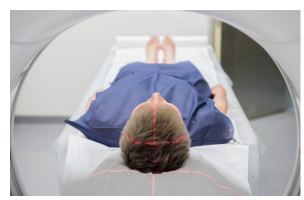
power
DISCRETES



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Semtech Databook

Power Discretes Product-Lines

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SEMTECH

Semtech Corporation Power Discretes

This publication presents technical information for the several product families that comprise the Semtech Corporation Power Discretes Product-Lines. The families include Hi-Rel qualified rectifiers, bridges, ceramic capacitors, transient voltage suppressors and custom assemblies. These are available in a variety of packages. Complete device specifications and typical performance curves are given on individual data sheets, which are grouped by various families.

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Chapter 1

Qualified Parts List (QPL)

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Hi-Reliability Devices

Semtech Corporation offers a complete line of Hi-Reliability devices in modern production facilities located at Camarillo, California and Reynosa, Mexico. Semtech products are, by design, capable of meeting the most severe environmental requirements specified for space, military, airborne, and industrial applications. Although emphasis is placed on designed and built-in quality and reliability, a complete reliability screening program has been established. Most products offered in this data book are available in all of the following Hi-Rel configurations:

- Military Qualified Rectifiers
- Source Controlled Devices (SCD)
- Custom Level "S" Processing
- Semtech Space Level Flow

Military Qualified Rectifiers

Semtech Corporation maintains qualified status for all the devices listed in Table I. Most devices are available in four standard quality levels, JAN, JANTX, JANTXV, and JANS, as defined by MIL-PRF-19500.

JAN — Controlled lot with sample environmental and life testing
JANTX — Same as JAN plus 100% processing
JANTXV — Same as JANTX plus 100% internal visual inspection
JANS — Same as JANTXV plus 100% serialization for Space/Critical programs

Semtech maintains European qualified status for all devices listed in Table II. Most standard devices are available in two standard quality levels, F and FX as defined by DEF-STAN 59-36 part 80 and part 90 detail specifications.

- F — Controlled lot with sample environmental and life testing
- FX — Same as F plus 100% processing

Source Controlled Devices (SCD)

Many devices listed in this data book are available with processing defined and controlled by customer specifications, commonly referred to as SCDs. These customer specials have the screening, testing and marking as determined by the customer to meet their particular requirements. This may range from a customer-marked industrial grade product to a Hi-Rel product which is subjected to series of stringent inspections and tests to meet aerospace or special military requirements.

Using the Semtech developed HR processing programs in this section, along with the standard test methods and conditions, complete custom processing can be designed. Semtech corporation HR programs were conceived with the intent of providing our customers with a standardized, off-the-shelf, cost effective Hi-Rel product. The Hi-Rel screening and testing program for each product category is defined by a separate HR specification which utilizes MIL-PRF-19500 screening, flow concepts and the MIL-STD-750 and MIL-STD-202 test methods.

The customer who must maintain his own specification for contractual purposes can simplify his procurement by incorporating the HR document into his own specification. HR documents for each category are as follows:

Product Category	Spec. #
Rectifier assemblies	HR500A
High voltage diodes (VRWM) > 1000V)	HR500H
Rectifiers (VRWM<1000V)	HR500R
Transient voltage suppressors	HR500T
Semtech Space Level Flow	HR500S

Table I: Military Qualified Rectifiers - Qualified product list

Device N	JAN	JANTX	JANTXV	JANS
1N3644	X	X		
1N3645	X	X		
1N3646	X	X		
1N3647	X	X		
1N5415	X	X	X	*
1N5416	X	X	X	*
1N5417	X	X	X	*
1N5418	X	X	X	*
1N5419	X	X	X	*
1N5420	X	X	X	*
1N5550	X	X	X	X
1N5551	X	X	X	X
1N5552	X	X	X	X
1N5553	X	X	X	X
1N5554	X	X	X	X
1N5614	X	X	X	
1N5615	X	X	X	
1N5616	X	X	X	
1N5617	X	X	X	
1N5618	X	X	X	
1N5619	X	X	X	
1N5620	X	X	X	
1N5621	X	X	X	
1N5622	X	X	X	
1N5623	X	X	X	
1N5802	X	X	X	*
1N5804	X	X	X	*
1N5806	X	X	X	*
1N5807	X	X	X	*
1N5809	X	X	X	*
1N5811	X	X	X	*
1N6073	X	X	X	
1N6074	X	X	X	
1N6075	X	X	X	
1N6079	X	X	X	
1N6080	X	X	X	
1N6081	X	X	X	
1N6102-73	X	X	X	*
1N6103A-73A	X	X	X	*
1N6461-6476	X	X	X	*

* Pending JANS certification

Table II: European Military Qualified Rectifiers - Qualified Products List

Device N	F	FX
1N3647	X	X
1N5416	X	X
1N5417	X	X
1N5418	X	X
1N5550	X	X
1N5551	X	X
1N5552	X	X
1N5553	X	X
1N5554	X	X
1N5614	X	X
1N5615	X	X
1N5616	X	X
1N5617	X	X
1N5618	X	X
1N5619	X	X
1N5620	X	X
1N5622	X	X
1N6074	X	X
1N6075	X	X
1N6080	X	X
1N6081	X	X
1N6102-73	X	X
1N6103A-73A	X	X
PF0		X
3PF0		X
2PFT2		X
3PFT2		X
F30	X	X
F60A	X	X
S25F	X	X
PFF50	X	X
SCAJ6	X	X
SCBH6	X	X
SCBA6	X	X
SCAJ4F	X	X
SCBH4F	X	X
SCBA4F	X	X
SC3BJ6	X	X
SC3BH6	X	X
SC3BA6	X	X

Device N	F	FX
SC3BJ4F	X	X
SC3BH4F	X	X
SC3BA4F	X	X
SBR10	X	X
SBR30	X	X
SBR4F	X	X
S3BR10	X	X
S3BR30	X	X
S3R4F	X	X

Custom Level “S” Processing

Top of the line custom built and processed devices, requiring baseline documentation, wafer lot acceptance, traceability, level “S” process controls and screening are available. Consult the factory for details.

Table III:
Semtech standard test methods and conditions

Test	MIL-STD-750 Method	Test Condition	Comments
Internal Visual	2072 2073 2074		
High Temp. Storage	1032		48 Hrs min @ rated max storage temp.
Temp. Cycle	1051	C	High temp. will be max rated storage temp., 10 cycles, 15 minutes at extremes
Hermetic Seal (Gross Leak)	1071	E	Isopropyl alcohol is used in lieu of dye penetrant; I_R performed as end point.
H.T.R.B Burn-in	1038	A	1) 125°C, 96 hours, 80% V_{RWM} min for high voltage rectifiers. 2) 150°C, 48 hrs, 80% V_{RWM} min for diodes
Power Burn-in	1038	B	1) V_{RWM} = rated or 3kV whichever is less; I_o= rated or 100mA whichever is less; T_A= 25°C, f=60Hz for diodes > 1kV. 2) V_{RWM} = rate; I_o= see HR500R; T_A= 25°C, f=60Hz for diodes ≤ 1kV.
X-Ray	2076		2 views
External Visual	2071		
Group A	-	-	MIL-PRF-19500 Table III, JANTXV
Group B	-	-	MIL-PRF-19500 TABLE IV
Group C	-	-	MIL-PRF-19500 TABLE V
Solderability	2026		LTPD=15, Electrical rejects may be used
Resistance to Solvents	1022		LTPD=15, Electrical rejects may be used

High Reliability Screening Specification and Test Procedure for Power Rectifier Assemblies

1. Purpose

This specification establishes the requirements for lot process-conditioning, testing and screening for those applications requiring a high degree of reliability assurance.

2. Scope

This specification is applicable to power rectifier assemblies.

3. Applicable Documents

The following documents form a part of this specification to the extend specified herein.

Specification: Military MIL-PRF-19500 - Semiconductor Devices, General Specification

Standard: Military MIL-STD-750- Test Methods for Semiconductor Devices

4. Requirements

All rectifier assemblies shall be process-conditioned, tested and screened in accordance with the procedure specified herein. All assemblies passing the log process-conditioning, testing and screening shall be identified (unless otherwise specified) with prefix “HR” added to the applicable part number. All assemblies with aluminum cases shall be black anodized.

4.1 **Definitions, abbreviations, symbols and statistical sampling.** The definitions, abbreviations, symbols and statistical sampling used herein are defined in MIL-PRF-19500 appendices.

5. Quality Assurance Provisions

5.1 **Sampling and Inspection**
Inspection shall be on a 100% basis unless otherwise specified.

5.2 **Methods of examination and test**
Methods of examination and test shall be as specified in Table 1 herein.

5.3 **Process-conditioning, testing and screening.**
The procedure for process-conditioning, testing and screening shall be in accordance with 5.3.1 through 5.3.4.

5.3.1 Diode screening. All diodes used in the assembly shall be subjected to 100% screening and testing in accordance with the applicable HR or equivalent military specification for the diodes being utilized.

5.3.2 Assembly screening. All assemblies shall be subjected to 100% screening and testing in accordance with 5.3.3 and 5.3.4.

5.3.3 Thermal shock (temperature cycling). All assemblies shall be subjected to thermal shock (temp. cycle) in accordance with MIL-STD-750, Method 1051, test condition F, except the low temperature shall be at minimum rated storage temperature and the time at the temperature extreme shall be 30 minutes minimum.

5.3.4 Post temperature cycling tests. All assemblies shall be subjected to Group A Inspections and Tests in accordance with Table 1. All assemblies failing to meet the limits of Table 1 shall be removed from the lot.

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Table 1 - HR500A

Inspection (1)	MIL-STD-750		LTPD	Symbol	Limits
	Method	Conditions			
Visual & mechanical examination	2071		10		
Reverse current	4016	dc method VR=rated	100%	IR	Applicable part number data sheet
Forward voltage	4011	tp ≤ 8.3mS duty cycle ≤2% IF=applicable part number data sheet	100%	VF	Applicable part number data sheet
Reverse current	4016	dc method TA=100°C VR=rated	10	IR	Applicable part number data sheet

(1) All tests are performed at 25°C unless otherwise specified.

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High Reliability Screening Specification and Test Procedure for Discrete, Axial, Subminiature, High Voltage Rectifiers

1. Purpose
This specification establishes the requirements for lot process-conditioning, testing and screening for those applications requiring a high degree of reliability assurance.

2. Scope
This specification is applicable to ceramic, discrete, axial lead, subminiature, high voltage rectifiers with V_{RWM} >1000 volt.

3. Applicable Documents
The following documents form a part of this specification to the extend specified herein.

Specification: Military MIL-PRF-19500 - Semiconductor devices, general specification

Standard: MIL-STD-750 - Test Methods for Semiconductor devices

4. Requirements
All devices shall be process-conditioned, tested and screened in accordance with the procedure specified herein. All devices passing the lot process-conditioning, testing and screening shall be identified (unless otherwise specified) with prefix 'HR' added to the applicable part number.

4.1 **Definitions, abbreviations, symbols and statistical sampling.** The definitions, abbreviations, symbols and statistical sampling used herein are defined in MIL-PRF-19500 appendices.

5. Quality Assurance Provisions

5.1 **Sampling and Inspection**
Inspection shall be on a 100% basis unless otherwise specified.

5.2 **Methods of examination and test**
Methods of examination and test shall be as specified in Table 1 and herein.

5.2.1 **Burn-In.**
This test shall be conducted with a one half sine wave of the specified peak voltage impressed across the diode in the reverse direction, followed by a one half sine wave which produces the specified average rectified current. The forward conduction angle of the rectified current shall be no greater than 180 degrees nor less than 150 degrees.

5.2.2 **Reverse recovery time.**
When specified by the applicable part number, the reverse recovery time (t_{rr}) shall be measured per MIL-STD-750, method 4031. The reverse recovery conditions shall be as specified for the applicable part number. The reverse recovery time is defined as the time the rectifier begins to conduct in the reverse direction (crosses I=0) until the reverse recovery current (I_{rr}) decays to 25% of the peak reverse current (I_R). The point of contact on the leads shall be no less than 0.375 inches from the diode body.

5.3 **Process-conditioning, testing and screening.**
The procedure for process-conditioning, testing and screening shall be in accordance with 5.3.1 through 5.3.8.

5.3.1 **High-temperature storage**
All devices shall be subjected to high temperature storage in accordance with MIL-STD-750, method 1032, for at least 48 hours at the rated maximum storage temperature.

5.3.2 **Thermal shock (temperature cycling)**
All devices shall be subjected to thermal shock (temperature cycling) in accordance with MIL-STD-750, method 1051, test condition C, except that the high temperature shall be at maximum rated storage temperature test duration shall be 10 continuous cycles, and the time at the temperature extremes shall be 15 minutes minimum.

5.3.3 **Hermetic seal (gross leak)**
All devices shall be tested for gross leaks in accordance with MIL-STD-750, method 1071, test condition E, except that isopropyl alcohol shall be used in lieu of dye penetrant, and the reverse leakage current test shall be performed as the end point.

5.3.4 **Pre burn-in tests**
All devices shall be measured for the applicable I_R and V_F limits. All devices which fail to meet the limits shall be removed for the lot.

5.3.5 **Burn-in tests**
All devices shall be subjected to burn-in accordance with 5.3.5.1 or 5.3.5.2.

5.3.5.1 **High temperature reverse bias.**
All devices shall be subjected to high temperature reverse bias in accordance MIL-STD-750, method 1038, condition A, for 96 hours, under the following conditions:

V_R = 80% rated V_{RWM}
T_A = 125°C

5.3.5.2 **Power burn-in.**
All devices shall be subjected to power burn-in in accordance with MIL-STD-750, method 1038, condition B, for 96 hours, under the following conditions (see 5.2.1):

V_{RWM} = rated or 3kV whichever is less
I_o = rated or 100mA whichever is less
T_A = room ambient
f = 60 Hz

5.3.6 **Post Burn-in tests**
All devices after burn-in shall be re-tested for the applicable parameters V_F and I_R. All devices which fail to meet the limits shall be removed from the lot.

5.3.7 **Percent defective allowable (PDA).**
When the total quantity of devices failing the post burn-in tests of 5.3.6 is less than or equal to 10%, the lot is acceptable. If the PDA is greater than 10% but less than 20%, the lot may be resubmitted for burn-in in accordance with MIL-PRF-19500 requirements. If the PDA exceeds 20%, the lot is unacceptable.

5.3.8 **Other examinations and tests.**
All other examinations and tests shall be performed in accordance with Table 2. All devices failing to meet the limits of Table 2 shall be removed from the lot.

1

Table 1 - 100% Process-conditioning, Testing and Screening

PROCESS	MIL-STD-750	
	Method	Conditions
1. High Temperature storage (Stabilization bake)	1032	48 hour mins at maximum storage temperature (see 5.3.1)
2. Thermal shock (Temperature cycling)	1051	Test condition C except T(high) = max. rated storage temperature (see 5.3.2)
3. Hermetic seal (Gross)	1071	Test condition E. Alcohol bomb at 100 psi 4 hours min. (see 5.3.3)
4. Pre burn-in tests	—	As specified in 5.3.4
5. Burn-in	1038	Test condition A or B and as specified in 5.2.1 and 5.3.5
Post burn-in tests for PDA	—	As specified in 5.3.6
7. Other examinations and tests	—	As specified in 5.3.8 and table 2.

Table 2 - HR500H Tests

INSPECTION (1)	MIL-STD-750		LTPD	Symbol	Limits
	Method	Conditions			
Visual & mechanical examination	2071		10		
Reverse Current	4061	dc method V_R - rated	100%	I_R	Applicable part number data sheet
Forward voltage	4011	$t_p \leq$ 8.3mS duty cycle ≤ 2%	100%	V_F	Applicable part number data sheet
Reverse recovery time	—	I_F = applicable part number data sheet See 5.2.3	10	t_{rr}	Applicable part number data sheet
Reverse current	4016	dc method T_A= 100°C V_R= rated	10	I_R	Applicable part number data sheet

(1) Add tests are performed at 25°C unless otherwise specified.

1

High Reliability Screening Specification and Test Procedure for Discrete, Axial Lead, Power Rectifiers

1. Purpose
This specification establishes the requirements for lot process-conditioning, testing and screening for those applications requiring a high degree of reliability assurance.

2. Scope
This specification is applicable to discrete, axial lead, power rectifiers devices with $V_{RWM} \leq 1000$ volt.

3. Applicable Documents
The following documents form a part of this specification to the extend specified herein.

Specification: Military MIL-PRF-19500 - Semiconductor devices, general specification

Standard: MIL-STD-750 - Test Methods for Semiconductor devices

4. Requirements
All devices shall be process-conditioned, tested and screened in accordance with the procedure specified herein. All devices passing the lot process-conditioning, testing and screening shall be identified (unless otherwise specified) with prefix 'HR' added to the applicable part number.

4.1 **Definitions, abbreviations, symbols and statistical sampling.** The definitions, abbreviations, symbols and statistical sampling used herein are defined in MIL-PRF-19500 appendices.

5. Quality Assurance Provisions

5.1 **Sampling and Inspection**
Inspection shall be on a 100% basis unless otherwise specified.

5.2 **Methods of examination and test**
Methods of examination and test shall be as specified in Table 1 and herein.

5.2.1 **Burn-In.**
This test shall be conducted with a one half since wave of the specified peak voltage impressed across the diode in the reverse direction, followed by a one half sine wave which produces the specified average rectified current. The forward conduction angle of the rectified current shall be no greater than 180 degrees nor less than 150 degrees.

5.2.2 **Scope display evaluation**
This test shall be conducted using an oscilloscope to display the reverse voltage breakdown characteristics. Reverse current over the knee shall be at least 50μA. Each device shall exhibit a stable characteristic and any discontinuity or dynamic instability of the trace shall be cause for rejection.

5.2.3 **Reverse recovery time.**
When specified by the applicable part number, the reverse recovery time (t_{rr}) shall be measured per MIL-STD-750, method 4031. The reverse recovery conditions shall be as specified for the applicable part number. The reverse recovery time is defined as the time the rectifier begins to conduct in the reverse direction (crosses I=0) until the reverse recovery current (I_{rr}) decays to 25% of the peak reverse current (I_R). The point of contact on the leads shall be no less than 0.375 inches from the diode body.

5.3 **Process-conditioning, testing and screening.**
The procedure for process-conditioning, testing and screening shall be in accordance with 5.3.1 through 5.3.8.

5.3.1 **High-temperature storage**
All devices shall be subjected to high temperature storage in accordance with MIL-STD-750, method 1032, for at least 48 hours at the rated maximum storage temperature.

5.3.2 **Thermal shock (temperature cycling)**
All devices shall be subjected to thermal shock (temperature cycling) in accordance with MIL-STD-750, method 1051, test condition C, except that the high temperature shall be at maximum rated storage temperature test duration shall be 10 continuous cycles, and the time at the temperature extremes shall be 15 minutes minimum.

5.3.3 **Hermetic seal (gross leak)**
All devices shall be tested for gross leaks in accordance with MIL-STD-750, method 1071, test condition E, except that isopropyl alcohol shall be used in lieu of dye penetrant, and the reverse leakage current test shall be performed as the end point.

5.3.4 **Pre burn-in tests**
All devices shall be measured for the applicable I_R and V_F limits. All devices shall be handled or identified such that the delta end points can be determined after the burn-in test. All devices which fail to meet the limits shall be removed from the lot.

5.3.5 **Power Burn-in**

All devices shall be subjected to power burn-in in accordance with MIL-STD-750, method 1038, condition B, for 96 hours, under the following conditions (see 5.2.1):

V_{RWM} = rated
I_o rated or adjust for T_j max. +0, -30°C
T_A = room ambient
f = 60 Hz

5.3.6 **Post Burn-in tests**
All devices after burn-in shall be re-tested for the applicable parameters V_F and I_R. Deltas for specified parameters shall not exceed the limits of table 2. All devices which fail to meet the limits shall be removed from the lot.

5.3.7 **Percent defective allowable (PDA).**
When the total quantity of devices failing the post burn-in tests of 5.3.6 is less than or equal to 10%, the lot is acceptable. If the PDA is greater than 10% but less than 20%, the lot may be resubmitted for burn-in in accordance with MIL-PRF-19500 requirements. If the PDA exceeds 20%, the lot is unacceptable.

5.3.8 **Other examinations and tests.**
All other examinations and tests shall be performed in accordance with Table 2. All devices failing to meet the limits of Table 2 shall be removed from the lot.

1

Table 1 - 100% Process-conditioning, Testing and Screening

PROCESS	MIL-STD-750	
	Method	Conditions
1. High Temperature storage (Stabilization bake)	1032	48 hour mins at maximum storage temperature (see 5.3.1)
2. Thermal shock (Temperature cycling)	1051	Test condition C except T(high) = max. rated storage temperature (see 5.3.2)
3. Hermetic seal (Gross)	1071	Test condition E. Alcohol bomb at 100 psi 4 hours min. (see 5.3.3)
4. Pre burn-in tests	—	As specified in 5.3.4
5. Burn-in	1038	Test condition A or B and as specified in 5.2.1 and 5.3.5
Post burn-in tests for PDA	—	As specified in 5.3.6
7. Other examinations and tests	—	As specified in 5.3.8 and table 2.

Table 2 - HR500R Tests

INSPECTION (1)	MIL-STD-750		LTPD	Symbol	Limits
	Method	Conditions			
Visual & mechanical examination	2071		10		
Reverse Current	4061	dc method V_R - rated	100%	I_R	Applicable part number data sheet
Forward voltage	4011	$t_p \leq 8.3$mS duty cycle ≤ 2% I_F = applicable part number data sheet	100%	V_F	Applicable part number data sheet
Scope display	–	See 5.2.2	100%	–	
Reverse recovery time	–	See 5.2.3	10	t_{rr}	Applicable part number data sheet
Reverse current	4016	dc method T_A= 100°C V_R= rated	10	I_R	Applicable part number data sheet
Reverse current delta	–		100%	ΔIR	100% initial value or 25% of limit which ever is the greater
Forward voltage delta	–		100%	ΔVF	±0.1V

(1) All tests performed at 25°C unless otherwise specified.

1

High Reliability Screening Specification and Test Procedure for Discrete, Axial Lead, Bipolar, Transient Voltage Suppressors

1. Purpose
This specification establishes the requirements for lot process-conditioning, testing and screening for those applications requiring a high degree of reliability assurance.

2. Scope
This specification is applicable to discrete, axial lead, silicon, bipolar, transient voltage suppressor devices.

3. Applicable Documents
The following documents form a part of this specification to the extend specified herein.

Specification: Military MIL-PRF-19500 - Semiconductor devices, general specification

Standard: MIL-STD-750 - Test Methods for Semiconductor devices

4. Requirements
All devices shall be process-conditioned, tested and screened in accordance with the procedure specified herein. All devices passing the lot process-conditioning, testing and screening shall be identified (unless otherwise specified) with prefix 'HR' added to the applicable part number.

4.1 **Definitions, abbreviations, symbols and statistical sampling.** The definitions, abbreviations, symbols and statistical sampling used herein are defined in MIL-PRF-19500 appendices.

5. Quality Assurance Provisions

5.1 **Sampling and Inspection**
Inspection shall be on a 100% basis unless otherwise specified.

5.2 **Methods of examination and test**
Methods of examination and test shall be as specified in Table 1 and herein.

5.2.1 **Maximum peak pulse current (Ip)**
The peak pulse current shall be applied with a current vs time waveform such that the pulse current shall reach 100 % of Ip at $t \leq 10\mu S$ and exponentially decays to 50% of Ip at $t \geq 1$ ms for tp = 1ms.

5.2.2 **Clamping voltage**
The peak pulse clamping voltage shall be measured across the diode in a 1 ms time interval.

5.3 **Process-conditioning, testing and screening.**
The procedure for process-conditioning, testing and screening shall be in accordance with 5.3.1 through 5.3.0.

5.3.1 **High-temperature storage**
All devices shall be subjected to high temperature storage in accordance with MIL-STD-750, method 1032, for at least 48 hours at the rated maximum storage temperature.

5.3.2 **Thermal shock (temperature cycling)**
All devices shall be subjected to thermal shock (temperature cycling) in accordance with MIL-STD-750, method 1051, test condition C, except that the high temperature shall be at maximum rated storage temperature test duration shall be 10 continuous cycles, and the time at the temperature extremes shall be 15 minutes minimum.

5.3.3 **Hermetic seal (gross leak)**
All devices shall be tested for gross leak in accordance with MIL-STD-750, method 1071, test condition E, and the reverse leakage current test shall be performed as the end point.

5.3.4 **Pre burn-in tests**
All devices shall be pulsed in each direction, in accordance with paragraph 5.2.1, at the applicable Ip(max). All devices shall be measured in each direction for the applicable IR and VBR limits. All devices shall be handled or identified such that the delta end points can be determined after the burn-in test. All devices which fail to meet the limits shall be removed from the lot.

5.3.5 **Burn-in tests**
All devices shall be subjected to burn-in for 48 hours in each direction, for a total duration of 96 hours, under the following conditions:

VRWM = rated
TA=125°C

5.3.6 **Post burn-in tests**
All devices after burn-in shall be rested, in each direction, for the applicable parameters IR and VBR. Deltas for specified parameters shall not exceed the limits of Table 2. All devices which fail to meet the limits shall be removed from the lot.

5.3.7 **Percent defective allowable**
When the total quantity of devices failing the post burn-in tests of 5.3.6 is less than or equal to 10%, the lot is acceptable. If the PDA is greater than 10% but less than 20%, the lot may be resubmitted for burn-in in accordance with MIL-PRF-19500 requirements. If the PDA exceeds 20%, the lot if unacceptable.

5.3.8 **Other examinations and tests**
All other examinations and tests shall be performed in accordance with Table 2. All devices failing to meet the limits of Table 2 shall be removed from the lot.

Table 1 - 100% Process-conditioning, Testing and Screening

PROCESS	MIL-STD-750	
	Method	Conditions
1. High Temperature storage (Stabilization bake)	1032	48 hour mins at maximum storage temperature (see 5.3.1)
2. Thermal shock (Temperature cycling)	1051	Test condition C except T(high) = max. rated storage temperature (see 5.3.2)
3. Hermetic seal (Gross)	1071	Test condition E. Alcohol bomb at 100 psi 4 hours min. (see 5.3.3)
4. Pre burn-in tests	—	As specified in 5.3.4
5. Burn-in	1038	Test condition A or B and as specified in 5.2.1 and 5.3.5
6. Post burn-in tests for PDA	—	As specified in 5.3.6
7. Other examinations and tests	—	As specified in 5.3.8 and table 2.

Table 2 - HR500T Tests

INSPECTION (1)	MIL-STD-750		LTPD	Symbol	Limits
	Method	Conditions			
Visual & mechanical examination	2071		10		
Reverse current	4016	dc method V_R - rated	100%	I_R	Applicable part number data sheet
Breakdown voltage (2)	4022	$t_p \leq$ 300mS duty cycle $\leq$ 2% I(BR) = applicable part number data sheet	100%	V_{BR} Min	Applicable part number data sheet
Clamping voltage max. (2) (see 5.2.2)	—	t_p = 1.0mS I_p = rated (See 5.2.1)	10	V_C max	Applicable part number data sheet
Reverse current delta (2)	—		100%	ΔIR	100% initial value or 20% of limit which ever is the greater
Breakdown voltage delta (2)	—		100%	±VBR min	±5% initial value

(2) All electrical testing shall be performed twice, once in each direction.

Semtech Space Level Screening (HR500S):

Semtech Space Level test flow screening is now available for our Power Discretes product line. This screening can be applied to both our standard QPL as well as QPL equivalent diodes that are manufactured in our DSCC certified production facility. Please contact factory for details.

Chapter 2
Half Wave Discrete Rectifiers

Datasheet No.	Title:
1N3611-14, 57	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N3647	Rectifier, up to 3kV, 600mA, 2.5us
1N4245_49	General Purpose Silicon Rectifiers
1N4942_48	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N5415_1N5420	Axial Leaded Hermetically Sealed Fast Rectifier Diode
1N5550-54, 3SM2-3SM0	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N5614_22	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N5615_23	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N5802_06	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N5802_06_US	Superfast Recovery Diodes, Surface Mount, US
1N5807_11	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
1N5807_11US	Superfast Recovery Diodes, Surface Mount, US
1N6073	Rectifier, up to 150V, 1.8A, 30ns
1N6076	Rectifier, up to 150V, 3.1A, 30ns
1N6081	Rectifier, up to 150V, 5A, 30ns
2PFF6	Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode
2PFF8-2PFF0	Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode
2PFT2	Rectifier, up to 200V, 2.6A, 25ns
3FF60	Rectifier, up to 600V, 3.4A, 50ns
3PF0	Rectifier, up to 1kV, 3.25A, 300ns
3PFR0	Rectifier, 1kV, 2.7A, 150ns
3PFT2	Rectifier, up to 200V, 4A, 30ns
F30	Rectifier, up to 3kV, 350mA, 250ns
F60A	Rectifier, up to 6kV, 100mA, 300ns
M30	Rectifier, up to 3kV, 330mA, 2us
M60A	Rectifier, up to 6kV, 260mA, 5us
PF20	Axial Leaded Hermetically Sealed Fast Rectifier Diode
PF8_PF0	Axial Leaded Hermetically Sealed Fast Rectifier Diode
PFF2_4_6	Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode
PFF50	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
PFF8_PFF0	Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode
PFM50A_PFM75A	Rectifier, up to 6kV, 100mA, 300ns
PFR0	Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode
PM6_8_0	Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode
S25F	Rectifier, up to 2.5kV, 500mA, 300ns
SFF30	Rectifier, 3kV, 360mA, 50ns
SFR0	Rectifier, 1kV, 1.6A, 150ns
SM100	Rectifier, up to 10kV, 300mA, 2.5us
SM100F	Rectifier, up to 10kV, 290mA, 300ns
USC1106	Rectifier, up to 400V, 2.1A, 50ns
USC1306	Rectifier, up to 400V, 5A, 50ns

Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode

SEMTECH

POWER DISCRETES

2

Description

Quick reference data

V_R = 200 - 1000 V
I_O = 1.0A
t_{rr} = 2µS
V_F = 1.1V

Features

- Low reverse leakage current
- Hermetically sealed in Metoxilite fused metal oxide
- Good thermal shock resistance
- Low forward voltage drop
- Avalanche capability

These products can be supplied as JANTX levels.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Types	V_{RWM}	V_F	I_O		I_{FSM}	I_R	T_{RR}	T_{STG} and T_J	$R_{\theta JL}$ L=.375 inch (9.53mm)
		At: T_J = 25°C I_O = 1A	At: T_A = +100°C (1)(2)	At: T_A = +150°C (1)(2)	T_A = +25°C I_O = 1 A dc t_p = 8.0ms	$V_{RWM,}$ T_J = 25°C	0.5A I_O to 1.0A I_{RM} recover to 0.25A I_{RM} (REC)		
	V(pk)	V	A dc	mA dc	A(pk)	µA	µS	°C	°C/W
1N3611	200	1.1	1	300	30	0.5	2	-65 to +175	38
1N3612	400	1.1	1	300	30	0.5	2	-65 to +175	38
1N3613	600	1.1	1	300	30	0.5	2	-65 to +175	38
1N3614	800	1.1	1	300	30	0.5	2	-65 to +175	38
1N3957	1000	1.1	1	300	30	0.5	2	-65 to +175	38

Notes:
(1) From I_O rating is independent of heat sinking, special mounting, or leads of the device.
(2) Derate linearly at 13.3mA between T_A = +100°C and T_A = +175°C

1N3611, 1N3612, 1N3613, 1N3614, 1N3957
Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode

SEMTECH

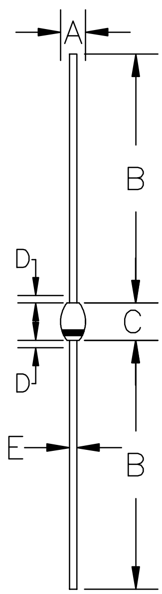
POWER DISCRETES

Ordering Information

Part Number	Description
1N3611 1N3612 1N3613 1N3614 1N3957	Axial leaded hermetically sealed[1]

Note:
(1) Available in bulk or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



G2

DIM^N	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	–
B	25.4	33.0	1.00	1.30	–
C	3.5	4.2	.140	.165	–
D	–	.80	–	.030	1
E	.66	.84	.026	.033	–

NOTES:
1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

CATHODE IS DENOTED BY A BAND.

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE STANDARD RECOVERY RECTIFIER DIODE

- High thermal shock resistance
- Hermetically sealed with Metoxilite fused metal oxide
- Multi-junction construction
- Low reverse leakage currents
- Subminiature body size

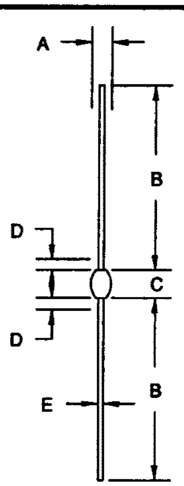
QUICK REFERENCE DATA

- V_R = 2kV - 3kV
- I_F = 600mA
- t_{rr} = 2.5µS
- I_R = 1.0µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N3645 SM20	1N3646 SM25	1N3647 SM30	Unit
Working reverse voltage	V_{RWM}	2000	2500	3000	V
Repetitive reverse voltage	V_{RRM}	2000	2500	3000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	←	600	→	mA
Repetitive surge current (@ 55°C in oil, lead length 0.375")	I_{FRM}	←	2.5	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	←	14	→	A
Storage temperature range	T_{STG}	←	-65 to +175	→	°C
Operating temperature range	T_{OP}	←	-65 to +175	→	°C

MECHANICAL



G12

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	4.8	5.5	.190	.215	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.018oz

These products are qualified to MIL-PRF-19500/279 and are preferred parts as listed in MIL-STD-701.

They can be supplied fully released as JAN and JANTX versions.

These products are available in Europe to DEF STAN 59-61 (PART 80)/034.

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N3645 SM20	1N3646 SM25	1N3647 SM30	Unit
Average forward current for sine wave - max. pcb mounted	$I_{F(AV)}$		260		mA
- max. in unstirred oil	$I_{F(AV)}$		600		mA
I^2t for fusing (t = 8.3mS) max.	I^2t		0.026		A^2S
Forward voltage drop max. @ I_F = 250mA, T_j = 25°C	V_F		5.00		V
Reverse current max. @ V_{RWM}, T_j = 25°C	I_R		1.00		µA
@ V_{RWM}, T_j = 100°C	I_R		20.0		µA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}.	t_{rr}		2.5		µS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j		8.0		pF
Thermal resistance - junction to oil Unstirred @ 55°C	$R_{\theta JO}$		30.0		°C/W
Stirred @ 55°C	$R_{\theta JO}$		18.0		°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$		90.0		°C/W

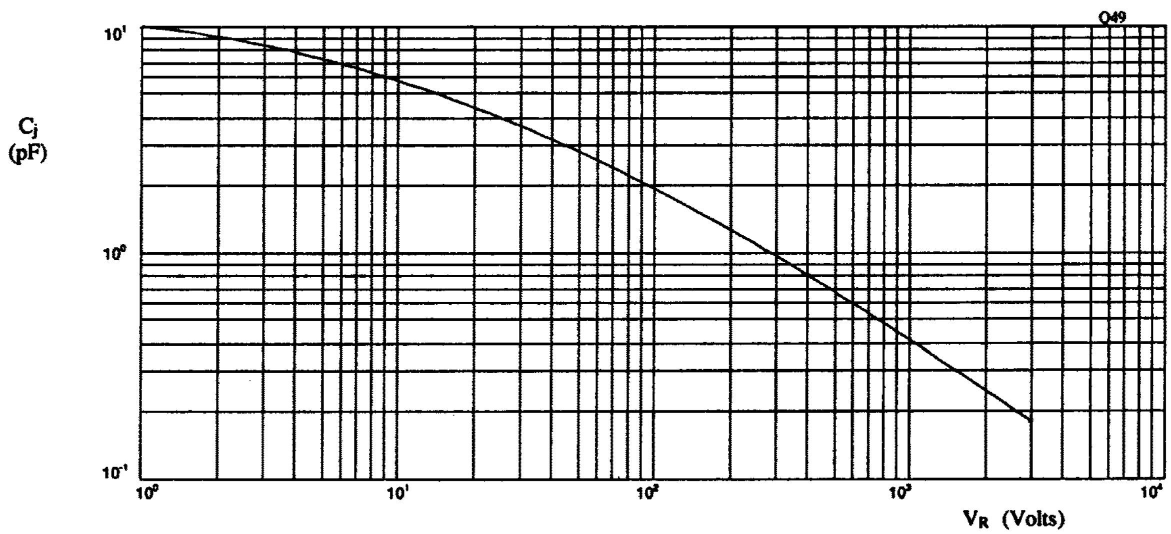


Fig 1. Typical junction capacitance as a function of reverse voltage.

2

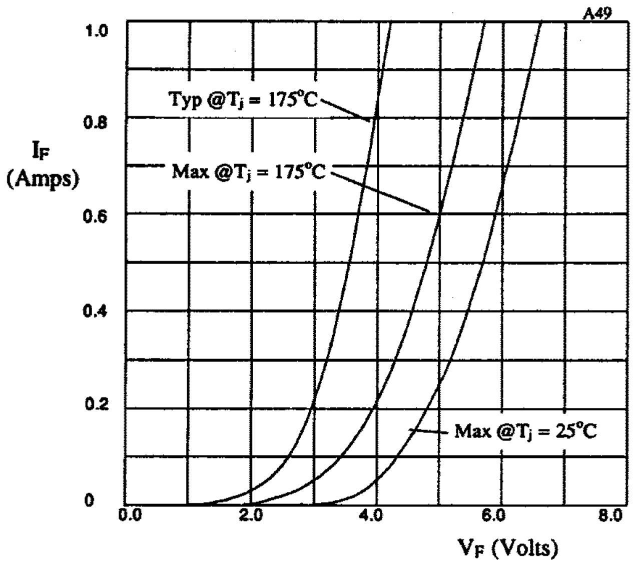


Fig 2. Forward voltage drop as a function of forward current.

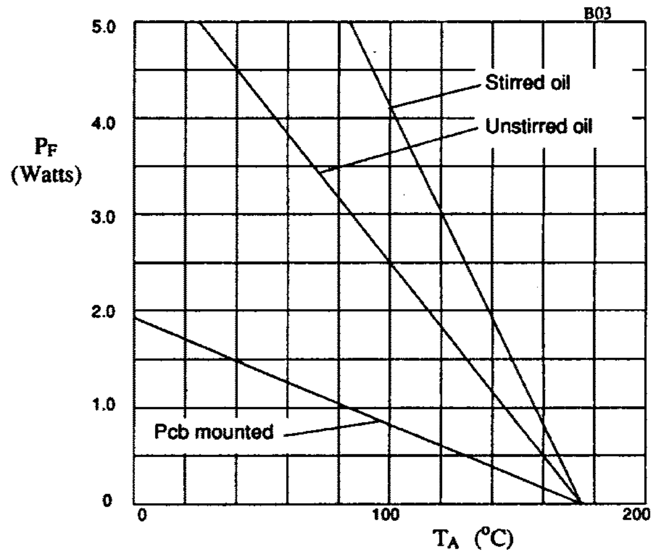


Fig 3. Power derating in oil and air.

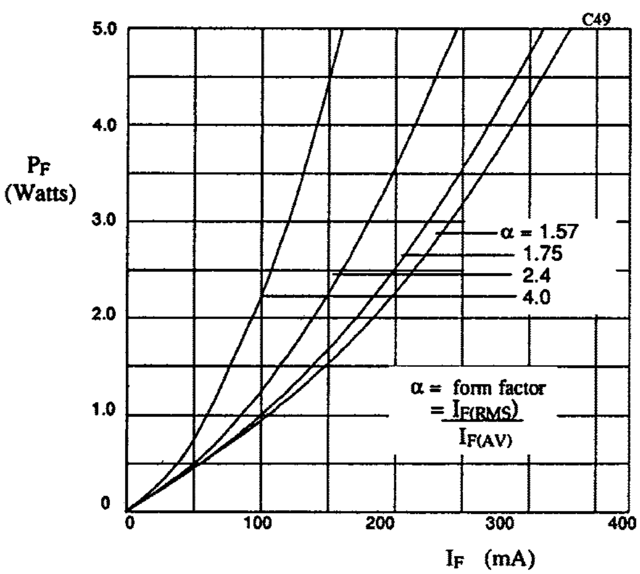


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

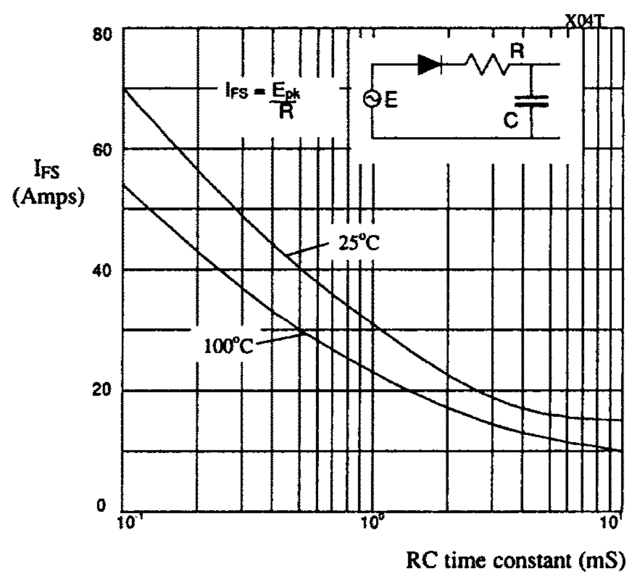


Fig 5. Maximum ratings for capacitive loads.

1N4245, 1N4246, 1N4247, 1N4248, 1N4249
General Purpose Silicon Rectifiers

POWER DISCRETES

2

Description

Quick reference data

V_R = 200V - 1000V
I_F = 1.0A
t_{rr} = 2µS
V_F = 1.2V

Features

- 1 Amp 55°C/no heat sink
- Monolithic non-cavity construction
- Fused metal oxide hermetic seal
- Superior thermal shock resistance
- Low thermal impedance
- Low reverse leakage
- PIV to 1000 volts

These products can be supplied as JAN, JANTX or JANTXV per MIL-PRF-19500/286

Electrical Specifications

Electrical specifications: All temperatures are local ambient , 25°C unless otherwise specified.

Device Types	Reverse Voltage		Forward Current (1)	Reverse Current (Max)		Instantaneous Forward Voltage	Repetitive Surge Current	1 Cycle Surge Current tp = 8.3ms	Reverse Recovery Time (2)		Typical Thermal Impedance	
	V_{RWM}	V_{RRM}	Free Air 55°C	I_R UAdc		V_F @ I_F = 1.0Adc	I_{FRM}	I_{FSM}	Trr µS		θ J - L °C/Watt	
	V	V	A	25°C	100°C	Vdc	A (pk)	A (pk)	Max.	Typ.	d = 0	d = .375
1N4245	200	200	1.0	1.0	25	1.2	10	30	2	1	7	38
1N4246	400	400	1.0	1.0	25	1.2	10	30	2	1	7	38
1N4247	600	600	1.0	1.0	25	1.2	10	30	2	1	7	38
1N4248	800	800	1.0	1.0	25	1.2	10	30	2	1	7	38
1N4249	1000	1000	1.0	1.0	25	1.2	10	30	2	1	7	38

Notes:
(1) The 1.0 amp rating @ 55°C requires no heat sinking, special mounting, or forced air across the body of the device.
(2) Recovery conditions: 0.5 Amp forward current to -1.0 Amp reverse current. Recovery time measured when rectifier recovers to -.25 Amp.

Storage temperature: -65°C to +175°C.

2

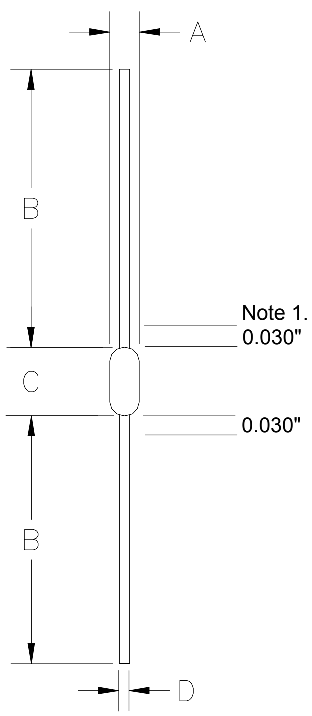
POWER DISCRETES

Ordering Information

Part Number	Description
1N4245 1N4246 1N4247 1N4248 1N4249	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIMN	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	.065	.110	1.65	2.79	-
B	1.00	1.25	25.4	31.7	-
C	.140	.165	3.56	4.19	-
D	.027	.031	.686	.786	-

Note:
1. Lead diameter not controlled in this area.

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

Axial Leaded Hermetically Sealed Fast Recovery Rectifier Diodes

SEMTECH

POWER DISCRETES

2

Description

Quick reference data

V_R = 200 - 1000 V
I_O = 1.0A
t_{rr} = 150 to 500nS
V_F = 1.2V

Features

- Low reverse leakage current
- Hermetically sealed in Metoxilite fused metal oxide
- Low forward voltage drop

These products are qualified to MIL-PRF-19500/359

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Types	V_{RWM}	I_F (AV) @ 55°C		I_{FSM}	I_{FRM} @ tp=8.3ms	T_{RR}	V_F @ I_F		I_R @ V_{RWM}		C_J @ 5V 1MHz	T_{STG}	RθjL	
		-pcb mid	L = 3/8"						25°C	100°C			3/8"	0"
	V(pk)	A	A	A	A	ns	V	A	µA	µA	pF	°C	C/W°C	C/W°C
1N4942	200	1.0	2.0	25	6.0	150	1.2	1.0	0.5	25	27	-65 to +175	3	7
1N4944	400	1.0	2.0	25	6.0	150	1.2	1.0	0.5	25	27	-65 to +175	3	7
1N4946	600	1.0	2.0	25	6.0	250	1.2	1.0	0.5	25	27	-65 to +175	3	7
1N4947	800	1.0	2.0	25	6.0	250	1.2	1.0	0.5	25	18	-65 to +175	3	7
1N4948	1000	1.0	2.0	25	6.0	500	1.2	1.0	0.5	25	18	-65 to +175	3	7

2

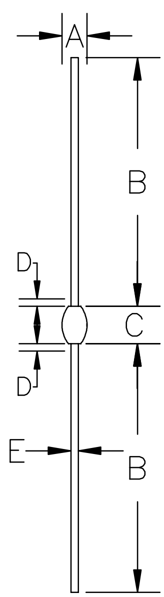
POWER DISCRETES

Ordering Information

Part Number	Description
1N4942 1N4944 1N4946 1N4947 1N4948	Axial leaded hermetically sealed[1]

Note:
(1) Available in bulk or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



G2

DIMENSIONS					
DIMN	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	1.6	2.8	.065	.110	–
B	25.4	33.0	1.00	1.30	–
C	3.5	4.2	.140	.165	–
D	–	.80	–	.030	1
E	.66	.84	.026	.033	–

NOTE:
1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

SEMTECH

Axial Leaded Hermetically Sealed Fast Rectifier Diode

POWER DISCRETES

Description

Quick reference data

V_R = 50 - 600V
I_F = 4.5A
t_{rr} = 150 - 400nS
I_R = 1.0µA

Features

- Very low reverse recovery time
- Hermetically sealed in fused metal oxide
- Low switching losses
- Low forward voltage drop
- Soft, non-snap off, recovery characteristics

These products are qualified to MIL-PRF-19500/411. They can be supplied fully released as JAN, JANTX, and JANTXV versions.

2

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Units
Working Reverse Voltage	V_{RWM}	50	100	200	400	500	600	V
Repetitive Reverse Voltage	V_{RRM}	50	100	200	400	500	600	V
Average Forward Current @ 55°C in free air, lead length 0.375"	$I_{F(AV)}$	4.5						A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	25						A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX}) (tp = 8.3mS, @ V_R & 25°C)	I_{FSM}	80 150						A
Storage Temperature Range	T_{STG}	-65 to +175						°C

POWER DISCRETES

2

Electrical Specifications

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Units
Average Forward Current max. for sine wave, T_A = 55°C	$I_{F(AV)}$	3.0						A
Average Forward Current max. (T_L= 55°C; L = 3/8") for sine wave for square wave	$I_{F(AV)}$ $I_{F(AV)}$	4.4 4.5						A
I^2t for fusing (t = 8.3mS) max	I^2t	90						A^2S
Forward Voltage Drop max. @ I_F = 3.0A, T_j = 25°C	V_F	1.1						V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	1.0 20						µA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	150	150	150	150	250	400	nS
Junction Capacitance typ. @ V_R = 4V, f = 1MHz	Cj	550	430	250	165	140	120	pF

Thermal Characteristics

	Symbol	1N5415 3SF05	1N5416 3SF1	1N5417 3SF2	1N5418 3SF4	1N5419 3SF5	1N5420 3SF6	Units
Thermal Resistance-Junction to Lead Lead length = 0.375" Lead length = 0.0"	$R_{\theta JL}$ $R_{\theta JL}$	20 4						°C/W
Thermal Resistance-Junction to Ambient on 0.06" thick pcb. 1 oz. copper	$R_{\theta JA}$	75						°C/W

Typical Characteristics

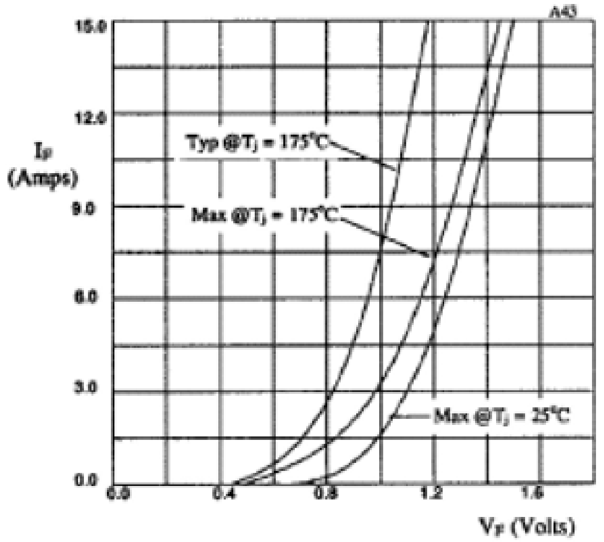


Fig 1. Forward voltage drop as a function of forward current.

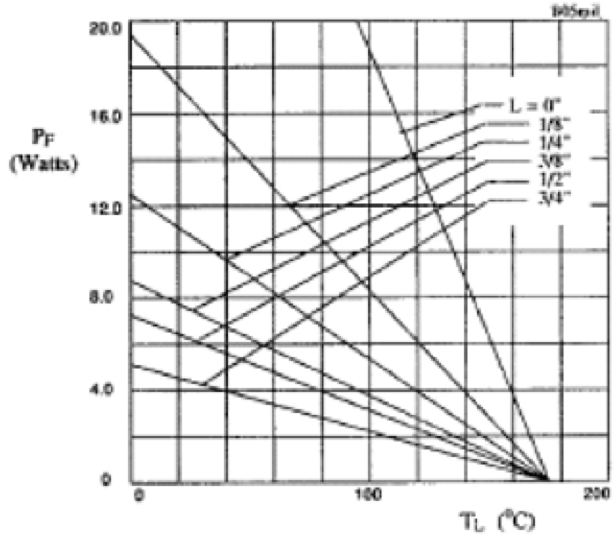


Fig 2. Maximum power versus lead temperature.

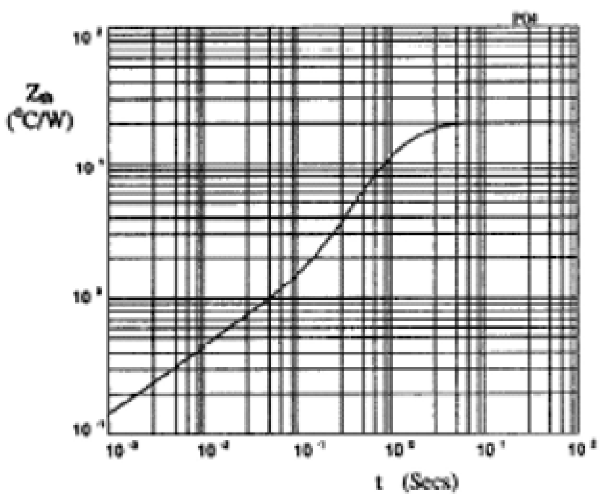


Fig 3. Transient thermal impedance characteristic.

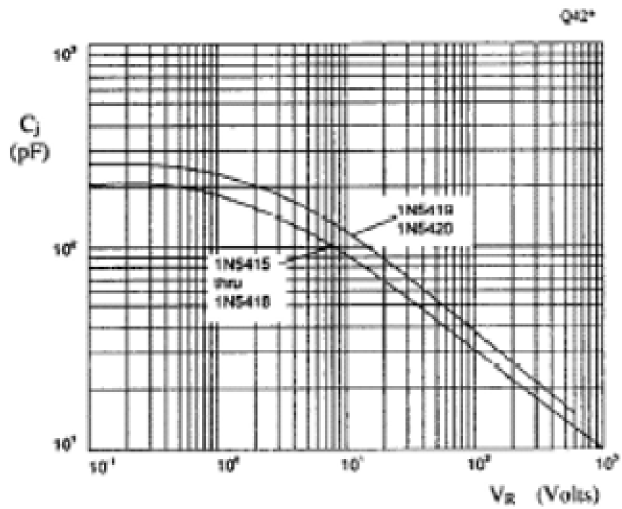


Fig 4. Typical junction capacitance as a function of reverse voltage.

2

Typical Characteristics

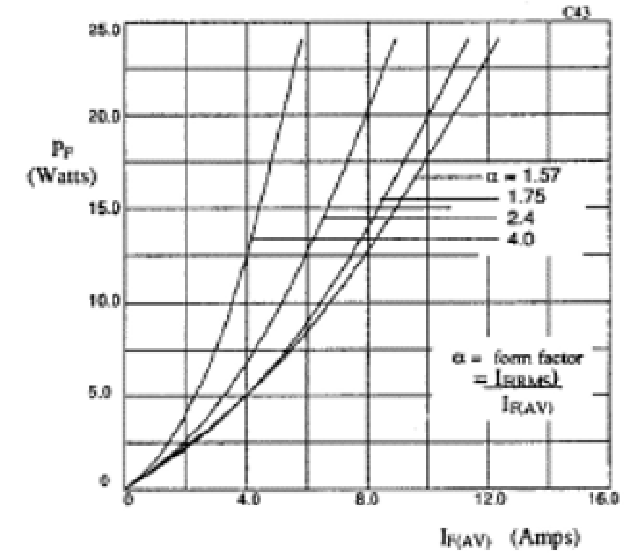


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

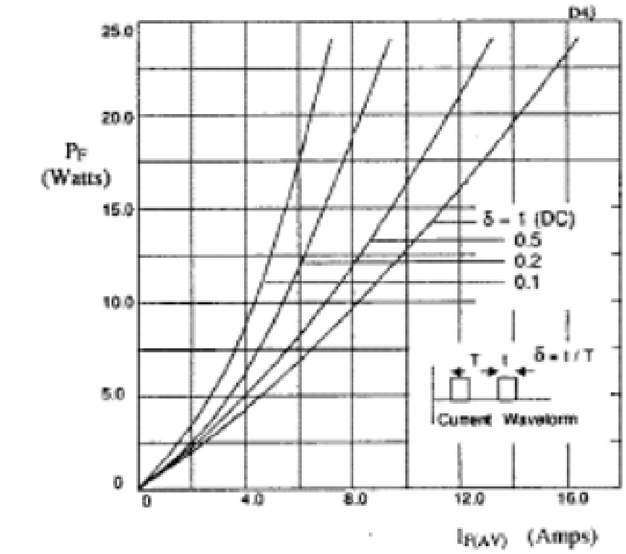


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

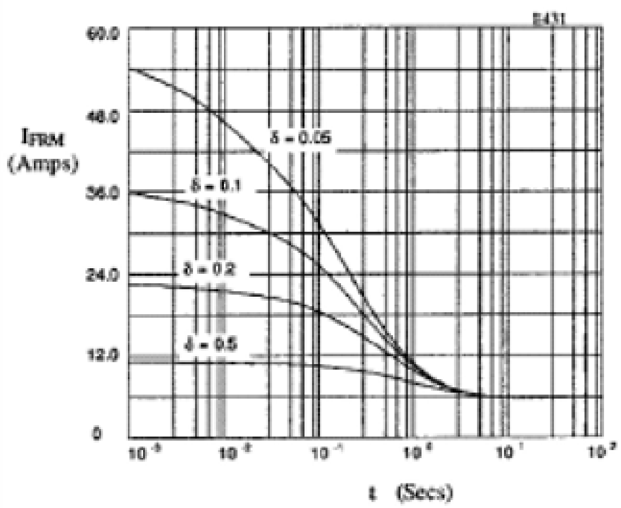


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 20 °C/W; V_{RWM} during 1 - δ.

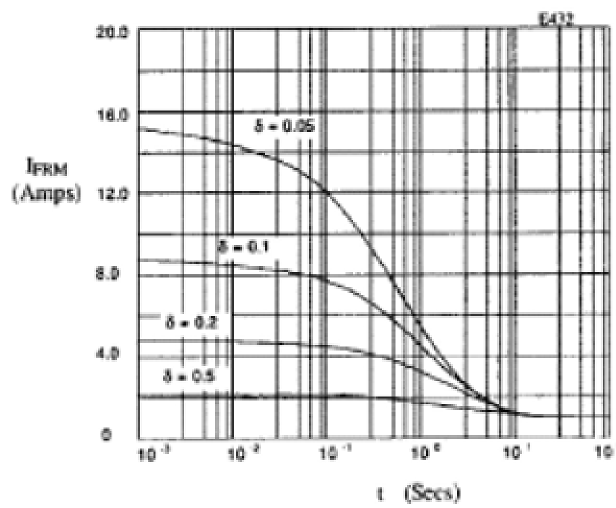


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 80 °C/W; V_{RWM} during 1 - δ.

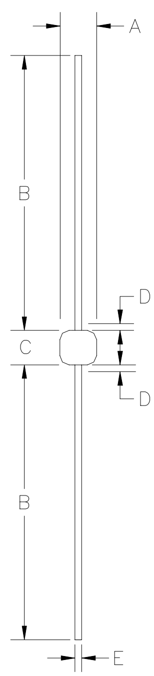
POWER DISCRETES

Ordering Information

Part Number	Description
1N5415 1N5416 1N5417 1N5418 1N5419 1N5420 3SF05 3SF1 3SF2 3SF4 3SF5 3SF6	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



G4

Dimensions					
DIMN	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	0.135	0.18	3.43	4.57	-
B	0.9	1.3	22.9	33.0	-
C	0.13	0.17	3.3	4.32	-
D	-	0.05	-	1.27	1
E	0.037	0.042	0.94	1.07	-

Note:
(1) Lead diameter uncontrolled over this region.

Weight = 0.04oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode

SEMTECH

POWER DISCRETES

2

Description

Quick reference data

V_R = 200 - 1000V
I_F = 5.0A
t_{rr} = 2μS
V_F = 1.0V

Features

- Low reverse leakage current
- Hermetically sealed in fused metal oxide
- Good thermal shock resistance
- Low forward voltage drop
- Avalanche capability

These products are qualified to MIL-PRF-19500/420. They can be supplied fully released as JAN, JANTX, JANTXV, and JANS versions.

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	1N5550 3SM2	1N5551 3SM4	1N5552 3SM6	1N5553 3SM8	1N5554 3SM0	Units
Working Reverse Voltage	V_{RWM}	200	400	600	800	1000	V
Average Forward Current @ 55°C in free air, lead length 0.375"	$I_{F(AV)}$	5.0					A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	25					A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX}) (tp = 8.3mS, @ V_R & 25°C)	I_{FSM}	100 150					A
Storage Temperature Range	T_{STG}	-65 to +175					°C

POWER DISCRETES

Electrical Specifications

	Symbol	1N5550 3SM2	1N5551 3SM4	1N5552 3SM6	1N5553 3SM8	1N5554 3SM0	Units
Average Forward Current (sine wave) - max. T_A = 55°C - max. L = 3/8"; T_L = 55°C	$I_{F(AV)}$ $I_{F(AV)}$	3.0 5.0					A
I^2t for fusing (t = 8.3mS) max	I^2t	42					A^2S
Forward Voltage Drop max. @ I_F = 3.0A, T_j = 25°C	V_F	1.0					V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 125°C	I_R I_R	1.0 60					μA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	2.0					μS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	92					pF

Thermal Characteristics

	Symbol	1N5550 3SM2	1N5551 3SM4	1N5552 3SM6	1N5553 3SM8	1N5554 3SM0	Units
Thermal Resistance-Junction to Lead Lead length = 0.375" Lead length = 0.0"	$R_{\theta JL}$ $R_{\theta JL}$	22 4					°C/W
Thermal Resistance-Junction to Ambient on 0.06" thick pcb. 1 oz. copper	$R_{\theta JA}$	47					°C/W

Typical Characteristics

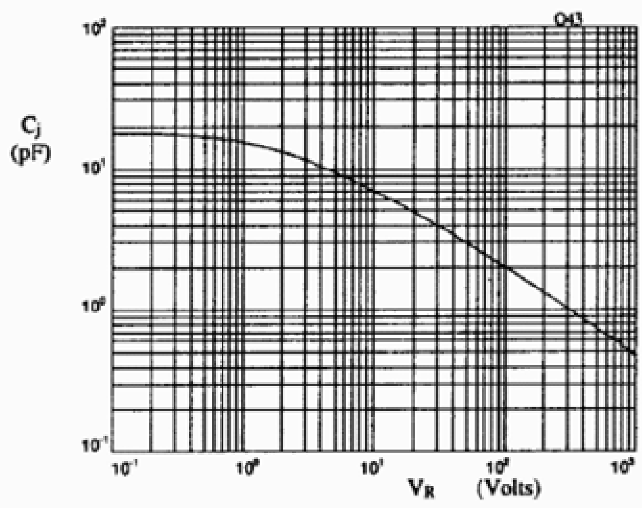


Fig 1. Typical junction capacitance as a function of reverse voltage.

Typical Characteristics

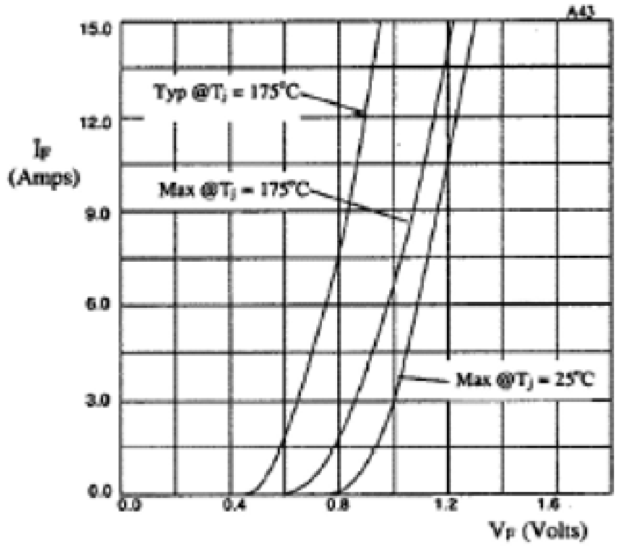


Fig 2. Forward voltage drop as a function of forward current

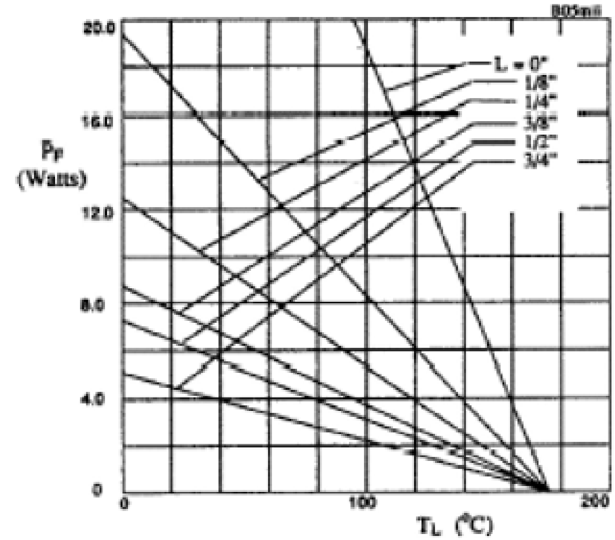


Fig 3. Maximum power versus lead temperature

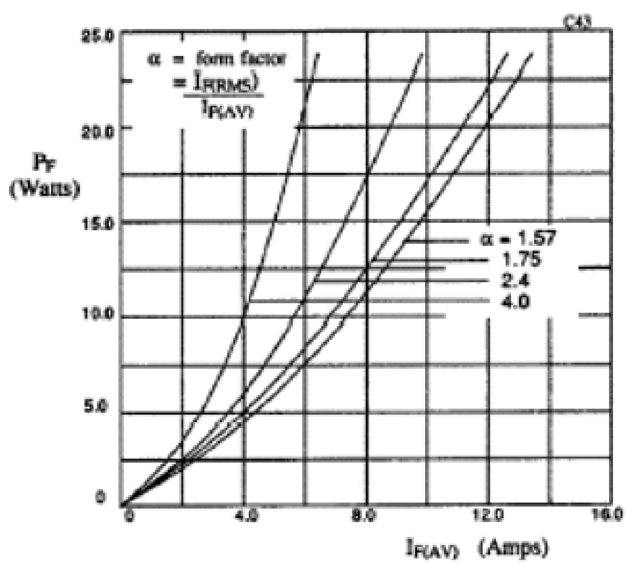


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

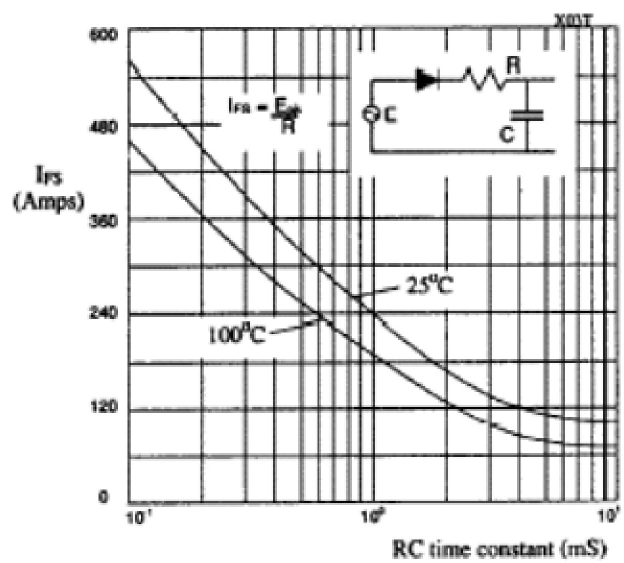


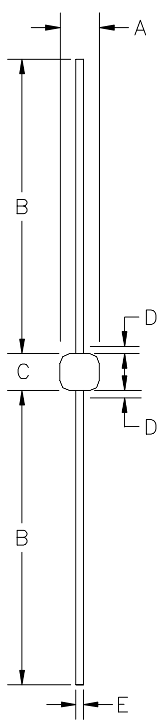
Fig 5. Maximum ratings for capacitive loads.

Ordering Information

Part Number	Description
1N5550	Axial leaded hermetically sealed(1)
1N5551	
1N5552	
1N5553	
1N5554	
3SM2	
3SM4	
3SM6	
3SM8	
3SM0	

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



G4

Dimensions					
DIMN	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	0.115	0.18	2.92	4.57	-
B	0.9	1.3	22.86	33.02	-
C	0.13	0.3	3.3	7.62	-
D	-	0.03	-	0.8	1
E	0.036	0.042	0.92	1.07	-

Note:
(1) Lead diameter uncontrolled over this region.

Weight = 0.039oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

SEMTECH RECTIFIER, up to 1kV, 2A, 2μs

1N5614	S2M
1N5616	S4M
1N5618	S6M
1N5620	S8M
1N5622	S0M

QUICK REFERENCE DATA

- V_R = 200 - 1000V
- I_F = 2.0A
- t_{rr} = 2μS
- V_F = 1.1V

AXIAL LEADED HERMETICALLY SEALED STANDARD RECOVERY RECTIFIER DIODE

- Low reverse leakage current
- Hermetically sealed in Metoxilite fused metal oxide
- Good thermal shock resistance
- Low forward voltage drop
- Avalanche capability.

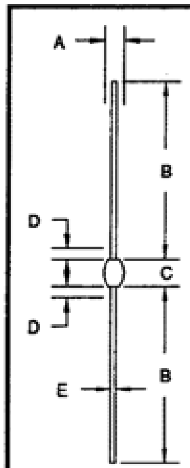
ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N5614 S2M	1N5616 S4M	1N5618 S6M	1N5620 S8M	1N5622 S0M	Unit
Working reverse voltage	V_{RWM}	200	400	600	800	1000	V
Repetitive reverse voltage	V_{RRM}	200	400	600	800	1000	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	← 2.0 →					A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 10 →					A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 30 →					A
Storage temperature range	T_{STG}	← -65 to +175 →					°C
Operating temperature range	T_{OP}	← -65 to +175 →					°C

These products are qualified to MIL-PRF-19500/427 and are preferred parts as listed in MIL-STD-701.
They can be supplied fully released as JAN, JANTX, and JANTXV versions.

These products are available in Europe to DEF STAN 59-61 (PART 80)/029 to F and FX levels.

MECHANICAL



G2

DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.013oz

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N5614 S2M 1N5616 S4M 1N5618 S6M 1N5620 S8M 1N5622 S0M	Unit
Average forward current (sine wave)			
- max. pcb mounted; $T_A = 55^oC$	$I_{F(AV)}$	1.0	A
- max. L = 3/8"; $T_L = 55^oC$	$I_{F(AV)}$	2.0	A
I^2t for fusing (t = 8.3mS) max.	I^2t	5.0	A^2S
Forward voltage drop max. @ I_F = 1.0A, $T_j = 25^oC$	V_F	1.1	V
Reverse current max.			
@ V_{RWM}, $T_j = 25^oC$	I_R	0.5	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	25	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	2.0	µS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	23	pF
Thermal resistance - junction to lead			
Lead length = 0.375"	$R_{\theta JL}$	36	°C/W
Lead length = 0"	$R_{\theta JL}$	7	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	95	°C/W

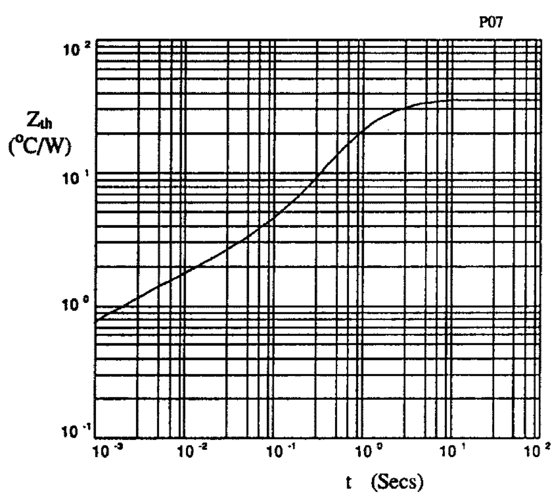


Fig 1. Transient thermal impedance characteristic.

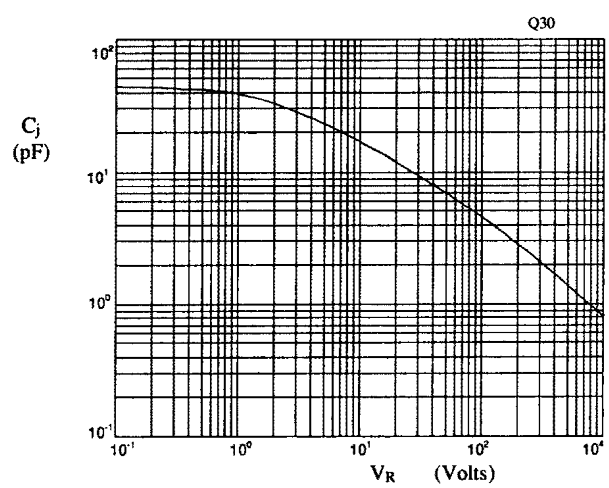


Fig 2. Typical junction capacitance as a function of reverse voltage.

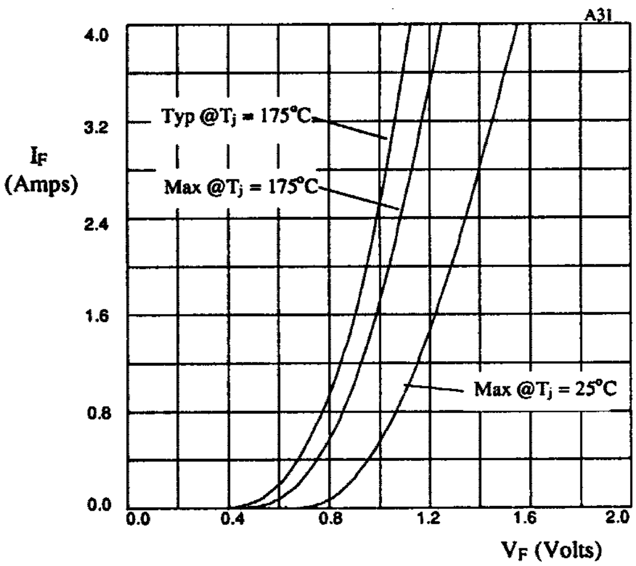


Fig 3. Forward voltage drop as a function of forward current.

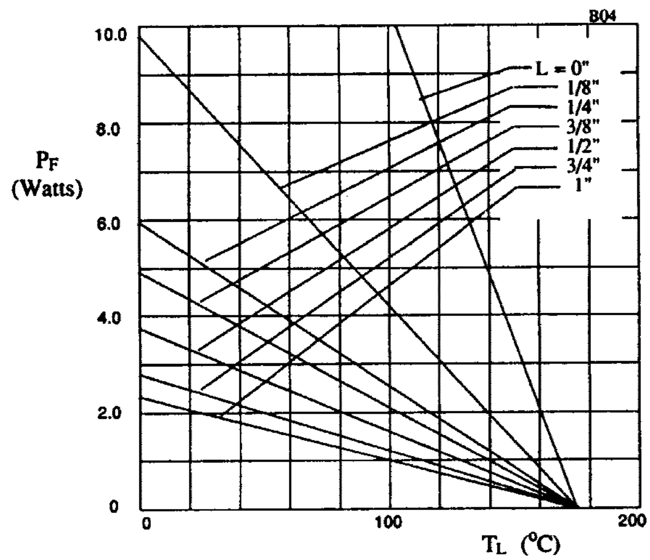


Fig 4. Maximum power versus lead temperature.

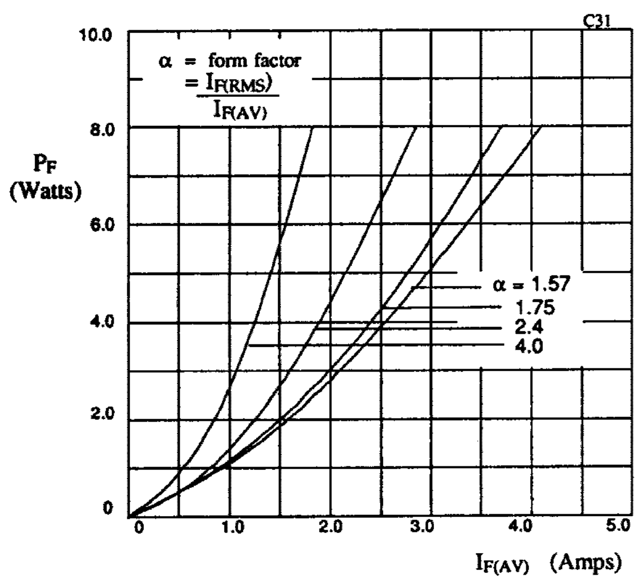


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

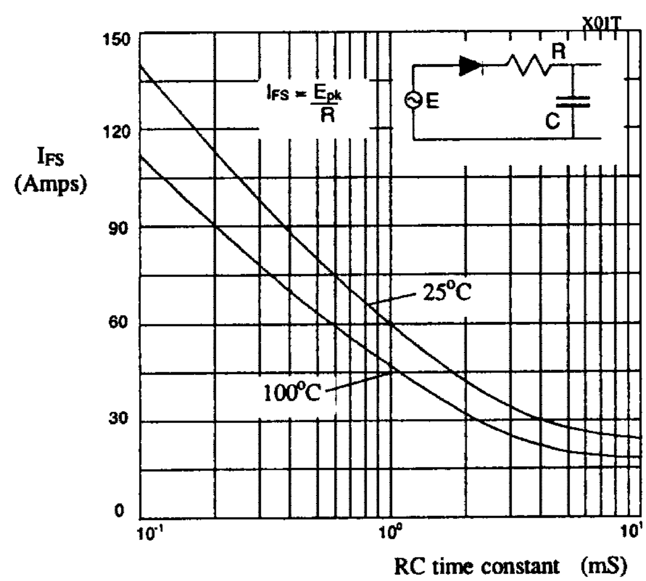


Fig 6. Maximum ratings for capacitive loads.

AXIAL LEADED HERMETICALLY SEALED FAST RECTIFIER DIODE

- Low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- Low forward voltage drop
- Soft, non-snap off, recovery characteristics

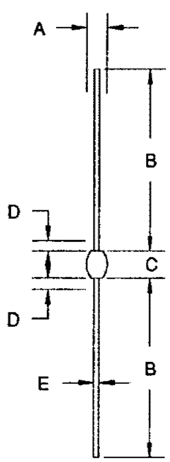
QUICK REFERENCE DATA

- V_R = 200 - 1000V
- I_F = 2.00A
- t_{rr} = 150 - 500nS
- I_R = 0.5µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N5615 S2F	1N5617 S4F	1N5619 S6F	1N5621 S8F	1N5623 S0F	Unit
Working reverse voltage	V_{RWM}	200	400	600	800	1000	V
Repetitive reverse voltage	V_{RRM}	200	400	600	800	1000	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	← 2.0 →					A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 6.0 →					A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 25 →					A
Storage temperature range	T_{STG}	← -65 to +175 →					°C
Operating temperature range	T_{OP}	← -65 to +175 →					°C

MECHANICAL



G2

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.04oz

These products are qualified to MIL-PRF-19500/429 and are preferred parts as listed in MIL-STD-701.

They can be supplied fully released as JAN, JANTX, and JANTXV versions.

These products are qualified in Europe to DEF STAN 59-61 (PART 80)/029.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N5615 S2F	1N5617 S4F	1N5619 S6F	1N5621 S8F	1N5623 S0F	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)							
for sine wave	$I_{F(AV)}$	← 1.00 →					A
for square wave (d = 0.5)	$I_{F(AV)}$	← 1.05 →					A
Average forward current max. ($T_L = 55^oC$; L = 3/8")							
for sine wave	$I_{F(AV)}$	← 1.95 →					A
for square wave	$I_{F(AV)}$	← 2.00 →					A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 2.5 →					A^2S
Forward voltage drop max. @ $I_F = 1.0A$, $T_j = 25^oC$	V_F	← 1.2 →					V
Reverse current max.							
@ V_{RWM}, $T_j = 25^oC$	I_R	← 0.5 →					µA
@ V_{RWM}, $T_j = 100^oC$	I_R	← 25 →					µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	150	150	250	300	500	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	27	27	27	18	18	pF

THERMAL CHARACTERISTICS

	Symbol	1N5615 S2F	1N5617 S4F	1N5619 S6F	1N5621 S8F	1N5623 S0F	Unit
Thermal resistance - junction to lead							
Lead length = 0.375"	$R_{\theta JL}$	← 38 →					°C/W
Lead length = 0.0"	$R_{\theta JL}$	← 7 →					°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	← 95 →					°C/W

2

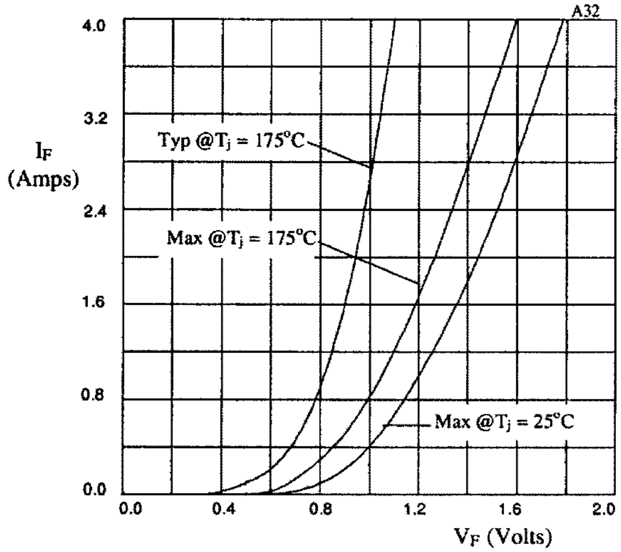


Fig 1. Forward voltage drop as a function of forward current.

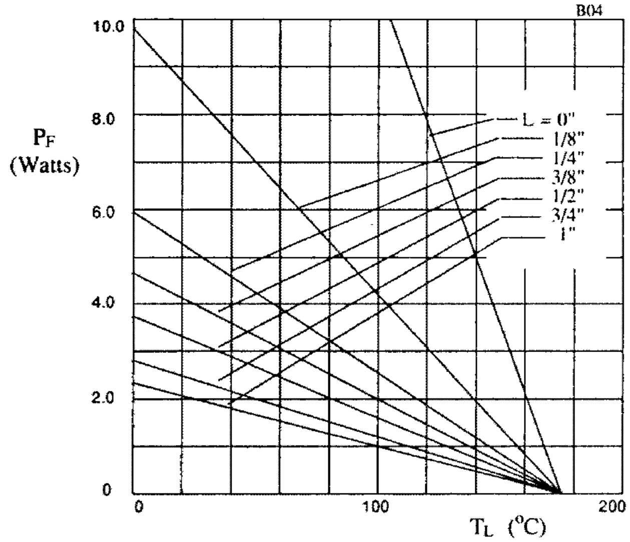


Fig 2. Maximum power versus lead temperature.

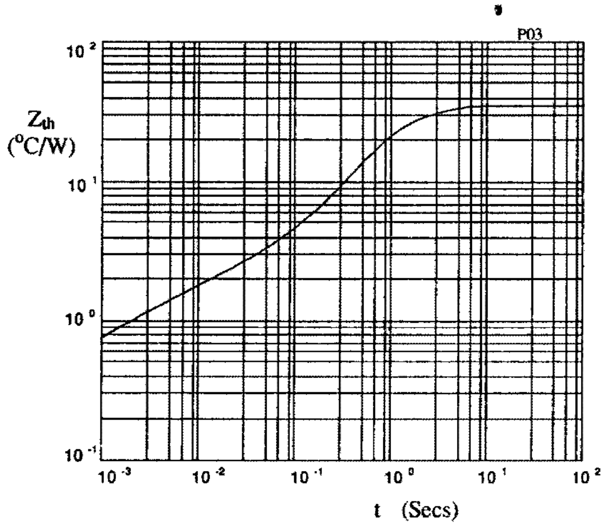


Fig 3. Transient thermal impedance characteristic.

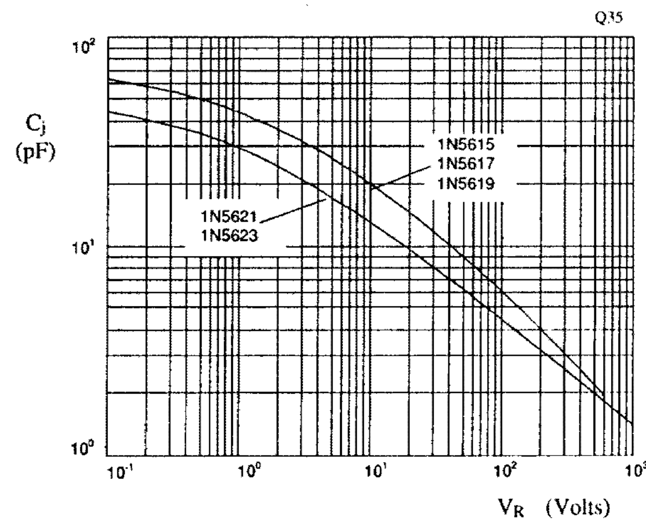


Fig 4. Typical junction capacitance as a function of reverse voltage.

2

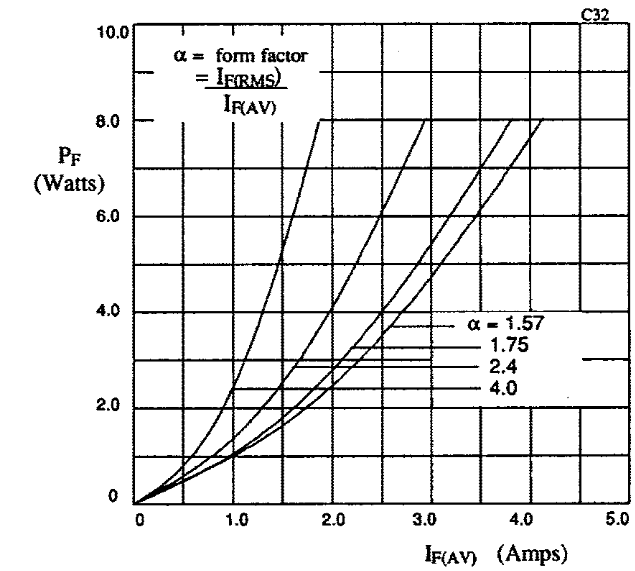


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

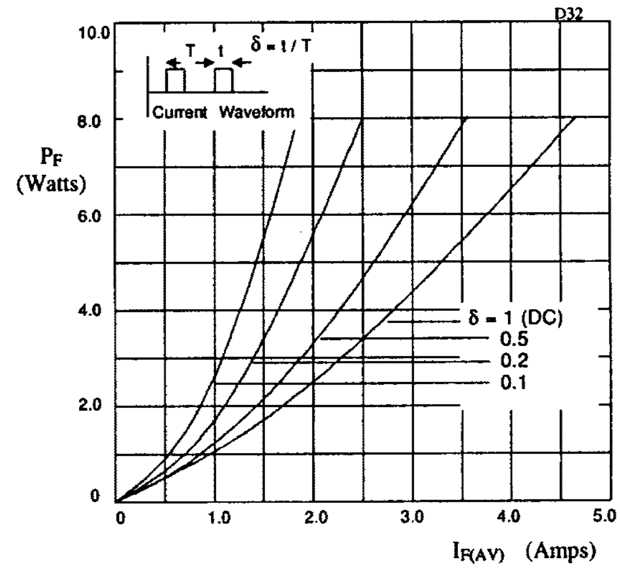


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

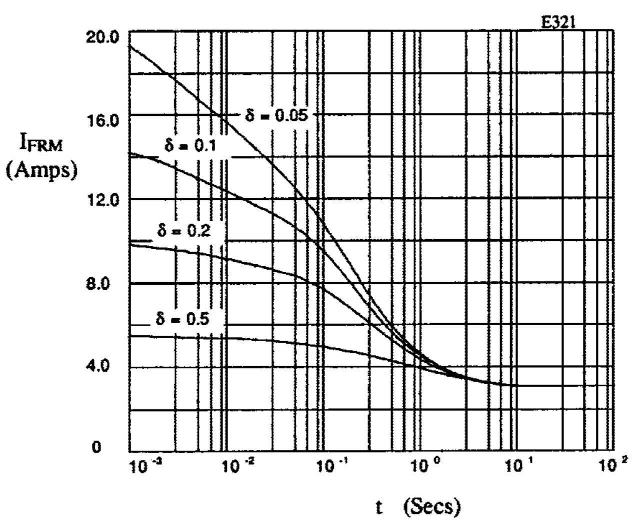


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 35 °C/W; V_{RWM} during 1 - δ.

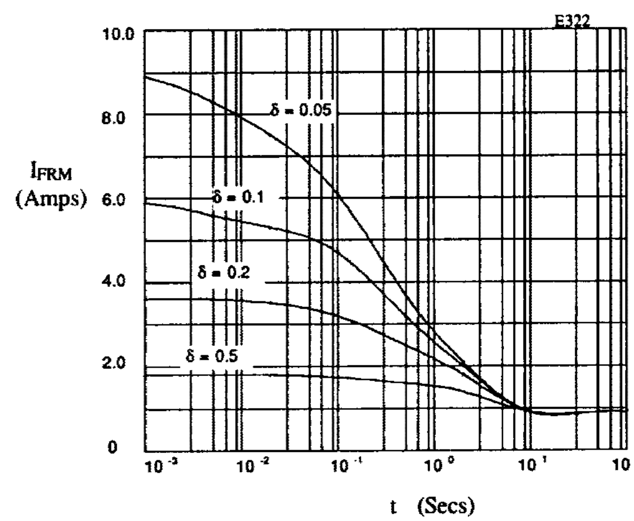


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 95 °C/W; V_{RWM} during 1 - δ.

2

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetical sealed in Metoxilite fused metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Very low forward voltage drop

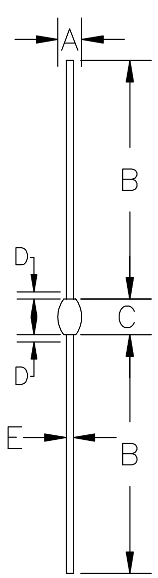
QUICK REFERENCE DATA

- V_R = 50 - 150V
- I_F = 2.5A
- t_{rr} = 25nS
- I_R = 1μA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N5802	1N5804	1N5806	Unit
Working reverse voltage	V_{RWM}	50	100	150	V
Repetitive reverse voltage	V_{RRM}	50	100	150	V
Average forward current (@ 75°C, lead length = 0.375")	$I_{F(AV)}$	←	2.5	→	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	←	14	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	←	35	→	A
Storage temperature range	T_{STG}	←	-65 to +200	→	°C
Operating temperature range	T_{OP}	←	-65 to +175	→	°C

MECHANICAL



G111

DIM^N	Dimensions				
	Millimeters		Inches		Note
	MIN	MAX	MIN	MAX	
A	1.65	2.16	0.065	0.085	-
B	17.8	33.0	0.70	1.30	-
C	3.18	6.35	0.125	0.250	-
D	-	0.80	-	0.030	1
E	0.69	0.81	0.027	0.032	-

Note:
(1) Lead diameter uncontrolled over this region.

Weight = 0.013oz

These products are qualified to MIL-PRF-19500/477 and are prefered parts as listed in MIL-STD-701. They can be supplied fully released as JANTX and JANTXV versions.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N5802	1N5804	1N5806	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$) for sine wave	$I_{F(AV)}$	←	1.3	→	A
for square wave (d = 0.5)	$I_{F(AV)}$	←	1.4	→	A
Average forward current max. ($T_L = 55^oC$; L = 3/8") for sine wave	$I_{F(AV)}$	←	3.1	→	A
for square wave	$I_{F(AV)}$	←	3.3	→	A
I^2t for fusing (t = 8.3mS) max.	I^2t	←	10.0	→	A^2S
Forward voltage drop max. @ $I_F = 1.0A$, $T_j = 25^oC$	V_F	←	0.875	→	V
Reverse current max. @ V_{RWM}, $T_j = 25^oC$	I_R	←	1.0	→	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	←	50	→	µA
Reverse recovery time max. 1.0A I_F to 1.0A I_R. Recovers to 0.1A I_{RR}.	t_{rr}	←	25	→	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	←	25	→	pF

THERMAL CHARACTERISTICS

	Symbol	1N5802	1N5804	1N5806	Unit
Thermal resistance - junction to lead Lead length = 0.375"	$R_{\theta JL}$	←	36	→	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	←	100	→	°C/W

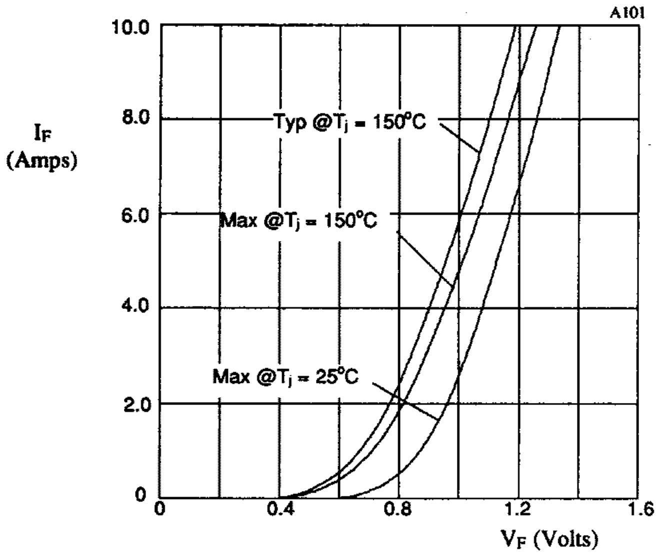


Fig 1. Forward voltage drop as a function of forward current.

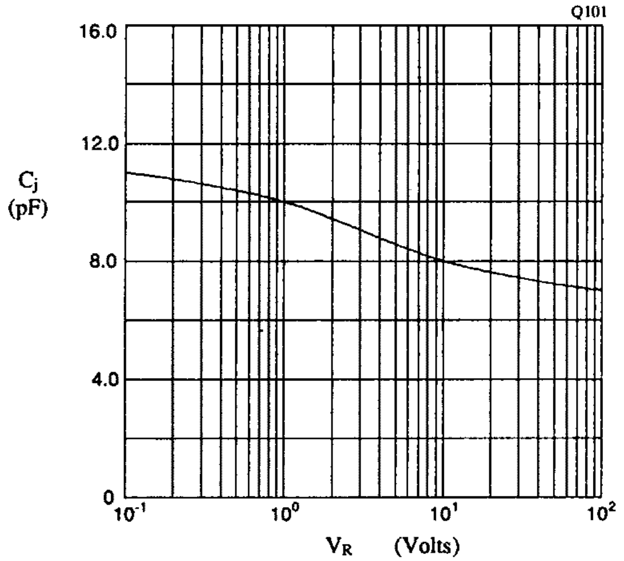


Fig 2. Typical junction capacitance as a function of reverse voltage.

1N5802US/1N5804US/1N5806US
Superfast Recovery Diodes Surface Mount (US)

SEMTECH

POWER DISCRETES

Description

Quick reference data

V_R 50 -150 V
I_F 1N5802US to 1N5806US = 2.5A
t_{rr} 1N5802US to 1N5806US = 25nS
I_R 1N5802US to 1N5806US = 1μA

Features

- Very low reverse recovery time
- Hermetically sealed non-cavity construction
- Soft, non-snap, off recovery characteristics
- Very low forward voltage drop

These products are qualified to MIL-PRF-19500/477 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	1N5802US	1N5804US	1N5806US	Units
Working Reverse Voltage	V_{RWM}	50	100	150	V
Repetitive Reverse Voltage	V_{RRM}	50	100	150	V
Average Forward Current (@ 75°C lead length = 0.375')	$I_{F(AV)}$	2.5			A
Repetitive Surge Current (@ 55°C lead length = 0.375')	I_{FRM}	14			A
Non-Repetitive Surge Current (tp = 8.3mS @ Vr & T_{JMAX})	I_{FSM}	35			A
Storage Temperature Range	T_{STG}	-65 to +175			°C
Average Forward Current Max (pcb mounted: T_A = 55°C) Sine wave Square wave (d = 0.5)	 $I_{F(AV)}$ $I_{F(AV)}$	 1.0 1.1			A
I^2t for fusing (t = 8.3mS) max	I^2t	10			A^2S
Forward Voltage Drop max @ T_J = 25°C	V_F	0.875 @ 1A			V
Reverse Current max @ V_{WRM}, T_J = 25°C @ V_{WRM}, T_J = 100°C	 I_R I_R	 1.0 50			μA
Reverse Recovery Time max (1.0A I_F to 1.0A I_{RM} recover to 0.25A $I_{RM(REC)}$)	trr	25			nS
Junction Capacitance typ @ V_R = 5V f = 1MHz	C_J	25			pF
Thermal Resistance to end cap	$R_{\theta JEC}$	13			°C/W

SEMTECH

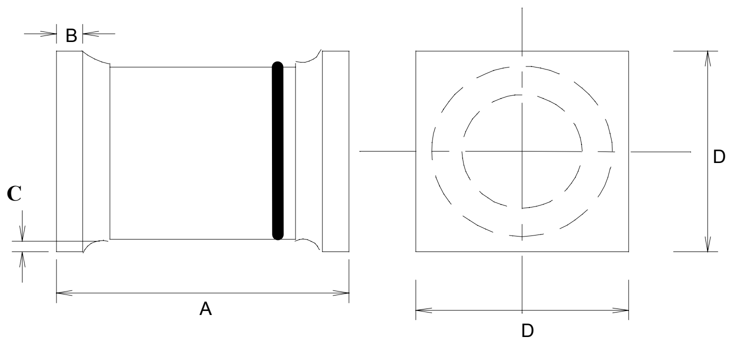
POWER DISCRETES

Ordering Information

Part Number	Description
1N5802US, 1N5804US, 1N5806US	Surface Mount[(1)]

Note:
(1) Available in trays and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



*Cathode is denoted by a black band on a white body.

	Dimensions in Inches	
	1N5802US - 1N5806US	
	MIN	MAX
A	0.168	0.2
B	0.019	0.028
C	0.003	-
D	0.091	0.103

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

2

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetical sealed in Metoxilite fused metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Very low forward voltage drop

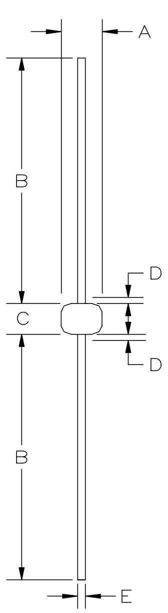
QUICK REFERENCE DATA

- V_R = 50 - 150V
- I_F = 6.0A
- t_{rr} = 30nS
- I_R = 5µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N5807	1N5809	1N5811	Unit
Working reverse voltage	V_{RWM}	50	100	150	V
Repetitive reverse voltage	V_{RRM}	50	100	150	V
Average forward current (@ 75°C, lead length = 0.375")	$I_{F(AV)}$	←	6.0	→	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	←	25	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	←	125	→	A
Storage temperature range	T_{STG}	←	-65 to +200	→	°C
Operating temperature range	T_{OP}	←	-65 to +175	→	°C

MECHANICAL



G112

Dimensions					
DIM^N	Millimeters		Inches		Note
	MIN	MAX	MIN	MAX	
A	2.92	3.61	.115	0.142	-
B	22.9	33.0	0.90	1.30	-
C	3.3	7.62	.130	0.3	-
D	-	0.80	-	.030	1
E	0.91	1.07	0.036	.042	-

Note:
(1) Lead diameter uncontrolled over this region.

Weight = 0.013oz

These products are qualified to MIL-PRF-19500/477 and are prefered parts as listed in MIL-STD-701. They can be supplied fully released as JANTX and JANTXV versions.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N5807	1N5809	1N5811	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$) for sine wave	$I_{F(AV)}$	←	1.7	→	A
for square wave (d = 0.5)	$I_{F(AV)}$	←	1.8	→	A
Average forward current max. ($T_L = 55°C$; L = 3/8") for sine wave	$I_{F(AV)}$	←	5.7	→	A
for square wave	$I_{F(AV)}$	←	6.0	→	A
I^2t for fusing (t = 8.3mS) max.	I^2t	←	32	→	A^2S
Forward voltage drop max. @ $I_F = 4.0A$, $T_j = 25°C$	V_F	←	0.875	→	V
Reverse current max. @ V_{RWM}, $T_j = 25°C$	I_R	←	5.0	→	µA
@ V_{RWM}, $T_j = 100°C$	I_R	←	150	→	µA
Reverse recovery time max. 1.0A I_F to 1.0A I_R. Recovers to 0.1A I_{RR}.	t_{rr}	←	30	→	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	←	60	→	pF

THERMAL CHARACTERISTICS

	Symbol	1N5807	1N5809	1N5811	Unit
Thermal resistance - junction to lead Lead length = 0.375"	$R_{\theta JL}$	←	22	→	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	←	90	→	°C/W

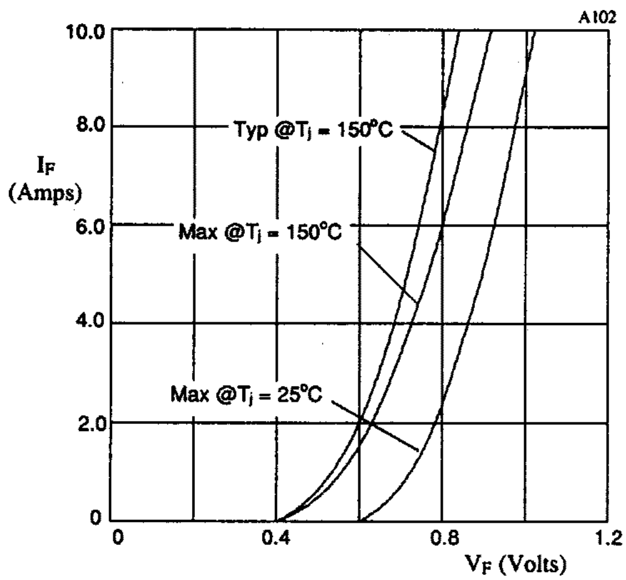


Fig 1. Forward voltage drop as a function of forward current.

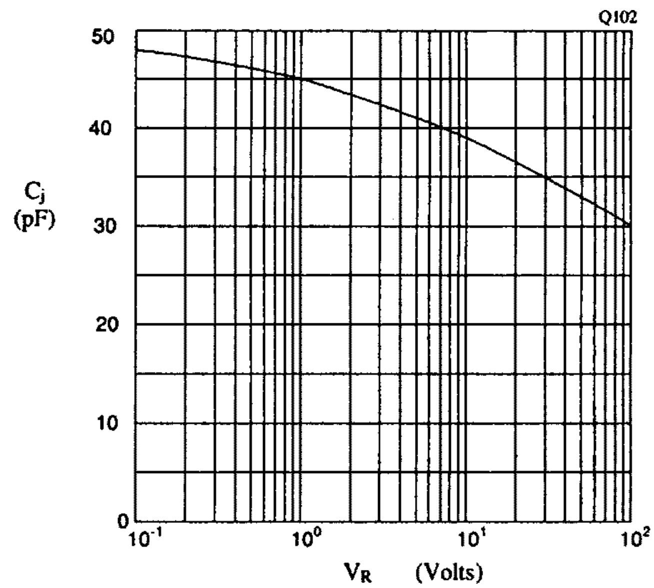


Fig 2. Typical junction capacitance as a function of reverse voltage.

1N5807US/1N5809US/1N5811US
Superfast Recovery Diodes Surface Mount (US)

POWER DISCRETES

2

Description

Quick reference data

V_R 50 -150 V
I_F 1N5807US to 1N5811US = 6A
t_{rr} 1N5807US to 1N5811US = 30nS
I_R 1N5807US to 1N5811US = 5μA

Features

- Very low reverse recovery time
- Hermetically sealed non-cavity construction
- Soft, non-snap, off recovery characteristics
- Very low forward voltage drop

These products are qualified to MIL-PRF-19500/477 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	1N5807US	1N5809US	1N5811US	Units
Working Reverse Voltage	V_{RWM}	50	100	150	V
Repetitive Reverse Voltage	V_{RRM}	50	100	150	V
Average Forward Current (@ 75°C lead length = 0.375')	$I_{F(AV)}$	6.0			A
Repetitive Surge Current (@ 55°C in free air lead length = 0.375')	I_{FRM}	25			A
Non-Repetitive Surge Current (tp = 8.3mS @ Vr & T_{JMAX})	I_{FSM}	125			A
Storage Temperature Range	T_{STG}	-65 to +175			°C
Average Forward Current Max (pcb mounted: T_A = 55°C) Sine wave Square wave (d = 0.5)	$I_{F(AV)}$ $I_{F(AV)}$	1.7 1.8			A
I^2t for fusing (t = 8.3mS) max	I^2t	32			A^2S
Forward Voltage Drop max @ T_J = 25°C	V_F	0.875 @ 4A			V
Reverse Current max @ V_{WRM}, T_J = 25°C @ V_{WRM}, T_J = 100°C	I_R I_R	5.0 150			μA
Reverse Recovery Time max (1.0A I_F to 1.0A I_{RM} recover to 0.25A $I_{RM(REC)}$)	trr	30			nS
Junction Capacitance typ @ V_R = 5V f = 1MHz	C_J	60			pF
Thermal Resistance to end cap	$R_{\theta JEC}$	6.5			°C/W

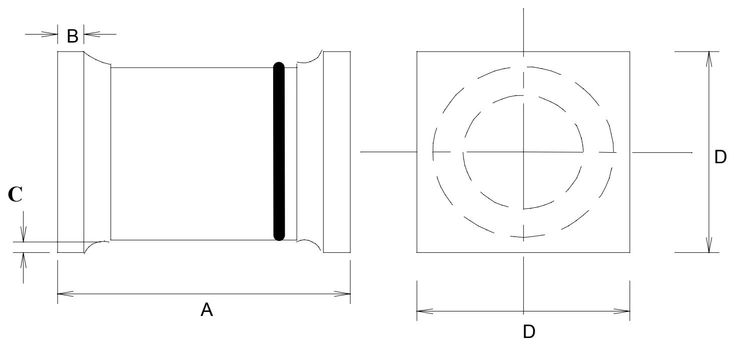
2

Ordering Information

Part Number	Description
1N5807US, 1N5809US, 1N5811US	Surface Mount(1)

Note:
(1) Available in trays and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



*Cathode is denoted by a black band on a white body.

	Dimensions in Inches	
	1N5807US - 1N5811US	
	MIN	MAX
A	0.2	0.225
B	0.019	0.028
C	0.003	-
D	0.137	0.148

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- Low forward voltage drop
- Soft, non-snap off, recovery characteristics

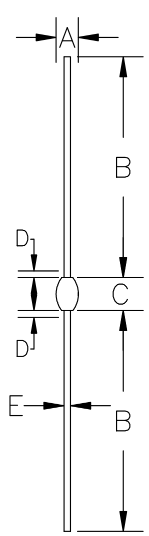
QUICK REFERENCE DATA

- V_R = 50 - 150V
- I_F = 1.8A
- t_{rr} = 30nS
- V_F = 1.2V

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N6073 FF05	1N6074 FF10	1N6075 FF15	Unit
Working reverse voltage	V_{RWM}	50	100	150	V
Repetitive reverse voltage	V_{RRM}	50	100	150	V
Average forward current (@ 55°C, lead length = 0.375")	$I_{F(AV)}$	←	1.8	→	A
Repetitive surge current (@ 55°C, lead length = 0.375")	I_{FRM}	←	14.0	→	A
Non-repetitive surge current (t_p = 8.3ms, @ V_R & T_{jmax})	I_{FSM}	←	35.0	→	A
Storage temperature range	T_{STG}	←	-65 to +150	→	°C
Operating temperature range	T_{OP}	←	-65 to +150	→	°C

MECHANICAL



G5

Dimensions					
DIM^N	Millimeters		Inches		Note
	MIN	MAX	MIN	MAX	
A	1.4	1.8	.055	0.083	-
B	25.4	33.0	1.00	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	

Note:
1. Lead diameter not controlled in this area.

These products are qualified to MIL-PRF-19500/503.

They can be supplied fully released as JAN, JANTX, and JANTXV versions.

These products are qualified in Europe to DEF STAN 59-61 (PART 80)/029 available to F and FX levels.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N6073 FF05	1N6074 FF10	1N6075 FF15	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)					
for sine wave	$I_{F(AV)}$	←	0.85	→	A
for square wave (d = 0.5)	$I_{F(AV)}$	←	0.90	→	A
Average forward current max.					
$T_L = 70^oC$; L = 0".	$I_{F(AV)}$	←	3.0	→	A
$T_L = 55^oC$; L = 3/8"					
for sine wave	$I_{F(AV)}$	←	1.7	→	A
for square wave	$I_{F(AV)}$	←	1.8	→	A
I^2t for fusing (t = 8.3mS) max.	I^2t	←	5.0	→	A^2S
Forward voltage drop max. @ I_F = 1.5A, $T_j = 25^oC$	V_F	←	1.2	→	V
Reverse current max.					
@ V_{RWM}, $T_j = 25^oC$	I_R	←	1.0	→	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	←	50	→	µA
Reverse recovery time 0.5A I_F, 1.0A I_R, 0.25A I_{RR}.	t_{rr}	←	30	→	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	←	24	→	pF

THERMAL CHARACTERISTICS

	Symbol	1N6073 FF05	1N6074 FF10	1N6075 FF15	Unit
Thermal resistance - junction to lead					
Lead length = 0.375"	$R_{\theta JL}$	←	46	→	°C/W
Lead length = 0.0"	$R_{\theta JL}$	←	13	→	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	←	95	→	°C/W

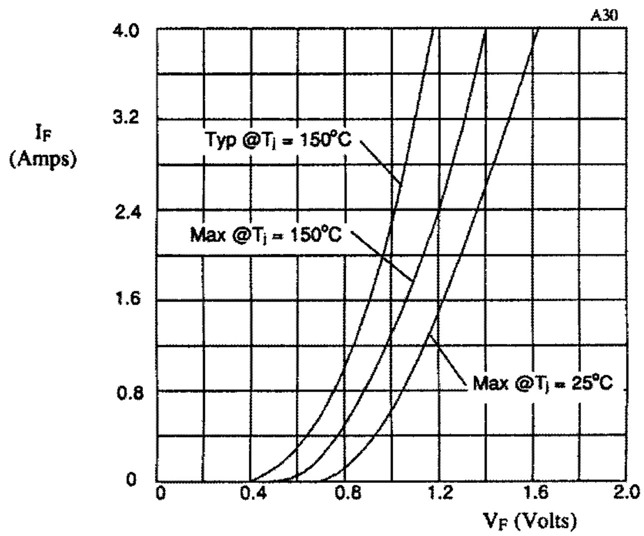


Fig 1. Forward voltage drop as a function of forward current.

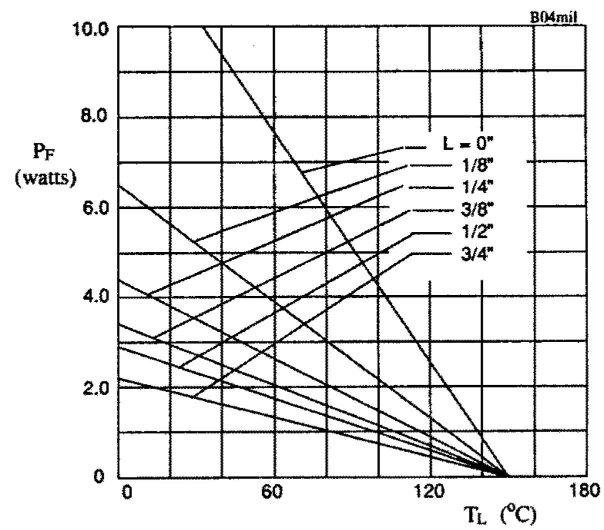


Fig 2. Maximum power versus lead temperature.

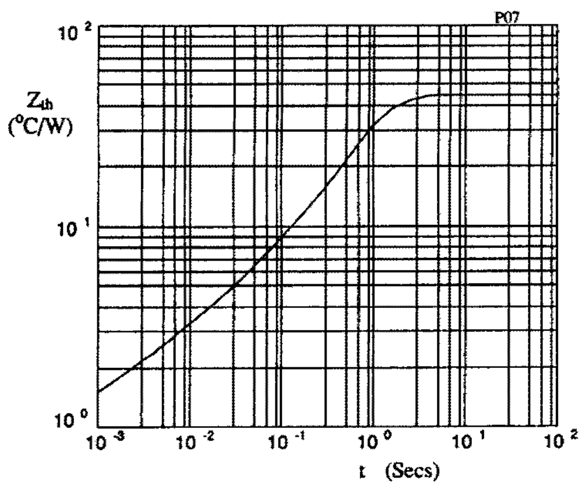


Fig 3. Transient thermal impedance characteristic.

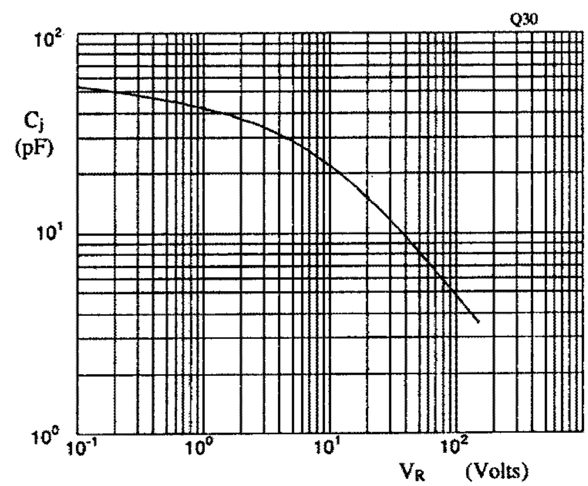


Fig 4. Typical junction capacitance as a function of reverse voltage.

2

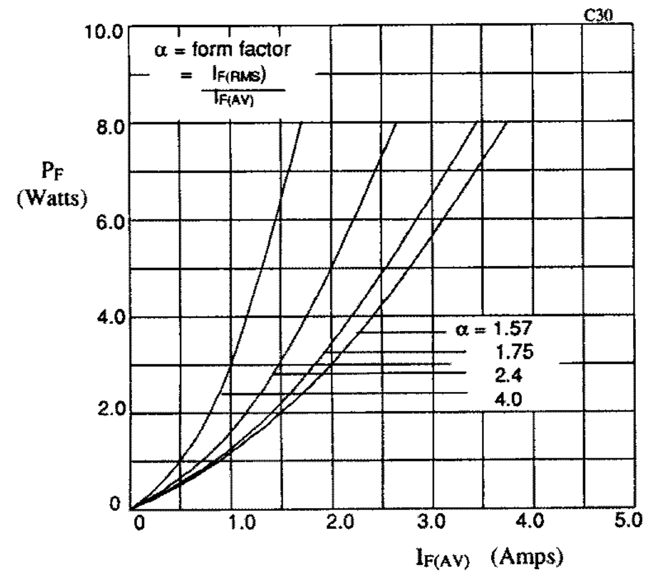


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

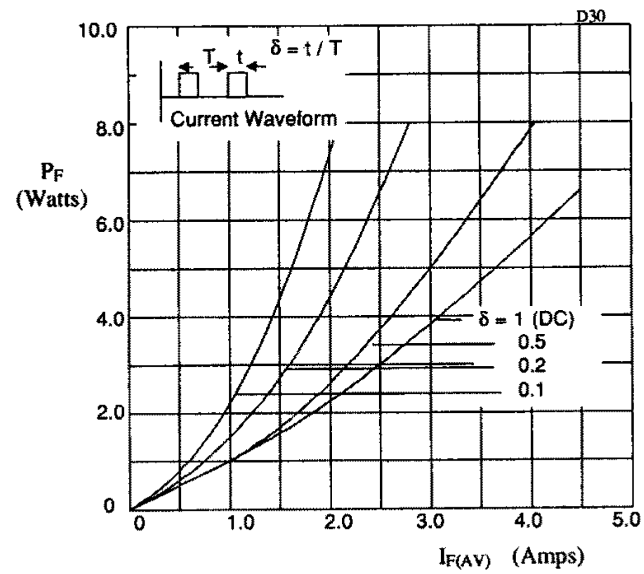


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

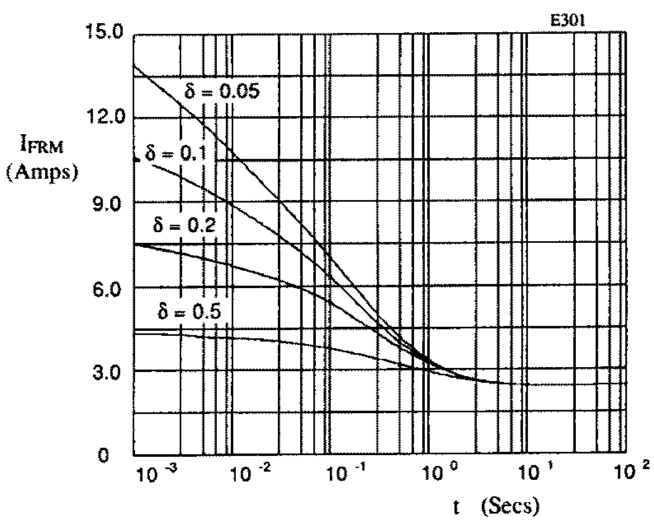


Fig 7. Maximum repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 45 °C/W; V_{RWM} during 1 - δ.

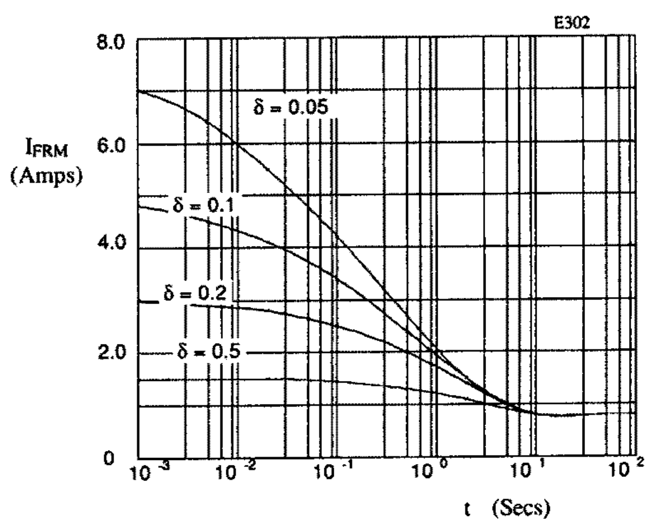


Fig 8. Maximum repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 110 °C/W; V_{RWM} during 1 - δ.

SEMTECH

RECTIFIER, up to 150V, 3.1A, 30ns

1N6076 3FF05
1N6077 3FF10
1N6078 3FF15

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- Low forward voltage drop
- Soft, non-snap off, recovery characteristics

QUICK REFERENCE DATA

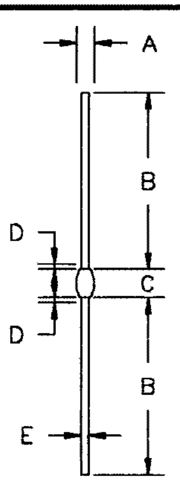
- V_R = 50 - 150V
- I_F = 3.1A
- t_{rr} = 30nS
- V_F = 1.2V

2

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N6076 3FF05	1N6077 3FF10	1N6078 3FF15	Unit
Working reverse voltage	V_{RWM}	50	100	150	V
Repetitive reverse voltage	V_{RRM}	50	100	150	V
Average forward current (@ 55°C, lead length = 0.375")	$I_{F(AV)}$	←	3.1	→	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	←	14.0	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	←	75.0	→	A
Storage temperature range	T_{STG}	←	-65 to +150	→	°C
Operating temperature range	T_{OP}	←	-65 to +150	→	°C

MECHANICAL



G102

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	–
B	25.4	33.0	1.00	1.30	–
C	3.5	4.2	.140	.165	–
D	–	0.8	–	.03	1
E	.66	.84	.036	.042	–

NOTES:
1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.134oz

These products are qualified to MIL-PRF-19500/503.

They can be supplied fully released as JAN, JANTX, and JANTXV versions.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N6076 3FF05	1N6077 3FF10	1N6078 3FF15	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$)					
for sine wave	$I_{F(AV)}$	←	1.30	→	A
for square wave (d = 0.5)	$I_{F(AV)}$	←	1.40	→	A
Average forward current max. $T_L = 70°C$; L = 0".	$I_{F(AV)}$	←	6.0	→	A
$T_L = 55°C$; L = 3/8"					
for sine wave	$I_{F(AV)}$	←	3.0	→	A
for square wave	$I_{F(AV)}$	←	3.1	→	A
I^2t for fusing (t = 8.3mS) max.	I^2t	←	5.1	→	A^2S
Forward voltage drop max. @ $I_F = 3.0A$, $T_j = 25°C$	V_F	←	1.2	→	V
Reverse current max.					
@ V_{RWM}, $T_j = 25°C$	I_R	←	5.0	→	µA
@ V_{RWM}, $T_j = 100°C$	I_R	←	100	→	µA
Reverse recovery time 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	←	30	→	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	←	58	→	pF

THERMAL CHARACTERISTICS

	Symbol	1N6076 3FF05	1N6077 3FF10	1N6078 3FF15	Unit
Thermal resistance - junction to lead					
Lead length = 0.0"	$R_{\theta JL}$	←	8.5	→	°C/W
Lead length = 0.375"	$R_{\theta JL}$	←	25	→	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	←	90	→	°C/W

2

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- Low forward voltage drop
- Soft, non-snap off, recovery characteristics

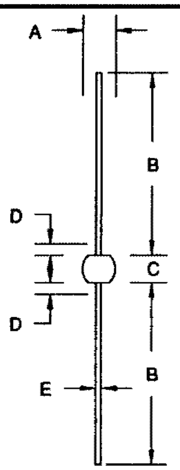
QUICK REFERENCE DATA

- V_R = 50 - 150V
- I_F = 5.0A
- t_{rr} = 30nS
- V_F = 0.97V

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	1N6079 5FF05	1N6080 5FF10	1N6081 5FF15	Unit
Working reverse voltage	V_{RWM}	50	100	150	V
Repetitive reverse voltage	V_{RRM}	50	100	150	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(av)}$	←	5.0	→	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	←	24	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	←	175	→	A
Storage temperature range	T_{STG}	←	-65 to +150	→	°C
Operating temperature range	T_{OP}	←	-65 to +150	→	°C

MECHANICAL



G4

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	3.4	4.6	.135	.180	-
B	22.9	33.0	.90	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.91	1.07	.036	.042	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.039oz

These products are qualified to MIL-PRF-19500/503.

They can be supplied fully released as JAN, JANTX, and JANTXV versions.

These products are qualified in Europe to DEF STAN 59-61 (PART 80)/030 available to F and FX levels.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	1N6079 5FF05 / 1N6080 5FF10 / 1N6081 5FF15	Unit
Average forward current max. $T_A = 55°C$ for sine wave	$I_{F(AV)}$	2.0	A
Average forward current max. $T_L = 70°C$; L = 0"	$I_{F(AV)}$	12.0	A
$T_L = 55°C$; L = 3/8" for sine wave	$I_{F(AV)}$	4.8	A
for square wave	$I_{F(AV)}$	5.0	A
I^2t for fusing (t = 8.3mS) max.	I^2t	127	A^2S
Forward voltage drop max. @ $I_F = 5.0A$, $T_j = 25°C$	V_F	0.97	V
Reverse current max. @ V_{RWM}, $T_j = 25°C$	I_R	10	µA
@ V_{RWM}, $T_j = 100°C$	I_R	500	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	30	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	230	pF

THERMAL CHARACTERISTICS

	Symbol	1N6079 5FF05 / 1N6080 5FF10 / 1N6081 5FF15	Unit
Thermal resistance - junction to lead, Lead length = 0.375"	$R_{\theta JL}$	23.5	°C/W
Lead length = 0.0"	$R_{\theta JL}$	5	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	75	°C/W

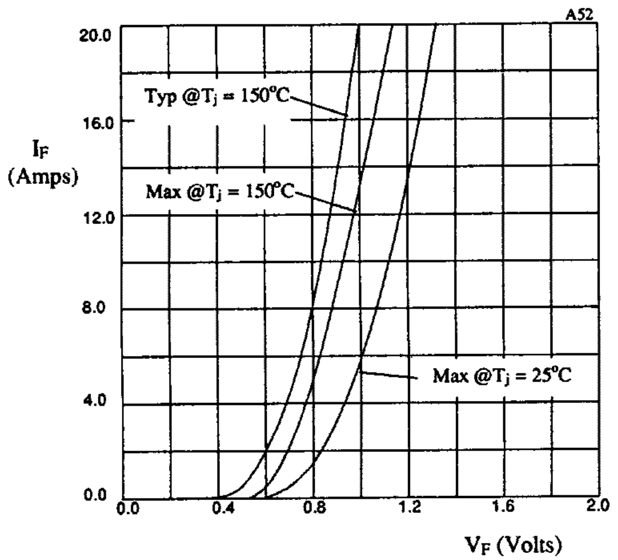


Fig 1. Forward voltage drop as a function of forward current

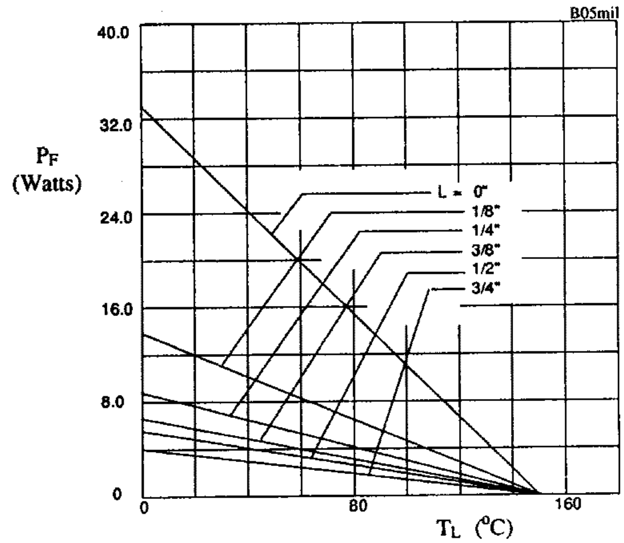


Fig 2. Maximum power versus lead temperature

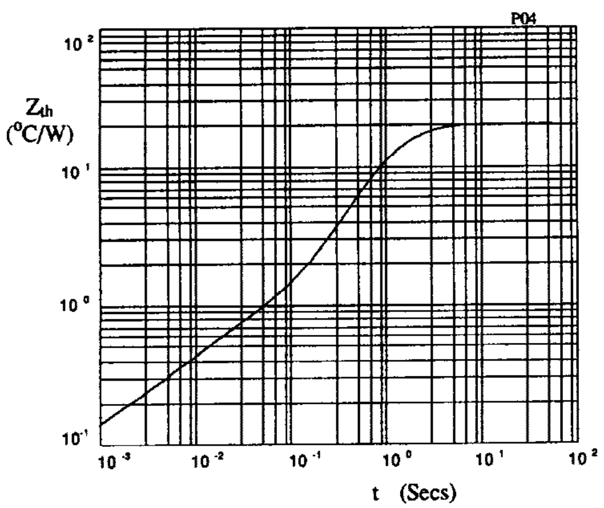


Fig 3. Transient thermal impedance characteristic.

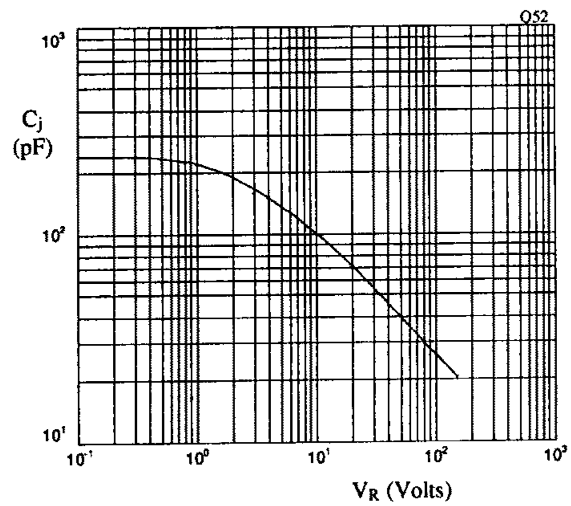


Fig 4. Typical junction capacitance as a function of reverse voltage.

2

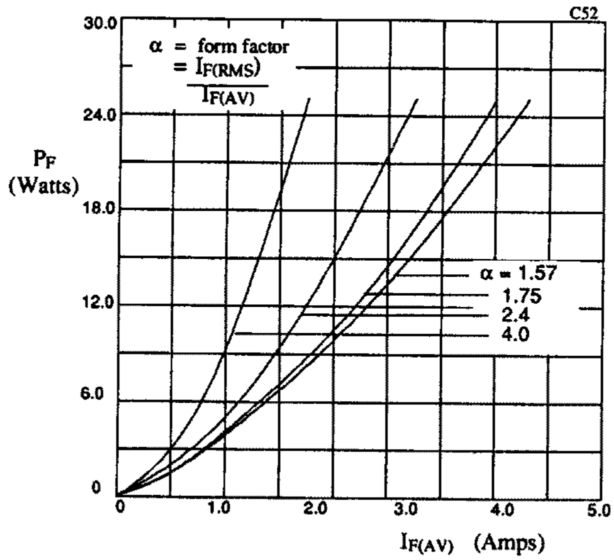


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

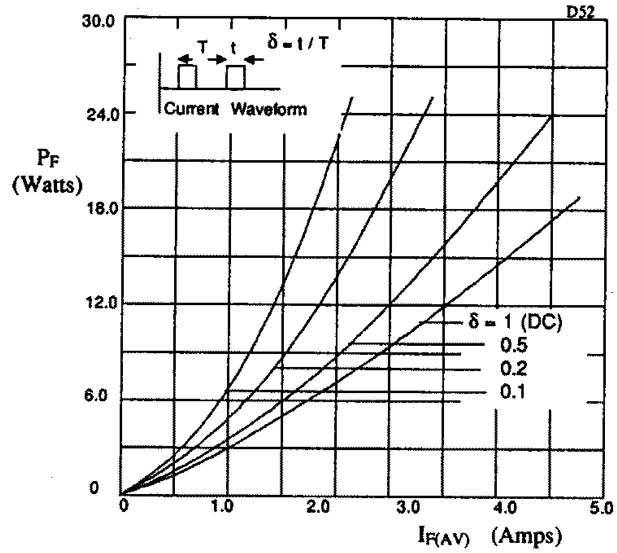


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

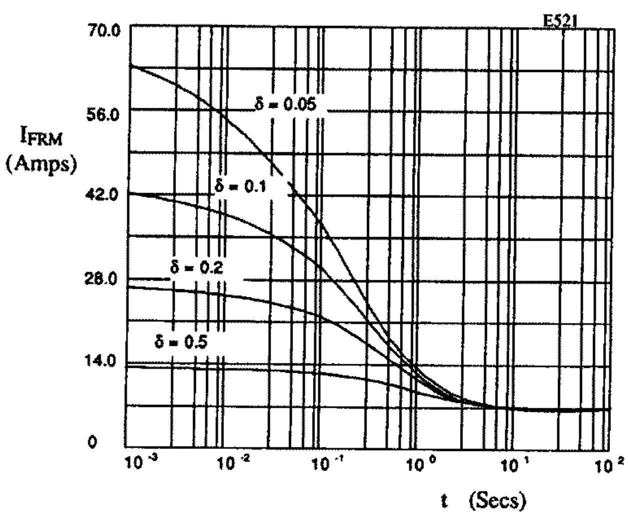


Fig 7. Maximum repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 20 °C/W; V_{RWM} during 1 - δ.

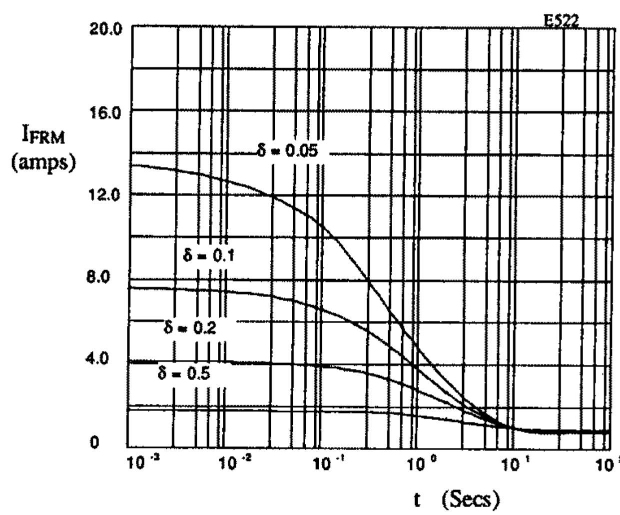


Fig 8. Maximum repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 80 °C/W; V_{RWM} during 1 - δ.

2PFF6
Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode

Description

Quick reference data

V_R = 600V
I_F = 2.0A
t_{rr} = 60nS
I_R = 1µA

Features

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	2PFF6	Units
Working Reverse Voltage	V_{RWM}	600	V
Repetitive Reverse Voltage	V_{RRM}	600	V
Average Forward Current @ 55°C, lead length 0.375"	$I_{F(AV)}$	2.0	A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	9.0	A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	45.0	A
Storage Temperature Range	T_{STG}	-55 to +175	°C

POWER DISCRETES

Electrical Specifications

	Symbol	2PFF6	Units
Average Forward Current max (pcb mounted; T_A = 55°C) for sine wave for square wave (d = 0.5)	$I_{F(AV)}$ $I_{F(AV)}$	0.85 0.90	A
Average Forward Current max (T_L = 55°C; L = 3/8") for sine wave for square wave	$I_{F(AV)}$ $I_{F(AV)}$	1.9 2.0	A
I^2t for fusing (t = 8.3mS) max	I^2t	8.4	A^2S
Forward Voltage Drop max. @ I_F = 2.0A, T_j = 25°C	V_F	2.1	V
Reverse Current typ. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	1 20	µA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	60	nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	40	pF

Thermal Characteristics

	Symbol	2PFF6	Units
Thermal Resistance-Junction to Lead Lead length = 0.375"	$R_{\theta\ JL}$	20	°C/W

Maximum Characteristics

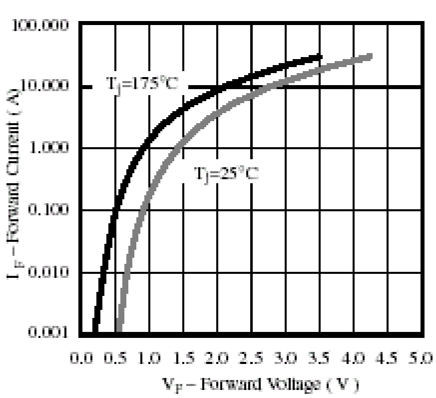


Figure 1. Forward Current vs. Forward Voltage

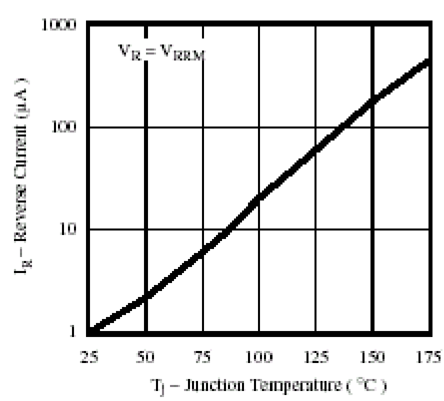


Figure 2. Reverse Current vs. Junction Temperature

Maximum Characteristics (Cont.)

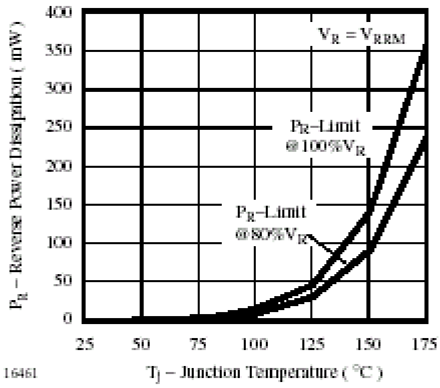


Figure 3. Max. Reverse Power Dissipation vs. Junction Temperature

POWER DISCRETES

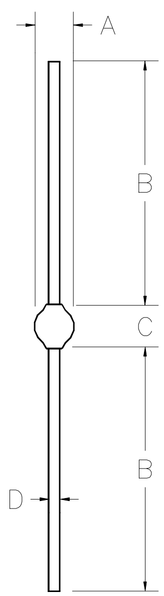
Ordering Information

Part Number	Description
2PFF6	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

2

Outline Drawing



Dimensions					
DIMN	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	.177	-	4.50	-
B	1.02	-	26	-	-
C	-	.197	-	5.00	-
D	-	.053	-	1.35	-

Weight = 0.035oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

2PFF8, 2PFF0
Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode

POWER DISCRETES

2

Description

Quick reference data

V_R = 800 - 1000V
I_F = 3.0A
t_{rr} = 75nS
I_R = 2µA

Features

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	2PFF8	2PFF0	Units
Working Reverse Voltage	V_{RWM}	800	1000	V
Average Forward Current @ 55°C, lead length 0.375"	$I_{F(AV)}$	3.0		A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	9.0		A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	45.0		A
Storage Temperature Range	T_{STG}	-55 to +175		°C

SEMTECH

POWER DISCRETES

2

Electrical Specifications

	Symbol	2PFF8	2PFF0	Units
Average Forward Current max (pcb mounted; T_A = 55°C)	$I_{F(AV)}$	1.0		A
Average Forward Current max (T_L = 55°C; L = 3/8")	$I_{F(AV)}$	3.0		A
I^2t for fusing (t = 8.3mS) max	I^2t	8.4		A^2S
Forward Voltage Drop max. @ I_F = 3.0A, T_j = 25°C	V_F	1.7		V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	2 50		μA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	75		nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	40		pF

Thermal Characteristics

	Symbol	2PFF8, 2PFF0	Units
Thermal Resistance-Junction to Lead Lead length = 0.375"	$R_{\theta JL}$	26	°C/W

Typical Characteristics

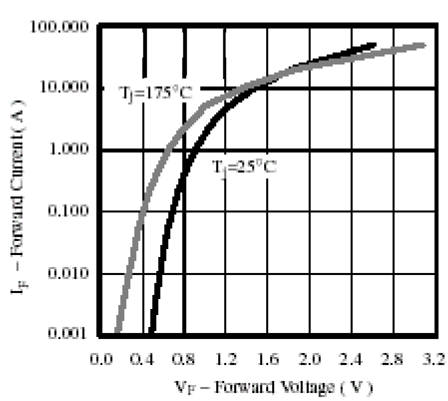


Figure 1. Max. Forward Current vs. Forward Voltage

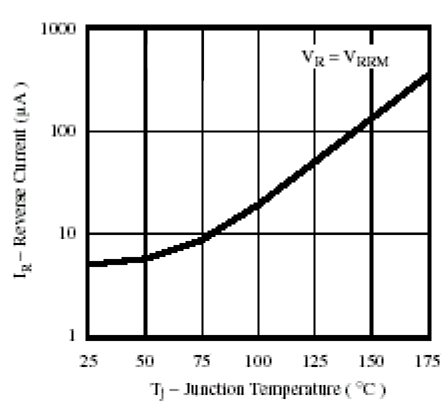


Figure 2. Max. Reverse Current vs. Junction Temperature

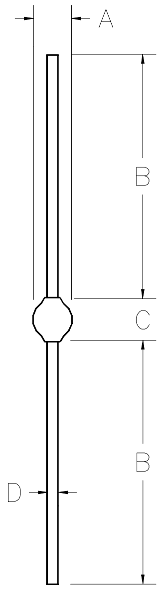
POWER DISCRETES

Ordering Information

Part Number	Description
2PFF8 2PFF0	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIM	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	.177	-	4.50	-
B	1.02	-	26	-	-
C	-	.197	-	5.00	-
D	-	.053	-	1.35	-

Weight = 0.035oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Low forward voltage drop

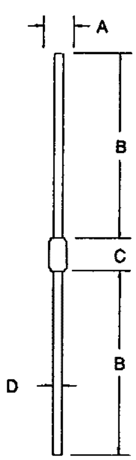
QUICK REFERENCE DATA

- V_R = 50 - 200V
- I_F = 2.6A
- t_{rr} = 25nS
- V_F = 0.97V

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	2PFT05	2PFT1	2PFT15	2PFT2	Unit
Working reverse voltage	V_{RWM}	50	100	150	200	V
Repetitive reverse voltage	V_{RRM}	50	100	150	200	V
Average forward current (@ 55°C, lead length = 0.375")	$I_{F(AV)}$	← 2.6 →				A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 15.0 →				A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	← 50.0 →				A
Storage temperature range	T_{STG}	← -65 to +175 →				°C
Operating temperature range	T_{OP}	← -65 to +175 →				°C

MECHANICAL



G88

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	3.81	-	.150	-
B	28.0	-	1.10	-	-
C	-	4.57	-	.180	-
D	-	0.81	-	.032	-

Weight = 0.013oz

These products are qualified in Europe to DEF STAN 59-61 (PART 80)/043 available to F and FX levels.

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	2PFT05	2PFT1	2PFT15	2PFT2	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$)						
for sine wave	$I_{F(AV)}$	← 1.35 →				A
for square wave (d = 0.5)	$I_{F(AV)}$	← 1.40 →				A
Average forward current max. ($T_L = 55°C$;L = 3/8")						
for sine wave	$I_{F(AV)}$	← 2.4 →				A
for square wave	$I_{F(AV)}$	← 2.6 →				A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 10.6 →				A^2S
Forward voltage drop max. @ $I_F = 2.0A$, $T_j = 25°C$	V_F	← 0.97 →				V
Reverse current max.						
@ V_{RWM}, $T_j = 25°C$	I_R	← 1.0 →				µA
@ V_{RWM}, $T_j = 100°C$	I_R	← 10 →				µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	← 25 →				nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	← 45 →				pF

THERMAL CHARACTERISTICS

	Symbol	2PFT05	2PFT1	2PFT15	2PFT2	Unit
Thermal resistance - junction to lead						
Lead length = 0.375"	$R_{\theta JL}$	← 47 →				°C/W
Lead length = 0.0"	$R_{\theta JL}$	← 19 →				°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	← 100 →				°C/W

2

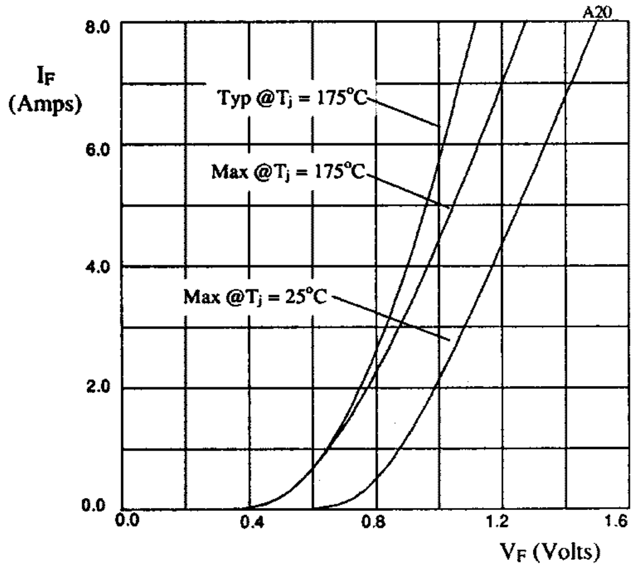


Fig 1. Forward voltage drops as a function of forward current.

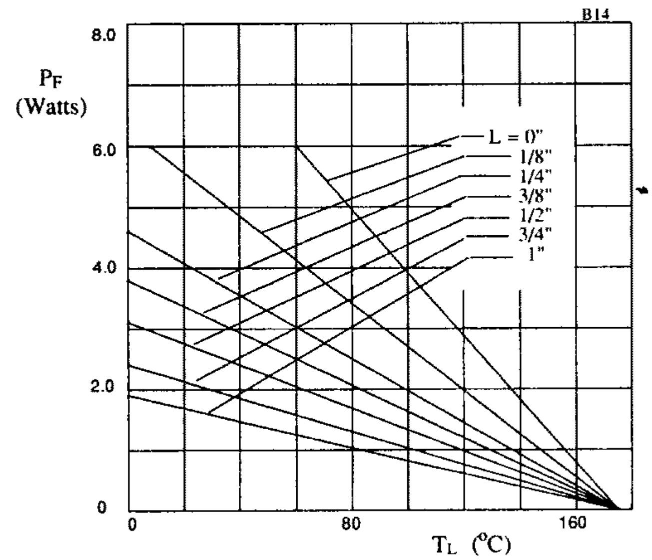


Fig 2. Maximum power versus lead temperature.

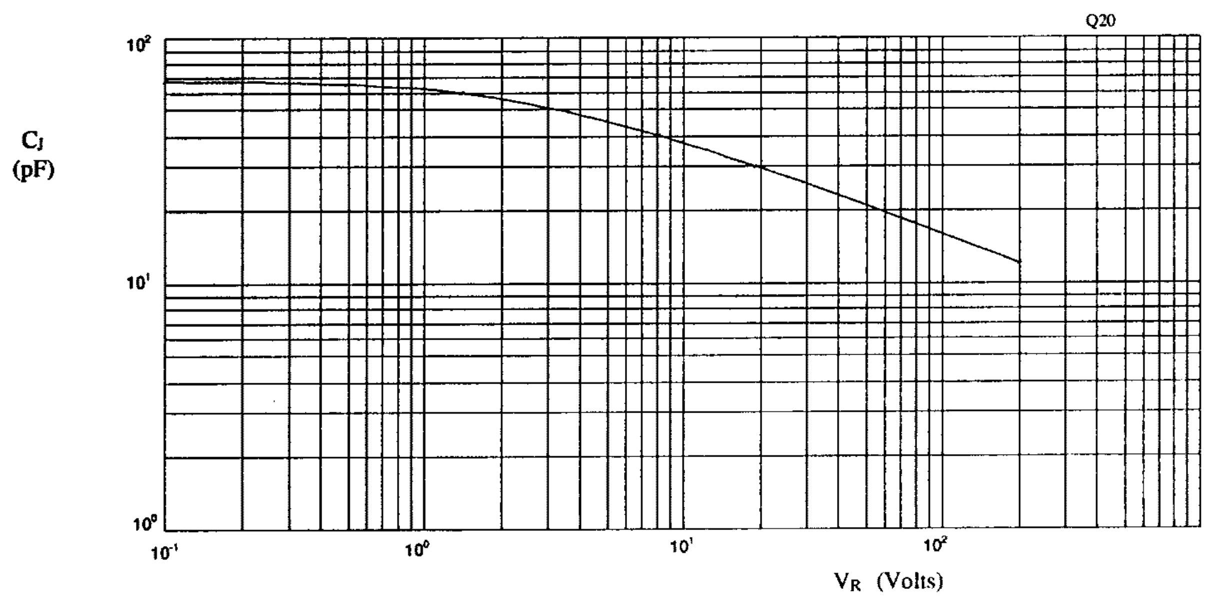


Fig 3. Typical junction capacitance as a function of reverse voltage.

2

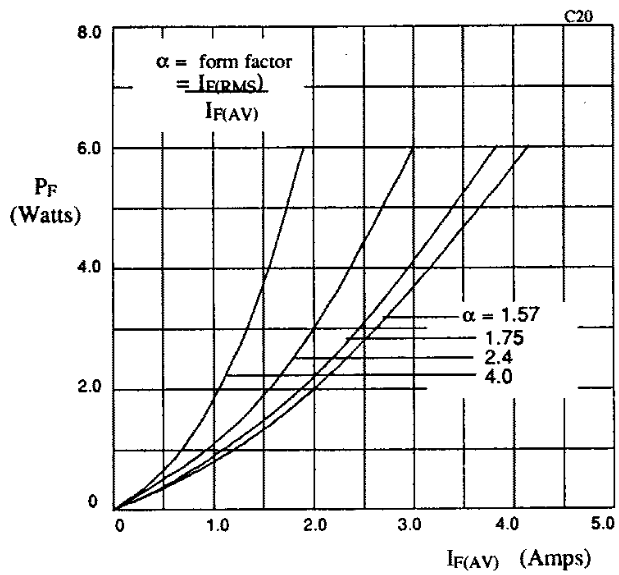


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

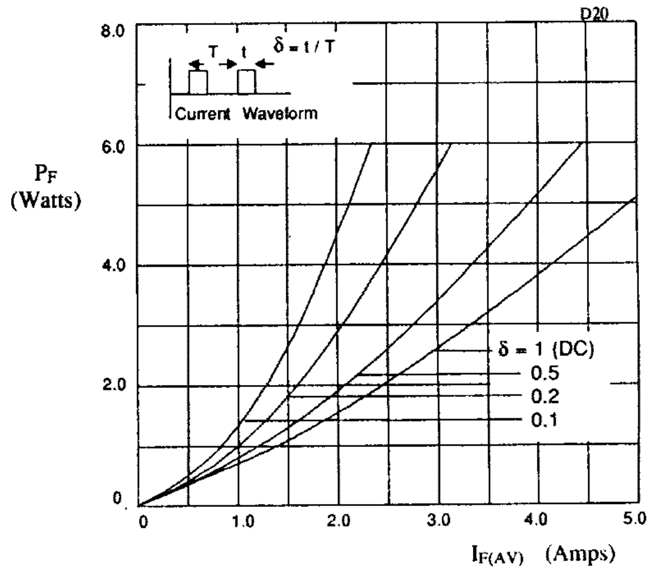


Fig 5. Forward power dissipation as a function of forward current, for square wave operation.

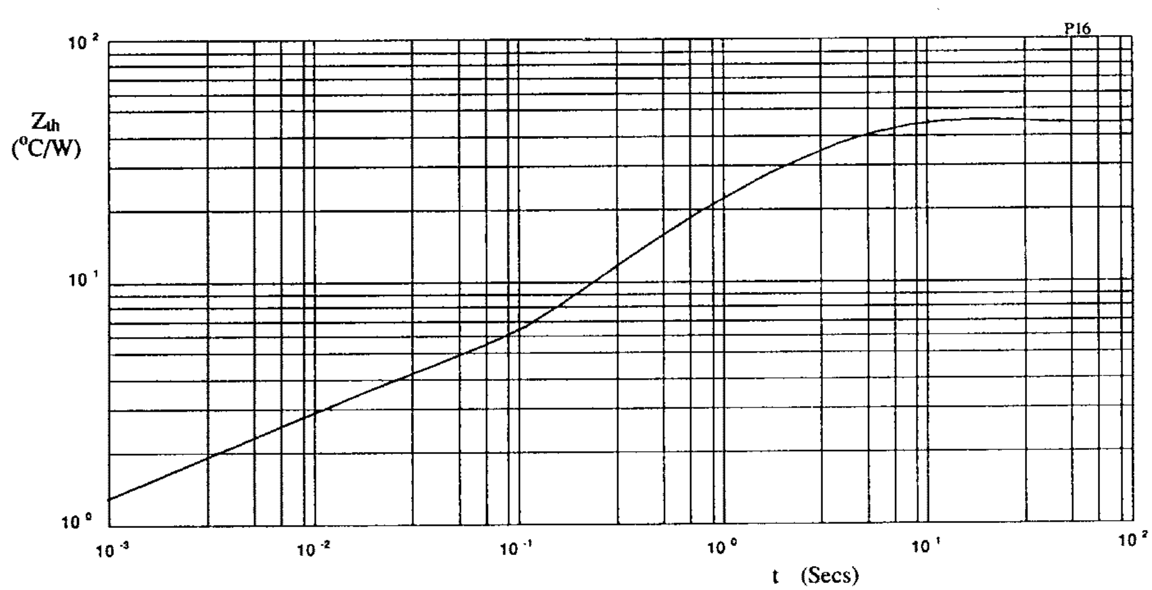


Fig 6. Transient thermal impedance characteristic.

2

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed with Metoxilite fused metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

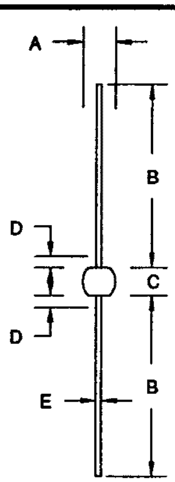
QUICK REFERENCE DATA

- V_R = 300 - 600V
- I_F = 3.4A
- t_{rr} = 50nS
- I_R = 10µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	3FF30	3FF40	3FF50	3FF60	Unit
Working reverse voltage	V_{RWM}	300	400	500	600	V
Repetitive reverse voltage	V_{RRM}	300	400	500	600	V
Average forward current (@ 55°C, lead length = 0.375")	$I_{F(AV)}$	← 3.4 →				A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 15.0 →				A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	← 70 →				A
Storage temperature range	T_{STG}	← -65 to +150 →				°C
Operating temperature range	T_{OP}	← -65 to +150 →				°C

MECHANICAL



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DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	3.4	4.6	.135	.180	-
B	22.9	33.0	.90	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.91	1.07	.036	.042	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.04oz

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	3FF30	3FF40	3FF50	3FF60	Unit
Average forward current max. (pcb mounted; T_A = 55°C) for sine wave	$I_{F(AV)}$	1.0	1.0	1.0	1.0	A
for square wave (d = 0.5)	$I_{F(AV)}$	1.1	1.1	1.1	1.1	A
Average forward current max. (T_L = 55°C; L = 3/8") for sine wave	$I_{F(AV)}$	3.3	3.3	3.3	3.3	A
for square wave	$I_{F(AV)}$	3.4	3.4	3.4	3.4	A
I^2t for fusing (t = 8.3mS) max.	I^2t	41	41	41	41	A^2S
Forward voltage drop max. @ I_F = 3.0A, T_j = 25°C	V_F	1.40	1.40	1.40	1.40	V
Reverse current max. @ V_{RWM}, T_j = 25°C	I_R	10	10	10	10	μA
@ V_{RWM}, T_j = 100°C	I_R	500	500	500	500	μA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	50	50	50	50	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	125	125	125	125	pF

THERMAL CHARACTERISTICS

	Symbol	3FF30	3FF40	3FF50	3FF60	Unit
Thermal resistance - junction to lead Lead length = 0.375"	$R_{\theta JL}$	20	20	20	20	°C/W
Lead length = 0.0"	$R_{\theta JL}$	5	5	5	5	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	75	75	75	75	°C/W

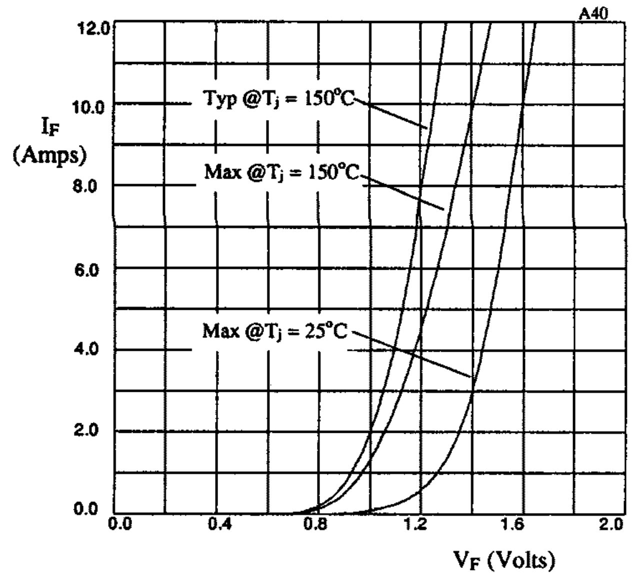


Fig 1. Forward voltage drops as a function of forward current

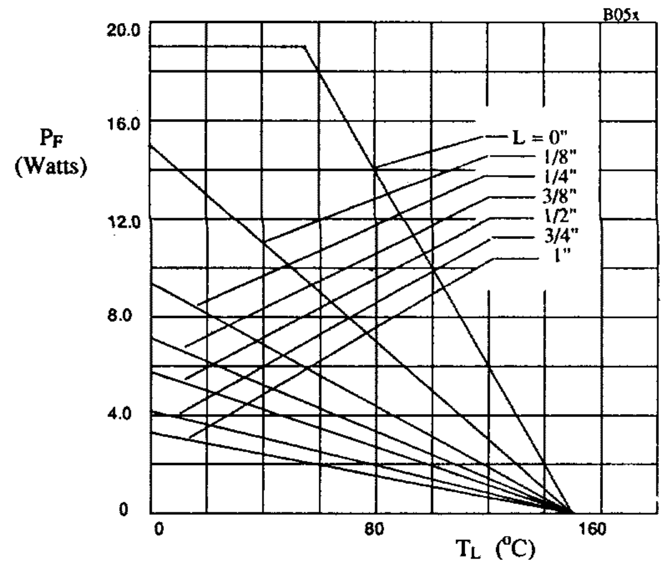


Fig 2. Maximum power versus lead temperature

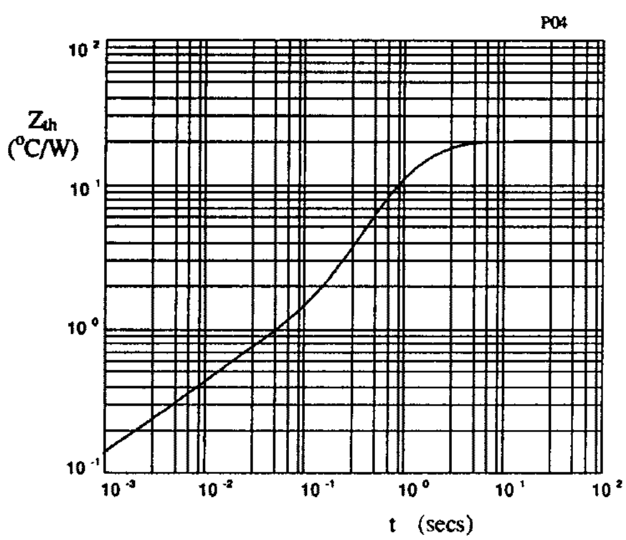


Fig 3. Transient thermal impedance characteristic.

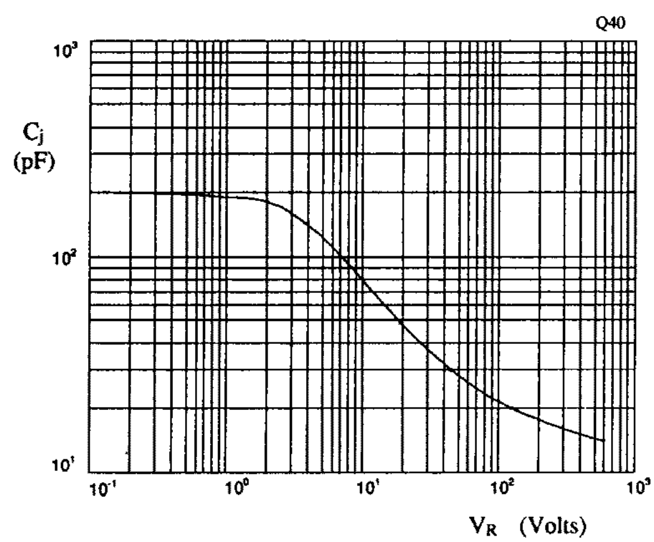


Fig 4. Typical junction capacitance as a function of reverse voltage.

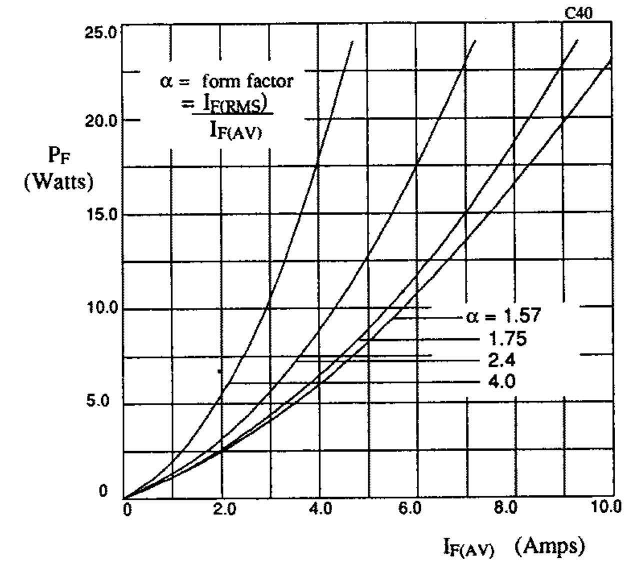


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

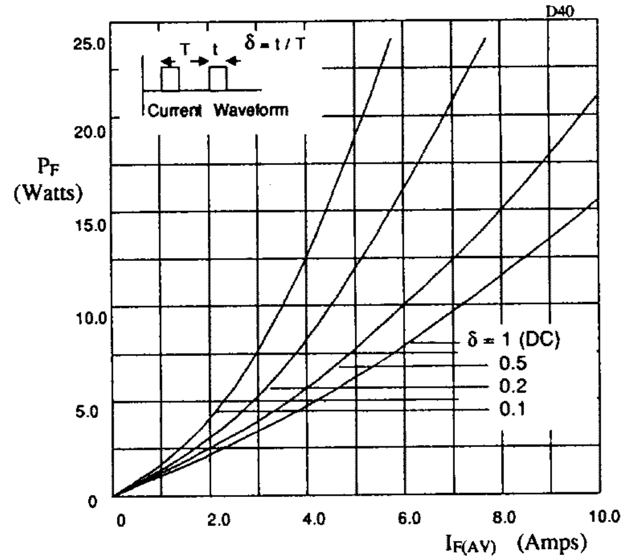


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

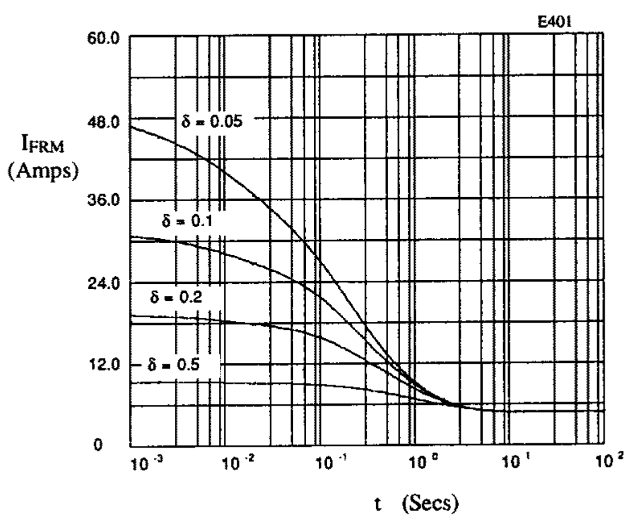


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 20 °C/W; V_{RWM} during 1 - δ.

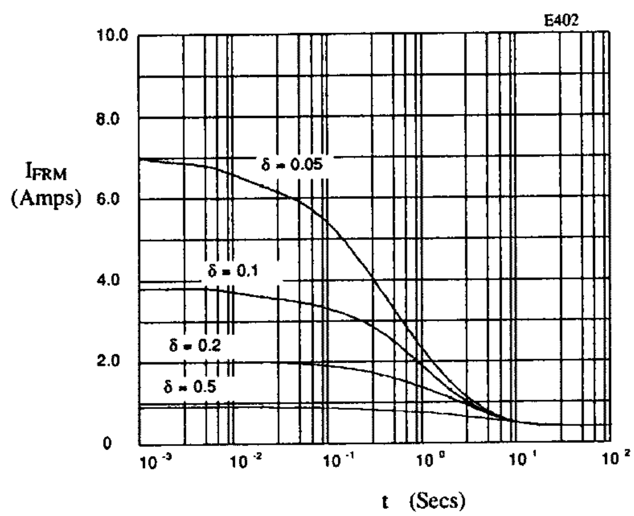


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 80 °C/W; V_{RWM} during 1 - δ.

2

AXIAL LEADED HERMETICALLY SEALED FAST RECTIFIER DIODE

- Low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

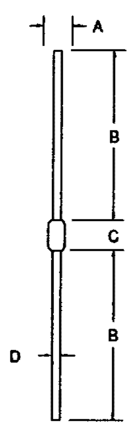
QUICK REFERENCE DATA

- V_R = 800 & 1000V
- I_F = 3.25A
- t_{rr} = 300nS
- I_R = 1µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	3PF8	3PF0	Unit
Working reverse voltage	V_{RWM}	800	1000	V
Repetitive reverse voltage	V_{RRM}	800	1000	V
Surge reverse voltage	V_{RSM}	900	1100	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	← 3.25 →		A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 27 →		A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 76 →		A
Storage temperature range	T_{STG}	-65 to +175		°C
Operating temperature range	T_{OP}	-65 to +175		°C

MECHANICAL



G83

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	4.50	-	.177	-
B	28.0	-	1.10	-	-
C	-	5.00	-	.197	-
D	-	1.35	-	.053	-

Weight = 0.013oz

These products are available in Europe to DEF STAN 59-61 (PART 80)/043 to F and FX levels.

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	3PF8 3PF0	Unit
Average forward current max. (pcb mounted; T_A = 55°C)			
for sine wave	$I_{F(AV)}$	← 1.40 →	A
for square wave (d = 0.5)	$I_{F(AV)}$	← 1.50 →	A
Average forward current max. (T_L = 55°C; L = 3/8")			
for sine wave	$I_{F(AV)}$	← 3.10 →	A
for square wave	$I_{F(AV)}$	← 3.25 →	A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 24 →	A^2S
Forward voltage drop max. @ I_F = 3.0A, T_j = 25°C	V_F	← 1.3 →	V
Reverse current max			
@ V_{RWM}, T_j = 25°C	I_R	← 1.0 →	µA
@ V_{RWM}, T_j = 100°C	I_R	← 10 →	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	← 300 →	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	← 30 →	pF

THERMAL CHARACTERISTICS

	Symbol	3PF8 3PF0	Unit
Thermal resistance - junction to lead			
Lead length = 0"	$R_{\theta JL}$	← 12 →	°C/W
Lead length = 0.375"	$R_{\theta JL}$	← 26 →	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	← 75 →	°C/W

2

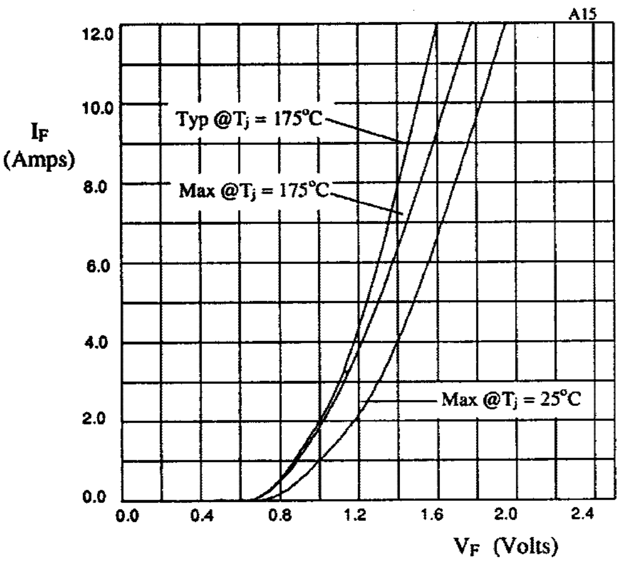


Fig 1. Forward voltage drop as a function of forward current.

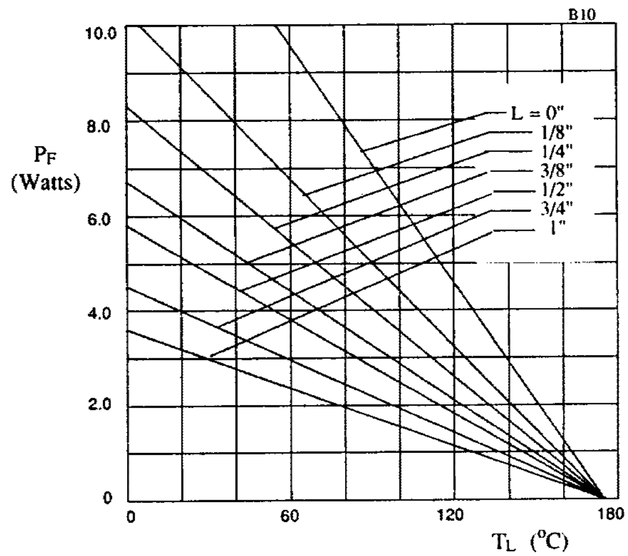


Fig 2. Maximum power versus lead temperature.

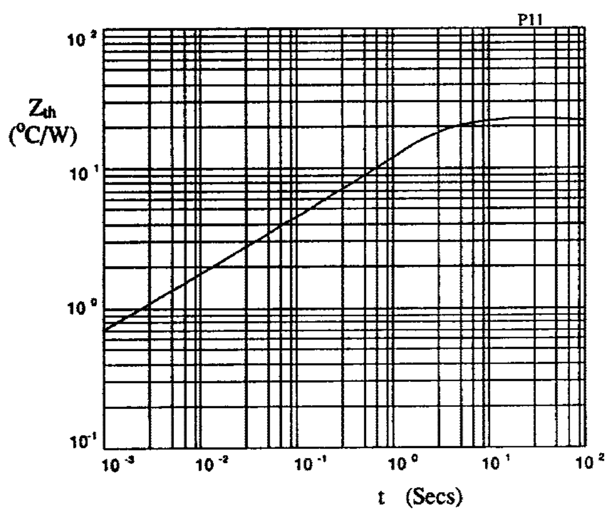


Fig 3. Transient thermal impedance characteristic.

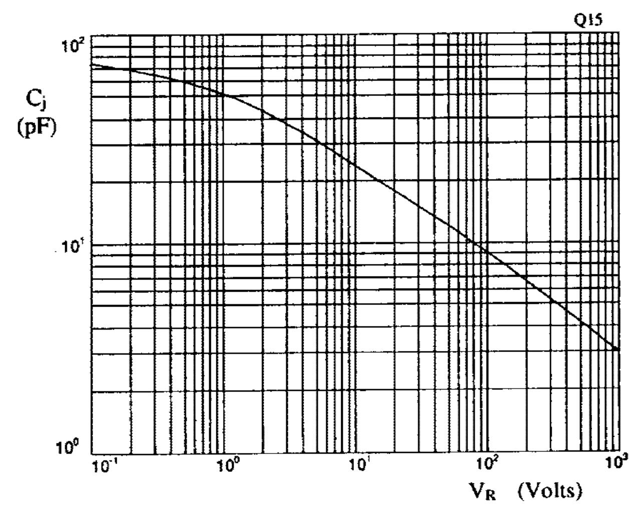


Fig 4. Typical junction capacitance as a function of reverse voltage.

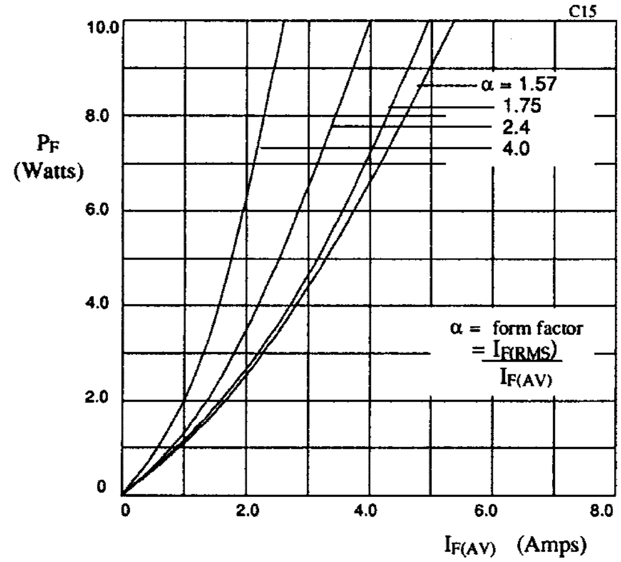


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

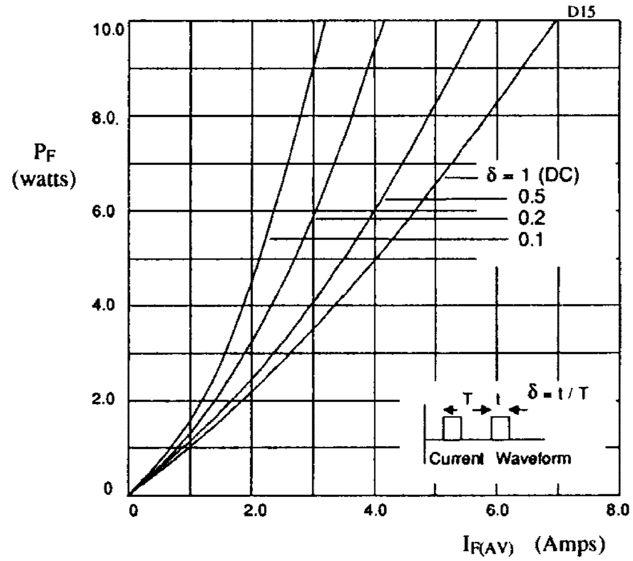


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

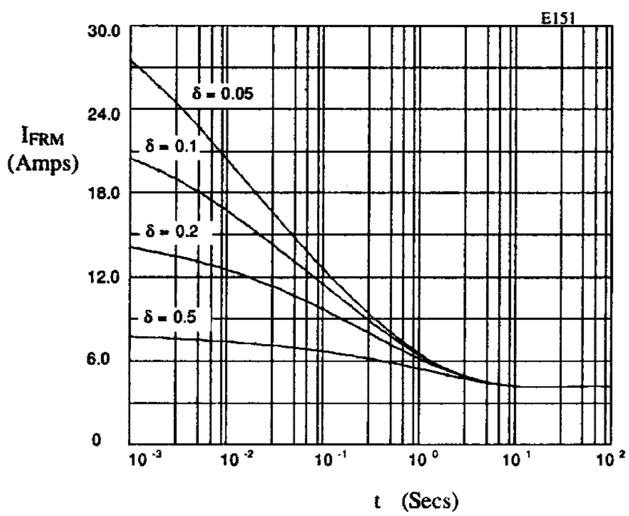


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 22 °C/W; V_{RWM} during 1 - δ.

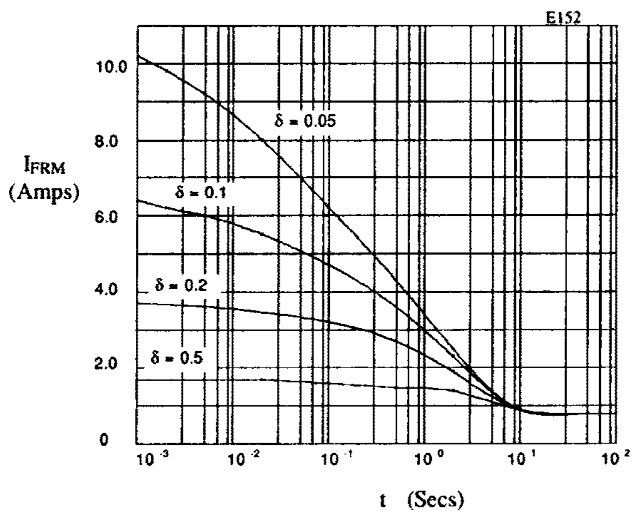


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 75 °C/W; V_{RWM} during 1 - δ.

AXIAL LEADED HERMETICALLY SEALED FAST RECTIFIER DIODE

- Low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

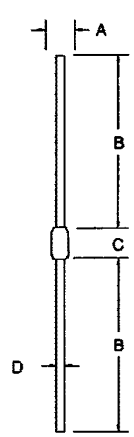
QUICK REFERENCE DATA

- V_R = 1000V
- I_F = 2.7A
- t_{rr} = 150nS
- I_R = 5µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	3PFR0	Unit
Working reverse voltage	V_{RWM}	1000	V
Repetitive reverse voltage	V_{RRM}	1000	V
Surge reverse voltage	V_{RSM}	1100	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	2.7	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	21	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	70	A
Storage temperature range	T_{STG}	-65 to +175	°C
Operating temperature range	T_{OP}	-65 to +175	°C

MECHANICAL



G83

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	4.50	-	.177	-
B	28.0	-	1.10	-	-
C	-	5.00	-	.197	-
D	-	1.35	-	.053	-

Weight = 0.04oz

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	3PFR0	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$)			
for sine wave	$I_{F(AV)}$	1.15	A
for square wave (d = 0.5)	$I_{F(AV)}$	1.20	A
Average forward current max. ($T_L = 55°C$; L = 3/8")			
for sine wave	$I_{F(AV)}$	2.60	A
for square wave	$I_{F(AV)}$	2.70	A
I^2t for fusing (t = 8.3mS) max.	I^2t	20	A^2S
Forward voltage drop max. @ $I_F = 2.0A$, $T_j = 25°C$	V_F	1.5	V
Reverse current max.			
@ V_{RWM}, $T_j = 25°C$	I_R	5.0	µA
@ V_{RWM}, $T_j = 100°C$	I_R	25	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	150	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	70	ρF

THERMAL CHARACTERISTICS

	Symbol	3PFR0	Unit
Thermal resistance - junction to lead			
Lead length = 0"	$R_{\theta JL}$	12	°C/W
Lead length = 0.375"	$R_{\theta JL}$	26	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	75	°C/W

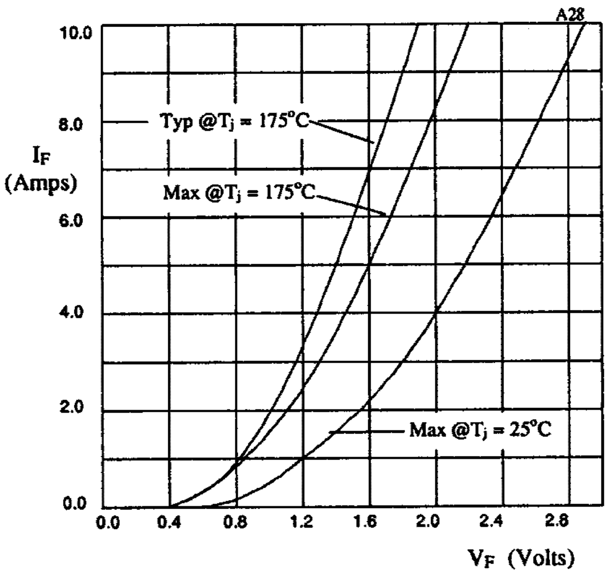


Fig 1. Forward voltage drop as a function of forward current.

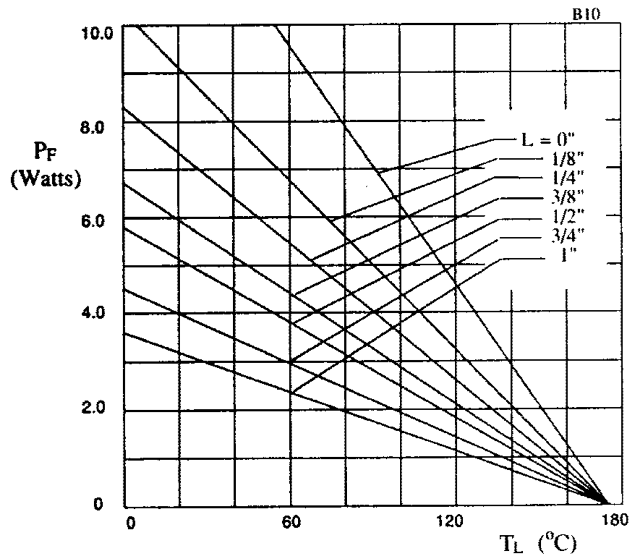


Fig 2. Maximum power versus lead temperature.

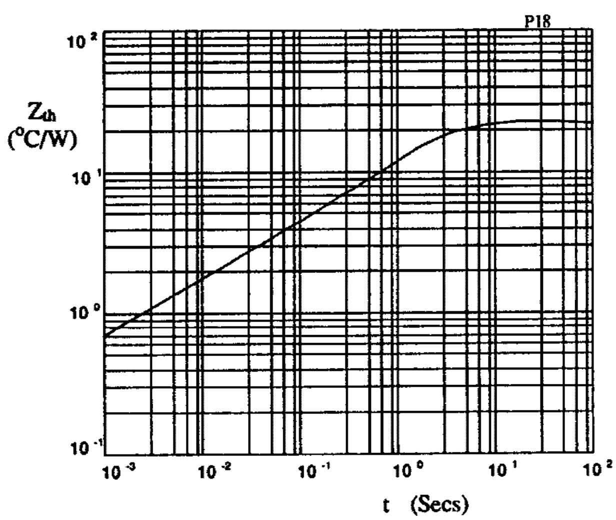


Fig 3. Transient thermal impedance characteristic.

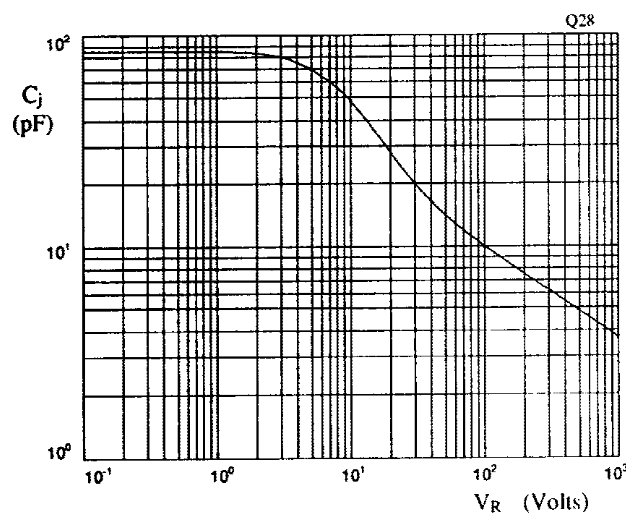


Fig 4. Typical junction capacitance as a function of reverse voltage.

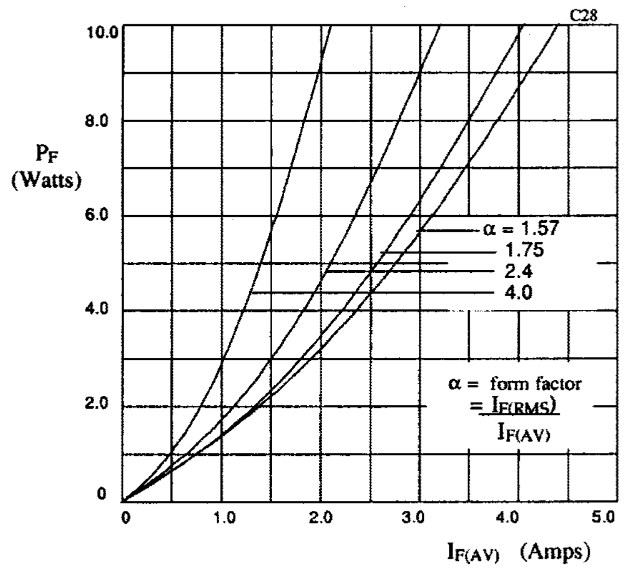


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

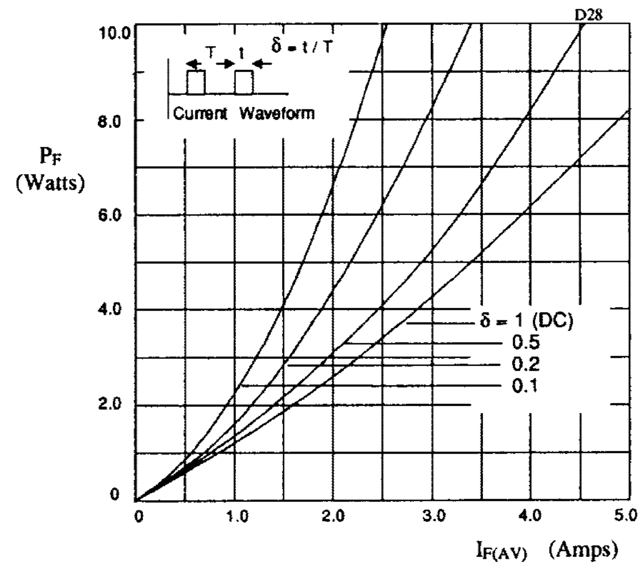


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

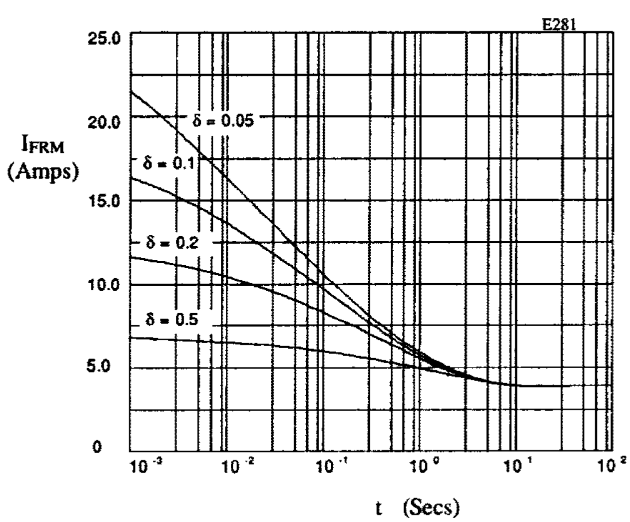


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 22 °C/W; V_{RWM} during 1 - δ.

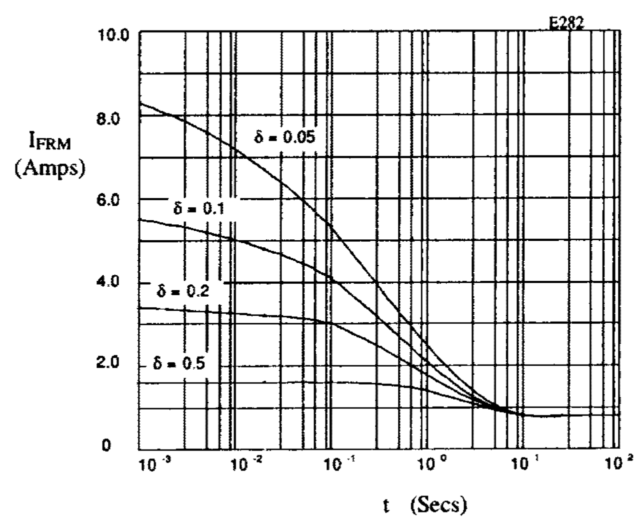


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 75 °C/W; V_{RWM} during 1 - δ.

SEMTECH

RECTIFIER, up to 200V, 4A, 30ns — **3PFT05 3PFT1 3PFT15 3PFT2**

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Low forward voltage drop
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics

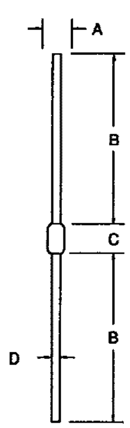
QUICK REFERENCE DATA

- V_R = 50 - 200V
- I_F = 4.0A
- t_{rr} = 30nS
- V_F = 1.05V

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	3PFT05	3PFT1	3PFT15	3PFT2	Unit
Working reverse voltage	V_{RWM}	50	100	150	200	V
Repetitive reverse voltage	V_{RRM}	50	100	150	200	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	←	4.0		→	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	←	25		→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	←	90		→	A
Storage temperature range	T_{STG}	←	-65 to +175		→	°C
Operating temperature range	T_{OP}	←	-65 to +175		→	°C

MECHANICAL



G83

DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	4.50	-	.177	-
B	28.0	-	1.10	-	-
C	-	5.00	-	.197	-
D	-	1.35	-	.053	-

Weight = 0.029oz

These products are qualified in Europe to DEF STAN 59-61 (PART 80)/029 available to F and FX levels.

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	3PFT05 3PFT1 3PFT15 3PFT2	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)			
for sine wave	$I_{F(AV)}$	← 1.8 →	A
for square wave (d = 0.5)	$I_{F(AV)}$	← 1.9 →	A
Average forward current max. ($T_L = 55^oC$; L = 3/8")			
for sine wave	$I_{F(AV)}$	← 3.8 →	A
for square wave	$I_{F(AV)}$	← 4.0 →	A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 33 →	A^2S
Forward voltage drop max. @ $I_F = 3.5A$, $T_j = 25^oC$	V_F	← 1.05 →	V
Reverse current max.			
@ V_{RWM}, $T_j = 25^oC$	I_R	← 1.0 →	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	← 10 →	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	← 30 →	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	← 92 →	pF

THERMAL CHARACTERISTICS

	Symbol	3PFT05 3PFT1 3PFT15 3PFT2	Unit
Thermal resistance - junction to lead			
Lead length = 0.375"	$R_{\theta JL}$	← 26 →	°C/W
Lead length = 0.0"	$R_{\theta JL}$	← 12 →	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	← 75 →	°C/W

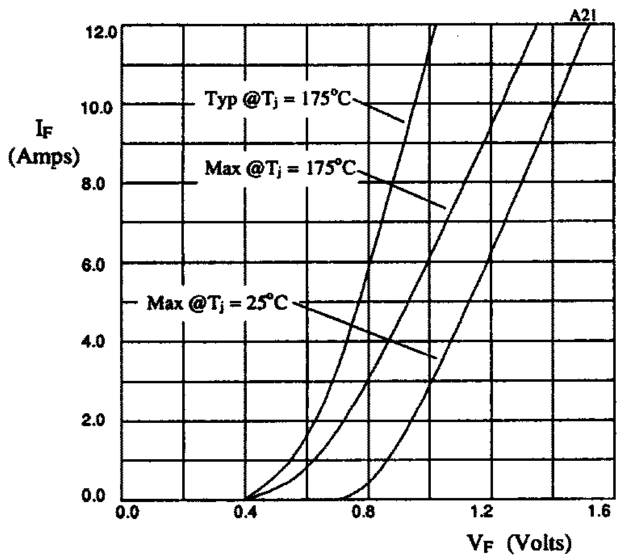


Fig 1. Forward voltage drops as a function of forward current.

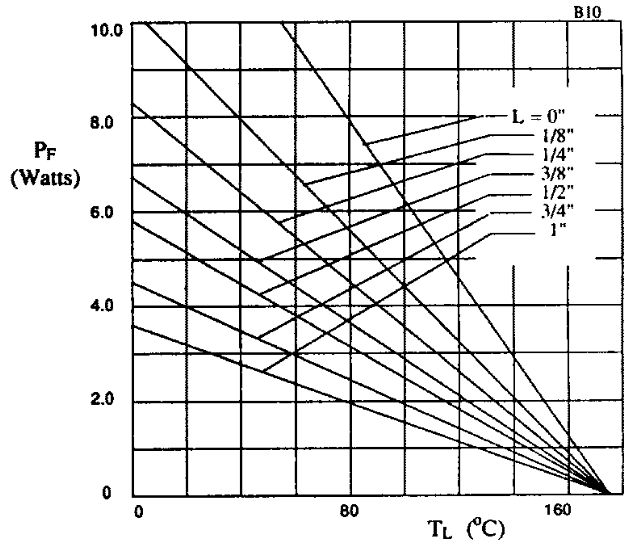


Fig 2. Maximum power versus lead temperature.

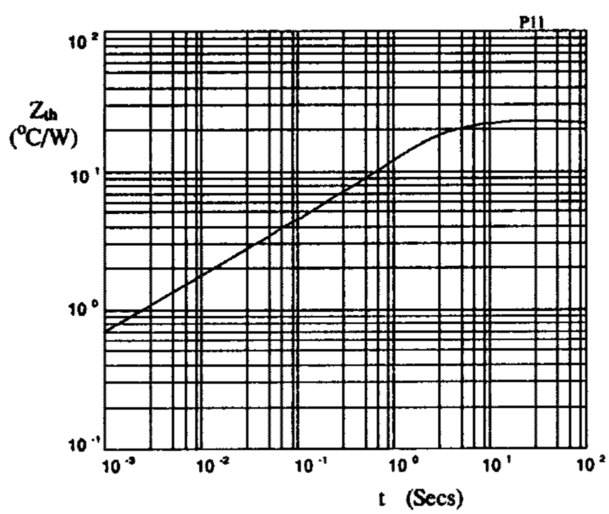


Fig 3. Transient thermal impedance characteristic.

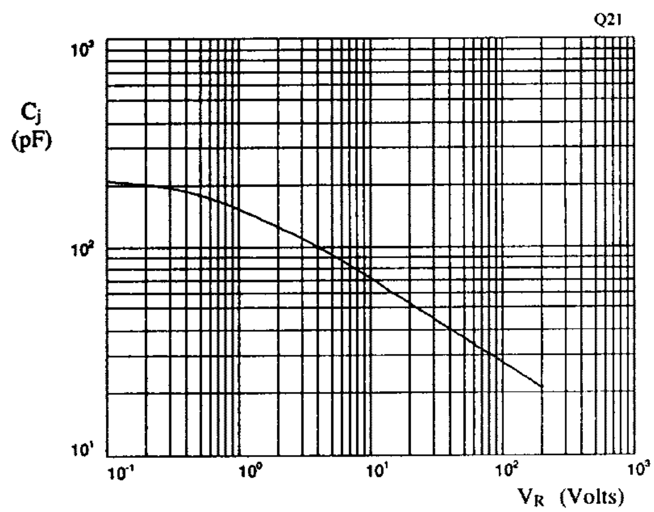


Fig 4. Typical junction capacitance as a function of reverse voltage.

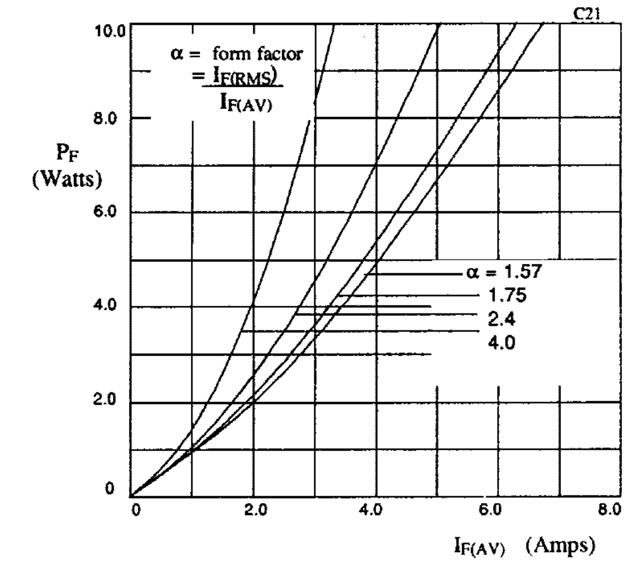


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

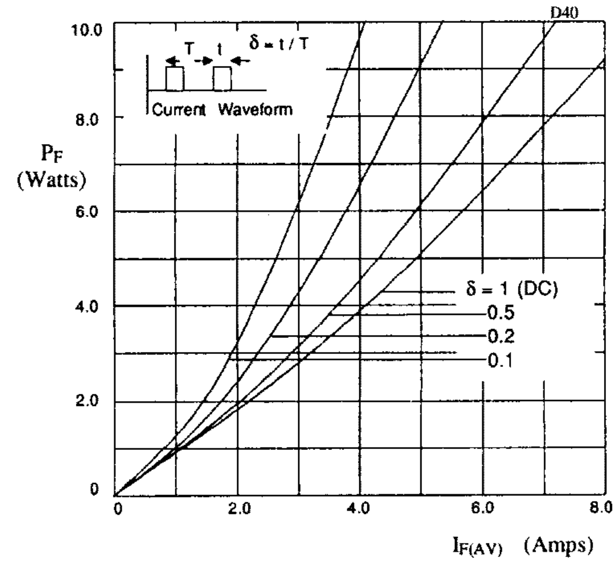


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

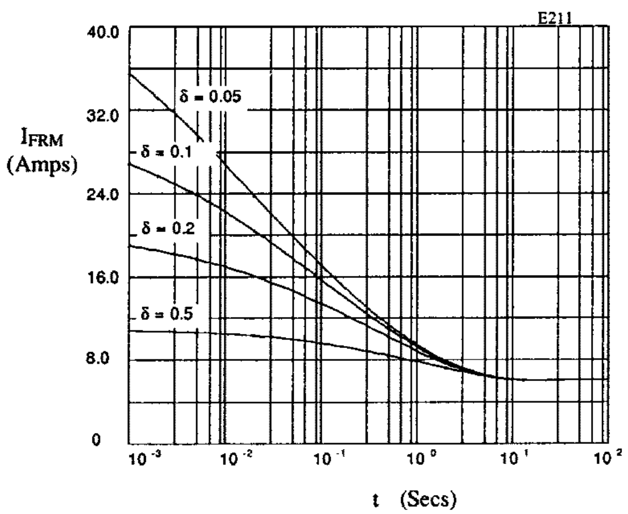


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 22 °C/W; V_{RWM} during 1 - δ.

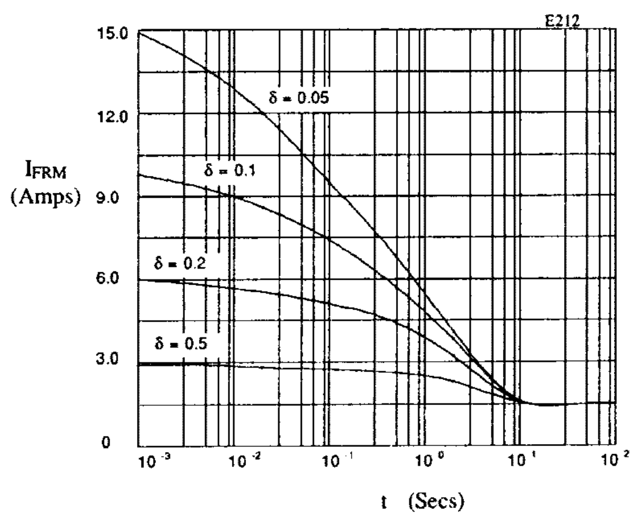


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 75 °C/W; V_{RWM} during 1 - δ.

2

AXIAL LEADED HERMETICALLY SEALED FAST RECOVERY RECTIFIER DIODE

- Low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- High thermal shock resistance
- Soft, non-snap off, recovery characteristics

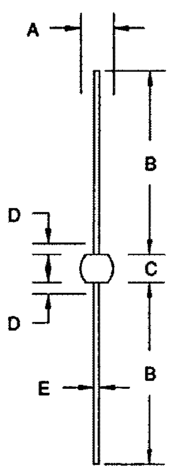
QUICK REFERENCE DATA

- V_R = 1000V
- I_F = 3.25A
- t_{rr} = 150nS
- I_R = 1µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	3SFR0	Unit
Working reverse voltage	V_{RWM}	1000	V
Repetitive reverse voltage	V_{RRM}	1000	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	3.25	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	15.0	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	80.0	A
Storage temperature range	T_{STG}	-65 to +175	°C
Operating temperature range	T_{OP}	-65 to +175	°C

MECHANICAL



G4

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	3.4	4.6	.135	.180	-
B	22.9	33.0	.90	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.91	1.07	.036	.042	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.039oz

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	3SFR0	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$)			
for sine wave	$I_{F(AV)}$	1.2	A
for square wave (d = 0.5)	$I_{F(AV)}$	1.3	A
Average forward current max. ($T_L = 55°C$; L = 3/8")			
for sine wave	$I_{F(AV)}$	3.00	A
for square wave	$I_{F(AV)}$	3.25	A
I^2t for fusing (t = 8.3mS) max.	I^2t	26	A^2S
Forward voltage drop max. @ $I_F = 3.0A$, $T_j = 25°C$	V_F	1.5	V
Reverse current max.			
@ V_{RWM}, $T_j = 25°C$	I_R	1.0	µA
@ V_{RWM}, $T_j = 100°C$	I_R	25	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	150	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	80	pF

THERMAL CHARACTERISTICS

	Symbol	3SFR0	Unit
Thermal resistance - junction to lead			
Lead length = 0"	$R_{\theta JL}$	4	°C/W
Lead length = 0.375"	$R_{\theta JL}$	20	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	75	°C/W

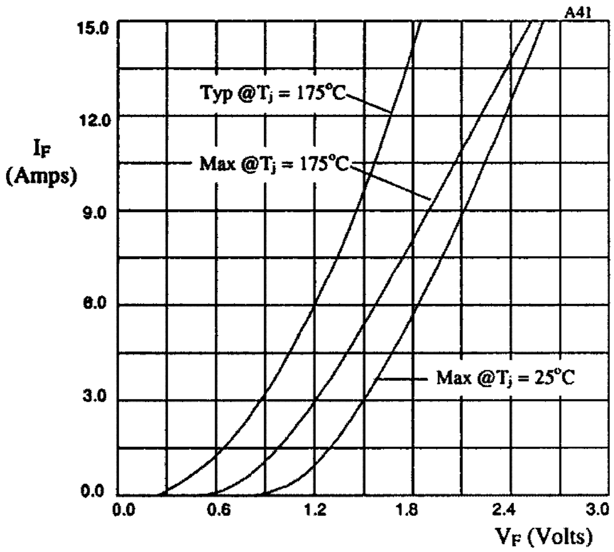


Fig 1. Forward voltage drop as a function of forward current.

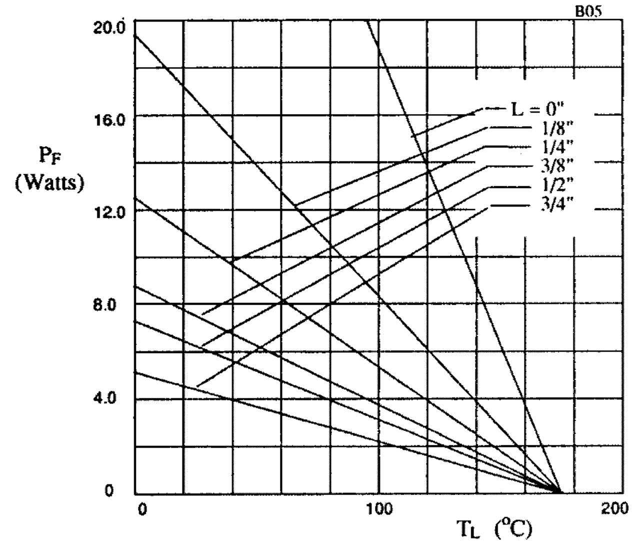


Fig 2. Maximum power versus lead temperature.

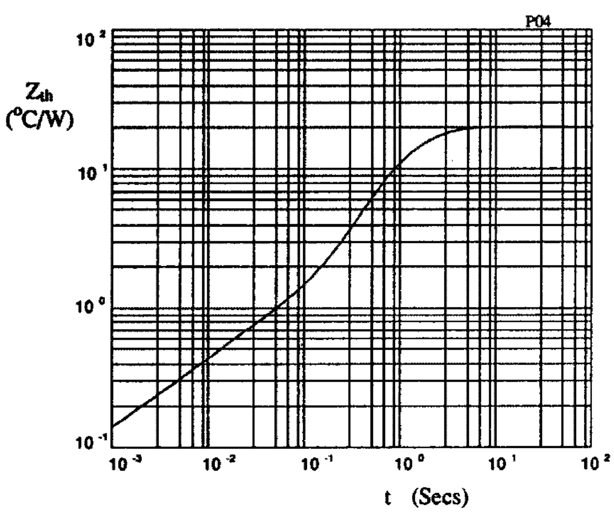


Fig 3. Transient thermal impedance characteristic.

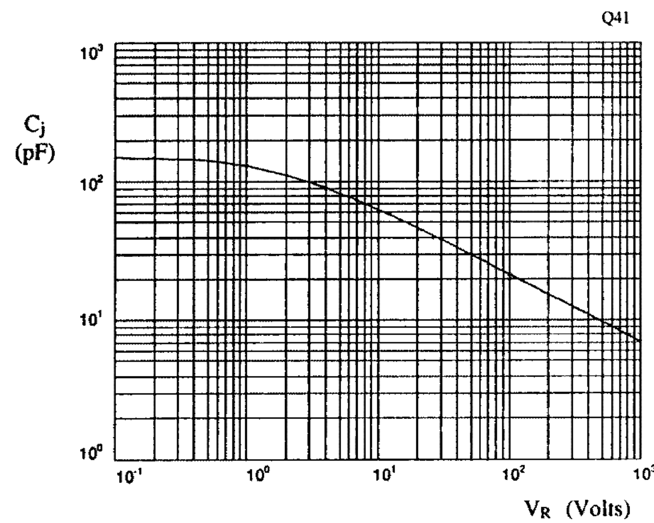


Fig 4. Typical junction capacitance as a function of reverse voltage.

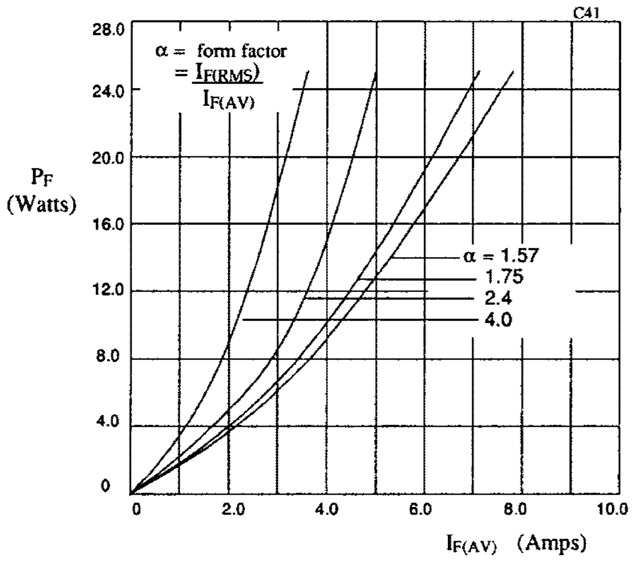


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

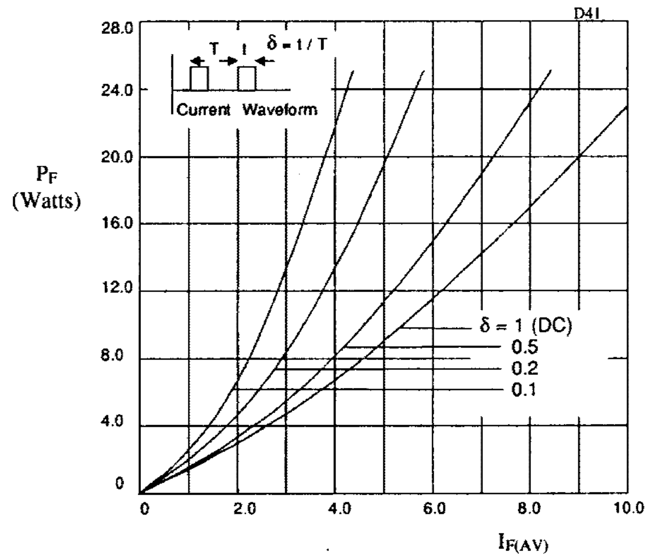


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

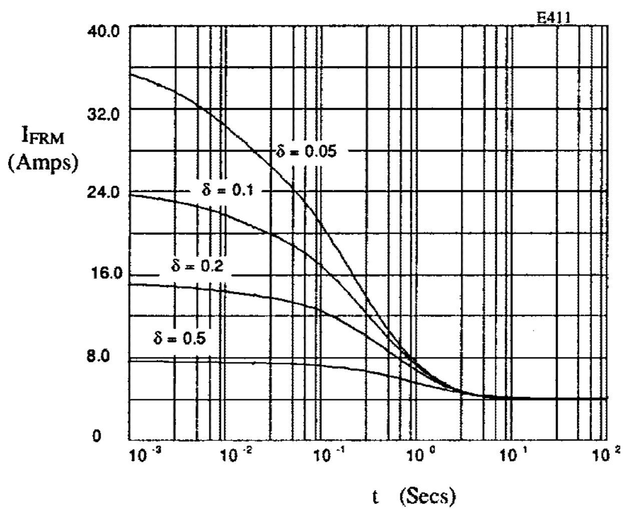


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 20 °C/W; V_{RWM} during 1 - δ.

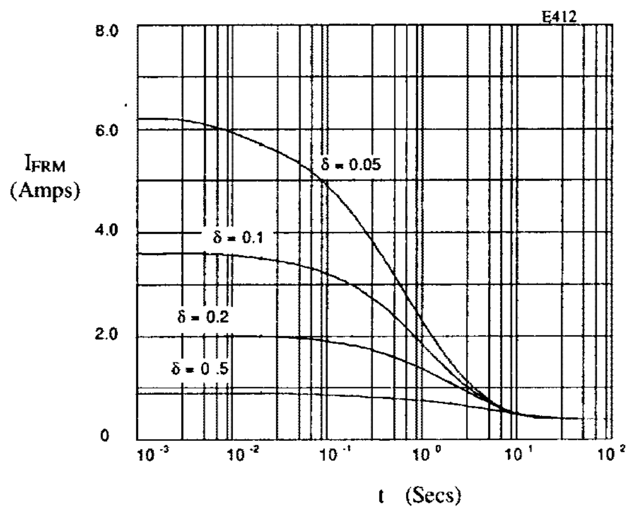


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 80 °C/W; V_{RWM} during 1 - δ.

QUICK REFERENCE DATA

- V_R = 1500 - 3000V
- I_F = 0.35A
- t_{rr} = 250nS
- I_R = 0.25µA

AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE FAST RECTIFIER DIODE

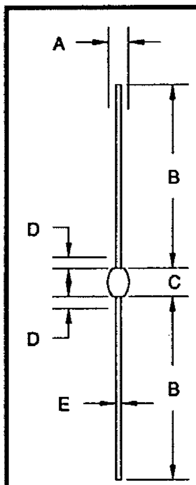
- Low reverse recovery time
- High thermal shock resistance
- Hermetically sealed with Metoxilite metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	F15	F20	F25	F30	Unit
Working reverse voltage	V_{RWM}	1500	2000	2500	3000	V
Repetitive reverse voltage	V_{RRM}	1500	2000	2500	3000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	← 0.35 →				A
Repetitive surge current (@ 55°C)	I_{FRM}	← 1.25 →				A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 5.0 →				A
Storage temperature range	T_{STG}	← -65 to +175 →				°C
Operating temperature range	T_{OP}	← -65 to +175 →				°C

MECHANICAL

These products are available in Europe to DEF STAN 59-61 (PART 80)/034 to F and FX levels.



G66

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	2.3	-	.09	-
B	25.4	33.0	1.00	1.30	-
C	4.6	5.3	.18	.21	-
D	-	.80	-	.030	1
E	.53	.66	.021	.026	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.011oz

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	F15 F20 F25 F30	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)			
for sine wave	$I_{F(AV)}$	← 0.16 →	A
for square wave (d = 0.5)	$I_{F(AV)}$	← 0.20 →	A
Average forward current max. (unstirred oil at 55°C)			
for sine wave	$I_{F(AV)}$	← 0.33 →	A
for square wave	$I_{F(AV)}$	← 0.35 →	A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 0.10 →	A^2S
Forward voltage drop max. @ $I_F = 0.10A$, $T_j = 25^oC$	V_F	← 5.00 →	V
Reverse current max.			
@ V_{RWM}, $T_j = 25^oC$	I_R	← 0.25 →	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	← 10 →	µA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}.	t_{rr}	← 250 →	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	← 2.5 →	pF
Thermal resistance - junction to oil			
Stirred oil	$R_{\theta JO}$	← 30 →	°C/W
Unstirred oil	$R_{\theta JO}$	← 48 →	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	← 120 →	°C/W

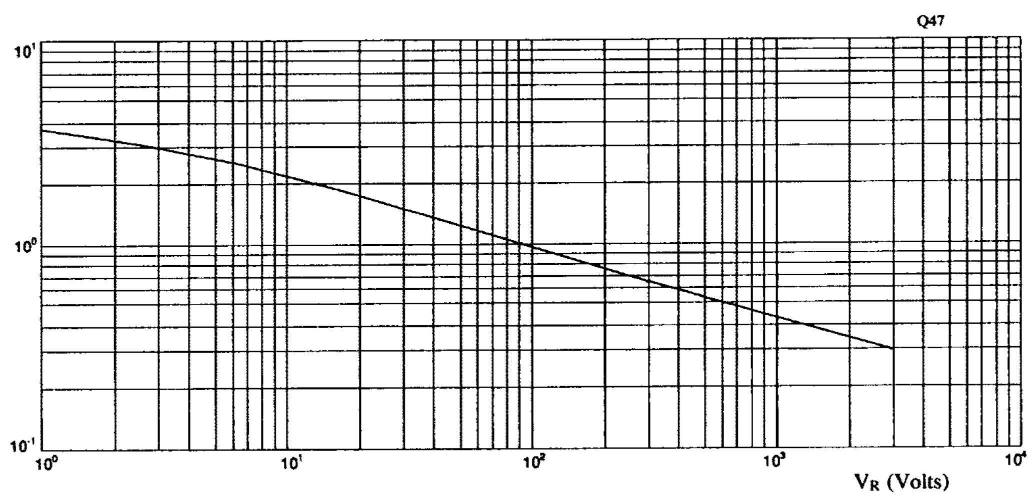


Fig 1. Junction capacitance against reverse voltage.

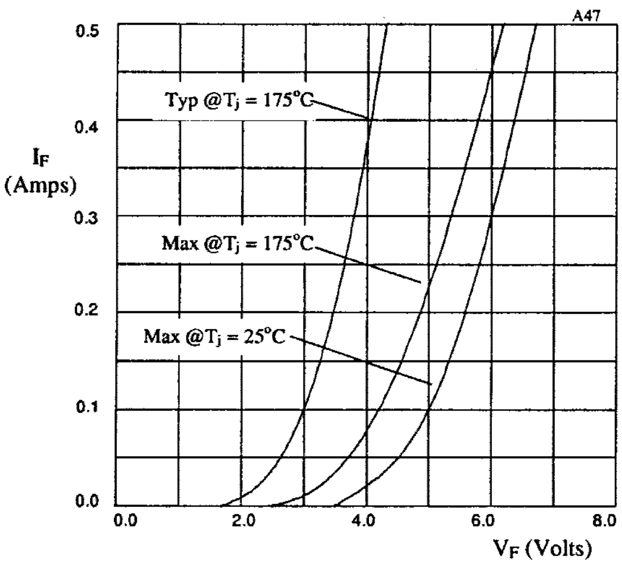


Fig 2. Forward voltage drop as a function of forward current.

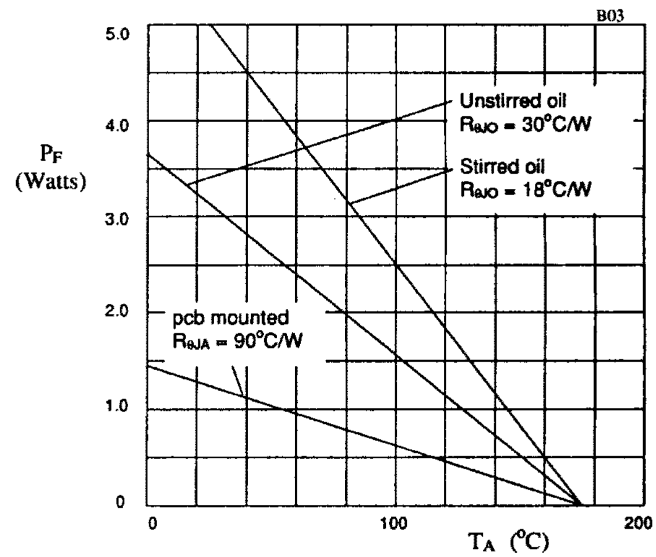


Fig 3. Power derating in air and oil.

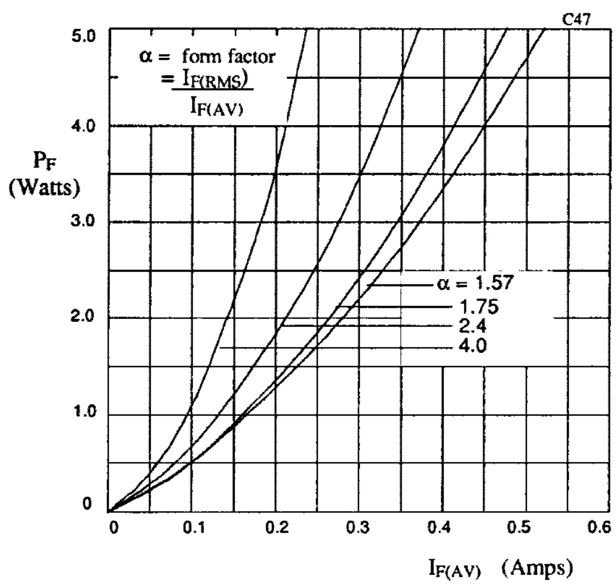


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

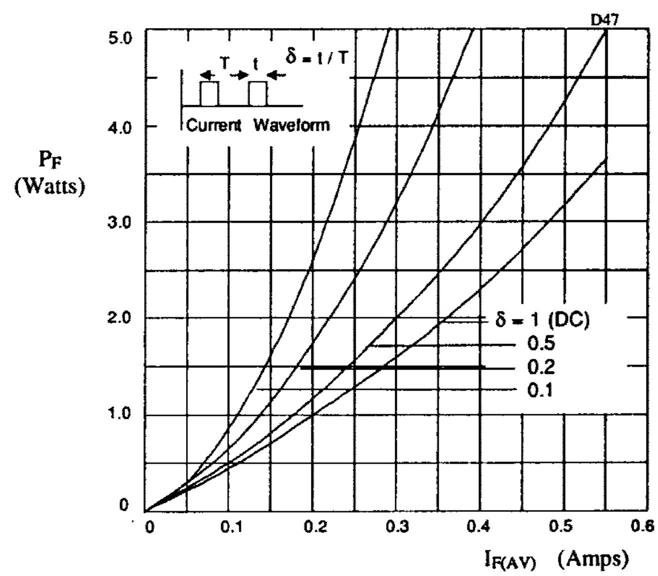


Fig 5. Forward power dissipation as a function of forward current, for square wave operation.

SEMTECH

RECTIFIER, up to 6kV, 100mA, 300ns

F40A
F50A
F60A

2

AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE FAST RECTIFIER DIODE

- Low reverse recovery time
- High thermal shock resistance
- Hermetically sealed with Metoxilite metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

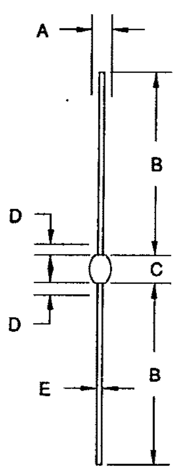
QUICK REFERENCE DATA

- V_R = 4 - 6kV
- I_F = 0.25A
- t_{rr} = 300nS
- I_R = 1µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	F40A	F50A	F60A	Unit
Working reverse voltage	V_{RWM}	4000	5000	6000	V
Repetitive reverse voltage	V_{RRM}	4000	5000	6000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	←	0.10	→	A
Repetitive surge current (@ 55°C)	I_{FRM}	←	0.75	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	←	2.50	→	A
Storage temperature range	T_{STG}	←	-65 to +175	→	°C
Operating temperature range	T_{OP}	←	-65 to +175	→	°C

MECHANICAL



G42

DIM N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	2.3	-	.09	-
B	25.4	33.0	1.00	1.30	-
C	5.6	6.6	.22	.26	-
D	-	.80	-	.030	1
E	.53	.66	.021	.026	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.018oz

These products are available in Europe to DEF STAN 59-61 (PART 80)/034 to F and FX levels.

2

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	F40A F50A F60A	Unit
Average forward current max. (pcb mounted; T_A = 55°C)			
for sine wave	$I_{F(av)}$	← 0.12 →	A
for square wave (d = 0.5)	$I_{F(av)}$	← 0.13 →	A
Average forward current max. (unstirred oil at 55°C)			
for sine wave	$I_{F(av)}$	← 0.23 →	A
for square wave	$I_{F(av)}$	← 0.25 →	A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 0.026 →	A^2S
Forward voltage drop max. @ I_F = 50mA, T_j = 25°C	V_F	← 8.0 →	V
Reverse current max.			
@ V_{RWM}, T_j = 25°C	I_R	← 1.0 →	µA
@ V_{RWM}, T_j = 100°C	I_R	← 10 →	µA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}.	t_{rr}	← 300 →	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	← 2.0 →	pF
Thermal resistance - junction to oil			
Stirred oil	$R_{\theta JO}$	← 26 →	°C/W
Unstirred oil	$R_{\theta JO}$	← 40 →	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	← 95 →	°C/W

Q54

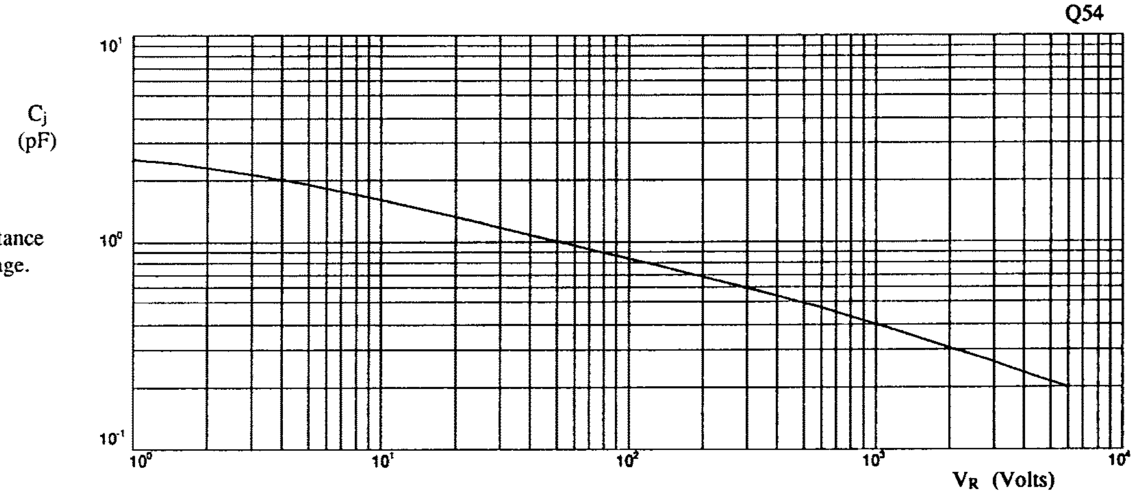


Fig 1 Junction capacitance against reverse voltage.

2

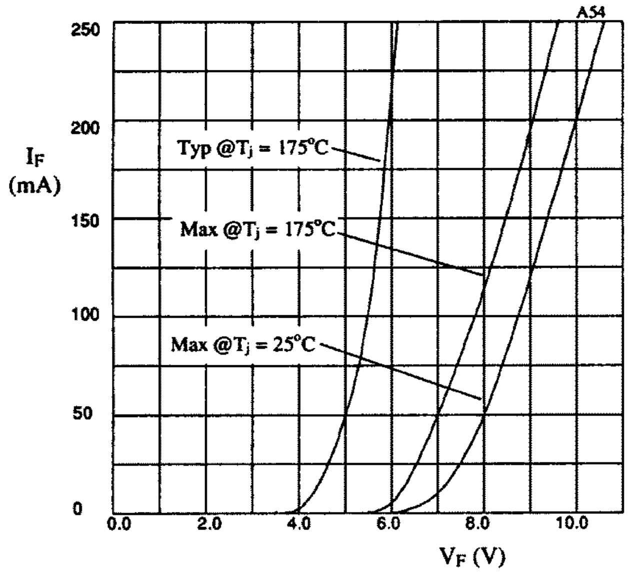


Fig 2. Forward voltage drop as a function of forward current.

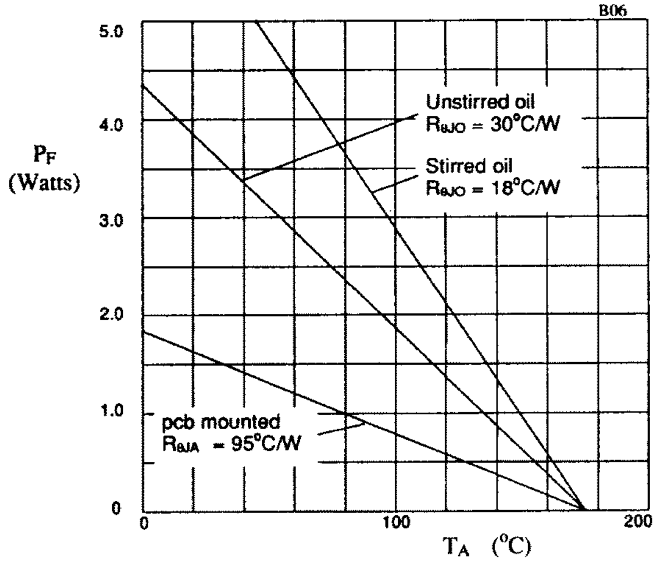


Fig 3. Power derating in air and oil.

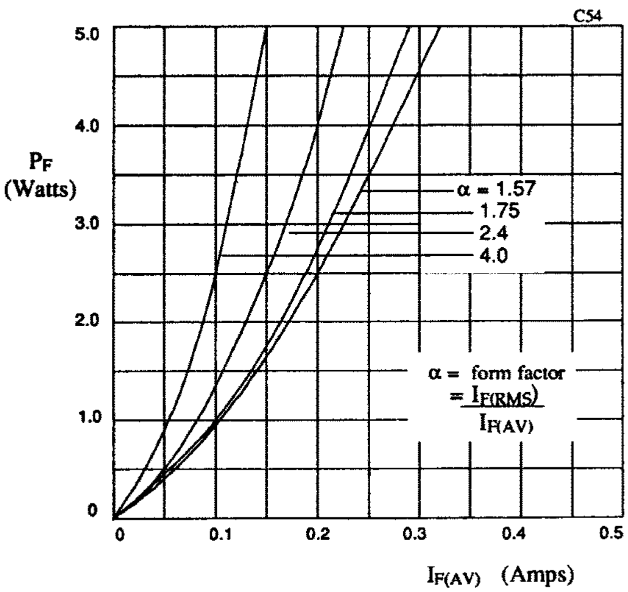


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

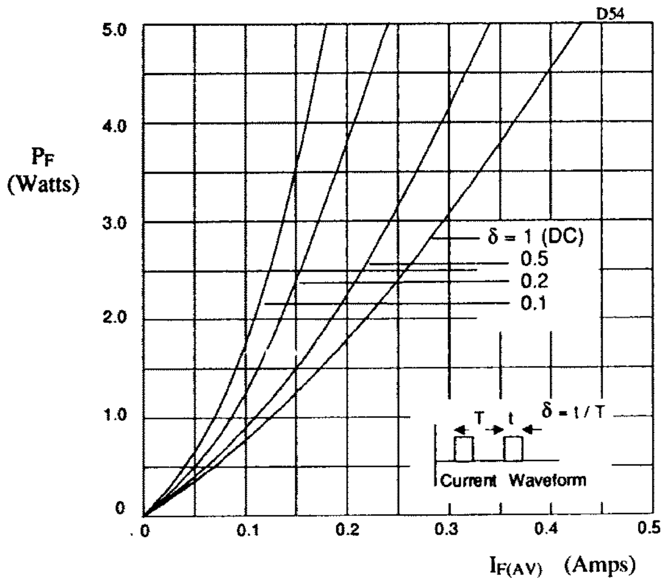


Fig 5. Forward power dissipation as a function of forward current, for square wave operation.

2

QUICK REFERENCE DATA

- V_R = 2kV - 3kV
- I_F = 330mA
- t_{rr} = 2.0µS
- I_R = 0.25µA

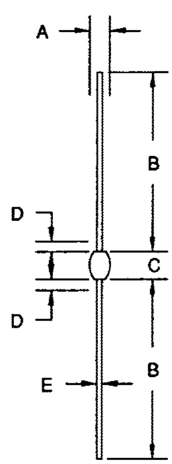
AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE STANDARD RECOVERY RECTIFIER DIODE

- High thermal shock resistance
- Hermetically sealed with Metoxilite fused metal oxide
- Low reverse leakage currents
- Miniature packaging
- Monolythic cavity free

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	M20	M30	Unit
Working reverse voltage	V_{RWM}	2000	3000	V
Repetitive reverse voltage	V_{RRM}	2000	3000	V
Surge reverse voltage	V_{RSM}	2000	3000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	← 330 →		mA
Repetitive surge current (@ 55°C)	I_{FRM}	← 1.3 →		A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 7.0 →		A
Storage temperature range	T_{STG}	-65 to +175		°C
Operating temperature range	T_{OP}	-65 to +175		°C

MECHANICAL



G66

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	2.3	-	.09	-
B	25.4	33.0	1.00	1.30	-
C	4.6	5.3	.18	.21	-
D	-	.80	-	.030	1
E	.53	.66	.021	.026	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.01oz

2

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	M20 M30	Unit
Average forward current for sine wave - max. pcb mounted; T_A = 55°C - max. in unstirred oil	 $I_{F(AV)}$ $I_{F(AV)}$	 ← 175 → ← 330 →	 mA mA
I^2t for fusing (t = 8.3mS) max.	I^2t	← 0.2 →	A^2S
Forward voltage drop max. @ I_F = 125mA, T_j = 25°C	 V_F	 ← 5.0 →	 V
Reverse current max. @ V_{RWM}, T_j = 25°C @ V_{RWM}, T_j = 100°C	 I_R I_R	 ← 0.25 → ← 10 →	 µA µA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}.	t_{rr}	← 2.0 →	µS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	← 1.7 →	pF
Thermal resistance - junction to oil Unstirred @ 55°C Stirred @ 55°C	 $R_{\theta JO}$ $R_{\theta JO}$	 ← 48 → ← 30 →	 °C/W °C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	← 120 →	°C/W

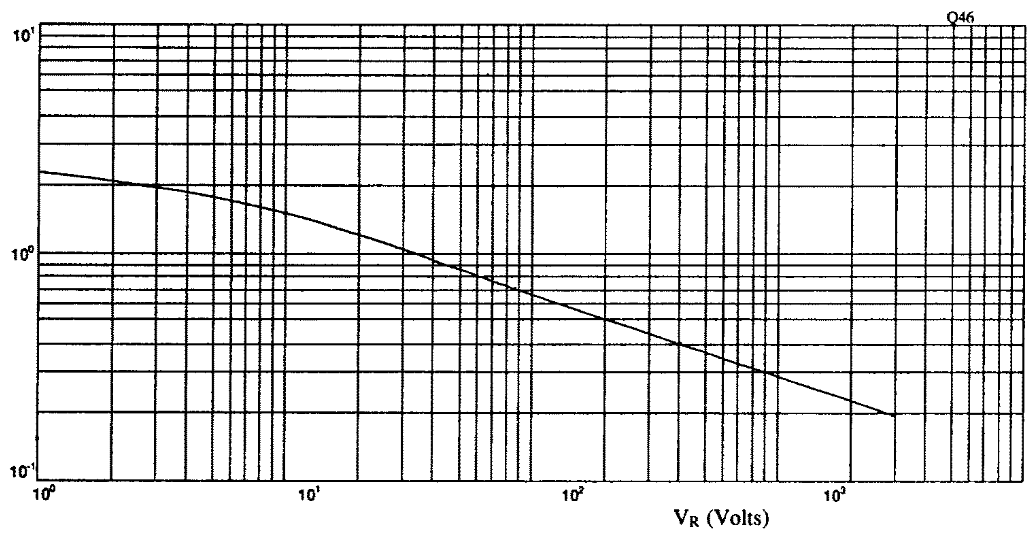


Fig 1. Junction capacitance against reverse voltage.

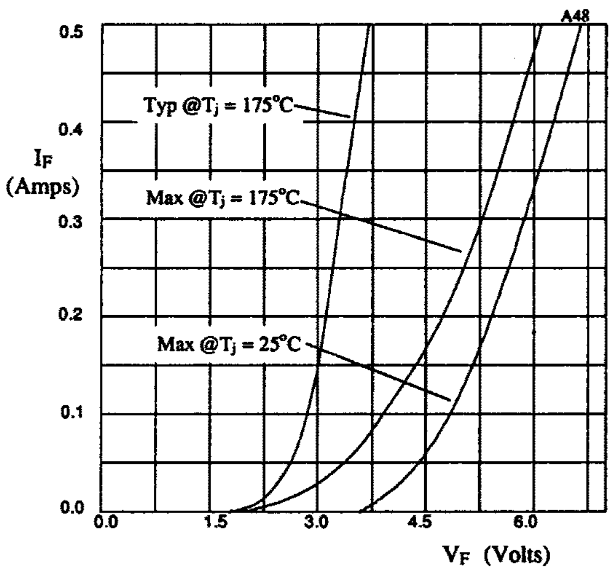


Fig 2. Forward voltage drop as a function of forward current.

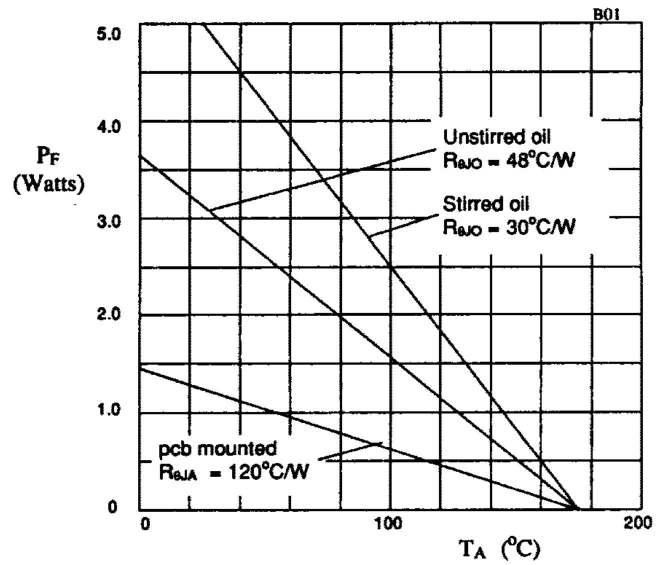


Fig 3. Power derating in air and oil.

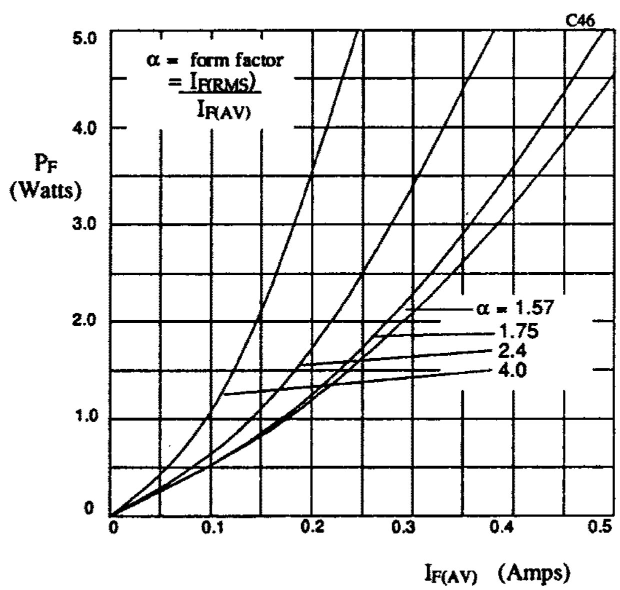


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

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AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE STANDARD RECOVERY RECTIFIER DIODE

- Low reverse leakage currents
- Hermetically sealed with Metoxilite fused metal oxide
- Good thermal shock resistance
- Subminiature packaging
- Multi-junction construction

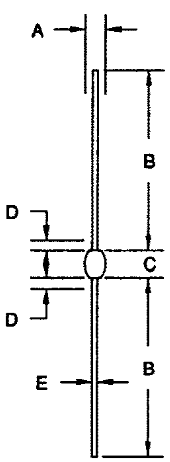
QUICK REFERENCE DATA

- V_R = 5kV - 6kV
- I_F = 260mA
- t_{rr} = 5µS
- I_R = 0.25µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	M50A	M60A	Unit
Working reverse voltage	V_{RWM}	5000	6000	V
Repetitive reverse voltage	V_{RRM}	5000	6000	V
Surge reverse voltage	V_{RSM}	5000	6000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	← 260 →		mA
Repetitive surge current (@ 55°C in oil, lead length 0.375")	I_{FRM}	← 1.0 →		A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 5.0 →		A
Storage temperature range	T_{STG}	-65 to +175		°C
Operating temperature range	T_{OP}	-65 to +175		°C

MECHANICAL



G10

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	2.3	-	.09	-
B	25.4	33.0	1.00	1.30	-
C	4.6	5.8	.18	.23	-
D	-	.80	-	.030	1
E	.53	.66	.021	.026	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.01oz

2

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	M50A	M60A	Unit
Average forward current for sine wave				
- max. pcb mounted T_A = 55°C	$I_{F(AV)}$	← 145 →		mA
- max. in unstirred oil @ 55°C	$I_{F(AV)}$	← 260 →		mA
I^2t for fusing (t = 8.3mS) max.	I^2t	← 0.10 →		A^2S
Forward voltage drop max. @ I_F = 50mA, T_j = 25°C	V_F	← 6.0 →		V
Reverse current max.				
@ V_{RWM}, T_j = 25°C	I_R	← 0.25 →		µA
@ V_{RWM}, T_j = 100°C	I_R	← 10 →		µA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}.	t_{rr}	← 5.0 →		µS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	← 1.6 →		pF
Thermal resistance - junction to oil				
Stirred oil @ 55°C	$R_{\theta JO}$	← 26 →		°C/W
Unstirred oil @ 55°C	$R_{\theta JO}$	← 40 →		°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	← 95 →		°C/W

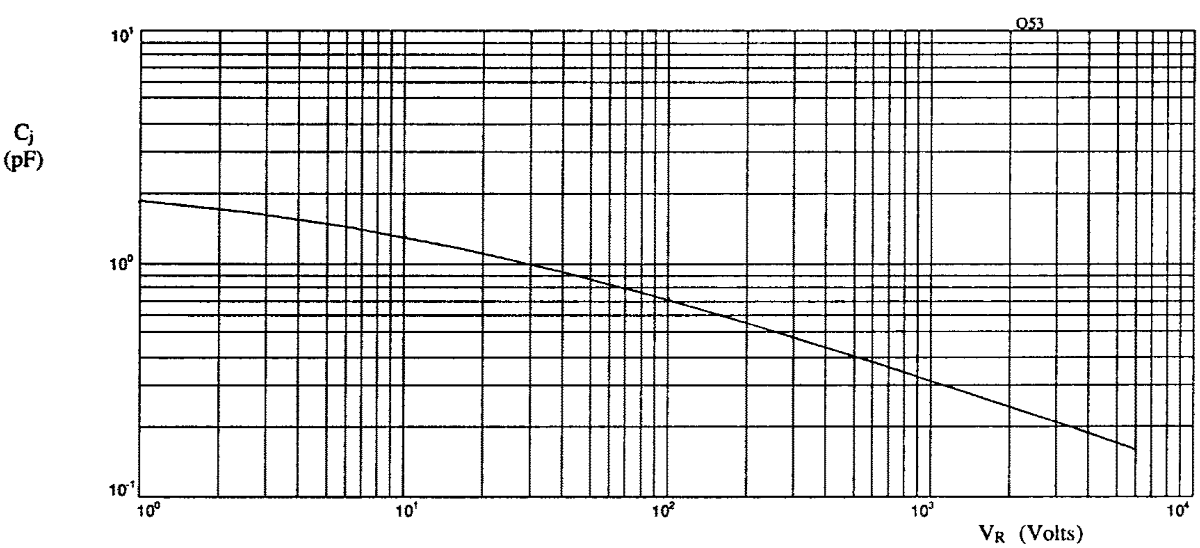


Fig 1. Typical junction capacitance as a function of reverse voltage.

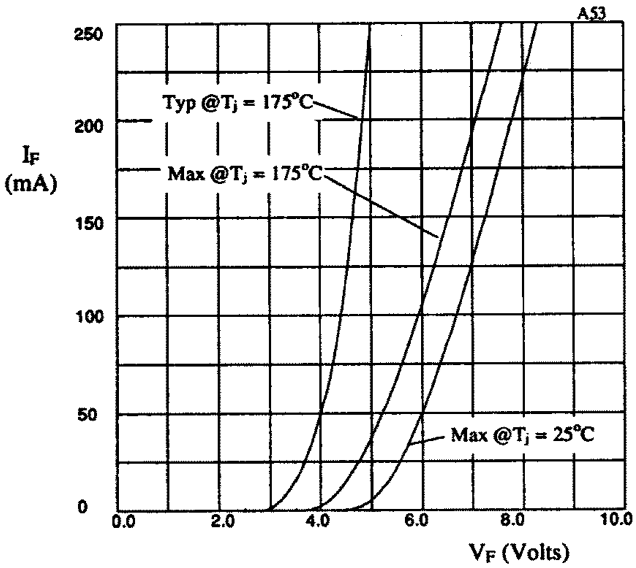


Fig 2. Forward voltage drop as a function of forward current.

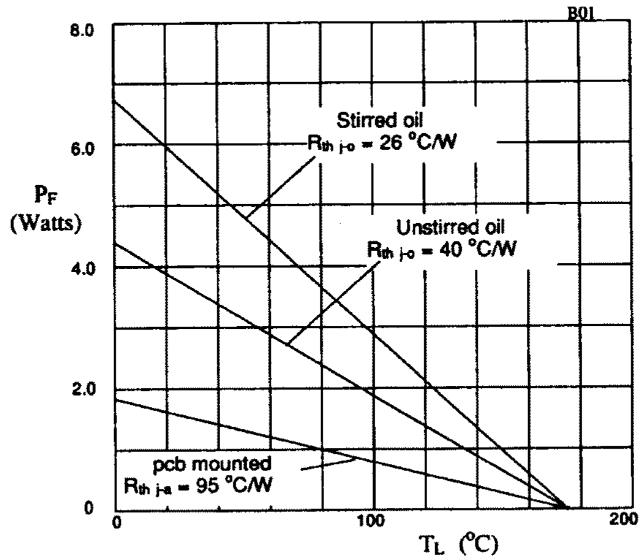


Fig 3. Power derating in air and oil.

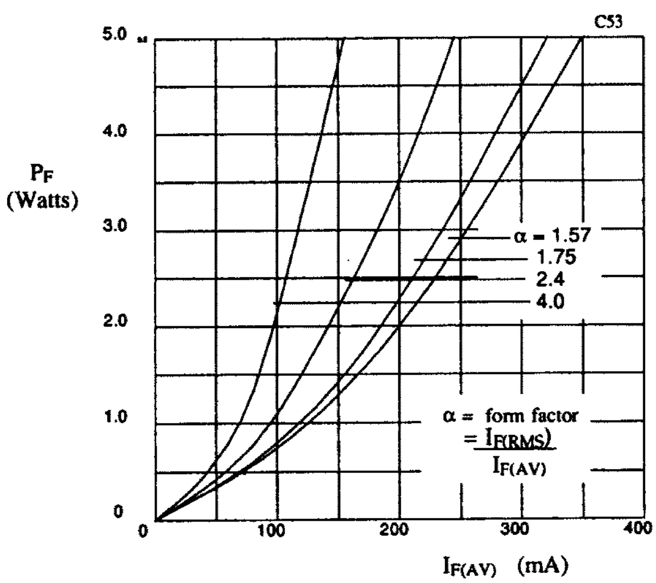


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

Axial Leaded Hermetically Sealed High Voltage Fast Rectifier Diode

POWER DISCRETES

2

Description

Quick reference data

V_R = 2000V
I_F = 100mA
t_{rr} = 200nS
I_R = 0.25µA

Features

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PF20	Units
Working Reverse Voltage	V_{RWM}	2000	V
Repetitive Reverse Voltage	V_{RRM}	2200	V
Average Forward Current @ 55°C in oil	$I_{F(AV)}$	100	mA
Repetitive Surge Current @ 55°C	I_{FRM}	0.5	A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	1.0	A
Storage Temperature Range	T_{STG}	-65 to +150	°C

SEMTECH

POWER DISCRETES

Electrical Specifications

	Symbol	PF20	Units
Average Forward Current max (pcb mounted, T_A = 55°C) for sine wave for square wave, d = 0.5	 $I_{F(AV)}$ $I_{F(AV)}$	 60 65	mA
Average Forward Current max (unstirred oil @ 55°C) for sine wave for square wave	 $I_{F(AV)}$ $I_{F(AV)}$	 90 100	mA
I^2t for fusing, t = 8.3mS max	I^2t	0.004	A^2S
Forward Voltage Drop max. @ I_F = 50mA, T_j = 25°C	V_F	6.0	V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	 I_R I_R	 0.25 10	µA
Reverse Recovery Time max. 50mA I_F to 100mA I_{RM} recovers to 0.25mA $I_{RM(REC)}$	trr	200	nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	2	pF

2

Thermal Characteristics

	Symbol	PF20	Units
Thermal Resistance-Junction to Oil Unstirred oil	$R_{\theta\ JO}$	75	°C/W

POWER DISCRETES

Typical Characteristics

2

Figure 1.

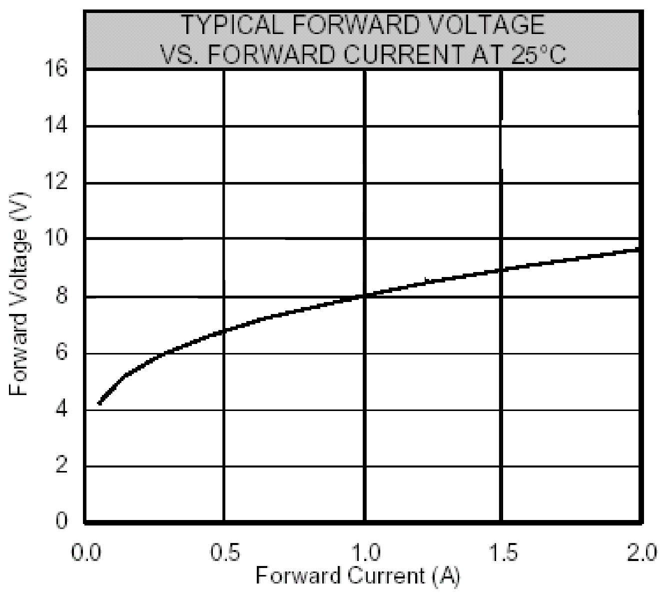


Figure 2.

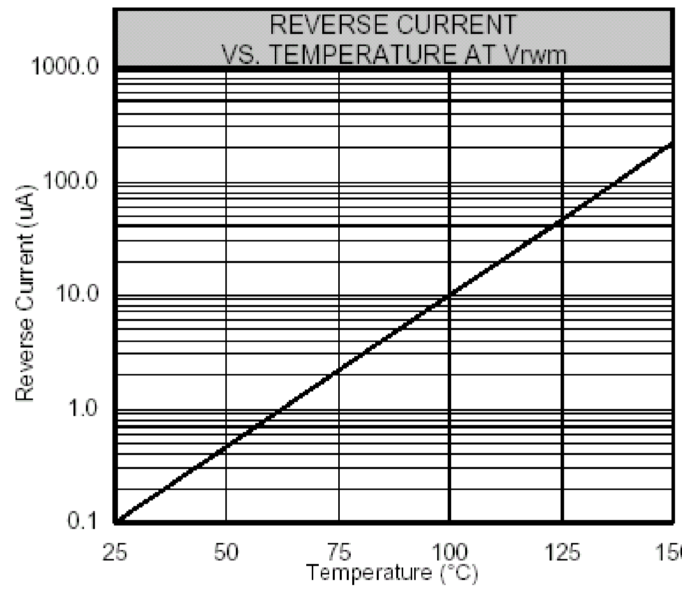
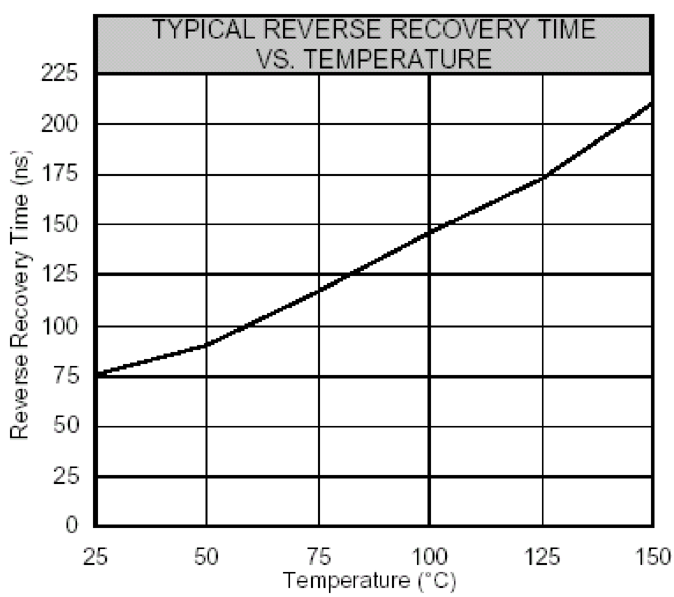


Figure 3.



SEMTECH

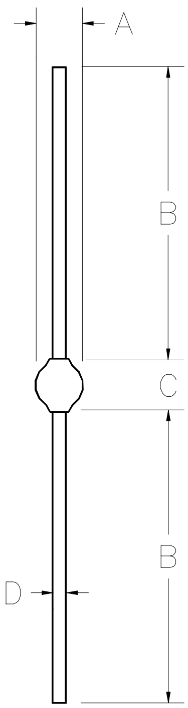
POWER DISCRETES

Ordering Information

Part Number	Description
PF20	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIMN	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	0.13	-	3.3	-
B	1.00	-	25.4	-	-
C	-	0.300	-	7.62	-
D	-	.026	-	.65	-

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

Axial Leaded Hermetically Sealed Fast Rectifier Diode

Description

Quick reference data

V_R = 800 & 1000V
I_F = 1.8A
t_{rr} = 300nS
I_R = 1μA

Features

- Low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristic
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PF8	PF0	Units
Working Reverse Voltage	V_{RWM}	800	1000	V
Repetitive Reverse Voltage	V_{RRM}	800	1000	V
Surge Reverse Voltage	V_{RSM}	900	1100	V
Average Forward Current @ 55°C, lead length 0.375"	$I_{F(AV)}$	1.8		A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	50		A
Storage Temperature Range	T_{STG}	-55 to +175		°C

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PF8/PF0	Units
Average Forward Current max. (pcb mounted)	$I_{F(AV)}$	0.85	A
Average Forward Current max. L = 10mm	$I_{F(AV)}$	1.8	A
Forward Voltage Drop max. @ I_F = 1.5A, Tj = 25°C	V_F	1.35	V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	1 15	μA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25mA $I_{RM(REC)}$	trr	300	nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	18	pF

Thermal Characteristics

	Symbol	PF8/PF0	Units
Thermal Resistance-Junction to Lead Lead length = 0" Lead length = 0.375"	$R_{\theta\ JL}$	19 47	°C/W

POWER DISCRETES

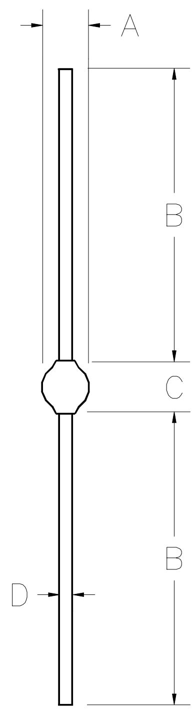
Ordering Information

Part Number	Description
PF8/PF0	Axial leaded hermetically sealed(1)

2

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIM^N	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	0.150	-	3.81	-
B	1.014	-	26	-	-
C	-	0.180	-	4.57	-
D	-	0.032	-	0.82	-

Weight = 369mg

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

PFF2, PFF4, PFF6
Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode

SEMTECH

POWER DISCRETES

2

Description

Quick reference data

V_R = 200 - 600V
I_F = 1.25A
t_{rr} = 30nS
I_R = 1µA

Features

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PFF2	PFF4	PFF6	Units
Working Reverse Voltage	V_{RWM}	200	400	600	V
Repetitive Reverse Voltage	V_{RRM}	200	400	600	V
Average Forward Current @ 55°C in free air, lead length 0.375"	$I_{F(AV)}$	1.25			A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	4.25			A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	22.0			A
Storage Temperature Range	T_{STG}	-65 to +175			°C
Operating Temperature Range	T_{OP}	-65 to +175			°C

2

Electrical Specifications

	Symbol	PFF2	PFF4	PFF6	Units
Average Forward Current max (pcb mounted, T_A = 55°C) for sine wave for square wave	$I_{F(AV)}$ $I_{F(AV)}$	0.7 0.75			A
Average Forward Current max. (T_L = 55°C; L = 3/8") for sine wave for square wave	$I_{F(AV)}$ $I_{F(AV)}$	1.15 1.25			A
I^2t for fusing (t = 8.3mS) max.	I^2t	2.00			A^2S
Forward Voltage Drop max. @ I_F = 1.0A, T_j = 25°C	V_F	2.50			V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	1.0 10.0			μA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	30			nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	30			pF

Thermal Characteristics

	Symbol	PFF2, PFF4, PFF6	Units
Thermal Resistance-Junction to Lead Lead length = 0.375" Lead length = 0.0"	$R_{\theta\ JL}$	47 19	°C/W
Thermal Resistance-Junction to Ambient on 0.06" thick pcb. 1 oz. copper	$R_{\theta\ JA}$	100	°C/W

POWER DISCRETES

Maximum Characteristics

2

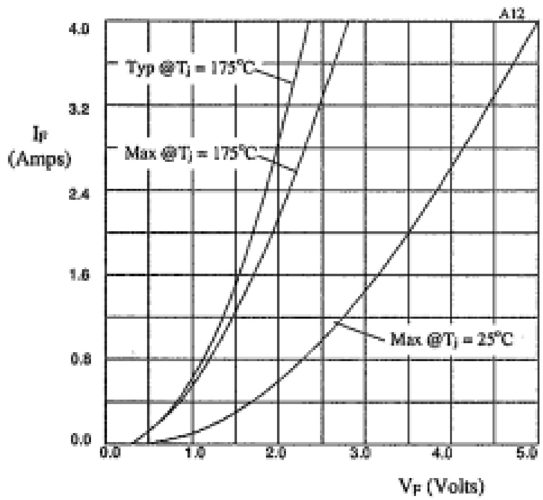


Figure 1. Forward voltage drops as a function of forward current.

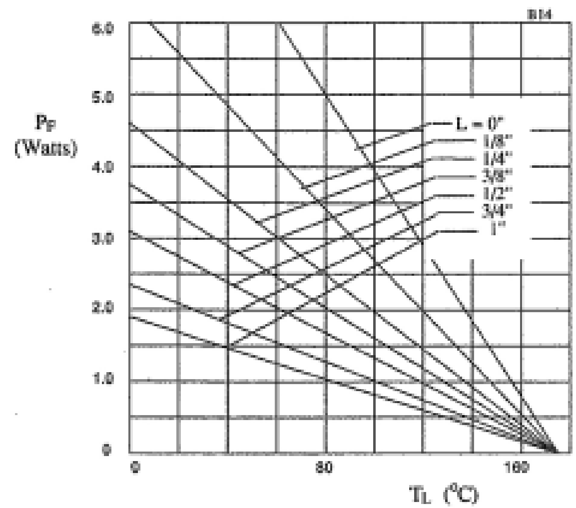


Figure 2. Maximum power versus lead temperature.

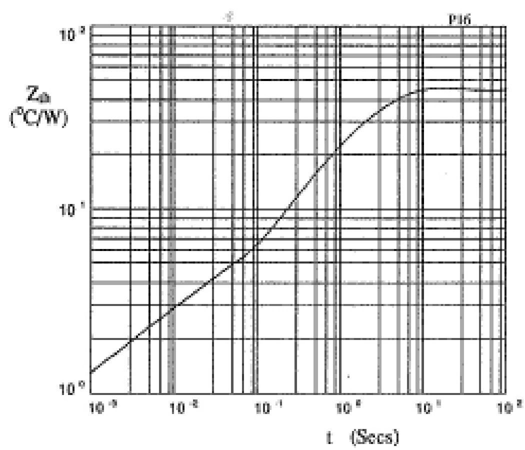


Figure 3. Transient thermal impedance characteristic

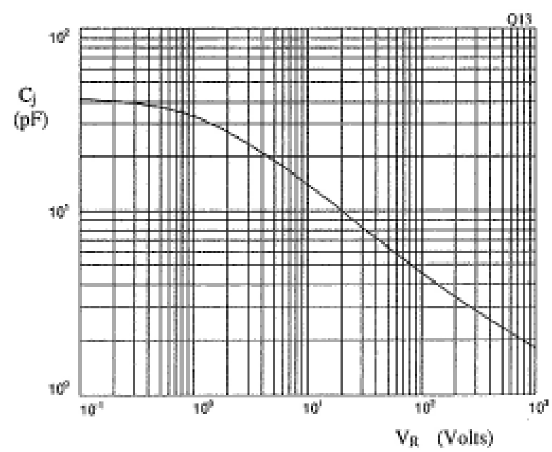


Figure 4. Typical junction capacitance as a function of reverse voltage.

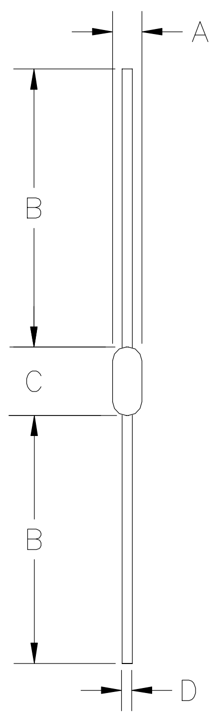
POWER DISCRETES

Ordering Information

Part Number	Description
PFF2, PFF4, PFF6	Axial leaded hermetically sealed[(1)]

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIM[N]	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	1.50	-	3.81	-
B	1.10	-	28.0	-	-
C	-	.180	-	4.57	-
D	-	.032	-	0.81	-

Weight = 0.013oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

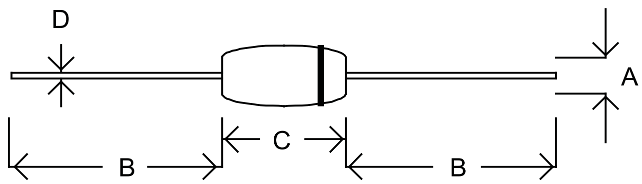
PFF50
Axial Leaded Hermetically Sealed High Voltage Superfast Rectifier Diode

POWER DISCRETES

Features

- Very Low Reverse Recovery Time
- Avalanche Capability
- Glass Passivated for Hermetic Sealing
- Low Switching Losses
- Soft, Non-snap off, Recovery Characteristics
- These diodes can also be available as screened F and FX level parts

Outline Drawing



*Cathode denoted by a black band

DIM	MM		INCHES	
	Min	Max	Min	Max
A	-	5.5	-	0.215
B	25.4	33.02	1.0	1.3
C	-	8.89	-	0.350
D	0.94	1.1	0.037	0.043

Absolute Maximum Rating

Parameter	Symbol	Max	Units
Working reverse voltage	V_{RWM}	5000	V
Repetitive reverse voltage	V_{RRM}	5000	V
Average forward current (@55°C, lead length 0.375")	$I_{F(AV)}$	0.36	A
Repetitive surge current @25°C	I_{FRM}	4	A
Non-repetitive surge current @25°C (t_p = 8.3ms)	I_{FSM}	20	A
Storage temperature range	t_{STG}	-65 to +200	°C
Operating temperature range	T_{OP}	-65 to +175	°C

Ordering Information

Part Number	Description
PFF50	Axial leaded, hermetically sealed high-voltage superfast rectifier diode[1]

Note:
(1) Available in bulk or tape and reel packaging. Please consult factory for quantities.

Thermal Characteristics

	Symbol	PFF50	Unit
Thermal Impedance	θ_{J-L}	L = 0.000, 3	°C/W
		L = 0.125, 6	°C/W
		L = 0.250, 12	°C/W

Electrical Characteristics

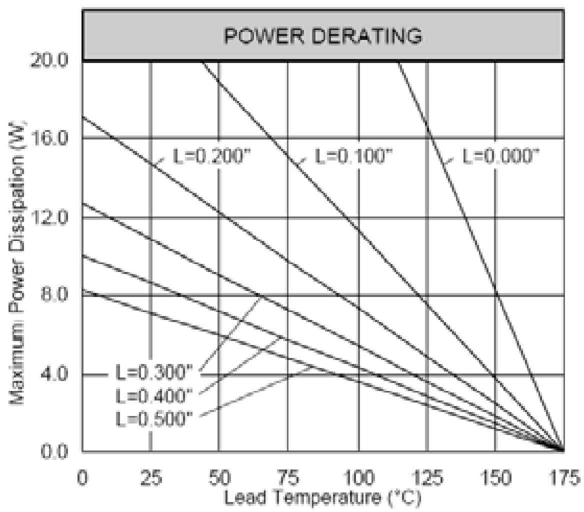
Parameter	Condition	Symbol	PFF50	Units
Average forward current	(max at 55°C)	$I_{F(AV)}$	0.36	A
	(max at 100°C)		0.18	
Forward voltage drop	(max @ I_F = 0.2A, T_J = 25°C)	V_F	12.5	V
Reverse current	(max at $V_{RWM,}$ T_J = 25°C)	I_R	1	µA
	(max at V_{RWM}, T_J = 100°C)		25	
Reverse recovery time	(0.5A If to 1.0A Irm. Recover to 0.25A Irm(REC))	t_{rr}	35	ns
Junction capacitance (typ)	$50V_{DC}$ @ 1kHZ	C_J	16	pF

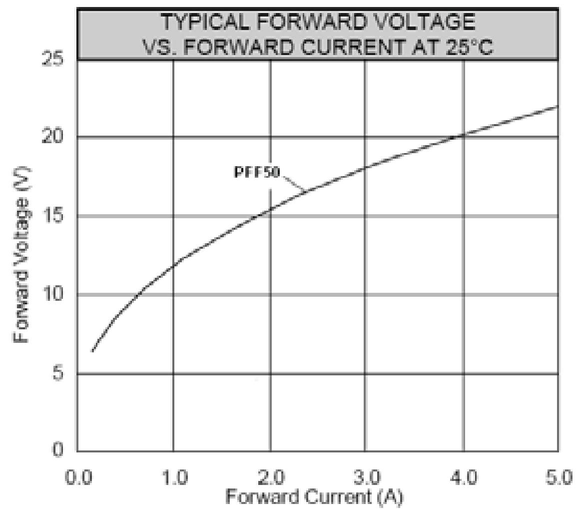
SEMTECH

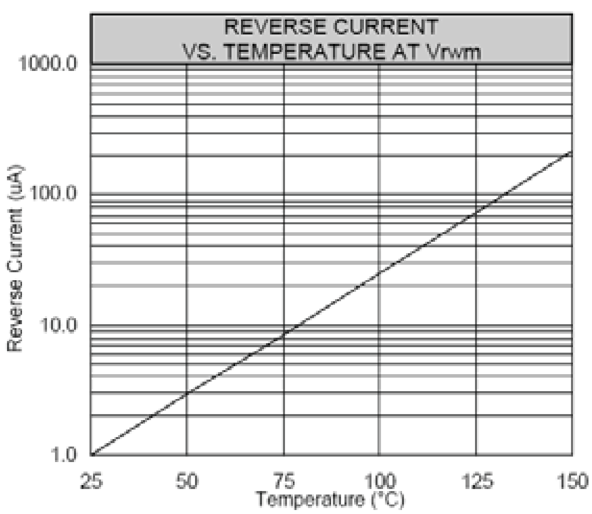
POWER DISCRETES

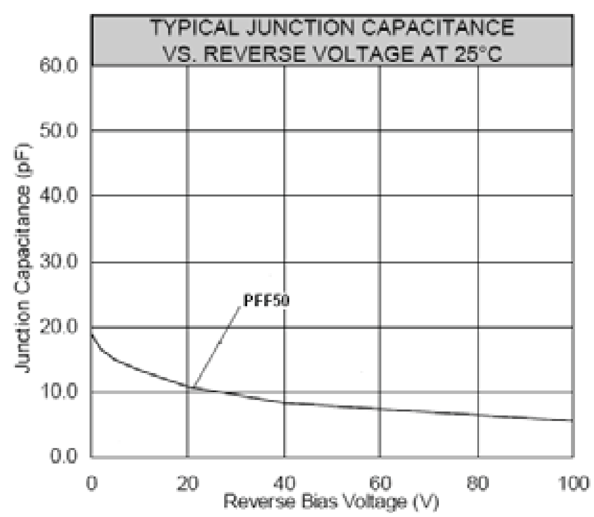
2

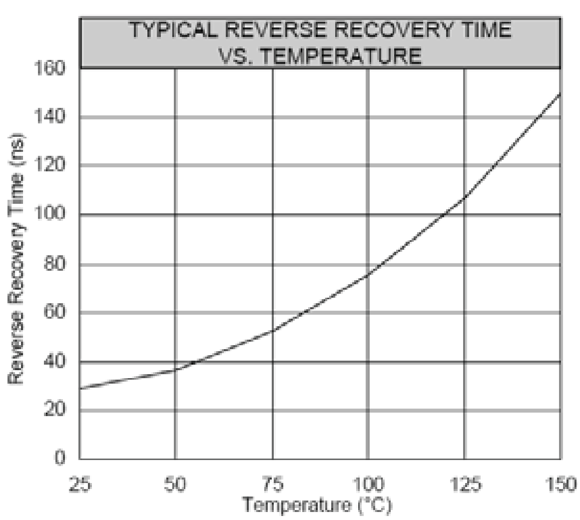
Typical Characteristics











PFF8, PFF0
Axial Leaded Hermetically Sealed Superfast Recovery Rectifier Diode

POWER DISCRETES

2

Description

Quick reference data

V_R = 800 - 1000V
I_F = 1.0A
t_{rr} = 75nS
I_R = 1µA

Features

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PFF8	PFF0	Units
Working Reverse Voltage	V_{RWM}	800	1000	V
Average Forward Current @ 55°C, lead length 0.375"	$I_{F(AV)}$	1.0		A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	4.25		A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	22.0		A
Storage Temperature Range	T_{STG}	-55 to +175		°C

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POWER DISCRETES

Electrical Specifications

	Symbol	PFF8	PFF0	Units
Average Forward Current max (T_L = 55°C; L = 3/8") for sine wave for square wave	$I_{F(AV)}$ $I_{F(AV)}$	1.0 1.0		A
Forward Voltage Drop typ. @ I_F = 1.0A, T_j = 25°C	V_F	2.1		V
Reverse Current typ. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	1 20		µA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	75		nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	30		pF

2

Thermal Characteristics

	Symbol	PFF8, PFF0	Units
Thermal Resistance-Junction to Lead Lead length = 0.375"	$R_{\theta JL}$	47	°C/W

Maximum Characteristics

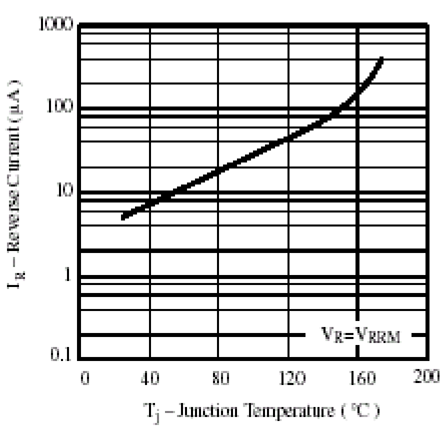


Figure 1. Max. Reverse Current vs. Junction Temperature

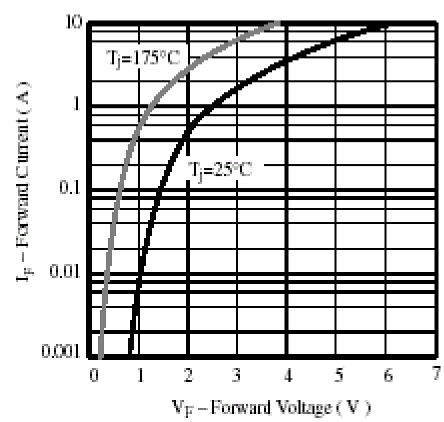


Figure 2. Max. Forward Current vs. Forward Voltage

Maximum Characteristics (Cont.)

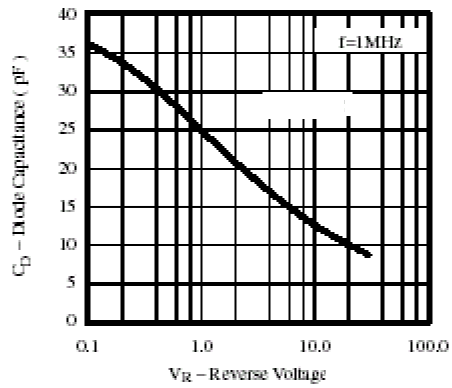


Figure 3. Diode Capacitance vs. Reverse Voltage

POWER DISCRETES

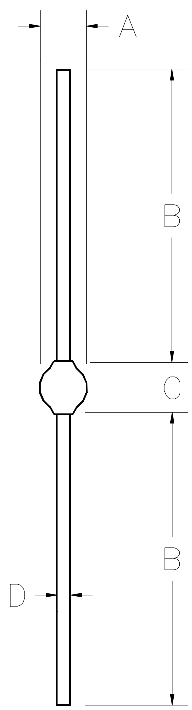
Ordering Information

Part Number	Description
PFF8, PFF0	Axial leaded hermetically sealed[(1)]

2

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIM^N	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	.150	-	3.81	-
B	1.02	-	26	-	-
C	-	.180	-	4.57	-
D	-	0.032	-	0.82	-

Weight = 0.013oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

PFM50A/PFM75A
Axial Leaded Hermetically Sealed High Voltage Fast Rectifier Diode

SEMTECH

POWER DISCRETES

2

Description

Quick reference data

V_R = 5 - 7.5kV
I_F = 92mA
t_{rr} = 250nS
I_R = 0.5µA

Features

- Low reverse recovery time
- Very low leakage current
- Glass passivated for hermetic sealing
- Soft, non-snap off, recovery characteristics
- Avalanche capability
- Please contact factory regarding HR screening

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PFM50A	PFM75A	Units
Working Reverse Voltage	V_{RWM}	5000	7500	V
Repetitive Reverse Voltage	V_{RRM}	5650	8500	V
Surge Reverse Voltage	V_{RSM}	5650	8500	V
Average Forward Current @ 55°C, in oil	$I_{F(AV)}$	92		mA
Repetitive Surge Current @ 55°C in oil, lead length 0.375"	$I_{F(AV)}$	1.0		A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	2.0		A
Storage Temperature Range	T_{STG}	-65 to +150		°C

2

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PFM50A/PFM75A	Units
Average Forward Current max. Unstirred oil @ 55°C	$I_{F(AV)}$	92	mA
Forward Voltage Drop max. @ I_F = 25mA, Tj = 25°C	V_F	12.5	V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	0.5 20	µA
Reverse Recovery Time max. 50mA I_F, 100mA I_R, 25mA $I_{RM(REC)}$	trr	250	nS
Junction Capacitance typ. @ V_R = 50V, f = 1KHz	Cj	2	pF

Thermal Characteristics

	Symbol	PFM50A/PFM75A	Units
Thermal Resistance-Junction to Oil Stirred oil Unstirred oil	$R_{\theta\ JO}$	48 64	°C/W
Thermal Resistance-Junction to Ambient On 0.06" thick pcb. 1oz copper	$R_{\theta\ JA}$	160	°C/W

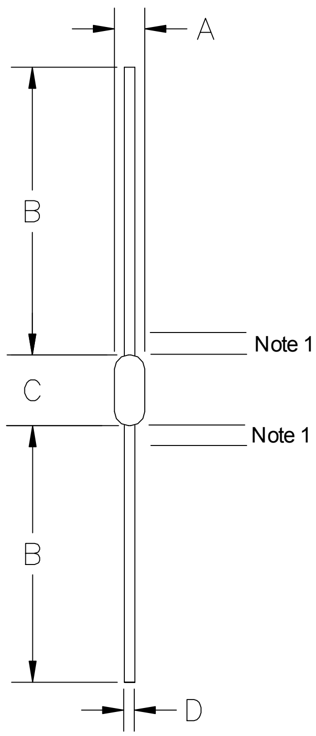
POWER DISCRETES

Ordering Information

Part Number	Description
PFM50A/PFM75A	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



G82

DIM^N	Dimensions				
	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	.118	-	3.0	-
B	1.0	-	25.4	-	-
C	-	.374	-	9.5	-
D	-	0.033	-	0.84	-

Note:
1. Lead diameter not controlled in this area.

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

POWER DISCRETES

2

Description

Quick reference data

V_R = 1000V
I_F = 1.25A
t_{rr} = 100nS
I_R = 1μA

Features

- Very low reverse recovery time
- Glass passivated for hermetic sealing
- Low switching losses
- Soft, non-snap off, recovery characteristics
- Avalanche capability

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PFR0	Units
Working Reverse Voltage	V_{RWM}	1000	V
Surge Reverse Voltage	V_{RSM}	1100	V
Average Forward Current @ 55°C, lead length 0.375"	$I_{F(AV)}$	1.25	A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}	11	A
Non-Repetitive Surge Current (tp = 8.3mS @ V_R & T_{JMAX})	I_{FSM}	30	A
Storage Temperature Range	T_{STG}	-55 to +175	°C

POWER DISCRETES

Electrical Specifications

	Symbol	PFR0	Units
Average Forward Current max (pcb mounted; T_A = 55°C) for sine wave for square wave (d = 0.5)	$I_{F(AV)}$ $I_{F(AV)}$	0.85 0.90	A
Average Forward Current max (T_L = 55°C; L = 3/8")	$I_{F(AV)}$	1.25	A
Forward Voltage Drop max. @ I_F = 1.0A, T_j = 25°C	V_F	1.5	V
Reverse Current typ. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R	1 20	μA
Reverse Recovery Time max. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr	100	nS
Junction Capacitance typ. @ V_R = 5V, f = 1MHz	Cj	22	pF

Thermal Characteristics

	Symbol	PFR0	Units
Thermal Resistance-Junction to Lead Lead length = 0.375"	$R_{\theta JL}$	47	°C/W

Maximum Characteristics

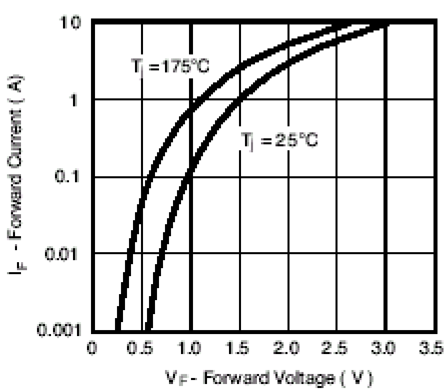


Figure 1. Forward Current vs. Forward Voltage

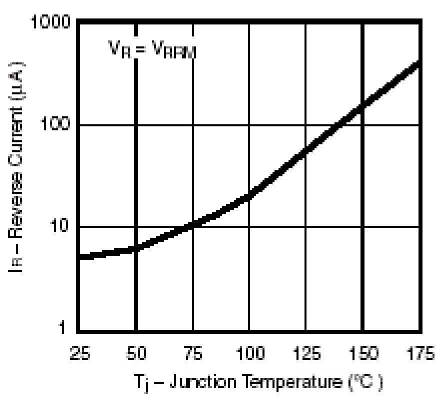


Figure 2. Reverse Current vs. Junction Temperature

Maximum Characteristics (Cont.)

2

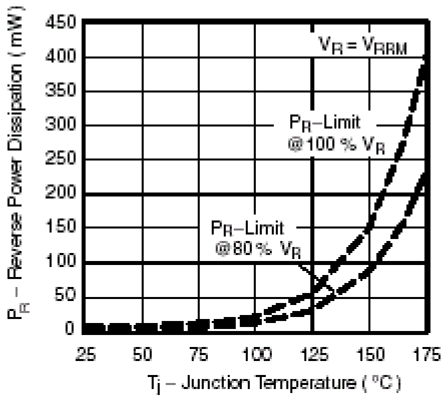


Figure 3. Max. Reverse Power Dissipation vs. Junction Temperature

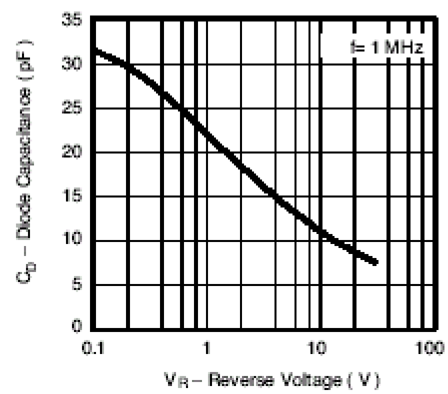


Figure 4. Diode Capacitance vs. Reverse Voltage

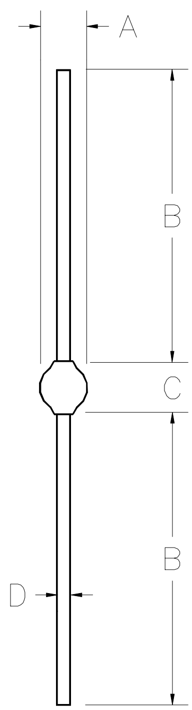
POWER DISCRETES

Ordering Information

Part Number	Description
PFR0	Axial leaded hermetically sealed[1]

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



DIM[N]	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	.150	-	3.81	-
B	1.02	-	26	-	-
C	-	.180	-	4.57	-
D	-	.032	-	0.82	-

Weight = 0.013oz

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

Axial Leaded Hermetically Sealed Standard Recovery Rectifier Diode

POWER DISCRETES

2

Description

Quick reference data

V_R = 600V - 1000V
I_F = 2.0A
t_{rr} = 3µS
I_R = 1.0µA

Features

- Avalanche capability
- High thermal shock resistance
- Glass passivated for hermetic sealing
- Low reverse leakage currents
- Low forward voltage drop

Absolute Maximum Ratings

Electrical specifications @ T_A = 25°C unless otherwise specified.

	Symbol	PM6	PM8	PM0	Units
Working Reverse Voltage	V_{RWM}	600	800	1000	V
Repetitive Reverse Voltage	V_{RRM}	600	800	1000	V
Surge Reverse Voltage	V_{RSM}	650	900	1100	V
Average Forward Current @ 55°C, lead length 0.375"	$I_{F(AV)}$		2.0		A
Repetitive Surge Current @ 55°C in free air, lead length 0.375"	I_{FRM}		12.0		A
Non-Repetitive Surge Current (tp = 10mS, half sinewave)	I_{FSM}		50		A
Storage Temperature Range	T_{STG}		-55 to +175		°C

POWER DISCRETES

Electrical Specifications

	Symbol	PM6	PM8	PM0	Units
Average Forward Current	$I_{F(AV)}$		2.0		A
I^2T for fusing (t = 8.3mS) max.	I^2T		8		A^2S
Forward Voltage Drop max. @ I_F = 1.00A, T_j = 25°C	V_F		1.0		V
Reverse Current max. @ V_{RWM}, Tj = 25°C @ V_{RWM}, Tj = 100°C	I_R I_R		1.0 10		µA
Reverse Recovery Time typ. 0.5A I_F to 1.0A I_{RM} recovers to 0.25A $I_{RM(REC)}$	trr		3		µS
Junction Capacitance typ. @ Vr = 4V, f = 1MHz	Cj		18		pF

Thermal Characteristics

	Symbol	PM6	PM8	PM0	Units
Thermal Resistance-Junction to Lead Lead length = 0.375" Lead length = 0"	$R_{\theta JL}$ $R_{\theta JL}$		47 19		°C/W

Maximum Characteristics

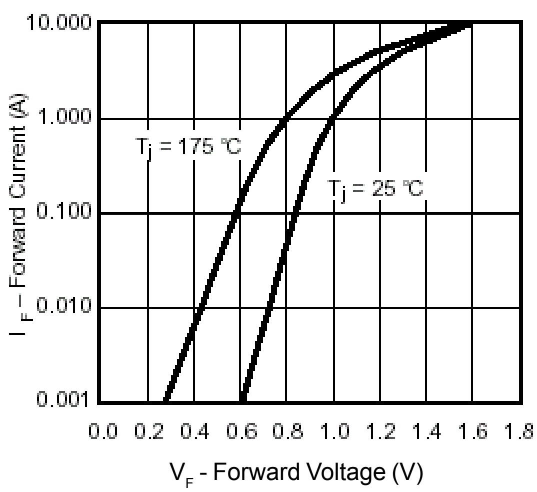


Figure 1. Forward Current vs. Forward Voltage

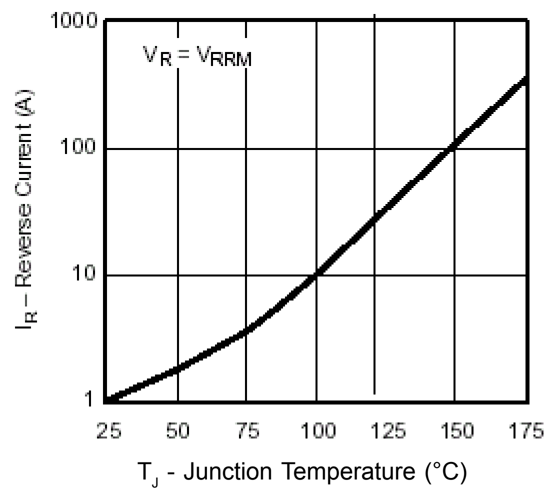


Figure 2. Reverse Current vs. Junction Temperature

2

SEMTECH

POWER DISCRETES

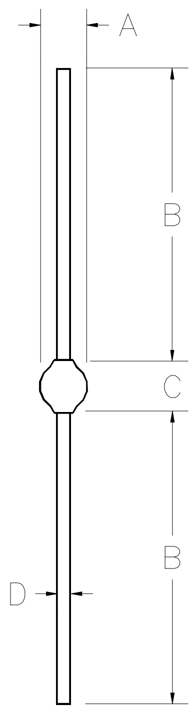
Ordering Information

Part Number	Description
PM6 PM8 PM0	Axial leaded hermetically sealed[(1)]

2

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



DIM[N]	Dimensions				
	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	.150	-	3.81	-
B	1.014	-	26	-	-
C	-	.180	-	4.57	-
D	-	.032	-	0.82	-

Weight = 369mg

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE FAST RECTIFIER DIODE

- Low reverse recovery time
- High thermal shock resistance
- Hermetically sealed with Metoxilite metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

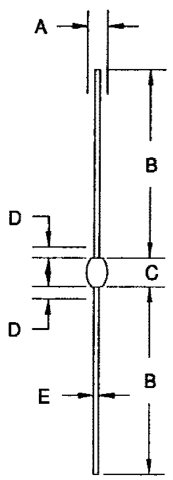
QUICK REFERENCE DATA

- V_R = 1500 - 2500V
- I_F = 0.5A
- t_{rr} = 300nS
- I_R = 1µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	S15F	S20F	S25F	Unit
Working reverse voltage	V_{RWM}	1500	2000	2500	V
Repetitive reverse voltage	V_{RRM}	1500	2000	2500	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	←	0.5	→	A
Repetitive surge current (@ 55°C in oil)	I_{FRM}	←	2.5	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	←	10.0	→	A
Storage temperature range	T_{STG}	←	-65 to +175	→	°C
Operating temperature range	T_{OP}	←	-65 to +175	→	°C

MECHANICAL



G12

DIM N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	4.8	5.5	.190	.215	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.018oz

These products are available in Europe to DEF STAN 59-61 (PART 80)/034 to F and FX levels.

2

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	S15F S20F S25F	Unit
Average forward current max. (pcb mounted; T_A = 55°C) for sine wave	$I_{F(AV)}$	← 0.23 →	A
for square wave (d = 0.5)	$I_{F(AV)}$	← 0.24 →	A
Average forward current max. (unstirred oil at 55°C) for sine wave	$I_{F(AV)}$	← 0.50 →	A
for square wave	$I_{F(AV)}$	← 0.50 →	A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 0.4 →	A^2S
Forward voltage drop max. @ I_F = 0.10A, T_j = 25°C	V_F	← 5.0 →	V
Reverse current max. @ V_{RWM}, T_j = 25°C	I_R	← 1.0 →	µA
@ V_{RWM}, T_j = 100°C	I_R	← 25 →	µA
Reverse recovery time max. 50mA I_F, 100mA I_R, Recover to 25mA I_{RR}.	t_{rr}	← 300 →	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	← 4.0 →	pF
Thermal resistance - junction to oil Stirred oil	$R_{\theta JO}$	← 18 →	°C/W
Unstirred oil	$R_{\theta JO}$	← 30 →	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	← 90 →	°C/W

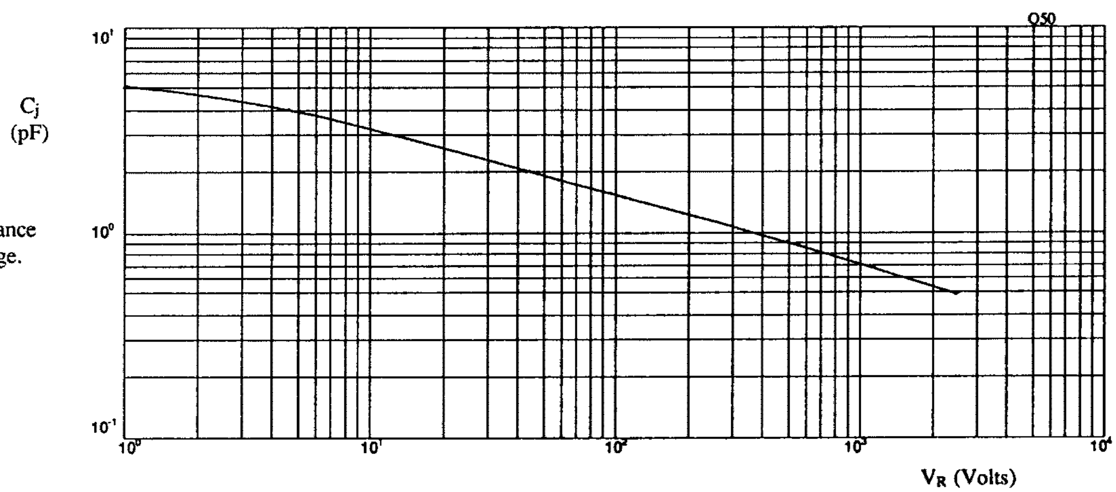


Fig 1 Junction capacitance against reverse voltage.

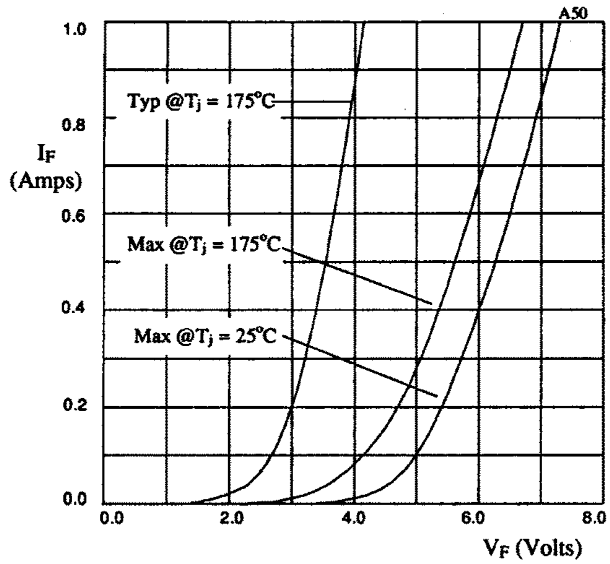


Fig 1. Forward voltage drop as a function of forward current.

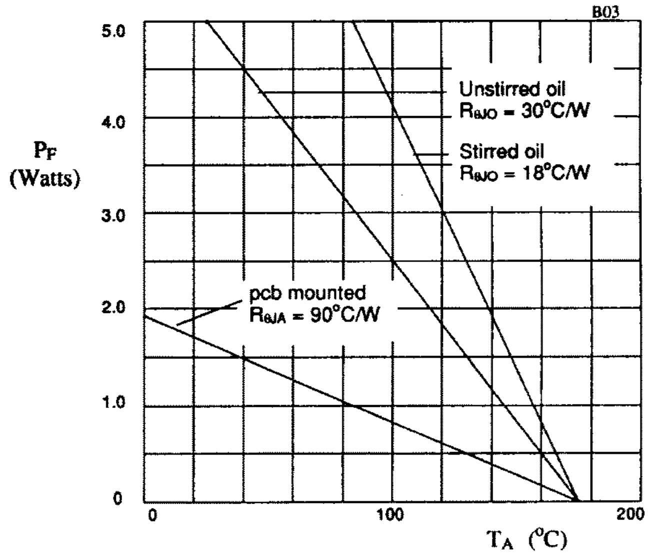


Fig 2. Power derating in air and oil.

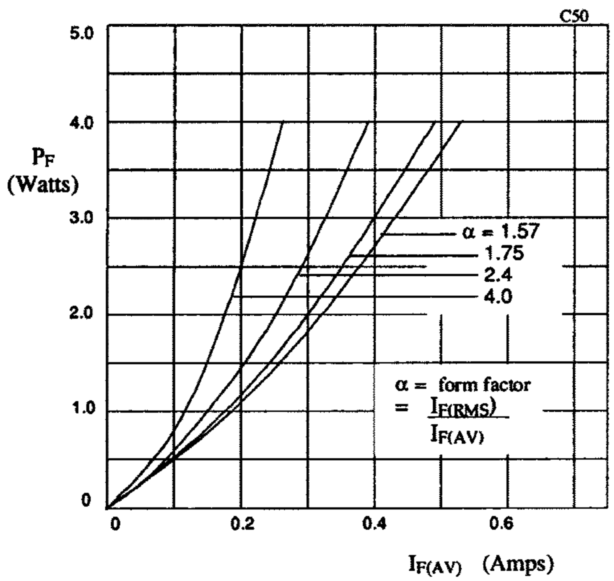


Fig 3. Forward power dissipation as a function of forward current, for sinusoidal operation.

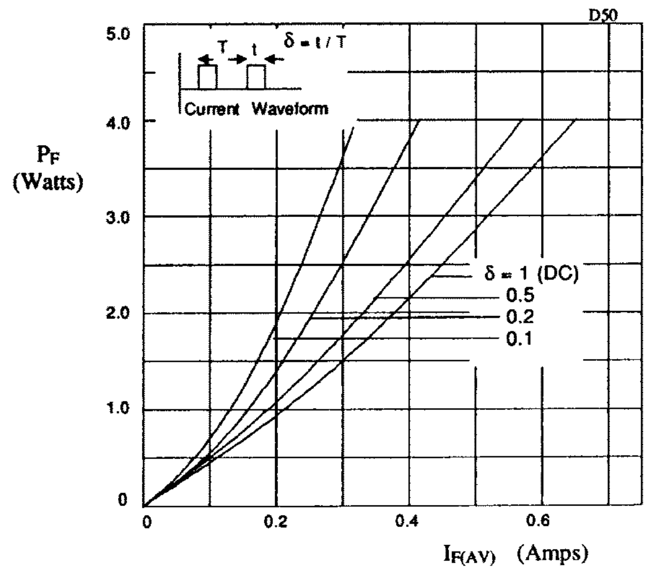


Fig 4. Forward power dissipation as a function of forward current, for square wave operation.

SEMTECH

2

AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- High thermal shock resistance
- Hermetically sealed with Metoxilite metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

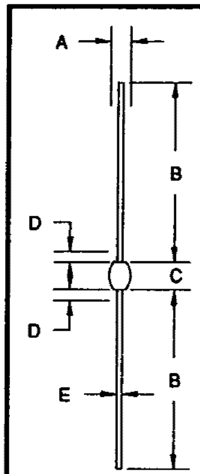
QUICK REFERENCE DATA

- V_R = 3000V
- I_F = 0.36A
- t_{rr} = 50nS
- I_R = 1μA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	SFF30	Unit
Working reverse voltage	V_{RWM}	3000	V
Repetitive reverse voltage	V_{RRM}	3000	V
Average forward current (@ 55°C, in oil)	$I_{F(AV)}$	0.36	A
Repetitive surge current (@ 55°C in oil)	I_{FRM}	1.0	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	10.0	A
Storage temperature range	T_{STG}	-65 to +175	°C
Operating temperature range	T_{OP}	-65 to +175	°C

MECHANICAL



G12

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	4.8	5.5	.190	.215	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.04oz

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	SFF30	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$) for sine wave	$I_{F(AV)}$	0.16	A
for square wave (d = 0.5)	$I_{F(AV)}$	0.17	A
Average forward current max. (oil at 55°C) for sine wave	$I_{F(AV)}$	0.33	A
for square wave	$I_{F(AV)}$	0.36	A
I^2t for fusing (t = 8.3mS) max.	I^2t	0.42	A^2S
Forward voltage drop max. @ $I_F = 0.175A$, $T_j = 25°C$	V_F	7.00	V
Reverse current max. @ V_{RWM}, $T_j = 25°C$	I_R	1.0	µA
@ V_{RWM}, $T_j = 100°C$	I_R	25	µA
Reverse recovery time max. 50mA I_F, 100mA I_R., 25mA I_{RR}.	t_{rr}	50	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	6.5	pF

THERMAL CHARACTERISTICS

	Symbol	SFF30	Unit
Thermal resistance - junction to oil Stirred oil	$R_{\theta JO}$	18	°C/W
Unstirred oil	$R_{\theta JO}$	30	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	90	°C/W

2

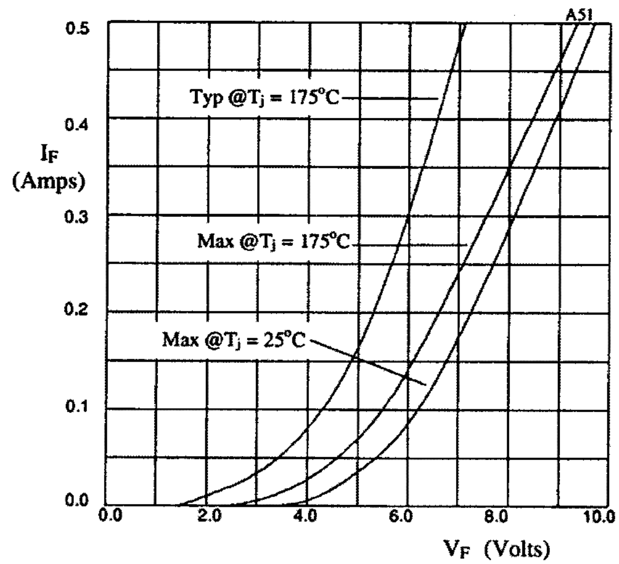


Fig 1. Forward voltage drop as a function of forward current.

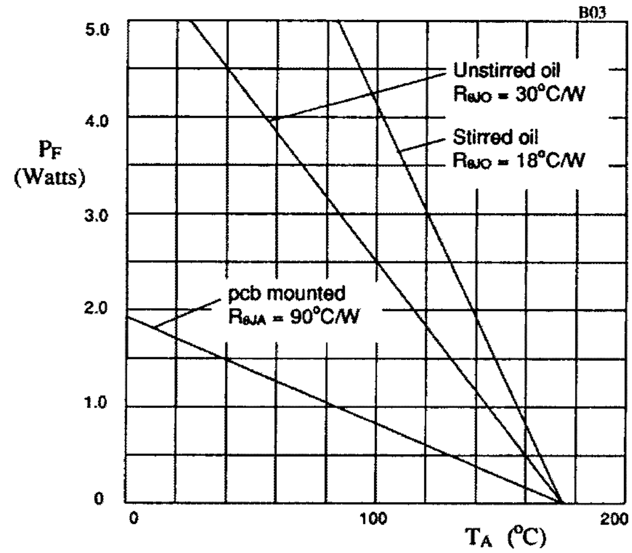


Fig 2. Power derating in air and oil.

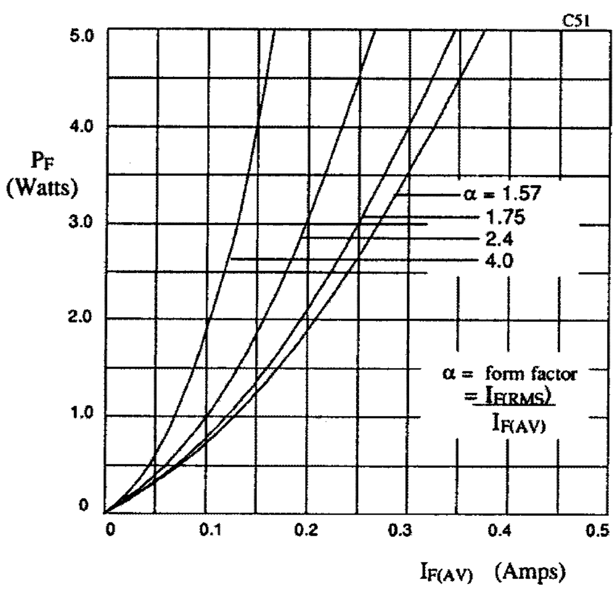


Fig 3. Forward power dissipation as a function of forward current, for sinusoidal operation.

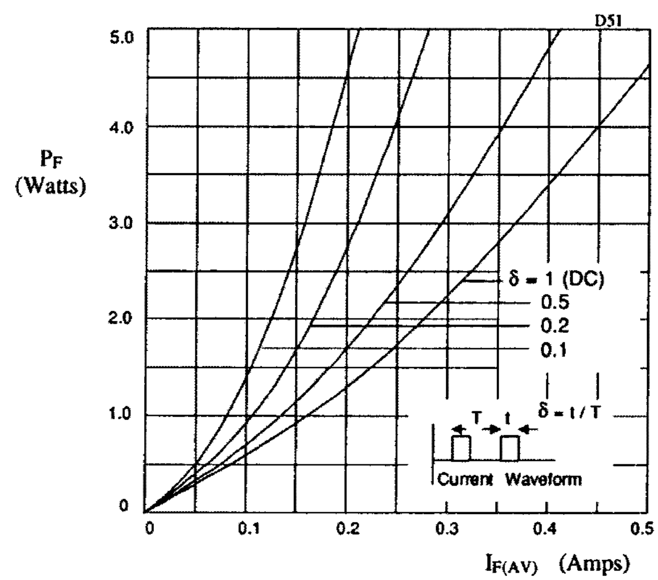


Fig 4. Forward power dissipation as a function of forward current, for square wave operation.

SEMTECH

AXIAL LEADED HERMETICALLY SEALED FAST RECOVERY RECTIFIER DIODE

- Low reverse recovery time
- Hermetically sealed in Metoxilite fused metal oxide
- Low switching losses
- Low reverse current
- Soft, non-snap off, recovery characteristics

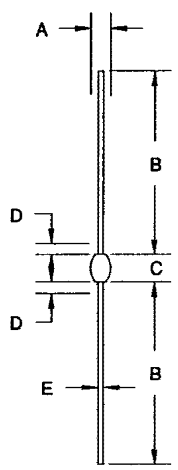
QUICK REFERENCE DATA

- V_R = 1000V
- I_F = 1.6A
- t_{rr} = 150nS
- I_R = 1μA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	SFR0	Unit
Working reverse voltage	V_{RWM}	1000	V
Repetitive reverse voltage	V_{RRM}	1000	V
Average forward current (@ 55°C, lead length 0.375")	$I_{F(AV)}$	1.6	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	6.0	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	25	A
Storage temperature range	T_{STG}	-65 to +175	°C
Operating temperature range	T_{OP}	-65 to +175	°C

MECHANICAL



G2

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.016oz

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	SFR0	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)			
for sine wave	$I_{F(AV)}$	0.75	A
for square wave (d = 0.5)	$I_{F(AV)}$	0.80	A
Average forward current max. (L = 3/8"; $T_L = 55^oC$)			
for sine wave	$I_{F(AV)}$	1.4	A
for square wave	$I_{F(AV)}$	1.6	A
I^2t for fusing (t = 8.3mS) max.	I^2t	2.5	A^2S
Forward voltage drop max. @ $I_F = 1.0A$, $T_j = 25^oC$	V_F	1.50	V
Reverse current max.			
@ V_{RWM}, $T_j = 25^oC$	I_R	1.0	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	25	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	150	nS
Junction capacitance typ. @ $V_R = 5V$, f = 1MHz	C_j	20	pF

THERMAL CHARACTERISTICS

	Label	SFR0	Unit
Thermal resistance - junction to lead			
Lead length = 0"	$R_{\theta JL}$	14.0	°C/W
Lead length = 0.375"	$R_{\theta JL}$	38.0	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	95.0	°C/W

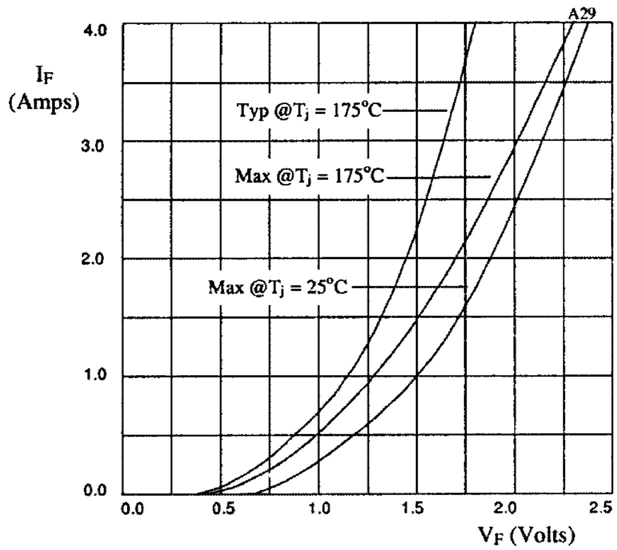


Fig 1. Forward voltage drop as a function of forward current.

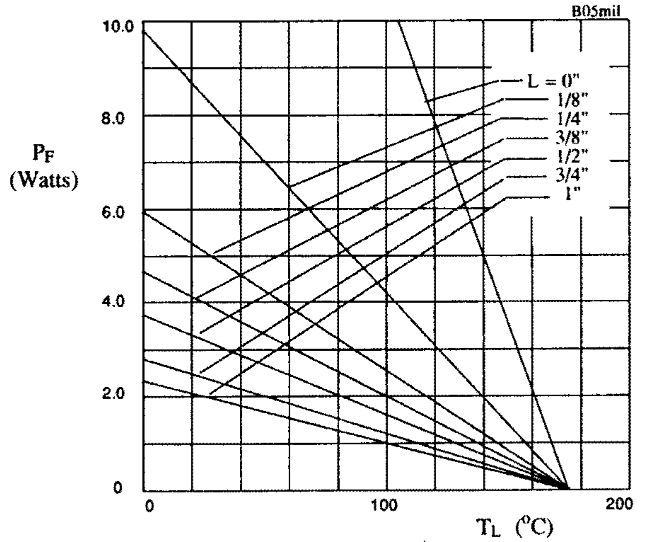


Fig 2. Maximum power versus lead temperature.

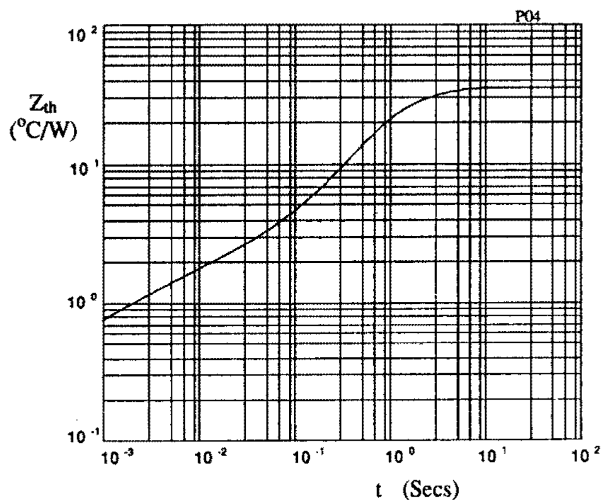


Fig 3. Transient thermal impedance characteristic.

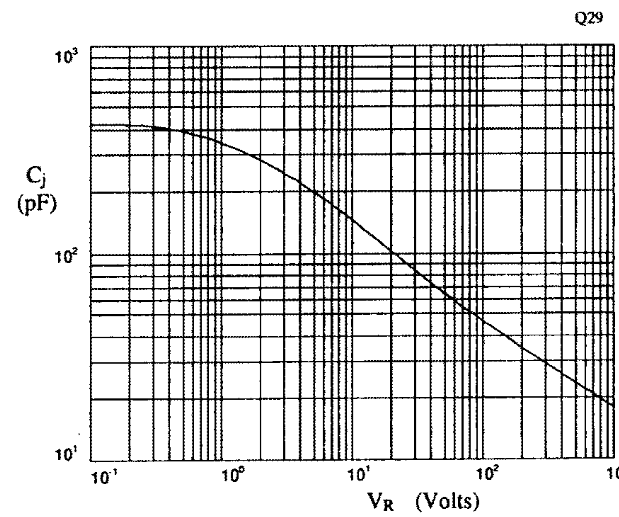


Fig 4. Typical junction capacitance as a function of reverse voltage.

2

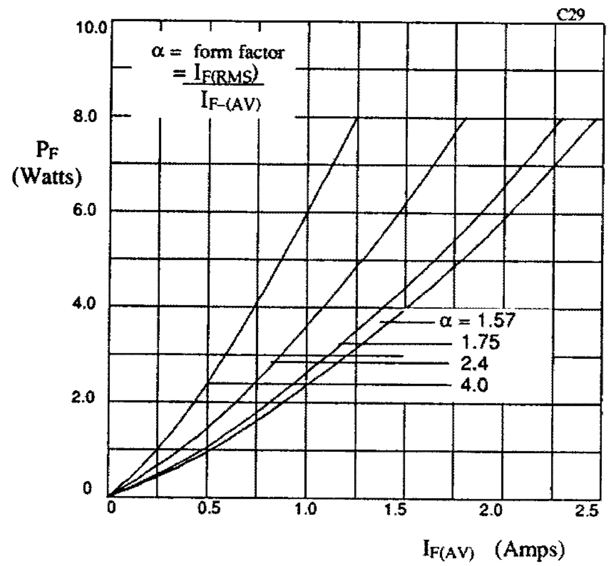


Fig 5. Forward power dissipation as a function of forward current, for sinusoidal operation.

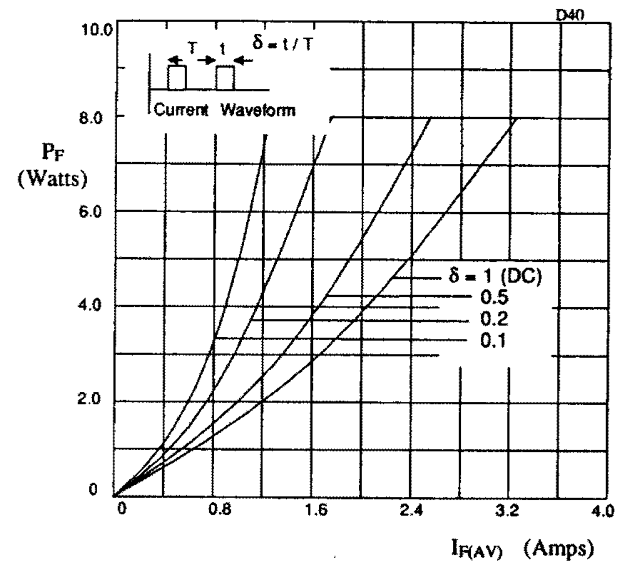


Fig 6. Forward power dissipation as a function of forward current, for square wave operation.

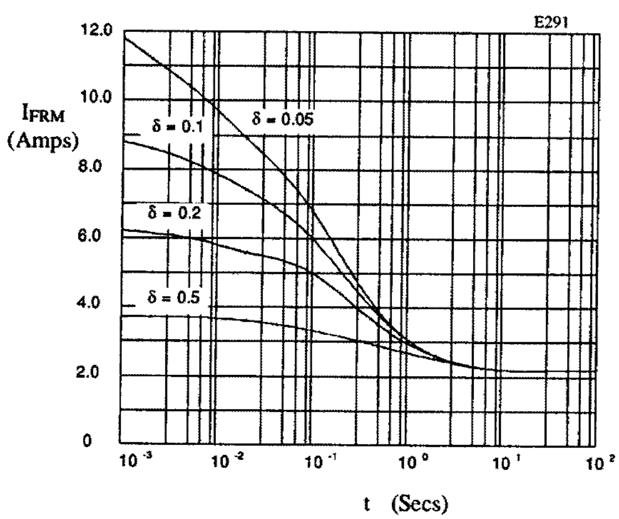


Fig 7. Typical repetitive forward current as a function of pulse width at 55°C; $R_{\theta JL}$ = 35 °C/W; V_{RWM} during 1 - δ.

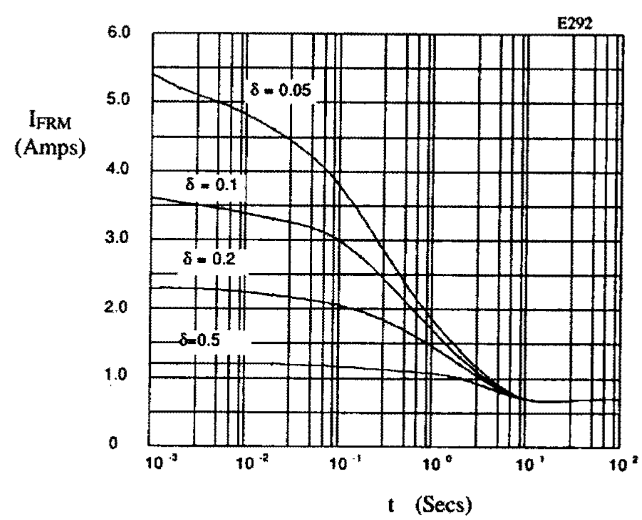


Fig 8. Typical repetitive forward current as a function of pulse width at 100°C; $R_{\theta JL}$ = 95 °C/W; V_{RWM} during 1 - δ.

2

QUICK REFERENCE DATA

- V_R = 4kV - 10kV
- I_F = 300mA
- t_{rr} = 2.5µS
- I_R = 1.0µA

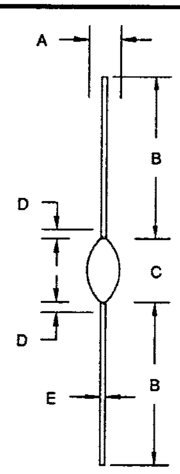
AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE STANDARD RECOVERY RECTIFIER DIODE

- Low reverse currents
- Hermetically sealed with Metoxilite fused metal oxide
- Good thermal shock resistance
- Monolythic cavity free construction
- Subminiature size

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	SM40	SM50	SM75	SM100	Unit
Working reverse voltage	V_{RWM}	4000	5000	7500	10000	V
Repetitive reverse voltage	V_{RRM}	4000	5000	7500	10000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	← 300 →				mA
Repetitive surge current (@ 55°C in oil, lead length 0.375")	I_{FRM}	← 1.0 →				A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	← 25 →				A
Storage temperature range	T_{STG}	← -65 to +175 →				°C
Operating temperature range	T_{OP}	← -65 to +175 →				°C

MECHANICAL



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DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	4.6	-	.180	-
B	25.4	33.0	1.00	1.30	-
C	-	10.7	-	.42	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.028

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	SM40 SM50 SM75 SM100	Unit
Average forward current (sine wave)			
- max. pcb mounted; $T_A = 55°C$	$I_{F(AV)}$	130	mA
- max. in unstirred oil	$I_{F(AV)}$	300	mA
I^2t for fusing (t = 8.3mS) max.	I^2t	2.6	A^2S
Forward voltage drop max. @ I_F = 100mA, T_j = 25°C	V_F	10.0	V
Reverse current max.			
@ V_{RWM}, T_j = 25°C	I_R	1.0	μA
@ V_{RWM}, T_j = 100°C	I_R	20	μA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}.	t_{rr}	2.5	μS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	3.2	pF
Thermal resistance - junction to oil			
Unstirred @ 55°C	$R_{\theta JO}$	28	°C/W
Stirred @ 55°C	$R_{\theta JO}$	20	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	91	°C/W

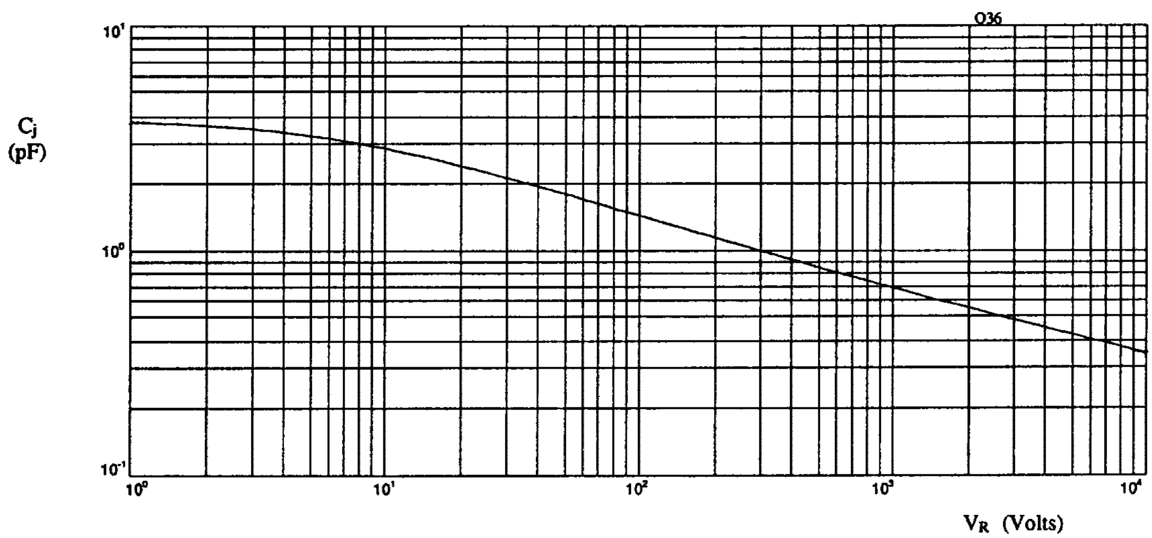


Fig 1. Typical junction capacitance as a function of reverse voltage.

2

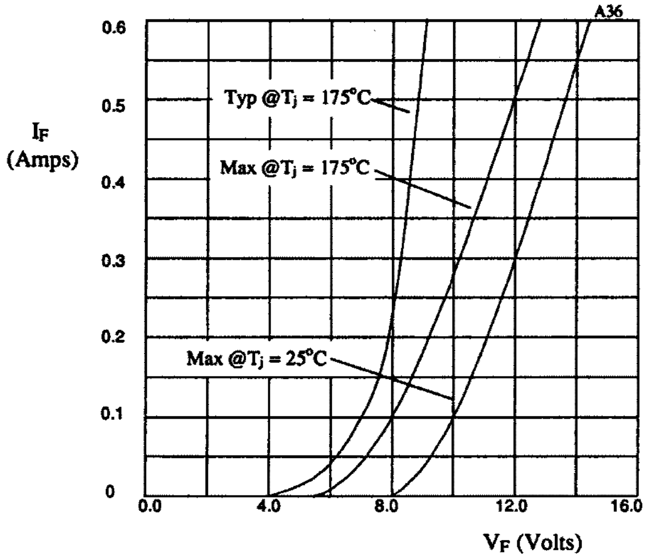


Fig 2. Forward voltage drop as a function of forward current.

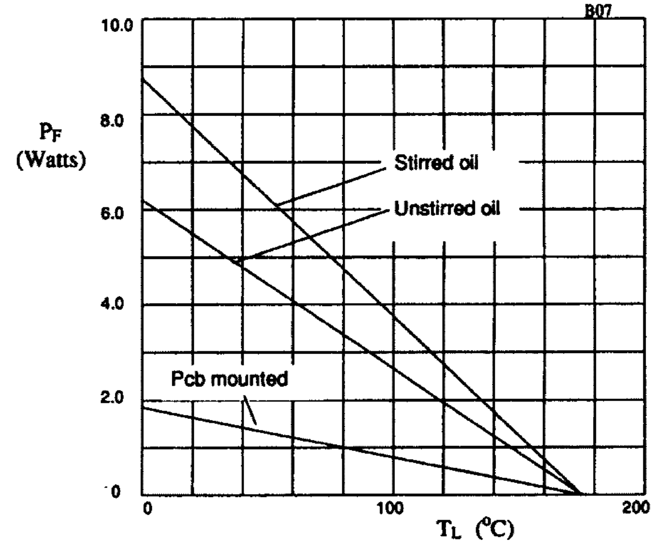


Fig 3. Power derating in air and oil.

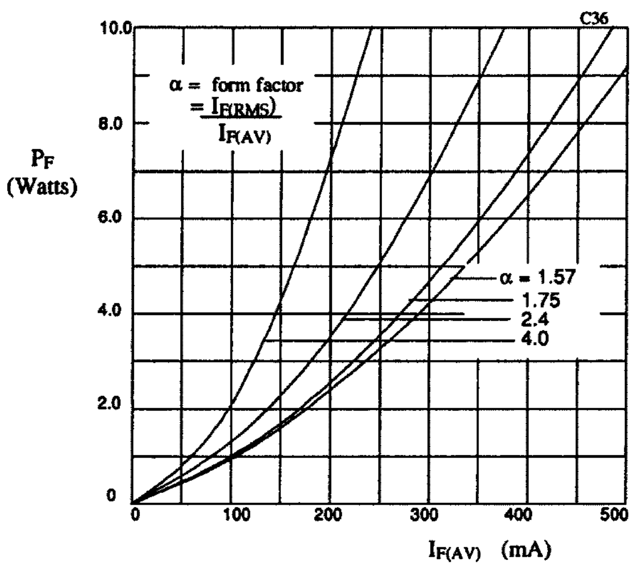


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

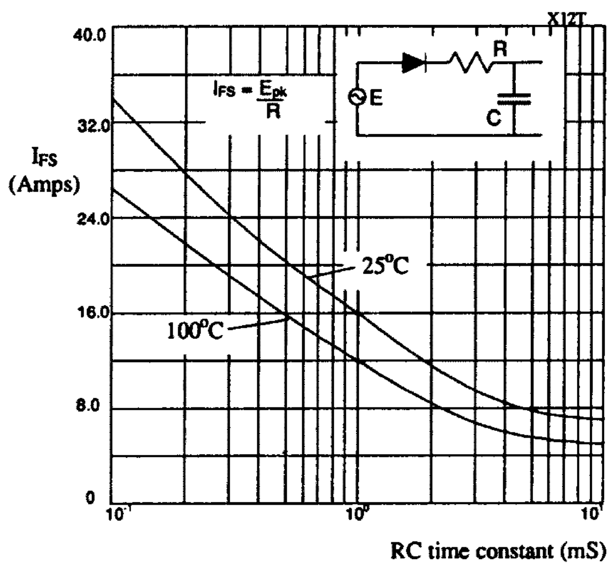


Fig 5. Maximum ratings for capacitive loads.

2

AXIAL LEADED HERMETICALLY SEALED HIGH VOLTAGE FAST RECTIFIER DIODE

- Low reverse recovery time
- High thermal shock resistance
- Hermetically sealed with Metoxilite metal oxide
- Low switching losses
- Soft, non-snap off, recovery characteristics

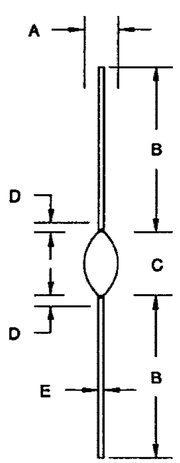
QUICK REFERENCE DATA

- V_R = 7.5 -10kV
- I_F = 290mA
- t_{rr} = 300nS
- I_R = 1µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	SM75F	SM100F	Unit
Working reverse voltage	V_{RWM}	7500	10000	V
Repetitive reverse voltage	V_{RRM}	7500	10000	V
Average forward current (@ 55°C in oil)	$I_{F(AV)}$	← 0.29 →		A
Repetitive surge current (@ 55°C)	I_{FRM}	← 1.00 →		A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & T_{jmax})	I_{FSM}	← 14.0 →		A
Storage temperature range	T_{STG}	← -65 to +175 →		°C
Operating temperature range	T_{OP}	← -65 to +175 →		°C

MECHANICAL



G43

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	4.6	-	.180	-
B	25.4	33.0	1.00	1.30	-
C	-	10.7	-	.42	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.028oz

CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	SM75F · SM100F	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)			
for sine wave	$I_{F(AV)}$	← 0.11 →	A
for square wave (d = 0.5)	$I_{F(AV)}$	← 0.12 →	A
Average forward current max. (unstirred oil at 55°C)			
for sine wave	$I_{F(AV)}$	← 0.27 →	A
for square wave	$I_{F(AV)}$	← 0.29 →	A
I^2t for fusing (t = 8.3mS) max.	I^2t	← 0.81 →	A^2S
Forward voltage drop max. @ I_F = 100mA, T_j = 25°C	V_F	← 12.0 →	V
Reverse current max.			
@ V_{RWM}, T_j = 25°C	I_R	← 1.0 →	µA
@ V_{RWM}, T_j = 100°C	I_R	← 20 →	µA
Reverse recovery time max. 50mA I_F to 100mA I_R. Recover to 25mA I_{RR}	t_{rr}	← 300 →	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	← 3.0 →	pF
Thermal resistance - junction to oil			
Stirred oil	$R_{\theta JO}$	← 20 →	°C/W
Unstirred oil	$R_{\theta JO}$	← 28 →	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1oz copper.	$R_{\theta JA}$	← 91 →	°C/W

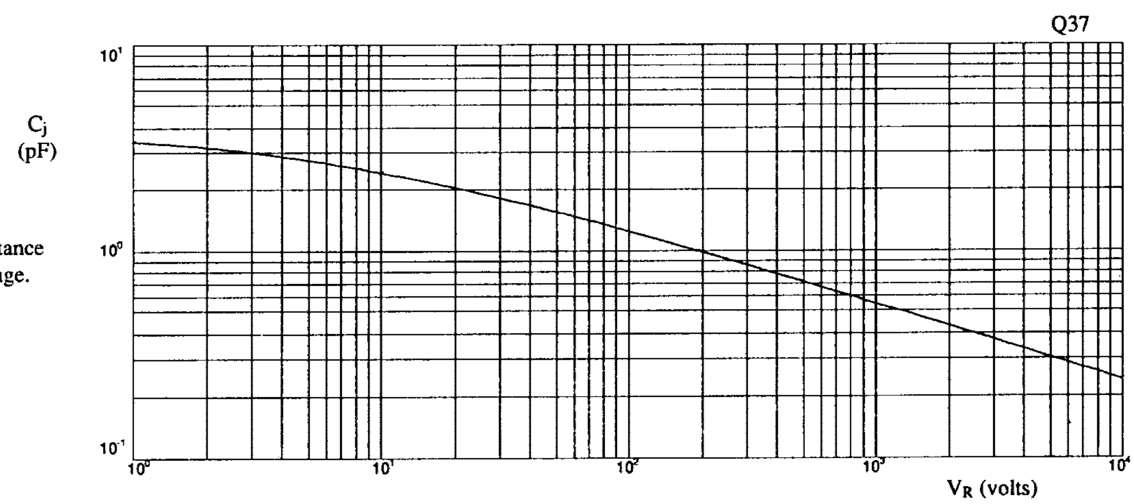


Fig 1 Junction capacitance against reverse voltage.

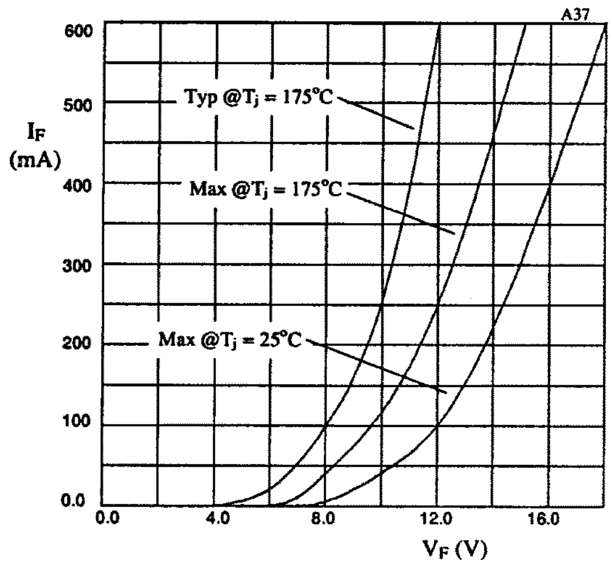


Fig 2. Forward voltage drop as a function of forward current.

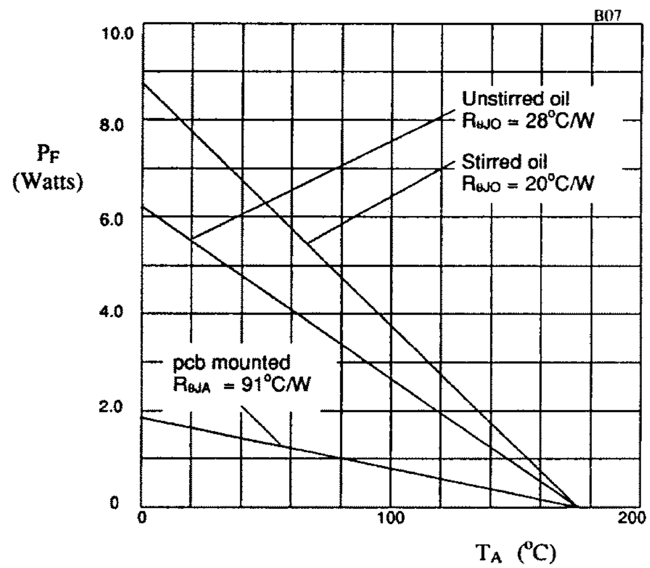


Fig 3. Power derating in air and oil.

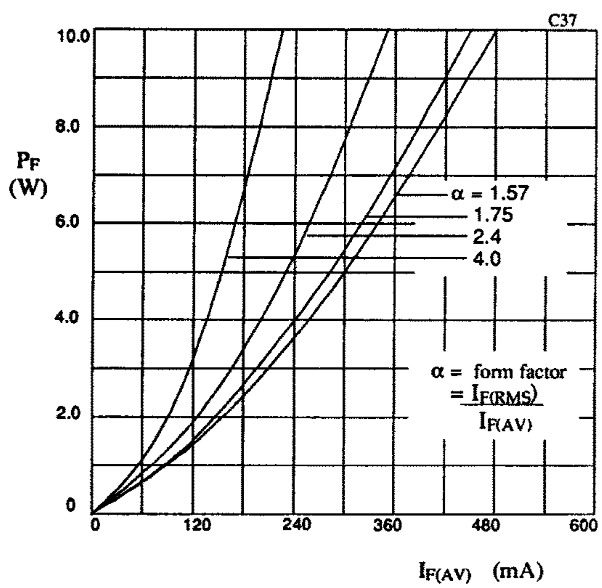


Fig 4. Forward power dissipation as a function of forward current, for sinusoidal operation.

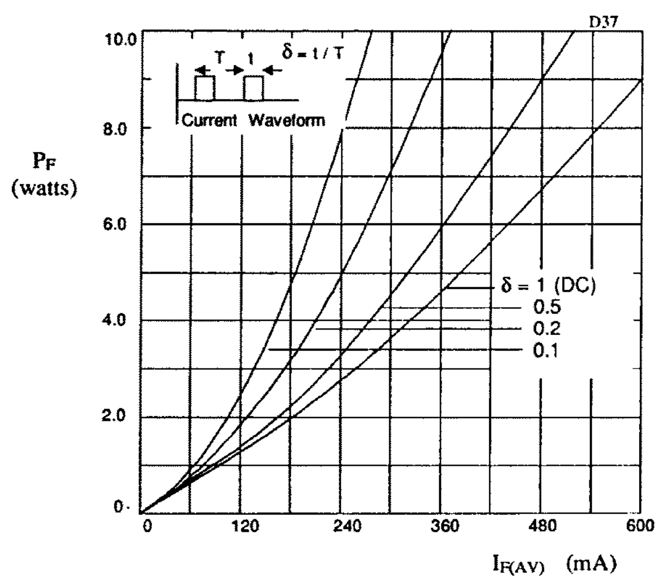


Fig 5. Forward power dissipation as a function of forward current, for square wave operation.

RECTIFIER, up to 400V, 2.1A, 50ns

USC1104
USC1105
USC1106

2

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed with Metoxilite fused metal oxide
- Low thermal impedance
- Low switching losses
- Soft, non-snap off, recovery characteristics

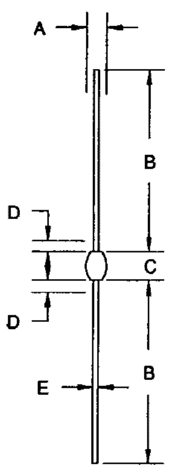
QUICK REFERENCE DATA

- V_R = 200 - 400V
- I_F = 2.1A
- t_{rr} = 50nS
- I_R = 10µA

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	USC1104	USC1105	USC1106	Unit
Working reverse voltage	V_{RWM}	200	300	400	V
Repetitive reverse voltage	V_{RRM}	200	300	400	V
Average forward current (@ 55°C, lead length = 0.375")	$I_{F(AV)}$	←	2.1	→	A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	←	9.0	→	A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	←	20	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C

MECHANICAL



G2

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	1.6	2.8	.065	.110	-
B	25.4	33.0	1.00	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.013oz

2

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	USC1104 USC1105 USC1106	Unit
Average forward current max. (pcb mounted; $T_A = 55°C$)			
for sine wave	$I_{F(AV)}$	1.0	A
for square wave (d = 0.5)	$I_{F(AV)}$	1.1	A
Average forward current max. ($T_L = 55°C$; L = 3/8")			
for sine wave	$I_{F(AV)}$	2.0	A
for square wave	$I_{F(AV)}$	2.1	A
I^2t for fusing (t = 8.3mS) max.	I^2t	1.7	A^2S
Forward voltage drop max. @ I_F = 1.0A, $T_j = 25°C$	V_F	1.25	V
Reverse current max.			
@ V_{RWM}, $T_j = 25°C$	I_R	10	µA
@ V_{RWM}, $T_j = 100°C$	I_R	200	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	50	nS
Junction capacitance typ. @ V_R = 5V , f = 1MHz	C_j	25	pF

THERMAL CHARACTERISTICS

	Symbol	USC1104 USC1105 USC1106	Unit
Thermal resistance - junction to lead			
Lead length =0.0"	$R_{\theta JL}$	7	°C/W
Lead length = 0.375"	$R_{\theta JL}$	38	°C/W
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	95	°C/W

RECTIFIER, up to 400V, 5A, 50ns

USC1304
USC1305
USC1306

AXIAL LEADED HERMETICALLY SEALED SUPERFAST RECTIFIER DIODE

- Very low reverse recovery time
- Hermetically sealed with Metoxilite fused metal oxide
- Low thermal impedance
- Low switching losses
- Soft, non-snap off, recovery characteristics

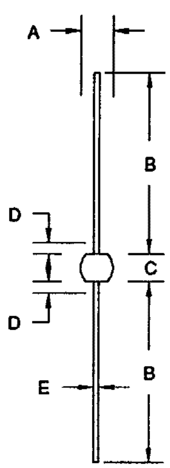
QUICK REFERENCE DATA

- V_R = 200 - 400V
- I_F = 5.0A
- t_{rr} = 50nS
- I_R = 20µA

ABSOLUTE MAXIMUM RATINGS (@ 25oC unless otherwise specified)

	Symbol	USC1304	USC1305	USC1306	Unit
Working reverse voltage	V_{RWM}	200	300	400	V
Repetitive reverse voltage	V_{RRM}	200	300	400	V
Average forward current (@ 55°C, lead length = 0.375")	$I_{F(AV)}$	← 5.0 →			A
Repetitive surge current (@ 55°C in free air, lead length 0.375")	I_{FRM}	← 16 →			A
Non-repetitive surge current (t_p = 8.3mS, @ V_R & Tj_{max})	I_{FSM}	← 70 →			A
Storage temperature range	T_{STG}	← -55 to +150 →			°C
Operating temperature range	T_{OP}	← -55 to +150 →			°C

MECHANICAL



G4

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	3.4	4.6	.135	.180	-
B	22.9	33.0	.90	1.30	-
C	3.5	4.2	.140	.165	-
D	-	.80	-	.030	1
E	.91	1.07	.036	.042	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

Weight = 0.04oz

2

ELECTRICAL CHARACTERISTICS (@ 25oC unless otherwise specified)

	Symbol	USC1304 USC1305 USC1306	Unit
Average forward current max. (pcb mounted; $T_A = 55^oC$)			
for sine wave	$I_{F(AV)}$	2.9	A
for square wave (d = 0.5)	$I_{F(AV)}$	3.0	A
Average forward current max. ($T_L = 55^oC$; L = 3/8")			
for sine wave	$I_{F(AV)}$	4.9	A
for square wave	$I_{F(AV)}$	5.0	A
I^2t for fusing (t = 8.3mS) max.	I^2t	20	A^2S
Forward voltage drop max. @ $I_F = 3.0A$, $T_j = 25^oC$	V_F	1.25	V
Reverse current max.			
@ V_{RWM}, $T_j = 25^oC$	I_R	20	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	500	µA
Reverse recovery time max. 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	50	nS
Junction capacitance typ. @ $V_R = 10V$, f = 1MHz	C_j	90	pF

THERMAL CHARACTERISTICS

	Symbol	USC1304 USC1305 USC1306	Unit
Thermal resistance - junction to lead			
Lead length = 0.375"	$R_{\theta JL}$	20	$^oC/W$
Lead length = 0.0"	$R_{\theta JL}$	5	$^oC/W$
Thermal resistance - junction to amb. on 0.06" thick pcb. 1 oz. copper.	$R_{\theta JA}$	75	$^oC/W$

Chapter 3
Half Wave, High Current Assemblies

SEMTECH

HIGH CURRENT ISOLATED RECTIFIER ASSEMBLY ISOPAC®

ISOPAC01**
ISOPAC02**
ISOPAC04**
ISOPAC06**

HIGH CURRENT, HIGH DENSITY, ISOLATED, SILICON POWER RECTIFIERS

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

- V_R = 150V - 1000V
- I_F = 15A
- t_{rr} = 10nS - 2µS
- $I_{FSM} \geq$ 150A

ABSOLUTE MAXIMUM RATINGS

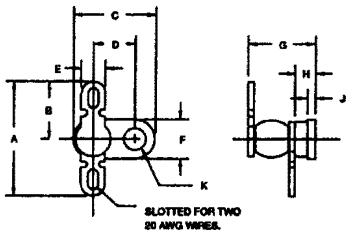
Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{mb}			1 Cycle Surge I_{FSM} t_P = 8.3mS		Repetitive Surge (I_{FRM})	Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	@ 25 °C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	°C
ISOPAC0103	1000	15	11	8	150	100	25	-55 to +175
ISOPAC0119	1000	10	8	6	150	80	15	-55 to +175
ISOPAC0112	600	15	11	8	150	100	25	-55 to +175
ISOPAC0104	400	15	11	8	150	80	25	-55 to +175
ISOPAC0111	150	15	10	7	175	175	24	-55 to +150
ISOPAC0203	1000	15	11	8	150	100	25	-55 to +175
ISOPAC0219	1000	10	8	6	150	80	15	-55 to +175
ISOPAC0212	600	15	11	8	150	100	25	-55 to +175
ISOPAC0204	400	15	11	8	150	80	25	-55 to +175
ISOPAC0211	150	15	10	7	175	175	24	-55 to +150
ISOPAC0403	1000	15	11	8	150	100	25	-55 to +175
ISOPAC0419	1000	10	8	6	150	80	15	-55 to +175
ISOPAC0412	600	15	11	8	150	100	25	-55 to +175
ISOPAC0404	400	15	11	8	150	80	25	-55 to +175
ISOPAC0411	150	15	10	7	175	175	24	-55 to +150
ISOPAC0603	1000	15	11	8	150	100	25	-55 to +175
ISOPAC0619	1000	10	8	6	150	80	15	-55 to +175
ISOPAC0612	600	15	11	8	150	100	25	-55 to +175
ISOPAC0604	400	15	11	8	150	80	25	-55 to +175
ISOPAC0611	150	15	10	7	175	175	24	-55 to +150
ISOPAC1203	1000	15	11	8	150	100	25	-55 to +175
ISOPAC1219	1000	10	8	6	150	80	15	-55 to +175
ISOPAC1212	600	15	11	8	150	100	25	-55 to +175
ISOPAC1204	400	15	11	8	150	80	25	-55 to +175
ISOPAC1211	150	15	10	7	175	175	24	-55 to +150

ELECTRICAL CHARACTERISTICS (apply per junction)

Device Type	Maximum Leakage Current @ V_{RWM}		Maximum Forward Voltage @ 9.0 A	Maximum Reverse Recovery Time
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
ISOPAC0103	1.0	20	1.2	2000
ISOPAC0119	1.0	25	2.2	150
ISOPAC0112	1.0	20	1.2	2000
ISOPAC0104	1.0	20	1.5	150
ISOPAC0111	10.0	500	1.1	30
ISOPAC0203	1.0	20	1.2	2000
ISOPAC0219	1.0	25	2.2	150
ISOPAC0212	1.0	20	1.2	2000
ISOPAC0204	1.0	20	1.5	150
ISOPAC0211	10.0	500	1.1	30
ISOPAC0403	1.0	20	1.2	2000
ISOPAC0419	1.0	25	2.2	150
ISOPAC0412	1.0	20	1.2	2000
ISOPAC0404	1.0	20	1.5	150
ISOPAC0411	10.0	500	1.1	30
ISOPAC0603	1.0	20	1.2	2000
ISOPAC0619	1.0	25	2.2	150
ISOPAC0612	1.0	20	1.2	2000
ISOPAC0604	1.0	20	1.5	150
ISOPAC0611	10.0	500	1.1	30
ISOPAC1203	1.0	20	1.2	2000
ISOPAC1219	1.0	25	2.2	150
ISOPAC1212	1.0	20	1.2	2000
ISOPAC1204	1.0	20	1.5	150
ISOPAC1211	10.0	500	1.1	30

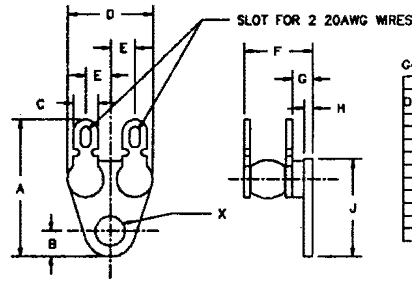
$R_{\theta JMB} = 3^{o}C/W$ per junction.
Non-isolated forms are available, consult factory for details.

3



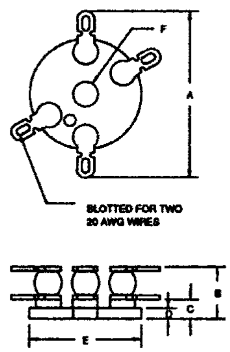
G45

DIM*	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	14.2	15.0	.53	.59	-
B	6.6	7.4	.26	.29	-
C	9.6	11.2	.38	.44	
D	4.5	6.1	.18	.24	-
E	3.0	3.3	.12	.13	-
F	4.8	5.3	.19	.21	-
G	7.9	10.2	.31	.40	-
H	2.2	3.0	.09	.12	-
J	.76	1.3	.03	.05	-
K	2.8	3.1	.111	.121	DIA



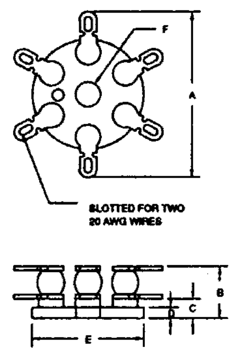
C46

DIM*	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	–	17.3	–	.68	–
B	2.9	3.4	.115	.135	–
C	3.0	3.3	.12	.13	–
D	10.0	10.4	.39	.41	–
E	2.8	3.0	.11	.12	–
F	–	10.7	–	.42	–
G	2.3	3.0	.09	.12	–
H	1.0	1.3	.04	.05	–
J	11.2	11.9	.44	.47	–
X	3.5	3.8	.139	.149	DIA



G47

DIM*	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	29.7	30.5	1.17	1.20	-
B	8.6	10.2	.34	.40	-
C	3.3	4.1	.13	.16	-
D	1.7	2.3	.07	.09	-
E	19.5	20.1	.77	.79	-
F	4.2	4.4	.167	.171	DIA

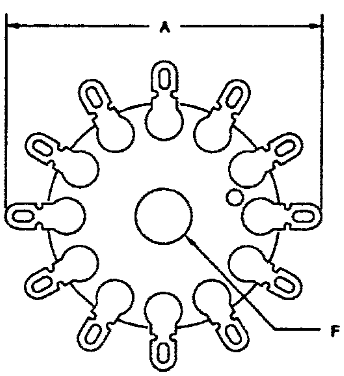


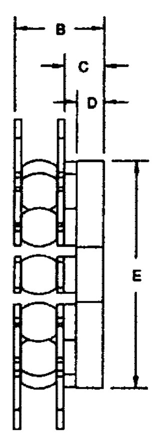
G49

DIM*	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	29.7	30.5	1.17	1.20	-
B	8.6	10.2	.34	.40	-
C	3.3	4.1	.13	.16	-
D	1.7	2.3	.07	.09	-
E	19.5	20.1	.77	.79	
F	4.2	4.4	.167	.171	DIA

G50

DIM*	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	38.3	39.2	1.51	1.54	-
B	10.1	10.9	.39	.43	-
C	4.3	5.1	.17	.20	-
D	3.0	3.3	.12	.13	-
E	27.6	28.4	1.09	1.12	-
F	6.7	6.8	.264	.268	DIA





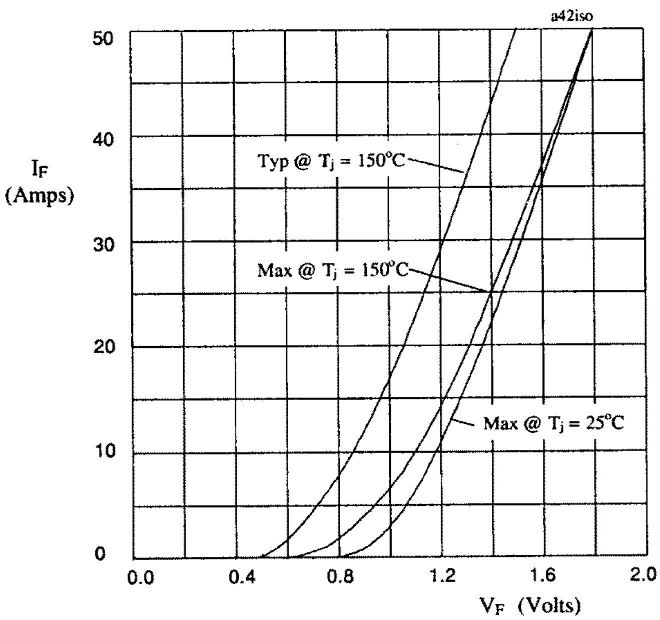


Figure 1. Forward voltage drop as a function of forward current for ISOPAC**03 & ISOPAC**12.

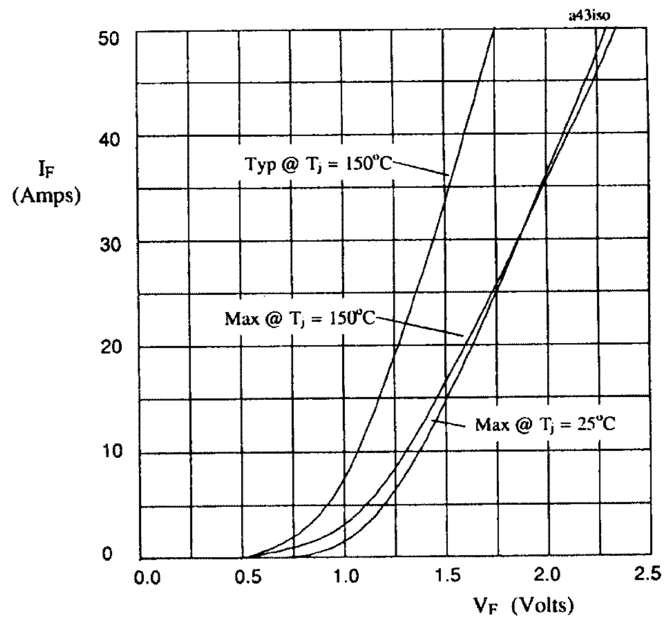


Figure 2. Forward voltage drop as a function of forward current for ISOPAC**04.

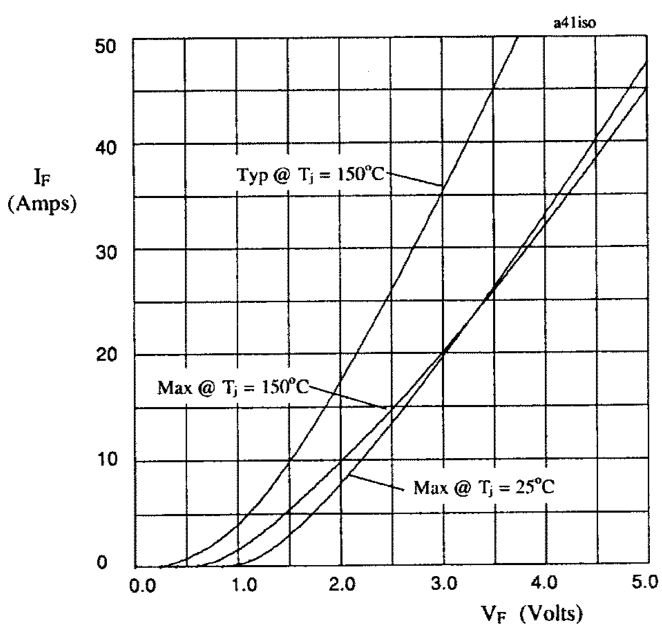


Figure 3. Forward voltage drop as a function of forward current for ISOPAC**19.

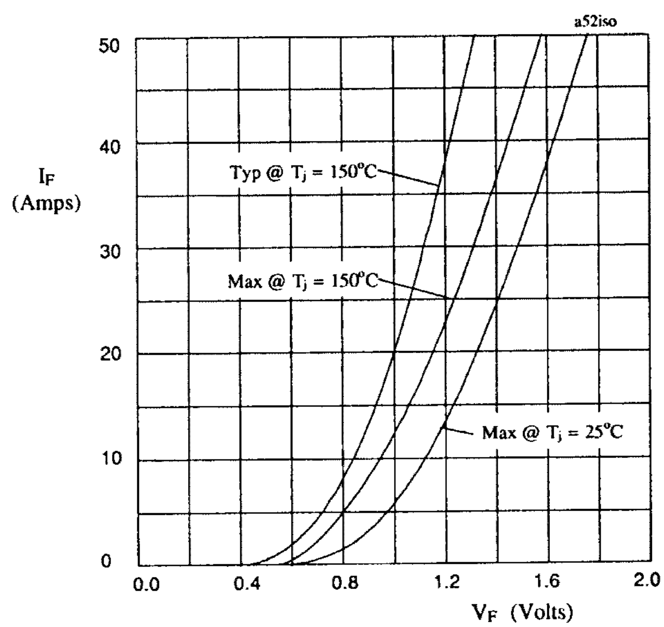


Figure 4. Forward voltage drop as a function of forward current for ISOPAC**11.

3

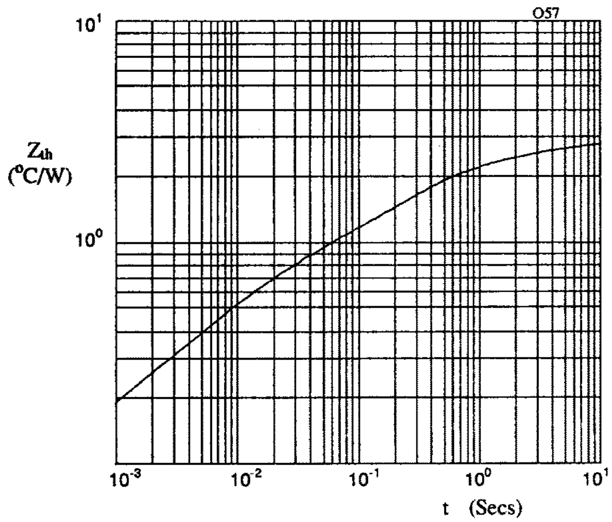


Figure 5. Typical transient thermal impedance characteristic.

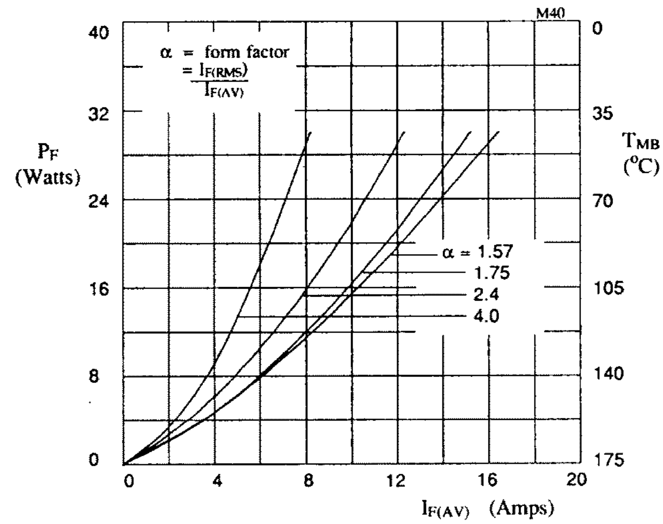


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for ISOPAC**03 and ISOPAC**12.

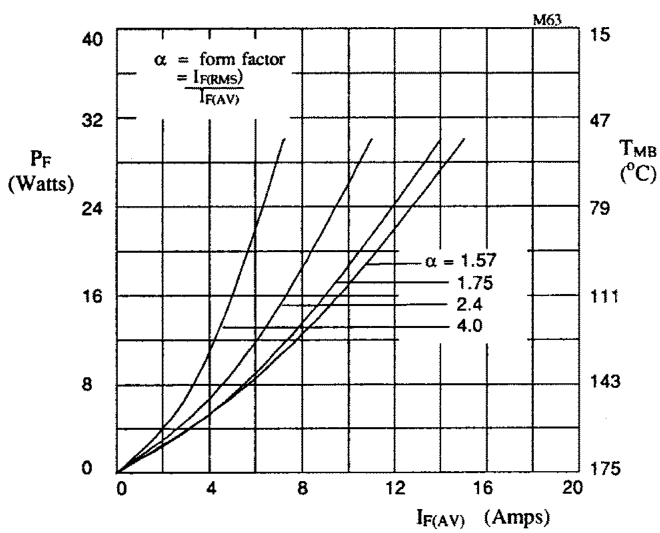


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for ISOPAC**04.

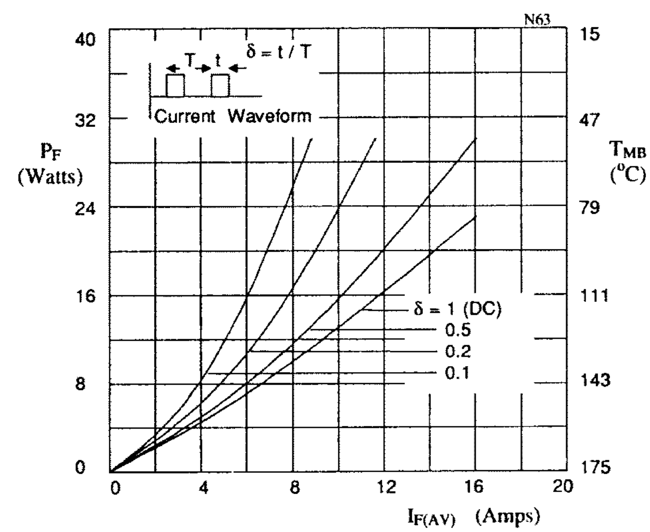


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for ISOPAC**04

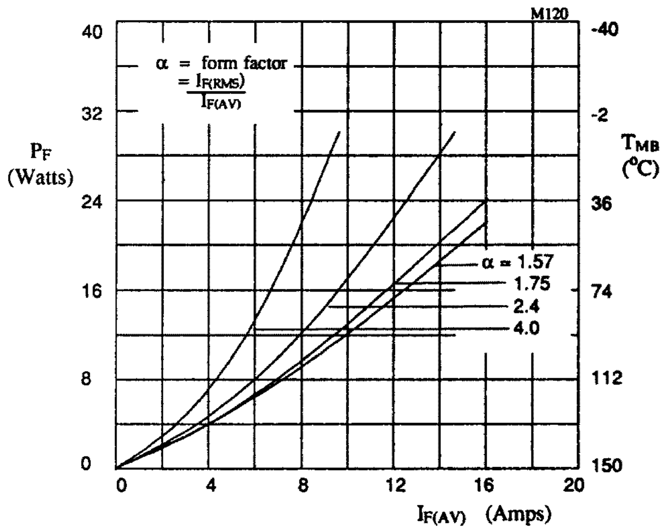


Figure 9. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for ISOPAC**11.

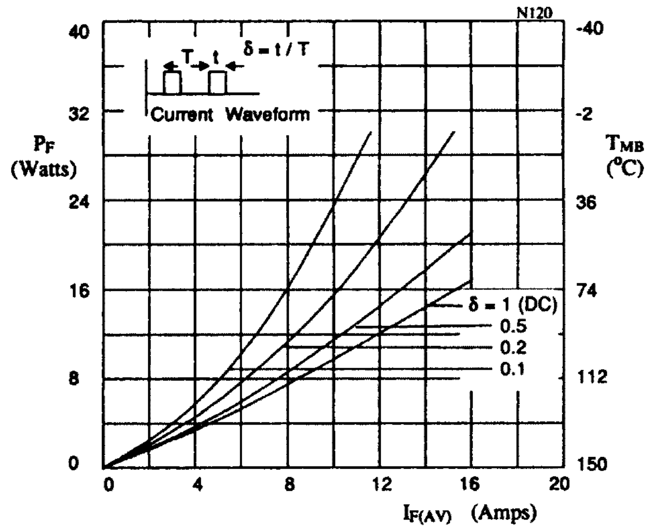


Figure 10. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for ISOPAC**11.

3

QUICK REFERENCE DATA

- V_R = 50V - 1000V
- I_F = 120A
- t_{rr} = 150nS
- I_{FSM} = 1800A

HIGH CURRENT, HIGH DENSITY, FAST RECOVERY SILICON POWER RECTIFIER STUD

- Low thermal impedance
- Low forward voltage drop
- Low reverse recovery time
- Low reverse leakage current
- High forward and surge currents ratings

ABSOLUTE MAXIMUM RATINGS

Device Type*	Working Reverse Voltage (V_{RWM})	Average Rectified Current $I_{F(AV)}$ insert mounting			stud mounted	stud + insert	1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 25°C	@ 55°C	@ 100°C	@ 55°C	@ 55°C	@ 25°C	@ 100°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCSF05	50	120	100	65	82.5	150	1800	1200	250
SCSF1	100	120	100	65	82.5	150	1800	1200	250
SCSF2	200	120	100	65	82.5	150	1800	1200	250
SCSF4	400	120	100	65	82.5	150	1800	1200	250
SCSF0	1000	85	70	50	60	105	1250	875	150

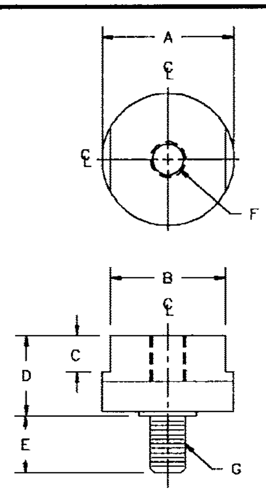
Normal polarity is cathode to stud

* add suffix "R" to part number for reverse polarity

MECHANICAL

Maximum thermal impedances

Stud mounted $R_{\theta JC}$ < 0.67°C/W
Insert mounted $R_{\theta JC}$ < 0.5°C/W
Stud + insert mtd $R_{\theta JC}$ < 0.28°C/W



G17

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	27.7	29.2	1.09	1.15	–
B	–	25.4	–	1.00	–
C	8.1	–	.32	–	–
D	–	17.8	–	.70	–
E	11.9	13.5	.47	.53	–
F	TAP'D 5/16–18UNC				–
G	STUD 5/16–18UNC				–

Stud mounting torque 40 in.lb. max.

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Forward voltage V_F @ 100A.	Reverse Recovery Time (1)
	@ 25 °C	@ 100 °C	Max @ 25°C	max @ 25 °C
	μA	μA	Volts	nS
SCSF05	12.0	300	1.35	150
SCSF1	12.0	300	1.35	150
SCSF2	12.0	300	1.35	150
SCSF4	12.0	300	1.35	150
SCSF0	12.0	300	2.0	150

1) Measured on discrete devices prior to assembly.

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

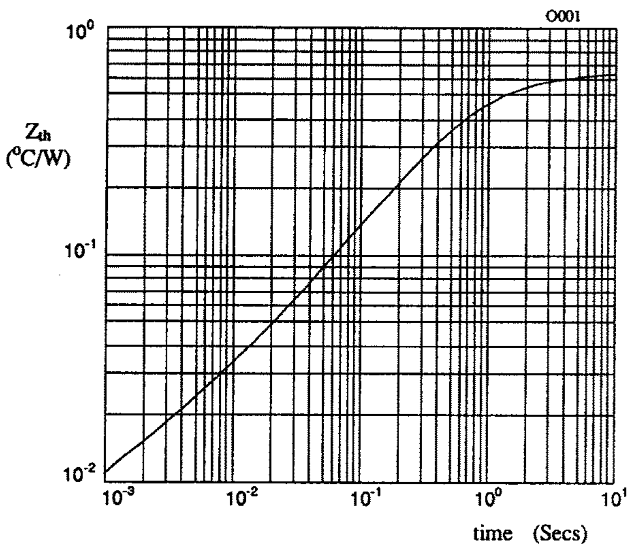


Fig 1. Transient thermal impedance characteristic when stud mounted.

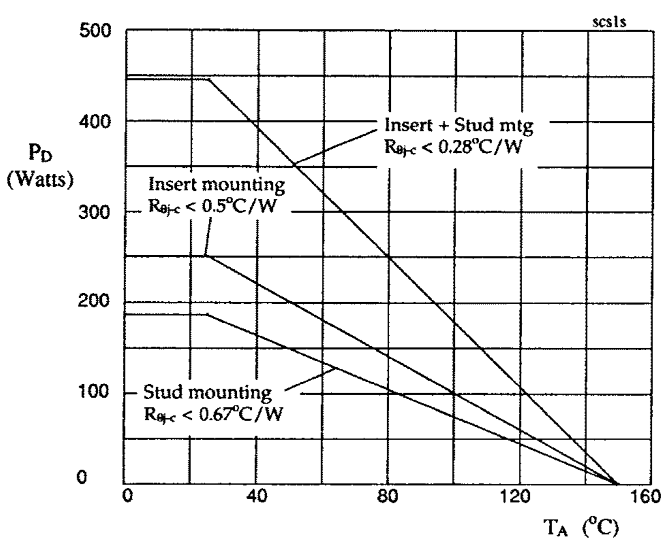


Fig 2. Power dissipation as a function of ambient temperature for different mountings.

3

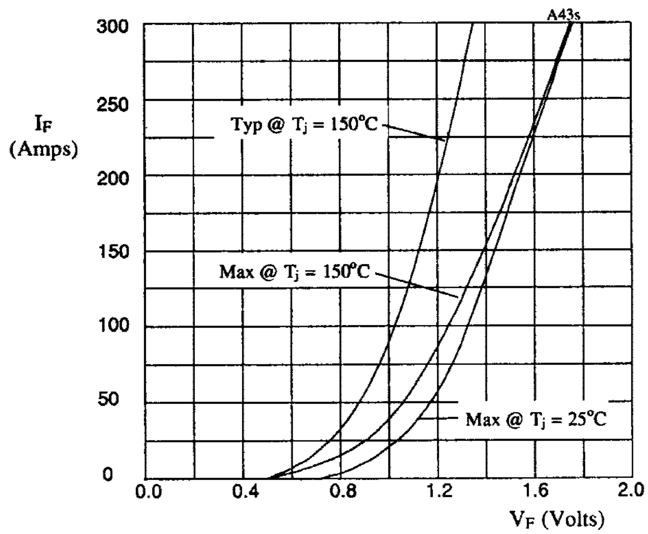


Fig 2. Forward voltage drop as a function of forward current for SCSF05 thru SCSF4.

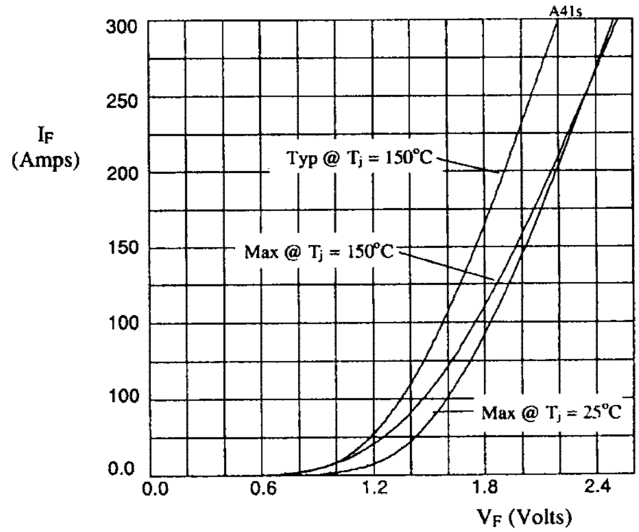


Fig 3. Forward voltage drop as a function of forward current for SCSF0.

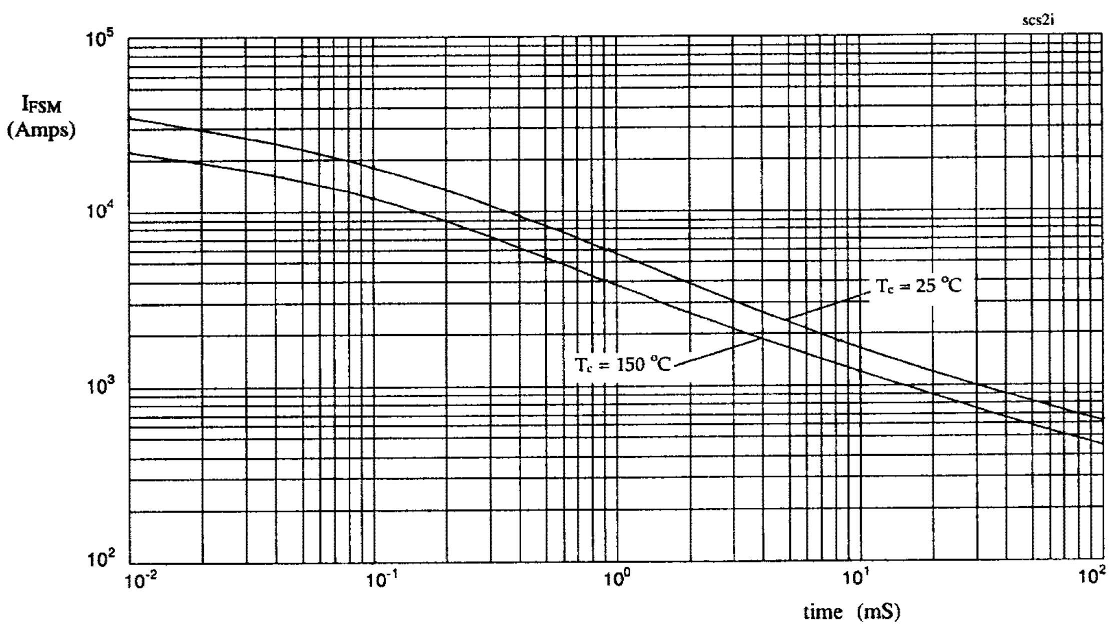


Figure 4. Maximum non-repetitive surge current against pulse width (SCSF05 thru SCSF4).

HIGH CURRENT, HIGH DENSITY, SUPERFAST RECOVERY SILICON POWER RECTIFIER STUD

- Very low reverse recovery time
- Low thermal impedance
- Low forward voltage drop
- High forward current applications
- High forward surge ratings

QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 150A
- t_{rr} = 30nS
- I_{FSM} = 1800A

3

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type *	Working Reverse Voltage (V_{RWM})	Average Rectified Current $I_{F(AV)}$ insert mounting			stud mounting	stud + insert mounting	1 Cycle Surge Current t_p = 8.3mS I_{FSM}		Repetitive Surge Current I_{FRM}
		@ 25 °C	@ 55 °C	@ 100 °C	@ 55 °C	@ 55 °C	@ 25 °C	@ 100 °C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCSFF05	50	↑	↑	↑	↑	↑	↑	↑	↑
SCSFF10	100	150	130	85	105	190	1800	930	240
SCSFF15	150	↓	↓	↓	↓	↓	↓	↓	↓

Normal polarity is cathode to stud

* add suffix "R" to part number for reverse polarity

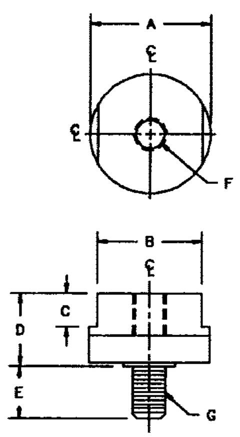
Operating temperature range -55 °C to +150 °C

Storage temperature range -55 °C to +150 °C

Device Type	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage V_F @ 100A	Reverse Recovery Time (1)
	@ 25 °C	@ 100 °C	@ 25°C	@ 25 °C
	µA	mA	Volts	nS
SCSFF05	↑	↑	↑	↑
SCSFF10	120	6.0	1.1	30
SCSFF15	↓	↓	↓	↓

1) Measured on discrete devices prior to assembly.

MECHANICAL



G17

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	27.7	29.2	1.09	1.15	–
B	–	25.4	–	1.00	–
C	8.1	–	.32	–	–
D	–	17.8	–	.70	–
E	11.9	13.5	.47	.53	–
F	TAP'D 5/16–18UNC				–
G	STUD 5/16–18UNC				–

Stud mounting torque 40 in.lb. max.

Maximum thermal impedances

Stud mounted $R_{\theta JC}$ < 0.67°C/W

Insert mounted $R_{\theta JC}$ < 0.5°C/W

Stud + insert mtd $R_{\theta JC}$ < 0.28°C/W

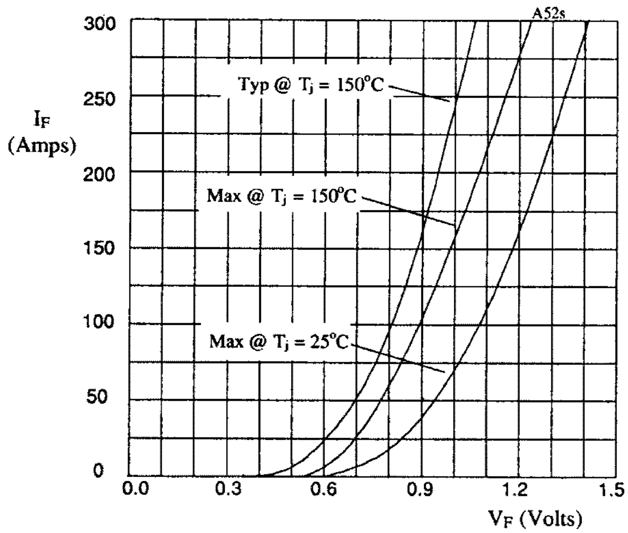


Fig 1. Forward voltage drop as a function of forward current.

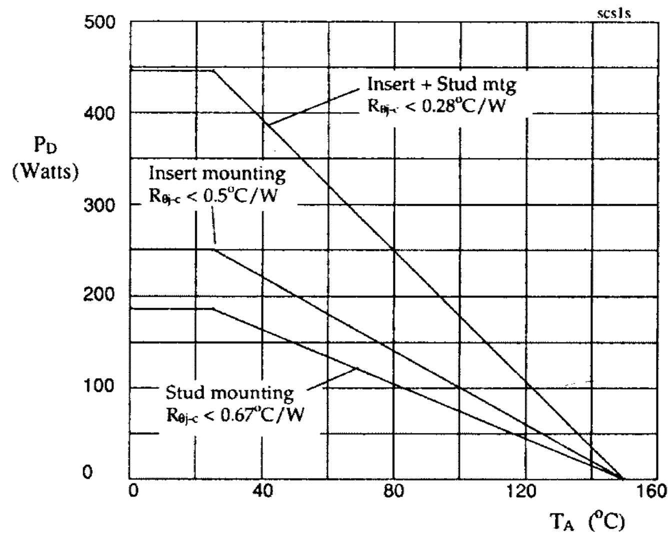


Fig 2. Power dissipation as a function of ambient temperature for different mountings.

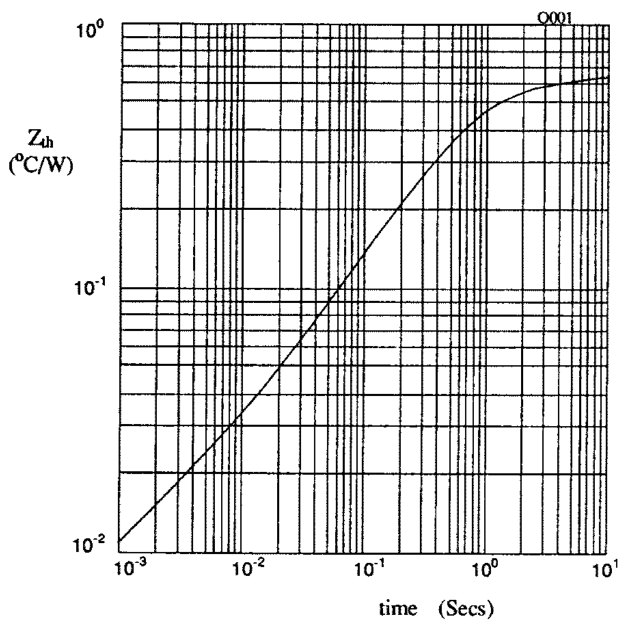


Fig 3. Transient thermal impedance characteristic when stud mounted.

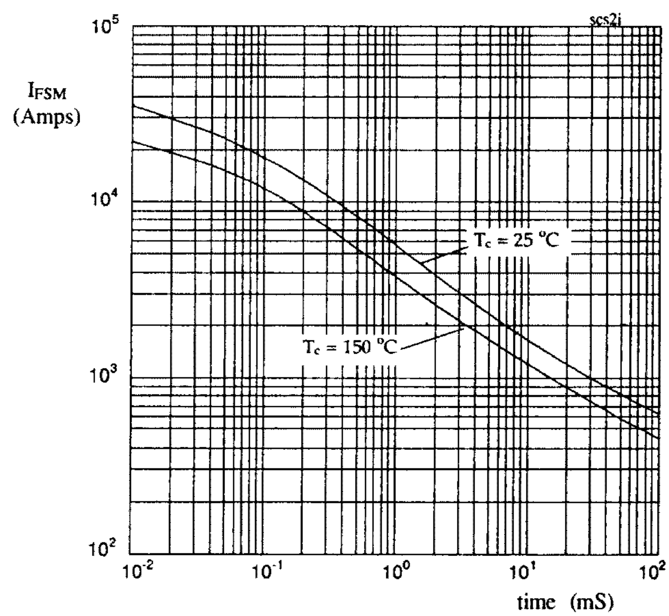


Fig 4. Maximum non-repetitive surge current against pulse width.

SEMTECH

STANDARD RECOVERY HIGH CURRENT RECTIFIER ASSEMBLY

SCSM05
SCSM1 SCSM2
SCSM4 SCSM6
SCSM8 SCSM0

HIGH CURRENT, HIGH DENSITY, STANDARD RECOVERY SILICON POWER RECTIFIER STUD

- Low thermal impedance
- Low forward voltage drop
- High current applications
- Low reverse leakage current
- High surge ratings

QUICK REFERENCE DATA

- V_R = 50V - 1000V
- I_F = 150A
- I_R = 12.0μA
- I_{FSM} = 1800A

3

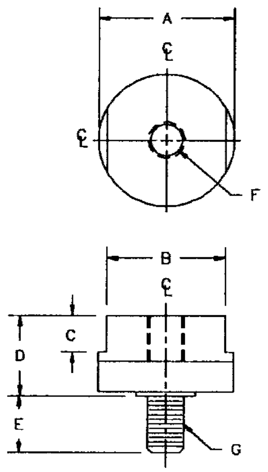
ABSOLUTE MAXIMUM RATINGS

Device Type *	Working Reverse Voltage (V_{RWM})	Average Rectified Current $I_{F(AV)}$ insert mounting			stud mounting	stud + insert mounting	1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 25 °C	@ 55 °C	@ 100 °C	@ 55 °C	@ 55 °C	@ 25 °C	@ 100 °C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCSM05	50	↑	↑	↑	↑	↑	↑	↑	↑
SCSM1	100								
SCSM2	200								
SCSM4	400	150	110	70	95	175	1800	840	250
SCSM6	600								
SCSM8	800								
SCSM0	1000	↓	↓	↓	↓	↓	↓	↓	↓

Normal polarity is cathode to stud

* add suffix "R" to part number for reverse polarity

MECHANICAL



G17

DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	27.7	29.2	1.09	1.15	–
B	–	25.4	–	1.00	–
C	8.1	–	.32	–	–
D	–	17.8	–	.70	–
E	11.9	13.5	.47	.53	–
F	TAP'D 5/16–18UNC				–
G	STUD 5/16–18UNC				–

Stud mounting torque 40 in.lb. max.

Maximum thermal impedances

Stud mounted $R_{\theta JC}$ < 0.67°C/W
Insert mounted $R_{\theta JC}$ < 0.5°C/W
Stud + insert mtd $R_{\theta JC}$ < 0.28°C/W

3

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage V_F @ 100A.	Reverse Recovery Time (1)
	@ 25 °C	@ 100 °C	Max @ 25°C	max @ 25 °C
	μA	μA	Volts	μS
SCSM05 SCSM1 SCSM2 SCSM4 SCSM6 SCSM8 SCSM0	12.0	400	1.15	2.0

1) Measured on discrete devices prior to assembly.

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

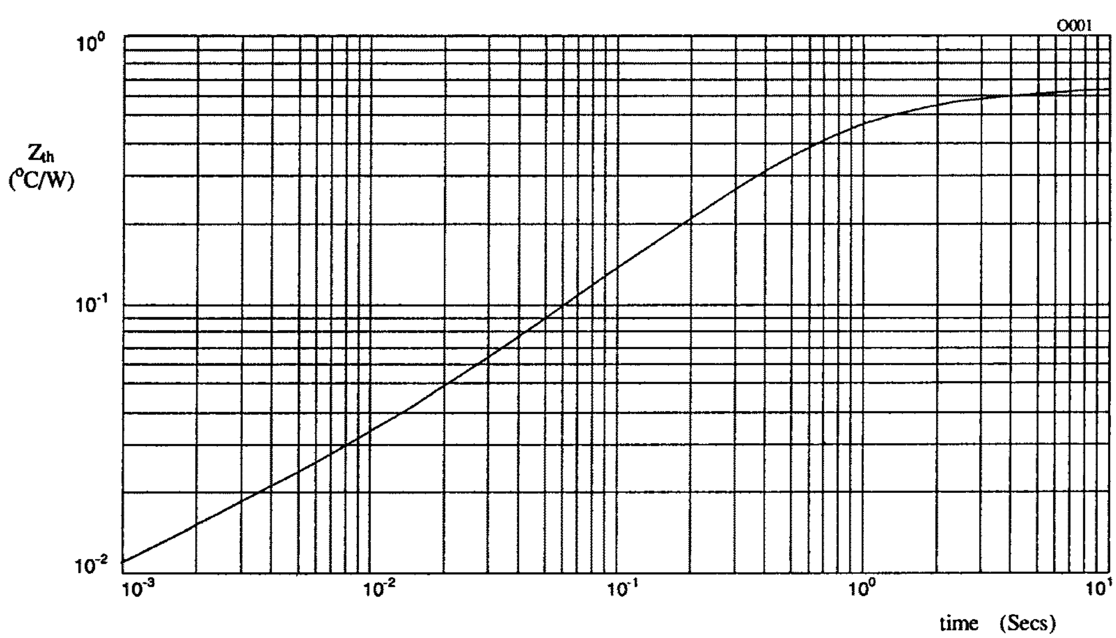


Figure 1. Transient thermal impedance characteristic when stud mounted.

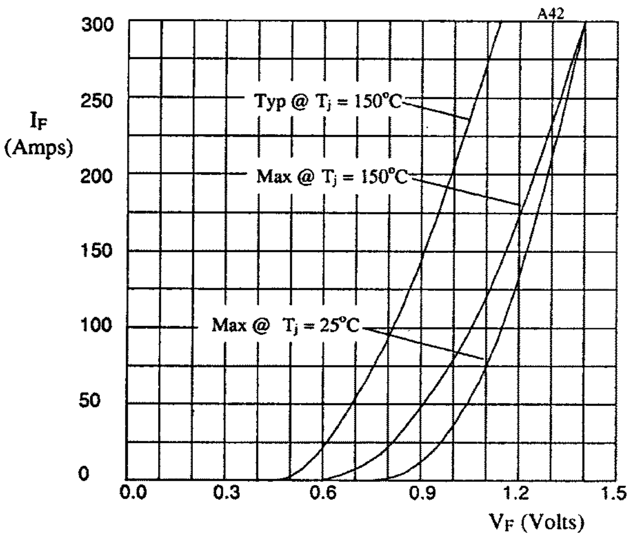


Fig 2. Forward voltage drop as a function of forward current.

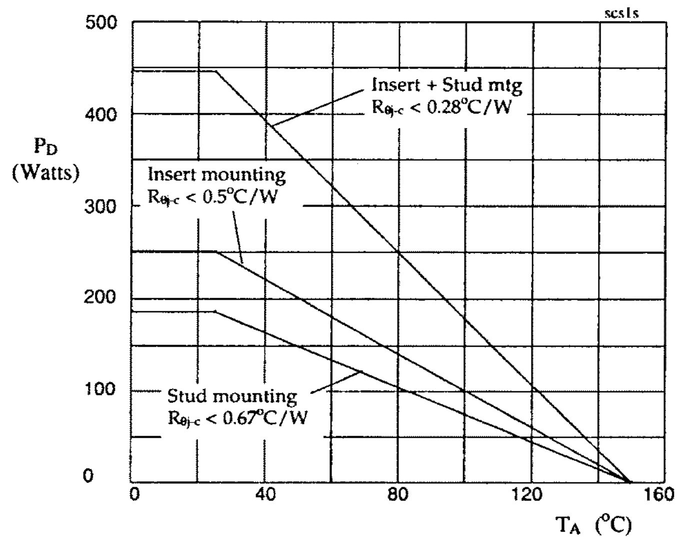


Fig 3. Power dissipation as a function of ambient temperature for different mountings.

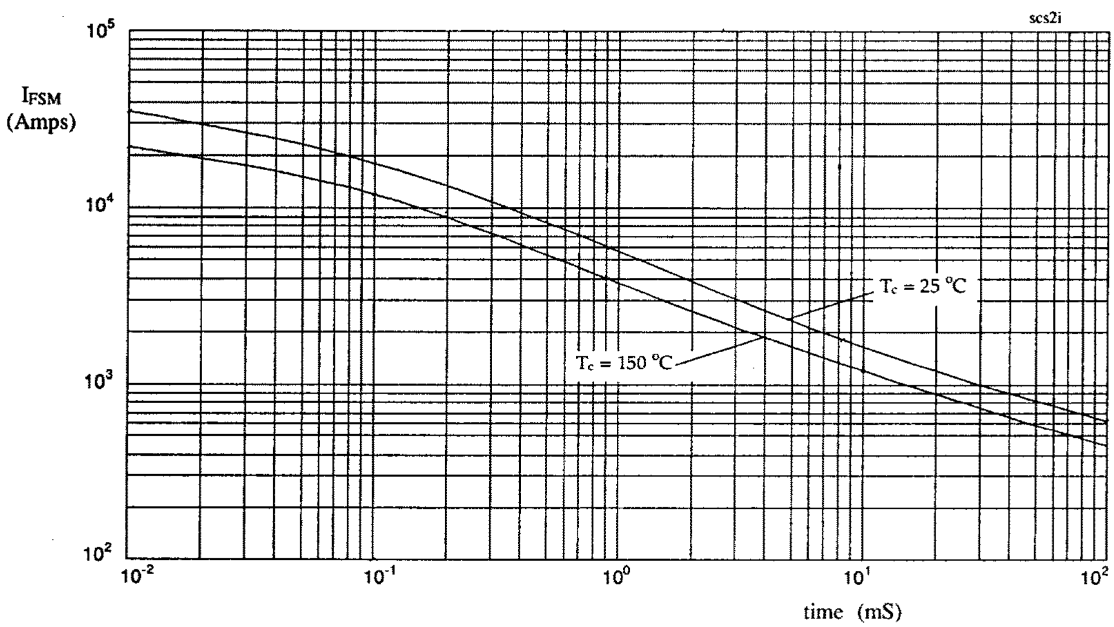


Figure 4. Maximum non-repetitive surge current against pulse width.

MINISTUD HIGH CURRENT ISOLATED RECTIFIER ASSEMBLY

SET010203
SET010219
SET010212
SET010204

3

HIGH CURRENT, HIGH DENSITY, ISOLATED, SILICON POWER RECTIFIER STUD

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

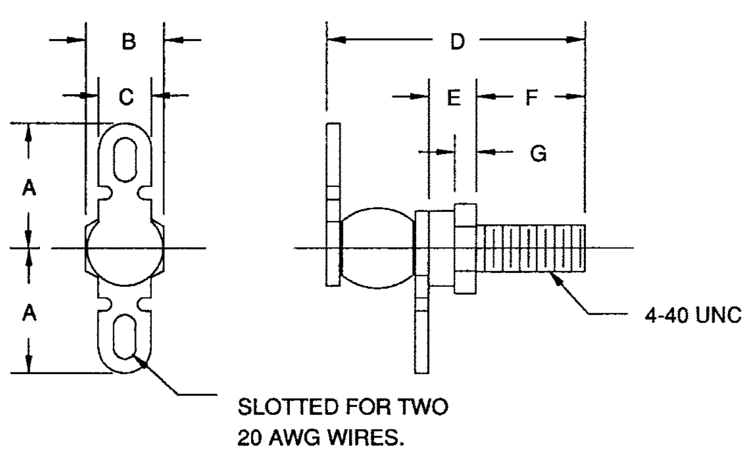
- V_R = 150V - 1000V
- I_F = 15A
- t_{rr} = 30nS - 2μS
- $I_{FSM} \geq$ 150A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{mb}			1 Cycle Surge I_{FSM} t_P = 8.3mS		Repetitive Surge (I_{FRM})	Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	@ 25 °C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	°C
SET010203	1000	15	11	8	150	100	25	-55 to +175
SET010219	1000	10	8	6	150	80	15	-55 to +175
SET010212	600	15	11	8	150	100	25	-55 to +175
SET010204	400	15	11	8	150	80	25	-55 to +175
SET010211	150	15	10	7	175	175	24	-55 to +150

$R_{\theta JMB}$ = 3°C/W for all varieties, other configurations available see next page for details

MECHANICAL



G57

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	5.8	7.4	.23	.29	-
B	4.5	4.8	.18	.19	-
C	3.0	3.3	.12	.13	-
D	14.2	16.5	.56	.65	-
E	2.7	3.3	.11	.13	-
F	6.0	6.6	.24	.26	-
G	1.2	1.5	.05	.06	-

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current @ V_{RWM}		Maximum Forward Voltage @ 9.0 A	Maximum Reverse Recovery Time
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
SET010203	1.0	20	1.2	2000
SET010219	1.0	25	2.2	150
SET010212	1.0	20	1.2	2000
SET010204	1.0	20	1.5	150
SET010211	10.0	500	1.1	30

OTHER CONFIGURATIONS

The Part Numbers Shown in this data Sheet are Isolated with the cathode at the stud end of the device. Part numbers for other configurations are shown below:

Isolated Cathode to Stud	Isolated Anode to Stud	Non-Isolated Cathode to Stud	Non-Isolated Anode to Stud
SET010203	SET010403	SET010103	SET010303
SET010219	SET010419	SET010119	SET010319
SET010212	SET010412	SET010112	SET010312
SET010204	SET010404	SET010104	SET010304
SET010211	SET010411	SET010111	SET010311

3

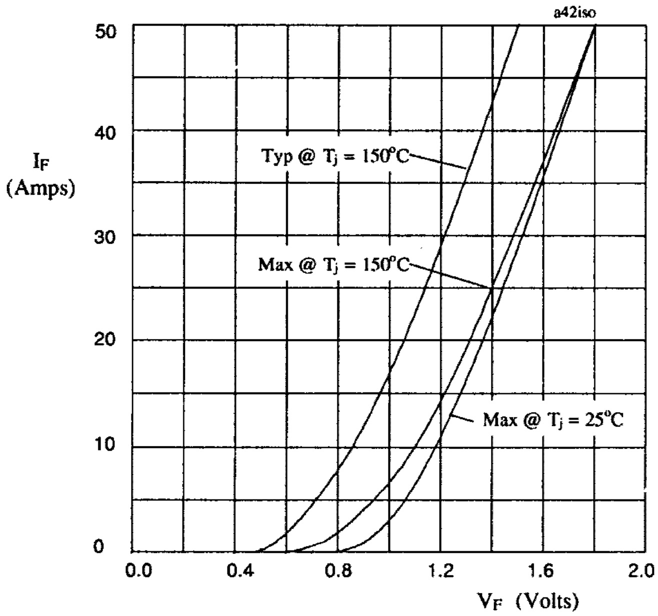


Figure 1. Forward voltage drop as a function of forward current for SET01**03 & SET01**12.

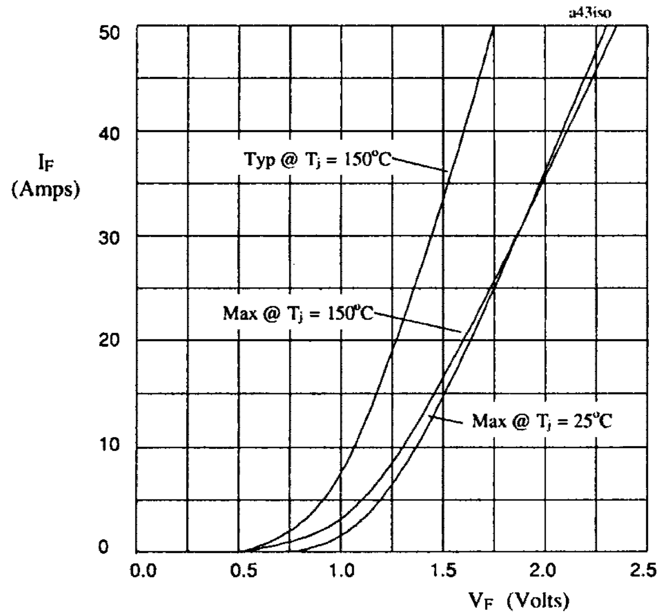


Figure 2. Forward voltage drop as a function of forward current for SET01**04.

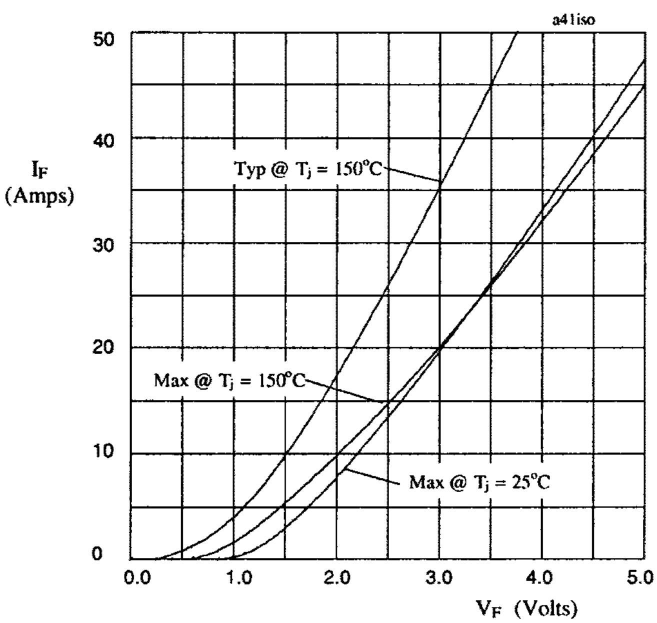


Figure 3. Forward voltage drop as a function of forward current for SET01**19.

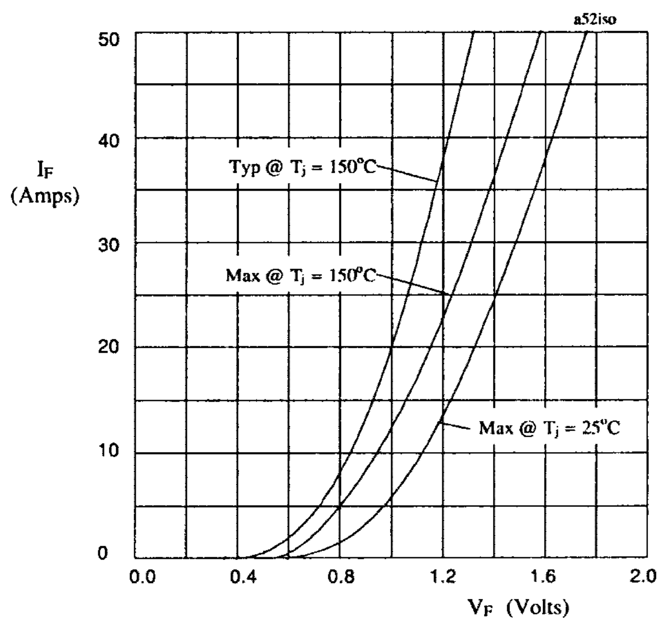


Figure 4. Forward voltage drop as a function of forward current for SET01**11.

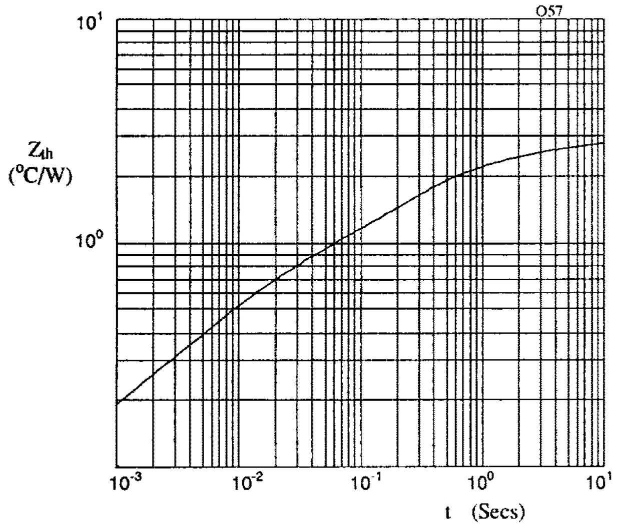


Figure 5. Typical transient thermal impedance characteristic.

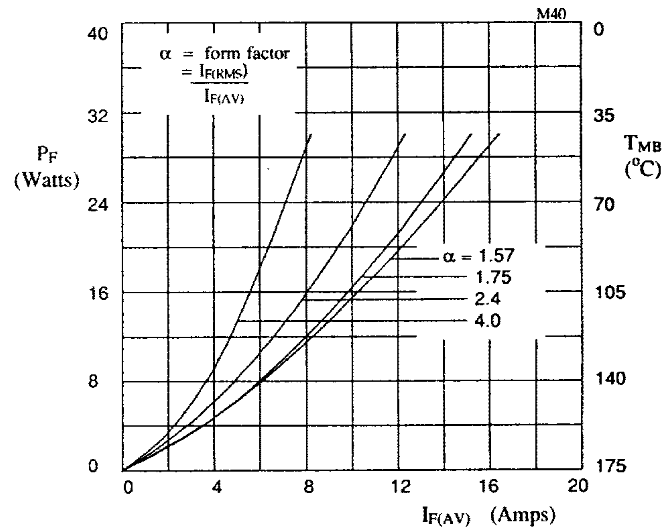


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET01**03 and SET01**12.

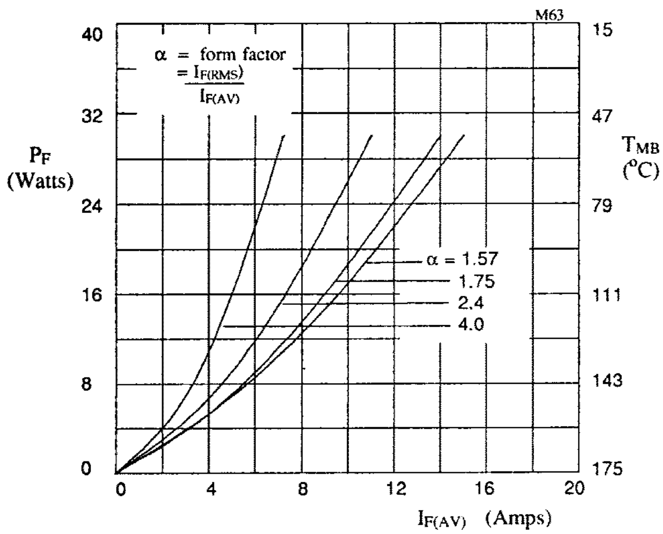


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET01**04.

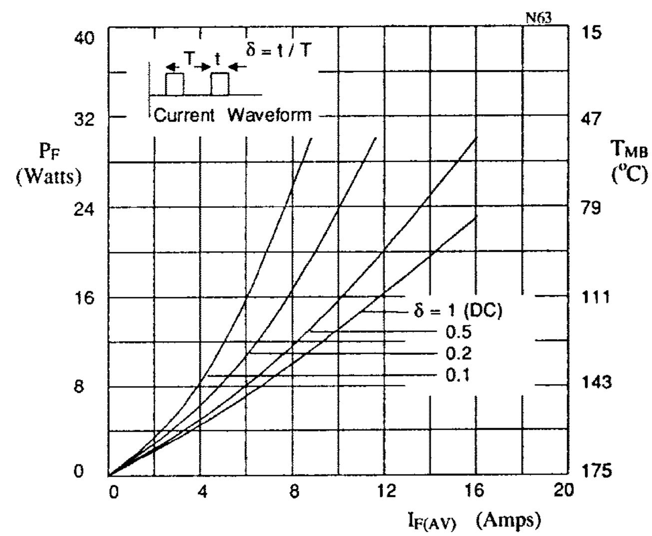


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET01**04

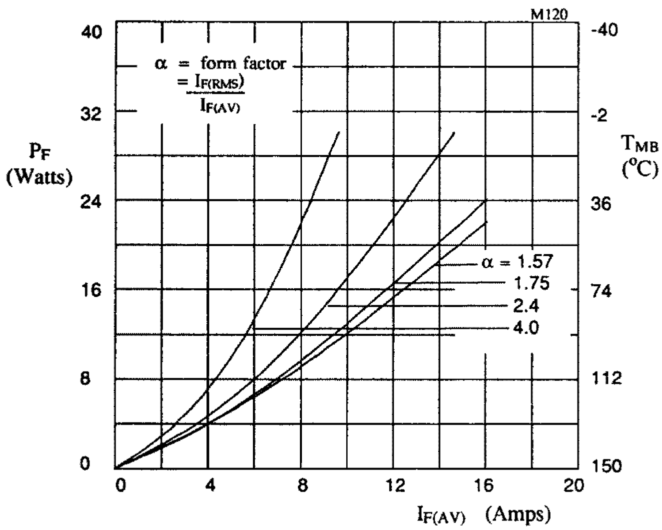


Figure 9. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET01**11.

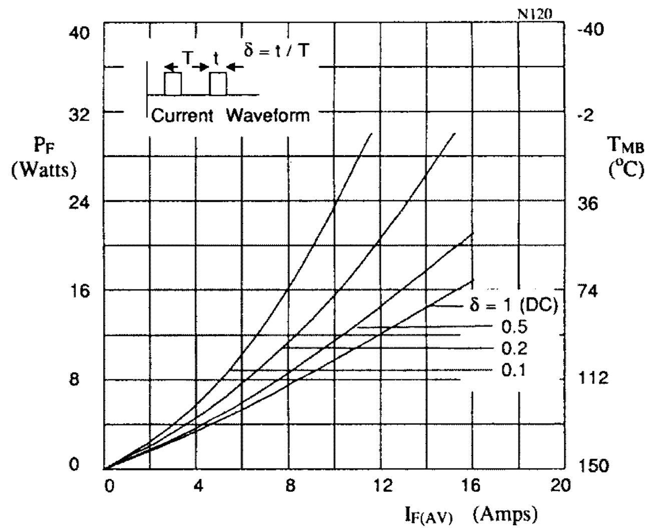


Figure 10. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET01**11.

DO4 STUD HIGH CURRENT ISOLATED RECTIFIER ASSEMBLY

SET040203
SET040219
SET040212
SET040204
SET040211

HIGH CURRENT, HIGH DENSITY, ISOLATED, SILICON POWER RECTIFIER DO4 STUD

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

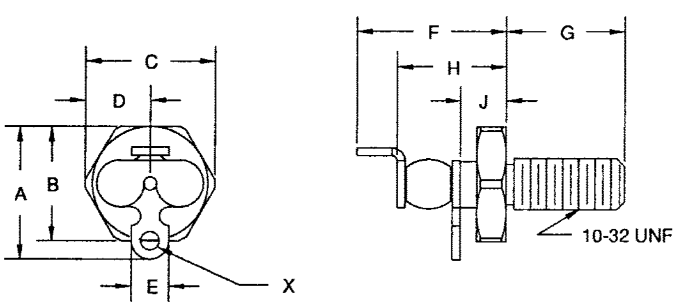
- V_R= 150V - 1000V
- I_F = 30A
- t_{rr} = 30nS - 2µS
- $I_{FSM} \geq$ 250A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{mb}			1 Cycle Surge I_{FSM} t_P = 8.3mS		Repetitive Surge (I_{FRM})	Operating & Storage Temperature Range (T_{OP}) (T_{STG})
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	@ 25 °C	
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	°C
SET040203	1000	30	22	16	250	200	50	-55 to +175
SET040219	1000	20	16	12	250	160	30	-55 to +175
SET040212	600	30	22	16	250	200	50	-55 to +175
SET040204	400	30	22	16	250	160	50	-55 to +175
SET040211	150	30	20	14	290	250	48	-55 to +150

$R_{\theta JMB}$ = 1.5°C/W for all varieties, other configurations available see next page for details

MECHANICAL



G58

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	12.4	13.2	.49	.52	-
B	10.6	11.2	.42	.44	-
C	11.4	12.2	.45	.48	-
D	5.5	6.1	.22	.24	-
E	3.3	3.6	.13	.14	-
F	13.7	14.8	.54	.57	-
G	10.6	11.4	.42	.45	-
H	9.1	9.9	.36	.39	-
J	4.0	4.6	.16	.18	-
X	1.6	1.9	.065	.075	DIA

3

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current @ V_{RWM}		Maximum Forward Voltage @ 18.0A	Maximum Reverse Recovery Time
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
SET040203	2.0	40	1.2	2000
SET040219	2.0	50	2.2	150
SET040212	2.0	40	1.2	2000
SET040204	2.0	40	1.5	150
SET040211	20.0	1.0mA	1.1	30

OTHER CONFIGURATIONS

The Part Numbers Shown in this data Sheet are Isolated with the cathode at the stud end of the device. Part numbers for other configurations are shown below:

Isolated Cathode to Stud	Isolated Anode to Stud	Non-Isolated Cathode to Stud	Non-Isolated Anode to Stud
SET040203	SET040403	SET040103	SET040303
SET040219	SET040419	SET040119	SET040319
SET040212	SET040412	SET040112	SET040312
SET040204	*SET040404*	*SET040104*	*SET040304*
SET040211	SET040411	SET040111	SET040311

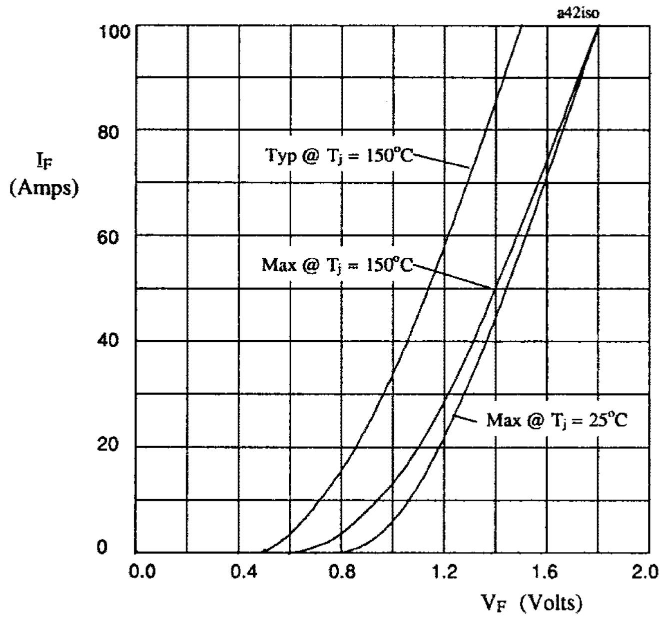


Figure 1. Forward voltage drop as a function of forward current for SET04**03 & SET04**12.

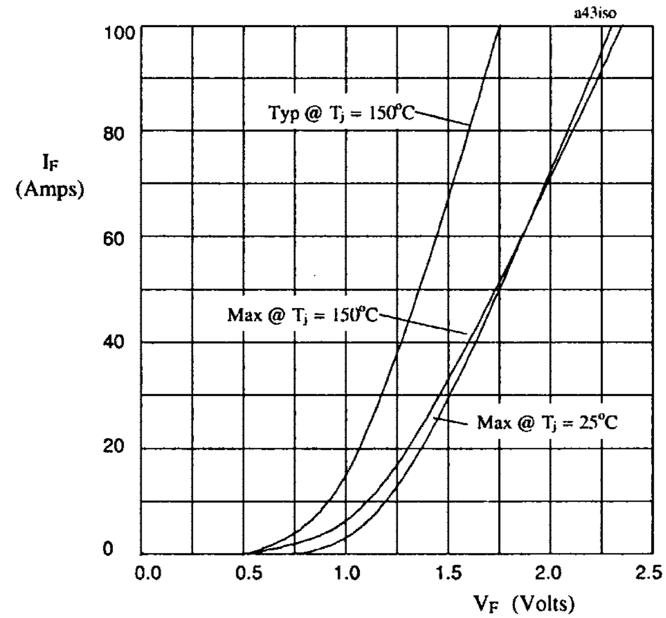


Figure 2. Forward voltage drop as a function of forward current for SET04**04.

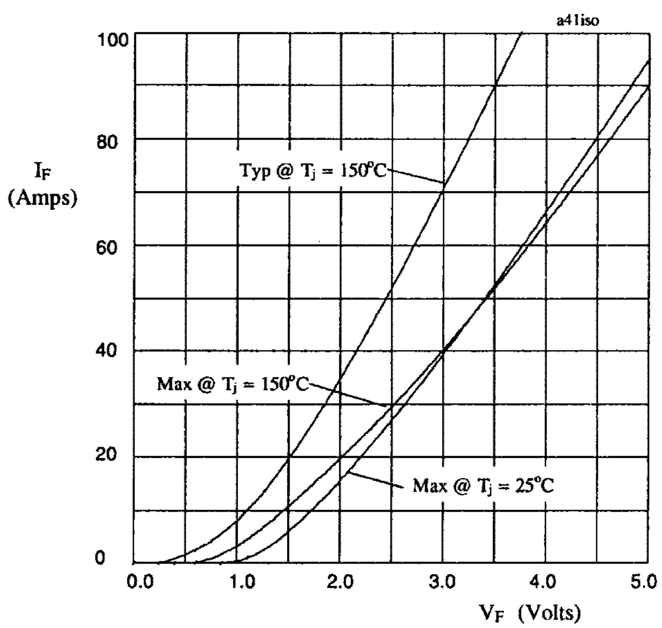


Figure 3. Forward voltage drop as a function of forward current for SET04**19.

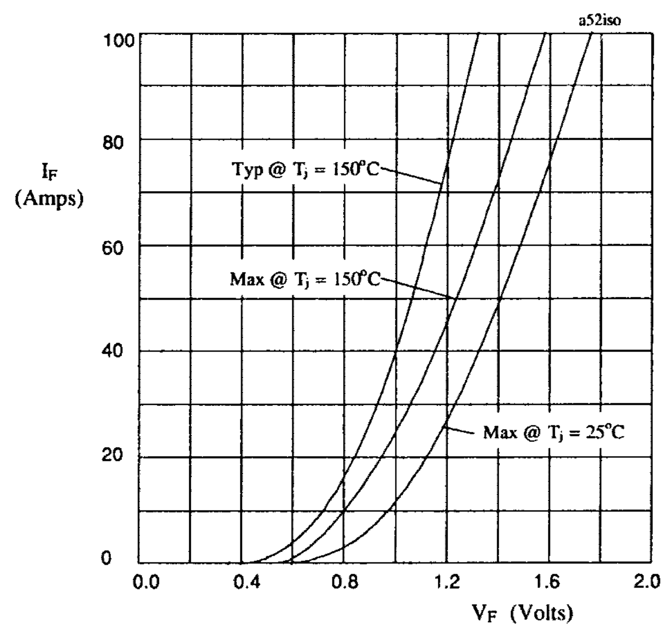


Figure 4. Forward voltage drop as a function of forward current for SET04**11.

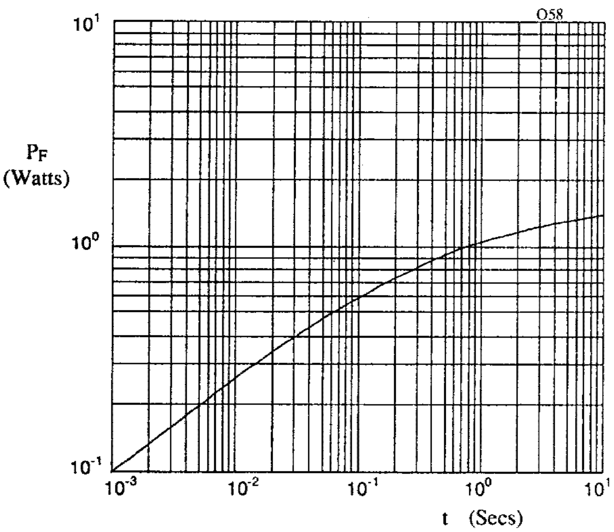


Figure 5. Typical transient thermal impedance characteristic.

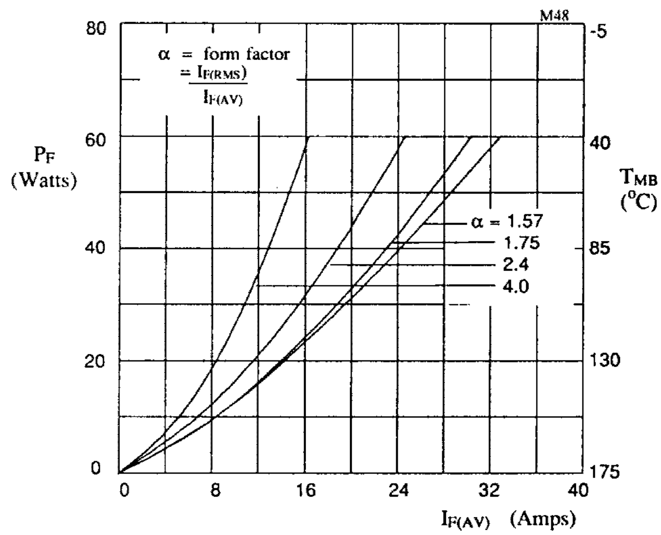


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET04**03 and SET04**12.

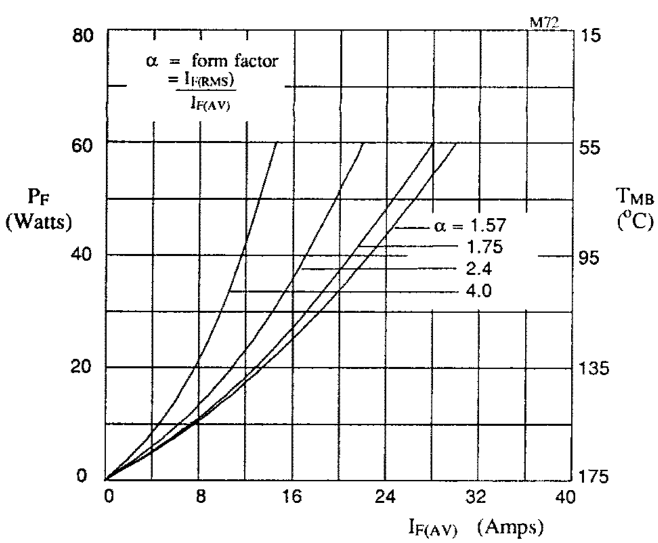


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET04**04.

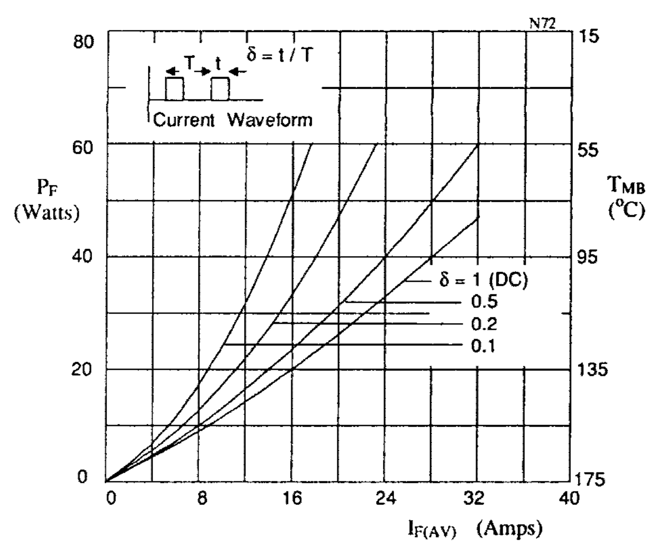


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET04**04

3

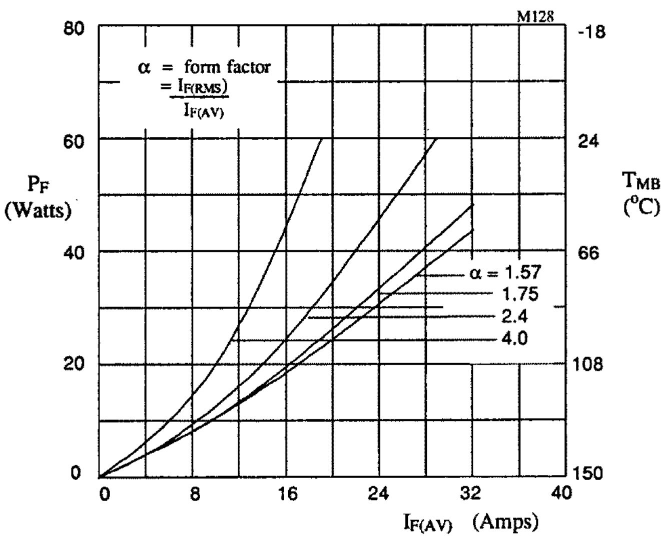


Figure 9. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET04**11.

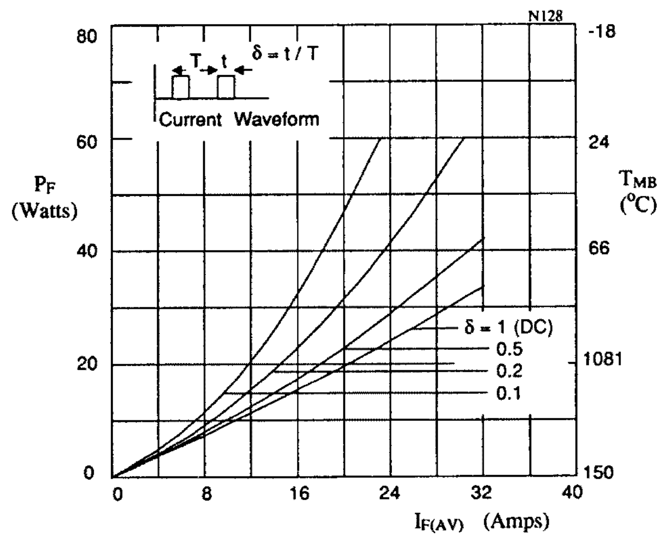


Figure 10. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET04**11.

DO5 STUD HIGH CURRENT ISOLATED RECTIFIER ASSEMBLY

SET050203
SET050219
SET050212
SET050204
SET050211

HIGH CURRENT, HIGH DENSITY, ISOLATED, SILICON POWER RECTIFIER DO5 STUD

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

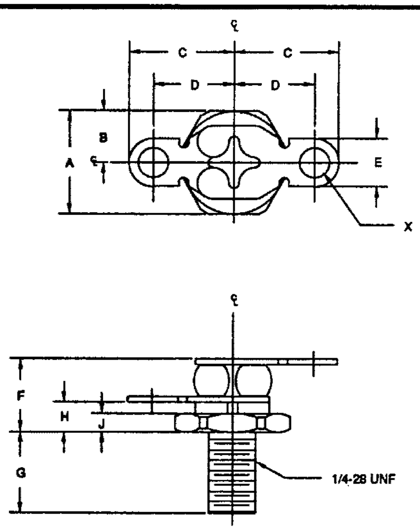
- V_R = 150V - 1000V
- I_F = 60A
- t_{rr} = 30nS - 2µS
- $I_{FSM} \geq$ 500A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{mb}			1 Cycle Surge I_{FSM} @ t_P = 8.3mS		Repetitive Surge (I_{FRM})	Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	@ 25 °C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	°C
SET050203	1000	60	44	32	500	400	100	-55 to +175
SET050219	1000	40	32	24	500	320	60	-55 to +175
SET050212	600	60	44	32	500	400	100	-55 to +175
SET050204	400	60	44	32	500	320	100	-55 to +175
SET050211	150	60	40	28	580	500	96	-55 to +150

$R_{\theta JMB}$ = 0.75°C/W for all varieties, other configurations available see next page for details

MECHANICAL



G79

DIM "	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	14.0	14.3	.55	.56	-
B	6.6	7.4	.26	.29	-
C	14.2	15.3	.56	.60	-
D	10.4	11.5	.41	.45	-
E	6.0	6.6	.24	.26	-
F	8.8	9.7	.35	.38	-
G	10.9	11.5	.43	.45	-
H	3.5	4.1	.14	.16	-
J	2.0	2.6	.08	.10	-
X	3.8	4.1	.15	.16	DIA

NOTES:
1. POSITIVE TERMINAL DENOTED BY RED DOT

3

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current @ V_{RWM}		Maximum Forward Voltage @ 36.0 A	Maximum Reverse Recovery Time
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
SET050203	4.0	80	1.2	2000
SET050219	4.0	100	2.2	150
SET050212	4.0	80	1.2	2000
SET050204	4.0	80	1.5	150
SET050211	40.0	2mA	1.1	30

OTHER CONFIGURATIONS

The Part Numbers Shown in this data Sheet are Isolated with the cathode at the stud end of the device. Part numbers for other configurations are shown below:

Isolated Cathode to Stud	Isolated Anode to Stud	Non-Isolated Cathode to Stud	Non-Isolated Anode to Stud
SET050203	SET050403	SET050103	SET050303
SET050219	SET050419	SET050119	SET050319
SET050212	SET050412	SET050112	SET050312
SET050204	SET050404	SET050104	SET050304
SET050211	SET050411	SET050111	SET050311

3

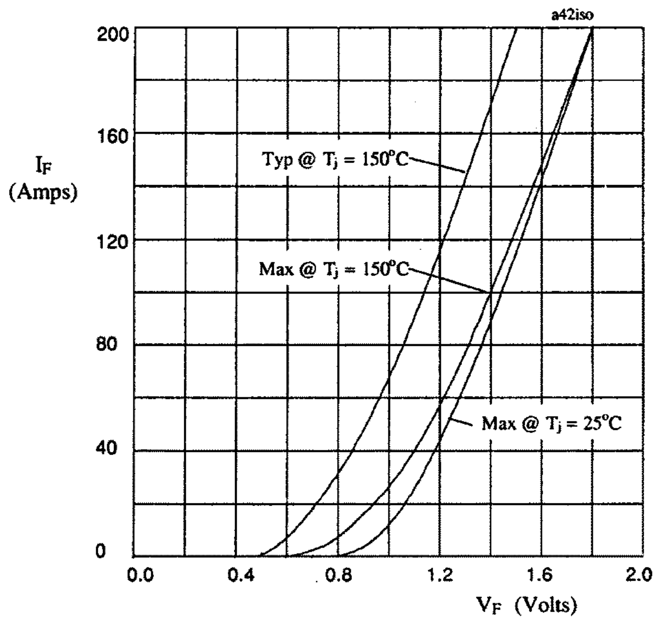


Figure 1. Forward voltage drop as a function of forward current for SET05**03 & SET05**12.

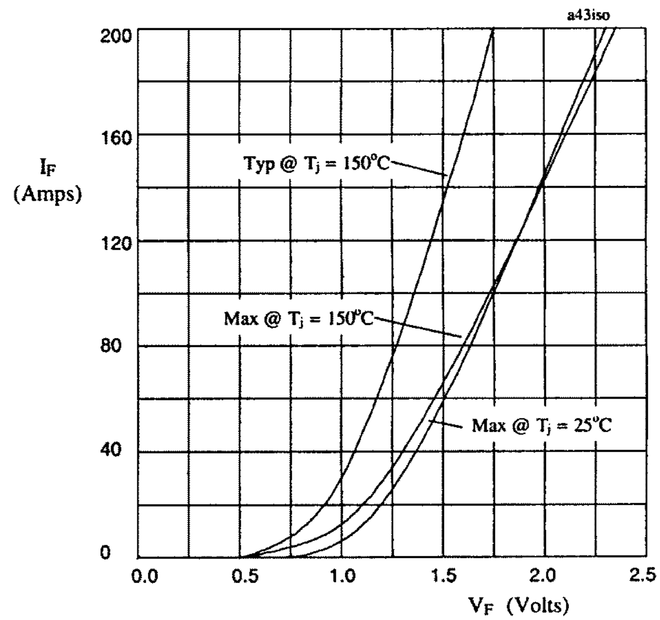


Figure 2. Forward voltage drop as a function of forward current for SET05**04.

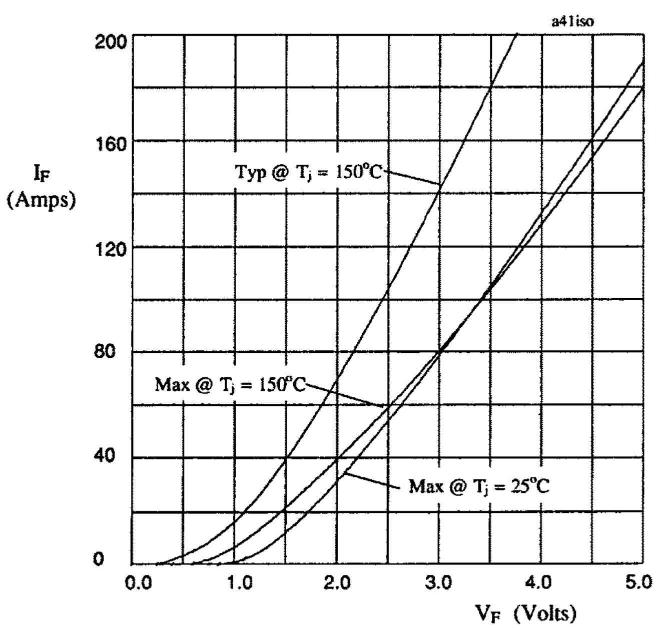


Figure 3. Forward voltage drop as a function of forward current for SET05**19.

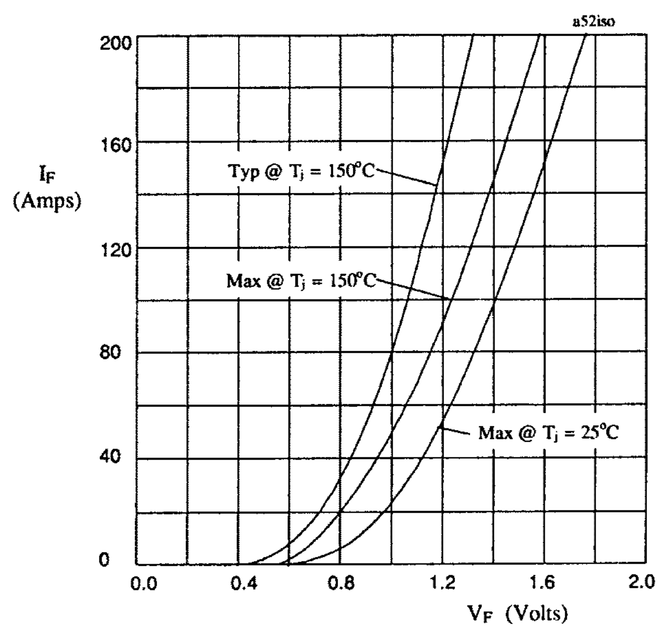


Figure 4. Forward voltage drop as a function of forward current for SET05**11.

3

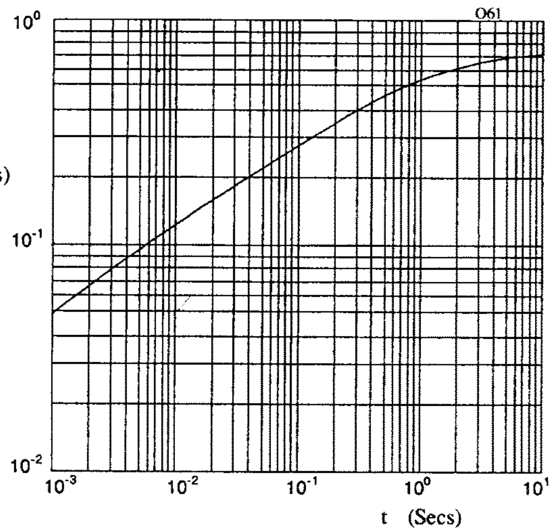


Figure 5. Typical transient thermal impedance characteristic.

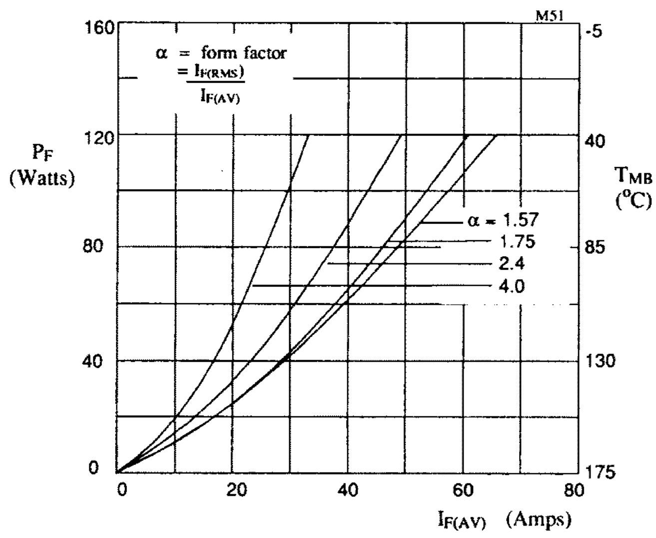


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET05**03 and SET05**12.

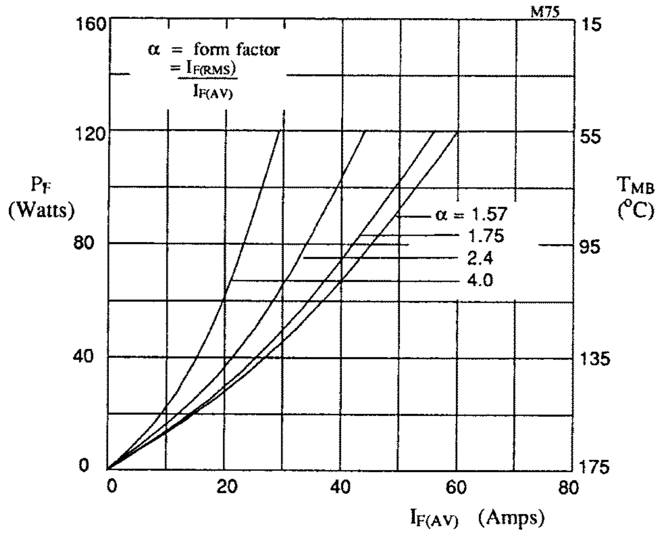


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET05**04.

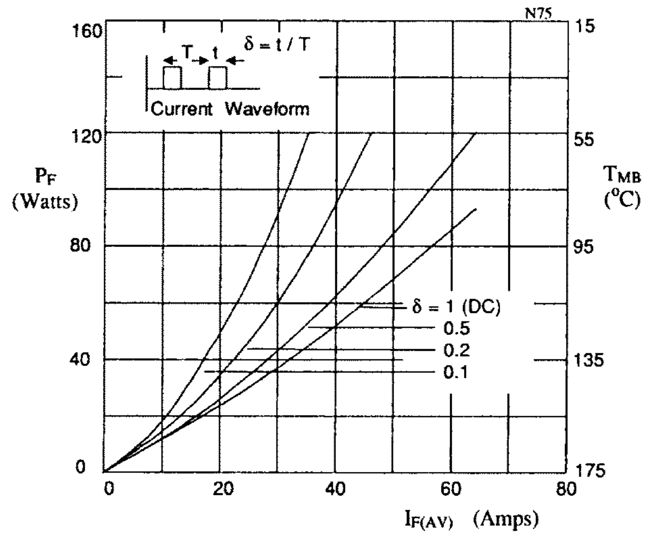


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET05**04

3

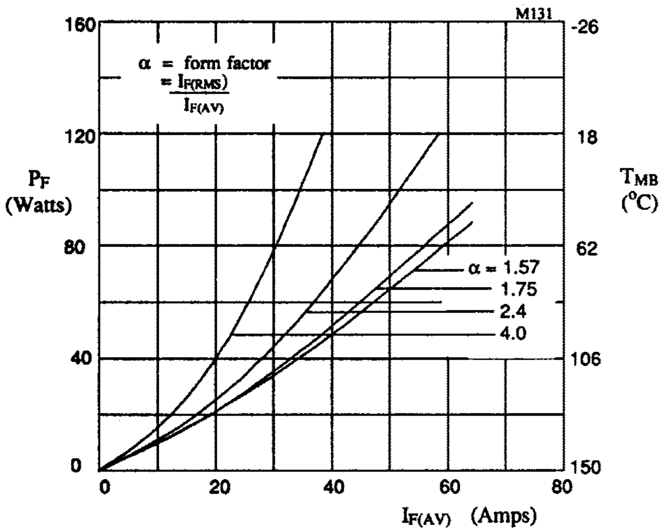


Figure 9. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET05**11.

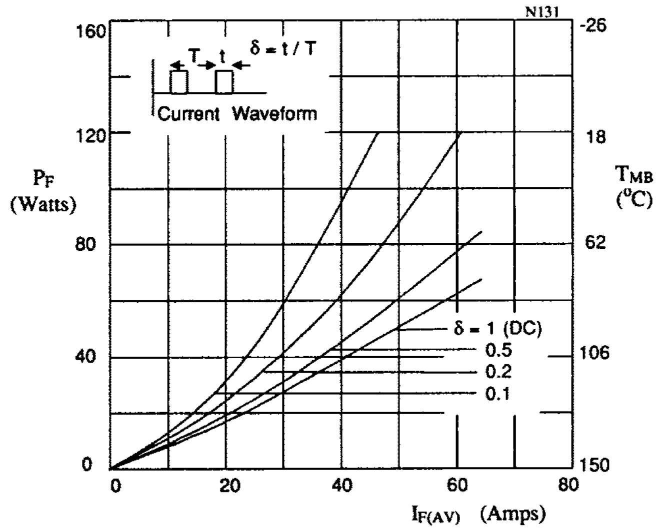


Figure 10. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET05**11.

DO5 STUD HIGH CURRENT ISOLATED RECTIFIER ASSEMBLY

SET100203
SET100219
SET100212
SET100204
SET100211

3

HIGH CURRENT, HIGH DENSITY, ISOLATED , SILICON POWER RECTIFIER DO5 STUD

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

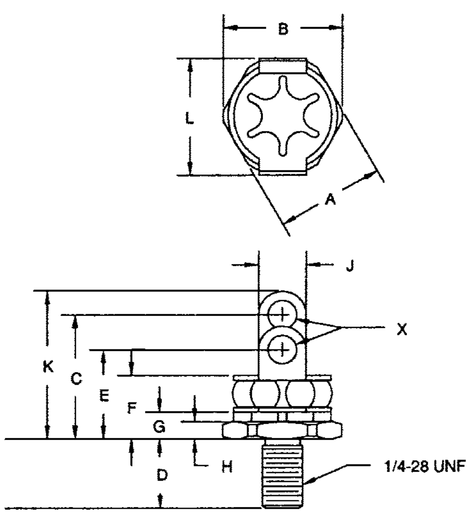
- V_R = 150V - 1000V
- I_F = 90A
- t_{rr} = 30nS - 2μS
- I_{FSM} ≥ 750A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{mb}			1 Cycle Surge I_{FSM} t_P = 8.3mS		Repetitive Surge (I_{FRM})	Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	@ 25 °C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	°C
SET100203	1000	90	66	48	750	600	150	-55 to +175
SET100219	1000	60	48	36	750	480	90	-55 to +175
SET100212	600	90	66	48	750	600	150	-55 to +175
SET100204	400	90	66	48	750	600	150	-55 to +175
SET100211	150	90	60	42	870	750	144	-55 to +150

$R_{\theta JMB}$ = 0.5°C/W for all varieties, other configurations available see next page for details

MECHANICAL



G74

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	17.0	17.6	.67	.69	-
B	18.7	19.3	.74	.76	-
C	19.5	20.6	.77	.81	-
D	10.6	11.7	.42	.46	-
E	13.9	15.0	.55	.59	-
F	-	11.0	-	.43	-
G	4.3	-	.17	-	-
H	2.5	3.1	.10	.12	-
J	7.3	7.9	.29	.31	-
K	-	25.4	-	1.0	-
L	-	19.1	-	.75	-
X	4.3	4.6	.170	.180	DIA

NOTES:
1. POLARITY - RED DOT DENOTES CATHODE TERM.

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current @ V_{RWM}		Maximum Forward Voltage @ 54.0 A	Maximum Reverse Recovery Time
	$T_j = 25\,^{\circ}C$	$T_j = 100\,^{\circ}C$		
	µA	µA	Volts	nS
SET100203	6.0	120	1.2	2000
SET100219	6.0	150	2.2	150
SET100212	6.0	120	1.2	2000
SET100204	6.0	120	1.5	150
SET100211	60.0	3mA	1.1	30

OTHER CONFIGURATIONS

The Part Numbers Shown in this data Sheet are Isolated with the cathode at the stud end of the device. Part numbers for other configurations are shown below:

Isolated Cathode to Stud	Isolated Anode to Stud	Non-Isolated Cathode to Stud	Non-Isolated Anode to Stud
SET100203	SET100403	SET100103	SET100303
SET100219	SET100419	SET100119	SET100319
SET100212	SET100412	SET100112	SET100312
SET100204	SET100404	SET100104	SET100304
SET100211	SET100411	SET100111	SET100311

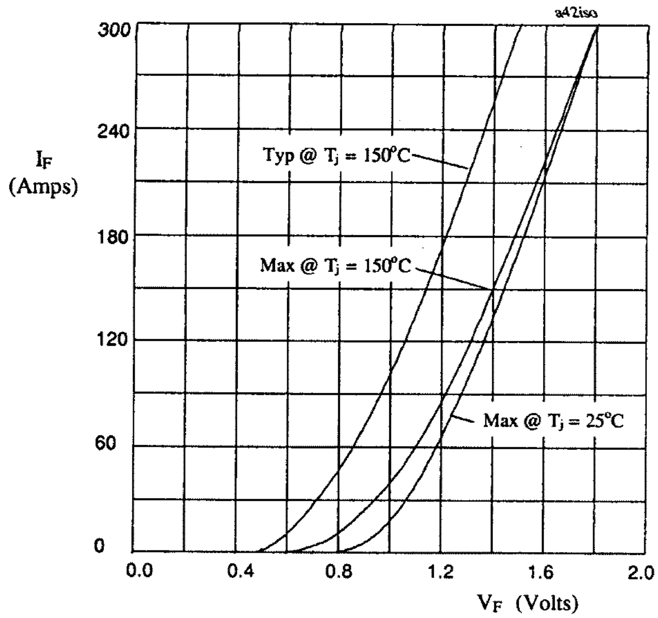


Figure 1. Forward voltage drop as a function of forward current for SET10**03 & SET10**12.

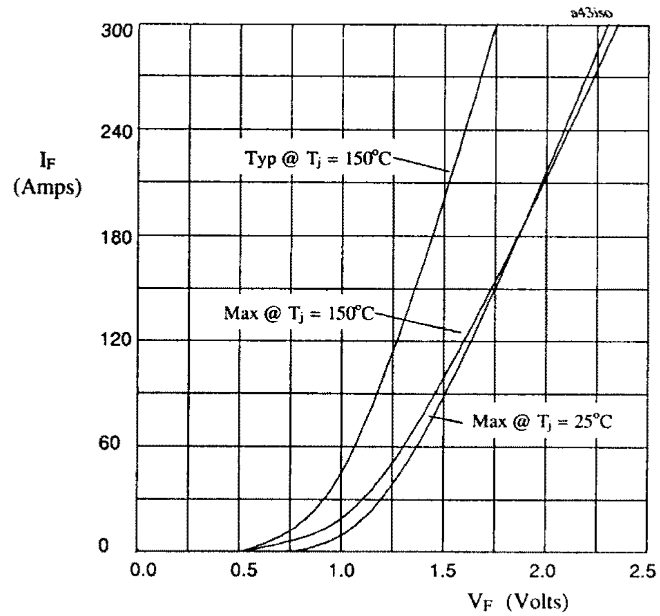


Figure 2. Forward voltage drop as a function of forward current for SET10**04.

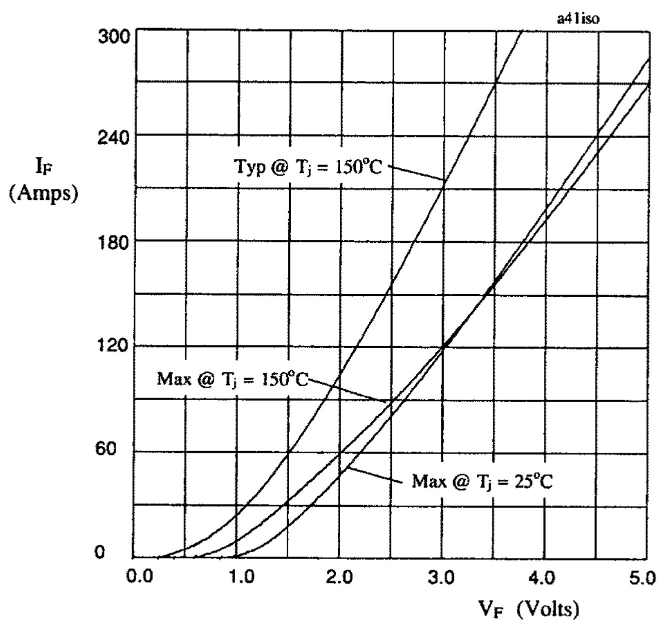


Figure 3. Forward voltage drop as a function of forward current for SET10**19.

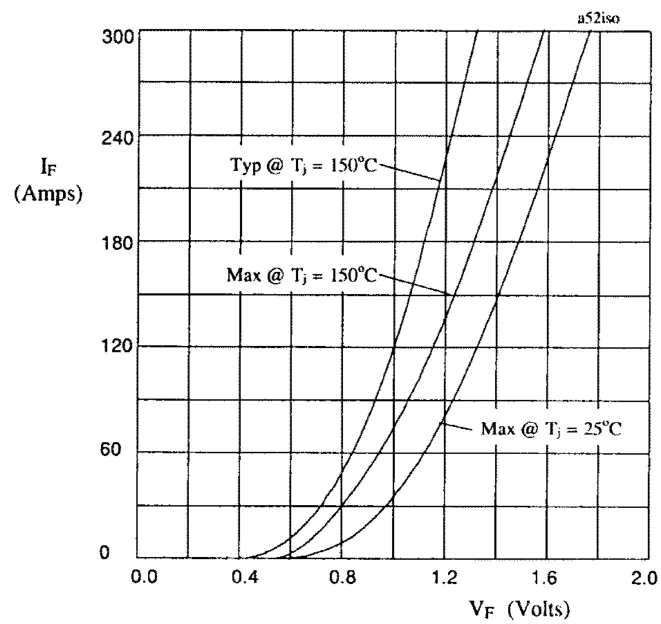


Figure 4. Forward voltage drop as a function of forward current for SET10**11.

3

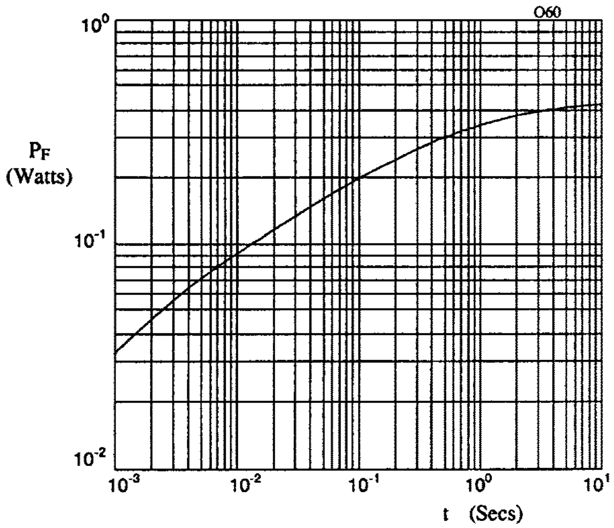


Figure 5. Typical transient thermal impedance characteristic.

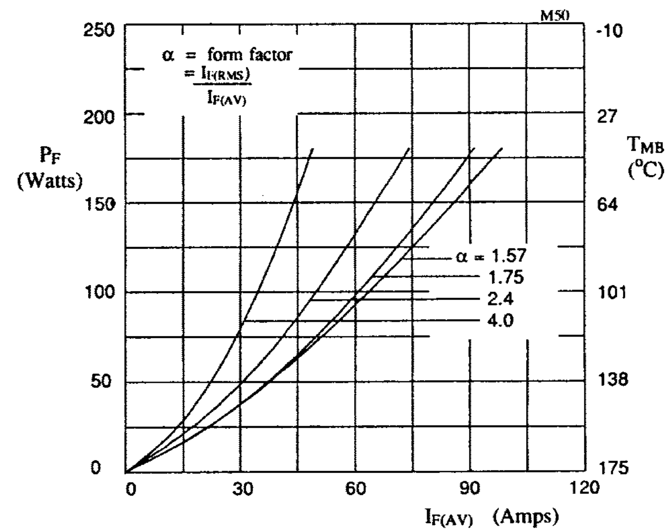


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET10**03 and SET10**12.

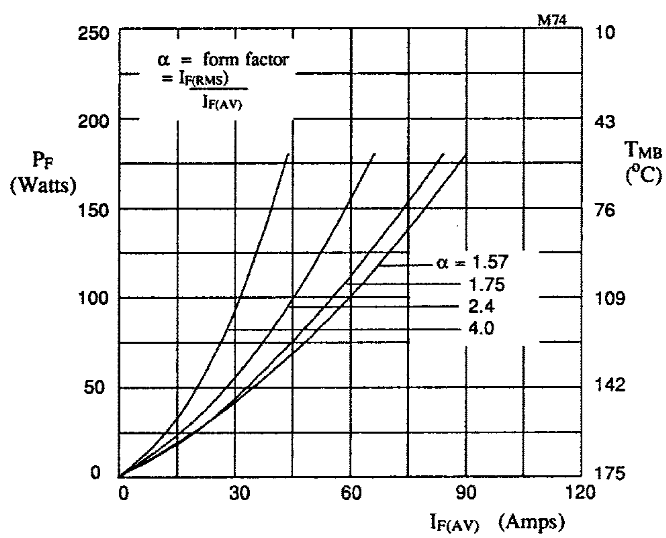


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET10**04.

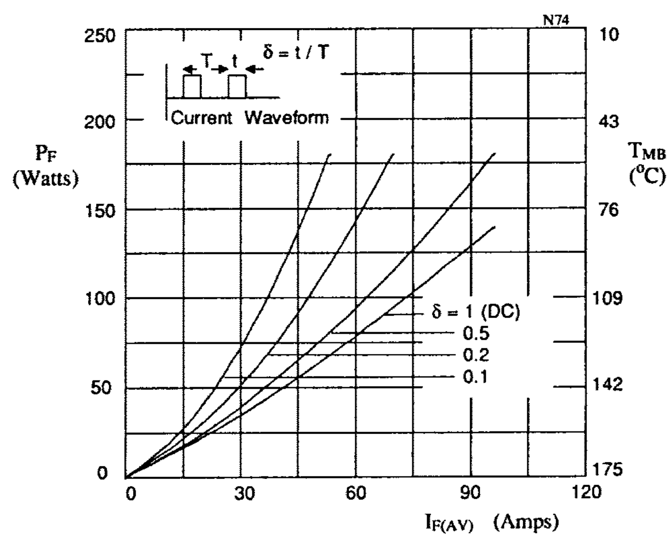


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET10**04

3

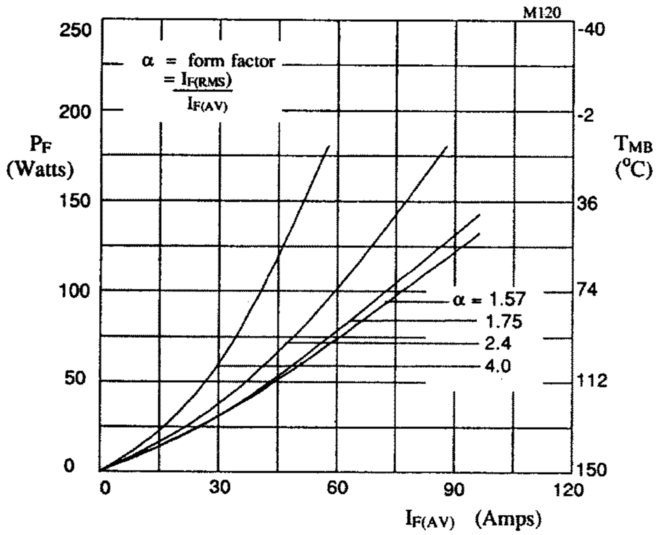


Figure 9. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET10**11.

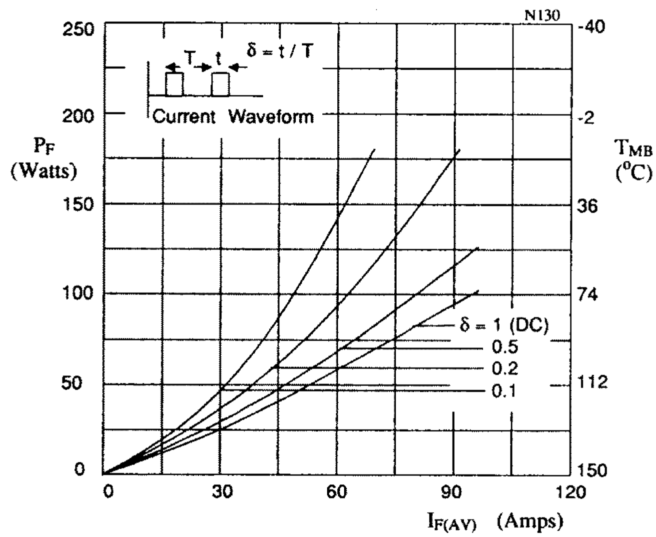


Figure 10. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET10**11.

Chapter 4
Single Phase Full Wave Bridge Assemblies

STANDARD RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- Three lead configurations
- Pcb mounting

QUICK REFERENCE DATA

- V_R = 200V - 1000V
- I_F = 3.0A
- I_R = 2.0 µA
- t_{rr} = 2.0µS

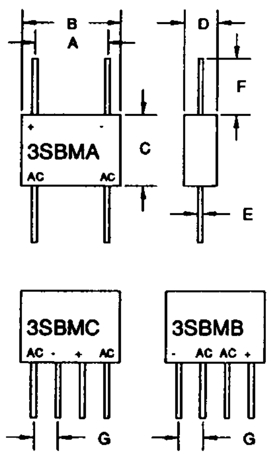
ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		1 Cycle Surge Current I_{FSM} t_p = 8.3mS	Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop V_F @ 3A/leg @ 25°C	Reverse Recovery Time t_{rr}
		@ 55°C	@ 100°C	@ 25°C	@ 25°C	@ 25°C	@ 100°C		@ 25°C
	Volts	Amps	Amps	Amps	Amps	µA	µA	Volts	µS
3SBM*2	200	3.0	1.5	150	25	2.0	40	1.0	2.0
3SBM*4	400	3.0	1.5	150	25	2.0	40	1.0	
3SBM*6	600	3.0	1.5	150	25	2.0	40	1.0	
3SBM*8	800	3.0	1.5	150	25	2.0	40	1.0	
3SBM*0	1000	3.0	1.5	150	25	2.0	40	1.0	

* Add A, B, C for desired circuit configuration (see Mechanical outline)

[1] Measured on discrete devices prior to assembly

MECHANICAL



G34

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	14.7	15.8	.58	.62	-
B	20.3	21.4	.80	.84	-
C	15.4	16.6	.61	.65	-
D	6.3	7.4	.25	.29	-
E	.91	1.07	.036	.042	DIA
F	12.7	-	.50	-	-
G	4.5	5.6	.18	.22	-

4

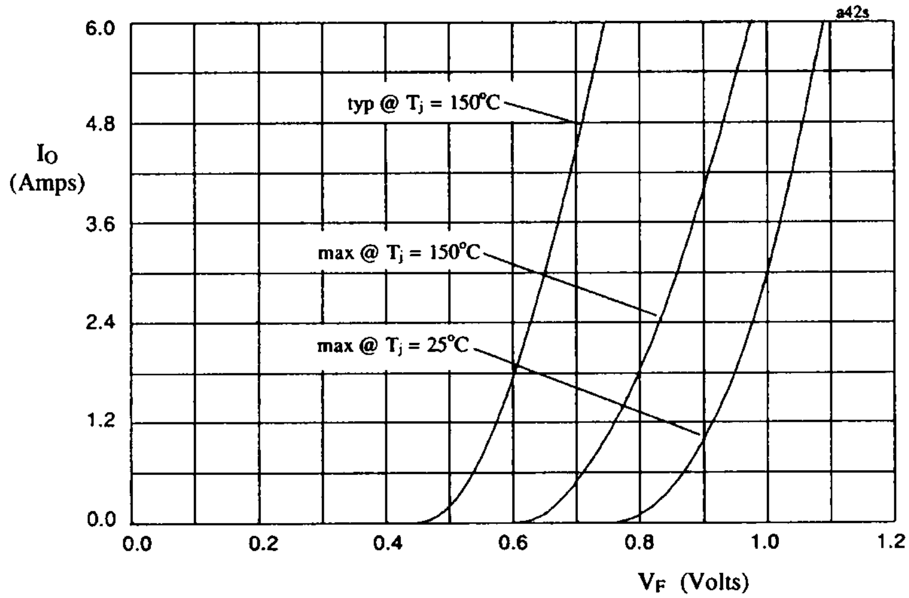


Fig 1. Forward voltage drop against output current per leg

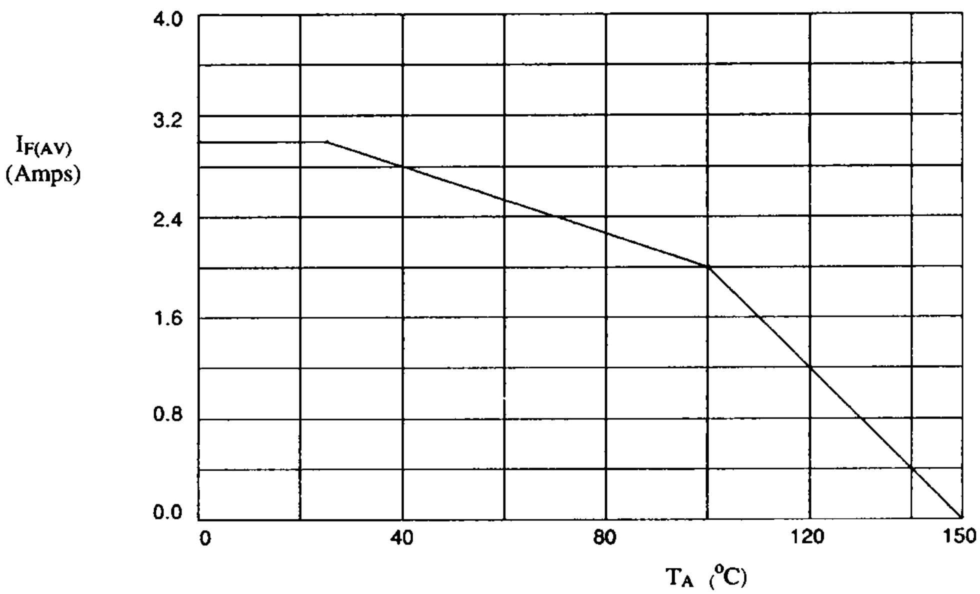


Fig 2. Maximum average forward current against ambient temperature.

FAST RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- Three lead configurations
- Fast reverse recovery time

QUICK REFERENCE DATA

- V_R = 50V - 400V
- I_F = 3.0A
- I_R = 2.0 µA
- t_{rr} = 150nS

4

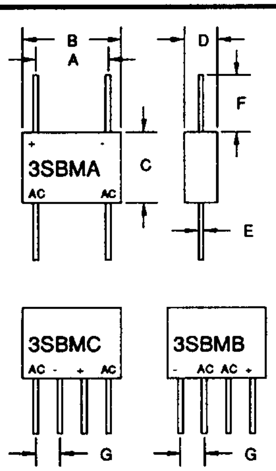
ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		1 Cycle Surge Current I_{FSM} t_p = 8.3mS	Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop V_F @ 3A/leg @ 25°C	Reverse Recovery Time[1] t_{rr}
		@ 55°C	@ 100°C	@ 25°C	@ 25°C	@ 25°C	@ 100°C		@ 25°C
	Volts	Amps	Amps	Amps	Amps	µA	µA	Volts	nS
3SBM*05F	50	3.0	1.5	150	25	2.0	40	1.1	150
3SBM*1F	100	3.0	1.5	150	25	2.0	40	1.1	150
3SBM*2F	200	3.0	1.5	150	25	2.0	40	1.1	150
3SBM*4F	400	3.0	1.5	150	25	2.0	40	1.1	150

* Add A, B, C for desired circuit configuration (see Mechanical outline)

[1] Measured on discrete devices prior to assembly

MECHANICAL



G34

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	14.7	15.8	.58	.62	-
B	20.3	21.4	.80	.84	-
C	15.4	16.6	.61	.65	-
D	6.3	7.4	.25	.29	-
E	.91	1.07	.036	.042	DIA
F	12.7	-	.50	-	-
G	4.5	5.6	.18	.22	-

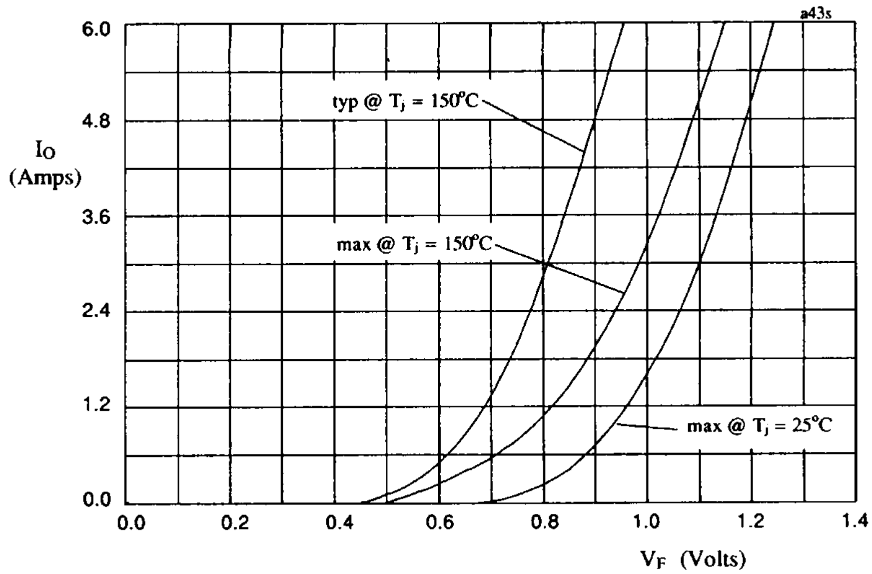


Fig 1. Forward voltage drop against output current per leg

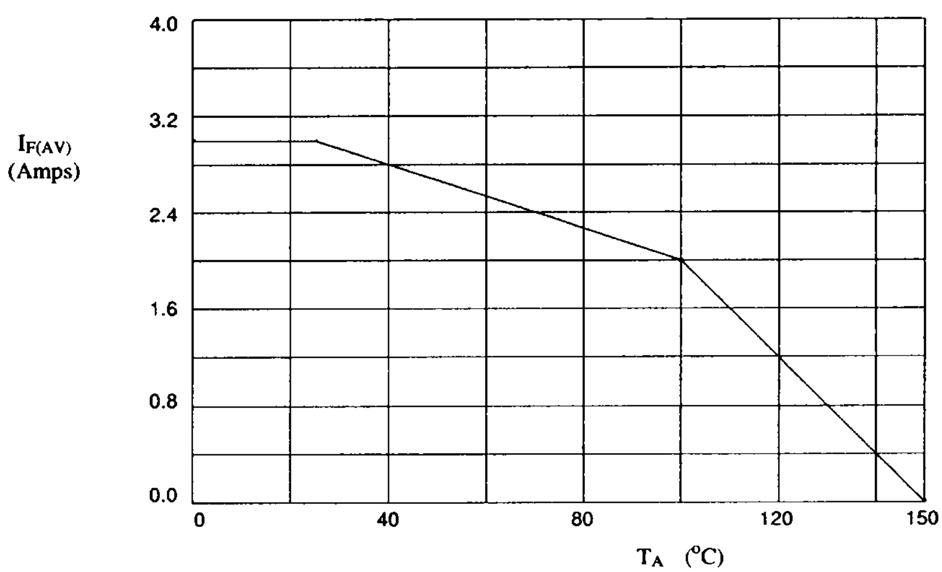


Fig 2. Maximum average forward current against ambient temperature.

STANDARD RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- Three lead configurations
- Pcb mounting

QUICK REFERENCE DATA

- V_R = 200V - 1000V
- I_F = 1.5A
- I_R = 2.0 µA
- t_{rr} = 2.0µS

4

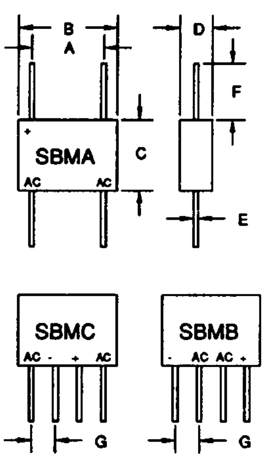
ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		1 Cycle Surge Current I_{FSM} t_p = 8.3mS	Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop V_F @ 1A/leg @ 25°C	Reverse Recovery Time[1] t_{rr}
		@ 55°C	@ 100°C	@ 25°C	@ 25°C	@ 25°C	@ 100°C		@ 25°C
	Volts	Amps	Amps	Amps	Amps	µA	µA	Volts	µS
SBM*2	200	1.5	1.0	50	10	2.0	50	1.1	2.0
SBM*4	400	1.5	1.0	50	10	2.0	50	1.1	
SBM*6	600	1.5	1.0	50	10	2.0	50	1.1	
SBM*8	800	1.5	1.0	50	10	2.0	50	1.1	
SBM*0	1000	1.5	1.0	50	10	2.0	50	1.1	

* Add A, B, C for desired circuit configuration (see Mechanical outline)

[1] Measured on discrete devices prior to assembly

MECHANICAL



G33

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	10.9	12.0	.43	.47	-
B	16.7	17.8	.66	.70	-
C	12.1	13.3	.48	.52	-
D	5.8	6.9	.23	.27	-
E	.66	.84	.026	.033	DIA
F	12.7	-	.50	-	-
G	3.3	4.4	.13	.17	-

4

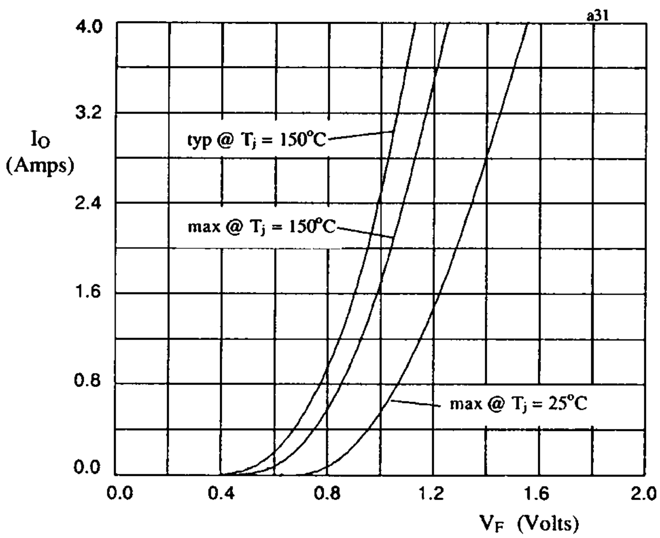


Fig 1. Forward voltage drop against output current per leg

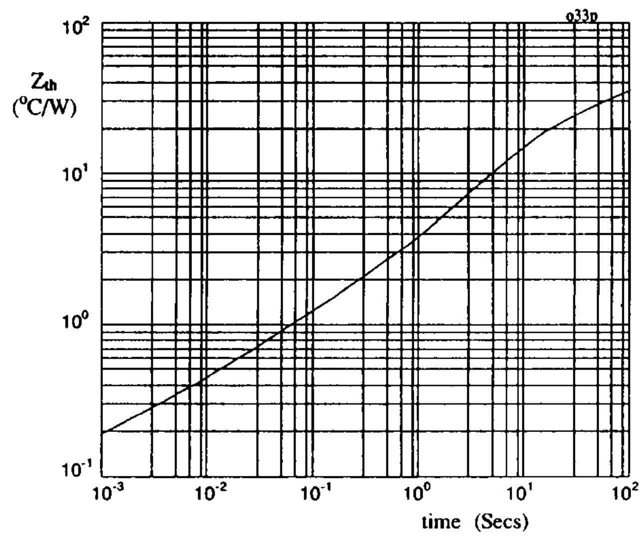


Fig 2. Transient thermal impedance characteristic per leg

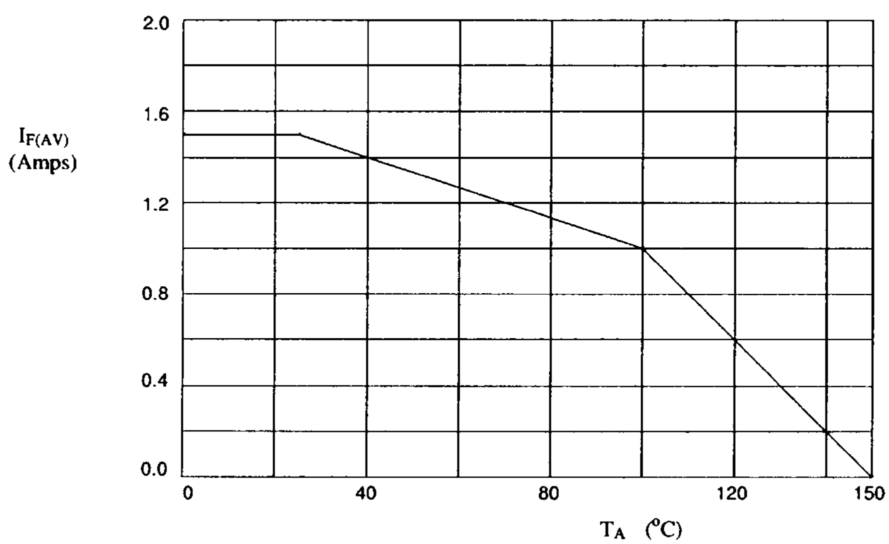


Fig 3. Maximum average forward current against ambient temperature.

FAST RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- Fast reverse recovery time
- Pcb mounting

QUICK REFERENCE DATA

- V_R = 50V - 600V
- I_F = 1.5A
- I_R = 2.0 µA
- t_{rr} = 150 - 250nS

4

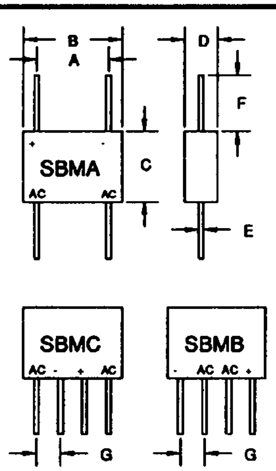
ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		1 Cycle Surge Current I_{FSM} t_p = 8.3mS	Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop V_F @ 1A/leg @ 25°C	Reverse Recovery Time t_{rr}
		@ 55°C	@ 100°C	@ 25°C	@ 25°C	@ 25°C	@ 100°C		@ 25°C
	Volts	Amps	Amps	Amps	Amps	µA	µA	Volts	nS
SBM*05F	50	1.5	1.0	25	10	2.0	50	1.2	150
SBM*1F	100	1.5	1.0	25	10	2.0	50	1.2	150
SBM*2F	200	1.5	1.0	25	10	2.0	50	1.2	150
SBM*4F	400	1.5	1.0	25	10	2.0	50	1.2	150
SBM*6F	600	1.5	1.0	25	10	2.0	50	1.2	250

* Add A, B, C for desired circuit configuration (see Mechanical outline)

[1] Measured on discrete devices prior to assembly

MECHANICAL



G33

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	10.9	12.0	.43	.47	-
B	16.7	17.8	.66	.70	-
C	12.1	13.3	.48	.52	-
D	5.8	6.9	.23	.27	-
E	.66	.84	.026	.033	DIA
F	12.7	-	.50	-	-
G	3.3	4.4	.13	.17	-

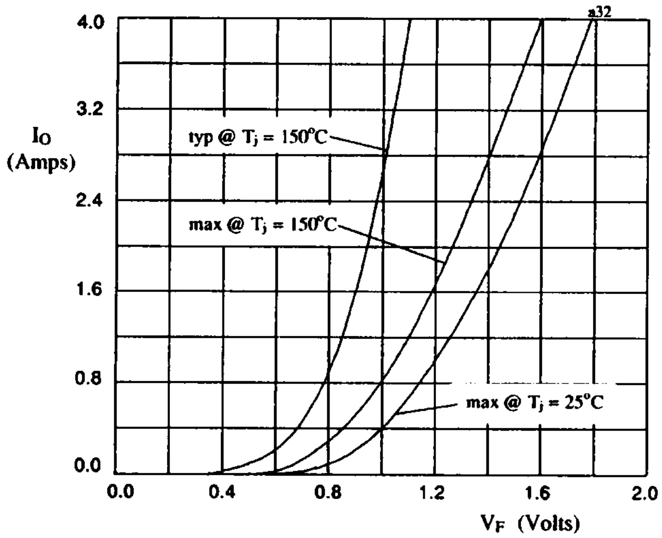


Fig 1. Forward voltage drop against output current per leg

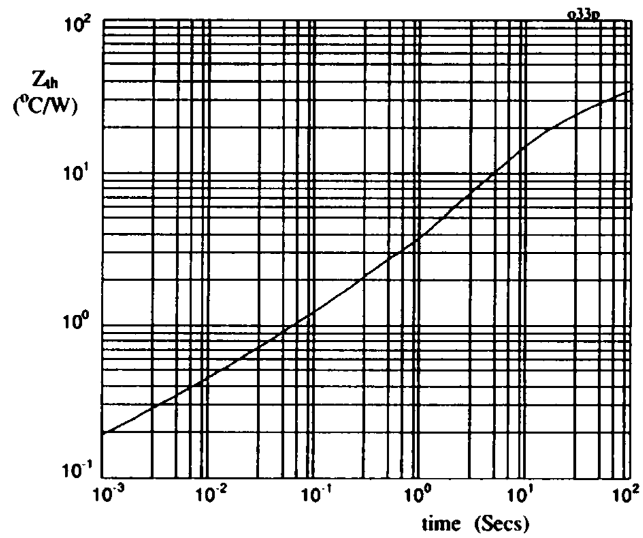


Fig 2. Transient thermal impedance characteristic per leg

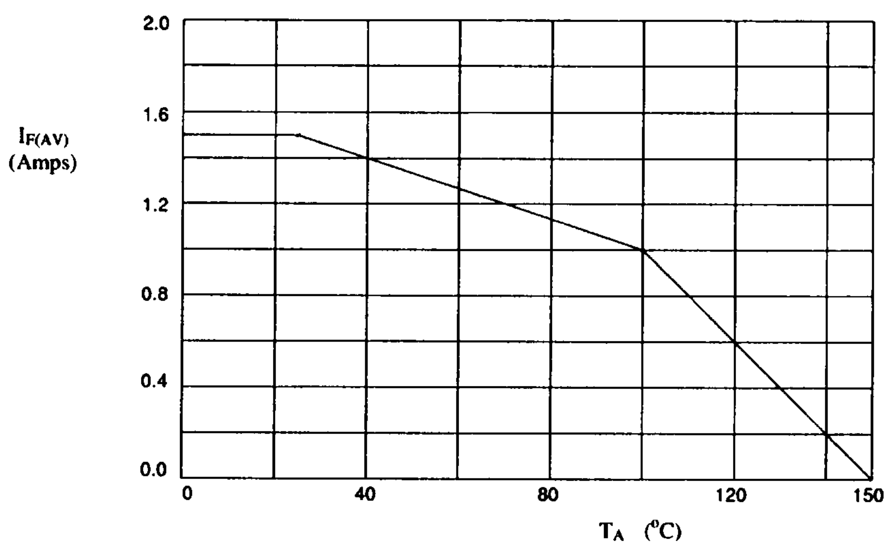


Fig 3. Maximum average forward current against ambient temperature.

STANDARD RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design for pcb mounting
- V_{RWM} up to 3000V
- Pcb mounting

QUICK REFERENCE DATA

- V_R = 50V - 3000V
- I_F = 0.36 - 1.5A
- I_R = 2.0 µA
- t_{rr} = 2 - 2.5µS

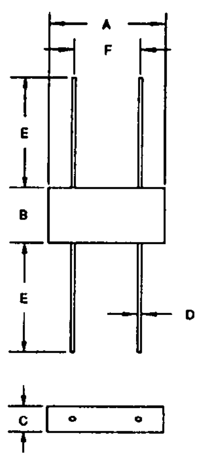
4

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop / leg @ 25°C	Reverse Recovery Time[1] t_{rr}
		@ 55°C	@ 100°C	@ 25°C	@ 25°C	@ 100°C	V_F @ 1A * @ 250mA	@ 25°C
	Volts	Amps	Amps	Amps	µA	µA	Volts	µS
SBR05	50	1.5	1.0	10	2.0	50	1.1	↑
SBR1	100	1.5	1.0	10	2.0	50	1.1	
SBR2	200	1.5	1.0	10	2.0	50	1.1	
SBR4	400	1.5	1.0	10	2.0	50	1.1	2.0
SBR6	600	1.5	1.0	10	2.0	50	1.1	
SBR8	800	1.5	1.0	10	2.0	50	1.1	
SBR10	1000	1.5	1.0	10	2.0	50	1.1	↓
SBR15	1500	0.36	0.24	2.5	2.0	50	* 5.0	↑
SBR20	2000	0.36	0.24	2.5	2.0	50	* 5.0	2.5
SBR25	2500	0.36	0.24	2.5	2.0	50	* 5.0	
SBR30	3000	0.36	0.24	2.5	2.0	50	* 5.0	↓

[1] Measured on discrete devices prior to assembly

MECHANICAL



G32

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	16.5	-	.65	-
B	-	11.2	-	.44	-
C	-	5.3	-	.21	-
D	.66	.84	.026	.033	DIA
E	22.2	-	.875	-	-
F	8.6	10.2	.34	.40	-

NOTES:
1. TERMINAL IDENTIFICATION IS MARKED ON CASE

SBR10 and SBR30 are available in Europe to DEF STAN 59-61/90/213 release to F and FX levels.

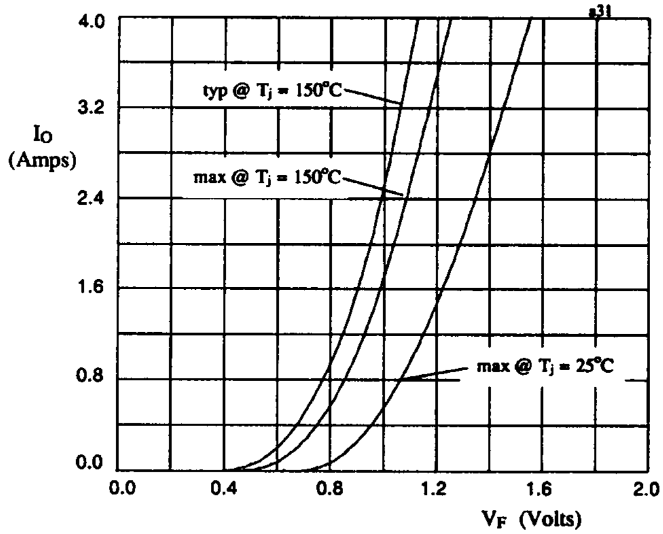


Fig 1. Forward voltage drop against output current per leg for SBR05 thru SBR10.

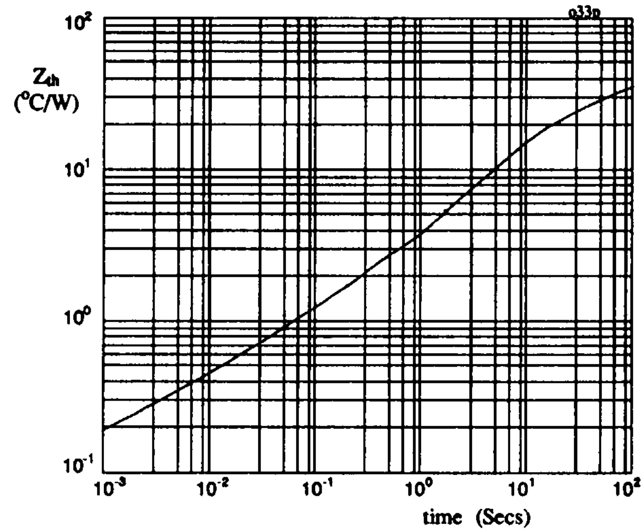


Fig 2. Transient thermal impedance characteristic per leg for SBR05 thru SBR10

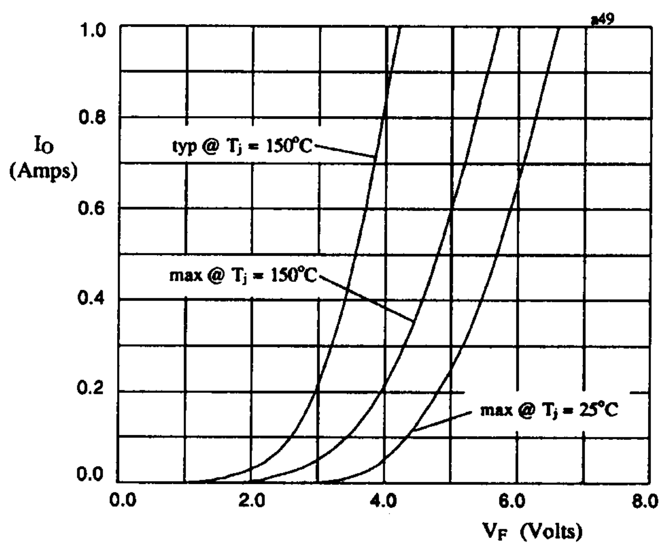


Fig 3. Forward voltage drop against output current per leg for SBR15 thru SBR30

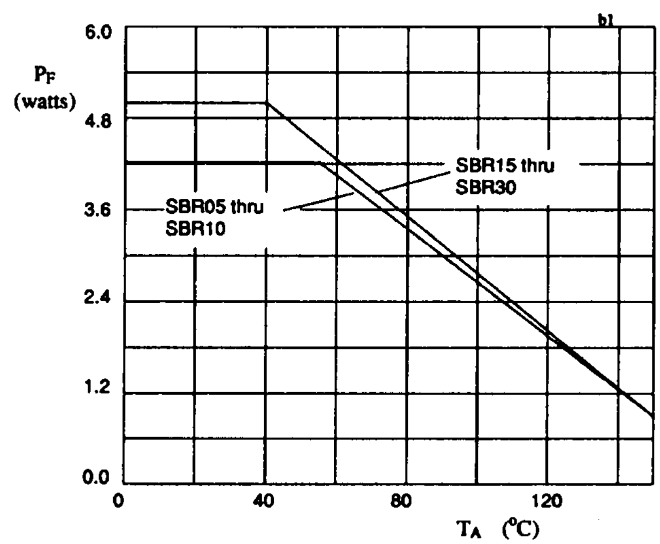


Fig 4. Power derating characteristics when p.c.b mounted

FAST RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design for pcb mounting
- V_{RWM} up to 2500V
- PCB mounting

QUICK REFERENCE DATA

- V_R = 50V - 2500V
- I_F = 0.36 - 1.0A
- I_R = 2.0 μA
- t_{rr} = 150 - 500nS

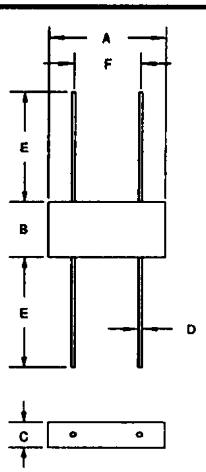
4

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop / leg @ 25°C V_F @ 1A * @ 100mA	Reverse Recovery Time[1] t_{rr}
		@ 55 °C	@ 100 °C	@ 25 °C	@ 25°C	@ 100°C		@ 25 °C
	Volts	Amps	Amps	Amps	μA	μA	Volts	nS
SBR05F	50	1.0	0.65	10	2.0	50	1.2	150
SBR1F	100	1.0	0.65	10	2.0	50	1.2	150
SBR2F	200	1.0	0.65	10	2.0	50	1.2	150
SBR4F	400	1.0	0.65	10	2.0	50	1.2	150
SBR6F	600	1.0	0.65	10	2.0	50	1.2	250
SBR8F	800	1.0	0.65	10	2.0	50	1.5	300
SBR10F	1000	1.0	0.65	10	2.0	50	1.5	500
SBR25F	2500	0.36	0.23	2.5	2.0	50	* 5.0	300

[1] Measured on discrete devices prior to assembly

MECHANICAL



G32

DIMENSIONS					
DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	16.5	-	.65	-
B	-	11.2	-	.44	-
C	-	5.3	-	.21	-
D	.66	.84	.026	.033	DIA
E	22.2	-	.875	-	-
F	8.6	10.2	.34	.40	-

NOTES:
1. TERMINAL IDENTIFICATION IS MARKED ON CASE

SBR4F is available in Europe to DEF STAN 59-61/90/213 release to F and FX levels.

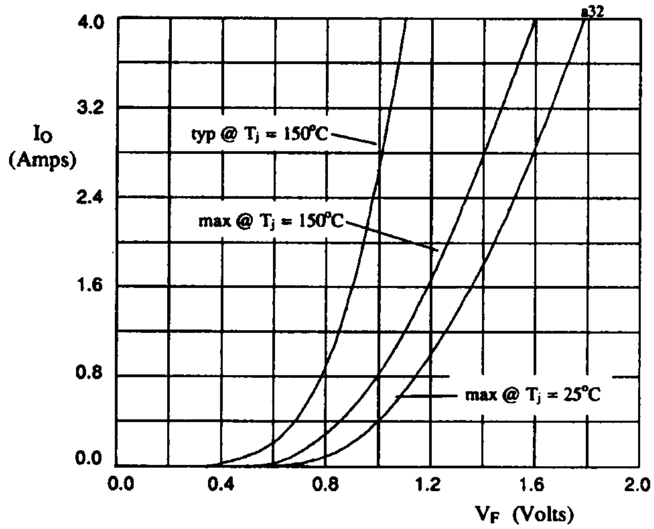


Fig 1. Forward voltage drop against output current per leg for SBR05F thru SBR6F.

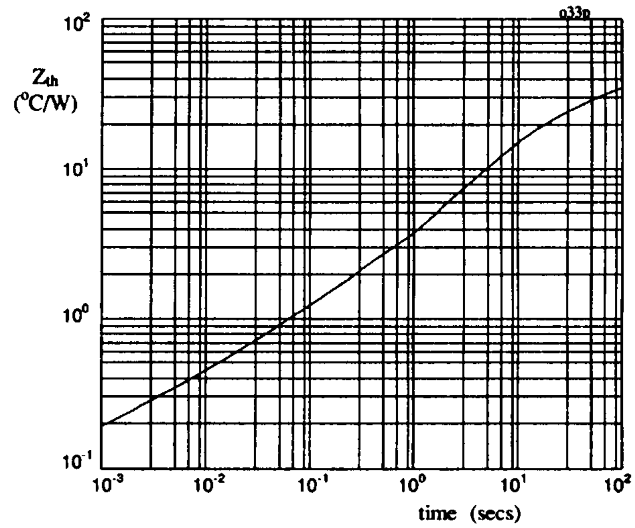


Fig 2. Transient thermal impedance characteristic per leg for SBR05F thru SBR10F

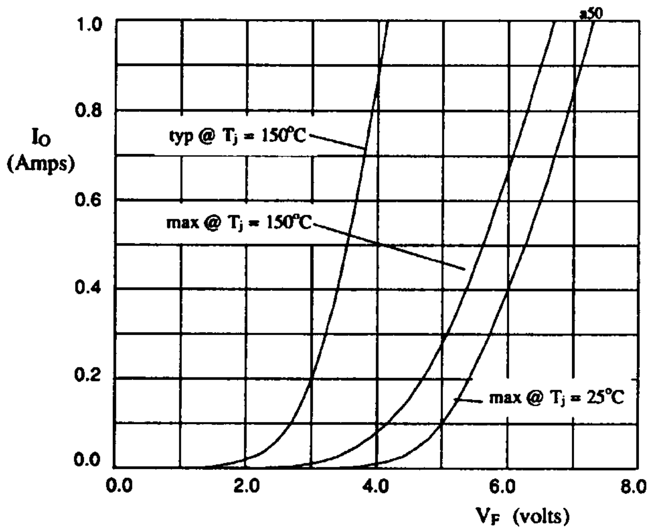


Fig 3. Forward voltage drop against output current per leg for SBR25F

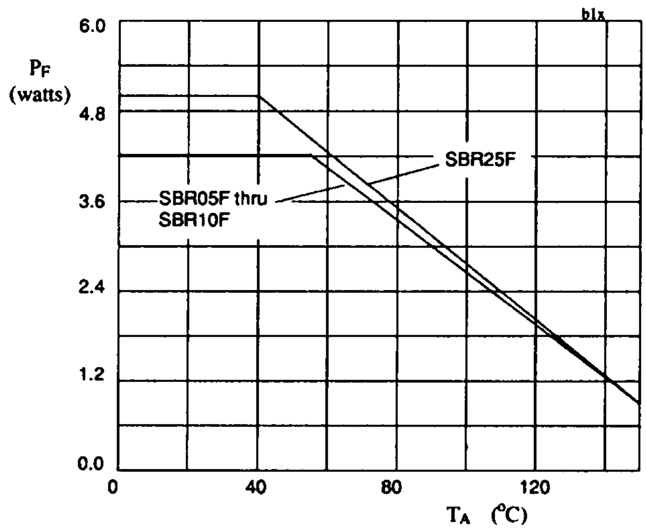


Fig 4. Power derating characteristics when p.c.b mounted

4

SUPERFAST RECOVERY, PCB MOUNTING, 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design for pcb applications
- V_{RWM} up to 3000V
- Pcb mounting

QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 1.0A
- I_R = 2.0 µA
- t_{rr} = 30nS

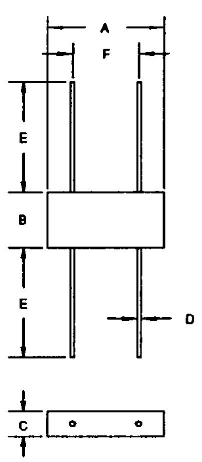
4

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		Repetitive Surge Current I_{FRM}	Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop / leg V_F @ 1.5A @ 25°C	Reverse Recovery Time[1] t_{rr}
		@ 55 °C	@ 100 °C	@ 25°C	@ 25°C	@ 100°C		@ 25°C
	Volts	amps	amps	amps	µA	µA	Volts	nS
SBR05FF	50	1.0	0.3	14	2.0	100	1.2	30
SBR10FF	100	1.0	0.3	14	2.0	100	1.2	30
SBR15FF	150	1.0	0.3	14	2.0	100	1.2	30

[1] Measured on discrete devices prior to assembly

MECHANICAL



G32

DIMENSIONS					
DIM	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	-	16.5	-	.65	-
B	-	11.2	-	.44	-
C	-	5.3	-	.21	-
D	.66	.84	.026	.033	DIA
E	22.2	-	.875	-	-
F	8.6	10.2	.34	.40	-

NOTES:
1. TERMINAL IDENTIFICATION IS MARKED ON CASE

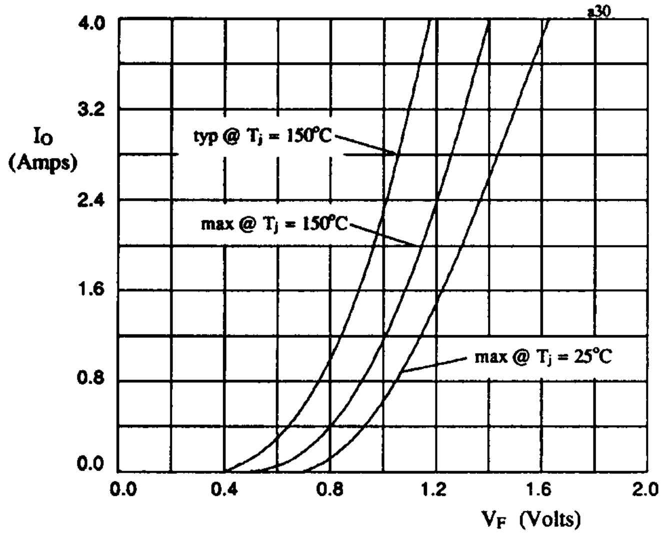


Fig 1. Forward voltage drop against output current per leg

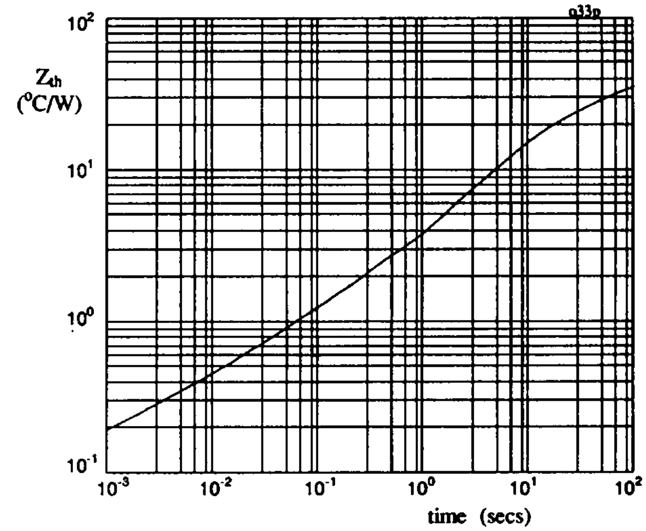


Fig 2. Transient thermal impedance characteristic per leg

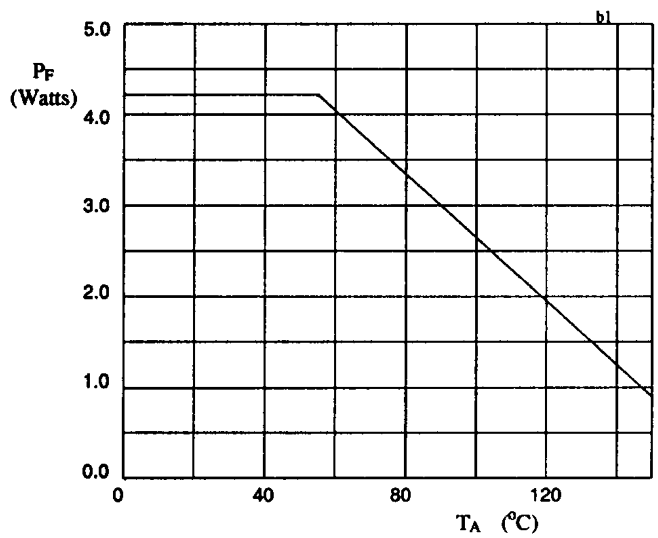


Fig 3. Power derating characteristics when p.c.b mounted

STANDARD RECOVERY, LOW CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

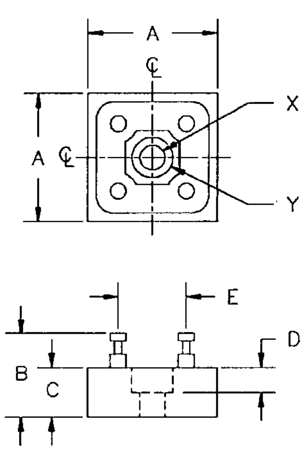
- V_R = 200V - 600V
- I_F = 5.0A
- I_R = 2.0µA
- t_{rr} = 2.0µS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		(@ case temperature)			(@ ambient temperature)					
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCAJ2 SCAJ4 SCAJ6	200 400 600	5.0	3.5	2.5	2.0	1.5	1.1	50	35	10

$R_{\theta JC}$ = 5°C/W

MECHANICAL



G28

DIM'N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	18.7	19.4	.735	.765	–
B	–	12.7	–	.50	–
C	–	7.6	–	.30	–
D	3.4	4.2	.135	.165	–
E	9.6	10.7	.38	.42	–
X	3.4	4.1	.132	.165	DIA
Y	5.6	6.4	.22	.25	DIA

NOTES:
1. TERMINAL IDENTIFICATION MARKED ON CASE

SCAJ6 is available in Europe to DEF STAN 59-61/90/207 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 1A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	µA	µA	Volts	µS	°C
SCAJ2 SCAJ4 SCAJ6	2.0	50	1.1	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

4

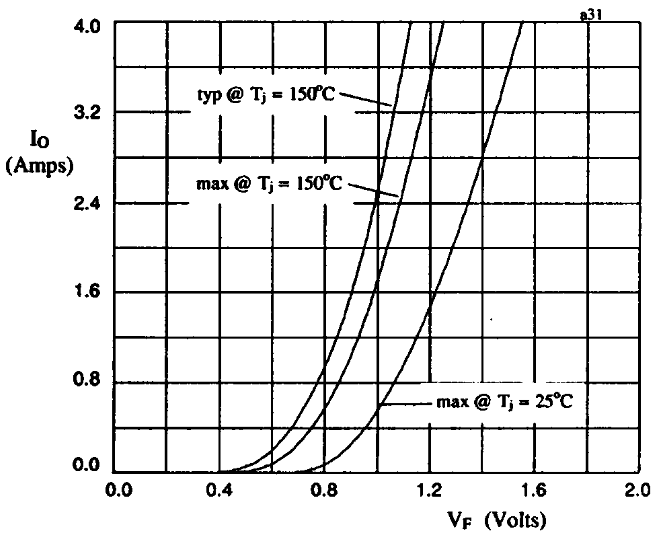


Fig 1. Forward voltage drop against output current per leg.

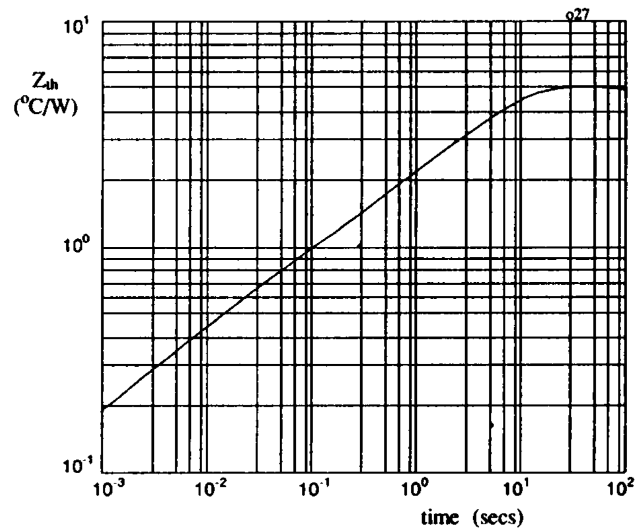


Fig 2. Transient thermal impedance characteristic per leg

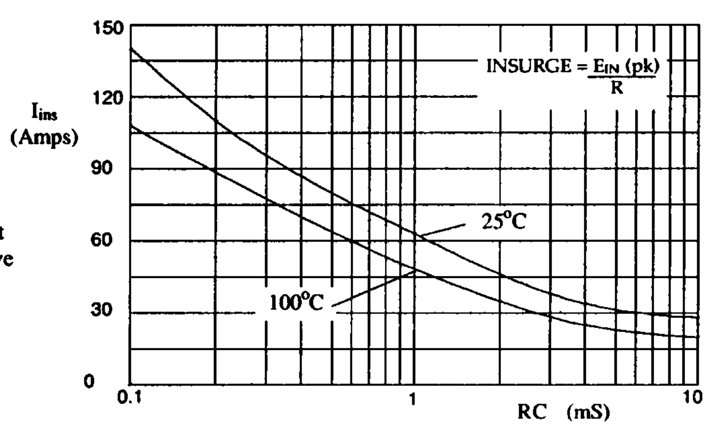


Fig 3. Maximum insurge current against time constant for capacitive loads.

FAST RECOVERY, LOW CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Fast reverse recovery time

QUICK REFERENCE DATA

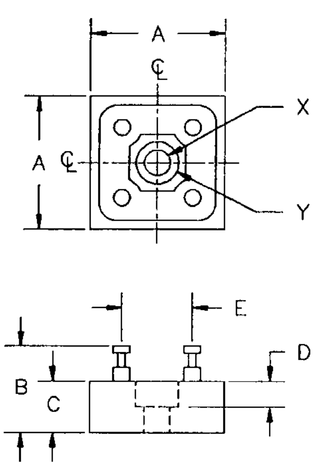
- V_R = 50V - 600V
- I_F = 4.5A
- I_R = 2.0μA
- t_{rr} = 150 - 250nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		(@ case temperature)			(@ ambient temperature)				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCAJ05F SCAJ1F SCAJ2F SCAJ4F SCAJ6F	50 100 200 400 600	4.5	3.0	2.0	1.5	1.0	0.7	25	15

$R_{\theta JC} = 5^{o}C/W$

MECHANICAL



G28

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	18.7	19.4	.735	.765	–
B	–	12.7	–	.50	–
C	–	7.6	–	.30	–
D	3.4	4.2	.135	.165	–
E	9.6	10.7	.38	.42	–
X	3.4	4.1	.132	.165	DIA
Y	5.6	6.4	.22	.25	DIA

NOTES:
1. TERMINAL IDENTIFICATION MARKED ON CASE

SCAJ4F is available in Europe to DEF STAN 59-61/90/207 release to F and FX levels.

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 1A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SCAJ05F SCAJ1F SCAJ2F SCAJ4F SCAJ6F	2.0	50	1.2	150 150 150 150 250	-55 to +150

[1] Measured on discrete devices prior to assembly

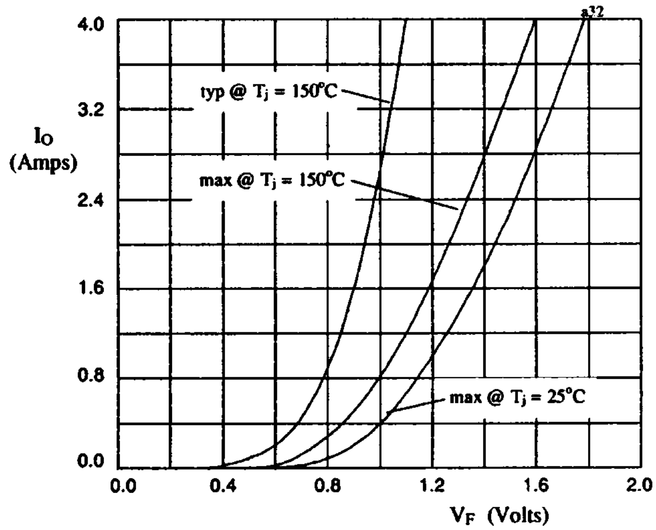


Fig 1. Forward voltage drop against output current per leg.

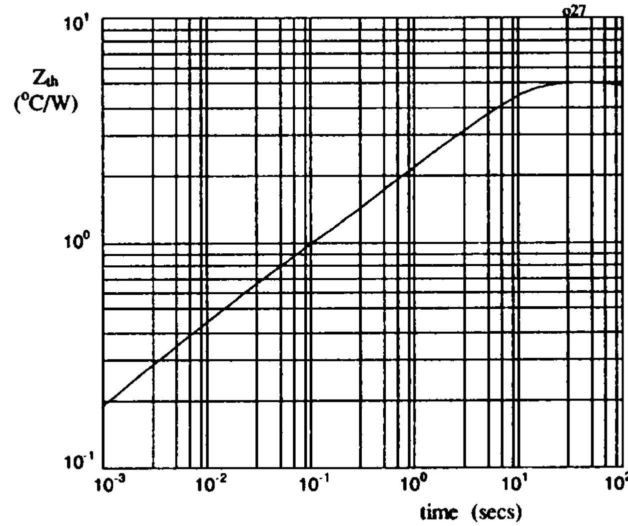
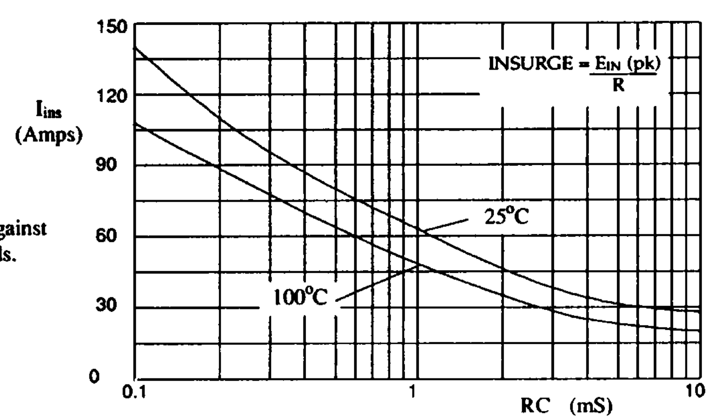


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



SUPERFAST RECOVERY, LOW CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Very fast reverse recovery time

QUICK REFERENCE DATA

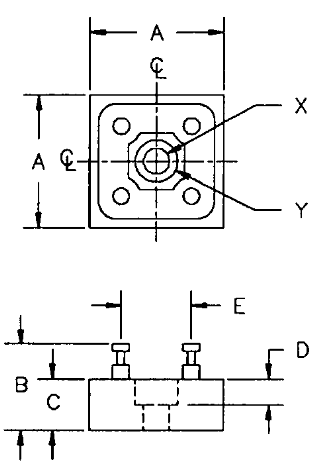
- V_R = 50V - 150V
- I_F = 5A
- V_F = 1.2V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCAJ05FF SCAJ10FF SCAJ15FF	50 100 150	5.0	3.8	2.9	1.5	1.1	0.7	35	24	13

$R_{\theta JC} = 5^{o}C/W$

MECHANICAL



G28

DIM^N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	18.7	19.4	.735	.765	–
B	–	12.7	–	.50	–
C	–	7.6	–	.30	–
D	3.4	4.2	.135	.165	–
E	9.6	10.7	.38	.42	–
X	3.4	4.1	.132	.165	DIA
Y	5.6	6.4	.22	.25	DIA

NOTES:
1. TERMINAL IDENTIFICATION MARKED ON CASE

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 1.5A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SCAJ05FF SCAJ10FF SCAJ15FF	2.0	100	1.2	30	-55 to +150

[1] Measured on discrete devices prior to assembly

4

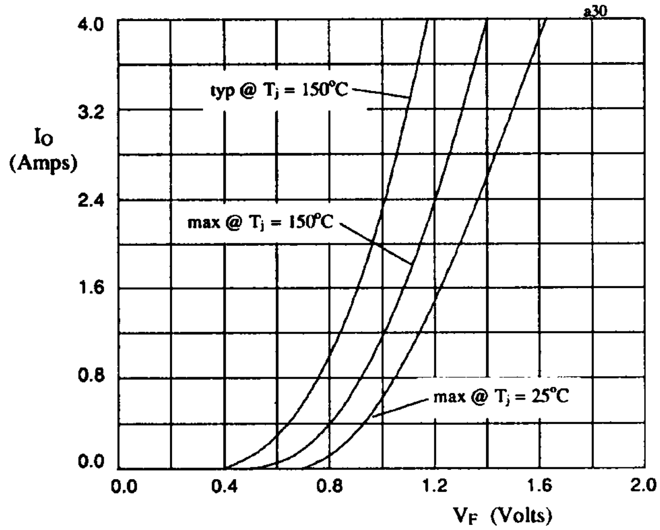


Fig 1. Forward voltage drop against output current per leg.

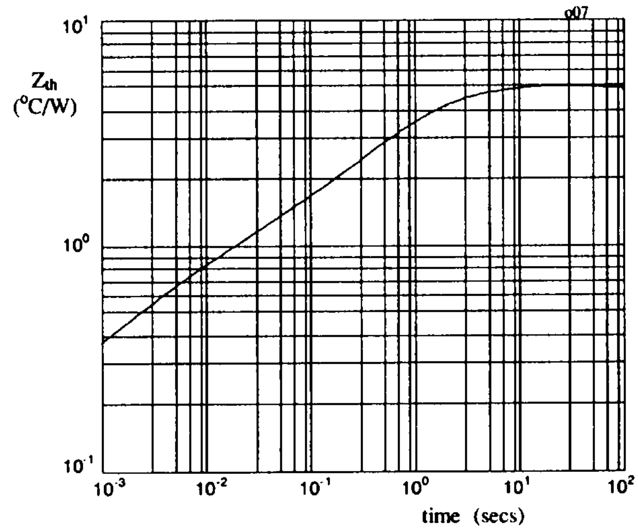


Fig 2. Transient thermal impedance characteristic per leg

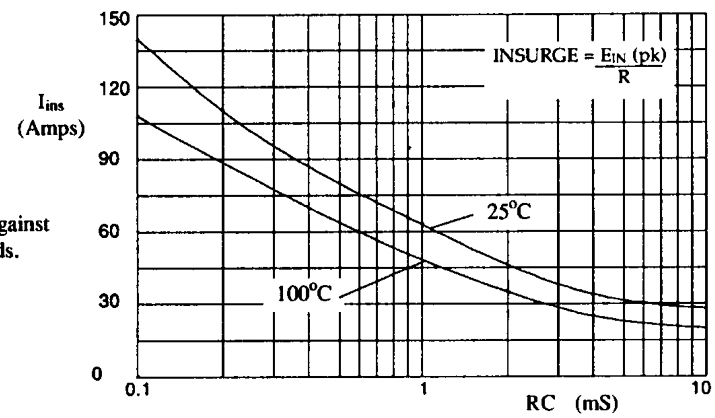


Fig 3. Maximum insurge current against time constant for capacitive loads.

STANDARD RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- High forward and surge current ratings

QUICK REFERENCE DATA

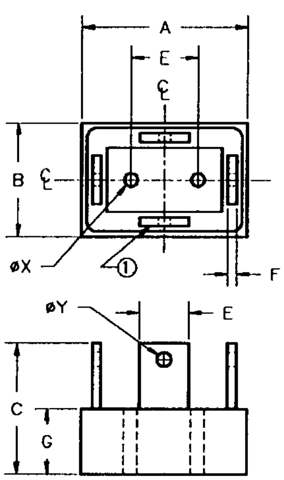
- V_R = 50V - 600V
- I_F = 70A
- I_R = 12.0µA
- I_{FSM} = 750A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCAS05 SCAS1 SCAS2 SCAS4 SCAS6	50 100 200 400 600	70	47	33	18	14	9	750	600	120

$R_{\theta JC} = 0.4°C/W$

MECHANICAL



G27

DIM"	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	64.3	–	2.53	–
B	–	45.5	–	1.78	–
C	–	51.6	–	2.03	–
D	24.6	26.2	0.97	1.03	–
E	–	19.8	–	0.78	–
F	–	3.31	–	0.13	–
G	24.6	26.2	0.97	1.03	–
ØX	4.3	5.9	.171	.231	2
ØY	4.0	5.6	.159	.219	3

NOTES:
1. A.C. TERMINAL 2 PLCS
2. 2 PLCS
3. 4 PLCS

Polarity marked on case

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 18A/leg	Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp. range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	µA	Volts	µS	°C
SCAS05 SCAS1 SCAS2 SCAS4 SCAS6	12.0	300	1.0	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

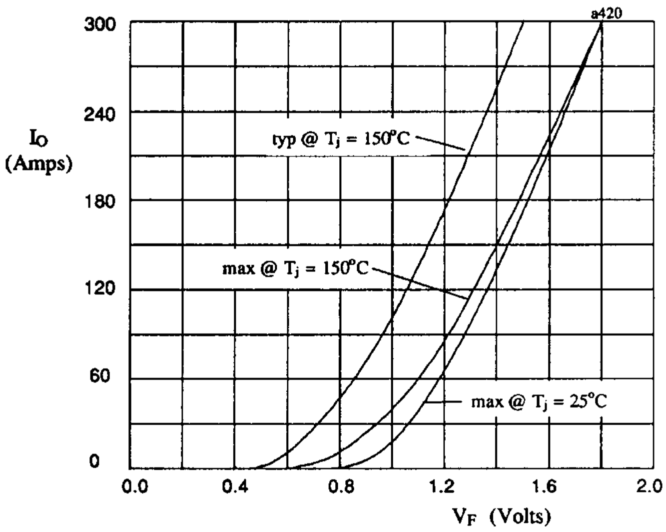


Fig 1. Forward voltage drop against output current per leg.

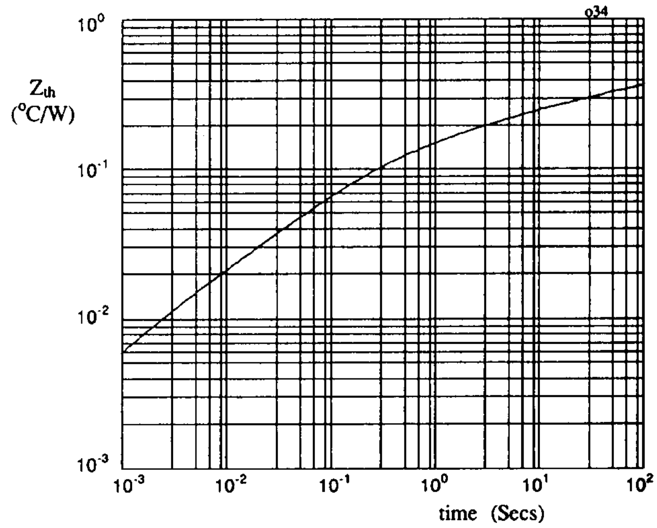


Fig 2. Transient thermal impedance characteristic per leg

4

FAST RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Low reverse recovery time
- Low thermal impedance
- High forward and surge current ratings

QUICK REFERENCE DATA

- V_R = 50V - 400V
- I_F = 65A
- I_R = 12 µA
- t_{rr} = 150nS

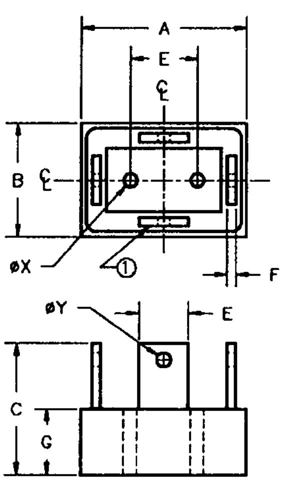
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		(@ case temperature)			(@ ambient temperature)					
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCAS05F SCAS1F SCAS2F SCAS4F	50 100 200 400	65	43	30	16	11.5	7.2	750	480	120

$R_{\theta JC}$ = 0.4°C/W

MECHANICAL



G27

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	64.3	–	2.53	–
B	–	45.5	–	1.78	–
C	–	51.6	–	2.03	–
D	24.6	26.2	0.97	1.03	–
E	–	19.8	–	0.78	–
F	–	3.31	–	0.13	–
G	24.6	26.2	0.97	1.03	–
øX	4.3	5.9	.171	.231	2
øY	4.0	5.6	.159	.219	3

NOTES:
1. A.C. TERMINAL 2 PLCS
2. 2 PLCS
3. 4 PLCS

Polarity marked on case

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 18A/leg	Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp. range. T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SCAS05F SCAS1F SCAS2F SCAS4F	12	300	1.1	150	-55 to +150

[1] Measured on discrete devices prior to assembly

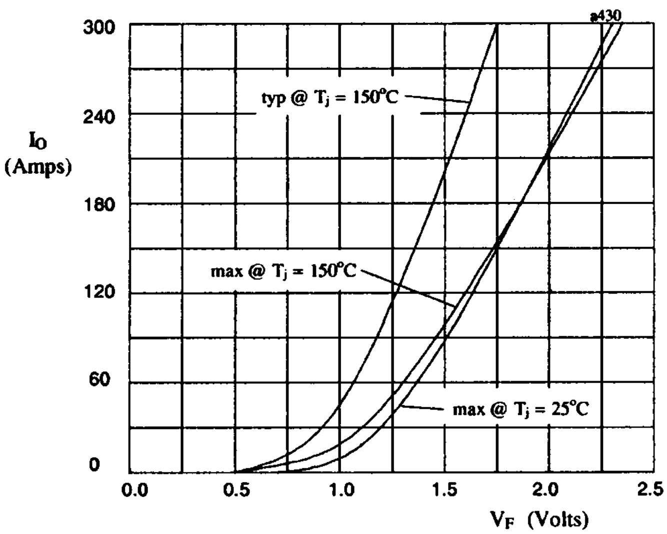


Fig 1. Forward voltage drop against output current per leg.

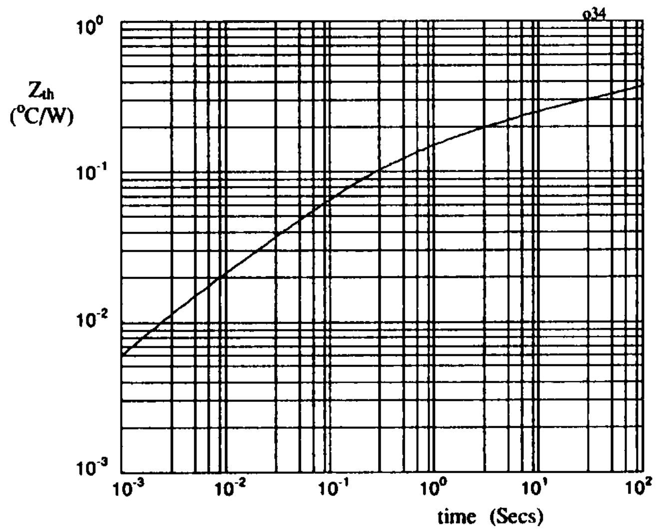


Fig 2. Transient thermal impedance characteristic per leg

4

SUPERFAST RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Very fast reverse recovery time
- Low thermal impedance
- High forward and surge current ratings

QUICK REFERENCE DATA

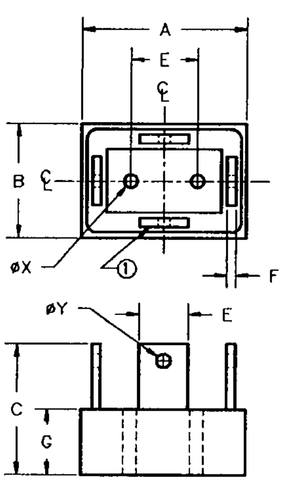
- V_R = 50V - 150V
- I_F = 70A
- V_F = 0.97V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCAS05FF SCAS10FF SCAS15FF	50 100 150	70	48	35	18	12.5	8.0	900	750	125

$R_{\theta JC} = 0.4^{o}C/W$

MECHANICAL



G27

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	64.3	–	2.53	–
B	–	45.5	–	1.78	–
C	–	51.6	–	2.03	–
D	24.6	26.2	0.97	1.03	–
E	–	19.8	–	0.78	–
F	–	3.31	–	0.13	–
G	24.6	26.2	0.97	1.03	–
ØX	4.3	5.9	.171	.231	2
ØY	4.0	5.6	.159	.219	3

NOTES:
1. A.C. TERMINAL 2 PLCS
2. 2 PLCS
3. 4 PLCS

Polarity marked on case

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 30A/leg	Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp. range. T_{OP} T_{STG}
	µA	mA	Volts	nS	°C
SCAS05FF SCAS10FF SCAS15FF	120	6.0	0.97	30	-55 to +150

[1] Measured on discrete devices prior to assembly

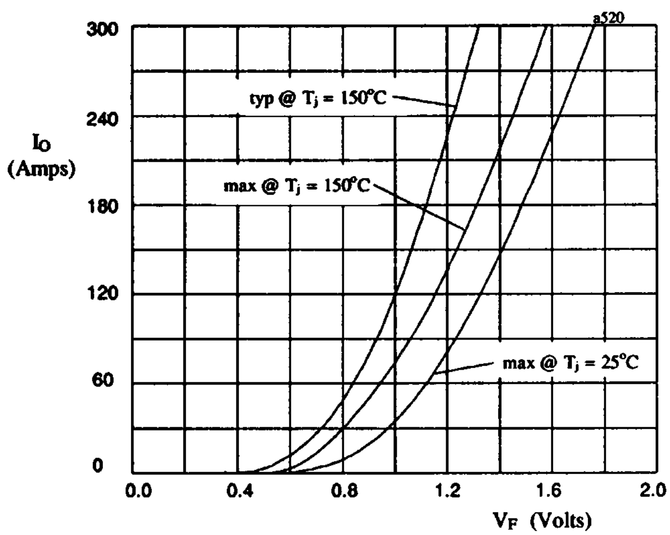


Fig 1. Forward voltage drop against output current per leg.

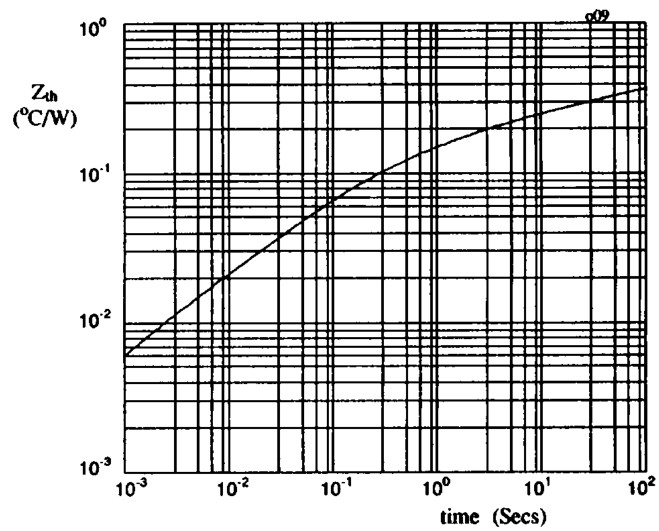


Fig 2. Transient thermal impedance characteristic per leg

STANDARD RECOVERY, MEDIUM CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

- V_R = 200V - 600V
- I_F = 25A
- I_R = 2.0µA
- t_{rr} = 2.0µS

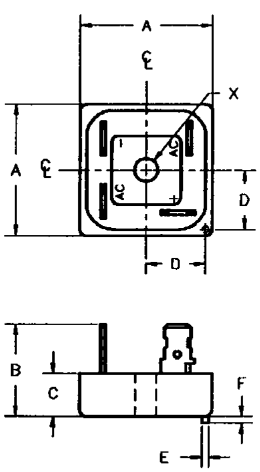
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			(@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBA2 SCBA4 SCBA6	200 400 600	25	18.5	12.5	6.0	5.0	3.0	150	100

$R_{\theta JC}$ = 2.0°C/W

MECHANICAL



G29

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	28.1	28.6	1.11	1.14	–
B	–	25.4	–	1.00	–
C	–	10.6	–	.416	–
D	12.4	13.0	.49	.51	–
E	1.3	1.8	.052	.072	DIA
F	–	1.6	–	.062	–
X	4.6	5.4	.183	.213	DIA

NOTES:
1. TERMINALS SUITABLE FOR .25" "FASTON" OR SOLDERING.

Polarity marked on case

SCBA6 is available in Europe to DEF STAN 59-61/90/207 release to F and FX levels.

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 3A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	µA	µA	Volts	µS	°C
SCBA2 SCBA4 SCBA6	2.0	40	1.0	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

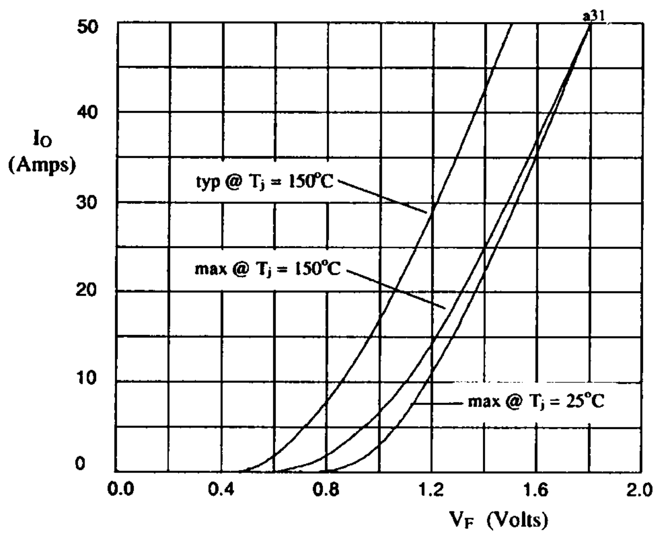


Fig 1. Forward voltage drop against output current per leg.

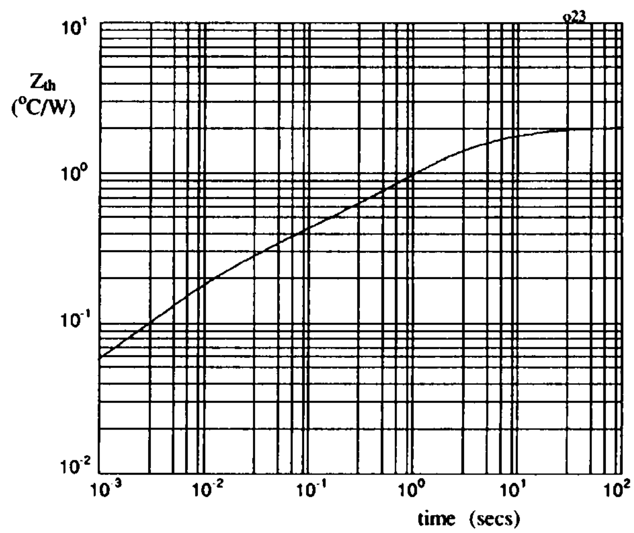
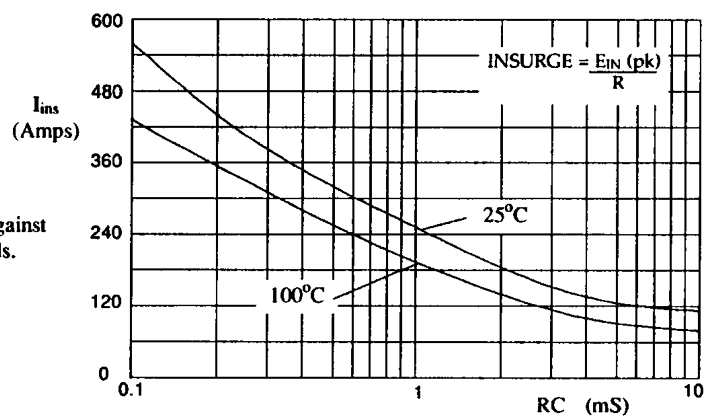


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



FAST RECOVERY 1 PHASE FULL WAVE BRIDGE RECTIFIERS

SCBA05F SCBA1F SCBA2F SCBA4F

FAST RECOVERY, MEDIUM CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Fast reverse recovery time

QUICK REFERENCE DATA

- V_R = 50V - 400V
- I_F = 20.0A
- I_R = 2.0 µA
- t_{rr} = **150ns**

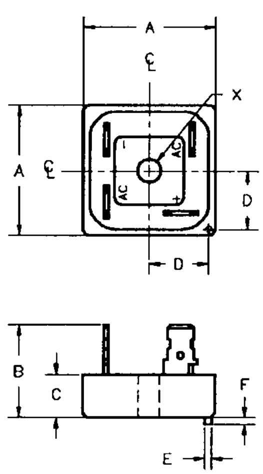
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBA05F SCBA1F SCBA2F SCBA4F	50 100 200 400	20	15	10	5.0	4.0	2.5	150	80

$R_{\theta JC} = 2.0^{o}C/W$

MECHANICAL



G29

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	28.1	28.6	1.11	1.14	–
B	–	25.4	–	1.00	–
C	–	10.6	–	.416	–
D	12.4	13.0	.49	.51	–
E	1.3	1.8	.052	.072	DIA
F	–	1.6	–	.062	–
X	4.6	5.4	.183	.213	DIA

NOTES:
1. TERMINALS SUITABLE FOR .25" "FASTON" OR SOLDERING.

Polarity marked on case

SCBA4F is available in Europe to DEF STAN 59-61/90/207 release to F and FX levels.

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 3A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SCBA05F SCBA1F SCBA2F SCBA4F	2.0	50	1.1	150 150 150 150	-55 to +150

[1] Measured on discrete devices prior to assembly

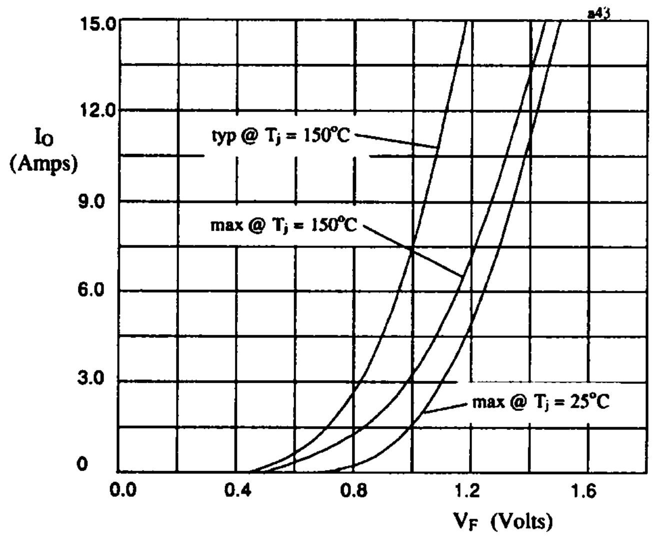


Fig 1. Forward voltage drop against output current per leg.

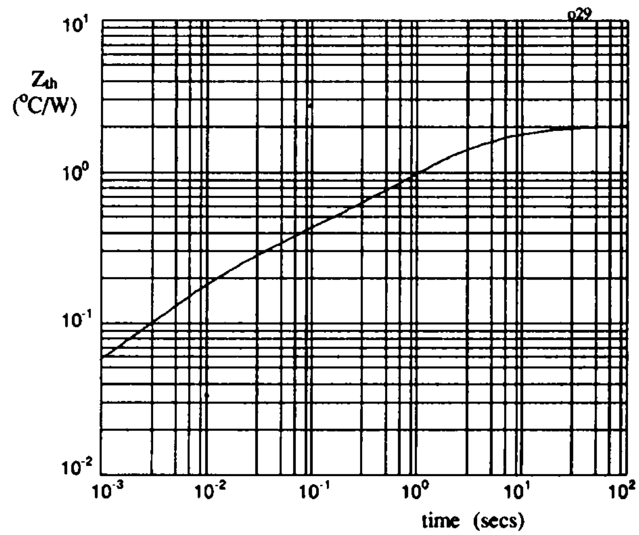


Fig 2. Transient thermal impedance characteristic per leg

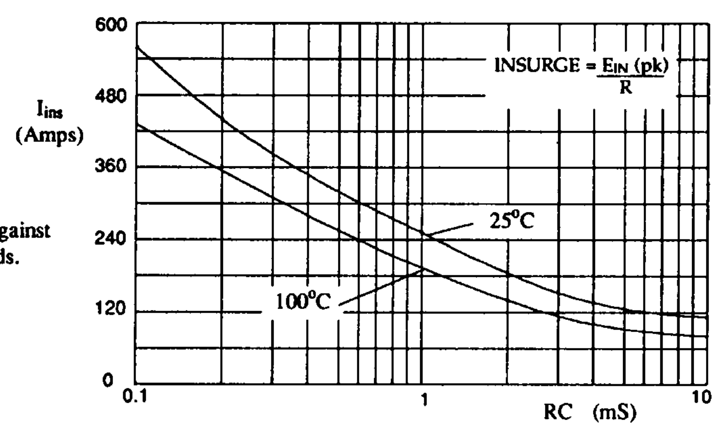


Fig 3. Maximum insurge current against time constant for capacitive loads.

SUPERFAST RECOVERY, MEDIUM CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Low thermal impedance
- Very fast reverse recovery time
- Aluminum case

QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 20A
- V_F = 0.97V
- t_{rr} = 30nS

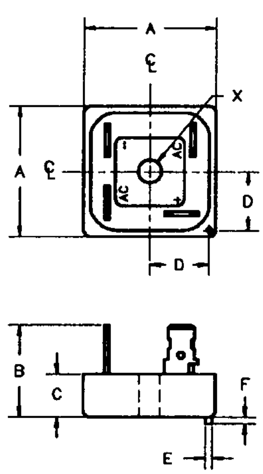
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		(@ case temperature)			(@ ambient temperature)				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBA05FF	50	25	18.5	12.8	5	3	1.8	175	120
SCBA10FF	100								
SCBA15FF	150								

$R_{\theta JC} = 2.0^{o}C/W$

MECHANICAL



G29

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	28.1	28.6	1.11	1.14	–
B	–	25.4	–	1.00	–
C	–	10.6	–	.416	–
D	12.4	13.0	.49	.51	–
E	1.3	1.8	.052	.072	DIA
F	–	1.6	–	.062	–
X	4.6	5.4	.183	.213	DIA

NOTES:
1. TERMINALS SUITABLE FOR .25" "FASTON" OR SOLDERING.

Polarity marked on case

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 5A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	µA	mA	Volts	nS	°C
SCBA05FF SCBA10FF SCBA15FF	20	1.0	0.97	30	-55 to +150

[1] Measured on discrete devices prior to assembly

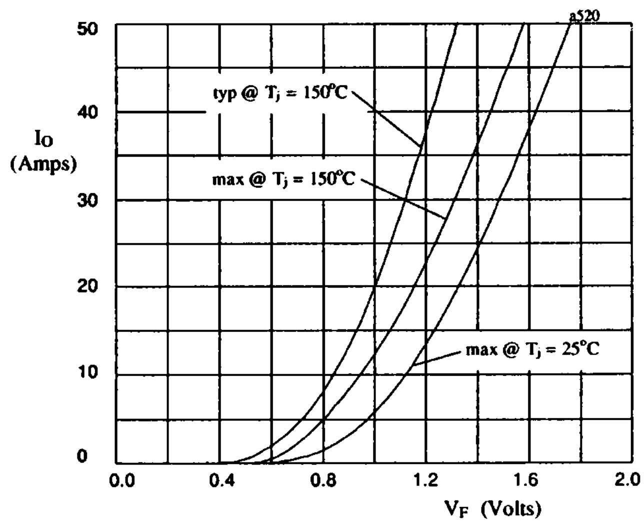


Fig 1. Forward voltage drop against output current per leg.

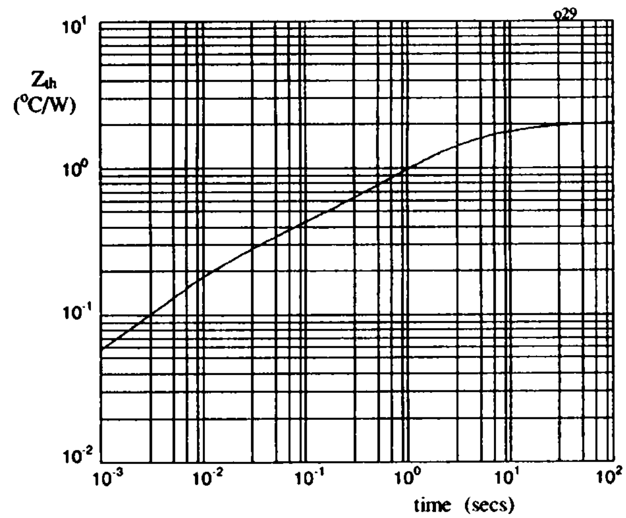
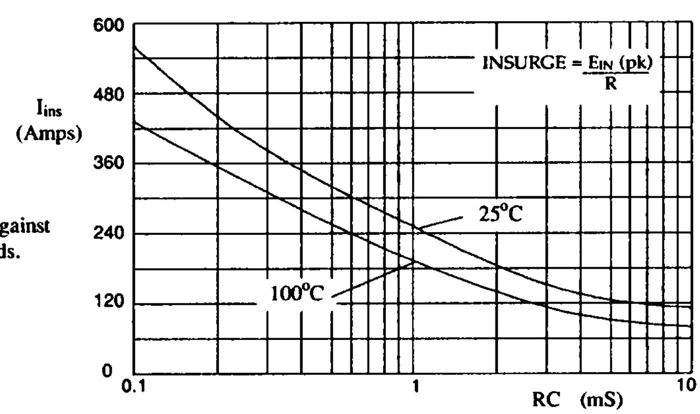


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



4

STANDARD RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminium case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

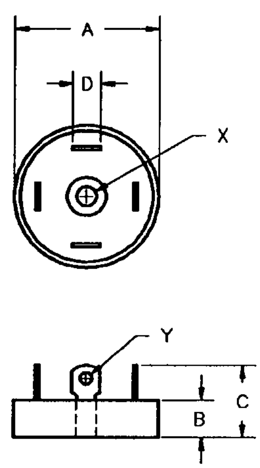
- V_R = 50V - 1000V
- I_F = 53A
- I_R = 6.0 µA
- t_{rr} = 2.0µS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		(@ case temperature)			(@ ambient temperature)				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBAR05 SCBAR1 SCBAR2 SCBAR4 SCBAR6 SCBAR8 SCBAR10	50 100 200 400 600 800 1000	53	35	25	9.5	7.0	4.5	375	250

$R_{\theta JC} = 0.7°C/W$

MECHANICAL



G31

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	13.5	–	0.53	–
C	–	26.2	–	1.03	–
D	8.6	10.2	0.34	0.40	–
X	5.6	7.1	0.22	0.28	–
Y	3.5	5.1	0.14	0.20	–

Polarity marked on case

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 9A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	µA	µA	Volts	µS	°C
SCBAR05 SCBAR1 SCBAR2 SCBAR4 SCBAR6 SCBAR8 SCBAR10	6.0	240	1.0	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

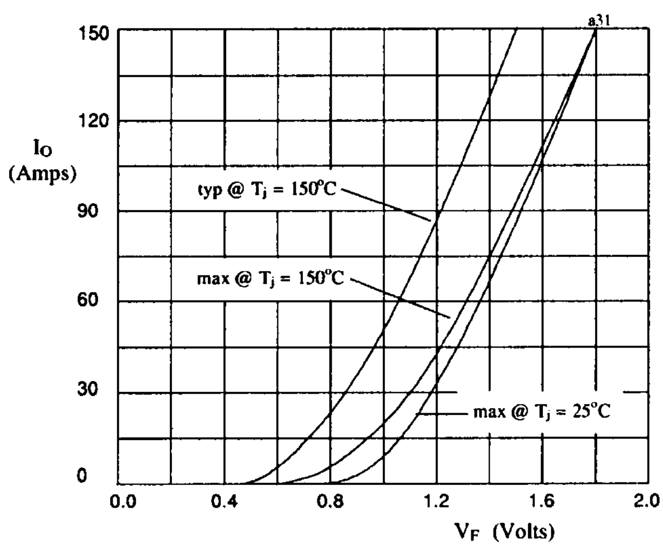


Fig 1. Forward voltage drop against output current per leg.

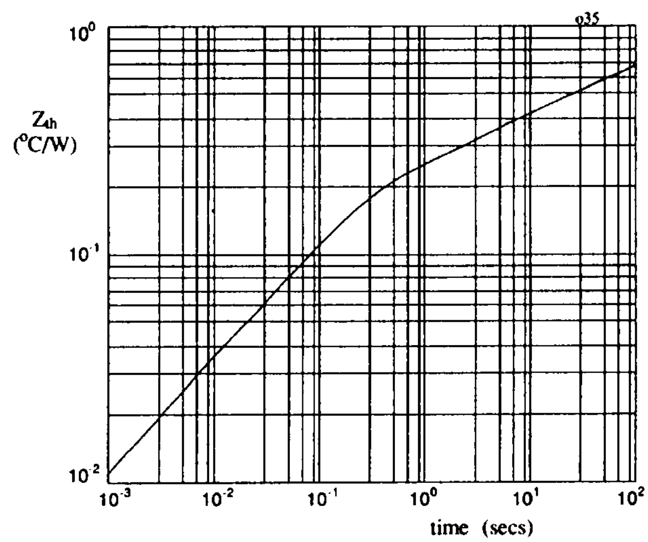


Fig 2. Transient thermal impedance characteristic per leg

FAST RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Fast reverse recovery time

QUICK REFERENCE DATA

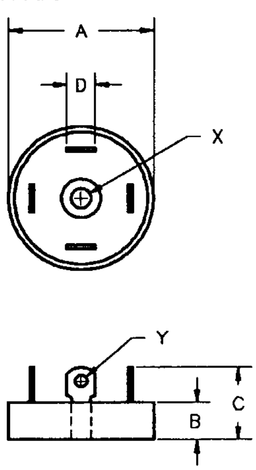
- V_R = 50V - 400V
- I_F = 50A
- I_R = 6.0µA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBAR05F	50	50	31	20	9.0	6.7	4.3	375	240
SCBAR1F	100								
SCBAR2F	200								
SCBAR4F	400								

$R_{\theta JC}$ = 0.7°C/W

MECHANICAL



G31

DIMᴺ	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	13.5	–	0.53	–
C	–	26.2	–	1.03	–
D	8.6	10.2	0.34	0.40	–
X	5.6	7.1	0.22	0.28	–
Y	3.5	5.1	0.14	0.20	–

Polarity marked on case

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 9A/leg	Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp. range. T_{OP} T_{STG}
	µA	µA	Volts	nS	°C
SCBAR05F SCBAR1F SCBAR2F SCBAR4F	6.0	150	1.1	150	-55 to +150

[1] Measured on discrete devices prior to assembly

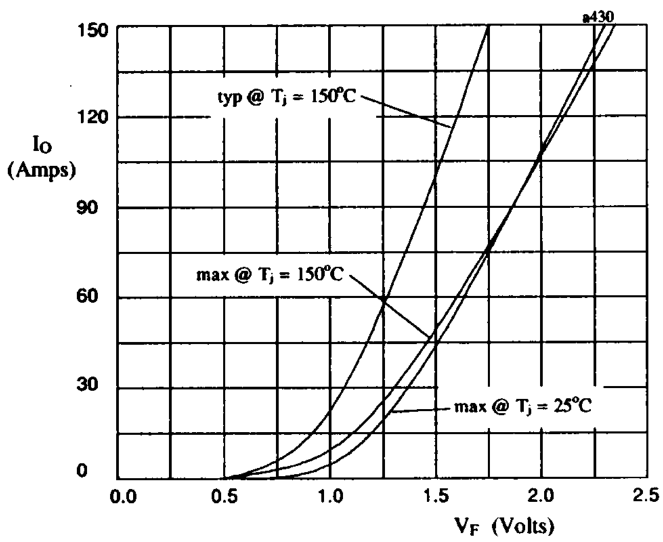


Fig 1. Forward voltage drop against output current per leg.

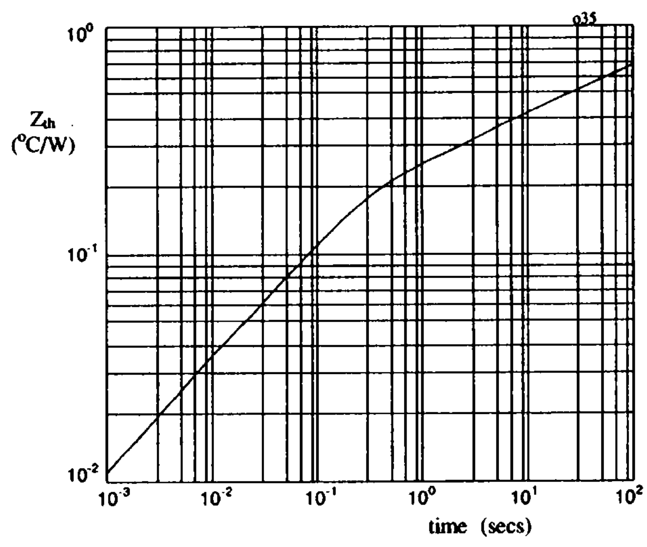


Fig 2. Transient thermal impedance characteristic per leg

SUPERFAST RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Low thermal impedance
- Very fast reverse recovery time
- Aluminum case

QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 55A
- V_F = 0.97V
- t_{rr} = 30nS

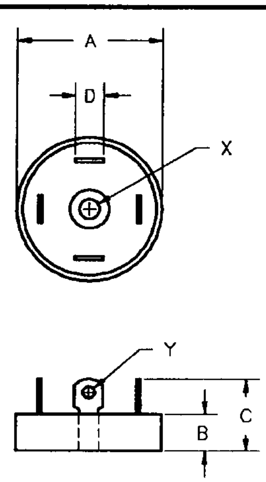
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS	
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBAR05FF SCBAR10FF SCBAR15FF	50 100 150	55	37	22	9.0	6.75	4.3	450	375

$R_{\theta JC} = 0.7^{o}C/W$

MECHANICAL



G31

DIM'N	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	13.5	–	0.53	–
C	–	26.2	–	1.03	–
D	8.6	10.2	0.34	0.40	–
X	5.6	7.1	0.22	0.28	–
Y	3.5	5.1	0.14	0.20	–

Polarity marked on case

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range. T_{OP} T_{STG}
	@ 25°C	@ 100°C	V_F @ 15A/leg	t_{rr} @ 25°C	
	µA	mA	Volts	nS	°C
SCBAR05FF SCBAR10FF SCBAR15FF	60	3.0	0.97	30	- 55 to +150

[1] Measured on discrete devices prior to assembly

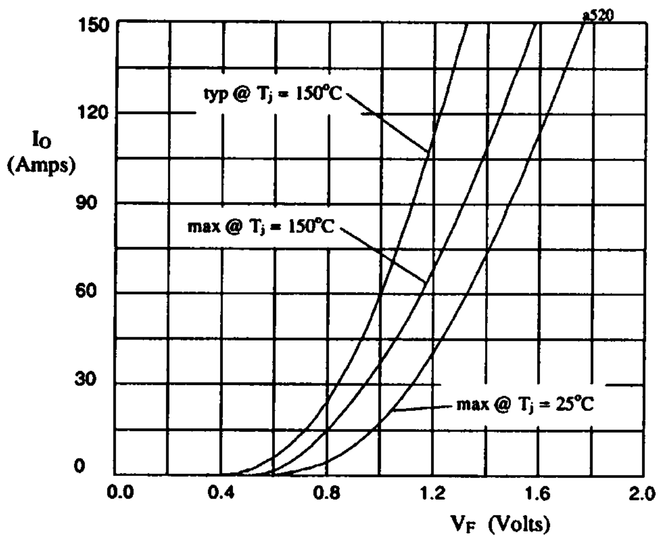


Fig 1. Forward voltage drop against output current per leg.

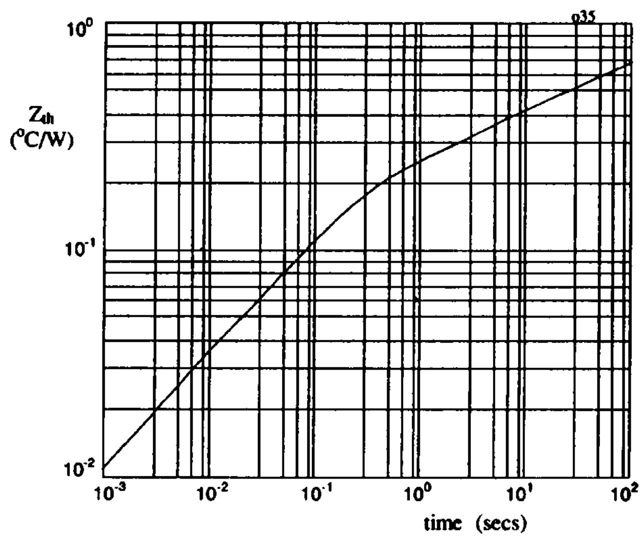


Fig 2. Transient thermal impedance characteristic per leg

STANDARD RECOVERY, LOW CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

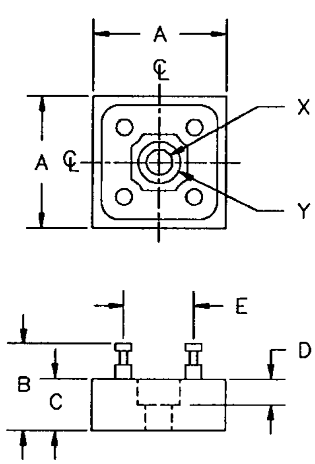
- V_R = 200V - 600V
- I_F = 12A
- I_R = 2.0μA
- t_{rr} = 2.0μS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		(@ case temperature)			(@ ambient temperature)					
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBH2 SCBH4 SCBH6	200 400 600	12	9.0	8.5	4.0	3.0	1.7	150	100	50

$R_{\theta JC}$ = 3.3°C/W

MECHANICAL



G28

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	18.7	19.4	.735	.765	–
B	–	12.7	–	.50	–
C	–	7.6	–	.30	–
D	3.4	4.2	.135	.165	–
E	9.6	10.7	.38	.42	–
X	3.4	4.1	.132	.165	DIA
Y	5.6	6.4	.22	.25	DIA

NOTES:
1. TERMINAL IDENTIFICATION MARKED ON CASE

SCBH6 is available in Europe to DEF STAN 59-61/90/207 release to F and FX levels.

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 3A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	μA	μA	Volts	μS	°C
SCBH2 SCBH4 SCBH6	2.0	50	1.0	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

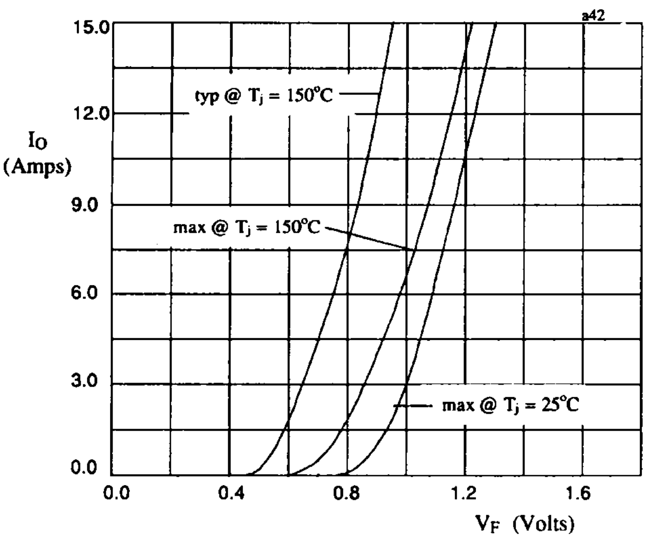


Fig 1. Forward voltage drop against output current per leg.

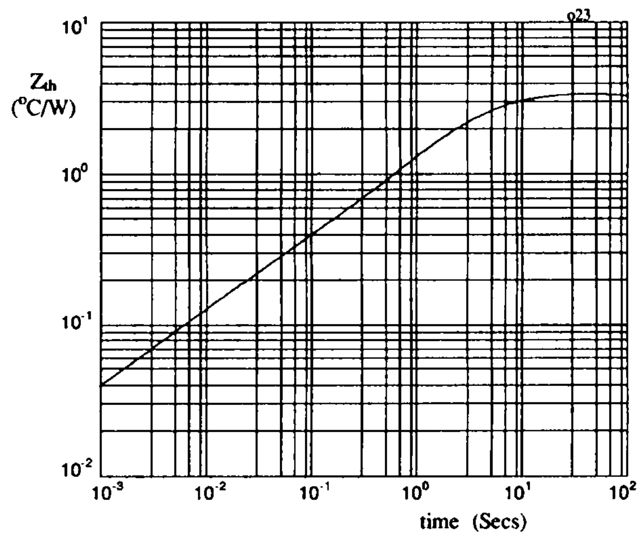
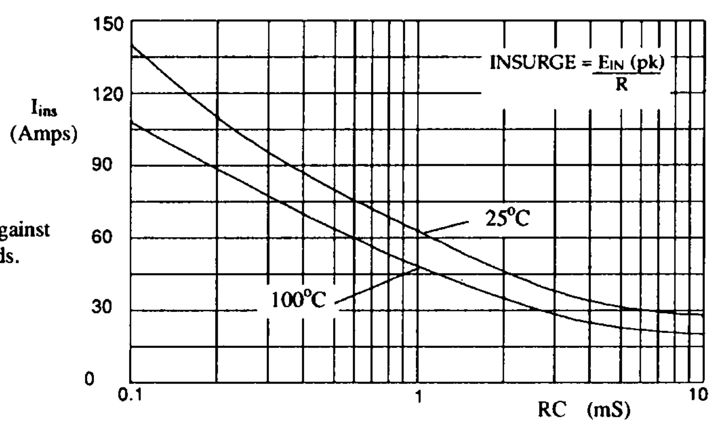


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



4

FAST RECOVERY, LOW CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Fast reverse recovery time
- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance

QUICK REFERENCE DATA

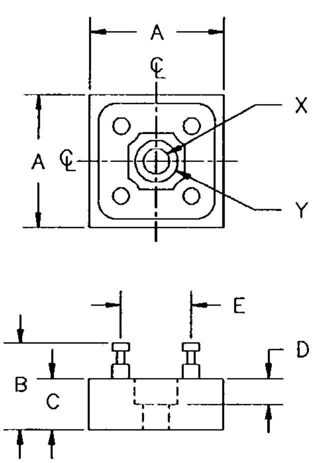
- V_R = 50V - 400V
- I_F = 10A
- I_R = 2.0μA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBH05F SCBH1F SCBH2F SCBH4F	50 100 200 400	10	7.5	5.5	4.0	3.0	1.7	150	80	25

$R_{\theta JC} = 3.3^{o}C/W$

MECHANICAL



G28

DIM	DIMENSIONS MM MIN	DIMENSIONS MM MAX	DIMENSIONS INCHES MIN	DIMENSIONS INCHES MAX	NOTE
A	18.7	19.4	.735	.765	–
B	–	12.7	–	.50	–
C	–	7.6	–	.30	–
D	3.4	4.2	.135	.165	–
E	9.6	10.7	.38	.42	–
X	3.4	4.1	.132	.165	DIA
Y	5.6	6.4	.22	.25	DIA

NOTES:
1. TERMINAL IDENTIFICATION MARKED ON CASE

SCBH4F is available in Europe to DEF STAN 59-61/90/207 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 3A/leg	Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp. range. T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SCBH05F SCBH1F SCBH2F SCBH4F	2.0	40	1.1	150	-55 to +150

[1] Measured on discrete devices prior to assembly

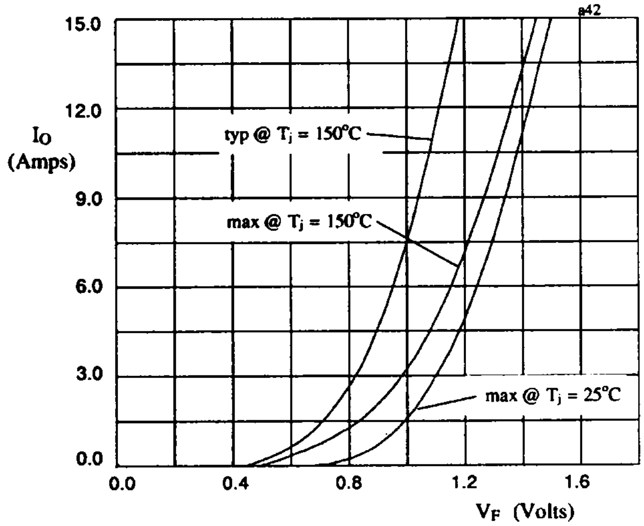


Fig 1. Forward voltage drop against output current per leg.

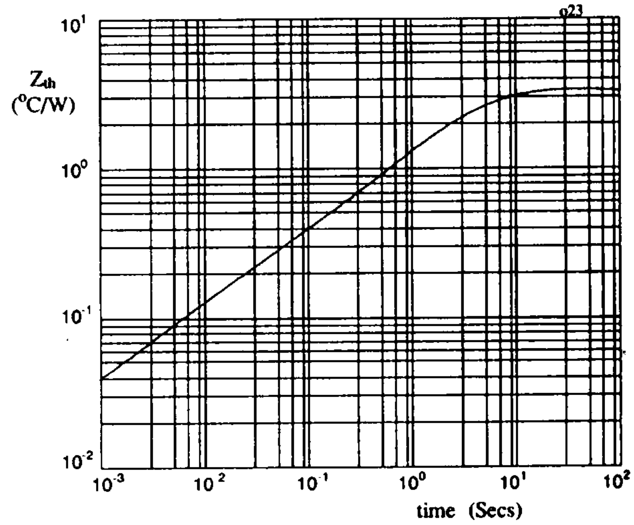


Fig 2. Transient thermal impedance characteristic per leg

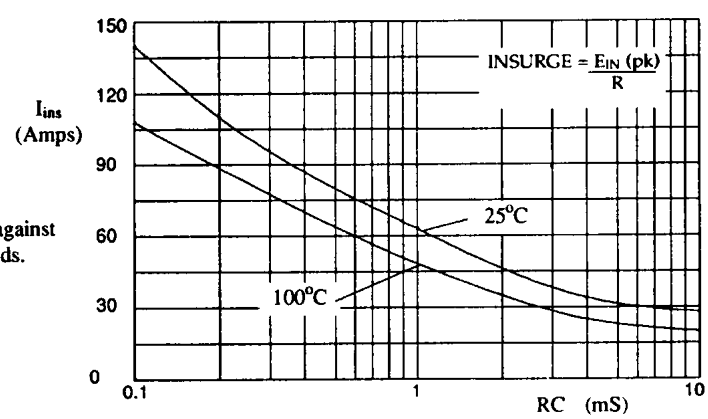


Fig 3. Maximum insurge current against time constant for capacitive loads.

SUPERFAST RECOVERY, LOW CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Very fast reverse recovery time
- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance

QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 12A
- V_F = 0.97V
- t_{rr} = 30nS

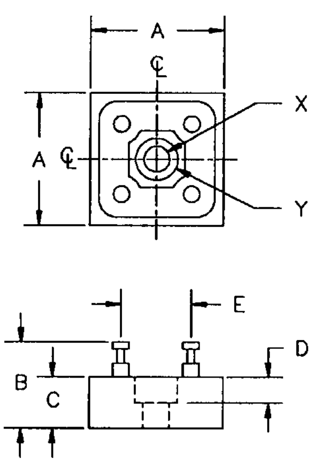
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			(@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBH05FF SCBH10FF SCBH15FF	50 100 150	12	9	7.5	5	3.8	2	175	120	24

$R_{\theta JC} = 3.3^{\circ}C/W$

MECHANICAL



G28

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	18.7	19.4	.735	.765	–
B	–	12.7	–	.50	–
C	–	7.6	–	.30	–
D	3.4	4.2	.135	.165	–
E	9.6	10.7	.38	.42	–
X	3.4	4.1	.132	.165	DIA
Y	5.6	6.4	.22	.25	DIA

NOTES:
1. TERMINAL IDENTIFICATION MARKED ON CASE

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time[1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 5A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	μA	mA	Volts	nS	°C
SCBH05FF SCBH10FF SCBH15FF	20	1.0	0.97	30	- 55 to +150

[1] Measured on discrete devices prior to assembly

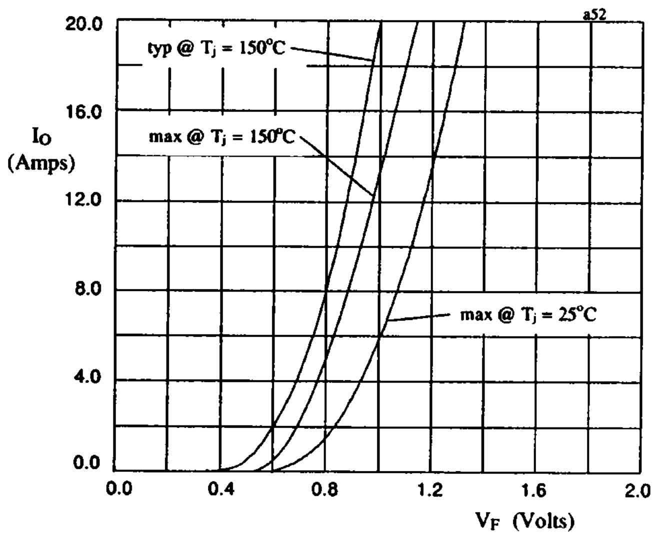


Fig 1. Forward voltage drop against output current per leg.

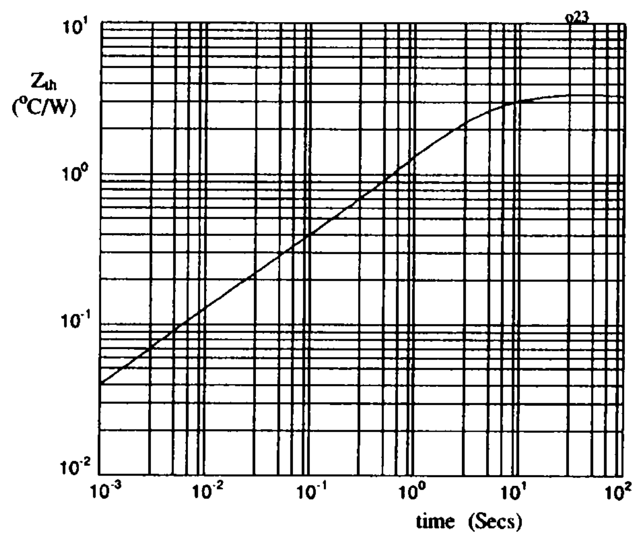
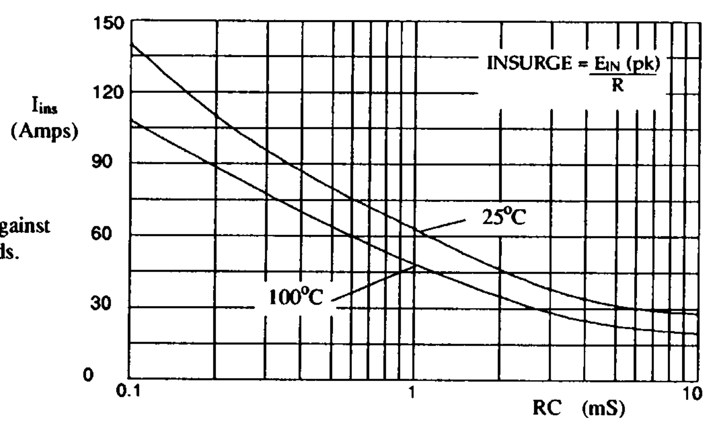


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



4

STANDARD RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- High surge ratings

QUICK REFERENCE DATA

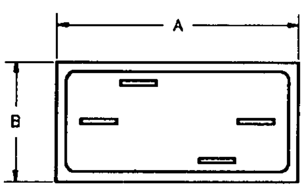
- V_R = 50V - 600V
- I_F = 38A
- I_R = 8.0μA
- I_{FSM} = 500A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature) @ 55°C	@ 100°C	@ 125°C	(@ ambient temperature) @ 25°C	@ 55°C	@ 100°C	1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ 25°C	@ 100°C	Repetitive Surge Current I_{FRM} @ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBK05	50	38	24	17.5	13	10	6	500	325	80
SCBK1	100									
SCBK2	200									
SCBK4	400									
SCBK6	600									

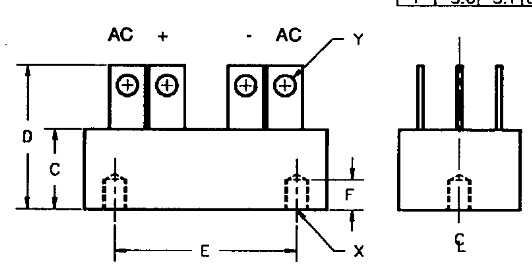
$R_{\theta JC}$ = 1.2°C/W

MECHANICAL



G30A

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	26.2	–	1.03	–
C	–	16.8	–	0.66	–
D	–	30.5	–	1.20	–
E	37.8	38.4	1.49	1.51	–
F	6.4	–	0.25	–	–
X	TAPPED 10–32UNF				–
Y	3.6	5.1	0.14	0.20	DIA



ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 12A/leg	Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp. range. T_{OP} T_{STG}
	μA	μA	Volts	μS	°C
SCBK05 SCBK1 SCBK2 SCBK4 SCBK6	8.0	200	1.0	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

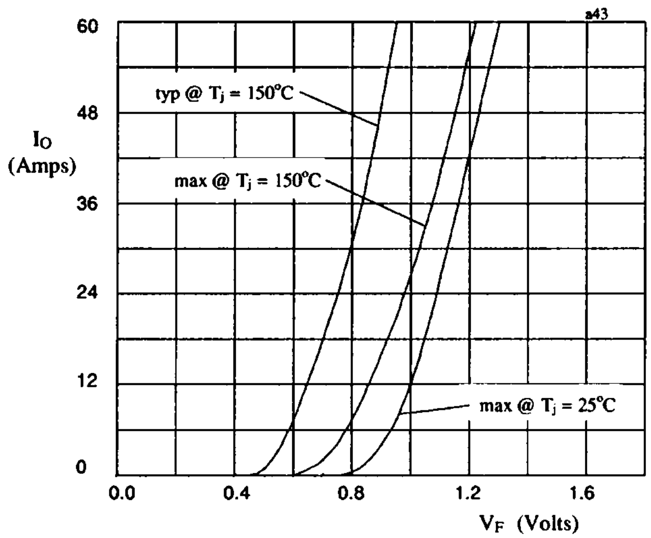


Fig 1. Forward voltage drop against output current per leg.

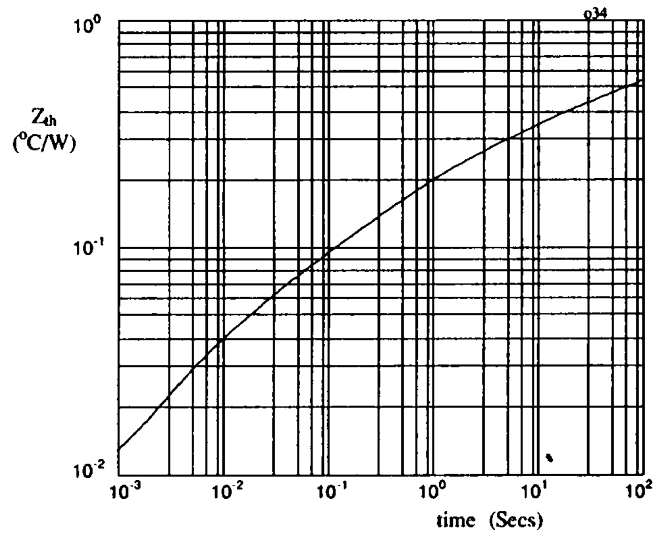


Fig 2. Transient thermal impedance characteristic per leg

SEMTECH

4

FAST RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Fast reverse recovery time
- Low thermal impedance
- High surge ratings

QUICK REFERENCE DATA

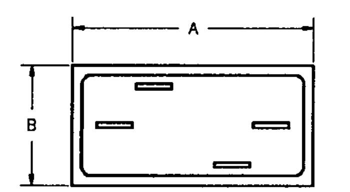
- V_R = 50V - 400V
- I_F = 32A
- I_R = 8.0μA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBK05F SCBK1F SCBK2F SCBK4F	50 100 200 400	32	20	16	11	8.5	5.0	500	320	80

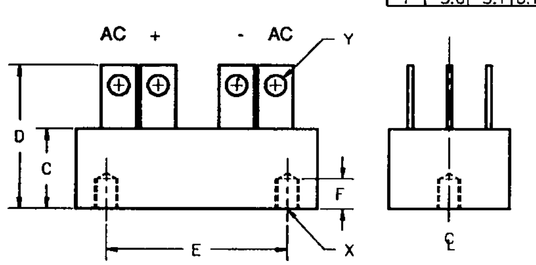
$R_{\theta JC} = 1.2^{\circ}C/W$

MECHANICAL



G30A

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	26.2	–	1.03	–
C	–	16.8	–	0.66	–
D	–	30.5	–	1.20	–
E	37.8	38.4	1.49	1.51	–
F	6.4	–	0.25	–	–
X	TAPPED 10–32UNF				–
Y	3.6	5.1	0.14	0.20	DIA



4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 12A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SCBK05F SCBK1F SCBK2F SCBK4F	8.0	200	1.1	150	-55 to +150

[1] Measured on discrete devices prior to assembly

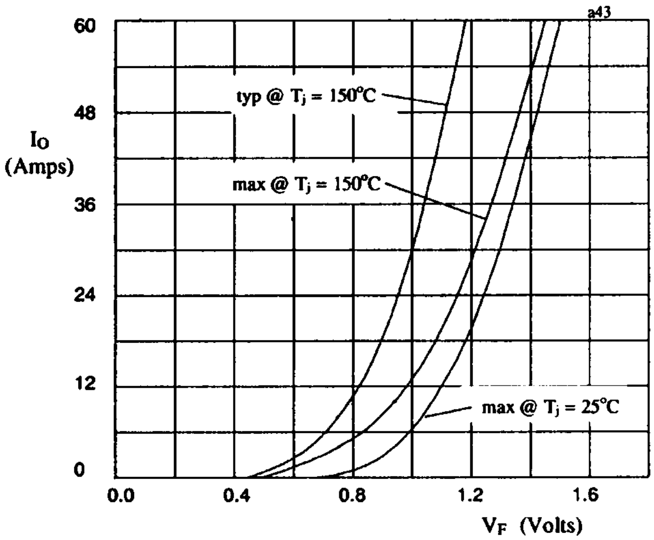


Fig 1. Forward voltage drop against output current per leg.

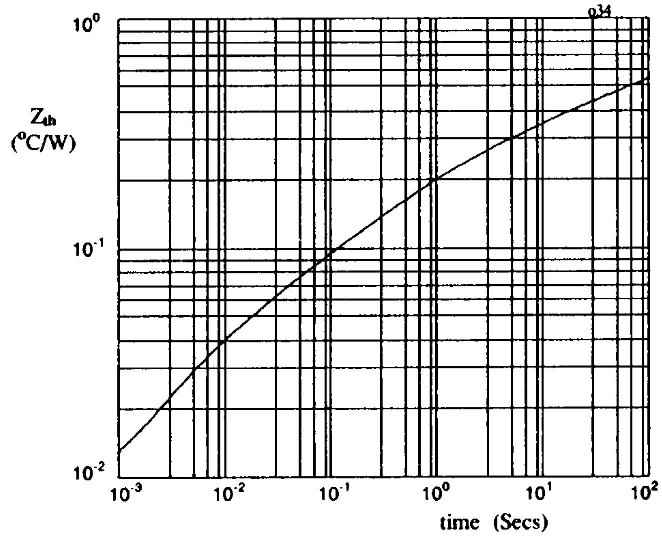


Fig 2. Transient thermal impedance characteristic per leg

4

SUPERFAST RECOVERY, HIGH CURRENT 1-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Low thermal impedance
- Very fast reverse recovery time
- High surge ratings

QUICK REFERENCE DATA

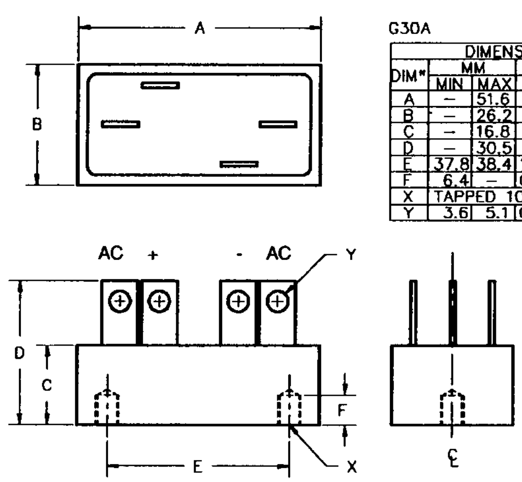
- V_R = 50V - 150V
- I_F = 38A
- V_F = 0.97V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ (@ case temperature)			Average Rectified Current $I_{F(AV)}$ (@ ambient temperature)			1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM}
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCBK05FF SCBK10FF SCBK15FF	50 100 150	38	28	20	13	9.2	5.5	600	500	80

$R_{\theta JC} = 1.2°C/W$

MECHANICAL



G30A

DIMENSIONS					
DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	26.2	–	1.03	–
C	–	16.8	–	0.66	–
D	–	30.5	–	1.20	–
E	37.8	38.4	1.49	1.51	–
F	6.4	–	0.25	–	–
X	TAPPED 10–32UNF				–
Y	3.6	5.1	0.14	0.20	DIA

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage	Reverse Recovery Time [1]	Maximum operating & storage temp. range.
	@ 25°C	@ 100°C	V_F @ 20A/leg	t_{rr} @ 25°C	T_{OP} T_{STG}
	µA	mA	Volts	nS	°C
SCBK05FF SCBK10FF SCBK15FF	80	4.0	0.97	30	-55 to +150

[1] Measured on discrete devices prior to assembly

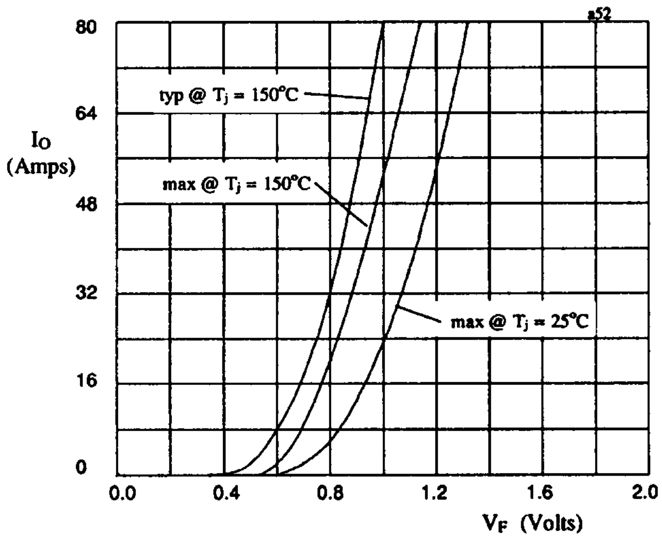


Fig 1. Forward voltage drop against output current per leg.

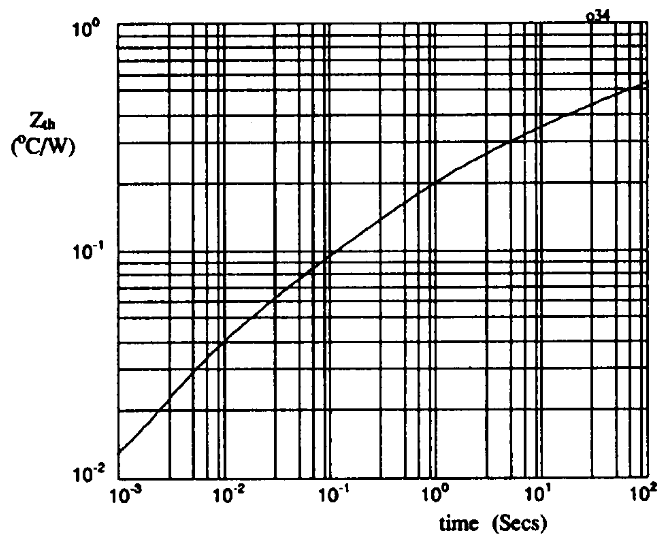


Fig 2. Transient thermal impedance characteristic per leg

SEMTECH

HIGH CURRENT, 1-PHASE FULL WAVE BRIDGE ASSEMBLY

SET061203
SET061219
SET061212
SET061204
SET061211

HIGH CURRENT, HIGH DENSITY, SINGLE PHASE FULL WAVE BRIDGE RECTIFIER.

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

- V_{RWM} = 150V - 1000V
- I_O = 30A
- t_{rr} = 30nS - 2µS
- I_{FSM} $\geq$ 150A

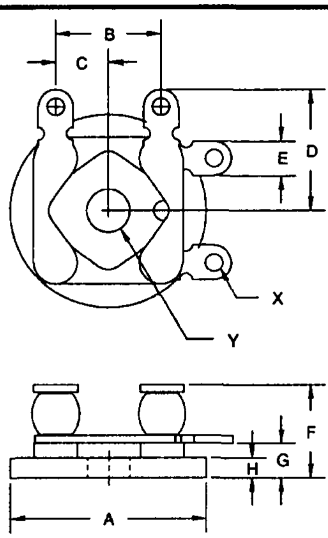
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{MB}			1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS		Operating & Storage Temperature Range (T_{OP}) (T_{STG})
		@ 55°C	100°C	125°C	@ 25°C	@ 100°C	
	Volts	Amps	Amps	Amps	Amps	Amps	°C
SET061203	1000	30	22	16	150	100	-55 to +175
SET061219	1000	20	16	12	150	80	-55 to +175
SET061212	600	30	22	16	150	100	-55 to +175
SET061204	400	30	22	16	150	80	-55 to +175
SET061211	150	30	20	14	175	175	-55 to +150

$R_{\theta JMB}$ = 0.75°C/W

MECHANICAL



G52

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	19.3	20.1	.76	.79	DIA
B	10.4	11.2	.41	.44	-
C	5.0	5.6	.20	.22	-
D	12.1	13.0	.48	.51	-
E	3.3	3.8	.13	.15	-
F	9.3	10.2	.32	.40	-
G	3.3	4.1	.13	.16	-
H	2.0	2.3	.07	.09	-
X	1.7	2.0	.067	.077	DIA
Y	4.2	4.4	.167	.172	DIA

NOTES:
1. TERMINAL MARKING
RED DOT, POSITIVE
BLACK DOT, NEGATIVE
YELLOW DOT, A.C.

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 9A/leg @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
SET061203	2.0	40	1.2	2000
SET061219	2.0	50	2.2	150
SET061212	2.0	40	1.2	2000
SET061204	2.0	40	1.5	150
SET061211	20.0	1mA	1.1	30

[1] Measured on discrete devices prior to assembly

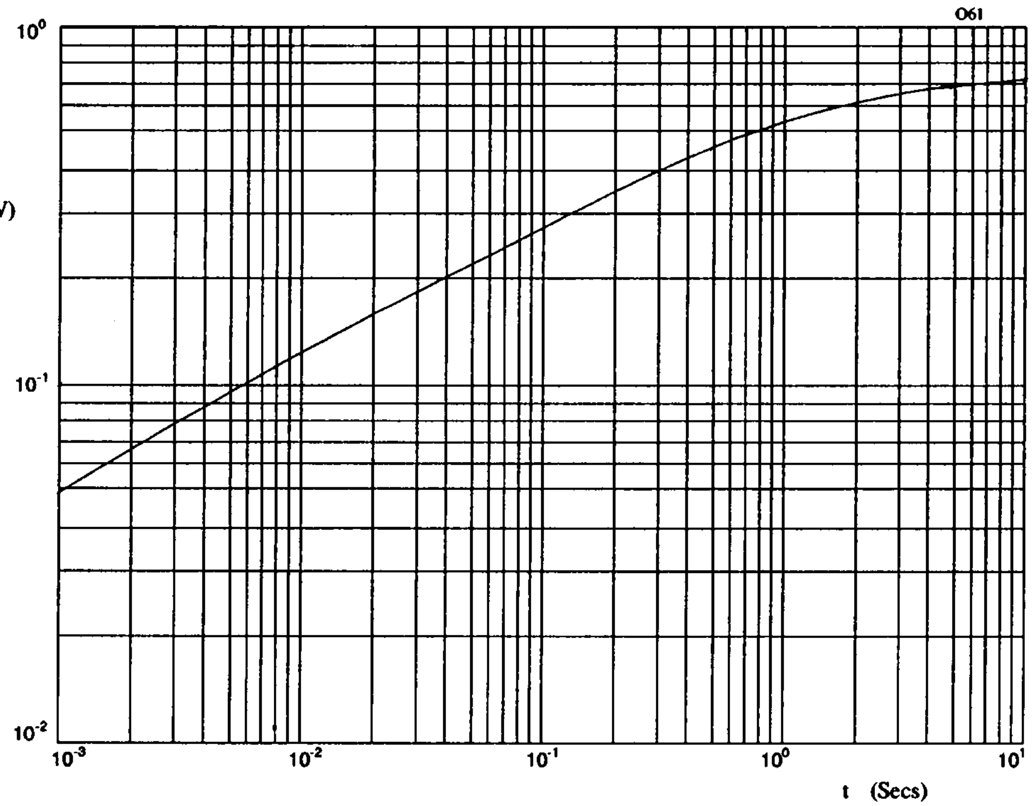


Figure 1. Typical transient thermal impedance characteristic.

4

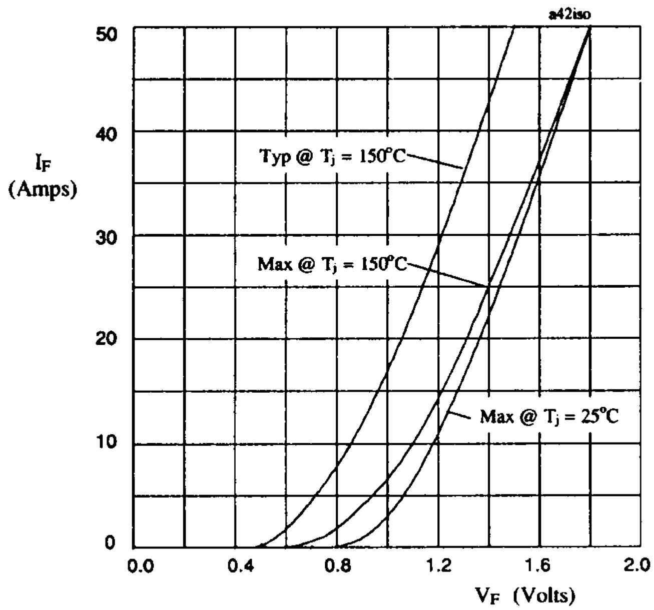


Figure 2. Forward voltage drop per leg as a function of forward current for SET061203 & SET061212.

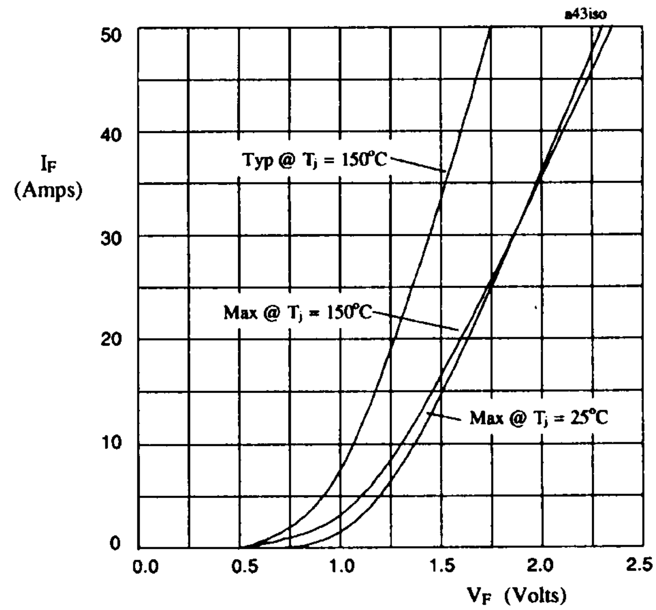


Figure 3. Forward voltage drop per leg as a function of forward current for SET061204.

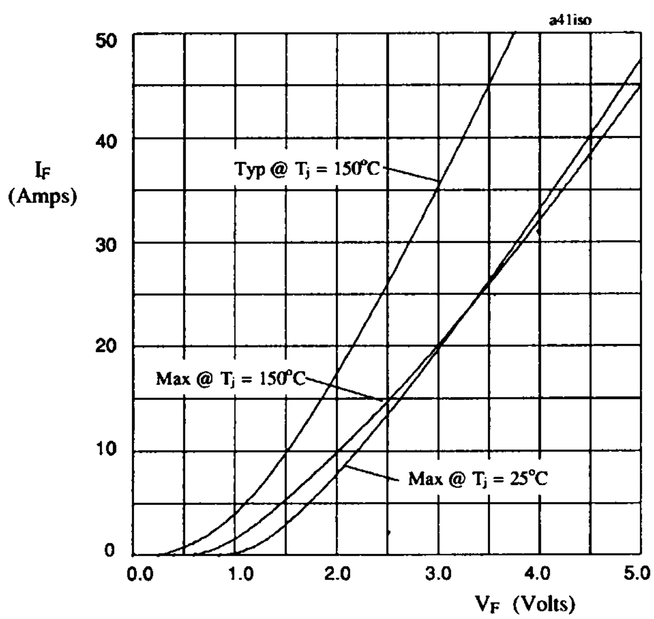


Figure 4. Forward voltage drop per leg as a function of forward current for SET061219.

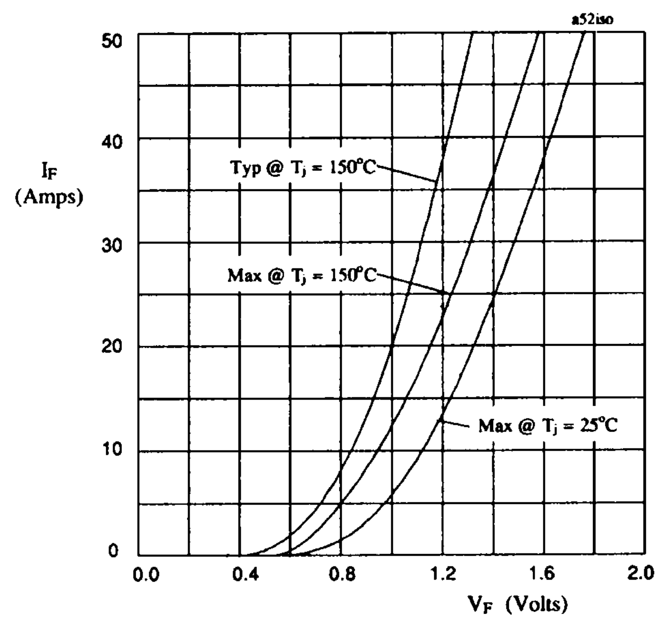


Figure 5. Forward voltage drop per leg as a function of forward current for SET061211.

4

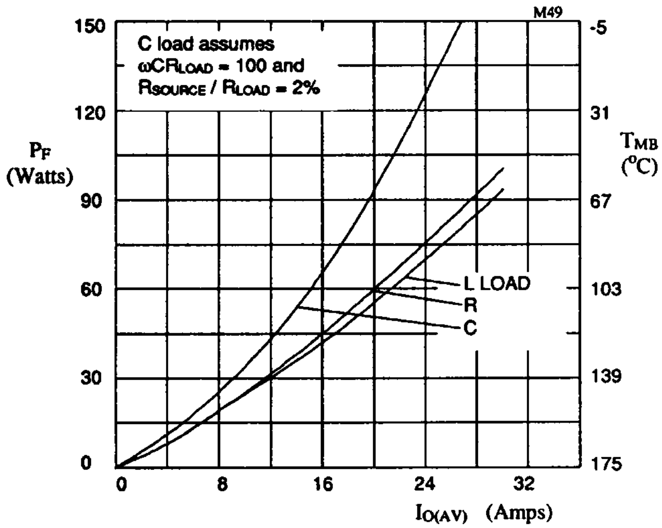


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET061203 and SET061212.

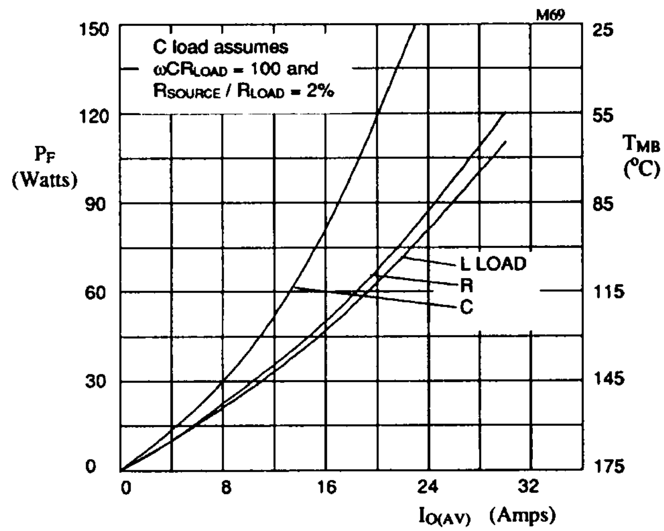


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET061204.

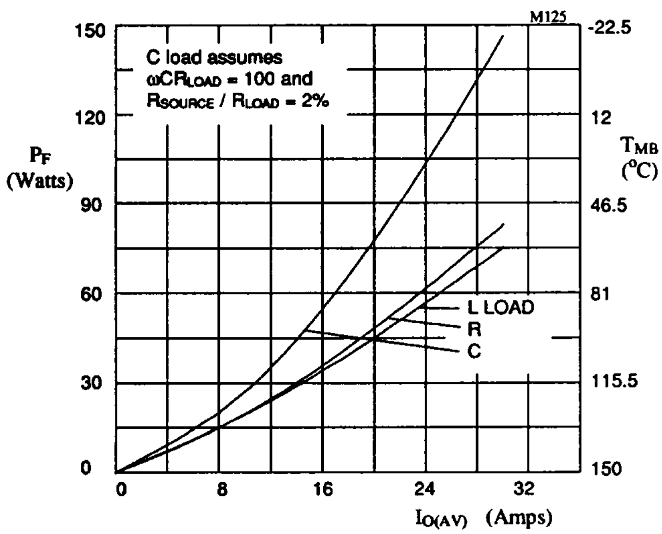


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET061211.

HIGH CURRENT, 1-PHASE FULL WAVE BRIDGE ASSEMBLY

SET121203
SET121219
SET121212
SET121204
SET121211

HIGH CURRENT, HIGH DENSITY, SINGLE PHASE FULL WAVE BRIDGE RECTIFIER.

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

- V_{RWM} = 150V - 1000V
- I_O = 30A
- t_{rr} = 30nS - 2µS
- I_{FSM} ≥ 150A

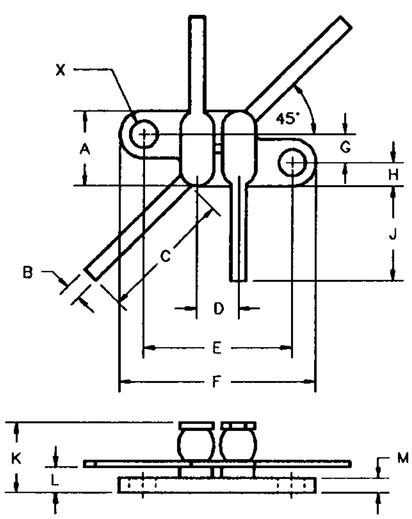
4

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{MB}			1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS		Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25°C	@ 100°C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	°C
SET121203	1000	30	22	16	150	100	-55 to +175
SET121219	1000	20	16	12	150	80	-55 to +175
SET121212	600	30	22	16	150	100	-55 to +175
SET121204	400	30	22	16	150	80	-55 to +175
SET121211	150	30	20	14	175	175	-55 to +150

$R_{\theta JMB}$ = 0.75°C/W

MECHANICAL



G72

DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	9.9	10.5	.39	.41	–
B	1.7	2.1	.07	.08	–
C	17	–	.68	–	–
D	5.3	6.1	.21	.24	–
E	19.6	20.0	.775	.785	–
F	–	26.5	–	1.04	–
G	3.68	3.94	.145	.155	–
H	3.0	3.3	.12	.13	–
J	11.9	–	.47	–	–
K	–	10.7	–	.40	–
L	3.3	–	.13	–	–
M	1.7	2.3	.07	.09	–
X	3.53	3.79	.139	.149	DIA

NOTES:
1. POLARITY INDICATED BY COLORED DOTS.
   TOP TERMINALS: –
   YELLOW DOTS – AC
   BOTTOM TERMINALS: –
   RED DOT – POSITIVE
   BLACK DOT – NEGATIVE

4

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 9A/leg @ 25°C	Maximum Reverse Recovery Time t_{rr} @ 25°C
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
SET121203	2.0	40	1.2	2000
SET121219	2.0	50	2.2	150
SET121212	2.0	40	1.2	2000
SET121204	2.0	40	1.5	150
SET121211	20.0	1mA	1.1	30

[1] Measured on discrete devices prior to assembly

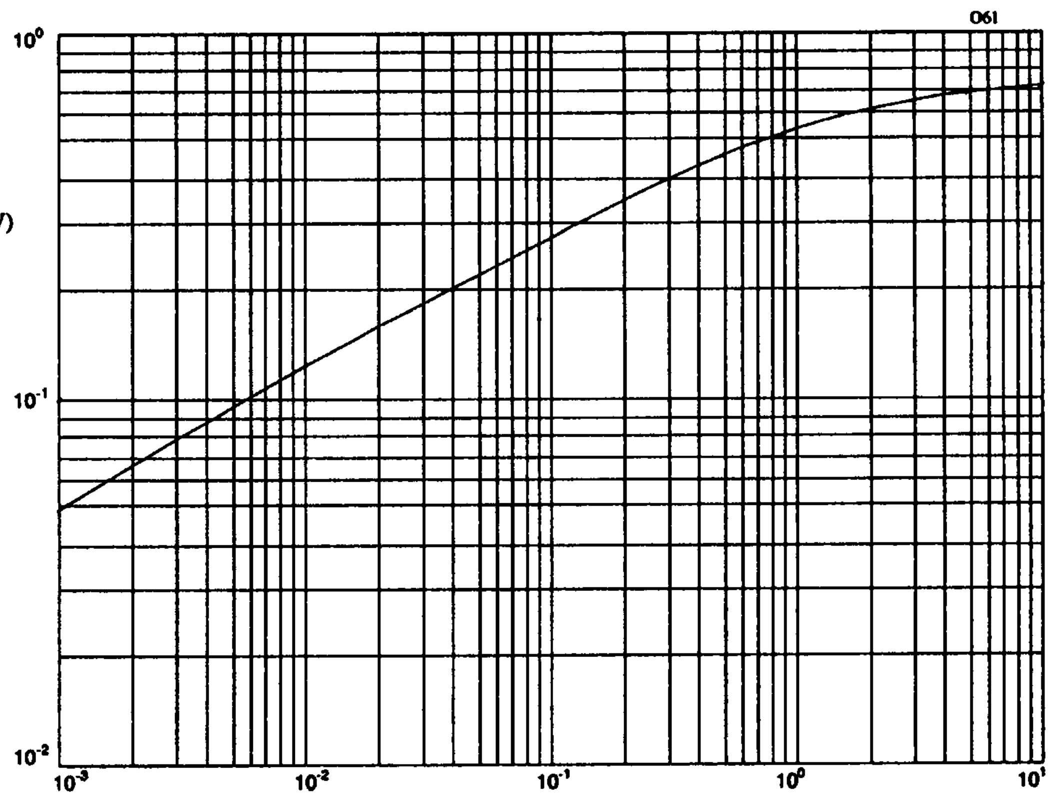


Figure 1. Typical transient thermal impedance characteristic.

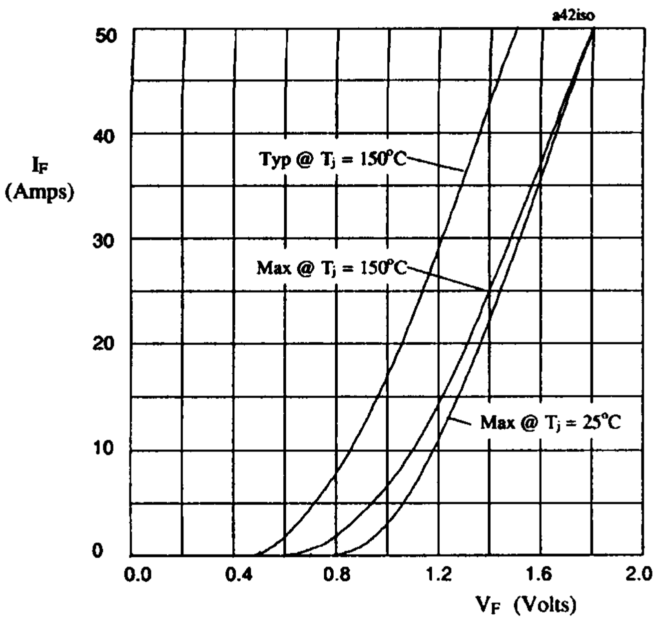


Figure 2. Forward voltage drop per leg as a function of forward current for SET121203 & SET121212.

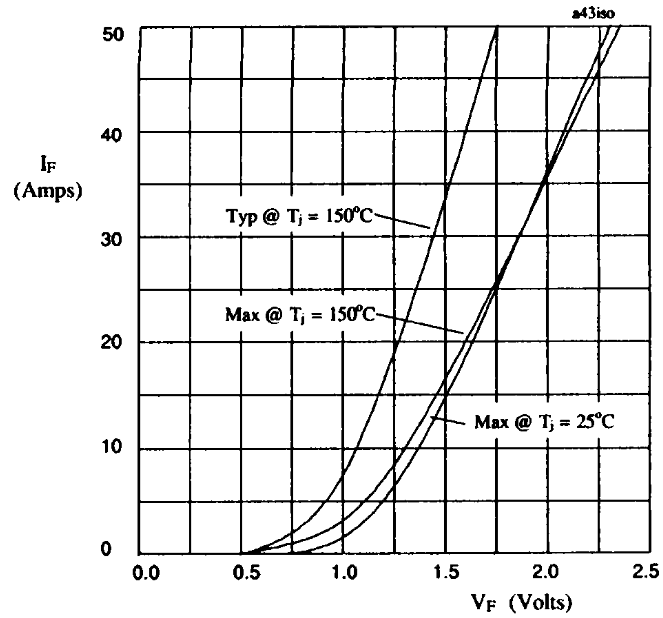


Figure 3. Forward voltage drop per leg as a function of forward current for SET121204.

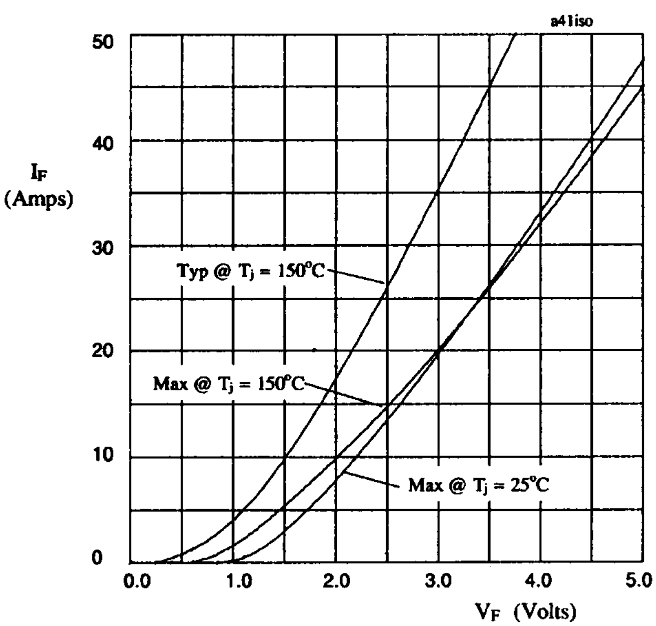


Figure 4. Forward voltage drop per leg as a function of forward current for SET121219.

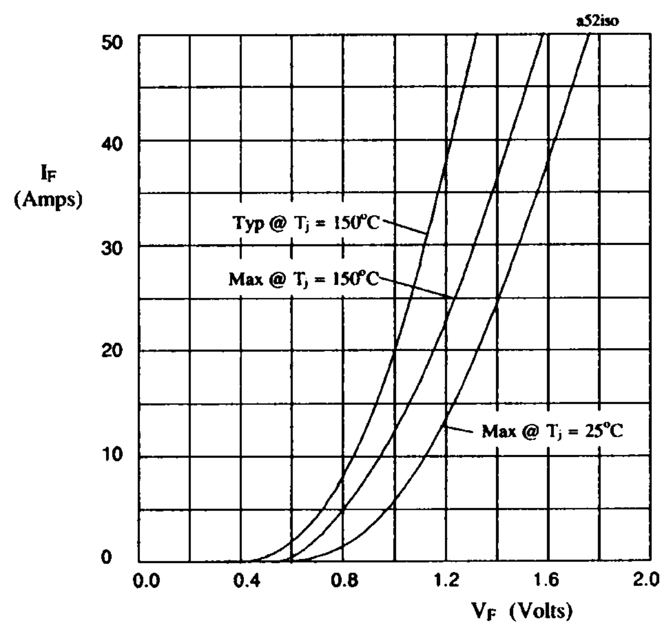


Figure 5. Forward voltage drop per leg as a function of forward current for SET121211.

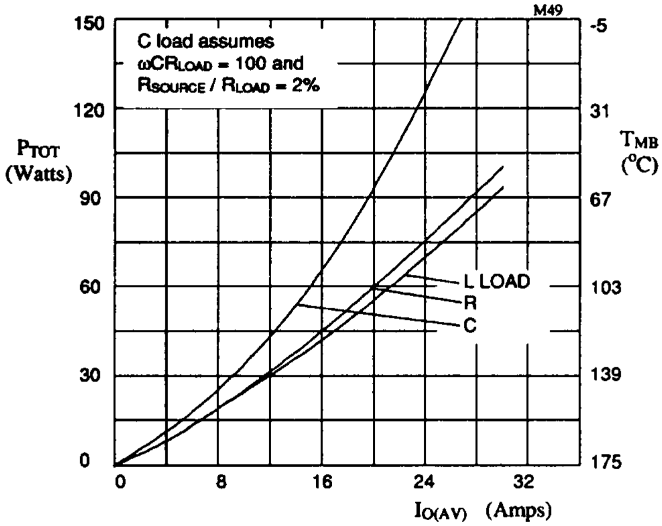


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET121203 and SET121212.

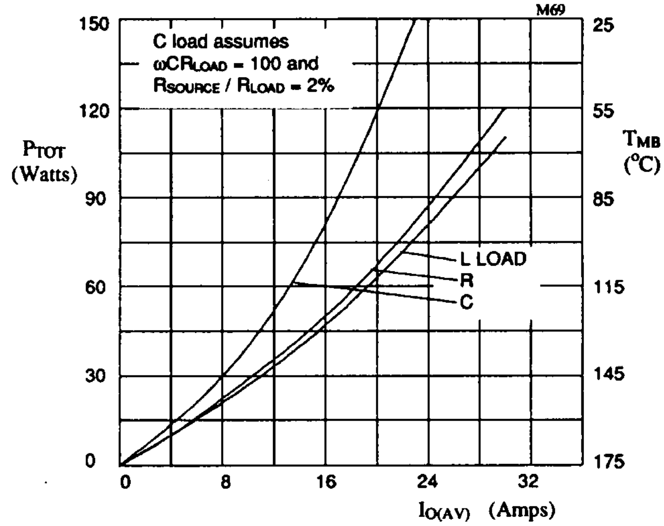


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET121204.

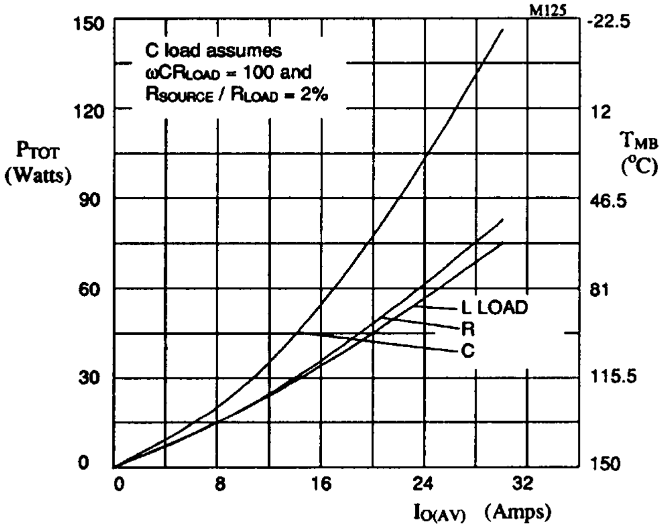


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET121211.

4

Chapter 5
Three Phase Full Wave Bridge Assemblies

Datasheet No.	Title:
S3BRX	Standard Recovery 3 Phase Silicon Bridge Rectifiers
S3BRXF	Fast Recovery 3 Phase Silicon Bridge Rectifiers
S3BRXFF	Superfast Recovery 3 Phase Silicon Bridge Rectifiers
SC3ASX	Standard Recovery 3 Phase Full Wave Bridge Rectifiers
SC3ASXF	Fast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3ASXFF	Superfast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BAX	Standard Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BAXF	Fast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BAXFF	Superfast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BHX	Standard Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BHXF	Fast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BHXFF	Superfast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BJX	Standard Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BJXF	Fast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BJXFF	Superfast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BKX	Standard Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BKXF	Fast Recovery 3 Phase Full Wave Bridge Rectifiers
SC3BKXFF	Superfast Recovery 3 Phase Full Wave Bridge Rectifiers
SC6BAX	Standard Recovery 3 Phase Full Wave Bridge Rectifiers
SET111403,04,11,12,19	High Current, 3 Phase Full Wave Bridge Rectifier

5

STANDARD RECOVERY, PCB MOUNTING 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- V_{RWM} up to 3000V

QUICK REFERENCE DATA

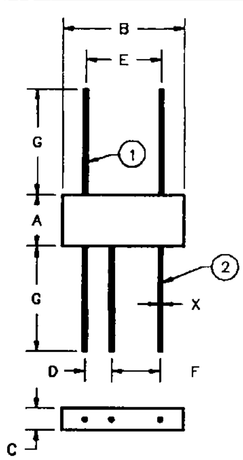
- V_R = 50V - 3000V
- I_F = 0.5 - 2.0A
- I_R = 3.0µA
- t_{rr} = 2.0 - 2.5µS

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop / leg @ 25°C	Reverse Recovery Time [1] t_{rr}
		@ 55 °C	@ 100 °C	@ 25 °C	@ 100 °C	V_F @ 1A * @ 250mA	@ 25°C
	Volts	Amps	Amps	µA	µA	Volts	µS
S3BR05	50	2.0	1.2	3.0	75	1.1	2.0
S3BR1	100	2.0	1.2	3.0	75	1.1	2.0
S3BR2	200	2.0	1.2	3.0	75	1.1	2.0
S3BR4	400	2.0	1.2	3.0	75	1.1	2.0
S3BR6	600	2.0	1.2	3.0	75	1.1	2.0
S3BR8	800	2.0	1.2	3.0	75	1.1	2.0
S3BR10	1000	2.0	1.2	3.0	75	1.1	2.0
S3BR15	1500	0.5	0.3	3.0	60	* 5.0	2.5
S3BR20	2000	0.5	0.3	3.0	60	* 5.0	2.5
S3BR25	2500	0.5	0.3	3.0	60	* 5.0	2.5
S3BR30	3000	0.5	0.3	3.0	60	* 5.0	2.5

[1] Measured on discrete devices prior to assembly

MECHANICAL



G39

DIMENSIONS					
DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	10.2	11.7	0.40	0.46	–
B	24.6	26.2	0.97	1.03	–
C	3.8	5.3	0.15	0.21	–
D	5.6	7.1	0.22	0.28	–
E	15.0	16.5	0.59	0.65	–
F	8.38	10.5	0.33	0.41	–
G	22.2	–	.875	–	–
X	0.66	0.84	.026	.033	3

NOTES:

1. POSITIVE LEAD
2. A.C. LEAD 3 PLCS
3. LEADS ARE PLATED COPPER

S3BR10 and S3BR30 are available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

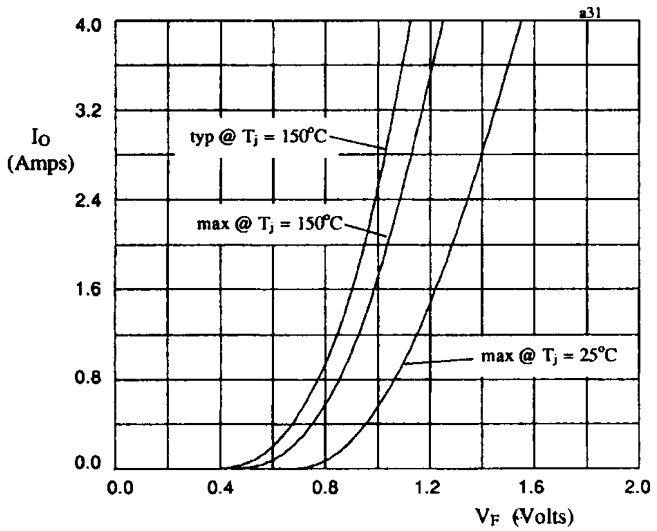


Fig 1. Forward voltage drop against output current per leg for S3BR05 thru S3BR10.

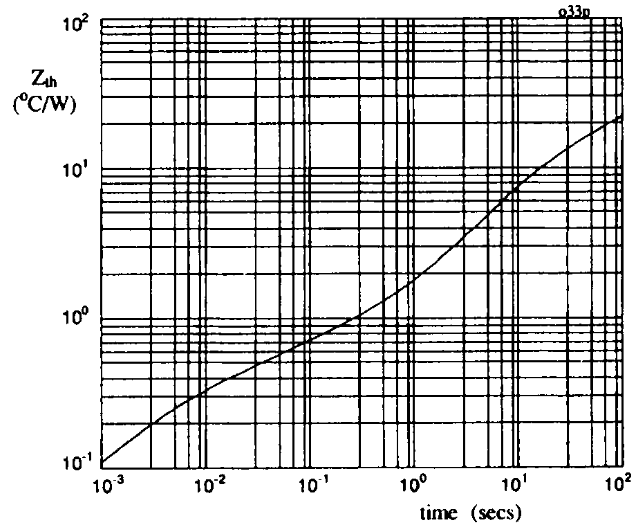


Fig 2. Transient thermal impedance characteristic per leg for S3BR05 thru S3BR10

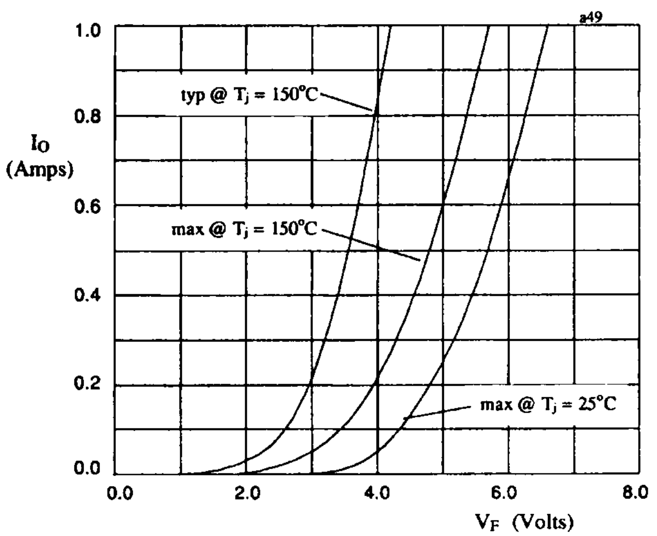


Fig 3. Forward voltage drop against output current per leg for S3BR15 thru S3BR30

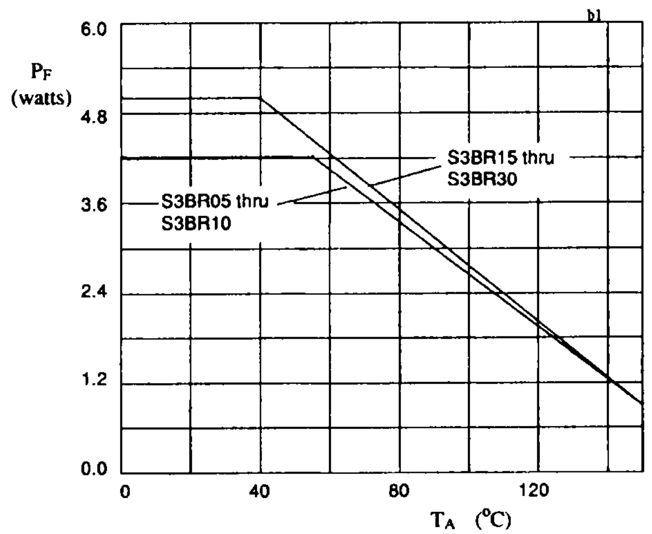


Fig 4. Power derating characteristics when p.c.b mounted

5

FAST RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- V_{RWM} up to 2500V
- PCB mounting

QUICK REFERENCE DATA

- V_R = 50V - 2500V
- I_F = 0.5 - 2.0A
- I_R = 3.0μA
- t_{rr} = 150 - 300nS

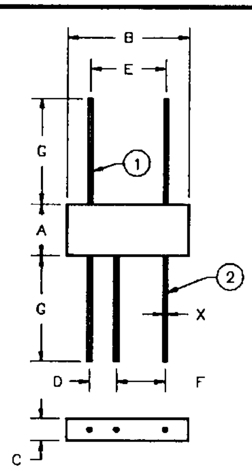
5

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop / leg @ 25°C V_F @ 1A * @ 100mA	Reverse Recovery Time[1] t_{rr}
		@ 55 °C	@ 100 °C	@ 25 °C	@ 100 °C		@ 25°C
	Volts	Amps	Amps	μA	μA	Volts	μS
S3BR05F	50	2.0	1.2	3.0	75	1.2	150
S3BR1F	100	2.0	1.2	3.0	75	1.2	150
S3BR2F	200	2.0	1.2	3.0	75	1.2	150
S3BR4F	400	2.0	1.2	3.0	75	1.2	150
S3BR6F	600	2.0	1.2	3.0	75	1.2	250
S3BR25F	2500	0.5	0.3	3.0	75	* 5.0	300

[1] Measured on discrete devices prior to assembly

MECHANICAL



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DIMENSIONS					
DIM"	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	10.2	11.7	0.40	0.46	–
B	24.6	26.2	0.97	1.03	–
C	3.8	5.3	0.15	0.21	–
D	5.6	7.1	0.22	0.28	–
E	15.0	16.5	0.59	0.65	–
F	8.38	10.5	0.33	0.41	–
G	22.2	–	.875	–	–
X	0.66	0.84	.026	.033	3

NOTES:

1. POSITIVE LEAD
2. A.C. LEAD 3 PLCS
3. LEADS ARE PLATED COPPER

S3BR4F is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

5

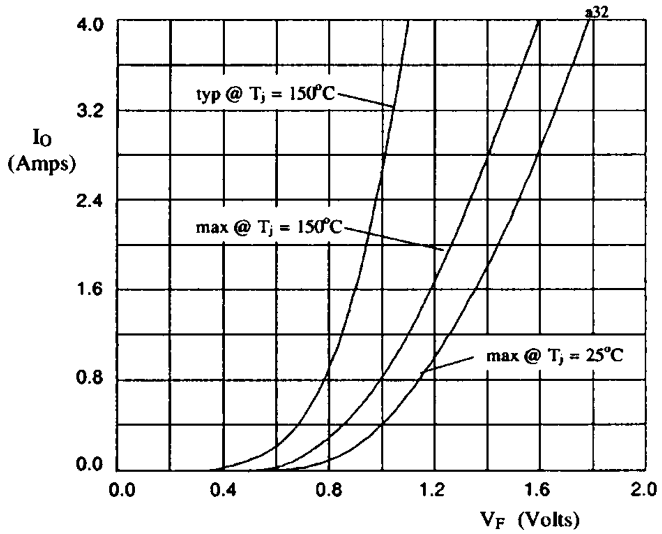


Fig 1. Forward voltage drop against output current per leg for S3BR05F thru S3BR6F.

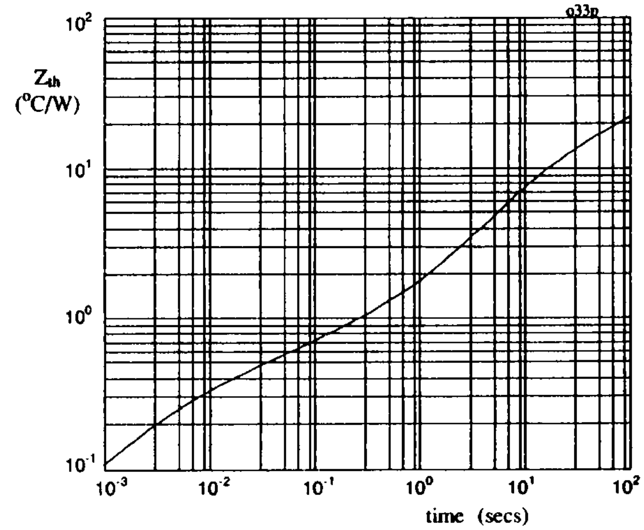


Fig 2. Transient thermal impedance characteristic per leg for S3BR05F thru S3BR6F

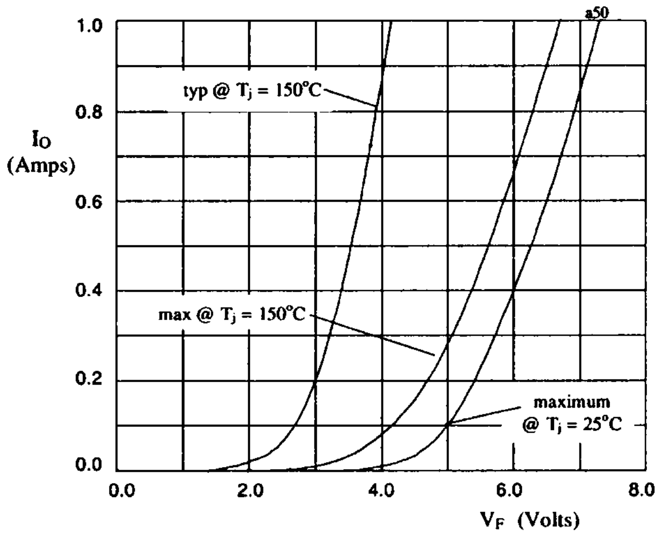


Fig 3. Forward voltage drop against output current per leg for S3BR25F.

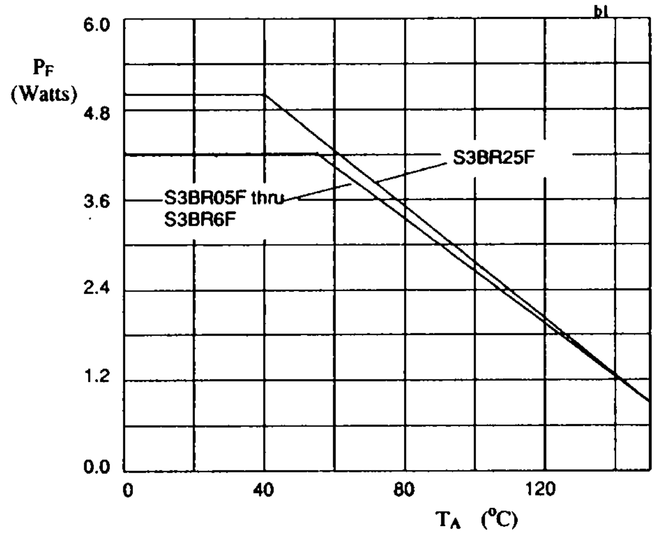


Fig 4. Power derating characteristics when p.c.b mounted

SEMTECH

SUPERFAST RECOVERY 3-PHASE SILICON BRIDGE RECTIFIERS

S3BR05FF
S3BR10FF
S3BR15FF

SUPERFAST RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Subminiature design
- V_{RWM} up to 150V
- Very fast reverse recovery time

QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 2.0A
- I_R = 3.0µA
- t_{rr} = 30nS

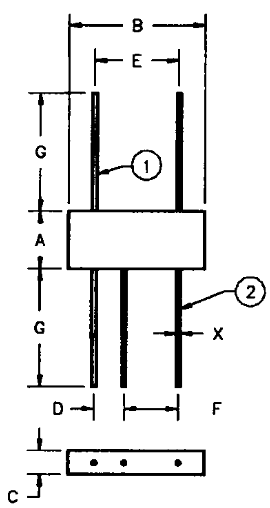
5

ABSOLUTE MAXIMUM RATINGS & CHARACTERISTICS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		Reverse Leakage Current I_R @ V_{RWM}		Forward Voltage drop / leg V_F @ 1.5A @ 25°C	Reverse Recovery Time[1] t_{rr}
		@ 55 °C	@ 100 °C	@ 25 °C	@ 100 °C		@ 25°C
	Volts	Amps	Amps	µA	µA	Volts	nS
S3BR05FF	50	2.0	1.1	3.0	150	1.2	30
S3BR10FF	100	2.0	1.1	3.0	150	1.2	30
S3BR15FF	150	2.0	1.1	3.0	150	1.2	30

[1] Measured on discrete devices prior to assembly

MECHANICAL



G39

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	10.2	11.7	0.40	0.46	–
B	24.6	26.2	0.97	1.03	–
C	3.8	5.3	0.15	0.21	–
D	5.6	7.1	0.22	0.28	–
E	15.0	16.5	0.59	0.65	–
F	8.38	10.5	0.33	0.41	–
G	22.2	–	.875	–	–
X	0.66	0.84	.026	.033	3

NOTES:

1. POSITIVE LEAD
2. A.C. LEAD 3 PLCS
3. LEADS ARE PLATED COPPER

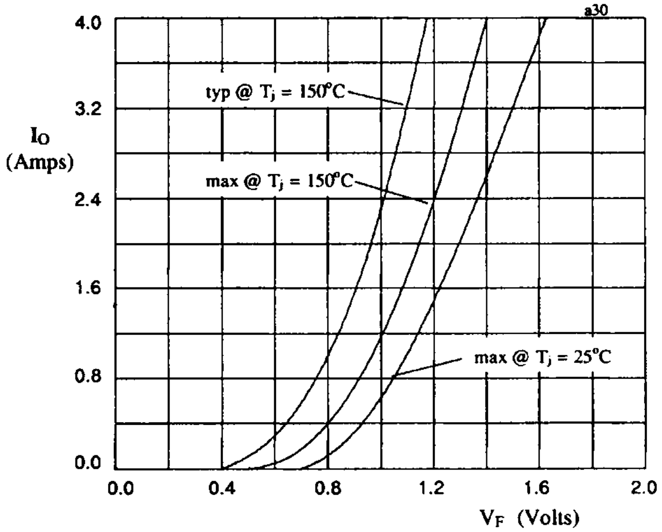


Fig 1. Forward voltage drop against output current per leg

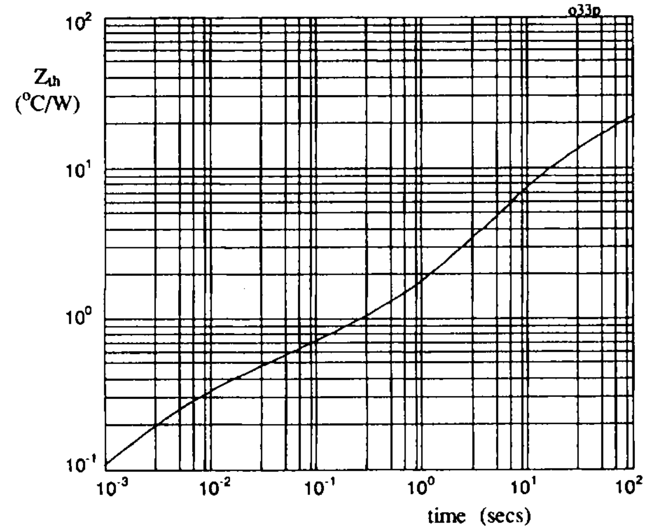


Fig 2. Transient thermal impedance characteristic per leg

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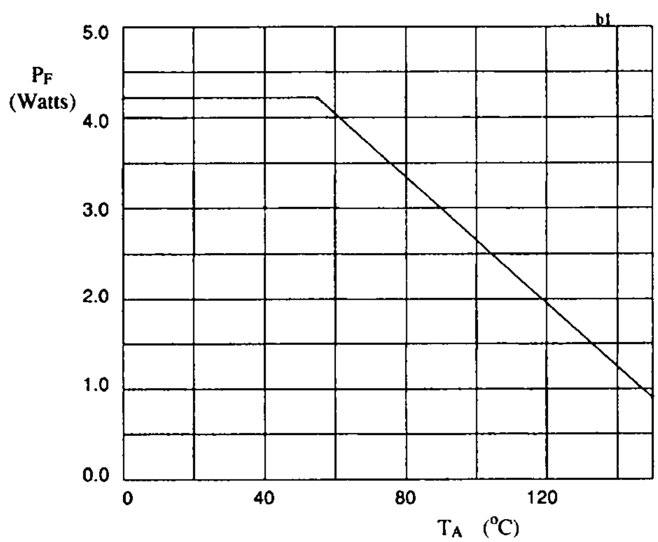


Fig 4. Power derating characteristics when p.c.b mounted

5

STANDARD RECOVERY, HIGH CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- High forward and surge current ratings

QUICK REFERENCE DATA

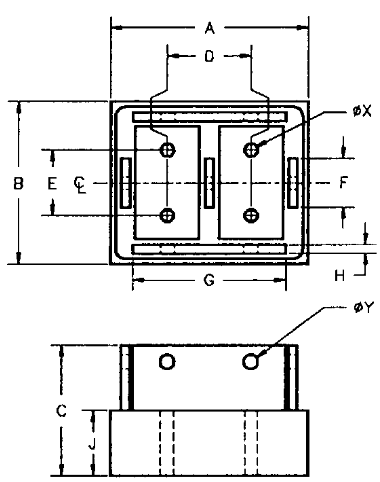
- V_R = 50V - 600V
- I_F = 130A
- I_R = 18 µA
- I_{FSM} = 750A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3AS05	50	130	95	70	18	14	9	750	600
SC3AS1	100								
SC3AS2	200								
SC3AS4	400								
SC3AS6	600								

$R_{\theta JC}$ = 0.3°C/W

MECHANICAL



G38

DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	73.8	–	2.90	–
B	–	64.3	–	2.53	–
C	–	51.6	–	2.03	–
D	27.8	29.3	1.10	1.15	–
E	24.6	26.2	.97	1.03	–
F	–	19.8	–	.78	–
G	–	54.7	–	2.16	–
H	1.8	3.3	.07	.13	–
J	24.6	26.2	.97	1.03	–
øX	4.3	5.9	.171	.231	1
øY	4.0	5.6	.159	.219	2

NOTES:
1. 4 PLACES
2. 7 PLACES

ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 18A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	µA	Volts	µS	°C
SC3AS05 SC3AS1 SC3AS2 SC3AS4 SC3AS6	18.0	360	1.0	2.0	- 55 to +150

[1] Measured on discrete devices prior to assembly

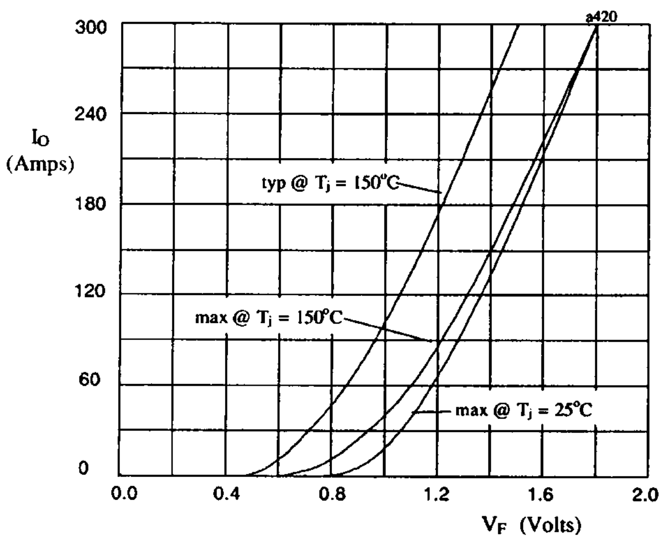


Fig 1. Forward voltage drop against output current per leg

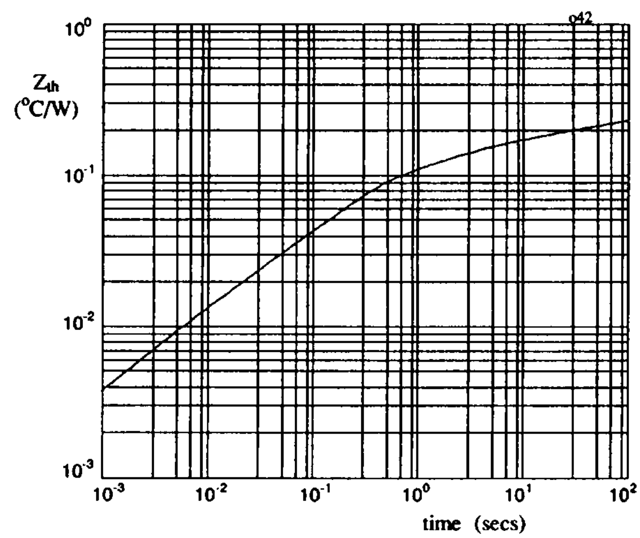


Fig 2. Transient thermal impedance characteristic per leg

5

FAST RECOVERY, HIGH CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Fast reverse recovery time
- Low thermal impedance
- High forward and surge current ratings

QUICK REFERENCE DATA

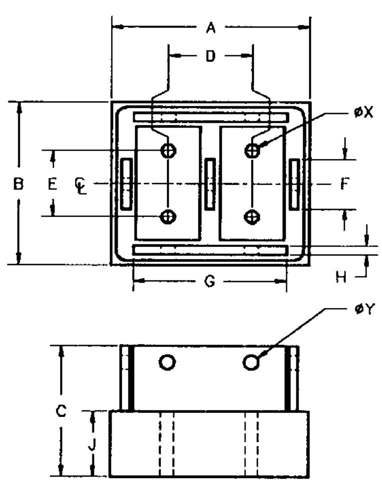
- V_R = 50V - 400V
- I_F = 110A
- I_R = 18µA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3AS05F SC3AS1F SC3AS2F SC3AS4F	50 100 200 400	110	80	60	16	11.5	7.2	750	480

$R_{\theta JC}$ = 0.3°C/W

MECHANICAL



G38

DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	73.8	–	2.90	–
B	–	64.3	–	2.53	–
C	–	51.6	–	2.03	–
D	27.8	29.3	1.10	1.15	–
E	24.6	26.2	.97	1.03	–
F	–	19.8	–	.78	–
G	–	54.7	–	2.16	–
H	1.8	3.3	.07	.13	–
J	24.6	26.2	.97	1.03	–
øX	4.3	5.9	.171	.231	1
øY	4.0	5.6	.159	.219	2

NOTES:
1. 4 PLACES
2. 7 PLACES

ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage / leg V_F @ 18A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	µA	Volts	nS	°C
SC3AS05F SC3AS1F SC3AS2F SC3AS4F	18	450	1.1	150	-55 to +150

[1] Measured on discrete devices prior to assembly

5

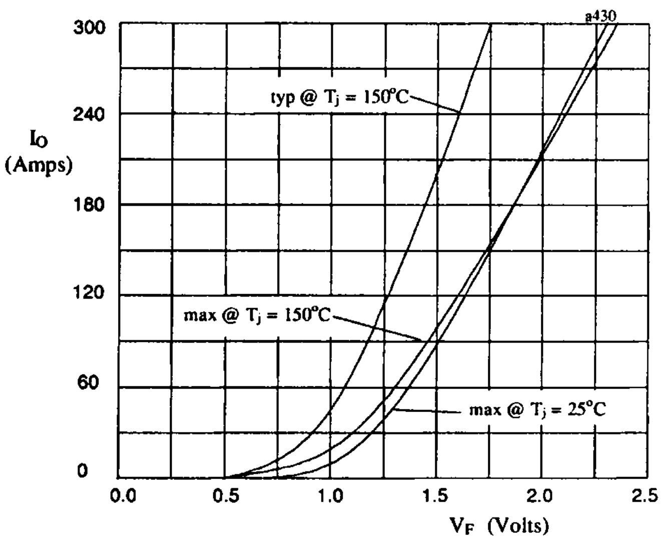


Fig 1. Forward voltage drop against output current per leg

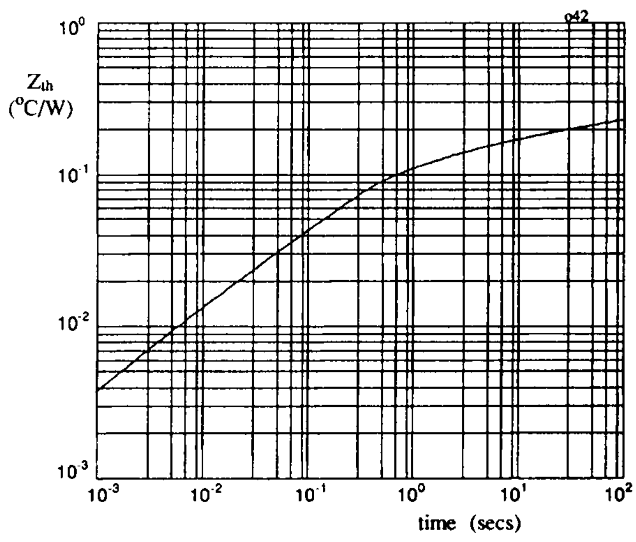


Fig 2. Transient thermal impedance characteristic per leg

SUPERFAST RECOVERY, HIGH CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Low thermal impedance
- Very fast reverse recovery time
- High forward and surge current ratings

QUICK REFERENCE DATA

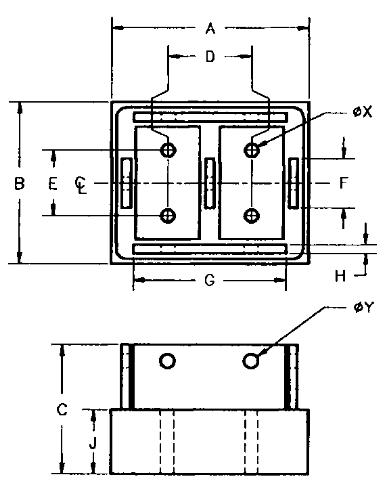
- V_R = 50V - 150V
- I_F = 130A
- V_F = 0.97V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ @ case temperature			Average Rectified Current $I_{F(AV)}$ @ ambient temperature			1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3AS05FF	50								
SC3AS10FF	100	130	80	45	18	12.5	8	900	750
SC3AS15FF	150								

$R_{\theta JC}$ = 0.3°C/W

MECHANICAL



G38

DIM"	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	73.8	–	2.90	–
B	–	64.3	–	2.53	–
C	–	51.6	–	2.03	–
D	27.8	29.3	1.10	1.15	–
E	24.6	26.2	.97	1.03	–
F	–	19.8	–	.78	–
G	–	54.7	–	2.16	–
H	1.8	3.3	.07	.13	–
J	24.6	26.2	.97	1.03	–
ØX	4.3	5.9	.171	.231	1
ØY	4.0	5.6	.159	.219	2

NOTES:
1. 4 PLACES
2. 7 PLACES

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 30A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	μA	mA	Volts	nS	°C
SC3AS05FF SC3AS10FF SC3AS15FF	180	9.0	0.97	30	-55 to +150

1 Measured on discrete devices prior to assembly

5

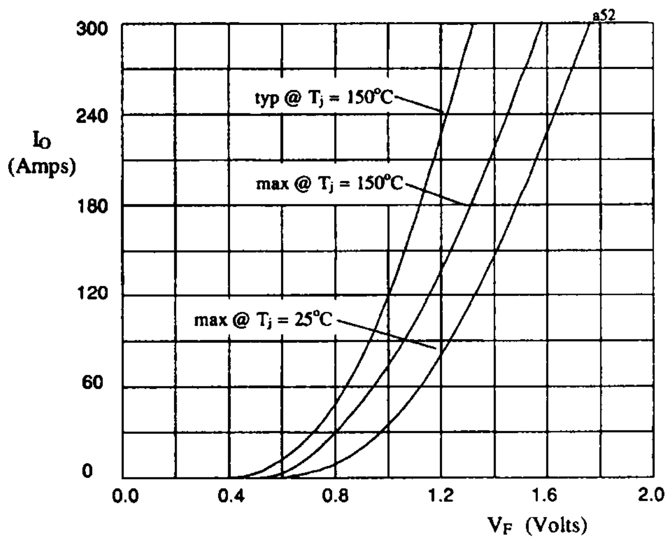


Fig 1. Forward voltage drop against output current per leg

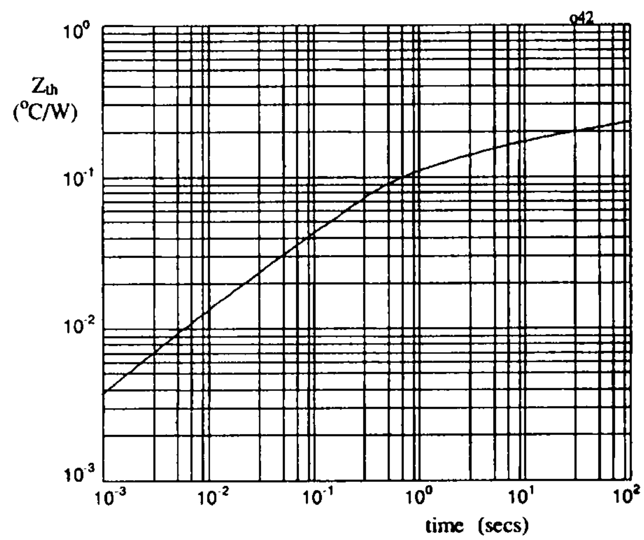


Fig 2. Transient thermal impedance characteristic per leg

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STANDARD RECOVERY, MEDIUM CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

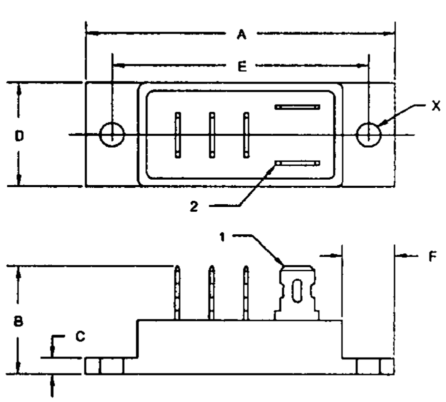
- V_R = 50V - 600V
- I_F = 18A
- I_R = 3.0 µA
- t_{rr} = 2.0µS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BA05	50								
SC3BA1	100								
SC3BA2	200	18	12.4	9.0	6.0	5.0	3.0	150	100
SC3BA4	400								
SC3BA6	600								

$R_{\theta JC}$ = 2.5°C/W

MECHANICAL



G37

DIMENSIONS					
DIM^N	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	56.4	57.9	2.22	2.28	-
B	-	20.3	-	.80	-
C	2.3	3.8	.09	.15	-
D	18.3	19.8	.72	.78	-
E	46.7	48.3	1.84	1.90	-
F	8.6	10.2	.34	.40	-
X	3.6	5.1	.14	.20	-

NOTES:
1. .25" 'FASTON' TERMINALS
2. POSITIVE TERMINAL

SC3BA6 is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 3A/leg @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	µA	Volts	µS	°C
SC3BA05 SC3BA1 SC3BA2 SC3BA4 SC3BA6	3.0	60	1.0	2.0	- 55 to +150

[1] Measured on discrete devices prior to assembly

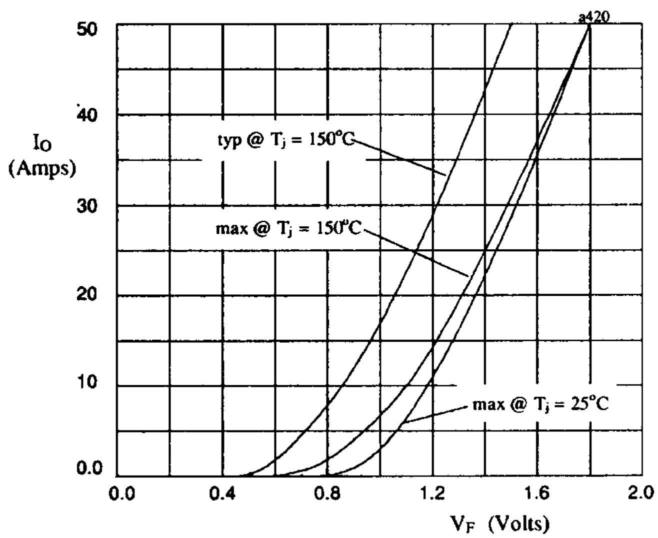


Fig 1. Forward voltage drop against output current per leg

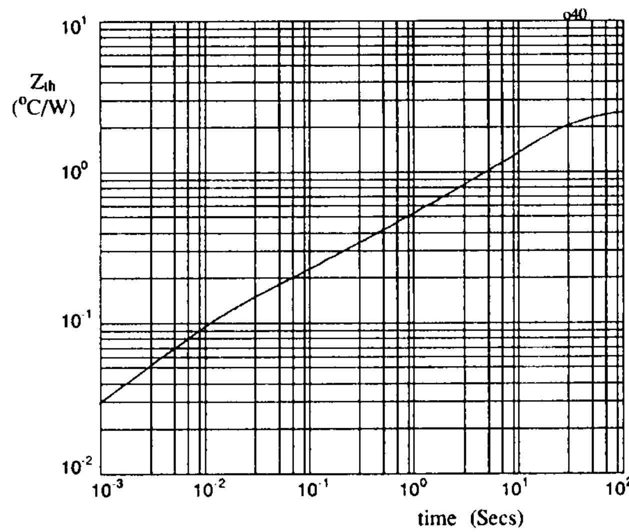


Fig 2. Transient thermal impedance characteristic per leg

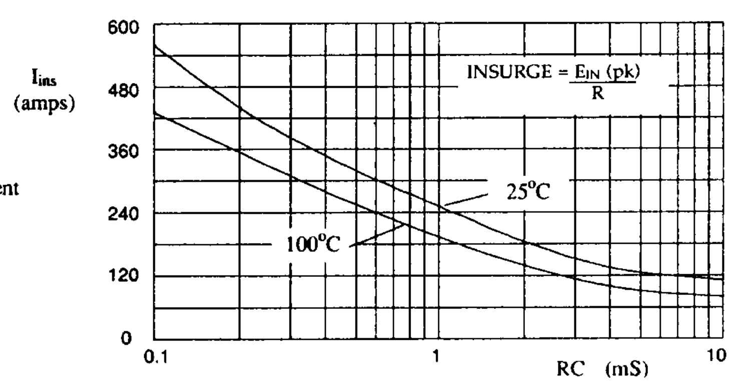


Fig 3. Maximum insurge current against time constant for capacitive loads.

5

FAST RECOVERY, MEDIUM CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Fast reverse recovery time

QUICK REFERENCE DATA

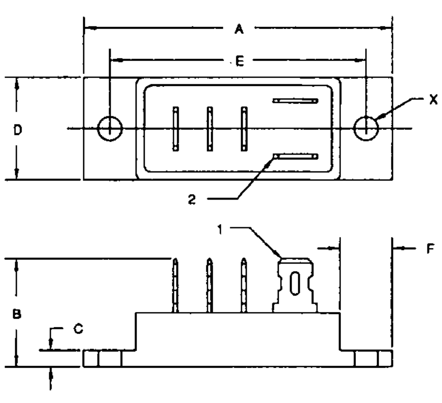
- V_R = 50V - 400V
- I_F = 15A
- I_R = 3μA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BA05F	50	15	10.5	7.5	6	5	3	150	100
SC3BA1F	100								
SC3BA2F	200								
SC3BA4F	400								

$R_{\theta JC} = 2.5°C/W$

MECHANICAL



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DIMENSIONS					
DIM *	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	56.4	57.9	2.22	2.28	-
B	-	20.3	-	.80	-
C	2.3	3.8	.09	.15	-
D	18.3	19.8	.72	.78	-
E	46.7	48.3	1.84	1.90	-
F	8.6	10.2	.34	.40	-
X	3.6	5.1	.14	.20	-

NOTES:
1. .25" 'FASTON' TERMINALS
2. POSITIVE TERMINAL

SC3BA4F is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 3A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	µA	µA	Volts	nS	°C
SC3BA05F SC3BA1F SC3BA2F SC3BA4F	3.0	75	1.1	150	- 55 to +150

[1] Measured on discrete devices prior to assembly

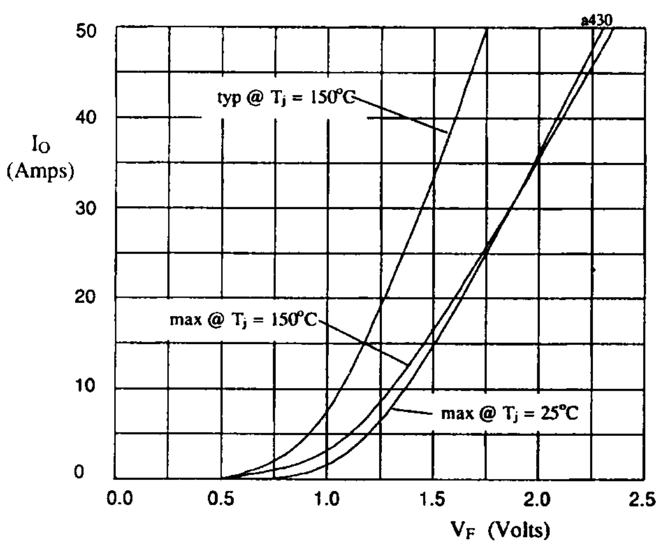


Fig 1. Forward voltage drop against output current per leg

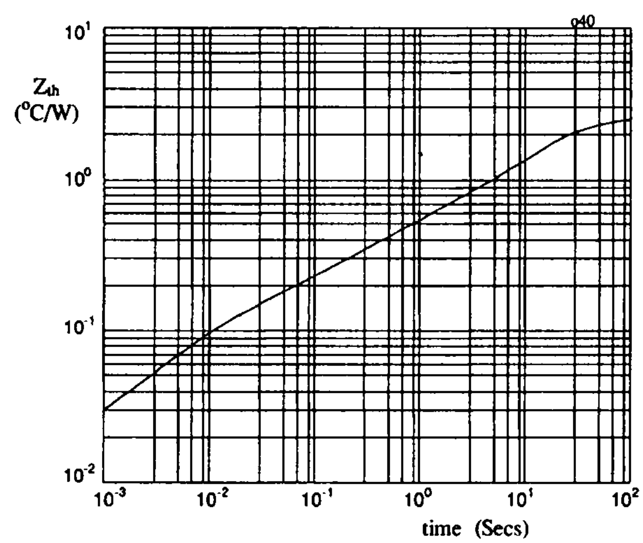
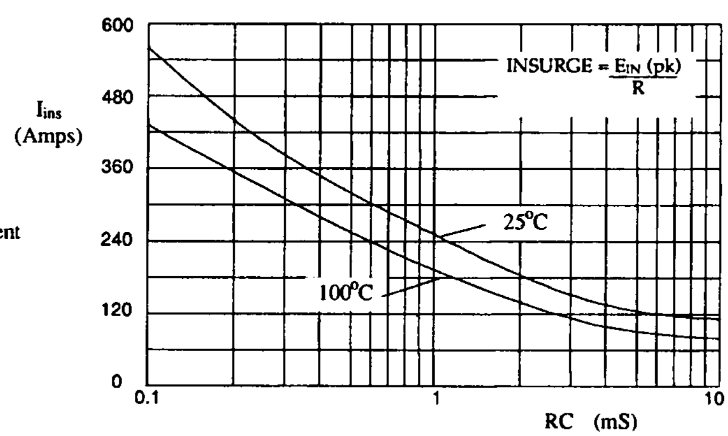


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



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5

SUPERFAST RECOVERY, MEDIUM CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Very fast reverse recovery time
- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance

QUICK REFERENCE DATA

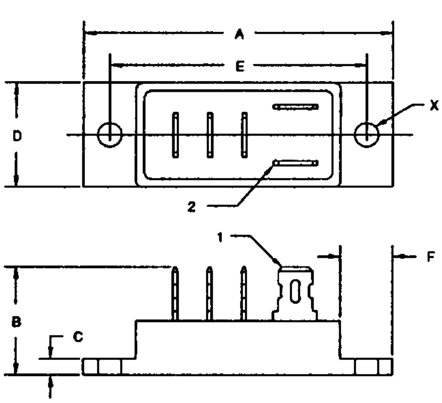
- V_R = 50V - 150V
- I_F = 17A
- V_F = 0.97V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BA05FF	50	17	10	5	6	5	3	175	120
SC3BA10FF	100								
SC3BA15FF	150								

$R_{\theta JC}$ = 2.5°C/W

MECHANICAL



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DIMENSIONS					
DIM N	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	56.4	57.9	2.22	2.28	-
B	-	20.3	-	.80	-
C	2.3	3.8	.09	.15	-
D	18.3	19.8	.72	.78	-
E	46.7	48.3	1.84	1.90	-
F	8.6	10.2	.34	.40	-
X	3.6	5.1	.14	.20	-

NOTES:
1. .25" 'FASTON' TERMINALS
2. POSITIVE TERMINAL

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 5A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	μA	mA	Volts	nS	°C
SC3BA05FF SC3BA10FF SC3BA15FF	30	1.5	0.97	30	- 55 to +150

[1] Measured on discrete devices prior to assembly

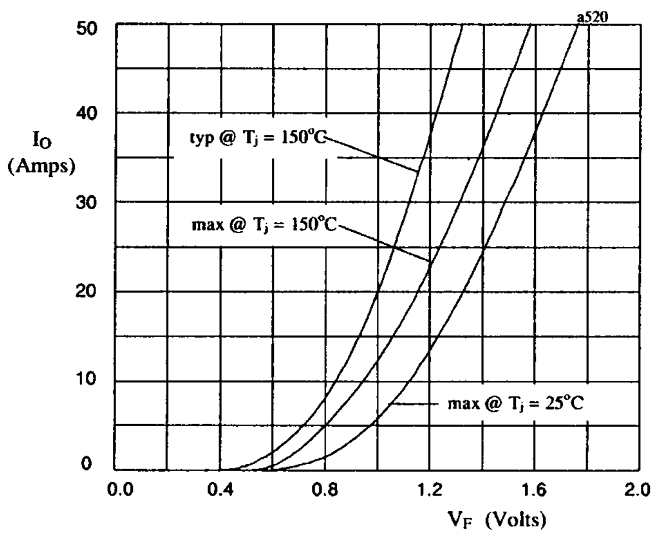


Fig 1. Forward voltage drop against output current per leg

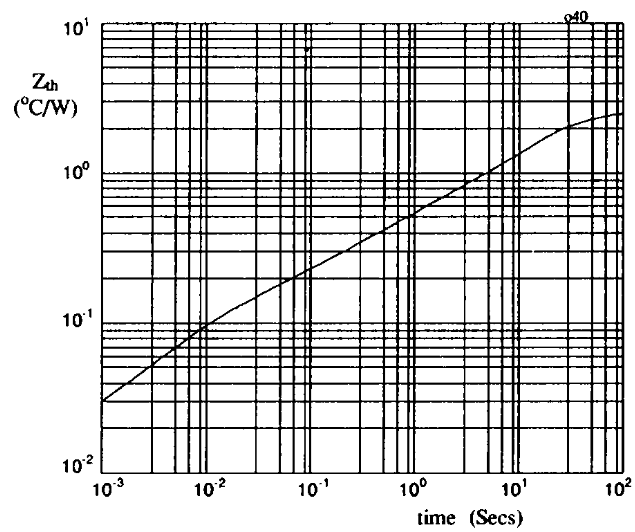


Fig 2. Transient thermal impedance characteristic per leg

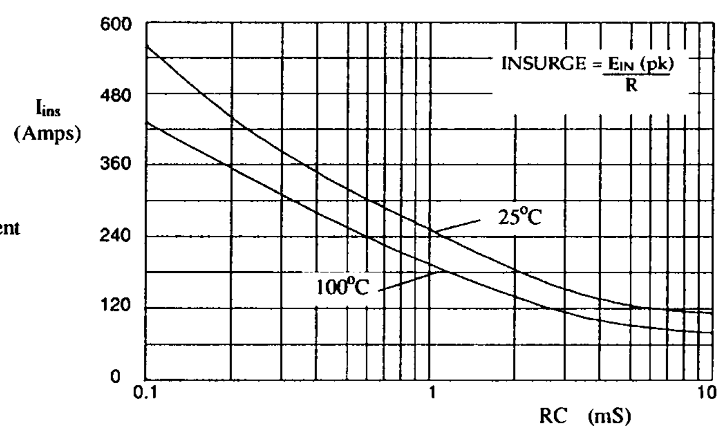


Fig 3. Maximum insurge current against time constant for capacitive loads.

5

STANDARD RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

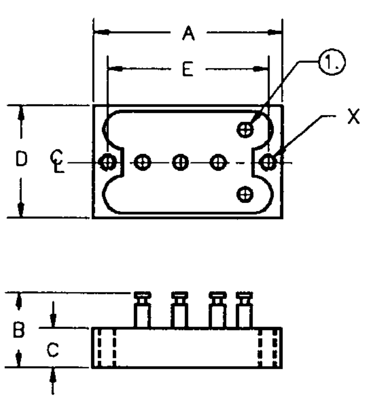
- V_R = 50V - 600V
- I_F = 10A
- I_R = 3.0 µA
- t_{rr} = 2.0µS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BH05	50								
SC3BH1	100								
SC3BH2	200	10	7	5	4	3	1.7	150	100
SC3BH4	400								
SC3BH6	600								

$R_{\theta JC}$ = 4.5°C/W

MECHANICAL



G35

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	31.0	32.5	1.22	1.28	–
B	–	12.7	–	0.50	–
C	5.6	7.1	0.22	0.28	–
D	18.3	19.8	0.72	0.78	–
E	26.7	27.2	1.05	1.07	–
X	4–40 UNC–2B THRU (2 PLCS)				–

NOTES:
1. POSITIVE TERMINAL

SC3BH6 is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

5

ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 3A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	μA	μA	Volts	μS	°C
SC3BH05 SC3BH1 SC3BH2 SC3BH4 SC3BH6	3.0	60	1.0	2.0	- 55 to +150

[1] Measured on discrete devices prior to assembly

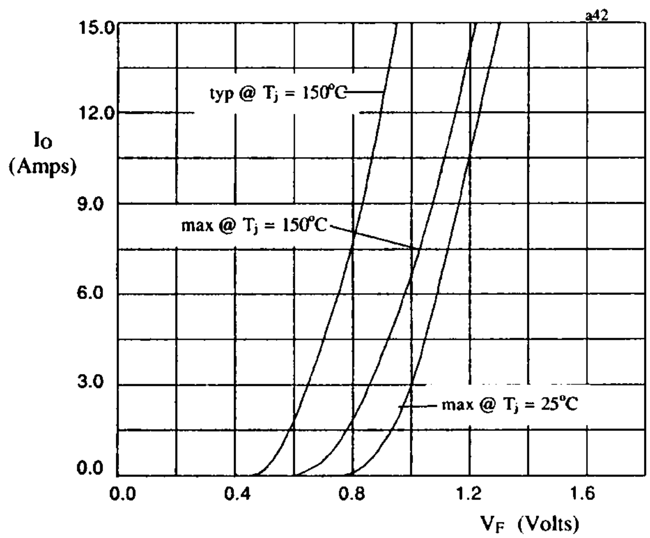


Fig 1. Forward voltage drop against output current per leg

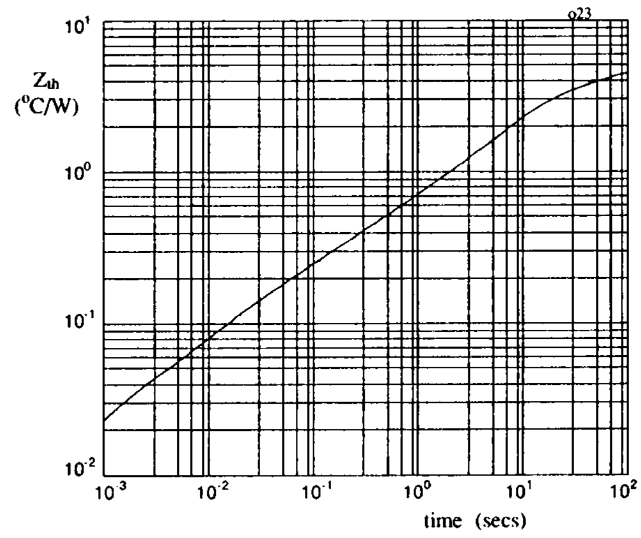


Fig 2. Transient thermal impedance characteristic per leg

FAST RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Fast reverse recovery time
- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance

QUICK REFERENCE DATA

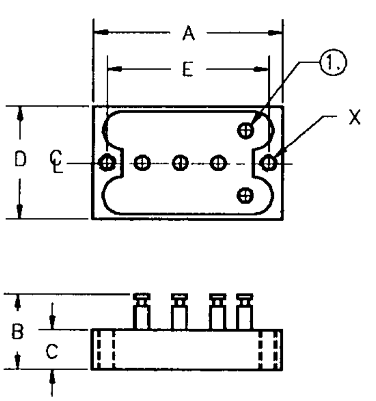
- V_R = 50V - 400V
- I_F = 9.0A
- I_R = 3.0 µA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BH05F	50	9.0	6.3	4.5	3.0	2.2	1.2	150	100
SC3BH1F	100								
SC3BH2F	200								
SC3BH4F	400								

$R_{\theta JC}$ = 4.5°C/W

MECHANICAL



G35

DIMENSIONS					
DIM^N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	31.0	32.5	1.22	1.28	–
B	–	12.7	–	0.50	–
C	5.6	7.1	0.22	0.28	–
D	18.3	19.8	0.72	0.78	–
E	26.7	27.2	1.05	1.07	–
X	4–40 UNC–2B THRU (2 PLCS)				–

NOTES:
1. POSITIVE TERMINAL

SC3BH4F is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 3A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	µA	µA	Volts	nS	°C
SC3BH05F	3.0	60	1.1	150	-55 to +150
SC3BH1F				150	
SC3BH2F				150	
SC3BH4F				150	

[1] Measured on discrete devices prior to assembly

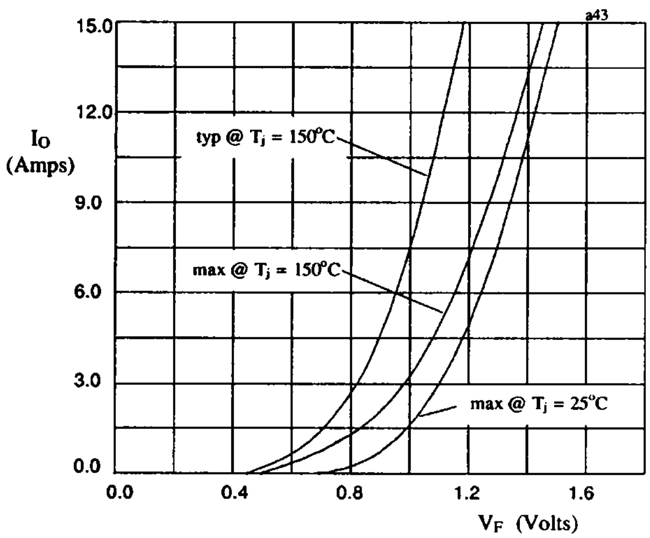


Fig 1. Forward voltage drop against output current per leg

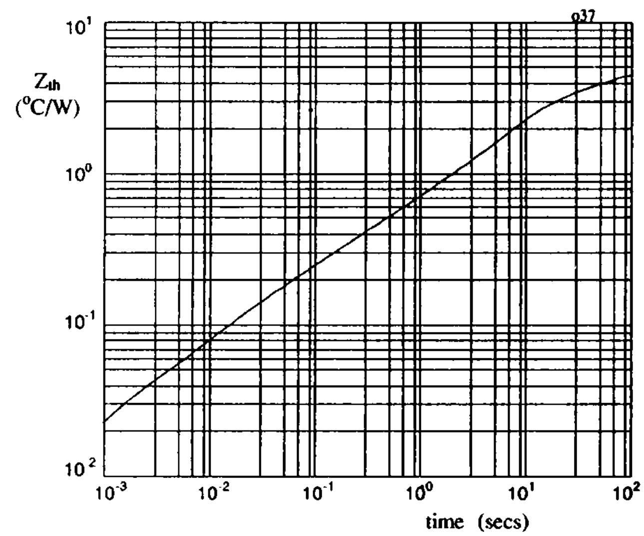


Fig 2. Transient thermal impedance characteristic per leg

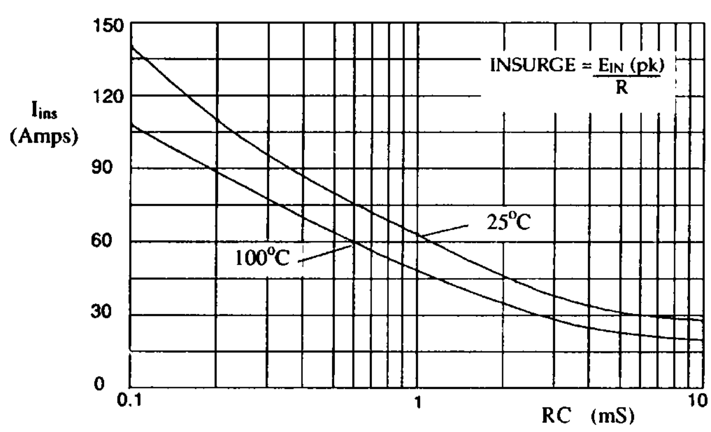


Fig 3. Maximum insurge current against time constant for capacitive loads.

SUPERFAST RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Very fast reverse recovery time
- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance

QUICK REFERENCE DATA

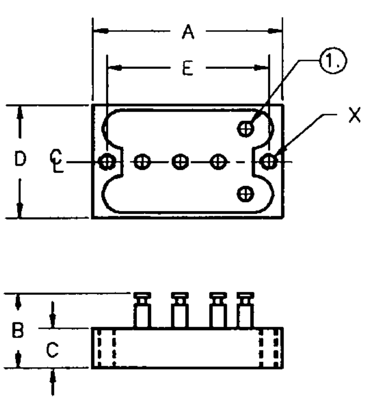
- V_R = 50V - 150V
- I_F = 12A
- V_F = 0.97V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BH05FF	50								
SC3BH10FF	100	12	9	7.5	4.0	3.0	1.7	175	120
SC3BH15FF	150								

$R_{\theta JC}$ = 4.5°C/W

MECHANICAL



G35

DIM'N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	31.0	32.5	1.22	1.28	–
B	–	12.7	–	0.50	–
C	5.6	7.1	0.22	0.28	–
D	18.3	19.8	0.72	0.78	–
E	26.7	27.2	1.05	1.07	–
X	4–40 UNC–2B THRU (2 PLCS)				–

NOTES:
1. POSITIVE TERMINAL

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 5A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	μA	mA	Volts	nS	°C
SC3BH05FF	30	1.50	0.97	30	- 55 to +150
SC3BH10FF					
SC3BH15FF					

[1] Measured on discrete devices prior to assembly

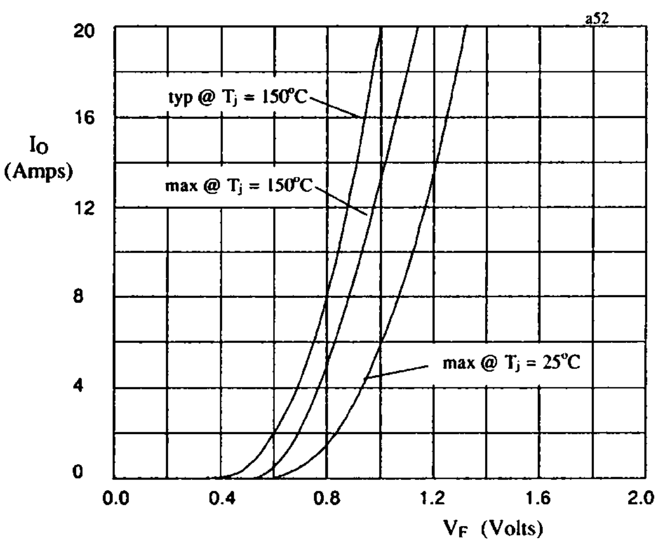


Fig 1. Forward voltage drop against output current per leg

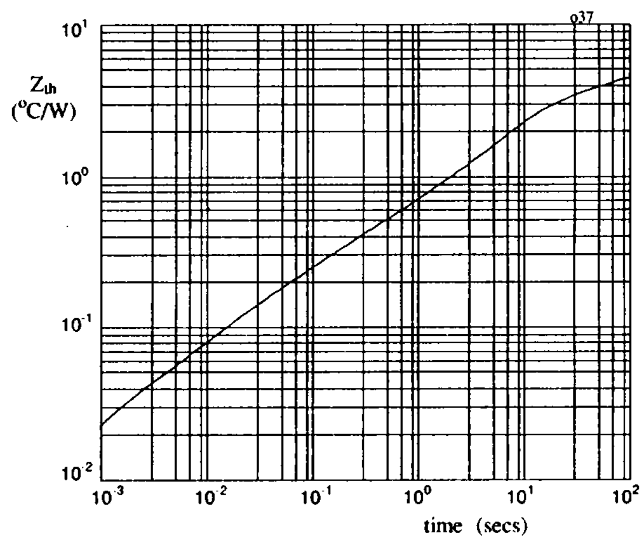


Fig 2. Transient thermal impedance characteristic per leg

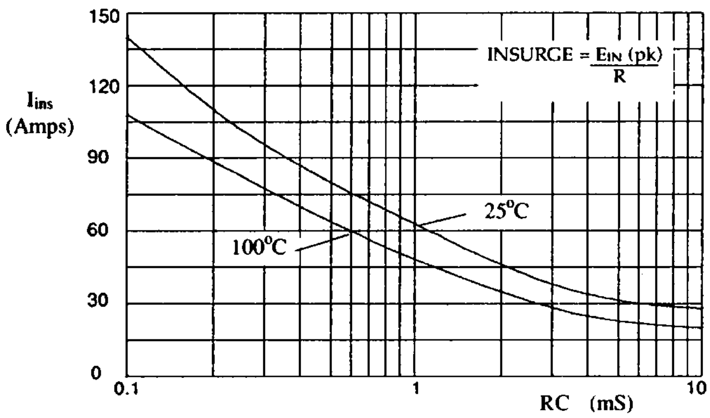


Fig 3. Maximum insurge current against time constant for capacitive loads.

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STANDARD RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Insulated electrical connections

QUICK REFERENCE DATA

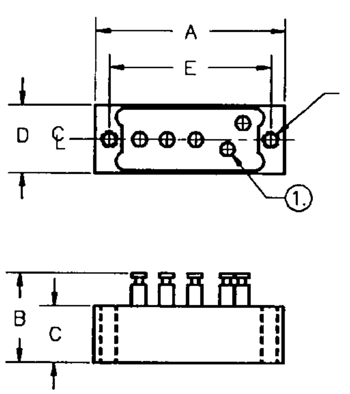
- V_R = 50V - 600V
- I_F = 5A
- I_R = 3.0µA
- t_{rr} = 2.0µS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BJ05	50								
SC3BJ1	100								
SC3BJ2	200	5.0	3.0	2.0	2.0	1.5	1.0	50	35
SC3BJ4	400								
SC3BJ6	600								

$R_{\theta JC}$ = 6.0°C/W

MECHANICAL



G36

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	31.0	32.5	1.22	1.28	–
B	–	15.2	–	0.60	–
C	8.6	9.7	0.34	0.38	–
D	10.9	11.9	0.43	0.47	–
E	26.7	27.2	1.05	1.07	–
X	4–40 UNC–2B THRU (2 PLCS)				–

NOTES:
1. POSITIVE TERMINAL

SC3BJ6 is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 1A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	μA	μA	Volts	μS	°C
SC3BJ05 SC3BJ1 SC3BJ2 SC3BJ4 SC3BJ6	3.0	75	1.1	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

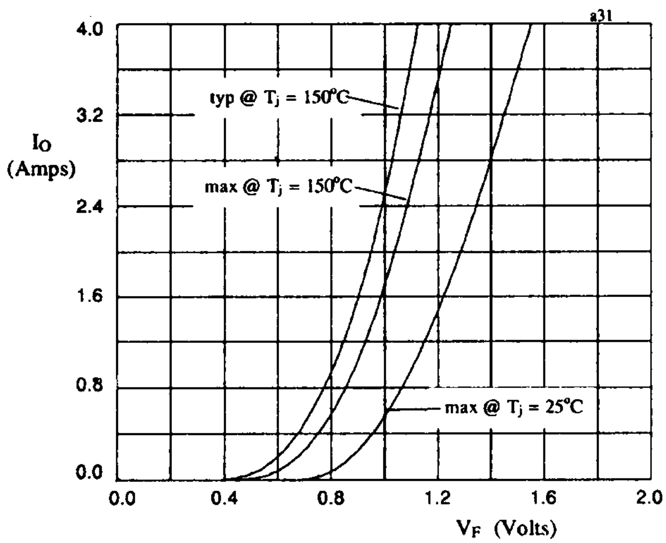


Fig 1. Forward voltage drop against output current per leg

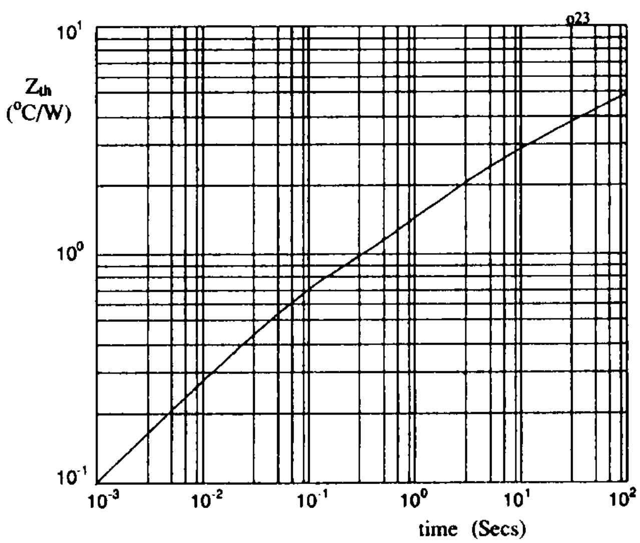


Fig 2. Transient thermal impedance characteristic per leg

5

SEMTECH

FAST RECOVERY
3-PHASE FULL WAVE
BRIDGE RECTIFIERS

SC3BJ05F
SC3BJ1F SC3BJ2F
SC3BJ4F SC3BJ6F

FAST RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Fast reverse recovery time

QUICK REFERENCE DATA

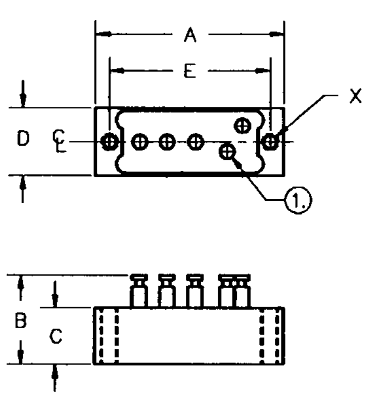
- V_R = 50V - 600V
- I_F = 5.0A
- I_R = 3.0 µA
- t_{rr} = 150 - 250nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BJ05F	50								
SC3BJ1F	100								
SC3BJ2F	200	5.0	3.5	2.5	1.5	1.0	0.7	25	15
SC3BJ4F	400								
SC3BJ6F	600								

$R_{\theta JC}$ = 6.0°C/W

MECHANICAL



G36

DIM^N	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	31.0	32.5	1.22	1.28	–
B	–	15.2	–	0.60	–
C	8.6	9.7	0.34	0.38	–
D	10.9	11.9	0.43	0.47	–
E	26.7	27.2	1.05	1.07	–
X	4-40 UNC-2B THRU (2 PLCS)				–

NOTES:
1. POSITIVE TERMINAL

SC3BJ4F is available in Europe to DEF STAN 59-61/90/208 release to F and FX levels.

ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM} @ 25°C	@ 100°C	Maximum Forward Voltage V_F @ 1A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	μA	μA	Volts	nS	°C
SC3BJ05F	3.0	75	1.2	150	-55 to +150
SC3BJ1F				150	
SC3BJ2F				150	
SC3BJ4F				150	
SC3BJ6F				250	

[1] Measured on discrete devices prior to assembly

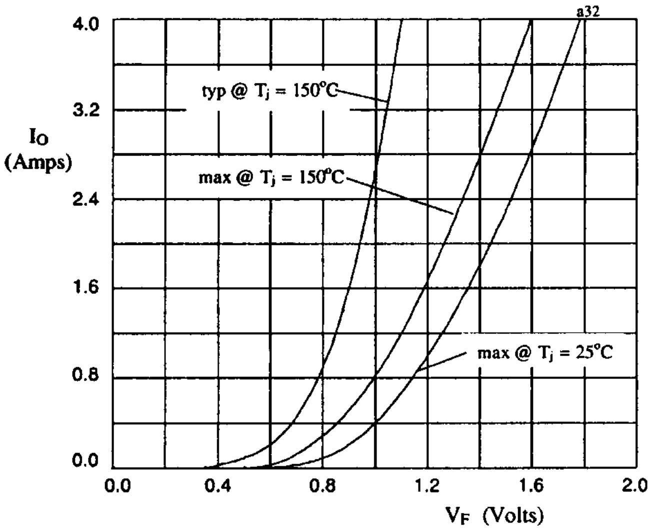


Fig 1. Forward voltage drop against output current per leg

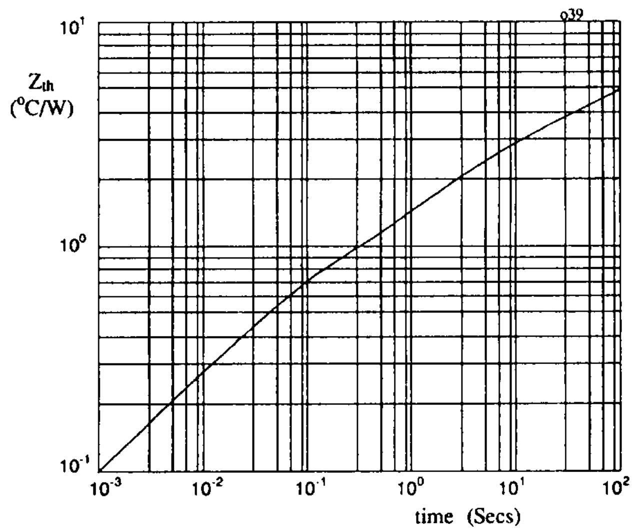
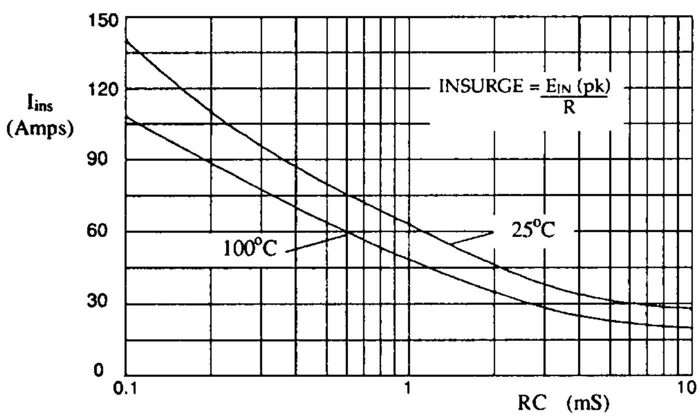


Fig 2. Transient thermal impedance characteristic per leg

Fig 3. Maximum insurge current against time constant for capacitive loads.



SUPERFAST RECOVERY, LOW CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Very fast reverse recovery time

QUICK REFERENCE DATA

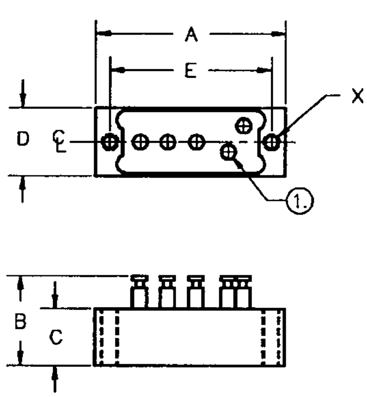
- V_R = 50V - 150V
- I_F = 5.0A
- V_F = 1.2V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ @ case temperature			Average Rectified Current $I_{F(AV)}$ @ ambient temperature			1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BJ05FF	50	5.0	3.1	1.8	1.5	1.1	0.7	35	24
SC3BJ10FF	100								
SC3BJ15FF	150								

$R_{\theta JC}$ = 6.0°C/W

MECHANICAL



G36

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	31.0	32.5	1.22	1.28	–
B	–	15.2	–	0.60	–
C	8.6	9.7	0.34	0.38	–
D	10.9	11.9	0.43	0.47	–
E	26.7	27.2	1.05	1.07	–
X	4-40 UNC-2B THRU (2 PLCS)				–

NOTES:
1. POSITIVE TERMINAL

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage / leg V_F @ 1.5A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	µA	Volts	nS	°C
SC3BJ05FF					- 55
SC3BJ10FF	3.0	150	1.2	30	to
SC3BJ15FF					+150

[1] Measured on discrete devices prior to assembly

5

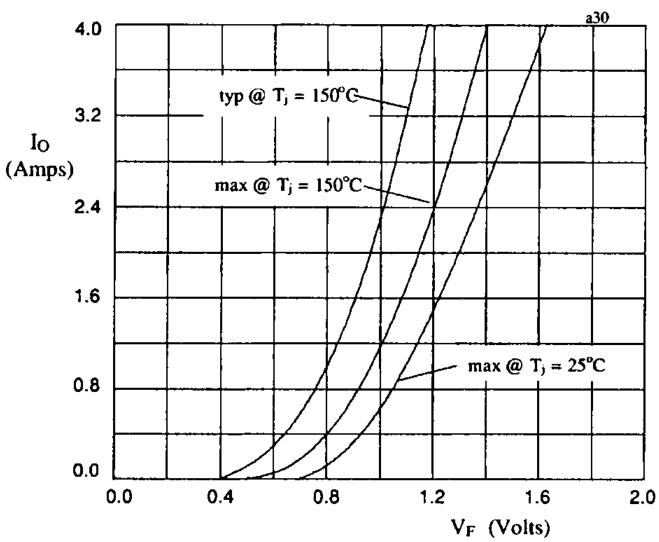


Fig 1. Forward voltage drop against output current per leg

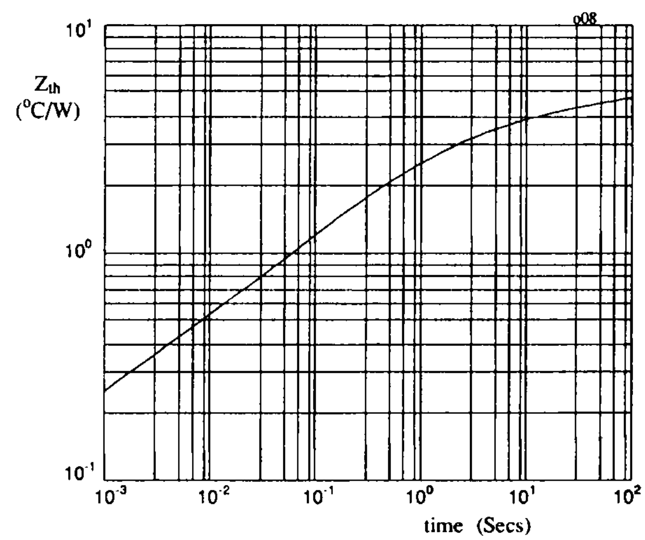


Fig 2. Transient thermal impedance characteristic per leg

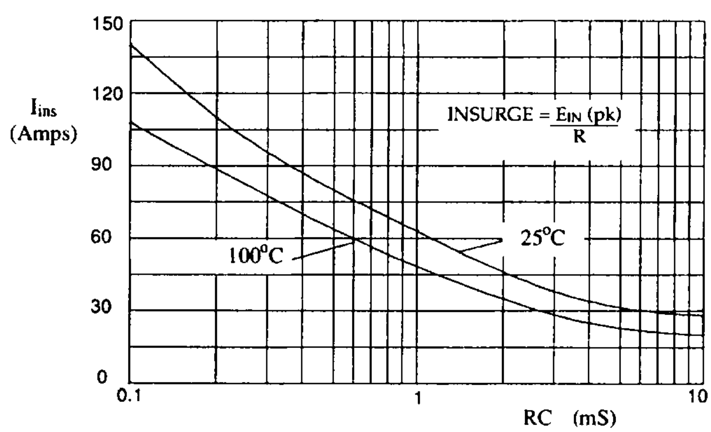


Fig 3. Maximum insurge current against time constant for capacitive loads.

5

STANDARD RECOVERY, HIGH CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- High surge ratings

QUICK REFERENCE DATA

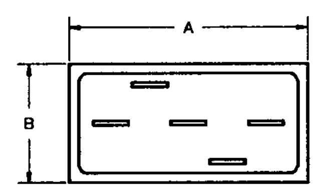
- V_R = 50V - 600V
- I_F = 38A
- I_R = 9.0μA
- I_{FSM} = 375A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BK05	50	38	24	17.5	13	10	6.0	375	300
SC3BK1	100								
SC3BK2	200								
SC3BK4	400								
SC3BK6	600								

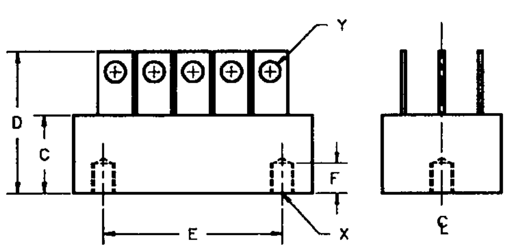
$R_{\theta JC}$ = 1.1°C/W

MECHANICAL



G30

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	26.2	–	1.03	–
C	–	16.8	–	0.66	–
D	–	30.5	–	1.20	–
E	37.8	38.4	1.49	1.51	–
F	6.4	–	0.25	–	–
X	TAPPED 10–32UNF				–
Y	3.6	5.1	0.14	0.20	DIA



ELECTRICAL CHARACTERISTICS

Device Type	Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 9A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	µA	µA	Volts	µS	°C
SC3BK05 SC3BK1 SC3BK2 SC3BK4 SC3BK6	9.0	180	1.0	2.0	-55 to +150

[1] Measured on discrete devices prior to assembly

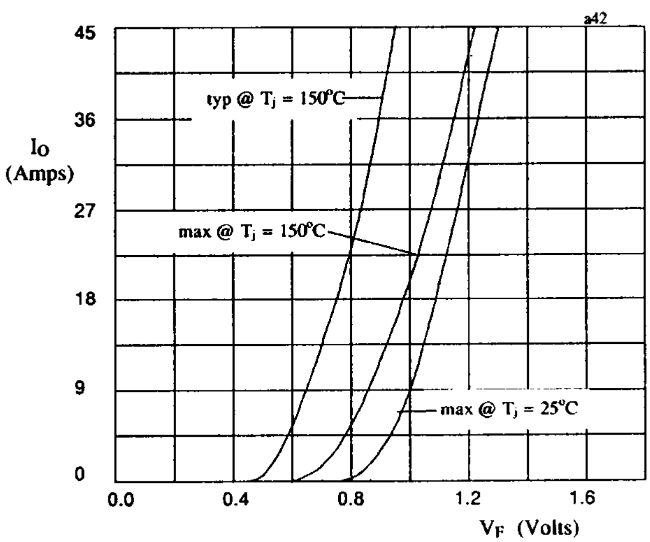


Fig 1. Forward voltage drop against output current per leg

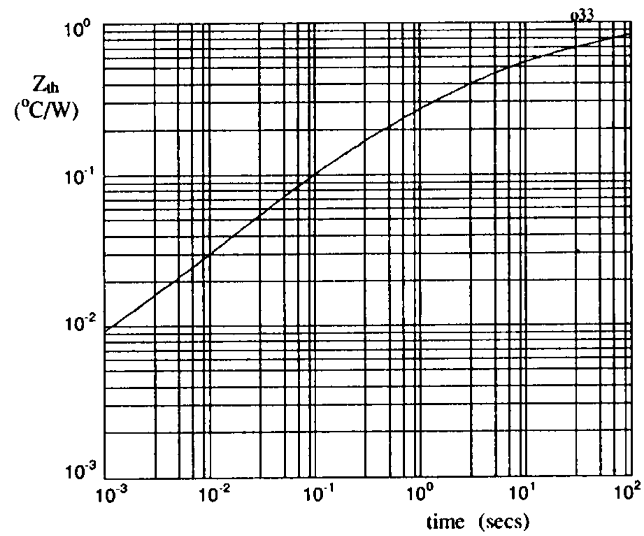


Fig 2. Typical transient thermal impedance characteristic per leg

SEMTECH

FAST RECOVERY 3-PHASE FULL WAVE BRIDGE RECTIFIERS

SC3BK05F SC3BK1F SC3BK2F SC3BK4F

FAST RECOVERY, HIGH CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Fast reverse recovery time
- Low thermal impedance
- High surge ratings

QUICK REFERENCE DATA

- V_R = 50V - 400V
- I_F = 42A
- I_R = 9.0µA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

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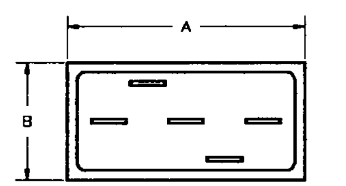
Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BK05F	50	42	29	20	11	8.5	5	375	240
SC3BK1F	100								
SC3BK2F	200								
SC3BK4F	400								

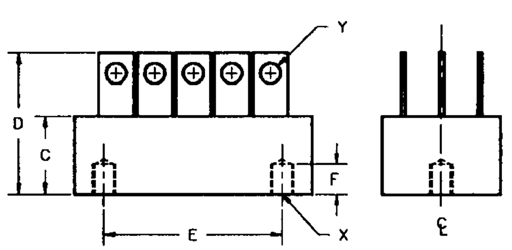
$R_{\theta JC}$ = 1.1°C/W

MECHANICAL



G30

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	26.2	–	1.03	–
C	–	16.8	–	0.66	–
D	–	30.5	–	1.20	–
E	37.8	38.4	1.49	1.51	–
F	6.4	–	0.25	–	–
X	TAPPED 10–32UNF				–
Y	3.6	5.1	0.14	0.20	DIA



ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 9A/leg @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp range. T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	µA	Volts	nS	°C
SC3BK05F	9.0	180	1.1	150	-55 to +150
SC3BK1F				150	
SC3BK2F				150	
SC3BK4F				150	

[1] Measured on discrete devices prior to assembly

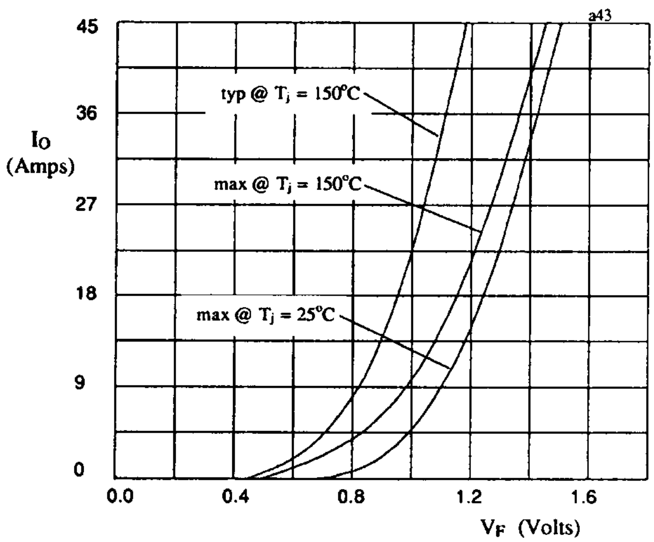


Fig 1. Forward voltage drop against output current per leg

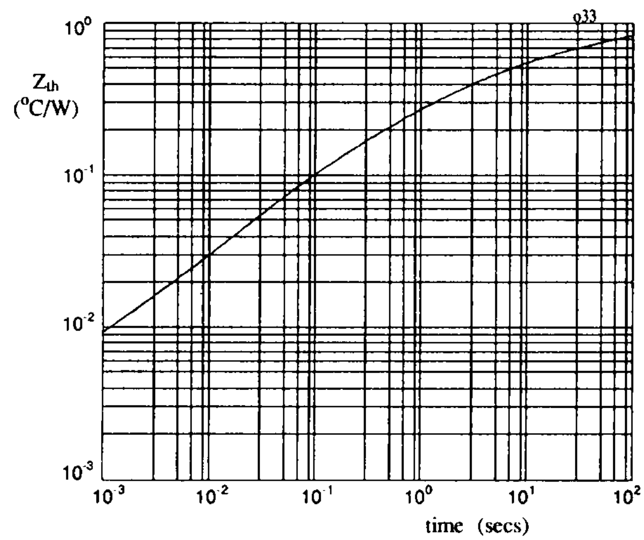


Fig 2. Typical transient thermal impedance characteristic per leg

SUPERFAST RECOVERY, HIGH CURRENT 3-PHASE FULL WAVE BRIDGE RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Very fast reverse recovery time
- Low thermal impedance
- High surge ratings

QUICK REFERENCE DATA

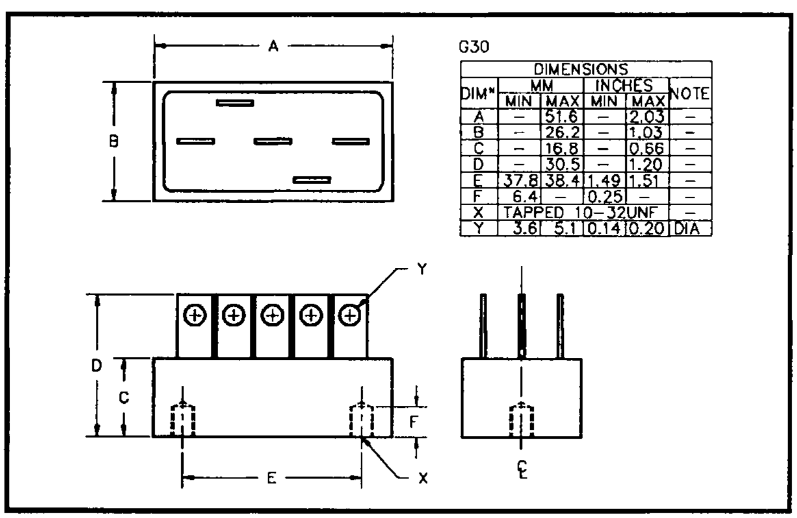
- V_R = 50V - 150V
- I_F = 38A
- V_F = 0.97V
- t_{rr} = 30nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$						1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		@ case temperature			@ ambient temperature				
		@ 55°C	@ 100°C	@ 125°C	@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC3BK05FF	50	38	25	14	13	9.25	5.5	450	360
SC3BK10FF	100								
SC3BK15FF	150								

$R_{\theta JC}$ = 1.1°C/W

MECHANICAL



G30

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	26.2	–	1.03	–
C	–	16.8	–	0.66	–
D	–	30.5	–	1.20	–
E	37.8	38.4	1.49	1.51	–
F	6.4	–	0.25	–	–
X	TAPPED 10–32UNF				–
Y	3.6	5.1	0.14	0.20	DIA

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 15A/leg	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum operating & storage temp. range T_{OP} T_{STG}
	@ 25°C	@ 100°C			
	µA	mA	Volts	ns	°C
SC3BK05FF SC3BK10FF SC3BK15FF	90	4.5	0.97	30	-55 to +150

[1] Measured on discrete devices prior to assembly

5

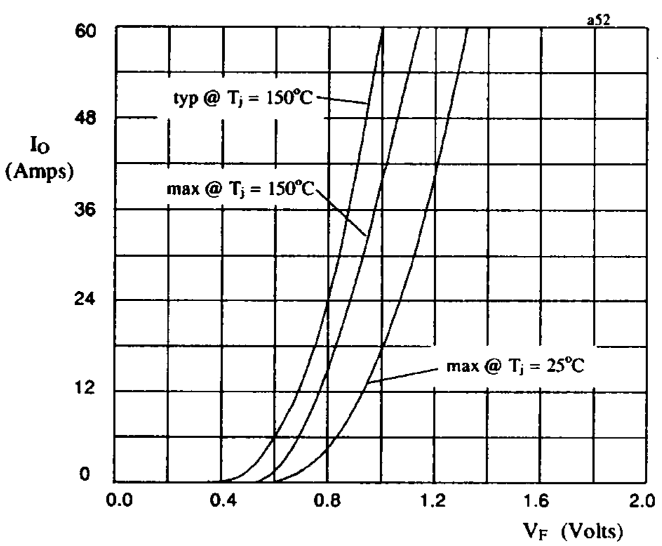


Fig 1. Forward voltage drop against output current per leg

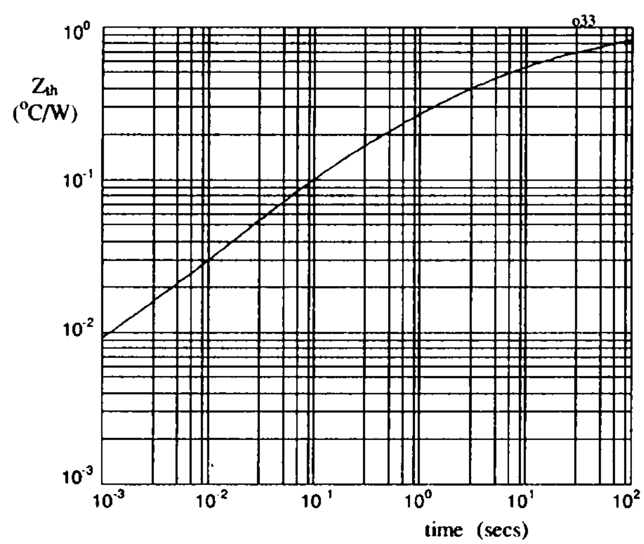


Fig 2. Typical transient thermal impedance characteristic per leg

SC6BA2, SC6BA4, SC6BA6, SC6BA8
Standard Recovery 3-Phase Full Wave Bridge Rectifiers

POWER DISCRETES

Description

Standard recovery 30A three phase full wave bridge rectifier.

Features

- Low forward voltage drop
- Low reverse leakage
- Black anodized aluminum case
- Low thermal impedance < 1.2° C/W
- Hi-Rel. screened version is similar to Mil-PRF-19500/483
- To order Hi-Rel. version place HR in front of the product name

Applications

Conversion of 3-phase power to DC power where high power density and rugged design is required. Typical industries are:

- Aerospace
- Military
- High end industrial

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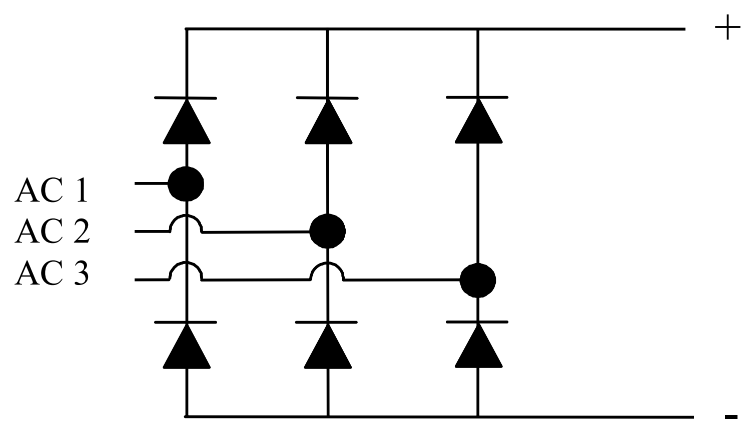
Block Diagram



POWER DISCRETES

Absolute Maximum Ratings

Part Number	Working Reverse Voltage	Average Rectifier Current $I_{F(AV)}$ @ case temperature			Average Rectifier Current $I_{F(AV)}$ @ ambient temperature			1 Cycle Surge Current I_{FSM} @ t_p = 8.3mS	
		55°C	100°C	125°C	25°C	55°C	100°C	25°C	100°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SC6BA2	200	30	20	10	10	7	5	250	125
SC6BA4	400								
SC6BA6	600								
SC6BA8	800								

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Electrical Specifications

Part Number	Reverse Leakage Current I_R @ V_{RWM} @ 25°C	Reverse Leakage Current I_R @ V_{RWM} @ 100°C	Maximum Forward Voltage V_F @ 39A/leg @ 25°	Maximum Reverse Recovery Time(1) T_A @ 25°C	Maximum Operational and Storage Temperatures T_{OP} T_{STG}
	μA	μA	Volts	μs	°C
SC6BA2	1.0	100	1.3	2.0	-65 to +150
SC6BA4					
SC6BA6					
SC6BA8					

(1) Measured on discrete devices prior to assembly

Ordering Information

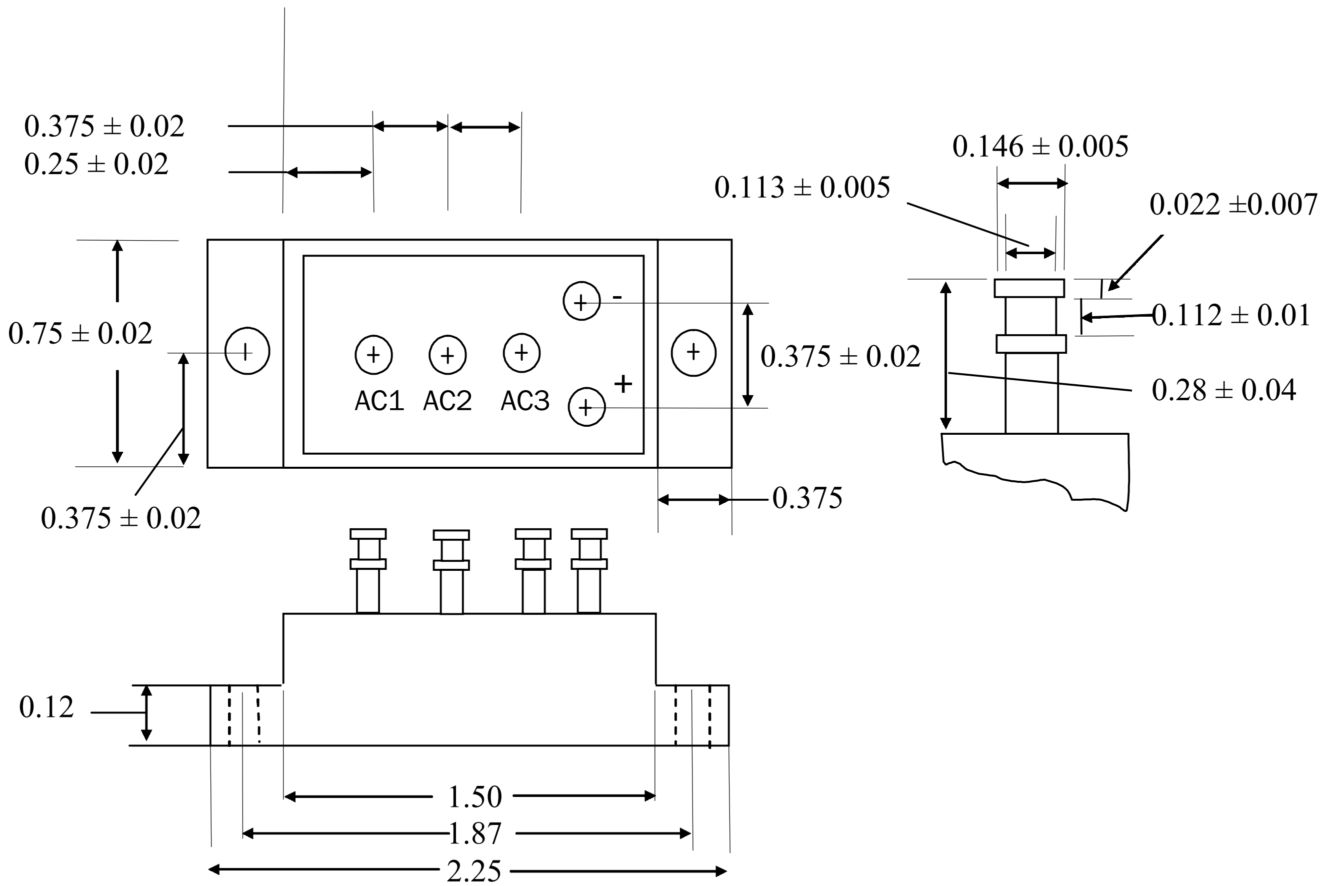
Part Number	Description
SC6BA2, SC6BA4, SC6BA6, SC6BA8(1)	Standard Recovery 3-Phase full wave bridge rectifier assembly
HRSC6BA2, HRSC6BA4, HRSC6BA6, HRSC6BA8(1)(2)	

Note:
(1) Available in trays. Please consult factory for quantity.
(2) Hi-Rel. screened version is similar to Mil-PRF-19500/483.

POWER DISCRETES

Outline Drawing

(Dimensions in inches)



Note: Unless otherwise stated tolerance is ± 0.03

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Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

SEMTECH

HIGH CURRENT, 3-PHASE FULL WAVE BRIDGE ASSEMBLY

SET111403
SET111419
SET111412
SET111404
SET111411

HIGH CURRENT, HIGH DENSITY, THREE PHASE FULL WAVE BRIDGE RECTIFIER.

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

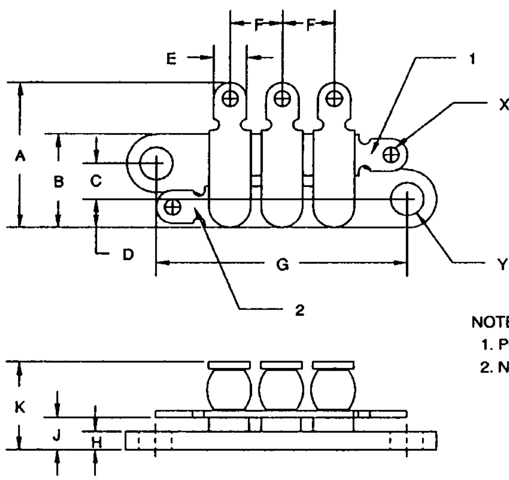
- V_R = 150V - 1000V
- I_O = 45A
- t_{rr} = 30nS - 2µS
- I_{FSM} ≥ 150A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current ($I_{F(AV)}$) @ T_{mb}			1 Cycle Surge I_{FSM} t_p = 8.3mS		Repetitive Surge (I_{FRM})	Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	@ 25 °C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	°C
SET111403	1000	45	33	24	150	100	25	-55 to +175
SET111419	1000	30	24	18	150	80	15	-55 to +175
SET111412	600	45	33	24	150	100	25	-55 to +175
SET111404	400	45	33	24	150	80	25	-55 to +175
SET111411	150	45	30	21	175	175	24	-55 to +150

$R_{\theta jc}$ = 0.5°C/W

MECHANICAL



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DIMENSIONS					
DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	15.2	16.0	.60	.63	-
B	10.0	10.4	.39	.41	-
C	3.68	3.94	.145	.155	-
D	3.0	3.3	.12	.13	-
E	3.3	3.8	.13	.15	-
F	5.3	6.1	.21	.24	-
G	26.9	27.2	1.06	1.07	-
H	1.8	2.3	.07	.09	-
J	3.3	4.1	.13	.16	-
K	8.1	9.7	.32	.38	-
X	1.5	2.0	.06	.08	DIA
Y	3.60	3.71	.142	.146	DIA

NOTES:
1. POSITIVE TERMINAL - RED DOT
2. NEGATIVE TERMINAL - BLACK DOT

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ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 9A @ 25°C	Maximum Reverse Recovery Time.[1] t_{rr}
	T_j = 25 °C	T_j = 100 °C		
	µA	µA	Volts	nS
SET111403	3.0	60	1.2	2000
SET111419	3.0	75	2.2	150
SET111412	3.0	60	1.2	2000
SET111404	3.0	60	1.5	150
SET111411	30.0	1.5mA	1.1	30

[1] Measured on discrete devices prior to assembly

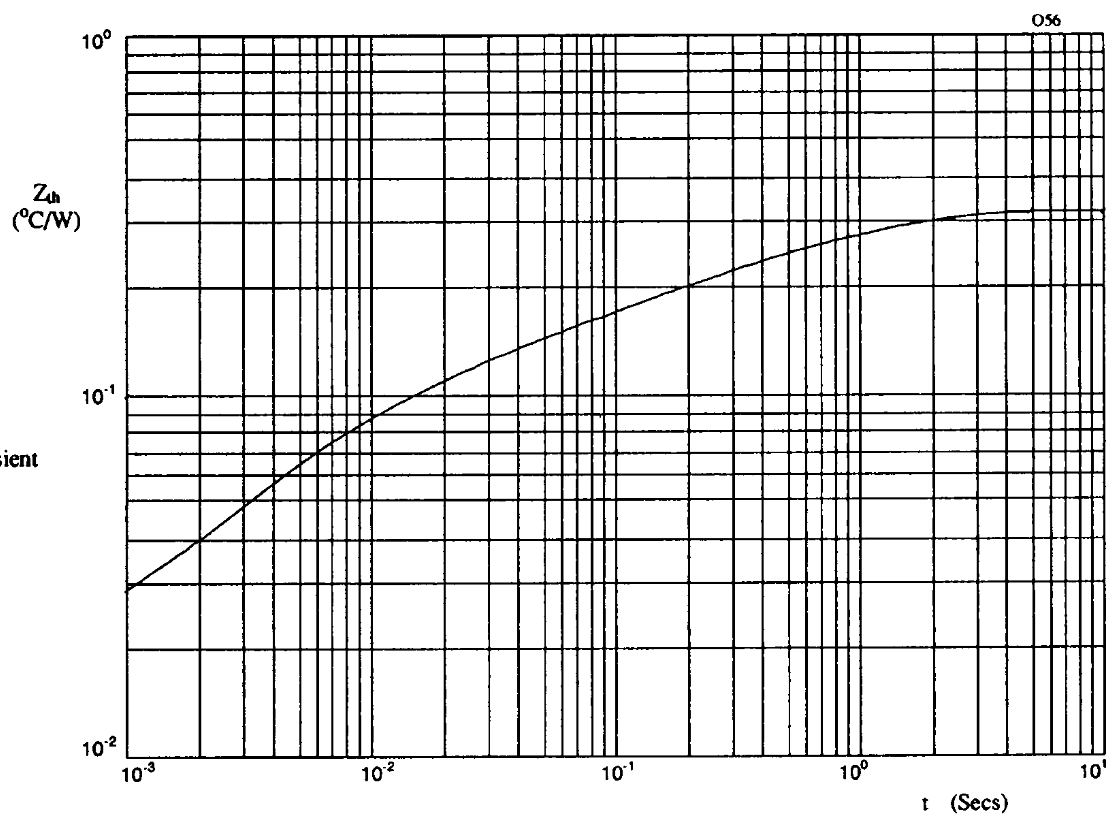

Figure 1. Typical transient thermal impedance characteristic.

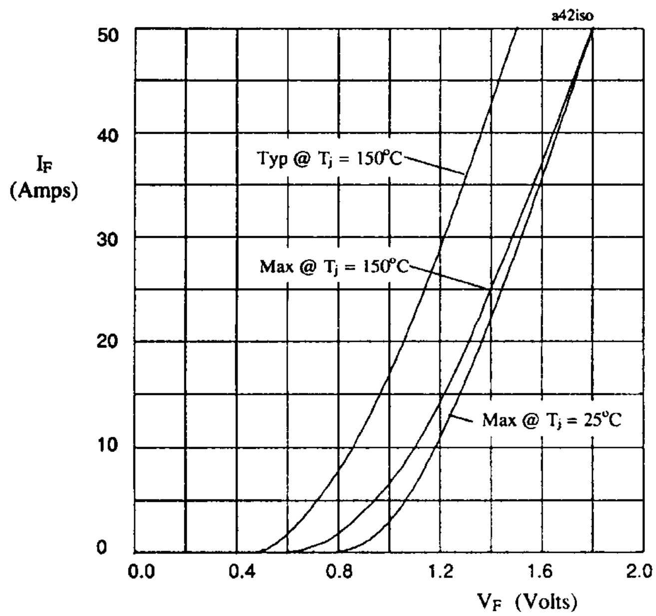

Figure 2. Forward voltage drop per leg as a function of forward current for SET111403 & SET111412.

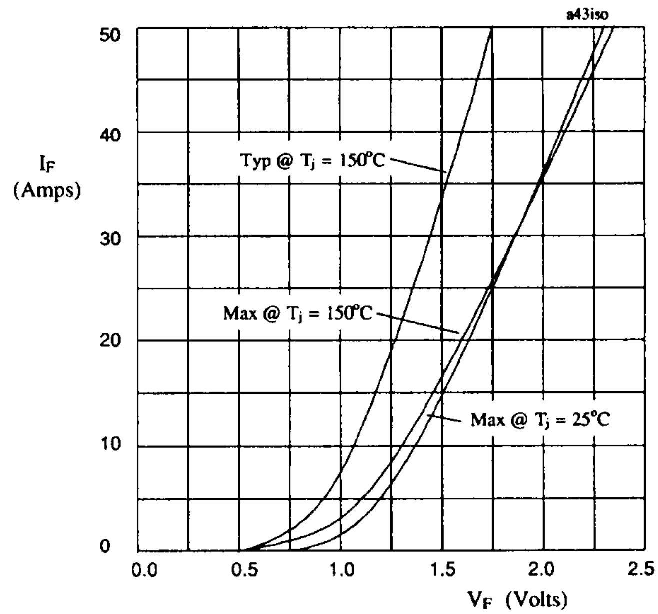

Figure 3. Forward voltage drop per leg as a function of forward current for SET111404.

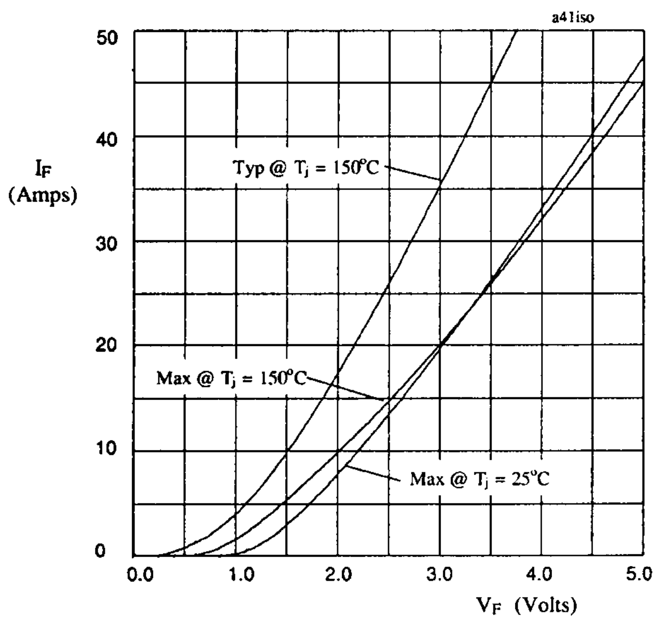

Figure 4. Forward voltage drop per leg as a function of forward current for SET111419.

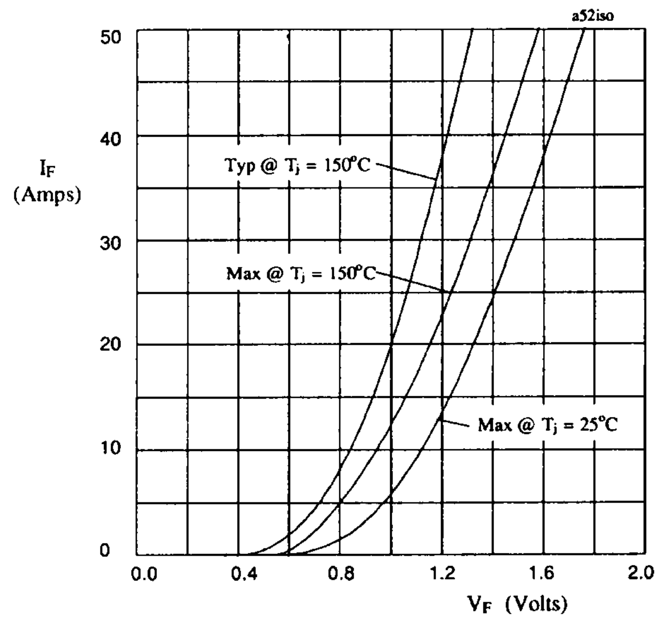

Figure 5. Forward voltage drop per leg as a function of forward current for SET111411.

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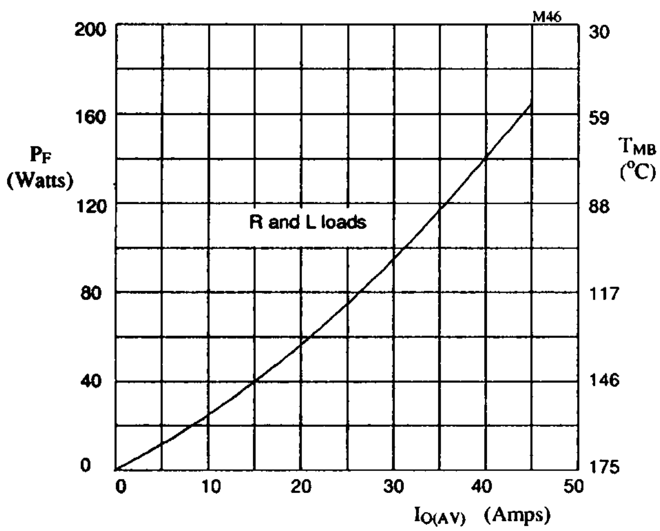


Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET111403 and SET111412.

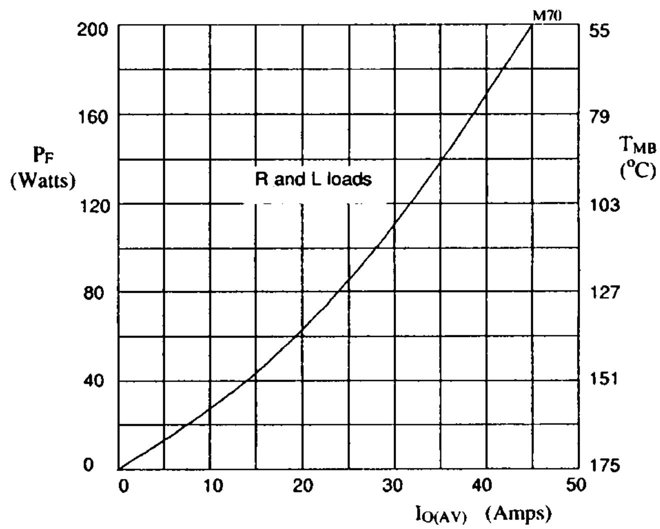


Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET111404.

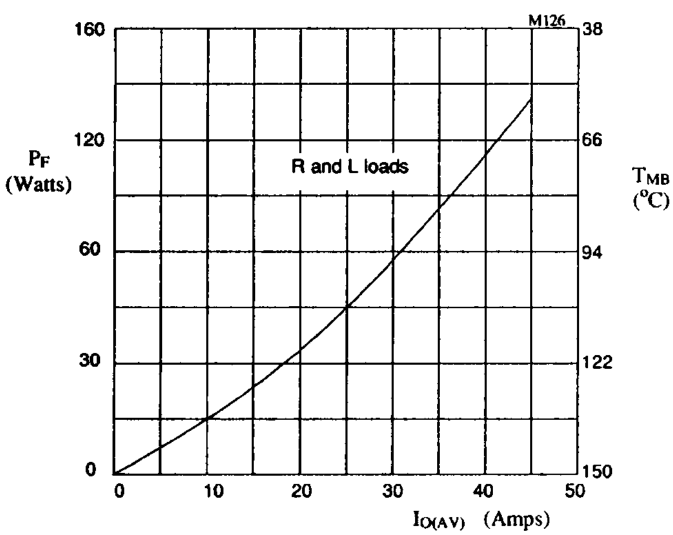


Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of output current for sinusoidal operation, for SET111411.

Chapter 6
Half Wave, High Voltage Assemblies

HIGH VOLTAGE, HIGH CURRENT, HIGH DENSITY, STANDARD RECOVERY RECTIFIER ASSEMBLY

- Up to 96kV reverse voltage
- Air or oil environment
- Low reverse leakage currents
- High thermal shock resistance
- Integral cooling fins.

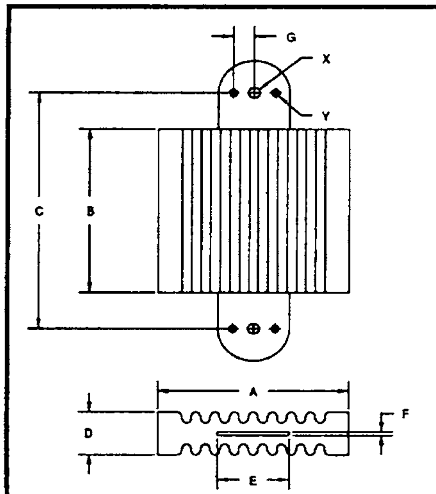
QUICK REFERENCE DATA

- V_R = 16kV - 96kV
- I_F = 3.8 - 5.0A (in oil)
- I_R = 1.0µA
- I_{FSM} = 150A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ air @ 25 °C	air @ 65 °C	forced air 600CFM @ 55°C	still oil @ 55 °C	1 Cycle Surge Current t_p = 8.3mS I_{FSM} @ 25 °C	@ 100 °C	Repetitive Surge Current I_{FRM} @ 25 °C	I^2t t_p = 8.3mS @ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S1KW16KA-1	16000	2.0	1.4	4.0	5.0	150	100	25.0	93.4
S1KW32KA-2	32000	1.5	1.0	3.0	3.8				
S1KW48KA-3	48000	1.5	1.0	3.0	3.8				
S1KW64KA-4	64000	1.5	1.0	3.0	3.8				
S1KW80KA-5	80000	1.5	1.0	3.0	3.8				
S1KW96KA-6	96000	1.5	1.0	3.0	3.8				

MECHANICAL



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DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	102	-	4.0	-
B	SEE TABLE				-
C	SEE TABLE				-
D	-	25.4	-	1.0	-
E	36.8	39.4	1.45	1.55	-
F	1.2	2.3	.047	.090	-
G	10.5	12.1	.415	.475	-
X	6.2	7.2	.245	.285	DIA
Y	3.8	4.8	.149	.189	DIA

Dimensions (see drawing) B (max)	C (max)
inches	inches
4.780	6.480
7.980	9.680
11.18	12.88
14.38	16.08
17.58	19.28
20.78	22.48

CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25 °C	@ 100 °C	Maximum Forward Voltage V_F @ 3.0A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	μA	μA	Volts	μS
S1KW16KA-1	1.0	20	16	2.0
S1KW32KA-2			32	
S1KW48KA-3			48	
S1KW64KA-4			64	
S1KW80KA-5			80	
S1KW96KA-6			72	

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

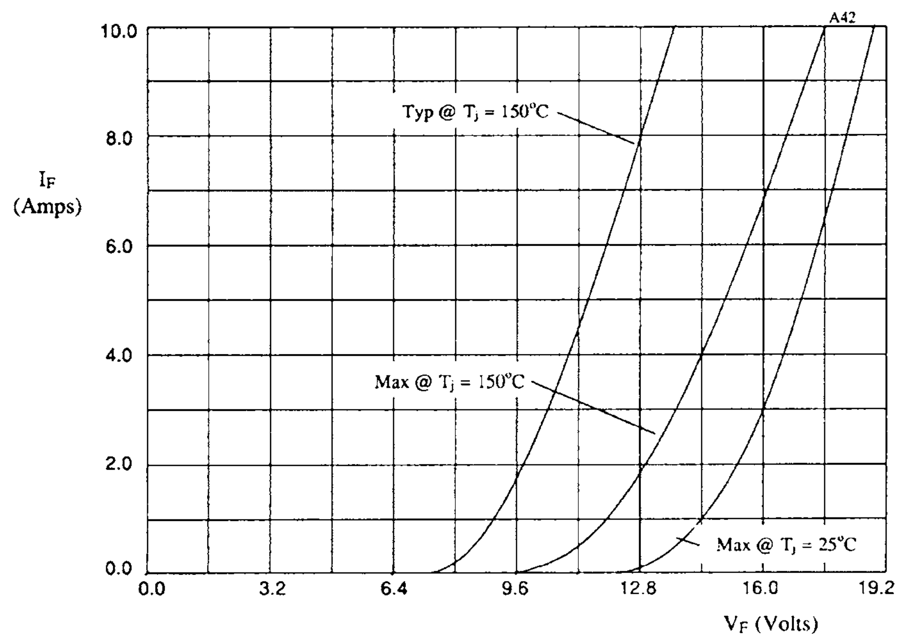

Figure 1. Forward voltage drop as a function of forward current.

TABLE 1

DEVICE	X-axis
S1KW16KA-1	x1
S1KW32KA-2	x2
S1KW48KA-3	x3
S1KW64KA-4	x4
S1KW80KA-5	x5
S1KW96KA-6	x6

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HIGH VOLTAGE, HIGH DENSITY, STANDARD RECOVERY MODULAR RECTIFIER ASSEMBLY

- Up to 15kV reverse voltage
- Modular construction
- Low reverse leakage current
- High thermal shock resistance
- Provides design versatility

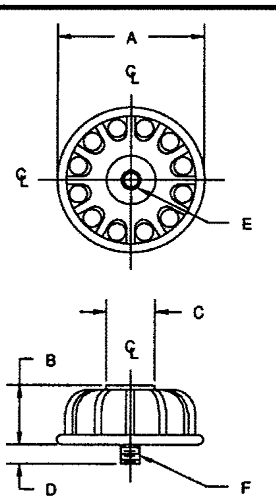
QUICK REFERENCE DATA

- V_R = 2.5kV - 15kV
- I_F = 0.8 - 2.0A (in air)
- I_R = 1.0μA
- I_{FSM} = 50A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$				1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM} @ 25°C	I^2t t_p = 8.3mS @ 25°C
		Air @ 25°C	Air @ 100°C	Stud to Heatsink @ 25 °C	Still oil @ 55 °C	@ 25°C	@ 100°C		
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S2HVM2.5	2500	2.0	0.8	2.0	2.0	50	20	12.0	10.0
S2HVM5	5000	2.0	0.8	2.0					
S2HVM7.5	7500	2.0	0.8	2.0					
S2HVM10	10000	1.2	0.5	2.0					
S2HVM12.5	12500	1.0	0.4	2.0					
S2HVM15	15000	0.8	0.3	1.5					

MECHANICAL



G20

DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	48.3	-	1.9	-
B	-	19.8	-	.78	-
C	-	16.0	-	.63	-
D	-	6.6	-	.26	-
E	TAP'D 1/4-28 UNF				-
F	STUD 1/4-28 UNF				-

MAXIMUM THERMAL IMPEDANCES

Junction - Ambient	$R_{\theta JA}$ < 12°C/W
Junction - Stud	$R_{\theta JS}$ < 6°C/W
Junction - Oil	$R_{\theta JO}$ < 4.5°C/W

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 2.0A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	μA	μA	Volts	μS
S2HVM2.5	1.0	20	3.3	2.5
S2HVM5	↕	↕	5.5	↕
S2HVM7.5	↕	↕	8.8	↕
S2HVM10	↕	↕	11.1	↕
S2HVM12.5	↕	↕	14.4	↕
S2HVM15	↕	↕	16.6	↕

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

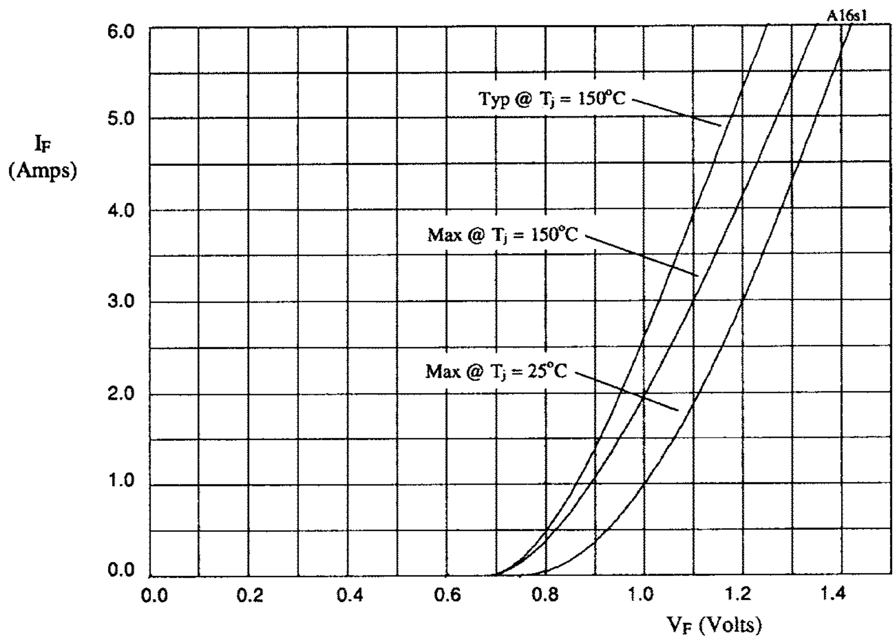


Figure 1. Forward voltage drop as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
S2HVM2.5	x3
S2HVM5	x5
S2HVM7.5	x8
S2HVM10	x10
S2HVM12.5	x13
S2HVM15	x15

SEMTECH

FAST RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

S2HVM2.5F S2HVM5F
S2HVM7.5F
S3HVM2.5F S3HVM5F
S6HVM2.5F

HIGH VOLTAGE, HIGH DENSITY, FAST RECOVERY MODULAR RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low reverse leakage current
- High thermal shock resistance
- Modular construction
- Low distributed capacitance

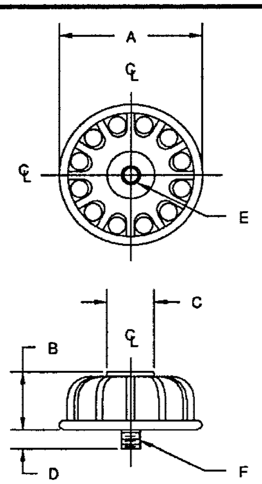
QUICK REFERENCE DATA

- V_R = 2500 - 7500V
- I_F = 0.8 - 2.4A
- I_{FSM} = up to 130A
- t_{rr} = 150 nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$				1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_{jMAX}	I^2t t_p = 8.3mS	Repetitive Surge Current I_{FRM} @ 25°C
		air 25 °C	air 100 °C	stud to heat-sink @ 25°C	in still oil @ 55 °C			
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	Amps
S2HVM2.5F	2500	2.0	0.8	2.0	2.0	32	4.25	11
S2HVM5F	5000	1.2	0.5	2.0	2.0	32	4.25	11
S2HVM7.5F	7500	0.8	0.3	1.5	2.0	32	4.25	11
S3HVM2.5F	2500	2.4	1.0	3.0	3.0	70	20	20
S3HVM5F	5000	1.2	0.5	2.5	3.0	70	20	20
S6HVM2.5F	2500	2.4	1.0	5.0	6.0	130	70	35

MECHANICAL



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DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	48.3	-	1.9	-
B	-	19.8	-	.78	-
C	-	16.0	-	.63	-
D	-	6.6	-	.26	-
E	TAP'D 1/4-28 UNF				-
F	STUD 1/4-28 UNF				-

polarity - cathode to stud

MAXIMUM THERMAL IMPEDANCES

Junction - Ambient	$R_{\theta JA}$ < 12°C/W
Junction - Stud	$R_{\theta JS}$ < 6°C/W
Junction - Oil	$R_{\theta JO}$ < 4.5°C/W

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ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum Forward Voltage V_F @ 25°C
	@ 25 °C	@ 100 °C		
	μA	μA	nS	Volts
				@ 1.0A
S2HVM2.5F	1.0	25.0	150	6
S2HVM5F	1.0	25.0	150	12
S2HVM7.5F	1.0	25.0	150	18
				@ 3.0A
S3HVM2.5F	5.0	25.0	150	6
S3HVM5F	5.0	25.0	150	12
				@ 6.0A
S6HVM2.5F	10.0	50.0	150	6

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

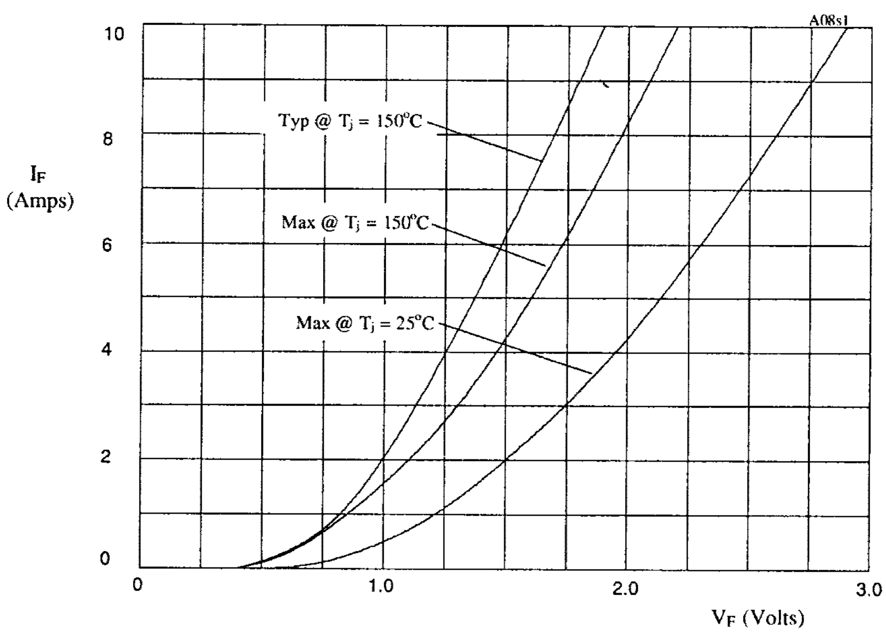


Figure 1. Forward voltage drop as a function of forward current for S2HVM**F series (see Table 1).

TABLE 1

DEVICE	X-AXIS
S2HVM2.5F	x3
S2HVM5F	x6
S2HVM7.5F	x8

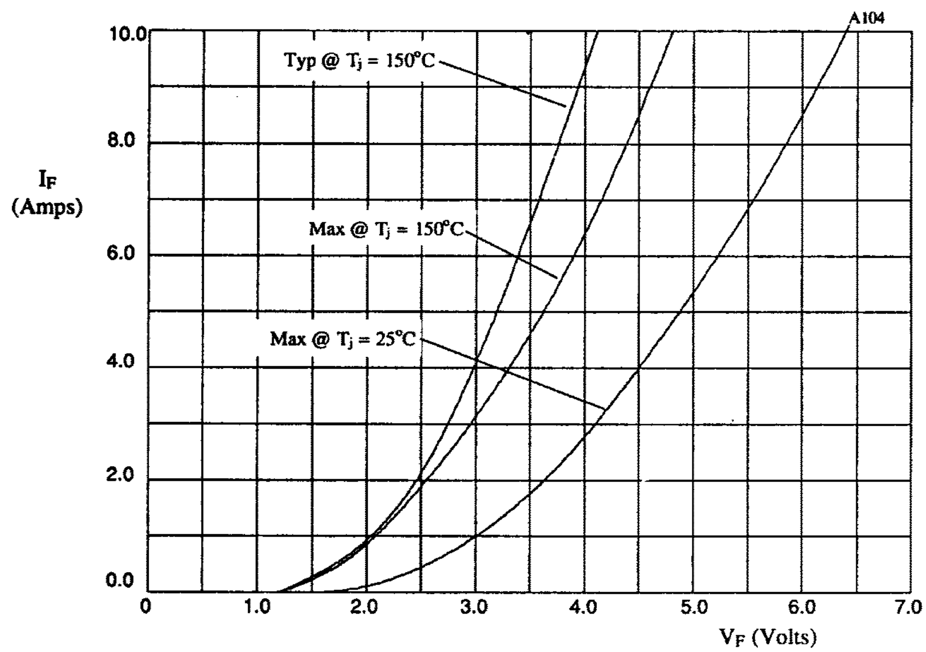


Figure 2. Forward voltage drop as a function of forward current for S3HVM**F series (see Table 2).

TABLE 2

DEVICE	X-AXIS
S3HVM2.5F	x1
S3HVM5F	x2

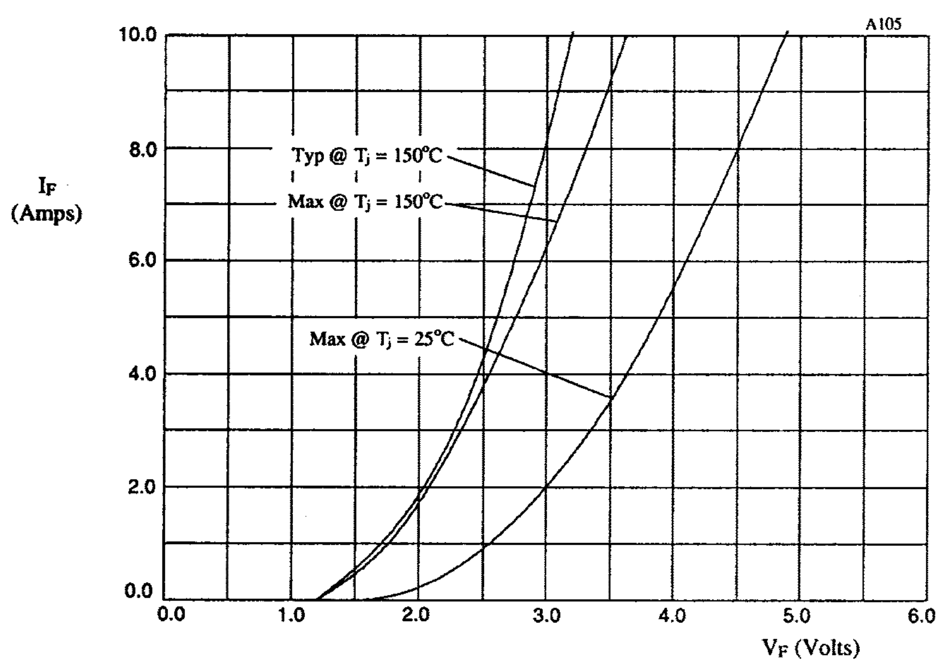


Figure 3. Forward voltage drop as a function of forward current for S6HVM2.5F.

HIGH VOLTAGE, HIGH DENSITY, STANDARD RECOVERY MODULAR RECTIFIER ASSEMBLY

- Up to 15kV reverse voltage
- Modular construction
- Low reverse leakage current
- High thermal shock resistance
- Provides design versatility

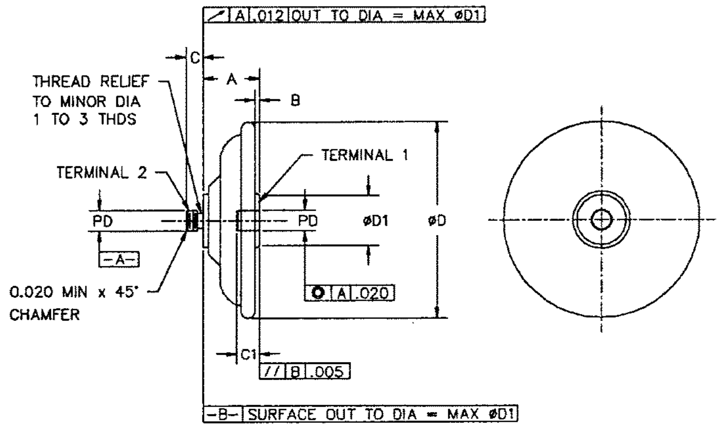
QUICK REFERENCE DATA

- V_R = 2.5kV - 7.5kV
- I_F = to 8.5A
- I_R = 2.0µA
- I_{FSM} = 200A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Rectified Current $I_{F(AV)}$ Air @ 25°C	Air @ 100°C	Still oil @ 55 °C	1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_{jMAX}	I^2t t_p = 8.3mS @ 25°C
	Volts	Amps	Amps	Amps	Amps	A^2S
S2HVS2.5	2500	5.5	3.1	8.5	200	150
S2HVS5	5000	4.4	2.4	6.8	200	150
S2HVS7.5	7500	3.2	1.7	5.1	200	150

MECHANICAL



5. MODULE CONTOUR WITHIN DIMENSION A NOT SPECIFIED
4. CATHODE CONNECTED TO TERMINAL 2
3. THREADED INSERT 1/4-28UNF-2B
2. THREADED STUD 1/4-28UNF-2A
1. ALL MARKINGS SHALL BE ON CATHODE SIDE OF MODULE

DIM	INCHES MIN	INCHES MAX	MM MIN	MM MAX	NOTE
A	0.970	1.020	24.6	26.0	5
B	0.050	0.080	1.27	2.03	
C	0.307	0.317	7.80	8.05	2,4
C1	0.318	0.400	8.08	10.16	3
ØD	3.45	3.65	87.6	92.8	
ØD1	0.95	1.25	24.1	31.8	

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 5.0A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	µS
S2HVS2.5	2.0	20	3.5	5.0
S2HVS5	2.0	20	5.8	5.0
S2HVS7.5	2.0	20	9.2	5.0

1. Measured on discrete devices prior to assembly

Operating temperature range	-55 °C to +150 °C
Storage temperature range	-55 °C to +150 °C

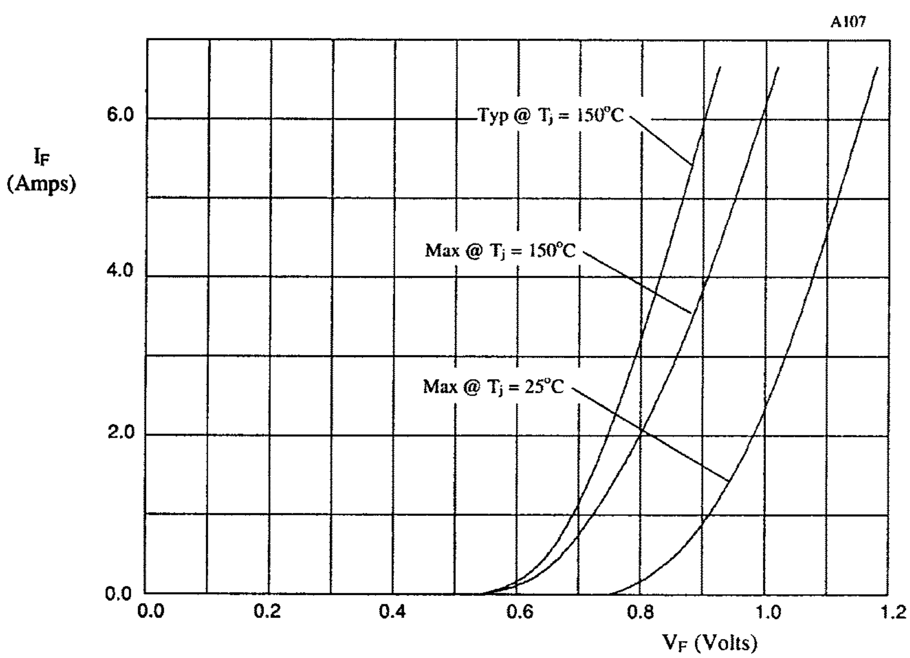


Figure 1. Forward voltage drop as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
S2HVS2.5	x3
S2HVS5	x5
S2HVS7.5	x8

FAST RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

S2HVS2.5F
S2HVS5F
S2HVS7.5F

HIGH VOLTAGE, HIGH DENSITY, FAST RECOVERY MODULAR RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low reverse leakage current
- High thermal shock resistance
- Modular construction
- Low distributed capacitance

QUICK REFERENCE DATA

- V_R = 2500 - 7500V
- I_F = to 7.2A
- I_{FSM} =150A
- t_{rr} = 300nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Rectified Current $I_{F(AV)}$			1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_{jMAX}	I^2t t_p = 8.3mS
		air 25 °C	air 100 °C	in still oil @ 55 °C		
	Volts	Amps	Amps	Amps	Amps	A^2S
S2HVS2.5F	2500	4.8	2.75	7.2	150	96
S2HVS5F	5000	3.8	2.1	5.8	150	96
S2HVS7.5F	7500	2.8	1.6	4.4	150	96

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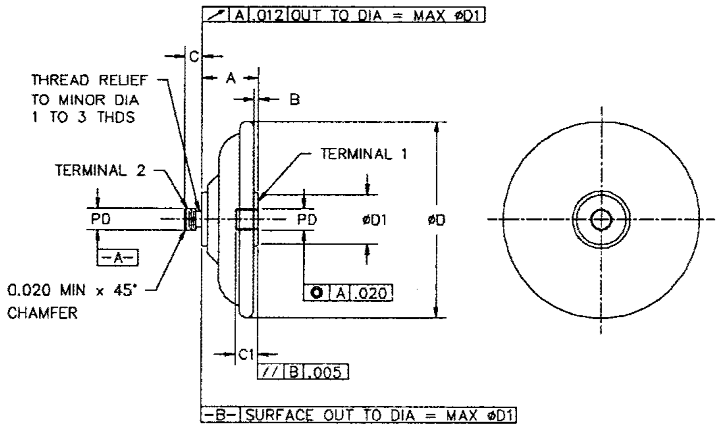
MECHANICAL



5. MODULE CONTOUR WITHIN DIMENSION A NOT SPECIFIED
4. CATHODE CONNECTED TO TERMINAL 2
3. THREADED INSERT 1/4-28UNF-2B
2. THREADED STUD 1/4-28UNF-2A
1. ALL MARKINGS SHALL BE ON CATHODE SIDE OF MODULE

DIMENSIONS					
DIM*	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.970	1.020	24.6	26.0	5
B	0.050	0.080	1.27	2.03	
C	0.307	0.317	7.80	8.05	2,4
C1	0.318	0.400	8.08	10.16	3
⌀D	3.45	3.65	87.6	92.8	
⌀D1	0.95	1.25	24.1	31.8	

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum Forward Voltage V_F @ 25°C @5A
	@ 25 °C	@ 100 °C		
	μA	μA	nS	Volts
S2HVS2.5F	2.0	20.0	300	3.9
S2HVS5F	2.0	20.0	300	6.5
S2HVS7.5F	2.0	20.0	300	10.4

1. Measured on discrete devices prior to assembly

Operating temperature range	-55 °C to +150 °C
Storage temperature range	-55 °C to +150 °C

6

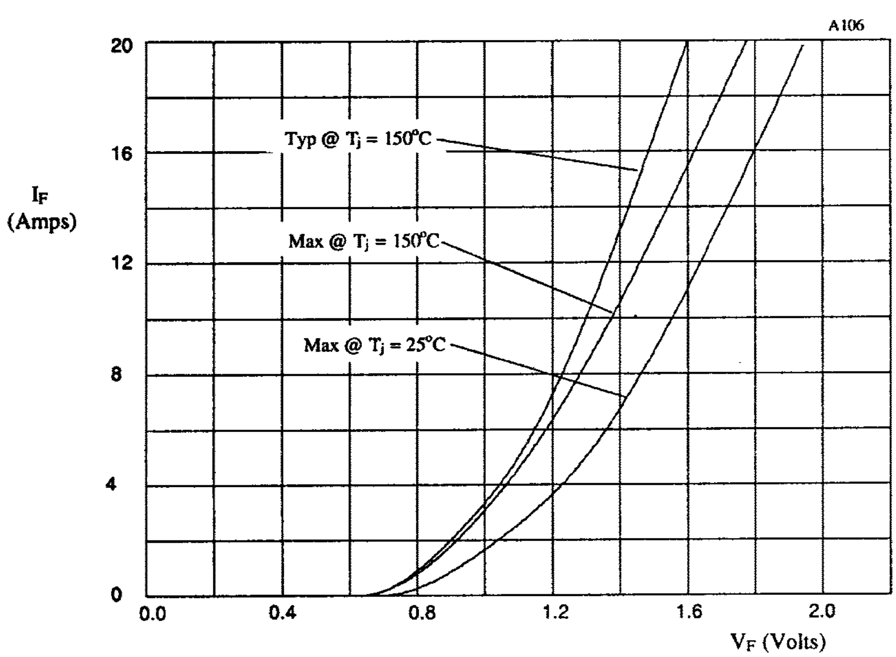


Figure 1. Forward voltage drop as a function of forward current (see TABLE 1).

TABLE 1

DEVICE	X-AXIS
S2HVS2.5F	x3
S2HVS5F	x5
S2HVS7.5F	x8

HIGH VOLTAGE, HIGH CURRENT, HIGH DENSITY, STANDARD RECOVERY RECTIFIER ASSEMBLY

- Up to 48kV reverse voltage
- Air or oil environment
- High reverse surge current
- High thermal shock resistance
- Integral cooling fins

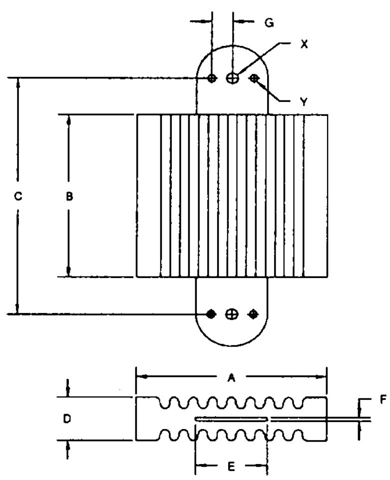
QUICK REFERENCE DATA

- V_R = 8kV - 48kV
- I_F = 7.5 - 10.0A (in oil)
- I_R = 2.0μA
- I_{FSM} = 250A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ air @ 25 °C	air @ 65 °C	forced air 600CFM @ 55°C	still oil @ 55 °C	1 Cycle Surge Current t_p = 8.3mS I_{FSM} @ 25 °C	@ 100 °C	Repetitive Surge Current I_{FRM} @ 25 °C	I^2t t_p = 8.3mS @ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S2KW8KA-1	8000	4.0	2.7	8.0	10.0	250	150	45	250
S2KW16KA-2	16000	3.0	2.0	6.0	7.5				
S2KW24KA-3	24000	3.0	2.0	6.0	7.5				
S2KW32KA-4	32000	3.0	2.0	6.0	7.5				
S2KW40KA-5	40000	3.0	2.0	6.0	7.5				
S2KW48KA-6	48000	3.0	2.0	6.0	7.5				

MECHANICAL



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DIMENSIONS					
DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	102		4.0	-
B	SEE TABLE				
C	SEE TABLE				-
D	-	25.4	-	1.0	-
E	36.8	39.4	1.45	1.55	
F	1.2	2.3	.047	.090	-
G	10.5	12.1	.415	.475	
X	6.2	7.2	.245	.285	DIA
Y	3.8	4.8	.149	.189	DIA

Dimensions (see drawing)	
B (max)	C (max)
inches	inches
4.780	6.480
7.980	9.680
11.18	12.88
14.38	16.08
17.58	19.28
20.78	22.48

CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25 °C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 6.0A @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	μA	μA	Volts	μS
S2KW8KA-1	↑	↑	8	↑
S2KW16KA-2			16	
S2KW24KA-3	2.0	40	24	2.0
S2KW32KA-4			32	
S2KW40KA-5			40	
S2KW48KA-6	↓	↓	48	↓

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

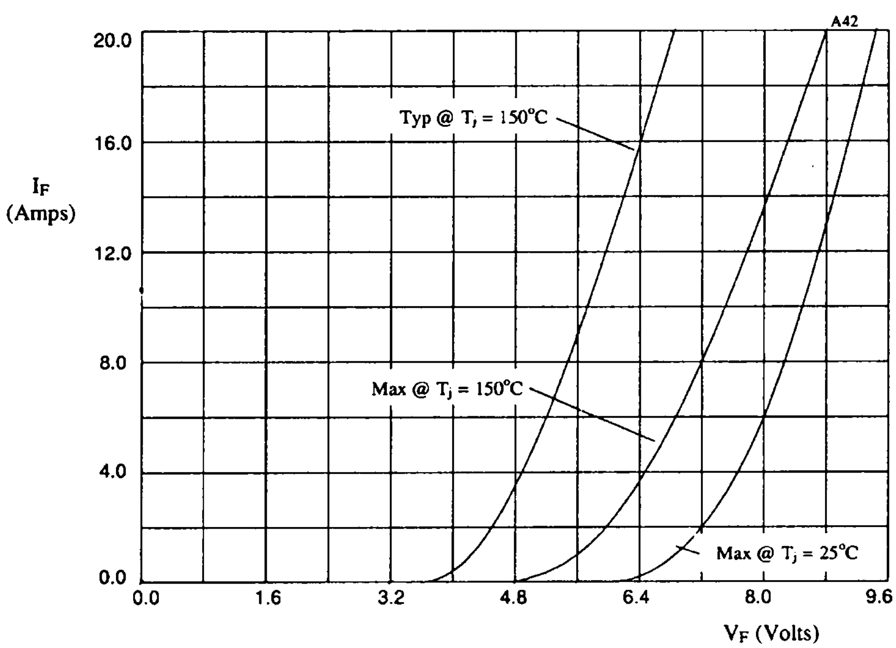


Figure 1. Forward voltage drop as a function of forward current.

TABLE I

DEVICE	X-axis
S2KW8KA-1	x1
S2KW16KA-2	x2
S2KW24KA-3	x3
S2KW32KA-4	x4
S2KW40KA-5	x5
S2KW48KA-6	x6

SEMTECH

STANDARD RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

S3HVM2.5 S3HVM5 S3HVM7.5 S3HVM10 S6HVM2.5 S6HVM5 S9HVM2.5

HIGH VOLTAGE, HIGH DENSITY, STANDARD RECOVERY MODULAR RECTIFIER ASSEMBLY

- Low forward voltage drop
- Low reverse leakage current
- High thermal shock resistance
- Modular construction and design versatility
- Low distributed capacitance

QUICK REFERENCE DATA

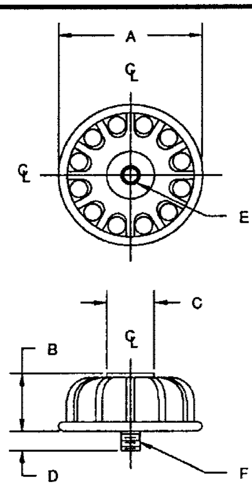
- V_R = 2500 - 10000V
- I_F =1.2 - 4.0A (in air)
- I_R = 1- 3 µA (max)
- t_{rr} = 2.5µS

6

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$				1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM} @ 25°C	I^2t t_p = 8.3mS @ 25°C
		Air @ 25°C	Air @ 100°C	Stud to Heatsink @ 25 °C	Still oil @ 55 °C	@ 25°C	@ 100°C		
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S3HVM2.5	2500	3.0	1.25	3.0	3.0	50	20	11	10
S3HVM5	5000	2.4	1.0	3.0	3.0	50	20	11	10
S3HVM7.5	7500	1.5	0.63	3.0	3.0	50	20	11	10
S3HVM10	10000	1.2	0.5	2.5	3.0	50	20	11	10
S6HVM2.5	2500	4.0	1.5	6.0	6.0	100	40	22	41.5
S6HVM5	5000	2.4	1.0	6.0	6.0	100	40	22	41.5
S9HVM2.5	2500	5.0	1.8	7.5	10.0	150	60	33	93.3

MECHANICAL



G20

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	48.3	-	1.9	-
B	-	19.8	-	.78	-
C	-	16.0	-	.63	-
D	-	6.6	-	.26	-
E	TAP'D 1/4-28 UNF				-
F	STUD 1/4-28 UNF				-

MAXIMUM THERMAL IMPEDANCES

Junction - Ambient	$R_{\theta JA}$ < 12°C/W
Junction - Stud	$R_{\theta JS}$ < 6°C/W
Junction - Oil	$R_{\theta JO}$ < 4.5°C/W

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	µS
			@ 3.0A	
S3HVM2.5	1.0	10.0	3.45	2.5
S3HVM5	1.0	10.0	5.75	2.5
S3HVM7.5	1.0	10.0	9.20	2.5
S3HVM10	1.0	10.0	11.5	2.5
			@ 6.0A	
S6HVM2.5	2.0	20.0	3.45	2.5
S6HVM5	2.0	20.0	5.75	2.5
			@ 9.0A	
S9HVM2.5	3.0	30.0	3.45	2.5

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

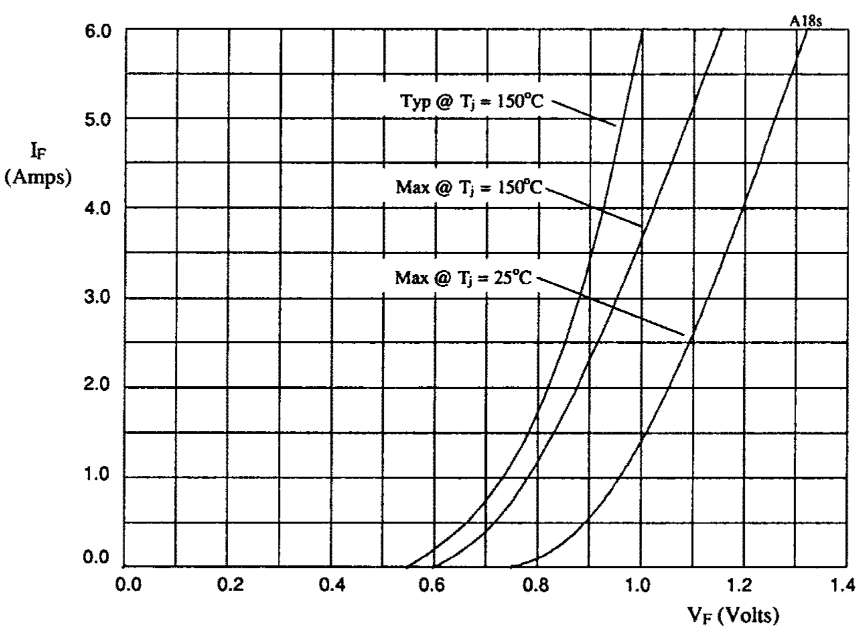


Figure 1. Forward voltage drops as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis	Y-axis
S3HVM2.5	x3	x1
S3HVM5	x5	x1
S3HVM7.5	x8	x1
S3HVM10	x10	x1
S6HVM2.5	x3	x2
S6HVM5	x5	x2
S9HVM2.5	x3	x3

HIGH VOLTAGE, HIGH CURRENT, HIGH DENSITY, STANDARD RECOVERY RECTIFIER ASSEMBLY

- Up to 20A forward current and 24kV reverse voltage
- Air or oil environment
- High reverse surge current
- High thermal shock resistance
- Integral cooling fins

QUICK REFERENCE DATA

- V_R = 4kV - 24kV
- I_F = 8.0 - 20.0A (in oil)
- I_R = 4.0µA
- I_{FSM} = 500A

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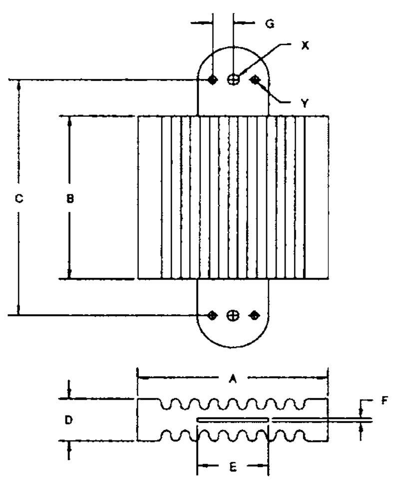
ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ air @ 25 °C	Average Rectified Current $I_{F(AV)}$ air @ 65 °C	Average Rectified Current $I_{F(AV)}$ forced air 600CFM @ 55°C	Average Rectified Current $I_{F(AV)}$ still oil @ 55 °C	1 Cycle Surge Current t_p = 8.3mS I_{FSM} @ 25 °C	1 Cycle Surge Current t_p = 8.3mS I_{FSM} @ 100 °C	Repetitive Surge Current I_{FRM} @ 25 °C	I^2t t_p = 8.3mS @ 25 °C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S4KW4KA-1	4000	8.0	5.4	16.0	20.0	500	300	90	1000
S4KW8KA-2	8000	6.0	4.0	12.0	15.0				
S4KW12KA-3	12000	6.0	4.0	12.0	15.0				
S4KW16KA-4	16000	6.0	4.0	12.0	15.0				
S4KW20KA-5	20000	6.0	4.0	12.0	15.0				
S4KW24KA-6	24000	6.0	4.0	12.0	15.0				

MECHANICAL



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DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	102	-	4.0	-
B	SEE TABLE				-
C	SEE TABLE				-
D	-	25.4		1.0	-
E	36.8	39.4	1.45	1.55	-
F	1 2	2.3	047	090	-
G	10.5	12.1	.415	475	
X	6.2	7.2	.245	285	DIA
Y	3.8	4.8	149	189	DIA

Dimensions (see drawing) B (max)	Dimensions (see drawing) C (max)
inches	inches
4.780	6.480
7.980	9.680
11.18	12.88
14.38	16.08
17.58	19.28
20.78	22.48

6

CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25 °C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 12.0A @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	μA	μA	Volts	μS
S4KW4KA-1	4.0	80	4.0	2.0
S4KW8KA-2			8.0	
S4KW12KA-3			12.0	
S4KW16KA-4			16.0	
S4KW20KA-5			20.0	
S4KW24KA-6			24.0	

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

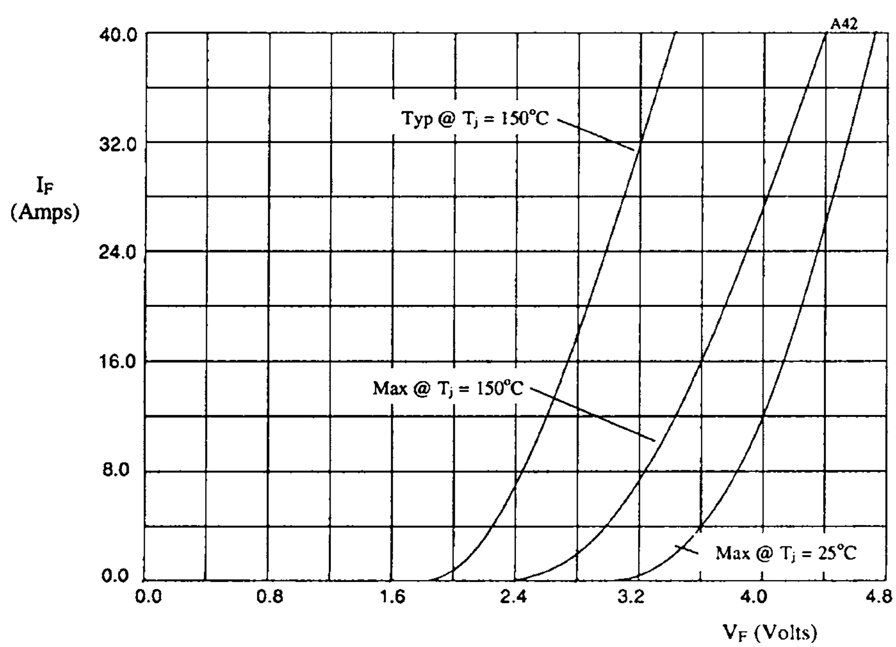


Figure 1. Forward voltage drop as a function of forward current.

TABLE 1

DEVICE	X-axis
S4KW4KA-1	x1
S4KW8KA-2	x2
S4KW12KA-3	x3
S4KW16KA-4	x4
S4KW20KA-5	x5
S4KW24KA-6	x6

FAST RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SCF2500 SCF5000 SCF7500 SCF10000 SCF12500

HIGH VOLTAGE, HIGH DENSITY, FAST RECOVERY LEADED SILICON RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low forward voltage drop
- High thermal shock resistance
- Corona free construction
- Low distributed capacitance

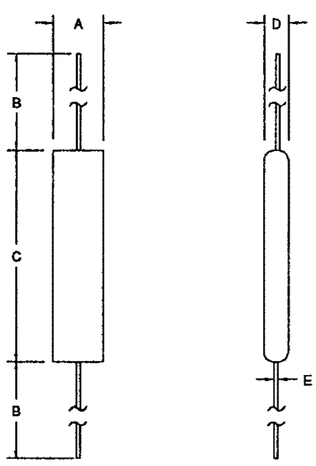
QUICK REFERENCE DATA

- V_R = 2500V - 12500V
- I_F = 0.5A
- I_R = 1.0 µA
- t_{rr} = 150nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current $I_{F(AV)}$		Repetitive Surge Current	1 Cycle Surge Current t_p = 8.3mS (sinusoidal)		I^2t t_p = 8.3mS	Case Length Max
		@ 55 °C	@ 100 °C	@ 25 °C	@ 25 °C	@ 100 °C	@ 25 °C	dim. C
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	inches
SCF2500	2500	↑	↑	↑	↑	↑	↑	1.145
SCF5000	5000							2.020
SCF7500	7500	0.5	0.3	15	25	12.5	2.6	2.770
SCF10000	10000							3.520
SCF12500	12500	↓	↓	↓	↓	↓	↓	4.270

MECHANICAL



G21

DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	13.2	-	.52	-
B	50.8	-	2.00	-	-
C	SEE TABLE				-
D	-	6.6	-	.26	-
E	1.22	1.37	.048	.054	-

6

FAST RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SCF2500 SCF5000 SCF7500 SCF10000 SCF12500

ELECTRICAL CHARACTERISTICS

Device Type	Max. Leakage Current @ V_{RWM} I_R @ 25 °C	Max. Leakage Current @ V_{RWM} I_R @ 100 °C	Maximum Forward Voltage drop V_F @ 0.5A @ 25 °C	Maximum Reverse Recovery Time [1] t_{rr} @ 25 °C
	µA	µA	Volts	nS
SCF2500	↑	↑	3.45	↑
SCF5000	↑	↑	5.75	↑
SCF7500	1.0	25	9.20	150
SCF10000	↓	↓	11.5	↓
SCF12500	↓	↓	15.0	↓

(1) measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

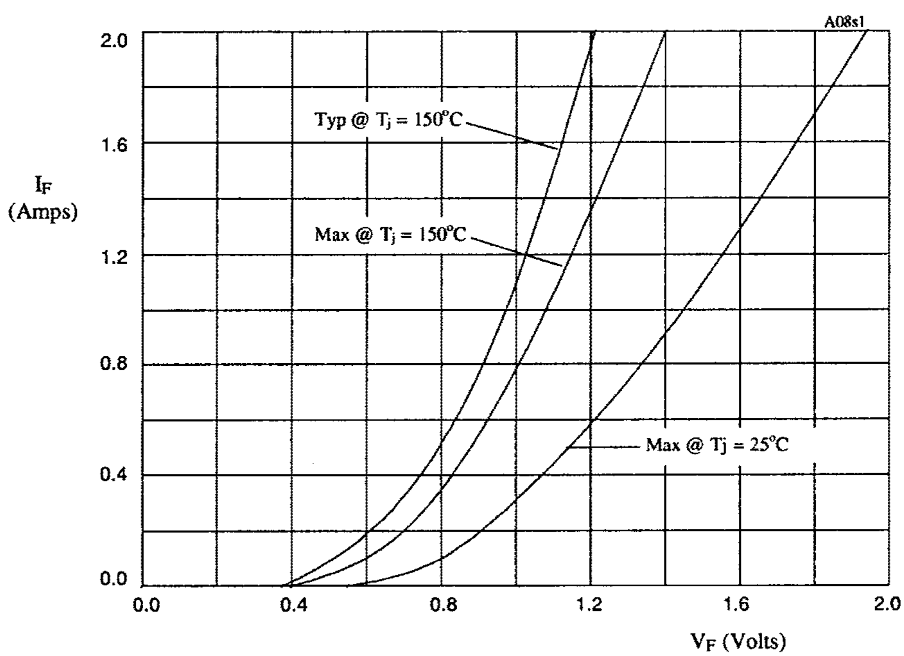


Fig 1. Forward voltage drop as a function of forward current.

TABLE 1

DEVICE	X-AXIS
SCF2500	x3
SCF5000	x5
SCF7500	x8
SCF10000	x10
SCF12500	x13

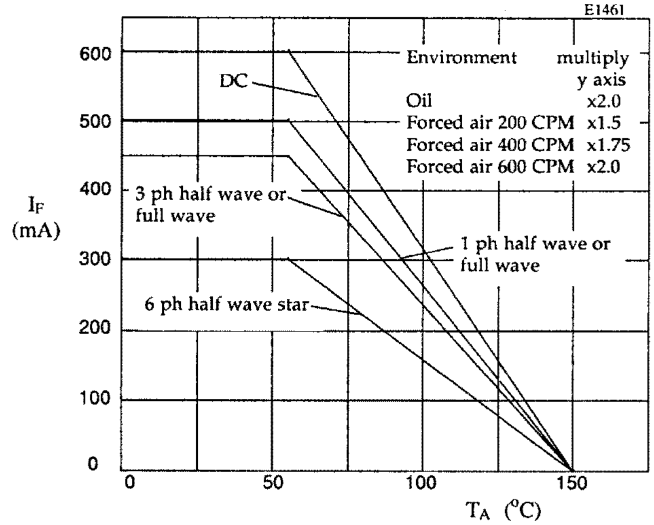


Figure 2. Maximum average forward currents against ambient temperature.

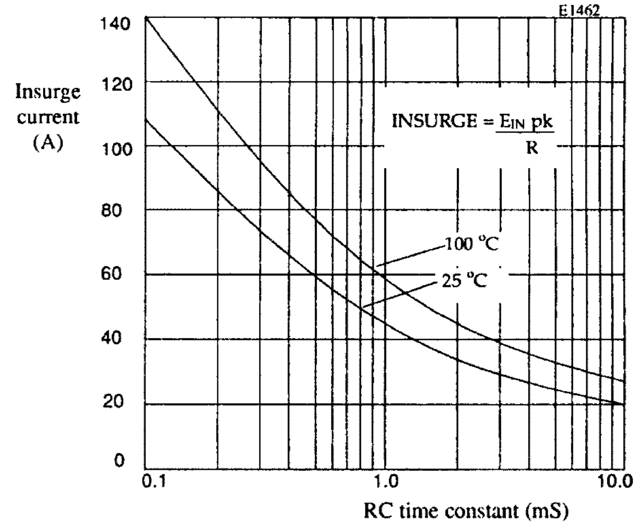


Figure 3. Maximum ratings for capacitive loads. Insurge current versus RC time constant

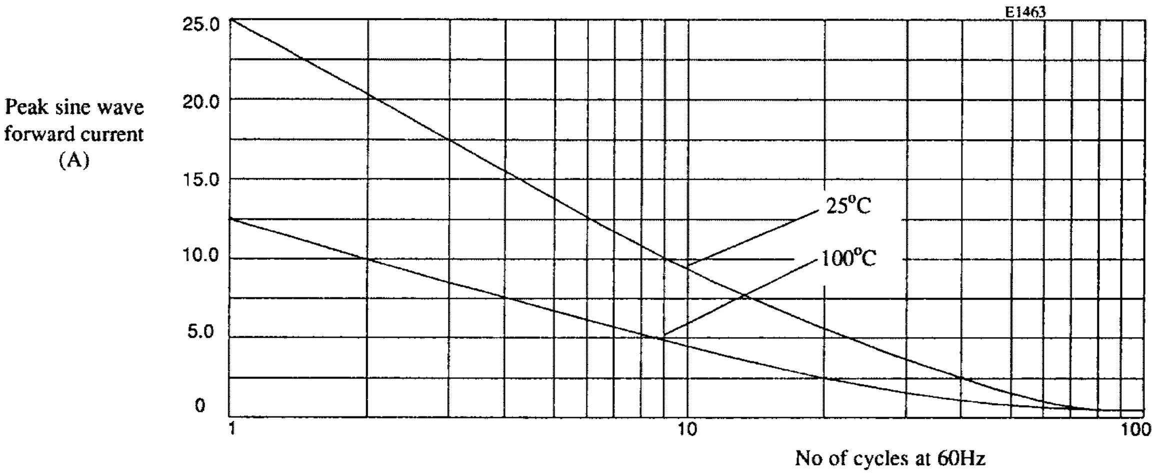


Figure 4. Non repetitive forward current surge curves.

6

FAST RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SCFS2000 SCFS8000
SCFS4000 SCFS10000
SCFS6000 SCFS12000

QUICK REFERENCE DATA

- V_R = 2000 - 12000V
- I_F = 1.5A
- I_R = 5.0μA
- t_{rr} = 150nS

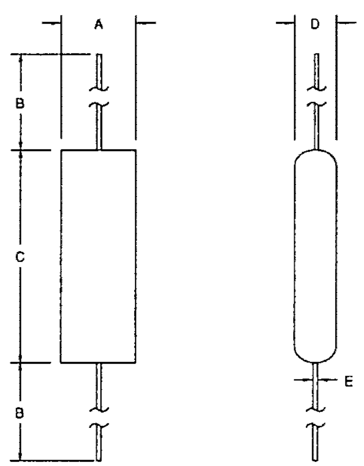
HIGH VOLTAGE, HIGH DENSITY, FAST RECOVERY LEADED SILICON RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low reverse leakage currents
- High thermal shock resistance
- Corona free construction
- Low distributed capacitance

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage (V_{RWM})	Average Rectified Current $I_{F(AV)}$		Repetitive Surge Current	1 Cycle Surge Current t_p = 8.3mS (sinusoidal) I_{FSM}		I^2t t_p = 8.3mS	Case Length Max
		@ 55 °C	@ 100 °C	@ 25 °C	@ 25 °C	@ 100 °C	@ 25 °C	dim. C
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	inches
SCFS2000	2000							1.53
SCFS4000	4000							2.53
SCFS6000	6000	1.5	1.0	10.0	150	75	93	3.53
SCFS8000	8000							4.53
SCFS10000	10000							5.53
SCFS12000	12000							6.53

MECHANICAL



G19

DIMENSIONS					
DIM *	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	-	18.0	-	.71	-
B	50.8	-	2.00	-	-
C	SEE TABLE				-
D	-	9.9	-	.39	-
E	1.22	1.37	.048	.054	-

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Leakage Current @ V_{RWM} I_R		Maximum Forward Voltage drop V_F @ 3.0A	Maximum Reverse Recovery Time[1]
	@ 25 °C	@ 100 °C	@ 25 °C	t_{rr} @ 25 °C
	µA	µA	Volts	nS
SCFS2000	5.0	25	5.4	150
SCFS4000	5.0	25	9.0	150
SCFS6000	5.0	25	12.6	150
SCFS8000	5.0	25	16.2	150
SCFS10000	5.0	25	19.8	150
SCFS12000	5.0	25	23.4	150

(1) measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

6

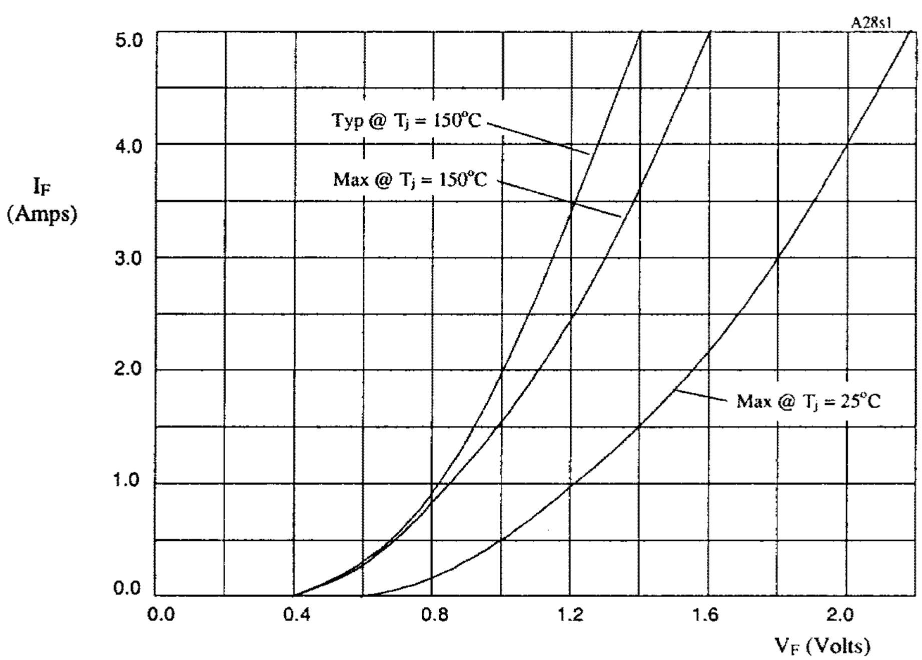


Fig 1. Forward voltage drop as a function of forward current.

TABLE 1

DEVICE	X-AXIS
SCFS2000	x3
SCFS4000	x5
SCFS6000	x7
SCFS8000	x9
SCFS10000	x11
SCFS12000	x13

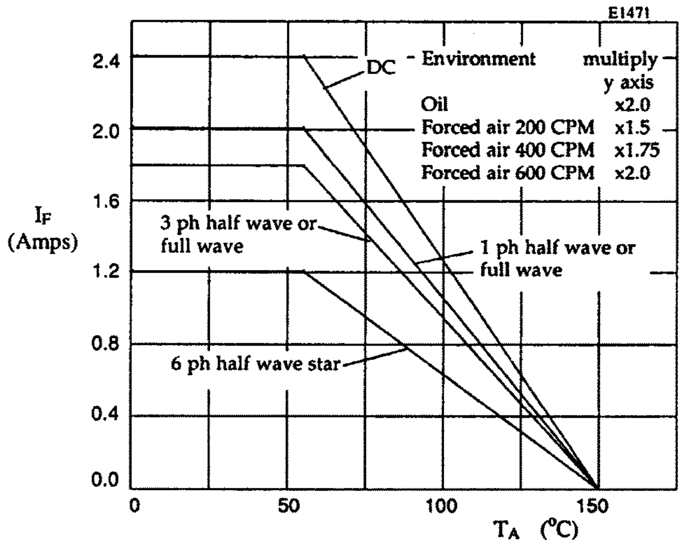


Figure 2. Maximum average forward currents against ambient temperature.

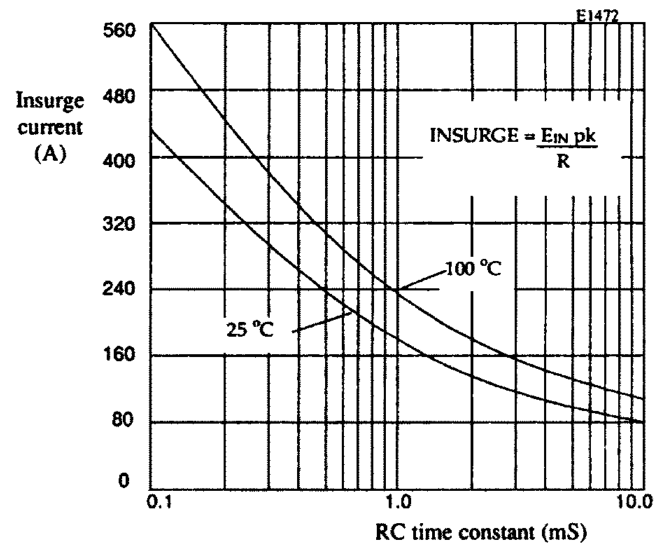


Figure 3. Maximum ratings for capacitive loads. Insurge current versus RC time constant

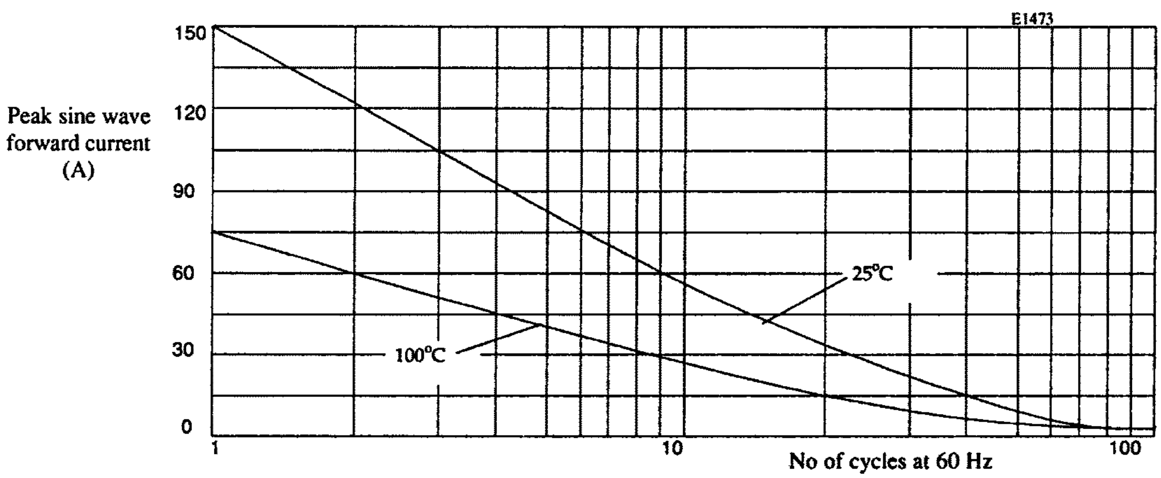


Figure 4. Non repetitive forward current surge curves for 25°C and 100°C

STANDARD RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SCH5000 SCH7500
SCH10000 SCH12500
SCH15000 SCH20000
SCH25000

QUICK REFERENCE DATA

- V_R = 5000 - 25000V
- I_F = 0.5A
- I_R = 1µA
- I_{FSM} = 50A

HIGH VOLTAGE, HIGH DENSITY, LEADED, SILICON RECTIFIER ASSEMBLY

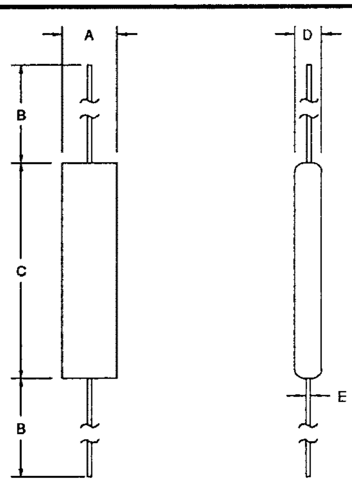
- Low forward voltage drop
- Low reverse leakage current
- High thermal shock resistance
- Corona free construction
- Low distributed capacitance

6

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$				1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ $T_{J\ MAX}$	I^2t t_p = 8.3mS @ $T_{J\ MAX}$	Repetitive Surge Current I_{FRM} @ 25°C	Case Length dim. C Max
		@ 55 °C	@ 100 °C	Forced air @ 600CFM, 55°C	in still oil @ 55 °C				
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	Amps	Inches
SCH5000	5000	↑	↑	↑	↑	↑	↑	↑	1.145
SCH7500	7500								1.645
SCH10000	10000								2.020
SCH12500	12500	0.50	0.33	1.0	1.0	50	12	10	2.395
SCH15000	15000								2.770
SCH20000	20000								3.520
SCH25000	25000	↓	↓	↓	↓	↓	↓	↓	4.270

MECHANICAL



G21

DIM	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	13.2	-	.52	-
B	50.8	-	2.00	-	-
C	SEE TABLE				-
D	-	6.6	-	.26	-
E	1.22	1.37	.048	.054	-

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltages V_F @ 1.0A @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	μA	μA	Volts	μS
SCH5000			5.0	
SCH7500			8.0	
SCH10000			10.0	
SCH12500	1.0	20	13.0	5.0
SCH15000			15.0	
SCH20000			20.0	
SCH25000			25.0	

1. Measured on discrete devices prior to assembly.

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

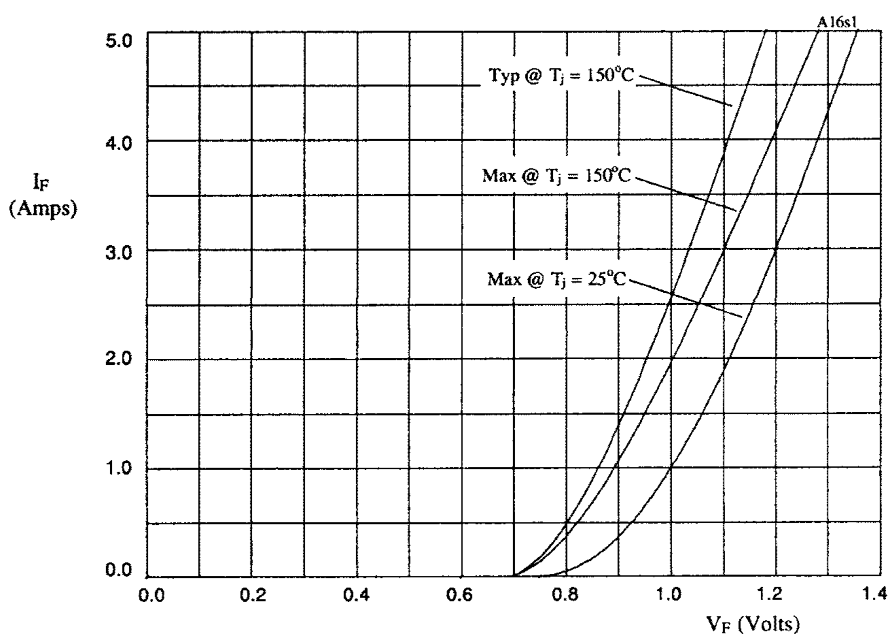


Figure 1. Forward voltage drop as a function of forward current (see Table 1).

TABLE 1

DEVICE	X-AXIS
SCH5000	x5
SCH7500	x8
SCH10000	x10
SCH12500	x13
SCH15000	x15
SCH20000	x20
SCH25000	x25

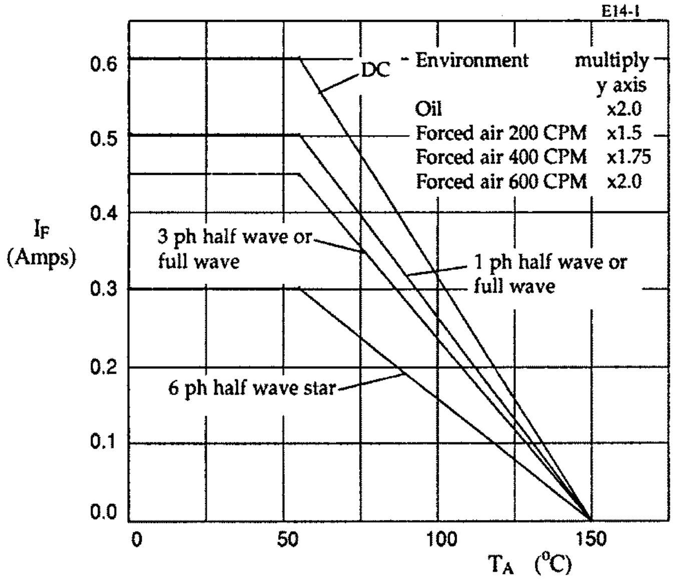


Figure 2. Maximum forward current against ambient temperature.

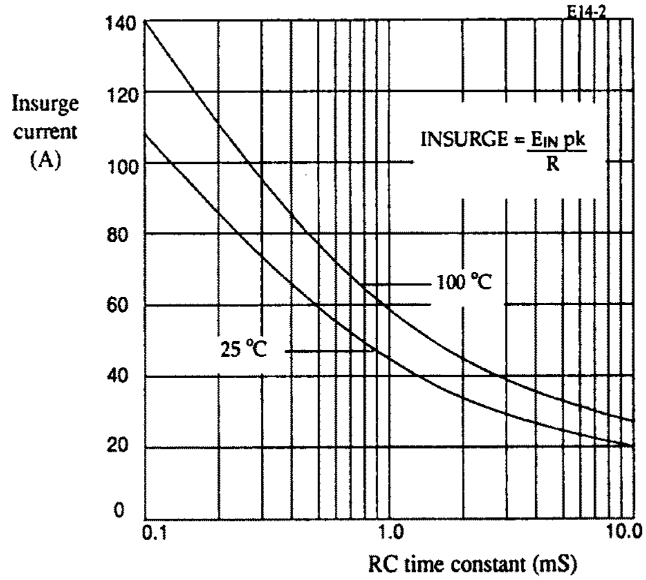


Figure 3. Maximum ratings for capacitive loads. Insurge current versus RC time constant

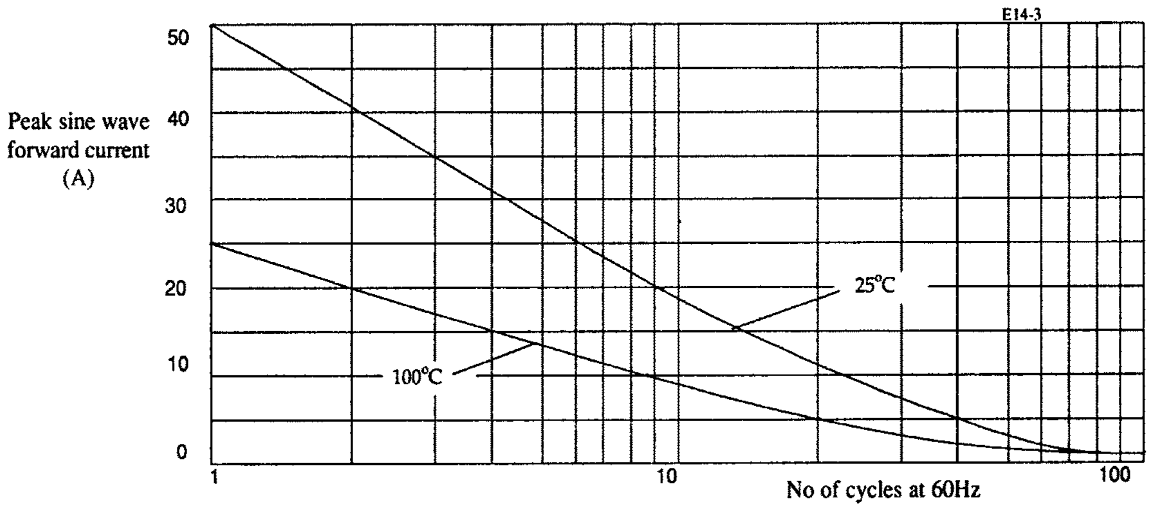


Figure 4. Non repetitive forward current surge curves.

6

QUICK REFERENCE DATA

- V_R = 15kV - 45kV
- I_F = 50mA (in air)
- I_R = 1.0μA
- I_{FSM} = 25A

HIGH VOLTAGE, HIGH DENSITY, LEADED SILICON RECTIFIER ASSEMBLY

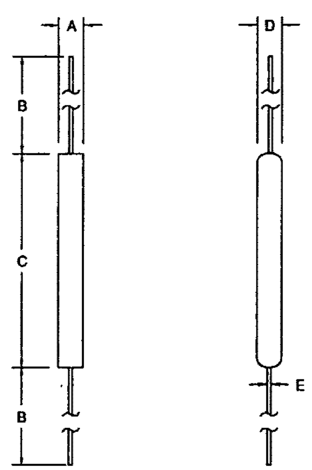
- Low forward voltage drops
- Low reverse leakage current
- High thermal shock resistance
- Corona free construction
- Low distributed capacitance

6

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current				1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ $T_{J\,MAX}$	I^2t t_p = 8.3mS @ $T_{J\,MAX}$	Repetitive Surge Current I_{FRM} @ 25°C	Case Length Max Dim C
		@ 55°C	@ 100°C	Forced air 600CFM, 55°C	in still oil @ 55 °C				
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	Amps	inches
SCHJ15K	15000								1.52
SCHJ22.5K	22500								2.02
SCHJ30K	30000	0.05	0.03	0.1	0.1	25	2.6	2.5	2.52
SCHJ37.5K	37500								3.02
SCHJ45K	45000								3.52

MECHANICAL



G18

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	6.6	-	.26	-
B	50.8	-	2.00	-	-
C	SEE TABLE				-
D	-	6.6	-	.26	-
E	.99	1.07	.039	.042	-

SEMTECH

STANDARD RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SCHJ15K SCHJ22.5K SCHJ30K SCHJ37.5K SCHJ45K

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25 °C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100 °C	Maximum Forward Voltages V_F @ 0.1A @ 25°C	Maximum Reverse Recovery Time (1) @ 25°C
	μA	μA	Volts	μS
SCHJ15K	↑	↑	20	↑
SCHJ22.5K			30	
SCHJ30K	1.0	20	40	2.5
SCHJ37.5K			50	
SCHJ45K	↓	↓	60	↓

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

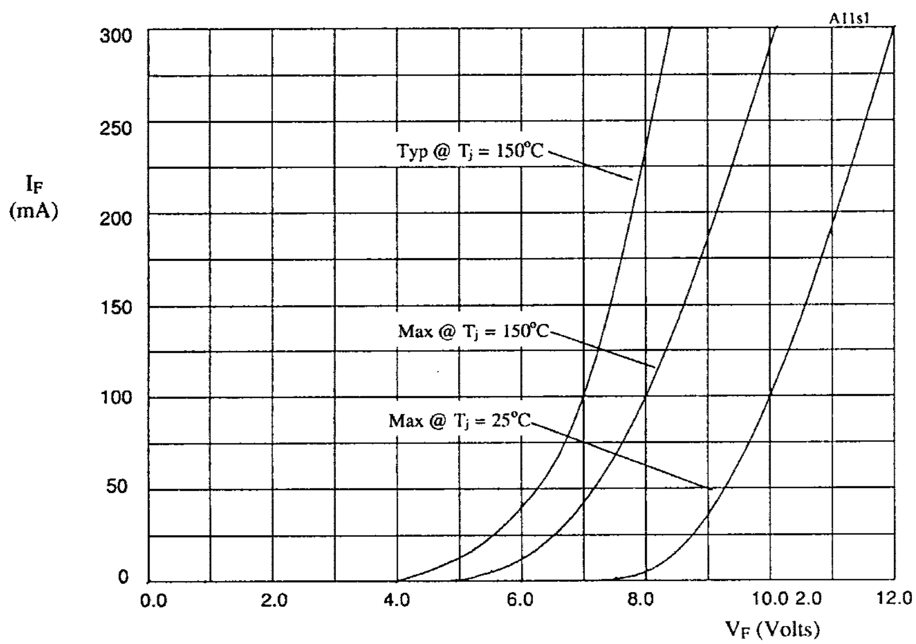


Fig 1. Forward voltage drop as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-AXIS
SCHJ15K	x2
SCHJ22.5K	x3
SCHJ30K	x4
SCHJ37.5K	x5
SCHJ45K	x6

6

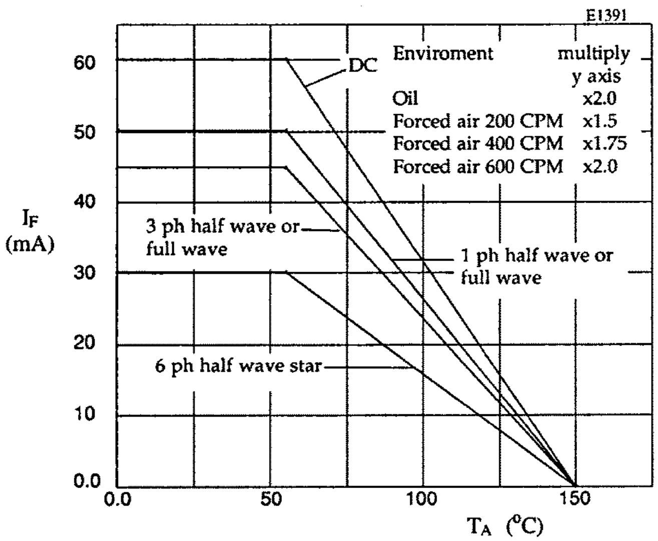


Figure 2. Maximum forward currents against ambient temperature.

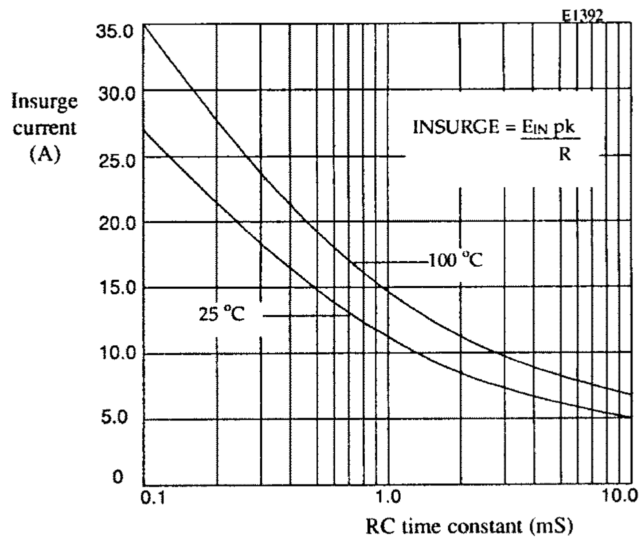


Figure 3. Maximum ratings for capacitive loads. Insurge current versus RC time constant

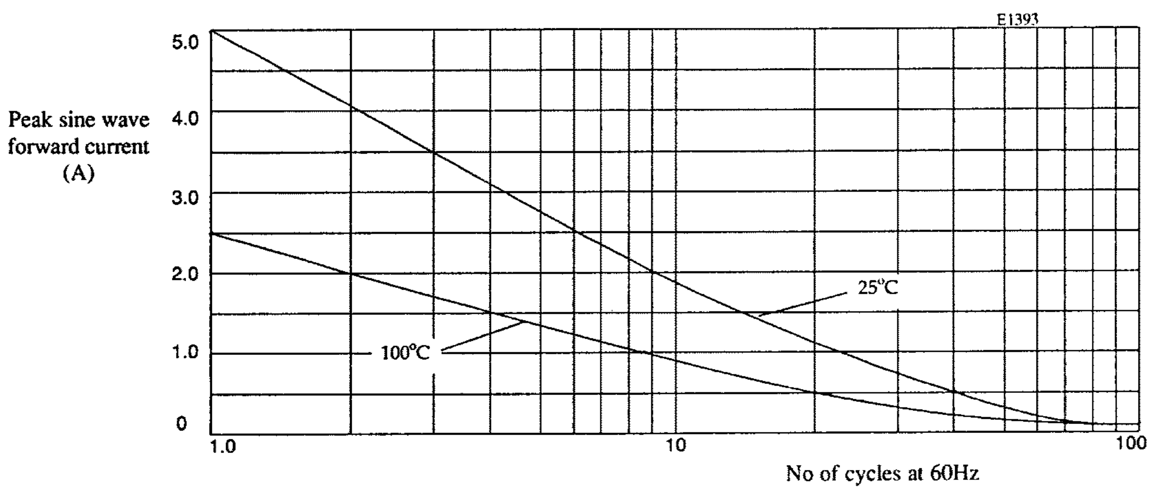


Figure 4. Non repetitive forward current surge curves for 25°C and 100°C

SEMTECH

STANDARD RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SCHS2500 SCHS10000
SCHS5000 SCHS12500
SCHS7500 SCHS15000

HIGH VOLTAGE, HIGH DENSITY, STANDARD RECOVERY LEADED SILICON RECTIFIER ASSEMBLY

- Low reverse leakage current
- Low forward voltage drop
- High thermal shock resistance
- Corona free construction
- Low distributed capacitance

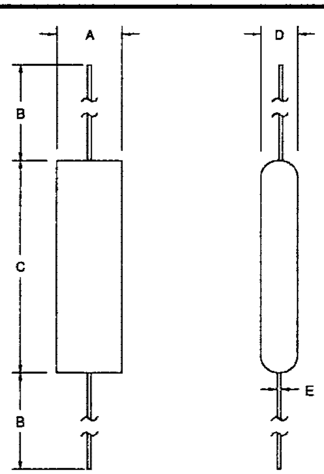
QUICK REFERENCE DATA

- V_R = 2500V - 15000V
- I_F = 2.0A
- I_R = 1.0 µA
- I_{FSM} = 80A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ @ 55 °C	Average Rectified Current $I_{F(AV)}$ @ 100 °C	Average Rectified Current $I_{F(AV)}$ Forced air 600CFM, 25°C	Average Rectified Current $I_{F(AV)}$ in still oil @ 55 °C	1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_j MAX	I^2t t_p = 8.3mS @ T_j MAX	Repetitive Surge Current @ 25°C	Case Length dim. C Max
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	Amps	Inches
SCHS2500	2500	2.0	1.2	2.0	4.0	80	26	31	1.53
SCHS5000	5000								2.53
SCHS7500	7500								3.53
SCHS10000	10000								4.53
SCHS12500	12500								5.53
SCHS15000	15000								6.53

MECHANICAL



G19

DIMENSIONS					
DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	18.0	-	.71	-
B	50.8	-	2.00	-	-
C	SEE TABLE				-
D	-	9.9	-	.39	-
E	1.22	1.37	.048	.054	-

6

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltages V_F @ 3.0A @ 25°C	Maximum Reverse Recovery Time (1) @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	µS
SCHS2500	1.00	10.0	3.45	2.5
SCHS5000	1.00	10.0	5.75	2.5
SCHS7500	1.00	10.0	9.20	2.5
SCHS10000	1.00	10.0	11.50	2.5
SCHS12500	1.00	10.0	14.95	2.5
SCHS15000	1.00	10.0	18.40	2.5

1. Measured on discrete devices prior to assembly.

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

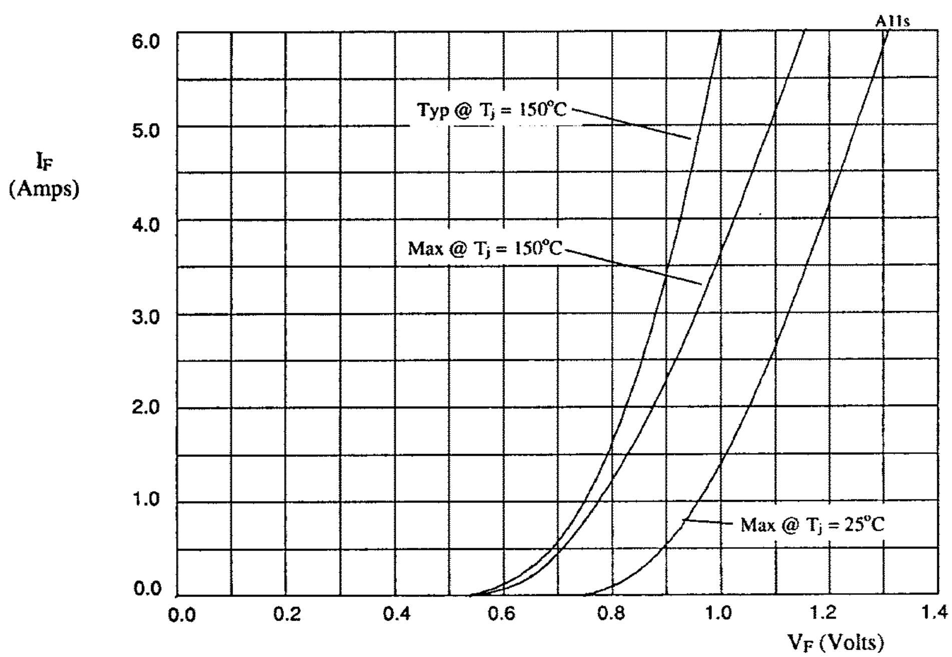


Figure 1. Forward voltage drop as a function of forward current.

TABLE 1

DEVICE	X-AXIS
SCHS2500	x3
SCHS5000	x6
SCHS7500	x8
SCHS10000	x10
SCHS12500	x13
SCHS15000	x16

6

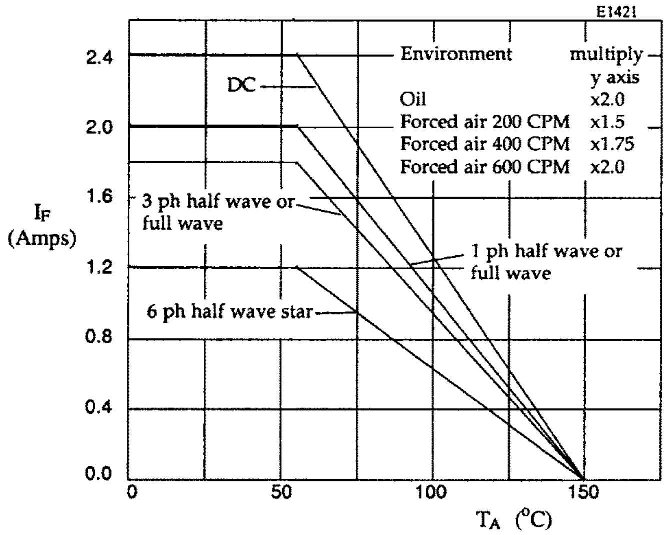


Figure 2. Maximum forward current against ambient temperature.

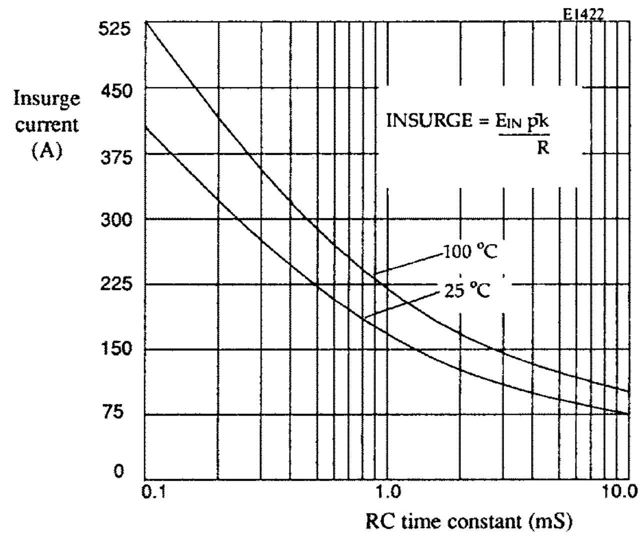


Figure 3. Maximum ratings for capacitive loads. Insurge current versus RC time constant

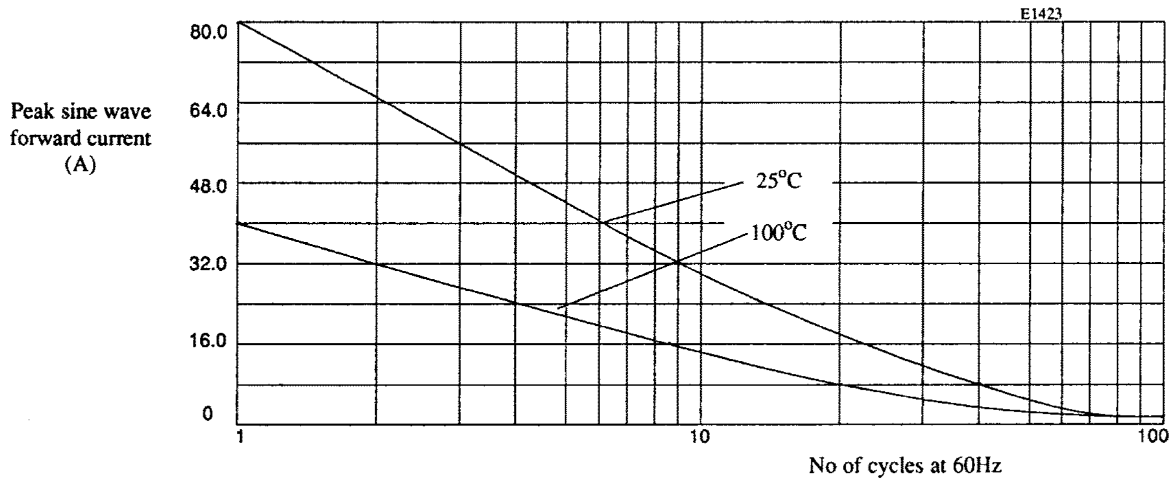


Figure 4. Non repetitive forward current surge curves.

STANDARD RECOVERY
HIGH VOLTAGE
RECTIFIER ASSEMBLY

SCKV33K12
SCKV45K12
SCKV66K12

6

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- High reverse voltages
- Low reverse leakage current
- Low distributed and ground capacitance
- Corona free design
- Air or oil enviroments

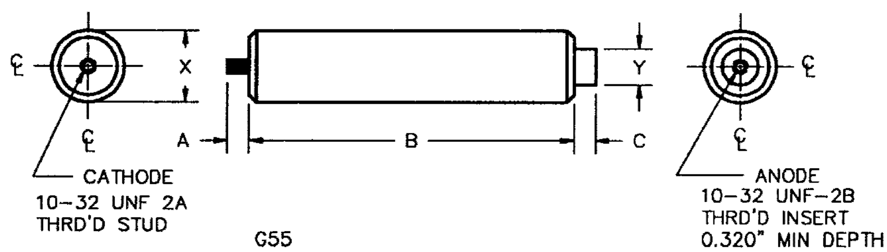
QUICK REFERENCE DATA

- V_R = 33kV - 66kV
- I_F = 300mA
- t_{rr} = 2.5µS
- I_R = 1.0µA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SCKV33K12	SCKV45K12	SCKV66K12	Unit
Working reverse voltage	V_{RWM}	33	45	66	kV
Surge reverse voltage	V_{RSM}	36.3	49.5	72.6	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	300	→	mA
in oil @ 55°C		←	1200	→	mA
in forced air 600 CFM		←	600	→	mA
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	14.0	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length Max.	dim B	4.53	6.66	8.78	inches

MECHANICAL



G55

DIM^N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	7.6	8.6	.298	.338	–
B	113	116	4.47	4.53	–
	167	170	6.60	6.66	–
	221	223	8.72	8.78	–
C	7.1	8.1	0.28	0.32	–
X	24.6	26.2	0.97	1.03	–
Y	12.2	13.2	0.48	0.52	–

ELECTRICAL CHARACTERISTICS

	Symbol	SCKV33K12	SCKV45K12	SCKV66K12	Unit
Max. forward voltage drop @ $I_F = 1.0A$, $T_j = 25^oC$	V_F	60.0	95.0	125.5	V
Max. reverse leakage current @ V_{RWM}, $T_j = 25^oC$	I_R	←	1.0	→	µA
@ V_{RWM}, $T_j = 100^oC$	I_R	←	20	→	µA
Max. reverse recovery time 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	←	2.5	→	µS
Max. fusing current $t_p = 8.3mS$	I^2t	←	0.8	→	A^2S

1. Measured on discrete devices prior to assembly

6

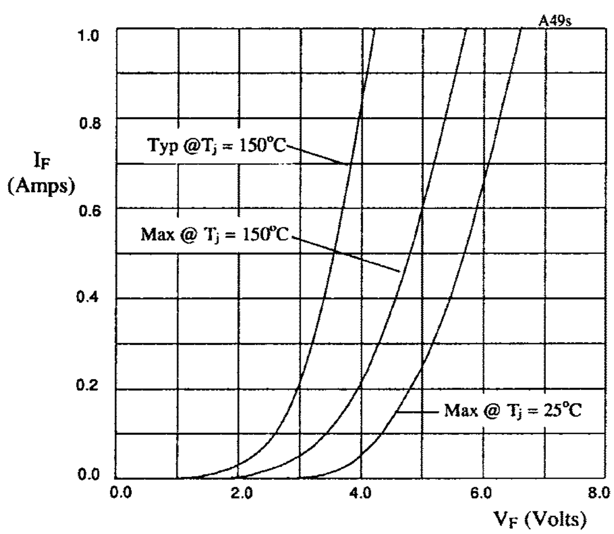


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table.

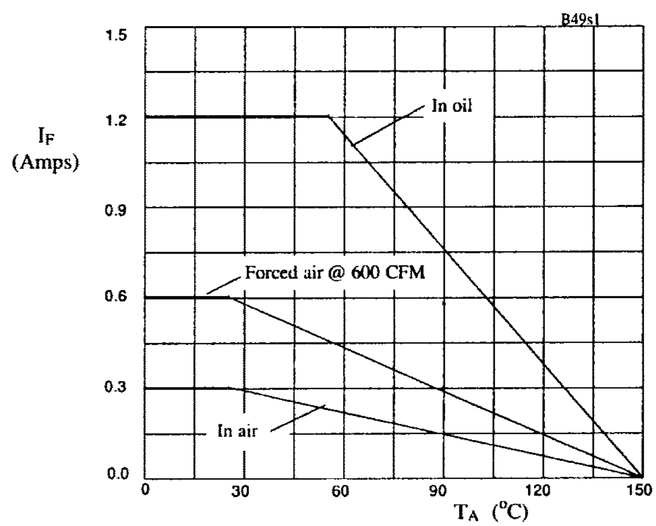


Fig 2. Maximum average forward current against ambient temperature.

Multiplication tables for fig 1.

SCKV33K12	X-axis x12
SCKV45K12	X-axis x19
SCKV66K12	X-axis x25

STANDARD RECOVERY
HIGH VOLTAGE
RECTIFIER ASSEMBLY

SCKV100K3
SCKV150K3
SCKV200K3

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- High reverse voltages
- Low reverse leakage current
- Low distributed and ground capacitance
- Corona free design
- Air or oil environments

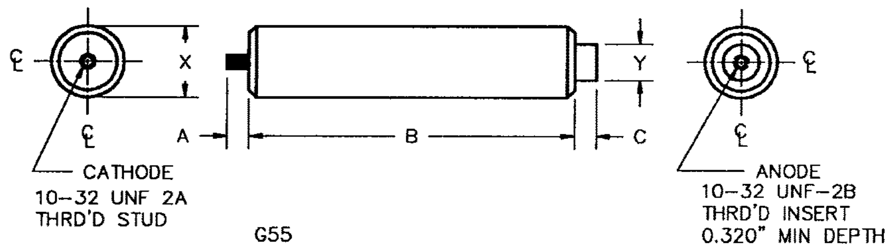
QUICK REFERENCE DATA

- V_R = 100 - 200kV
- I_F = 100mA
- t_{rr} = 2.5µS
- I_R = 1.0µA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SCKV100K3	SCKV150K3	SCKV200K3	Unit
Working reverse voltage	V_{RWM}	100	150	200	kV
Surge reverse voltage	V_{RSM}	110	165	220	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	100	→	mA
in oil @ 55°C		←	300	→	mA
in forced air 600 CFM		←	200	→	mA
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	25	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length Max.	dim B	4.53	6.66	8.78	inches

MECHANICAL



G55

DIMN	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	7.6	8.6	.298	.338	–
B	113	116	4.47	4.53	–
	167	170	6.60	6.66	–
	221	223	8.72	8.78	–
C	7.1	8.1	0.28	0.32	–
X	24.6	26.2	0.97	1.03	–
Y	12.2	13.2	0.48	0.52	–

ELECTRICAL CHARACTERISTICS

	Symbol	SCKV100K3	SCKV150K3	SCKV200K3	Unit
Max. forward voltage drop @ I_F = 100mA, T_j = 25°C	V_F	120	190	250	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	←	1.0	→	μA
@ V_{RWM}, T_j = 100°C	I_R	←	20	→	μA
Max. reverse recovery time 50mA I_F to 100mA I_R. Recovers to 25mA I_{RR}.	t_{rr}	←	2.5	→	μS
Max. fusing current t_p = 8.3mS	I^2t	←	2.6	→	A^2S

1. Measured on discrete devices prior to assembly

6

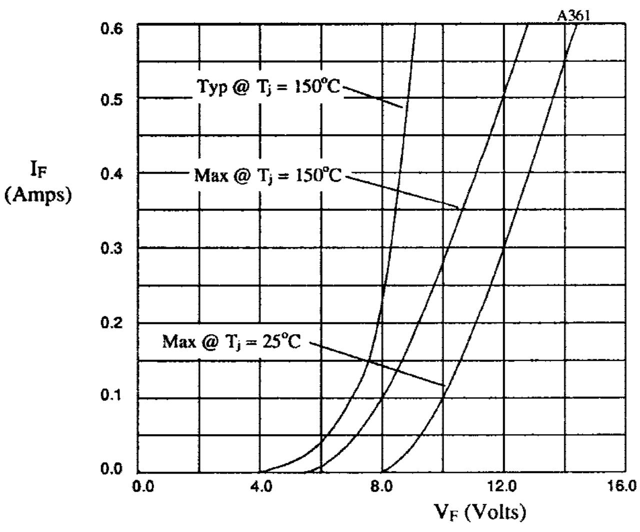


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table.

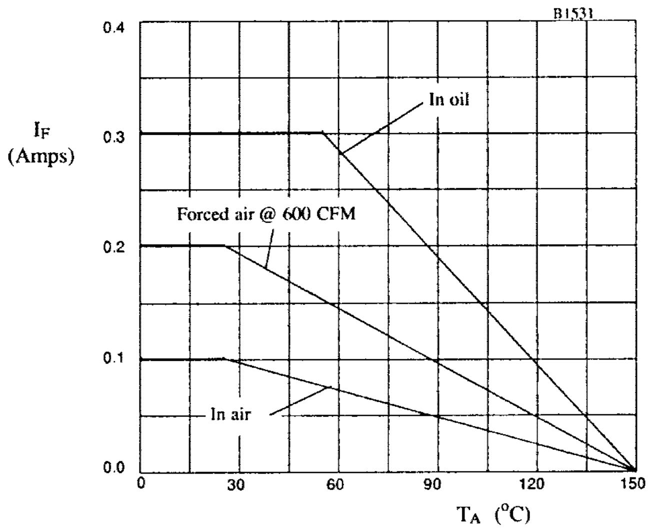


Fig 2. Maximum average forward current against ambient temperature.

Multiplication tables for fig 1.

SCKV100K3	X-axis x12
SCKV150K3	X-axis x19
SCKV200K3	X-axis x25

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- High reverse voltages
- Low reverse leakage current
- Low distributed and ground capacitance
- Corona free design
- Air or oil environments

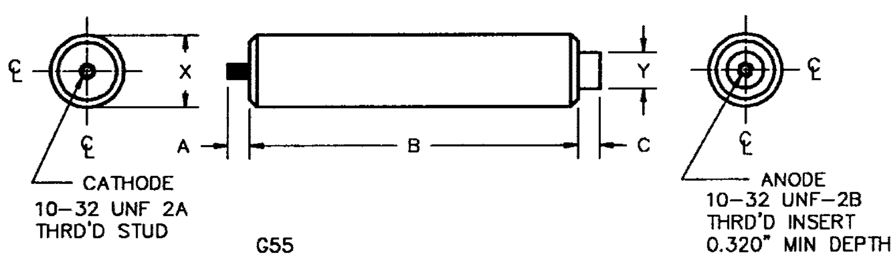
QUICK REFERENCE DATA

- V_R = 12kV - 25kV
- I_F = 1.0A
- t_{rr} = 2.0µS
- I_R = 1.0µA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SCKV12K30	SCKV18K30	SCKV25K30	Unit
Working reverse voltage	V_{RWM}	12	18	25	kV
Surge reverse voltage	V_{RSM}	13.2	19.8	27.5	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	1.00	→	A
in oil @ 55°C		←	2.00	→	A
in forced air 600 CFM		←	1.50	→	A
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	50.0	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length Max.	dim B	4.53	6.66	8.78	inches

MECHANICAL



G55

DIM'N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	7.6	8.6	.298	.338	–
B	113	116	4.47	4.53	–
	167	170	6.60	6.66	–
	221	223	8.72	8.78	–
C	7.1	8.1	0.28	0.32	–
X	24.6	26.2	0.97	1.03	–
Y	12.2	13.2	0.48	0.52	–

ELECTRICAL CHARACTERISTICS

	Symbol	SCKV12K30	SCKV18K30	SCKV25K30	Unit
Max. forward voltage drop @ I_F = 1.0A, T_j = 25°C	V_F	13.2	20.9	27.5	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	←	1.0	→	µA
@ V_{RWM}, T_j = 100°C	I_R	←	25	→	µA
Max. reverse recovery time 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	←	2.0	→	µS
Max. fusing current t_p = 8.3mS	I^2t	←	10.4	→	A^2S

1. Measured on discrete devices prior to assembly

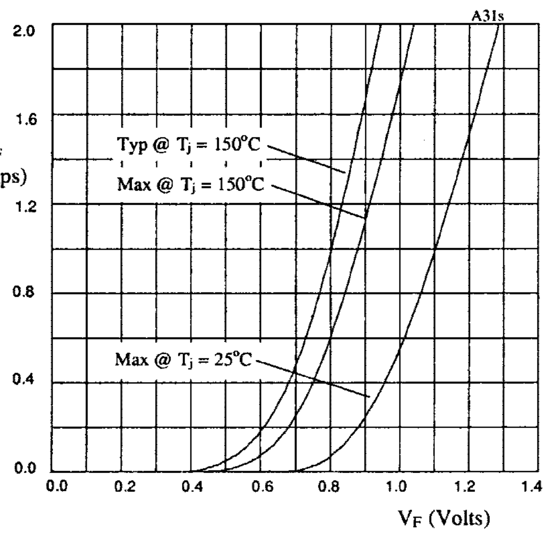


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table.

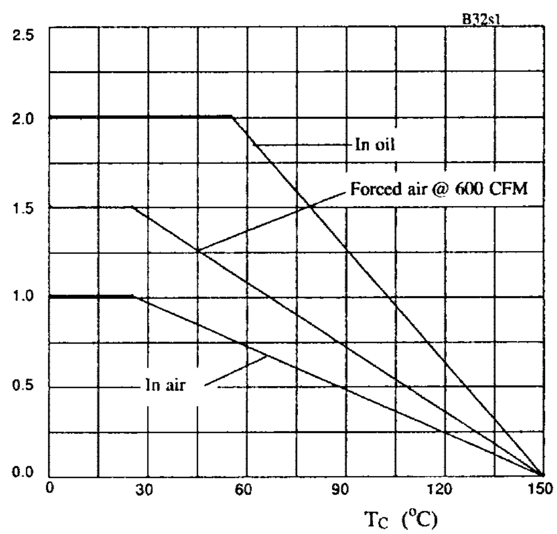


Fig 2. Maximum average forward current against ambient temperature.

Multiplication tables for fig 1.

SCKV12K30	X-axis	x12
SCKV18K30	X-axis	x19
SCKV25K30	X-axis	x25

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- High reverse voltages
- Low reverse leakage current
- Low distributed and ground capacitance
- Corona free design
- Air or oil environments

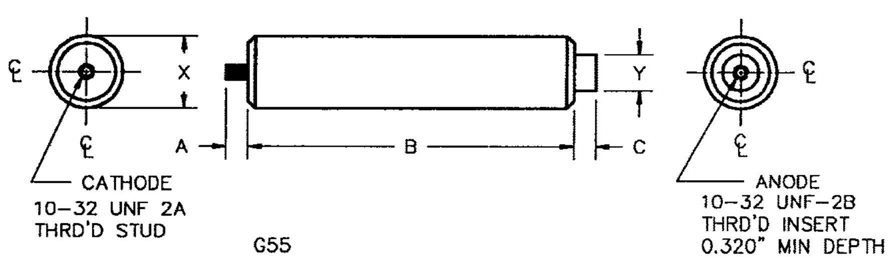
QUICK REFERENCE DATA

- V_R = 12kV - 25kV
- I_F = 1.0A
- t_{rr} = 2.0μS
- I_R = 1.0μA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SCKV12K40	SCKV18K40	SCKV25K40	Unit
Working reverse voltage	V_{RWM}	12	18	25	kV
Surge reverse voltage	V_{RSM}	13.2	19.8	27.5	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	1.0	→	A
in oil @ 55°C		←	3.0	→	A
in forced air 600 CFM		←	2.0	→	A
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	150	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length Max.	dim B	4.53	6.66	8.78	inches

MECHANICAL



G55

DIM"	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	7.6	8.6	.298	.338	–
B	113	116	4.47	4.53	–
	167	170	6.60	6.66	–
	221	223	8.72	8.78	–
C	7.1	8.1	0.28	0.32	–
X	24.6	26.2	0.97	1.03	–
Y	12.2	13.2	0.48	0.52	–

ELECTRICAL CHARACTERISTICS

	Symbol	SCKV12K40	SCKV18K40	SCKV25K40	Unit
Max. forward voltage drop @ I_F = 3.0A, T_j = 25°C	V_F	12.0	19.0	25.0	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R		1.0		µA
@ V_{RWM}, T_j = 100°C	I_R		20		µA
Max. reverse recovery time[1] 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}		2.0		µS
Max. fusing current t_p = 8.3mS	I^2t		92		A^2S

1. Measured on discrete devices prior to assembly

6

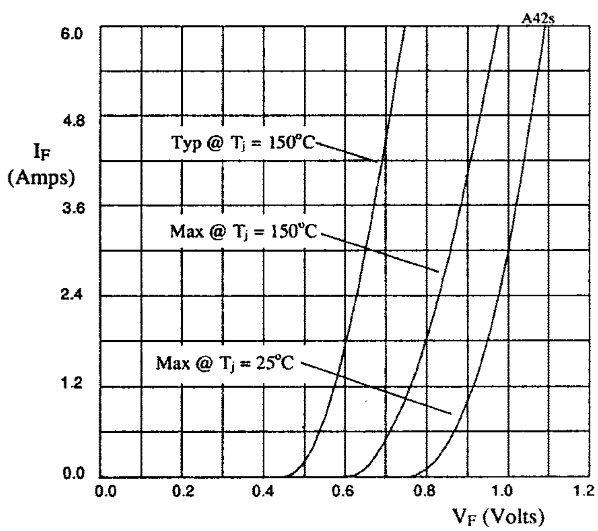


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table.

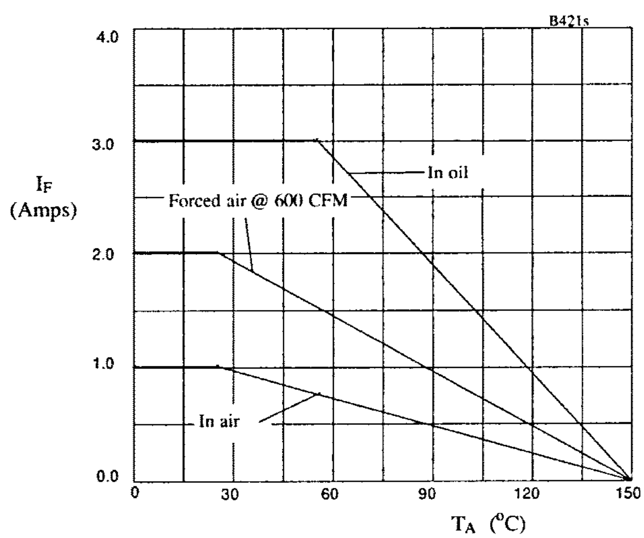


Fig 2. Maximum average forward current against ambient temperature.

Multiplication tables for fig 1.

SCKV12K40	X-axis	x12
SCKV18K40	X-axis	x19
SCKV25K40	X-axis	x25

HIGH DENSITY, HIGH VOLTAGE, FAST RECOVERY SILICON RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low reverse leakage currents
- Low distributed and ground capacitance
- Corona free design
- Air or oil environments

QUICK REFERENCE DATA

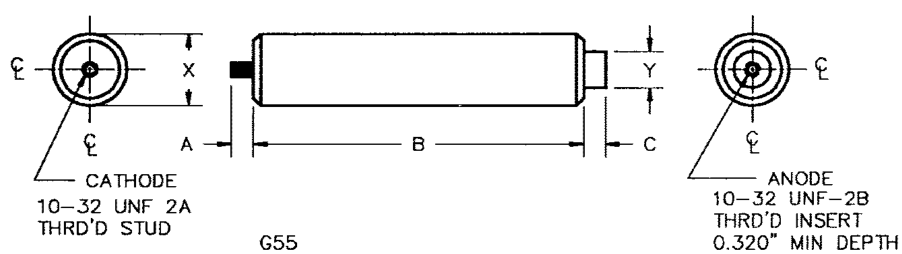
- V_R = 30kV - 60kV
- I_F = 200mA
- t_{rr} = 300nS
- I_R = 1.0µA

6

ABSOLUTE MAXIMUM RATINGS (@ 25°C unless otherwise specified)

	Symbol	SCKV30K12F	SCKV45K12F	SCKV60K12F	Unit
Working reverse voltage	V_{RWM}	30	45	60	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	200	→	mA
in oil @ 55°C		←	800	→	mA
in forced air 600CFM		←	400	→	mA
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	10	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length ±0.030"	dim B	4.53	6.66	8.78	inches

MECHANICAL



G55

DIMENSIONS					
DIM'N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	7.6	8.6	.298	.338	–
B	113	116	4.47	4.53	–
	167	170	6.60	6.66	–
	221	223	8.72	8.78	–
C	7.1	8.1	0.28	0.32	–
X	24.6	26.2	0.97	1.03	–
Y	12.2	13.2	0.48	0.52	–

ELECTRICAL CHARACTERISTICS (@ 25°C unless otherwise specified)

	Symbol	SCKV30K12F	SCKV45K12F	SCKV60K12F	Unit
Max. forward voltage drop @ I_F = 100mA, T_j = 25°C	V_F	60	95	125	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	←	1.0	→	µA
@ V_{RWM}, T_j = 100°C	I_R	←	25	→	µA
Max. reverse recovery time [1] 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	←	300	→	nS
Max. fusing current t_p = 8.3mS	I^2t	←	0.4	→	A^2S

[1] Measured on discrete devices prior to assembly

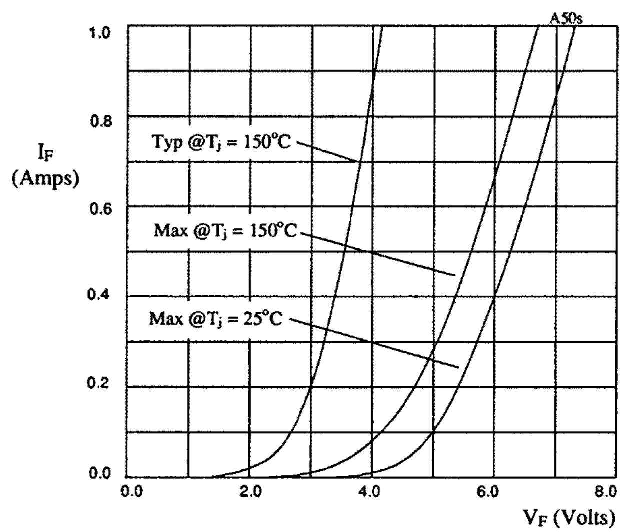


Fig 1. Forward voltage drops as a function of forward current.

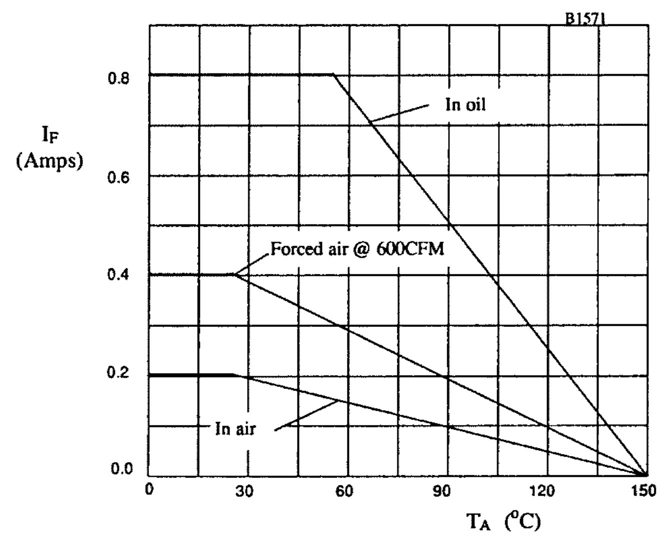


Fig 2. Maximum average forward current against ambient temperature.

Multiplication tables for fig 1.

DEVICE	X-axis
SCKV30K12F	x12
SCKV40K12F	x19
SCKV60K12F	x25

HIGH VOLTAGE, HIGH CURRENT, HIGH DENSITY, STANDARD RECOVERY RECTIFIER ASSEMBLY

- 5.5A forward current and 30kV reverse voltage
- Air or oil enviroment
- High reverse surge current
- High thermal shock resistance
- Integral fins for easy cooling

QUICK REFERENCE DATA

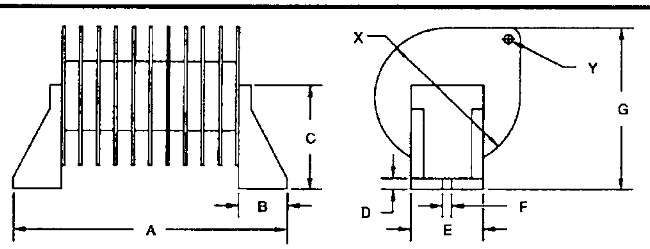
- V_R = 6kV - 30kV
- I_F = 5.50A
- I_R = 1.0µA
- I_{FSM} = 150A

6

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$		1 Cycle Surge Current t_p = 8.3mS I_{FSM}		Repetitive Surge Current I_{FRM}	I^2t t_p = 8.3mS	Body length
		air 55°C	air 100°C	@ 25 °C	@ 100 °C	@ 25 °C	@ 25 °C	dim A
	Volts	Amps	Amps	Amps	Amps	Amps	A^2S	inches
SCPHN6	6000	5.5	3.0	150	80	90	93.4	4.21
SCPHN10	10000							5.53
SCPHN16	16000							7.51
SCPHN20	20000							8.83
SCPHN26	26000							10.81
SCPHN30	30000							12.13

MECHANICAL



G44

DIM *	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	SEE TABLE				-
B	24.6	26.2	.97	1.03	-
C	56.4	57.9	2.22	2.28	-
D	6.1	6.4	.24	.25	-
E	37.3	38.9	1.47	1.53	-
F	4.1	5.6	.16	.22	-
G	88.1	89.7	3.47	3.53	-
X	75.4	77.0	2.97	3.03	DIA
Y	4.7	5.0	.185	.195	DIA

CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25 °C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 3.0A. @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	µA	µA	Volts	µS
SCPHN6	1.0	20	6.0	2.0
SCPHN10	1.0	20	10.0	2.0
SCPHN16	1.0	20	16.0	2.0
SCPHN20	1.0	20	20.0	2.0
SCPHN26	1.0	20	26.0	2.0
SCPHN30	1.0	20	30.0	2.0

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

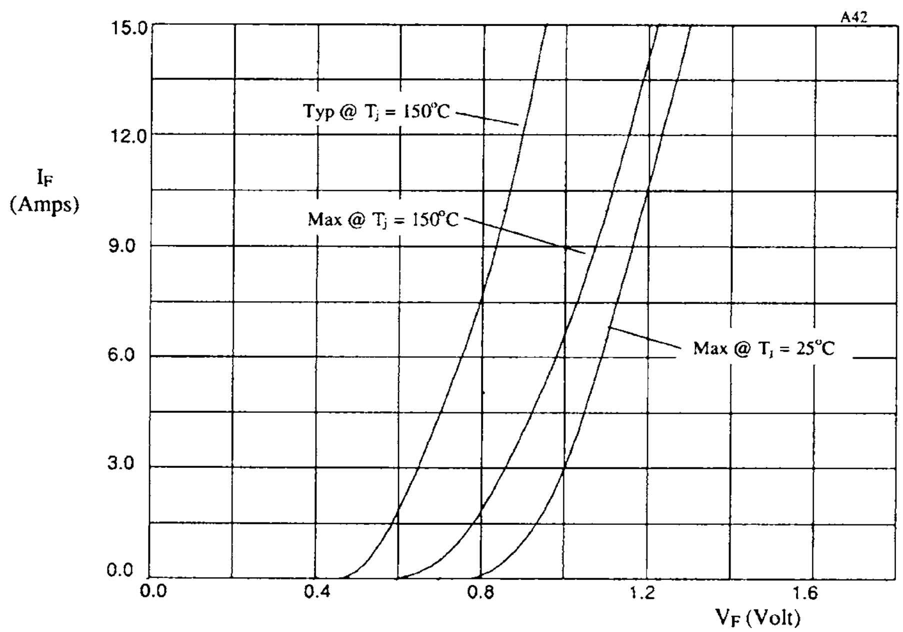


Figure 1. Forward voltage drop as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
SCPHN6	x6
SCPHN10	x10
SCPHN16	x16
SCPHN20	x20
SCPHN26	x26
SCPHN30	x30

6

6

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- Low reverse leakage current
- Corona free design
- Easy aluminum base mount
- Low forward voltage drop
- Up to 15kV reverse voltage

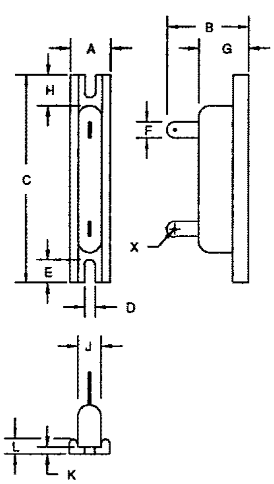
QUICK REFERENCE DATA

- V_R = 7.5kV & 15kV
- I_F = 400mA
- t_{rr} = 2.5µS
- I_R = 2.0µA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SDH7.5K	SDH15K	Unit
Working reverse voltage	V_{RWM}	7.5	15.0	kV
Surge reverse voltage	V_{RSM}	8.25	16.50	kV
Average forward current	$I_{F(AV)}$			
in air @ 25°C		← 400 →		mA
in oil @ 55°C		← 400 →		mA
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	← 40.0 →		A
Storage temperature range	T_{STG}	← -55 to +150 →		°C
Operating temperature range	T_{OP}	← -55 to +150 →		°C
Body length ±0.030"	dim C	3.36	4.04	inches

MECHANICAL



G22A

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	15.2	16.8	.60	.66	-
B	-	33.5	-	1.32	-
C	SEE TABLE				-
D	3.6	5.1	.14	.20	-
E	8.6	10.2	.34	.40	-
F	5.6	7.1	.22	.28	-
G	19.6	21.1	.77	.83	-
H	11.9	13.5	.47	.53	-
J	8.9	10.4	.35	.41	-
K	2.3	3.8	.09	.15	-
L	5.6	7.1	.22	.28	-
X	1.0	-	.04	-	DIA

ELECTRICAL CHARACTERISTICS

	Symbol	SDH7.5K	SDH15K	Unit
Max. forward voltage drop @ I_F = 200mA, T_j = 25°C	V_F	10.0	20.0	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	2.0	2.0	µA
@ V_{RWM}, T_j = 100°C	I_R	40	40	µA
Max. reverse recovery time [1] 50mA I_F to 100mA I_R. Recovers to 25mA I_{RR}.	t_{rr}	2.5	2.5	µS
Max. fusing current t_p = 8.3mS	I^2t	6.64	6.64	A^2S

[1] Measured on discrete devices prior to assembly

6

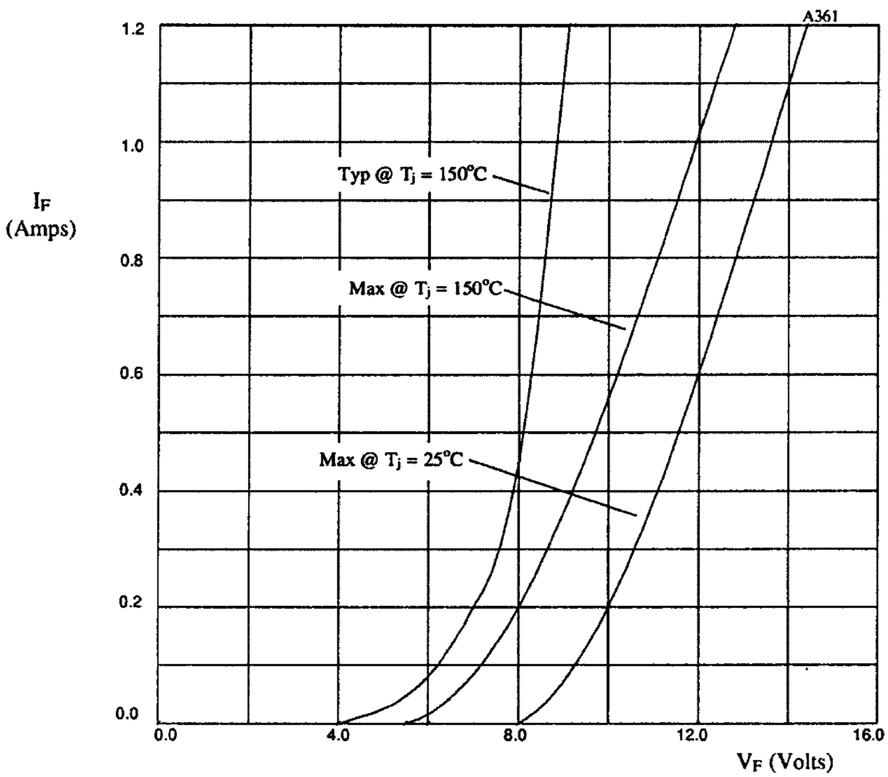


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table 1.

Multiplication tables for fig 1.

SDH7.5K	X-axis x1
SDH15K	X-axis x2

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- Low reverse leakage current
- Low distributed and ground capacitance
- Corona free design
- Easy aluminium base mount
- Low forward voltage drop

QUICK REFERENCE DATA

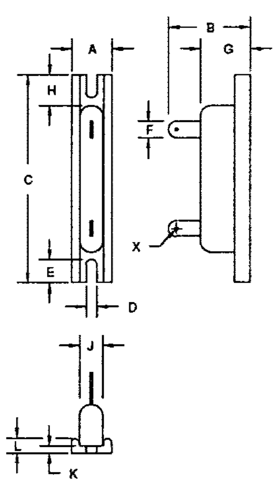
- V_R = 5kV - 15kV
- I_F = 1A
- t_{rr} = 2.0µS
- I_R = 1.0µA

6

ABSOLUTE MAXIMUM RATINGS

	Symbol	SDH5KM	SDH10KM	SDH15KM	Unit
Working reverse voltage	V_{RWM}	5.0	10.0	15.0	kV
Surge reverse voltage	V_{RSM}	5.5	11.0	16.5	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	1.0	→	A
in oil @ 55°C		←	1.0	→	A
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	50	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length ±0.030"	dim C	3.36	4.04	4.04	inches

MECHANICAL



G22A

DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	15.2	16.8	.60	.66	-
B	-	33.5	-	1.32	-
C	SEE TABLE				-
D	3.6	5.1	.14	.20	-
E	8.6	10.2	.34	.40	-
F	5.6	7.1	.22	.28	-
G	19.6	21.1	.77	.83	-
H	11.9	13.5	.47	.53	-
J	8.9	10.4	.35	.41	-
K	2.3	3.8	.09	.15	-
L	5.6	7.1	.22	.28	-
X	1.0	-	.04	-	DIA

ELECTRICAL CHARACTERISTICS

	Symbol	SDH5KM	SDH10KM	SDH15KM	Unit
Max. forward voltage drop @ I_F = 1.0A, T_j = 25°C	V_F	6.6	13.2	19.8	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C @ V_{RWM}, T_j = 100°C	I_R I_R		1.0 25		µA µA
Max. reverse recovery time [1] 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}		2.0		µS
Max. fusing current t_p = 8.3mS	I^2t		10		A^2S

[1] Measured on discrete devices prior to assembly

6

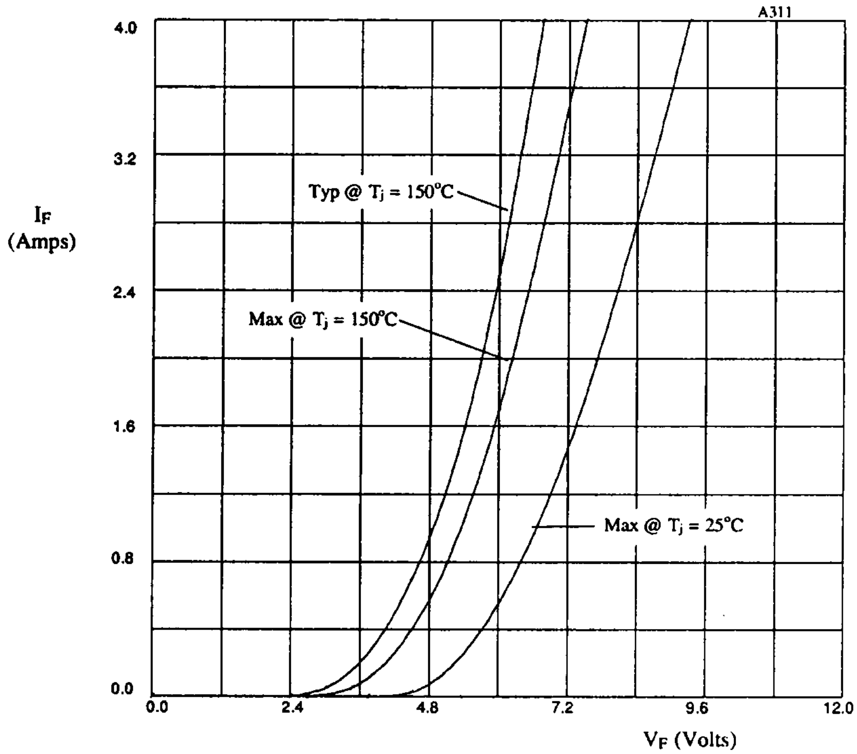


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table 1.

Multiplication tables for fig 1.

SDH5KM	X-axis	x1
SDH10KM	X-axis	x2
SDH15KM	X-axis	x3

6

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY RECTIFIER ASSEMBLY

- 2.5A forward current
- Low reverse leakage current
- Corona free design
- Easy aluminum base mount
- Low forward voltage drop

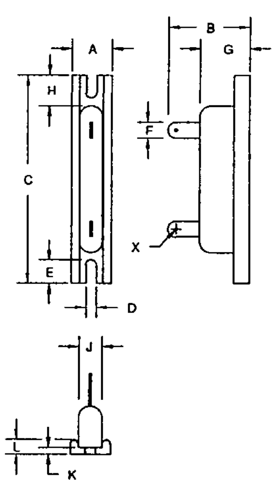
QUICK REFERENCE DATA

- V_R = 5kV & 10kV
- I_F = 2.5A
- t_{rr} = 2.0μS
- I_R = 1.0μA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SDH5KS	SDH10KS	Unit
Working reverse voltage	V_{RWM}	5.0	10.0	kV
Surge reverse voltage	V_{RSM}	5.5	11.0	kV
Average forward current	$I_{F(AV)}$			
in air @ 25°C		←— 2.5 —→		A
in oil @ 55°C		←— 2.5 —→		A
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←— 150 —→		A
Storage temperature range	T_{STG}	← -55 to +150 →		°C
Operating temperature range	T_{OP}	← -55 to +150 →		°C
Body length ±0.030"	dim C	3.36	4.04	inches

MECHANICAL



G22A

DIMENSIONS					
DIM"	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	15.2	16.8	.60	.66	-
B	-	33.5	-	1.32	-
C	SEE TABLE				-
D	3.6	5.1	.14	.20	-
E	8.6	10.2	.34	.40	-
F	5.6	7.1	.22	.28	-
G	19.6	21.1	.77	.83	-
H	11.9	13.5	.47	.53	-
J	8.9	10.4	.35	.41	-
K	2.3	3.8	.09	.15	-
L	5.6	7.1	.22	.28	-
X	1.0	-	.04	-	DIA

ELECTRICAL CHARACTERISTICS

	Symbol	SDH5KS	SDH10KS	Unit
Max. forward voltage drop @ I_F = 3.0A, T_j = 25°C	V_F	6.0	12.0	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	← 1.0 →		μA
@ V_{RWM}, T_j = 100°C	I_R	← 20 →		μA
Max. reverse recovery time [1] 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	← 2.0 →		μS
Max. fusing current t_p = 8.3mS	I^2t	← 94 →		A^2S

[1] Measured on discrete devices prior to assembly

6

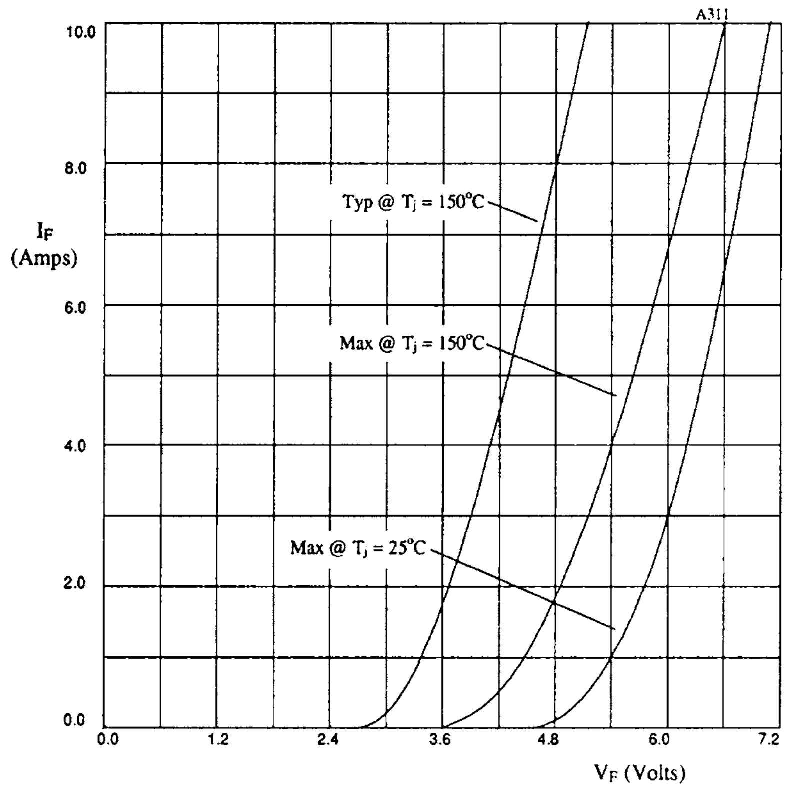


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table 1.

Multiplication tables for fig 1.

SDH5KS	X-axis x1
SDH10KS	X-axis x2

FAST RECOVERY HIGH VOLTAGE RECTIFIER ASSEMBLY

SDHF2.5KM
SDHF5KM
SDHF7.5KM

HIGH DENSITY, HIGH VOLTAGE, FAST RECOVERY RECTIFIER ASSEMBLY

- Low reverse leakage current
- Low reverse recovery time
- Corona free design
- Easy aluminum base mount
- Low forward voltage drop

QUICK REFERENCE DATA

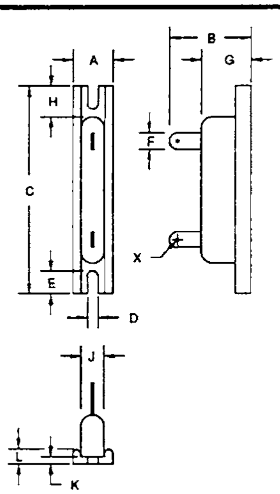
- V_R = 2.5 - 7.5kV
- I_F = 1A
- t_{rr} = 150nS
- I_R = 1.0µA

6

ABSOLUTE MAXIMUM RATINGS

	Symbol	SDHF2.5KM	SDHF5KM	SDHF7.5KM	Unit
Working reverse voltage	V_{RWM}	2.5	5.0	7.5	kV
Surge reverse voltage	V_{RSM}	2.5	5.0	7.5	kV
Average forward current	$I_{F(AV)}$				
in air @ 25°C		←	1.0	→	A
in oil @ 55°C		←	1.0	→	A
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	←	25	→	A
Storage temperature range	T_{STG}	←	-55 to +150	→	°C
Operating temperature range	T_{OP}	←	-55 to +150	→	°C
Body length ±0.030"	dim C	3.36	4.04	6.09	inches

MECHANICAL



G22A

DIMENSIONS					
DIM*	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	15.2	16.8	.60	.66	-
B	-	33.5	-	1.32	-
C	SEE TABLE				-
D	3.6	5.1	.14	.20	-
E	8.6	10.2	.34	.40	-
F	5.6	7.1	.22	.28	-
G	19.6	21.1	.77	.83	-
H	11.9	13.5	.47	.53	-
J	8.9	10.4	.35	.41	-
K	2.3	3.8	.09	.15	-
L	5.6	7.1	22	.28	-
X	1.0	-	.04	-	DIA

ELECTRICAL CHARACTERISTICS

	Symbol	SDHF2.5KM	SDHF5KM	SDHF7.5KM	Unit
Max. forward voltage drop @ I_F = 1.0A, T_j = 25°C	V_F	7.2	14.4	21.6	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	←	1.0	→	µA
@ V_{RWM}, T_j = 100°C	I_R	←	25	→	µA
Max. reverse recovery time [1] 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	←	150	→	nS
Max. fusing current t_p = 8.3mS	I^2t	←	2.6	→	A^2S

[1] Measured on discrete devices prior to assembly

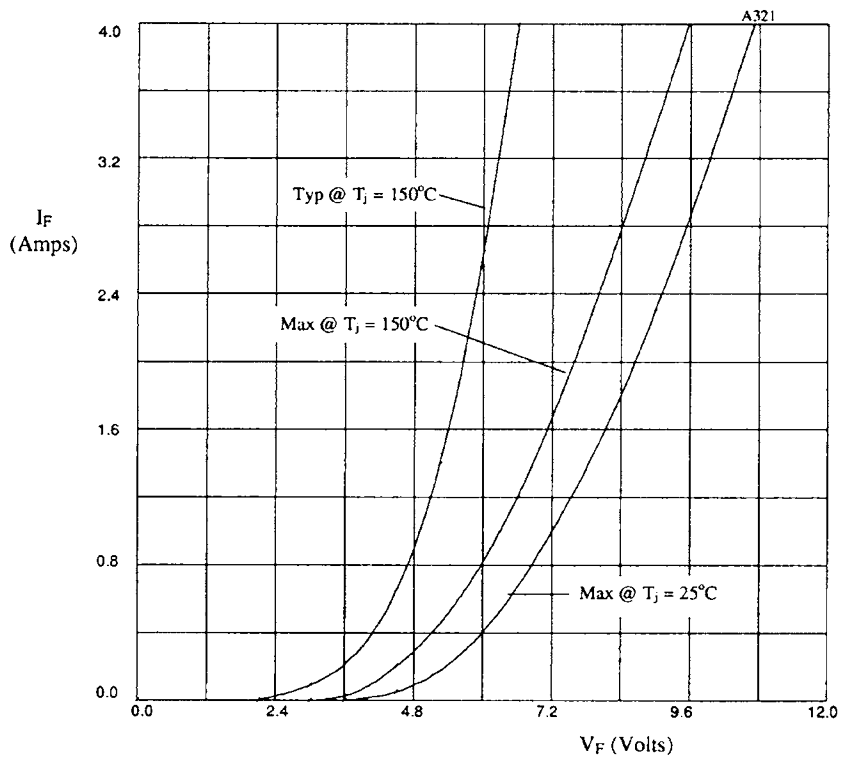


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table 1.

Multiplication tables for fig 1.

SDHF2.5KM	X-axis	x1
SDHF5KM	X-axis	x2
SDHF7.5KM	X-axis	x3

6

HIGH DENSITY, HIGH VOLTAGE, FAST RECOVERY RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low reverse leakage current
- Corona free design
- Easy aluminum base mount
- Low forward voltage drop

QUICK REFERENCE DATA

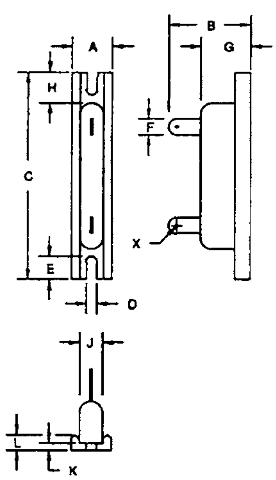
- V_R = 2.5kV & 5kV
- I_F = 2.5A
- t_{rr} = 150nS
- I_R = 1.0µA

ABSOLUTE MAXIMUM RATINGS

	Symbol	SDHF2.5KS	SDHF5KS	Unit
Working reverse voltage	V_{RWM}	2.5	5.0	kV
Surge reverse voltage	V_{RSM}	2.5	5.0	kV
Average forward current	$I_{F(AV)}$			
in air @ 25°C		← 2.5 →		A
in oil @ 55°C		← 2.5 →		A
Non-repetitive surge current t_p = 8.3mS, @ 25°C	I_{FSM}	← 150 →		A
Storage temperature range	T_{STG}	← -55 to +150 →		°C
Operating temperature range	T_{OP}	← -55 to +150 →		°C
Body length ±0.030"	dim C	3.36	4.04	inches

6

MECHANICAL



G22A

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	15.2	16.8	.60	.66	-
B	-	33.5	-	1.32	-
C	SEE TABLE				-
D	3.6	5.1	.14	.20	-
E	8.6	10.2	.34	.40	-
F	5.6	7.1	.22	.28	-
G	19.6	21.1	.77	.83	-
H	11.9	13.5	.47	.53	-
J	8.9	10.4	.35	.41	-
K	2.3	3.8	.09	.15	-
L	5.6	7.1	.22	.28	-
X	1.0	-	.04	-	DIA

ELECTRICAL CHARACTERISTICS

	Symbol	SDHF2.5KS	SDHF5KS	Unit
Max. forward voltage drop @ I_F = 3.0A, T_j = 25°C	V_F	6.6	13.2	V
Max. reverse leakage current @ V_{RWM}, T_j = 25°C	I_R	← 1.0 →		µA
@ V_{RWM}, T_j = 100°C	I_R	← 25 →		µA
Max. reverse recovery time [1] 0.5A I_F to 1.0A I_R. Recovers to 0.25A I_{RR}.	t_{rr}	← 150 →		nS
Max. fusing current t_p = 8.3mS	I^2t	← 93 →		A^2S

[1] Measured on discrete devices prior to assembly

6

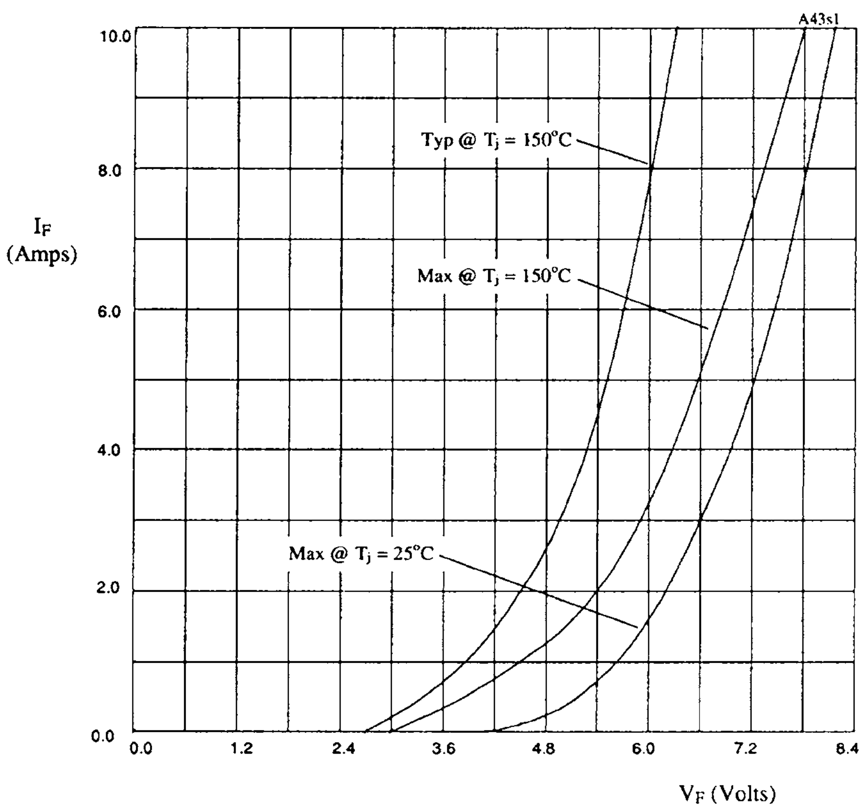


Fig 1. Forward voltage drop as a function of forward current for use with multiplication table 1.

Multiplication tables for fig 1.

SDHF2.5KS	X-axis	x1
SDHF5KS	X-axis	x2

HIGH VOLTAGE, HIGH DENSITY, STANDARD RECOVERY MODULAR RECTIFIER ASSEMBLY

- Up to 15kV reverse voltage
- Modular construction
- Low reverse leakage currents
- High thermal shock resistance
- Provides design versatility

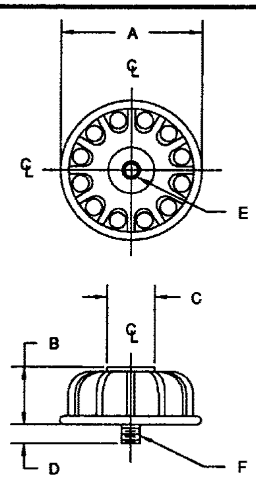
QUICK REFERENCE DATA

- V_R = 2.5kV - 15kV
- I_F = 500mA (in air)
- I_R = 1.0 µA
- I_{FSM} = 20A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$				1 Cycle Surge Current I_{FSM} t_p = 8.3mS		Repetitive Surge Current I_{FRM} @ 25°C	I^2t t_p = 8.3mS @ 25°C
		Air @ 25°C	Air @ 100°C	Stud to Heatsink @ 25 °C	Still oil @ 55 °C	@ 25°C	@ 100°C		
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
SHVM2.5	2500	0.5	0.2	0.5	0.5	20.0	8.0	8.0	1.67
SHVM5	5000								
SHVM7.5	7500								
SHVM10	10000								
SHVM12.5	12500								
SHVM15	15000								

MECHANICAL



G20

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	48.3	-	1.9	-
B	-	19.8	-	.78	-
C	-	16.0	-	.63	-
D	-	6.6	-	.26	-
E	TAP'D 1/4-28 UNF				-
F	STUD 1/4-28 UNF				-

MAXIMUM THERMAL IMPEDANCES

Junction - Ambient	$R_{\theta JA}$ < 12°C/W
Junction - Stud	$R_{\theta JS}$ < 6°C/W
Junction - Oil	$R_{\theta JO}$ < 4.5°C/W

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 25 °C	Maximum Reverse Leakage Current I_R @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 0.8A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	µA	µA	Volts	µS
SHVM2.5	1.0	50	7.0	2.0
SHVM5	1.0	50	14.0	2.0
SHVM7.5	1.0	50	21.0	2.0
SHVM10	1.0	50	28.0	2.0
SHVM12.5	1.0	50	35.0	2.0
SHVM15	1.0	50	42.0	2.0

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

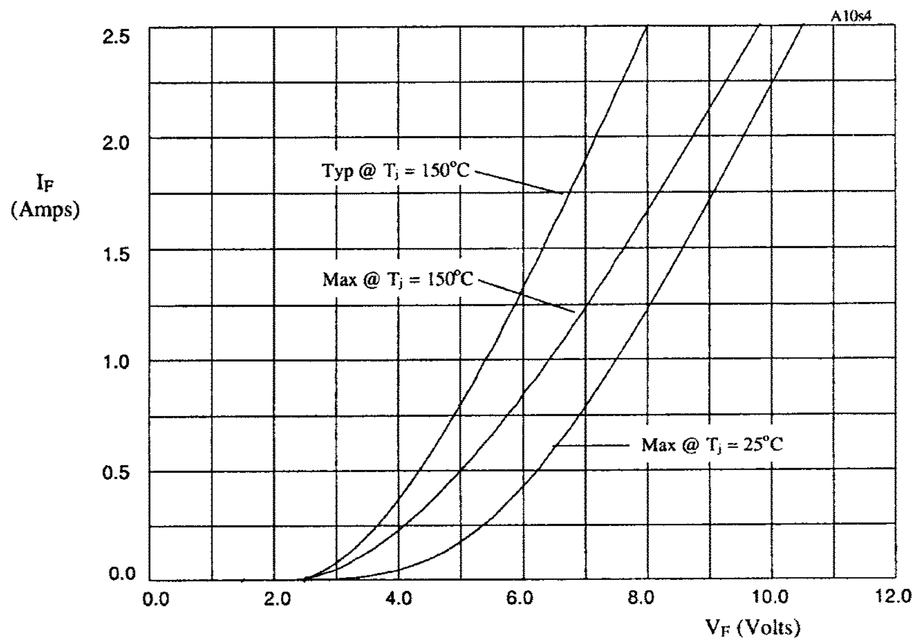


Figure 1. Forward voltage drop as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
SHVM2.5	x1
SHVM5	x2
SHVM7.5	x3
SHVM10	x4
SHVM12.5	x5
SHVM15	x6

6

HIGH VOLTAGE, HIGH DENSITY, FAST RECOVERY MODULAR RECTIFIER ASSEMBLY

- Low reverse recovery time
- Modular construction
- Low reverse leakage current
- High thermal shock resistance
- Provides design versatility

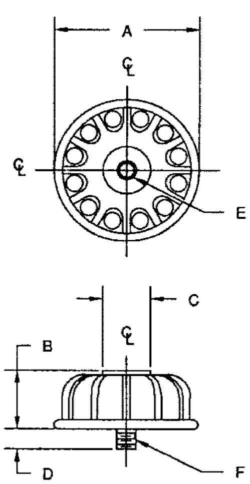
QUICK REFERENCE DATA

- V_R = 2.5kV - 15kV
- I_F = 350mA
- I_R = 0.25µA
- t_{rr} = 350nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current $I_{F(AV)}$ air 25 °C	Average Rectified Current $I_{F(AV)}$ air 100 °C	Average Rectified Current $I_{F(AV)}$ stud to heat-sink @ 25°C	Average Rectified Current $I_{F(AV)}$ in still oil @ 55 °C	1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_{jMAX}	Repetitive Surge Current I_{FRM} @ 25°C	I^2t t_p = 8.3mS
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
SHVM2.5F	2500	0.35	0.15	0.35	0.35	15.0	8.0	0.9
SHVM5F	5000							
SHVM7.5F	7500							
SHVM10F	10000							
SHVM12.5F	12500							
SHVM15F	15000							

MECHANICAL



G20

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	48.3	-	1.9	-
B	-	19.8	-	.78	-
C	-	16.0	-	.63	-
D	-	6.6	-	.26	-
E	TAP'D 1/4-28 UNF				-
F	STUD 1/4-28 UNF				-

polarity - cathode to stud

MAXIMUM THERMAL IMPEDANCES

Junction - Ambient	$R_{\theta JA}$ < 12°C/W
Junction - Stud	$R_{\theta JS}$ < 6°C/W
Junction - Oil	$R_{\theta JO}$ < 4.5°C/W

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @V_{RWM}		Maximum Reverse Recovery Time [1] t_{rr} @ 25°C	Maximum Forward Voltage V_F @ 0.8A @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	nS	Volts
SHVM2.5F	1.0	50	350	7
SHVM5F	1.0	50	350	14
SHVM7.5F	1.0	50	350	21
SHVM10F	1.0	50	350	28
SHVM12.5F	1.0	50	350	35
SHVM15F	1.0	50	350	42

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

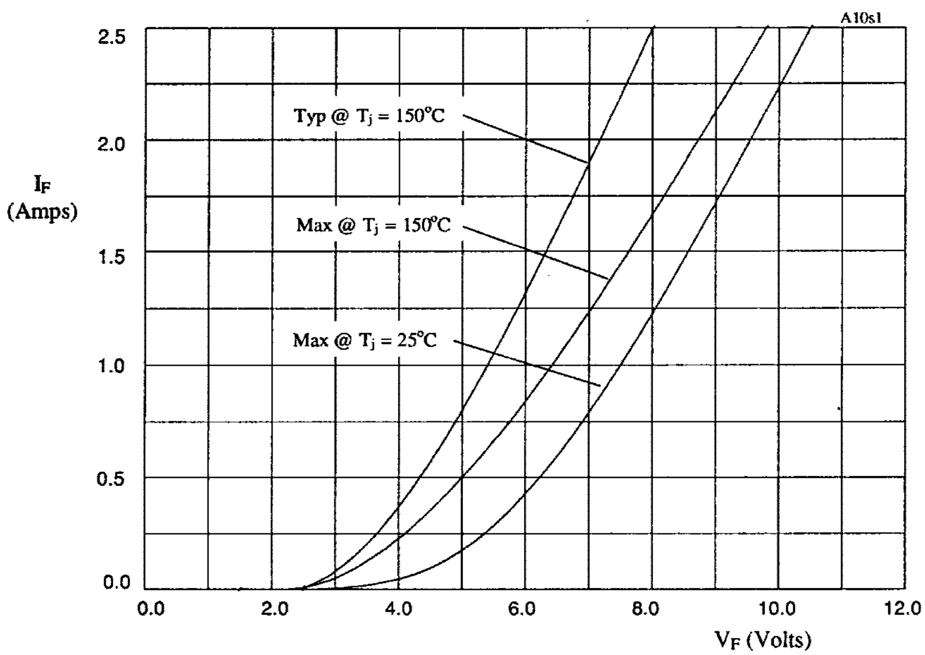


Figure 1. Forward voltage drop as a function of forward current.

TABLE 1

DEVICE	X-AXIS
SHVM2.5F	x1
SHVM5F	x2
SHVM7.5F	x3
SHVM10F	x4
SHVM12.5F	x5
SHVM15F	x6

HIGH VOLTAGE, HIGH DENSITY, STANDARD RECOVERY MODULAR RECTIFIER ASSEMBLY

- Up to 15kV reverse voltage
- Modular construction
- Low reverse leakage current
- High thermal shock resistance
- Provides design versatility

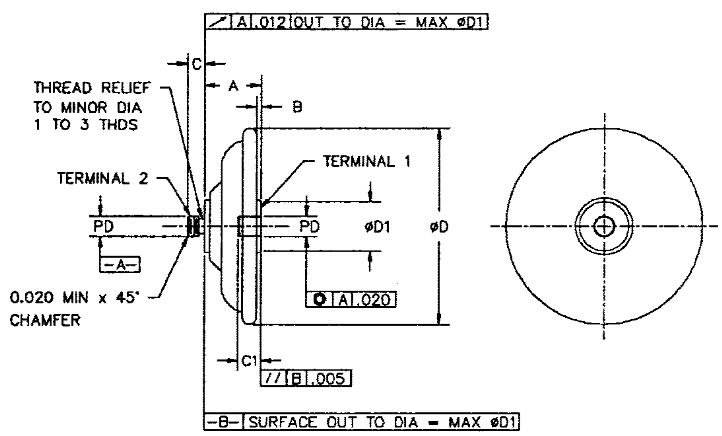
QUICK REFERENCE DATA

- V_R = 7.5kV - 10kV
- I_F = to 3.75A
- I_R = 1.0µA
- I_{FSM} = 50A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Rectified Current $I_{F(AV)}$			1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_{jMAX}	I^2t t_p = 8.3mS @ 25°C
		Air @ 25°C	Air @ 100°C	Still oil @ 55 °C		
	Volts	Amps	Amps	Amps	Amps	A^2S
SHVS7.5	7500	2.4	1.3	3.75	100	37
SHVS10	10000	2.2	1.2	3.4	100	37

MECHANICAL



5. MODULE CONTOUR WITHIN DIMENSION A NOT SPECIFIED
4. CATHODE CONNECTED TO TERMINAL 2
3. THREADED INSERT 1/4-28UNF-2B
2. THREADED STUD 1/4-28UNF-2A
1. ALL MARKINGS SHALL BE ON CATHODE SIDE OF MODULE

DIMENSIONS					
DIM^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.970	1.020	24.6	26.0	5
B	0.050	0.080	1.27	2.03	
C	0.307	0.317	7.80	8.05	2,4
C1	0.318	0.400	8.08	10.16	3
ØD	3.45	3.65	87.6	92.8	
ØD1	0.95	1.25	24.1	31.8	

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Forward Voltage V_F @ 3.0A @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	µS
SHVS7.5	1.0	10	9.2	5.0
SHVS10	1.0	10	11.5	5.0

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

6

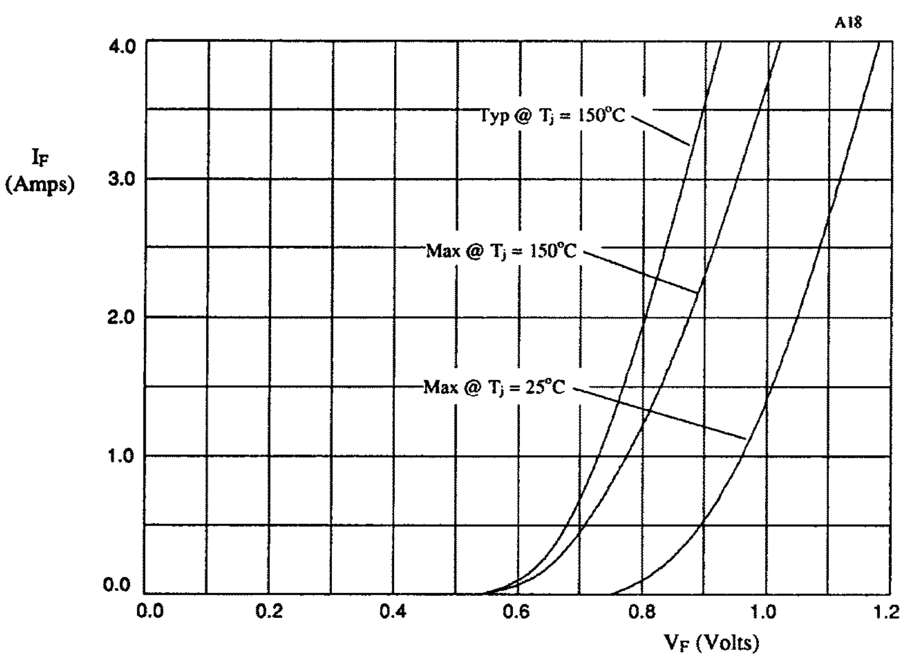


Figure 1. Forward voltage drop as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
SHVS7.5	x8
SHVS10	x10

6

HIGH VOLTAGE, HIGH DENSITY, FAST RECOVERY MODULAR RECTIFIER ASSEMBLY

- Low reverse recovery time
- Low reverse leakage current
- High thermal shock resistance
- Modular construction
- Low distributed capacitance

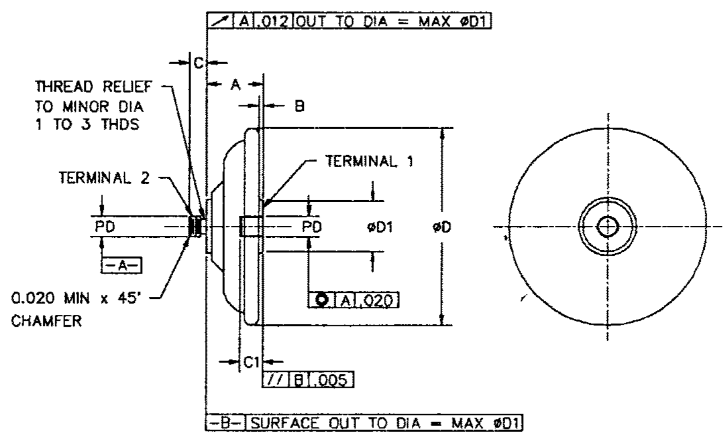
QUICK REFERENCE DATA

- V_R = 5000 - 10000V
- I_F = to 4.0A
- I_{FSM} = 80A
- t_{rr} = 300nS

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Rectified Current $I_{F(AV)}$			1 Cycle Surge Current I_{FSM} t_p = 8.3mS @ T_{jMAX}	I^2t t_p = 8.3mS
		air 25 °C	air 100 °C	in still oil @ 55 °C		
	Volts	Amps	Amps	Amps	Amps	A^2S
SHVS5F	5000	2.75	1.6	4.0	80	24
SHVS7.5F	7500	2.0	1.2	3.2	80	24
SHVM10F	10000	1.9	1.1	2.9	80	24

MECHANICAL



5. MODULE CONTOUR WITHIN DIMENSION A NOT SPECIFIED
4. CATHODE CONNECTED TO TERMINAL 2
3. THREADED INSERT 1/4-28UNF-2B
2. THREADED STUD 1/4-28UNF-2A
1. ALL MARKINGS SHALL BE ON CATHODE SIDE OF MODULE

DIMENSIONS					
DIM"	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.970	1.020	24.6	26.0	5
B	0.050	0.080	1.27	2.03	
C	0.307	0.317	7.80	8.05	2,4
C1	0.318	0.400	8.08	10.16	3
ØD	3.45	3.65	87.6	92.8	
ØD1	0.95	1.25	24.1	31.8	

ELECTRICAL CHARACTERISTICS

Device Type	Maximum Reverse Leakage Current I_R @ V_{RWM}		Maximum Reverse Recovery Time[1] t_{rr} @ 25°C	Maximum Forward Voltage V_F @ 25°C @3A
	@ 25 °C	@ 100 °C		
	μA	μA	nS	Volts
SHVS5F	1.0	10.0	300	6.5
SHVS7.5F	1.0	10.0	300	10.4
SHVM10F	1.0	10.0	300	13

1. Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

6

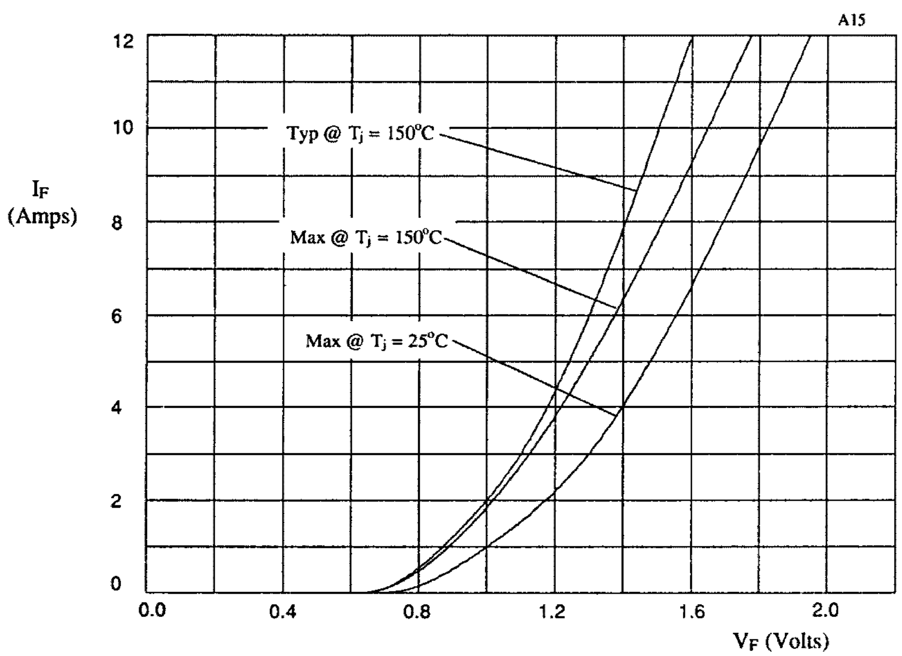


Figure 1. Forward voltage drop as a function of forward current (See TABLE 1)

TABLE 1

DEVICE	X-AXIS
SHVS5F	x5
SHVS7.5F	x8
SHVS10F	x10

SEMTECH

POWER DISCRETES

Description

Quick reference data

V_R = 2500V - 15000V
I_F = 0.5A
I_r = 5μA
I_{FSM} = 35A

Features

- Low forward voltage drop
- Low reverse leakage current
- High thermal shock resistance

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Types	V_{RWM}	$I_{F\,(AV)}$ T_A= 25°C	$I_{F\,(AV)}$ T_A= 55°C	I_{FRM}	I_{FSM}	I_R @ $V_{RWM,}$ T_A= 25°C	I_R @ $V_{RWM,}$ T_A= 100°C	V_f @ $I_{F(AV)}$ T_A= 25°C	t_{rr}	Dim "C" (See Table G21)
	Volts	Amps	Amps	Amps	Amps	μA	μA	Volts	ns	Inches
SLF2500	2500	0.5	0.5	10	35	5	100	4	300	1.145
SLF5000	5000	0.5	0.5	10	35	5	100	7.5	300	1.145
SLF10000	10000	0.5	0.5	10	35	5	100	15	300	2.020
SLF15000	15000	0.5	0.5	10	35	5	100	22.5	300	2.770

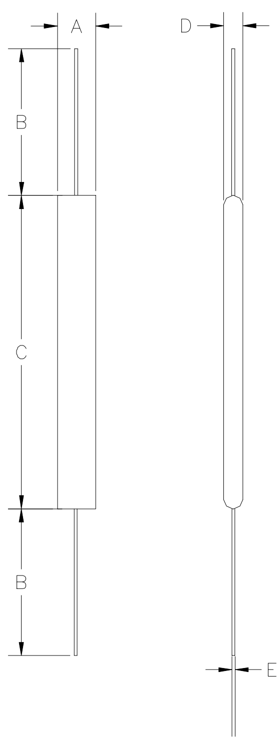
POWER DISCRETES

Ordering Information

Part Number	Description
SLF2500 SLF5000 SLF10000 SLF15000	Axial lead(1)

Note:
(1) Available in trays. Please consult factory for quantities.

Outline Drawing



G21

DIMN	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	-	.52	-	13.2	-
B	2.00	-	50.8	-	-
C	SEE TABLE (Page 1)				
D	-	.26	-	6.6	-
E	.048	.054	1.22	1.37	-

6

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

Chapter 7

Single Phase Center Tap and Doubler Assemblies

Standard Recovery High Power Doubler and Center Taps

POWER DISCRETES

Description

Quick reference data

V_R = 8kV - 48kV
I_F = 7.5A - 10.0A (in oil)
I_R = 1.0μA
I_{FSM} = 150A

Features

- Up to 48kV reverse voltage
- Air or oil environment
- High reverse surge current
- High thermal shock resistance
- Integral cooling fins

Absolute Maximum Ratings

(Apply per leg)

Device Type	Working Reverse Voltage V_{RWM}	Average Rectifier Current $I_{F(AV)}$ air @ 25°C	air @ 65°C	forced air 600CFM @ 55°C	in oil @ 25°C	1 Cycle Surge Current tp = 8.3mS @ 25°C	@ 100°C	Repetitve Surge Current @ 25°C	I^2t tp = 8.3mS @ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S1KW8C-1*	8000	4.0	2.75	8.0	10.0	150	100	45.0	90
S1KW16C-2*	16000	3.0	2.0	6.0	7.5				
S1KW24C-3*	24000	3.0	2.0	6.0	7.5				
S1KW32C-4*	32000	3.0	2.0	6.0	7.5				
S1KW40C-5*	40000	3.0	2.0	6.0	7.5				
S1KW48C-6*	48000	3.0	2.0	6.0	7.5				

* add suffix for desired circuit arrangement:
D = Doubler, N = Negative center tap, P = Positive center tap
(I_O x 0.5 for doubler)

Electrical Characteristics

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 3.0A @ 25°C	Maximum Reverse Recovery Time[1] trr @ 25°C
	@ 25°C	@ 100°C		
	µA	µA	Volts	µS
S1KW8C-1*	1.0	20.0	8	2.0
S1KW16C-2*			16	
S1KW24C-3*			24	
S1KW32C-4*			32	
S1KW40C-5*			40	
S1KW48C-6*			48	

Note:
(1) Measured on discrete devices prior to assembly.

Operating temperature range: -55°C to +150°C.
Storage temperature range: -55°C to +150°C.

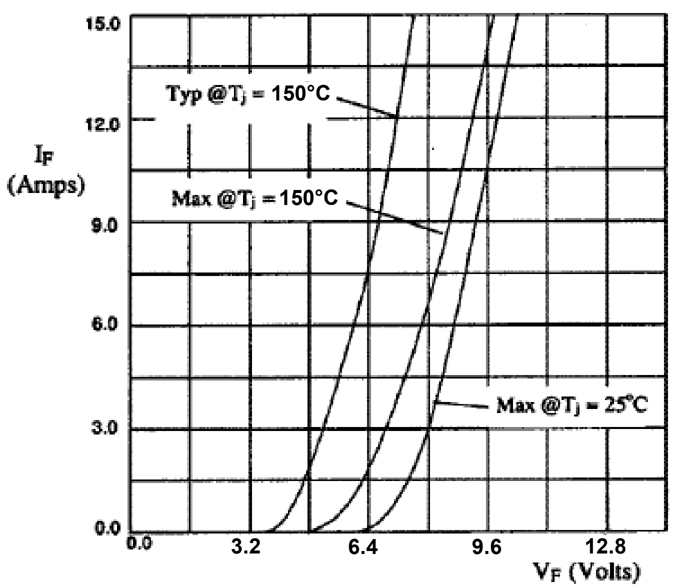
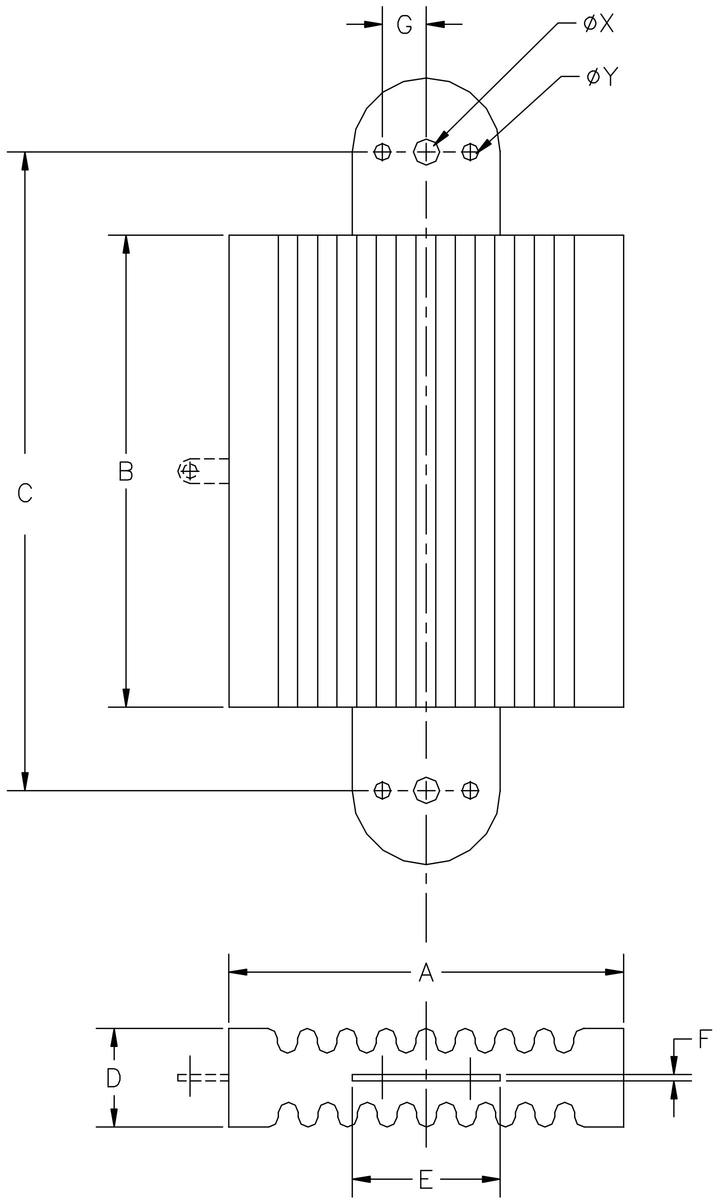


Table 1

Device Type	X-AXIS
S1KW8C-1*	x1
S1KW16C-2*	x2
S1KW24C-3*	x3
S1KW32C-4*	x4
S1KW40C-5*	x5
S1KW48C-6*	x6

Figure 1. Forward voltage drop per leg as a function of forward current (see Table 1).

Outline Drawing



G23A

Dimensions					
DIM[N]	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	-	4.0	-	102	-
B	See Table				-
C	See Table				-
D	-	1.0	-	25.4	-
E	1.45	1.55	36.8	39.4	-
F	.047	.090	1.2	2.3	
G	.415	.475	10.5	12.1	
X	.245	.285	6.2	7.2	Dia.
Y	.149	.189	3.8	4.8	Dia.

Dimensions (see drawing)	
B ± 0.030"	C ± 0.030"
inches	inches
4.78	6.48
7.98	9.68
11.18	12.88
14.38	16.08
17.58	19.28
20.78	22.48

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

HIGH VOLTAGE, HIGH CURRENT, STANDARD RECOVERY DOUBLER AND CENTER TAPS

- Up to 24kV reverse voltage
- Air or oil environment
- High reverse surge current
- High thermal shock resistance
- Integral cooling fins

QUICK REFERENCE DATA

- V_R = 4kV - 24kV
- I_F = 15 - 20A (in oil)
- I_R = 2.0µA
- I_{FSM} = 250A

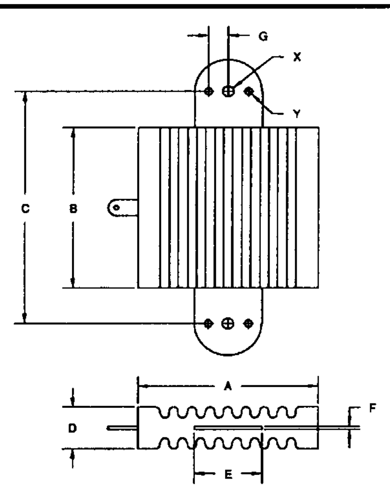
7

ABSOLUTE MAXIMUM RATINGS (apply per leg)

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current				1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current	I^2t t_p = 8.3mS
		air @ 25°C	air @ 65°C	forced air 600CFM @ 55°C	in oil @ 25°C	@ 25°C	@ 100°C	@ 25°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S2KW4C-1*	4000	8.0	5.5	16	20	250	150	45.0	240
S2KW8C-2*	8000	6.0	4.1	12	15				
S2KW12C-3*	12000	6.0	4.1	12	15				
S2KW16C-4*	16000	6.0	4.1	12	15				
S2KW20C-5*	20000	6.0	4.1	12	15				
S2KW24C-6*	24000	6.0	4.1	12	15				

* add suffix for desired circuit arrangement
D = doubler, N = Negative center tap, P = positive center tap
(I_O x 0.5 for doubler)

MECHANICAL



G23A

DIMENSIONS					
DIM "	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	-	102	-	4.0	-
B	SEE TABLE				-
C	SEE TABLE				-
D	-	25.4	-	1.0	-
E	36.8	39.4	1.45	1.55	-
F	1.2	2.3	.047	.090	-
G	10.5	12.1	.415	.475	-
X	6.2	7.2	.245	.285	DIA
Y	3.8	4.8	.149	.189	DIA

Dimensions (see drawing)	
B ±0.030"	C ±0.030"
inches	inches
4.78	6.48
7.98	9.68
11.18	12.88
14.38	16.08
17.58	19.28
20.78	22.48

CHARACTERISTICS (apply per leg)

Device Type	Reverse Current @ V_{RWM} @ 25 °C	Reverse Current @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 6.0A @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	µA	µA	Volts	µS
S2KW4C-1*	↑	↑	4.0	↑
S2KW8C-2*			8.0	
S2KW12C-3*	2.0	40	12	2.0
S2KW16C-4*			16	
S2KW20C-5*			20	
S2KW24C-6*	↓	↓	24	↓

[1] Measured on discrete devices prior to assembly

Operating temperature range	-55 °C to +150 °C
Storage temperature range	-55 °C to +150 °C

7

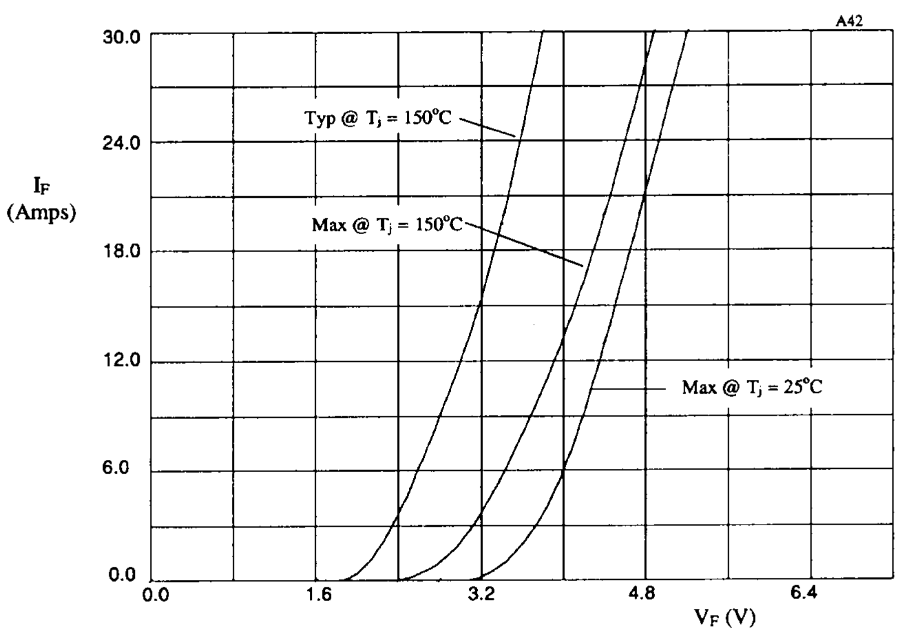


Figure 1. Forward voltage drop per leg as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
S2KW4C-1*	x1
S2KW8C-2*	x2
S2KW12C-3*	x3
S2KW16C-4*	x4
S2KW20C-5*	x5
S2KW24C-6*	x6

SEMTECH

HIGH VOLTAGE, HIGH CURRENT, STANDARD RECOVERY DOUBLER AND CENTER TAPS

- Up to 12kV reverse voltage
- Air or oil environment
- Low reverse leakage currents
- High forward current and surge ratings
- Integral cooling fins

QUICK REFERENCE DATA

- V_R = 2kV - 12kV
- I_F = 30 - 40A (in oil)
- I_R = 4.0µA
- I_{FSM} = 500A

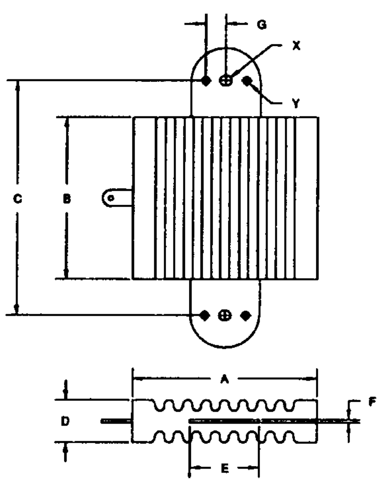
7

ABSOLUTE MAXIMUM RATINGS (apply per leg)

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current				1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current	I^2t t_p = 8.3mS
		air @ 25°C	air @ 65°C	forced air 600CFM @ 55°C	in oil @ 25 °C	@ 25°C	@ 100°C	@ 25°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	A^2S
S4KW2C-1*	2000	16	11	16	40	500	400	80	975
S4KW4C-2*	4000	12	8	12	30				
S4KW6C-3*	6000	12	8	12	30				
S4KW8C-4*	8000	12	8	12	30				
S4KW10C-5*	10000	12	8	12	30				
S4KW12C-6*	12000	12	8	12	30				

* add suffix for desired circuit arrangement
D = doubler, N = Negative center tap, P = positive center tap
(Io x 0.5 for doubler)

MECHANICAL



G23A

DIM *	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	-	102	-	4.0	-
B	SEE TABLE				-
C	SEE TABLE				-
D	-	25.4	-	1.0	-
E	36.8	39.4	1.45	1.55	-
F	1.2	2.3	.047	.090	-
G	10.5	12.1	.415	.475	-
X	6.2	7.2	.245	.285	DIA
Y	3.8	4.8	.149	.189	DIA

Dimensions (see drawing)	
B ±0.030"	C ±0.030"
inches	inches
4.78	6.48
7.98	9.68
11.18	12.88
14.38	16.08
17.58	19.28
20.78	22.48

CHARACTERISTICS (apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 12A @ 25°C	Maximum Reverse Recovery Time [1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	µS
S4KW2C-1*	4.0	80	2.00	2.0
S4KW4C-2*	4.0	80	4.00	2.0
S4KW6C-3*	4.0	80	6.00	2.0
S4KW8C-4*	4.0	80	8.00	2.0
S4KW10C-5*	4.0	80	10.0	2.0
S4KW12C-6*	4.0	80	12.0	2.0

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

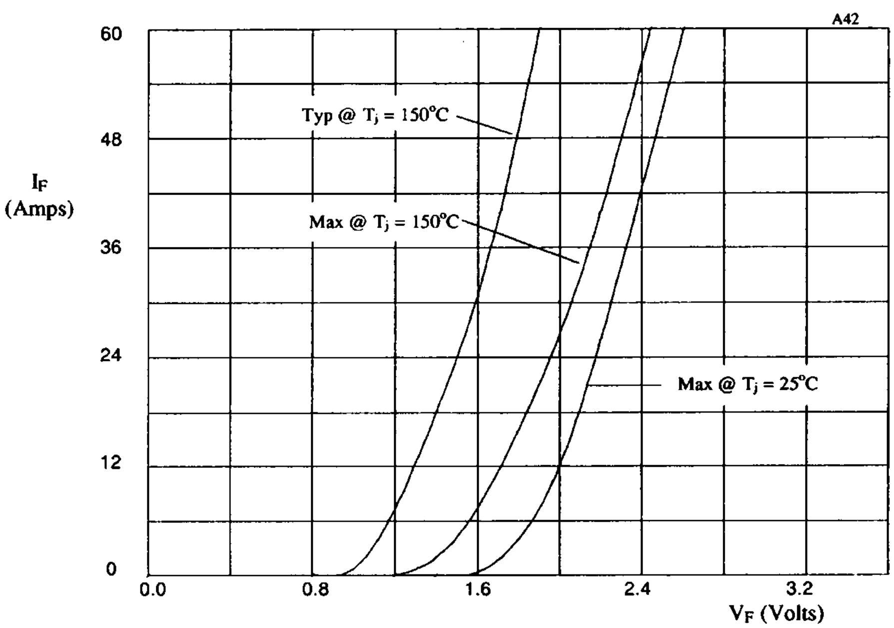


Figure 1. Forward voltage drop per leg as a function of forward current for use with table 1.

TABLE 1

DEVICE	X-axis
S4KW2C-1*	x1
S4KW4C-2*	x2
S4KW6C-3*	x3
S4KW8C-4*	x4
S4KW10C-5*	x5
S4KW12C-6*	x6

STANDARD RECOVERY, MEDIUM CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Universal 3-way terminals

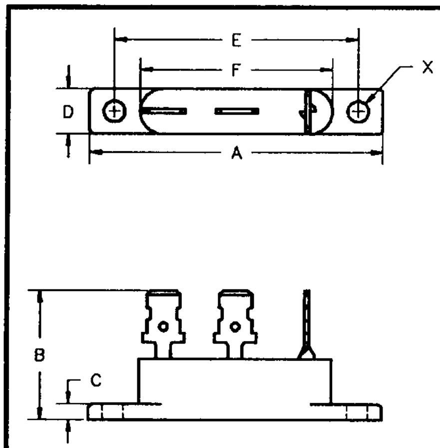
QUICK REFERENCE DATA

- V_R = 50V - 600V
- I_F = 15A
- I_R = 1.0 µA
- V_F = 1.0V

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			Average Rectified Current (@ ambient temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		55°C	100°C	125°C	25°C	55°C	100°C	25°C	100°C	25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCDA05	50	↑	↑	↑	↑	↑	↑	↑	↑	↑
SCDA1	100									
SCDA2	200	7.5	5.0	2.5	2.5	2.0	1.25	150	100	25
SCDA4	400									
SCDA6	600	↓	↓	↓	↓	↓	↓	↓	↓	↓
SCNA05 SCPA05	50	↑	↑	↑	↑	↑	↑	↑	↑	↑
SCNA1 SCPA1	100									
SCNA2 SCPA2	200	15.0	10.0	5.0	5.0	4.0	2.5	150	100	25
SCNA4 SCPA4	400									
SCNA6 SCPA6	600	↓	↓	↓	↓	↓	↓	↓	↓	↓

MECHANICAL



G24

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	56.4	57.9	2.22	2.28	–
B	–	25.4	–	1.00	–
C	2.5	3.8	.10	.15	–
D	8.1	9.6	.32	.38	–
E	46.7	48.3	1.84	1.90	–
F	36.8	37.8	1.45	1.49	–
X	3.8	4.3	.149	.171	–

NOTES:
1. TERMINAL LAYOUT SHOWN FOR DOUBLER. CATHODE TERMINALS PERPENDICULAR TO UNIT AXIS
2. TERMINALS SUITABLE FOR .25" 'FASTON' CONNECTORS OR SOLDERING.

Maximum thermal impedance
$R_{\theta JC}$ = 4°C/W

7

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM} @ 25 °C	Reverse Current @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 3.0A @ 25°C	Maximum Reverse Recovery Time[1]
	μA	μA	Volts	μS
SCDA05				
SCDA1				
SCDA2	1.0	20	1.0	
SCDA4				
SCDA6				
				2.0
SCNA05 SCPA05				
SCNA1 SCPA1				
SCNA2 SCPA2	1.0	20	1.0	
SCNA4 SCPA4				
SCNA6 SCPA6				

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

7

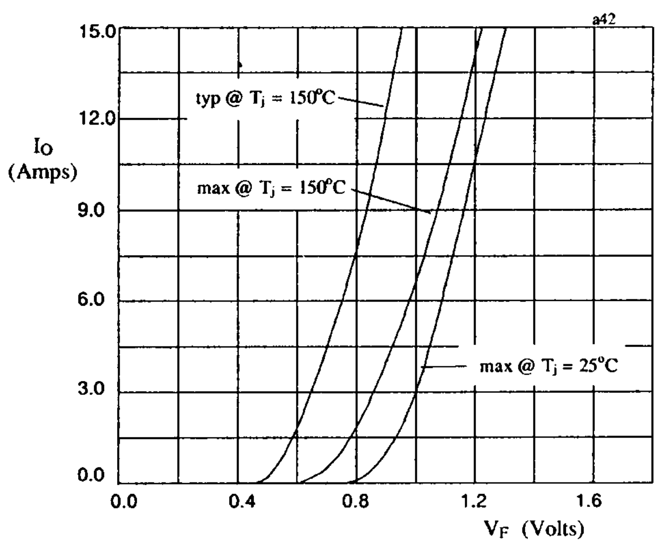


Fig 1. Forward voltage drop against current (per leg)

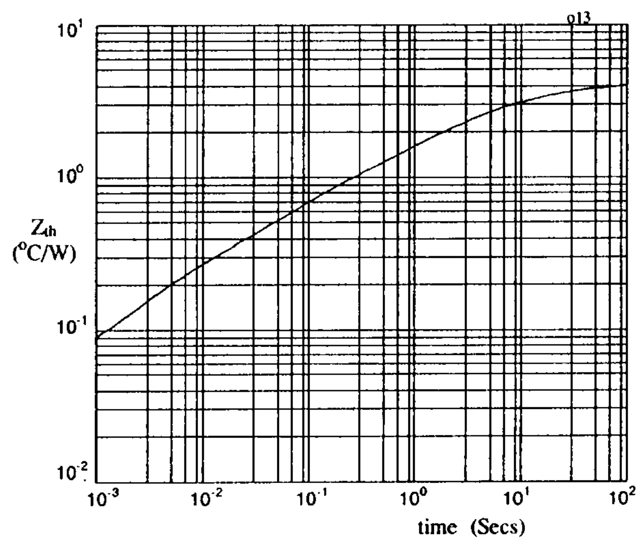


Fig 2. Transient thermal impedance characteristic per leg

FAST RECOVERY, MEDIUM CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Fast reverse recovery time

QUICK REFERENCE DATA

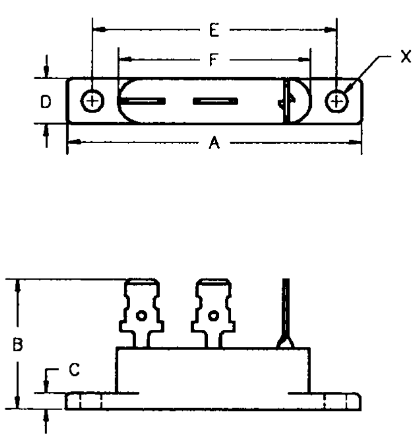
- V_R = 50V - 400V
- I_F = 15.0A
- I_R = 1.0 µA
- t_{rr} = 150nS

7

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			Average Rectified Current (@ ambient temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		55°C	100°C	125°C	25°C	55°C	100°C	25°C	100°C	25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCDA05F SCDA1F SCDA2F SCDA4F	50 100 200 400	7.5	5.0	2.5	1.50	1.15	0.6	150	100	25
SCNA05F SCPA05F SCNA1F SCPA1F SCNA2F SCPA2F SCNA4F SCPA4F	50 100 200 400	15.0	10.0	5.0	3.00	2.30	1.2	150	100	25

MECHANICAL



G24

DIMENSIONS					
DIM"	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	56.4	57.9	2.22	2.28	–
B	–	25.4	–	1.00	–
C	2.5	3.8	.10	.15	–
D	8.1	9.6	.32	.38	–
E	46.7	48.3	1.84	1.90	–
F	36.8	37.8	1.45	1.49	–
X	3.8	4.3	.149	.171	–

NOTES:
1. TERMINAL LAYOUT SHOWN FOR DOUBLER. CATHODE TERMINALS PERPENDICULAR TO UNIT AXIS
2. TERMINALS SUITABLE FOR .25" 'FASTON' CONNECTORS OR SOLDERING.

Maximum thermal impedance
$R_{\theta JC}$ = 4°C/W

ELECTRICAL CHARACTERISTICS (apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 3.0A @ 25°C	Maximum Reverse Recovery Time[1]
	@ 25 °C	@ 100 °C		
	μA	μA	Volts	nS
SCDA05F SCDA1F SCDA2F SCDA4F	1.0	20	1.1	150
SCNA05F SCPA05F SCNA1F SCPA1F SCNA2F SCPA2F SCNA4F SCPA4F	1.0	20	1.1	

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

7

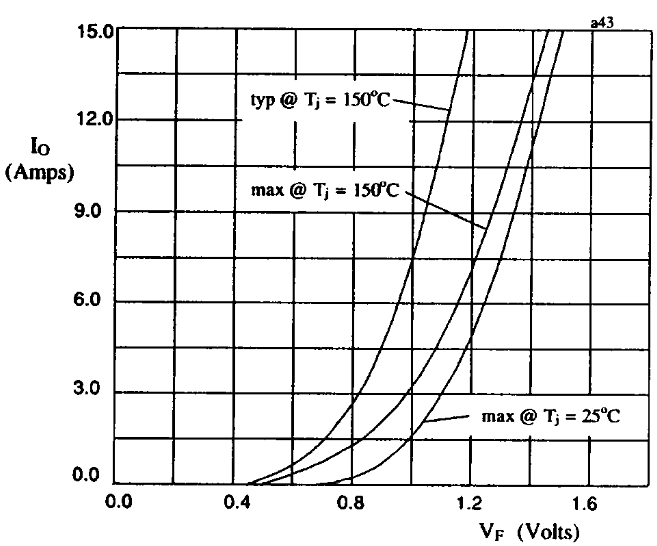


Fig 1. Forward voltage drop against current (per leg)

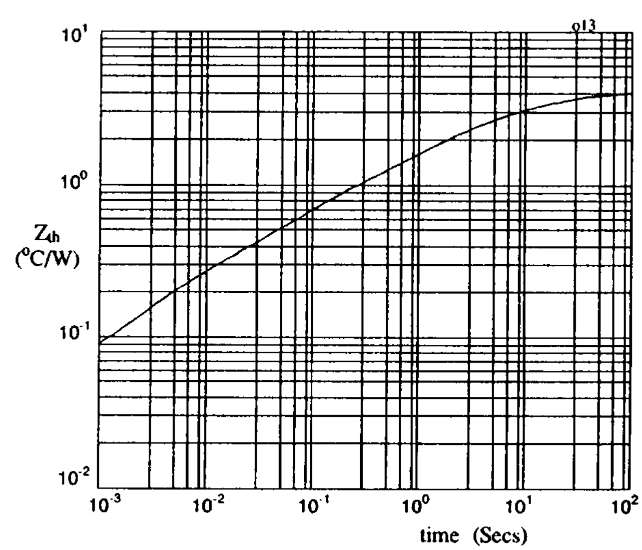


Fig 2. Transient thermal impedance characteristic per leg

SUPERFAST RECOVERY, MEDIUM CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- Very low reverse recovery time

QUICK REFERENCE DATA

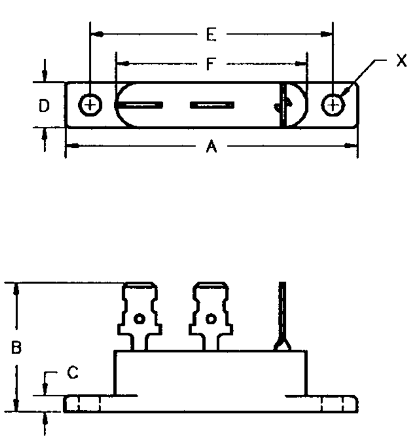
- V_R = 50V - 150V
- I_F = 15A
- I_R = 10µA
- t_{rr} = 30nS

7

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			Average Rectified Current (@ ambient temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		55°C	100°C	125°C	25°C	55°C	100°C	25°C	100°C	25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps	Amps
SCDA05FF SCDA10FF SCDA15FF	50 100 150	7.5	5.0	2.5	2.25	1.75	1.0	175	120	24
SCNA05FF SCNA10FF SCNA15FF	50 100 150	15	10	5	4.5	3.5	2.0	175	120	24
SCPA05FF SCPA10FF SCPA15FF	50 100 150	15	10	5	4.5	3.5	2.0	175	120	24

MECHANICAL



G24

DIM*	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	56.4	57.9	2.22	2.28	–
B	–	25.4	–	1.00	–
C	2.5	3.8	.10	.15	–
D	8.1	9.6	.32	.38	–
E	46.7	48.3	1.84	1.90	–
F	36.8	37.8	1.45	1.49	–
X	3.8	4.3	.149	.171	–

NOTES:
1. TERMINAL LAYOUT SHOWN FOR DOUBLER. CATHODE TERMINALS PERPENDICULAR TO UNIT AXIS
2. TERMINALS SUITABLE FOR .25" 'FASTON' CONNECTORS OR SOLDERING.

Maximum thermal impedance
$R_{\theta JC}$ = 4°C/W

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 5.0A @ 25°C	Maximum Reverse Recovery Time[1]
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	nS
SCDA05FF SCDA10FF SCDA15FF	10	500	0.97	30
SCNA05FF SCNA10FF SCNA15FF	10	500	0.97	30
SCPA05FF SCPA10FF SCPA15FF	10	500	0.97	30

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

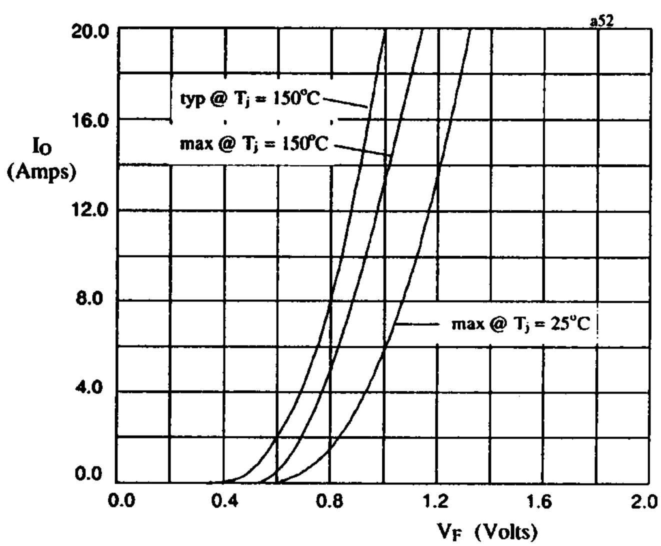


Fig 1. Forward voltage drop against current (per leg)

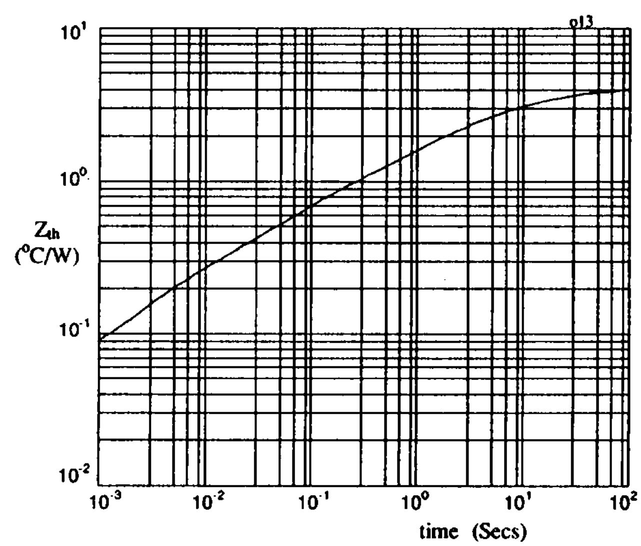


Fig 2. Transient thermal impedance characteristic per leg

STANDARD RECOVERY, HIGH CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- High forward surge rating

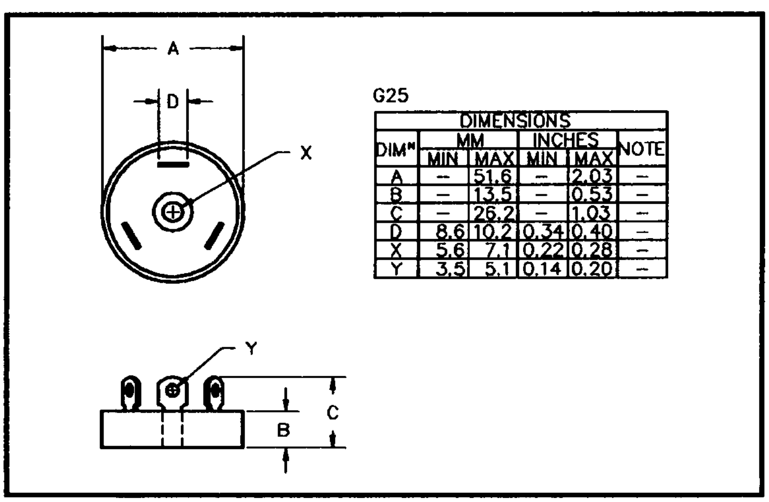
QUICK REFERENCE DATA

- V_R = 50V - 1000V
- I_F = 45A
- I_R = 3.0μA
- V_F = 1.0V

ABSOLUTE MAXIMUM RATINGS

Device Type		Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
			@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25°C
		Volts	Amps	Amps	Amps	Amps	Amps	Amps
SCDAR05		50	22.5	17.5	10.0	375	300	70
SCDAR1		100						
SCDAR2		200						
SCDAR4		400						
SCDAR6		600						
SCDAR8		800						
SCDAR10		1000						
SCNAR05	SCPAR05	50	45.0	35.0	20.0	375	300	70
SCNAR1	SCPAR1	100						
SCNAR2	SCPAR2	200						
SCNAR4	SCPAR4	400						
SCNAR6	SCPAR6	600						
SCNAR8	SCPAR8	800						
SCNAR10	SCPAR10	1000						

MECHANICAL



G25

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	13.5	–	0.53	–
C	–	26.2	–	1.03	–
D	8.6	10.2	0.34	0.40	–
X	5.6	7.1	0.22	0.28	–
Y	3.5	5.1	0.14	0.20	–

Maximum thermal impedance
$R_{\theta JC}$ = 1.5°C/W

Approximate mass = 75g

7

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM} @ 25 °C	Reverse Current @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 9.0A @ 25°C	Maximum Reverse Recovery Time [1]
	µA	µA	Volts	µS
SCDAR05 SCDAR1 SCDAR2 SCDAR4 SCDAR6 SCDAR8 SCDAR10	3.0	60	1.0	2.0
SCNAR05 SCPAR05 SCNAR1 SCPAR1 SCNAR2 SCPAR2 SCNAR4 SCPAR4 SCNAR6 SCPAR6 SCNAR8 SCPAR8 SCNAR10 SCPAR10	3.0	60	1.0	

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

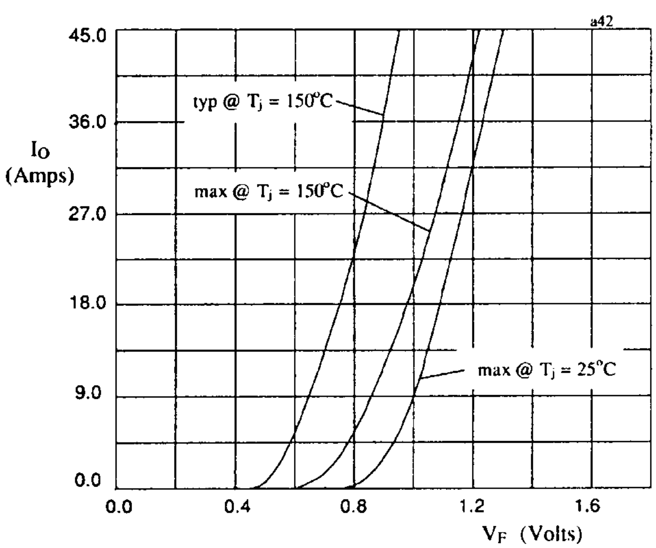


Fig 1. Forward voltage drop against current (per leg)

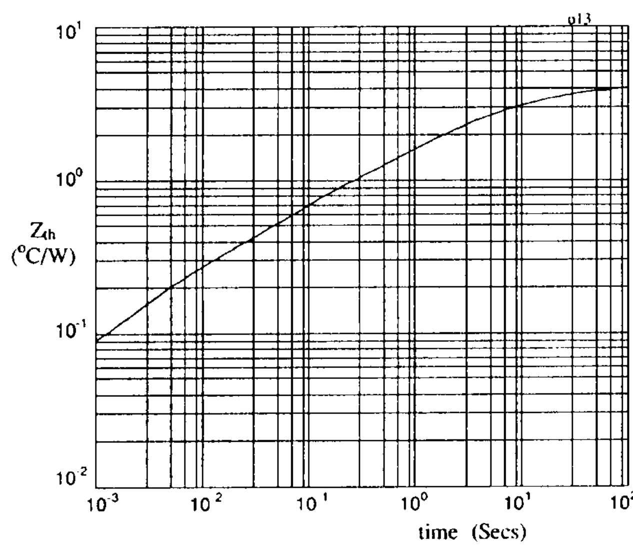


Fig 2. Transient thermal impedance characteristic per leg

FAST RECOVERY, HIGH CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Fast reverse recovery time
- Low thermal impedance
- High forward current rating

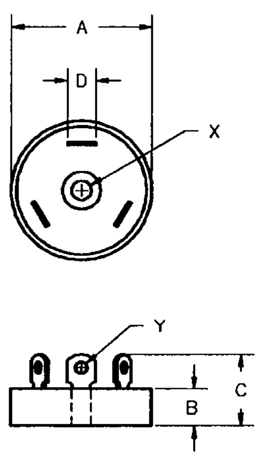
QUICK REFERENCE DATA

- V_R = 50V - 400V
- I_F = 40.0A
- t_{rr} = 150nS
- V_F = 1.0V

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps
SCDAR05F SCDAR1F SCDAR2F SCDAR4F	50 100 200 400	20.0	15.5	9.0	450	300	70.0
SCNAR05F SCPAR05F SCNAR1F SCPAR1F SCNAR2F SCPAR2F SCNAR4F SCPAR4F	50 100 200 400	40.0	31.0	18.0	450	300	70.0

MECHANICAL



G25

DIM'N	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	51.6	–	2.03	–
B	–	13.5	–	0.53	–
C	–	26.2	–	1.03	–
D	8.6	10.2	0.34	0.40	–
X	5.6	7.1	0.22	0.28	–
Y	3.5	5.1	0.14	0.20	–

Maximum thermal impedance
$R_{\theta JC}$ = 1.5°C/W

Approximate mass = 75g

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 9.0A @ 25°C	Maximum Reverse Recovery Time[1]
	@ 25 °C	@ 100 °C		
	μA	μA	Volts	nS
SCDAR05F SCDAR1F SCDAR2F SCDAR4F	3.0	60	1.1	150
SCNAR05F SCPAR05F SCNAR1F SCPAR1F SCNAR2F SCPAR2F SCNAR4F SCPAR4F	3.0	60	1.1	150

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

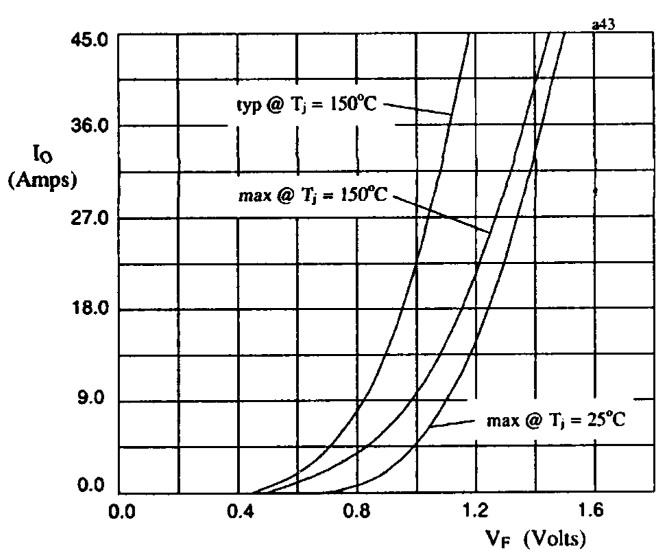


Fig 1. Forward voltage drop against current (per leg)

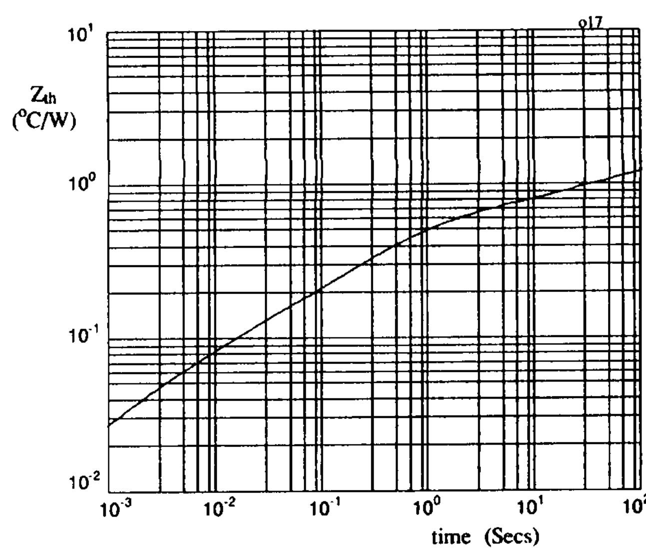


Fig 2. Transient thermal impedance characteristic per leg

SUPERFAST RECOVERY, HIGH CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Very fast reverse recovery time
- Low thermal impedance
- High forward and surge currents

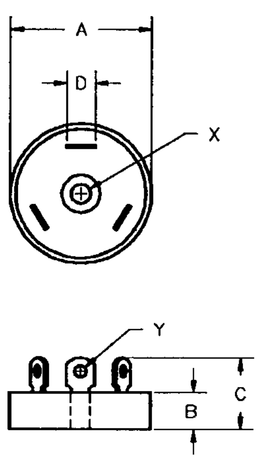
QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 45A
- t_{rr} = 30nS
- V_F = 0.97V

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps
SCDAR05FF SCDAR10FF SCDAR15FF	50 100 150	22.5	17.5	10	450	375	70
SCNAR05FF SCNAR10FF SCNAR15FF	50 100 150	45	35	20	450	375	70
SCPAR05FF SCPAR10FF SCPAR15FF	50 100 150	45	35	20	450	375	70

MECHANICAL



G25

DIMENSIONS					
DIM^N	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	–	51.6	–	2.03	–
B	–	13.5	–	0.53	–
C	–	26.2	–	1.03	–
D	8.6	10.2	0.34	0.40	–
X	5.6	7.1	0.22	0.28	–
Y	3.5	5.1	0.14	0.20	–

Maximum thermal impedance
$R_{\theta JC}$ = 1.5°C/W

Approximate mass = 75g

7

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 15.0A @ 25°C	Maximum Reverse Recovery Time[1]
	@ 25 °C	@ 100 °C		
	µA	mA	Volts	nS
SCDAR05FF SCDAR10FF SCDAR15FF	30	1.5	0.97	30
SCNAR05FF SCNAR10FF SCNAR15FF	30	1.5	0.97	30
SCPAR05FF SCPAR10FF SCPAR15FF	30	1.5	0.97	30

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

7

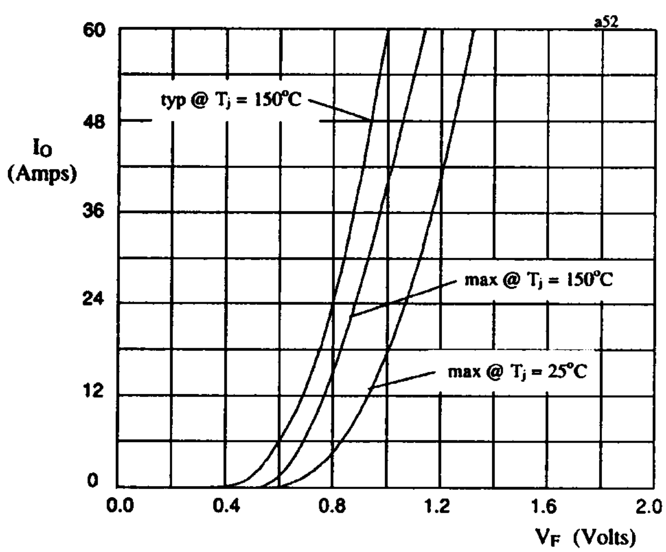


Fig 1. Forward voltage drop against current (per leg)

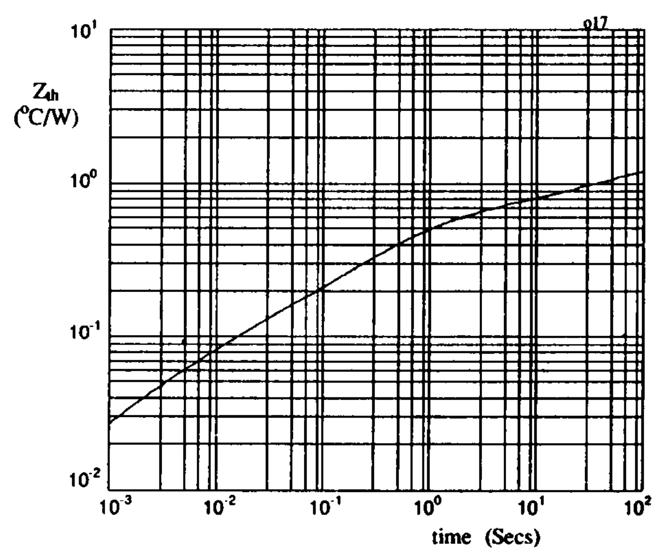


Fig 2. Transient thermal impedance characteristic per leg

STANDARD RECOVERY, HIGH CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Aluminum case
- Low thermal impedance
- High forward current rating

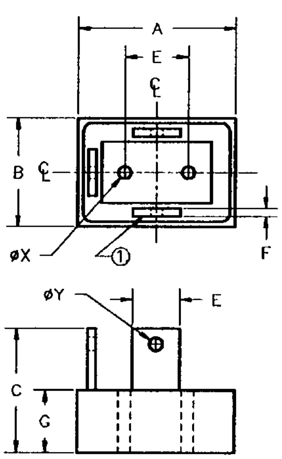
QUICK REFERENCE DATA

- V_R = 50V - 600V
- I_F = 85A
- I_R = 6.0μA
- V_F = 1.0V

ABSOLUTE MAXIMUM RATINGS

Device Type		Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
			@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25°C
		Volts	Amps	Amps	Amps	Amps	Amps	Amps
SCDAS05		50						
SCDAS1		100						
SCDAS2		200	42.5	35	22.5	900	600	120
SCDAS4		400						
SCDAS6		600						
SCNAS05	SCPAS05	50						
SCNAS1	SCPAS1	100						
SCNAS2	SCPAS2	200	85.0	70	45.0	900	600	120
SCNAS4	SCPAS4	400						
SCNAS6	SCPAS6	600						

MECHANICAL



G27A

DIM	DIMENSIONS MM MIN	DIMENSIONS MM MAX	DIMENSIONS INCHES MIN	DIMENSIONS INCHES MAX	NOTE
A	–	64.3	–	2.53	–
B	–	45.5	–	1.78	–
C	–	51.6	–	2.03	–
D	24.6	26.2	0.97	1.03	–
E	–	19.8	–	0.78	–
F	–	3.31	–	0.13	–
G	24.6	26.2	0.97	1.03	–
øX	4.3	5.9	.171	.231	2
øY	4.0	5.6	.159	.219	3

NOTES:
1 A.C. TERMINAL 2 PLCS
2. 2 PLCS
3. 4 PLCS

Maximum thermal impedance
$R_{\theta JC}$ = 0.80°C/W

Approximate mass = 245g

7

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type		Reverse Current @ V_{RWM} @ 25 °C	Reverse Current @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 18.0A @ 25°C	Maximum Reverse Recovery Time[1]
		μA	μA	Volts	μS
SCDAS05 SCDAS1 SCDAS2 SCDAS4 SCDAS6		6.0	120	1.0	2.0
SCNAS05 SCNAS1 SCNAS2 SCNAS4 SCNAS6	SCPAS05 SCPAS1 SCPAS2 SCPAS4 SCPAS6	6.0	120	1.0	

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

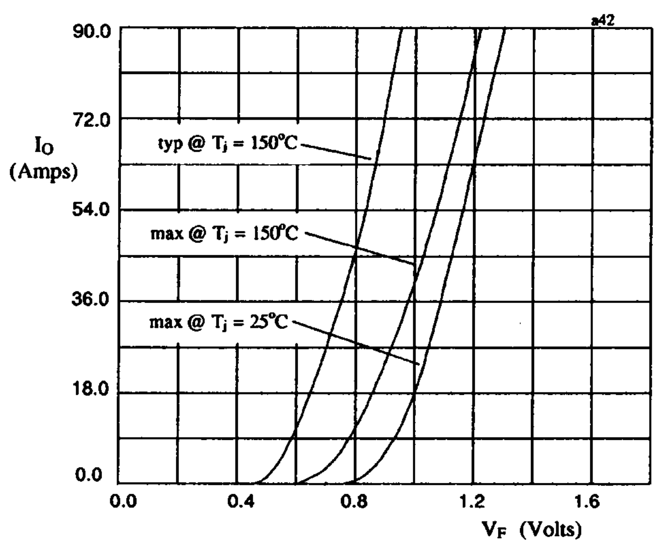


Fig 1. Forward voltage drop against output current (per leg)

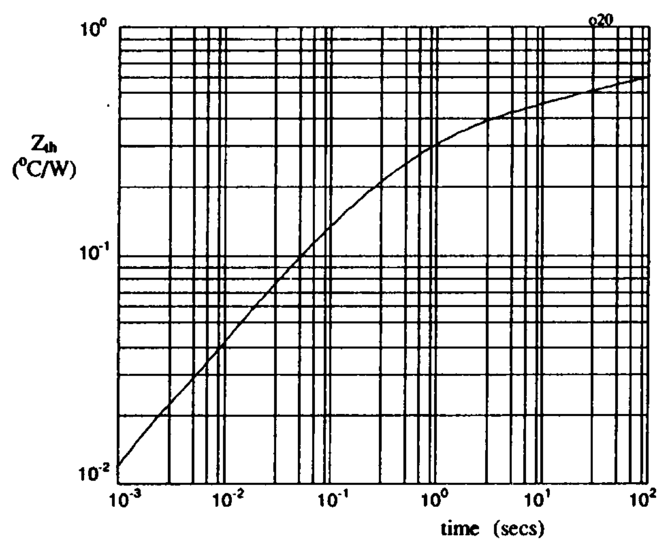


Fig 2. Transient thermal impedance characteristic per leg

FAST RECOVERY, HIGH CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Fast reverse recovery time
- Low thermal impedance
- High forward current rating

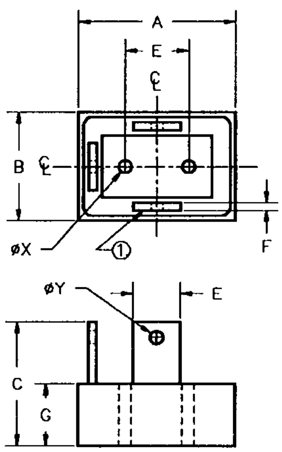
QUICK REFERENCE DATA

- V_R = 50V - 400V
- I_F = 80.0A
- t_{rr} = 150nS
- V_F = 1.0V

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps
SCDAS05F SCDAS1F SCDAS2F SCDAS4F	50 100 200 400	40.0	32.5	21.0	900	600	120
SCNAS05F SCPAS05F SCNAS1F SCPAS1F SCNAS2F SCPAS2F SCNAS4F SCPAS4F	50 100 200 400	80.0	65.0	42.0	900	600	120

MECHANICAL



G27A

DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	64.3	–	2.53	–
B	–	45.5	–	1.78	–
C	–	51.6	–	2.03	–
D	24.6	26.2	0.97	1.03	–
E	–	19.8	–	0.78	–
F	–	3.31	–	0.13	–
G	24.6	26.2	0.97	1.03	–
øX	4.3	5.9	.171	.231	2
øY	4.0	5.6	.159	.219	3

NOTES:
1. A.C. TERMINAL 2 PLCS
2. 2 PLCS
3. 4 PLCS

Maximum thermal impedance
$R_{\theta JC}$ = 0.80°C/W

Approximate mass = 245g

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM} @ 25 °C	Reverse Current @ V_{RWM} @ 100 °C	Maximum Forward Voltage V_F @ 18.0A @ 25°C	Maximum Reverse Recovery Time[1]
	μA	μA	Volts	nS
SCDAS05F SCDAS1F SCDAS2F SCDAS4F	6.0	120	1.1	150
SCNAS05F SCPAS05F SCNAS1F SCPAS1F SCNAS2F SCPAS2F SCNAS4F SCPAS4F	6.0	120	1.1	

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

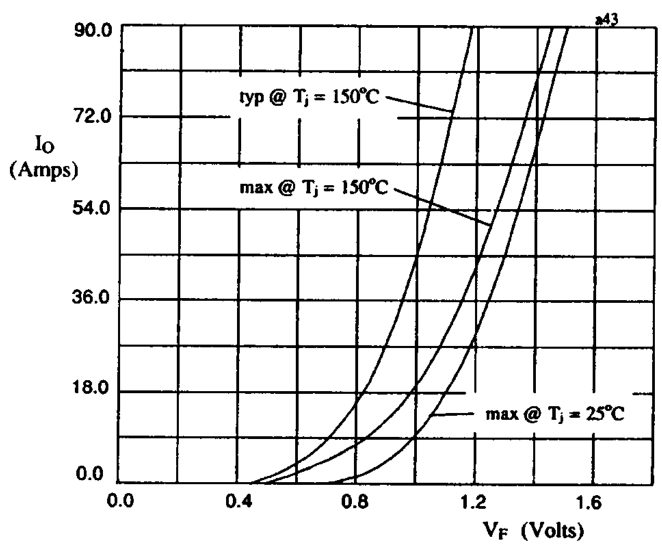


Fig 1. Forward voltage drop against current (per leg)

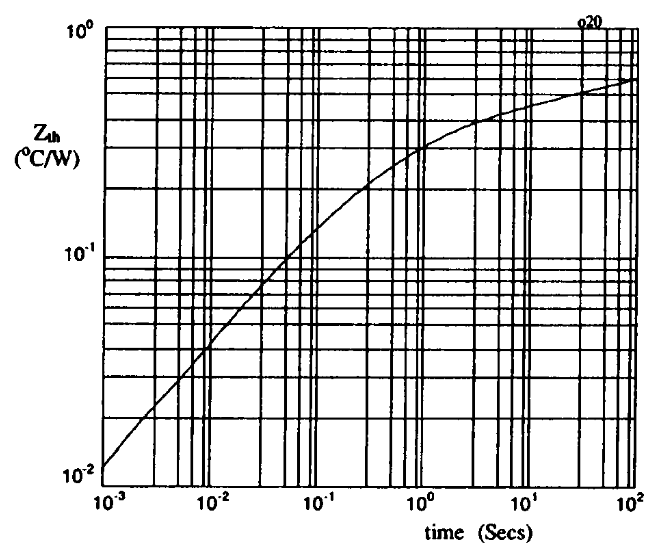


Fig 2. Transient thermal impedance characteristic per leg

SUPERFAST RECOVERY, HIGH CURRENT CENTER TAP AND DOUBLER RECTIFIER ASSEMBLIES

- Low forward voltage drop
- Low reverse leakage current
- Very fast reverse recovery time
- Low thermal impedance
- High forward and surge currents

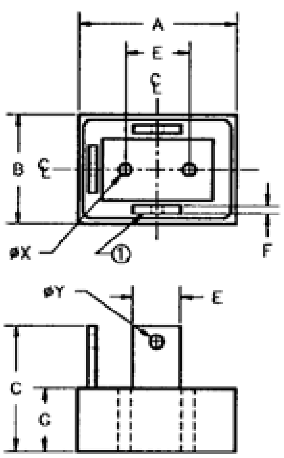
QUICK REFERENCE DATA

- V_R = 50V - 150V
- I_F = 85A
- t_{rr} = 30nS
- V_F = 0.97V

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current (@ case temperature)			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current
		@ 25°C	@ 55°C	@ 100°C	@ 25°C	@ 100°C	@ 25°C
	Volts	Amps	Amps	Amps	Amps	Amps	Amps
SCDAS05FF SCDAS10FF SCDAS15FF	50 100 150	42.5	35	22.5	900	700	135
SCNAS05FF SCNAS10FF SCNAS15FF	50 100 150	85	70	45	900	700	135
SCPAS05FF SCPAS10FF SCPAS15FF	50 100 150	85	70	45	900	700	135

MECHANICAL



G27A

DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	–	64.3	–	2.53	–
B	–	45.5	–	1.78	–
C	–	51.6	–	2.03	–
D	24.6	26.2	0.97	1.03	–
E	–	19.8	–	0.78	–
F	–	3.31	–	0.13	–
G	24.6	26.2	0.97	1.03	–
øX	4.3	5.9	.171	.231	2
øY	4.0	5.6	.159	.219	3

NOTES:
1. A.C. TERMINAL 2 PLCS
2. 2 PLCS
3. 4 PLCS

Maximum thermal impedance
$R_{\theta JC}$ = 0.80°C/W

Approximate mass = 245g

ELECTRICAL CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 30A @ 25°C	Maximum Reverse Recovery Time[1]
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	nS
SCDAS05FF SCDAS10FF SCDAS15FF	3.0	60	0.97	30
SCNAS05FF SCNAS10FF SCNAS15FF	3.0	60	0.97	30
SCPAS05FF SCPAS10FF SCPAS15FF	3.0	60	0.97	30

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

7

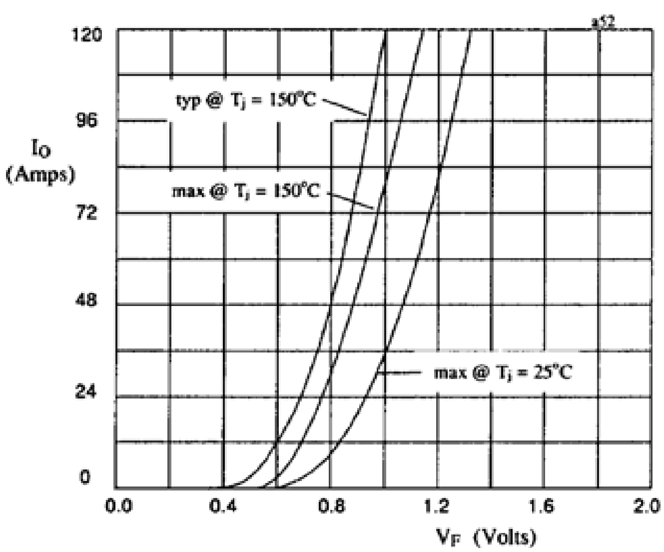


Fig 1. Forward voltage drop against current (per leg)

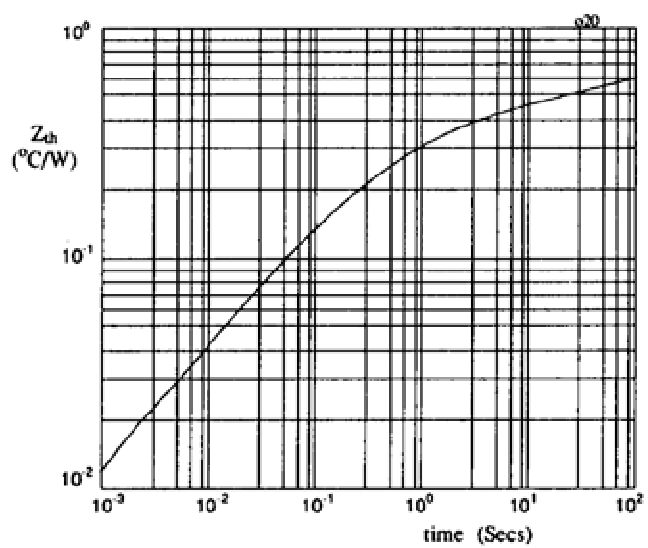


Fig 2. Transient thermal impedance characteristic per leg

HIGH VOLTAGE, HIGH CURRENT, STANDARD RECOVERY DOUBLER AND CENTER TAPS

- Up to 11A forward current and 15kV reverse voltage
- Air or oil enviroment
- High reverse surge current
- High thermal shock resistance
- Integral cooling fins

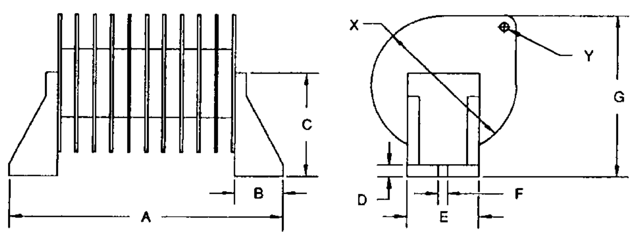
QUICK REFERENCE DATA

- V_R = 5kV - 15kV
- I_F = 11.0A
- I_R = 1.0 µA
- I_{FSM} = 150A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current			1 Cycle Surge Current t_p = 8.3mS		Repetitive Surge Current	I^2t t_p = 8.3mS	Body length
		air 55°C	air 100°C	oil 55°C	@ 25 °C	@ 100 °C	@ 25 °C	@ 25 °C	dim A
	Volts	Amps	Amps	Amps	Amps	Amps	Amps	A^2S	inches
SCPND5 SCPND10 SCPND15	5000 10000 15000	5.5	3.0	11	150	80	25	93.4	5.53 8.83 12.13
SCPNN5 SCPNN10 SCPNN15	5000 10000 15000	11.0	6.0	22	150	80	25	93.4	5.53 8.83 12.13
SCPNP5 SCPNP10 SCPNP15	5000 10000 15000	11.0	6.0	22	150	80	25	93.4	5.53 8.83 12.13

MECHANICAL



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DIM	MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	SEE TABLE				-
B	24.6	26.2	.97	1.03	-
C	56.4	57.9	2.22	2.28	-
D	6.1	6.4	.24	.25	-
E	37.3	38.9	1.47	1.53	-
F	4.1	5.6	.16	.22	-
G	88.1	89.7	3.47	3.53	-
X	75.4	77.0	2.97	3.03	DIA
Y	4.7	5.0	.185	.195	DIA

7

CHARACTERISTICS (apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 3.0A. @ 25°C	Maximum Reverse Recovery Time[1] t_{rr} @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	nS
SCPND5 SCPND10 SCPND15	1.0	20	5.0 10.0 15.0	2000
SCPNN5 SCPNN10 SCPNN15	1.0	20	5.0 10.0 15.0	2000
SCPNP5 SCPNP10 SCPNP15	1.0	20	5.0 10.0 15.0	2000

[1] Measured on discrete devices prior to assembly

Operating temperature range -55 °C to +150 °C
Storage temperature range -55 °C to +150 °C

7

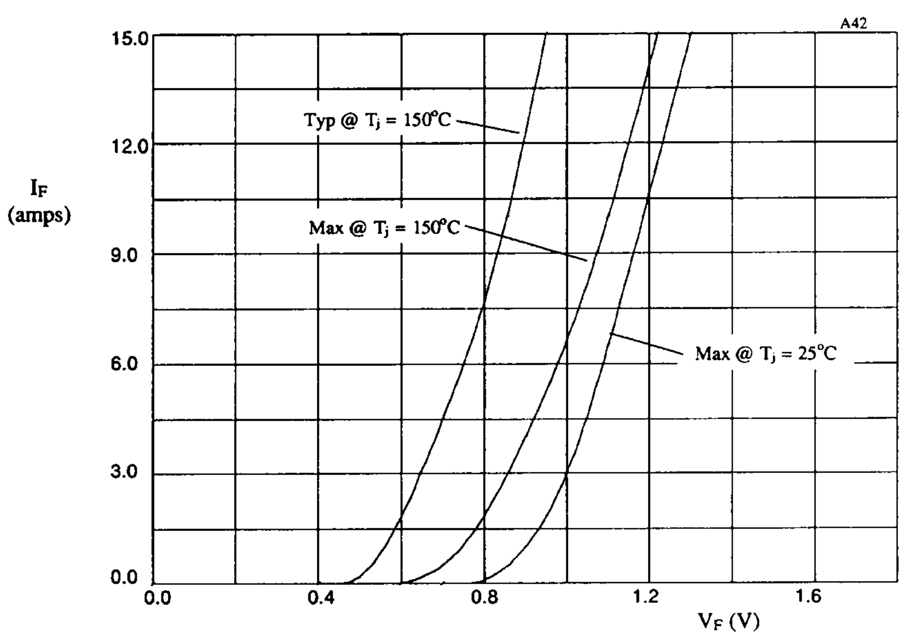


Figure 1. Maximum and typical forward voltage drops as a function of forward current (T_j = 25°C & 150°C) for use with table 1.

TABLE 1

DEVICE	X-axis
SCPN*5	x1
SCPN*10	x2
SCPN*15	x3

HIGH DENSITY, HIGH VOLTAGE, STANDARD RECOVERY DOUBLER AND CENTER TAPS

- Low reverse leakage currents
- Corona free design
- Easy aluminum base mount
- Low forward voltage drop
- Up to 15kV reverse voltage

QUICK REFERENCE DATA

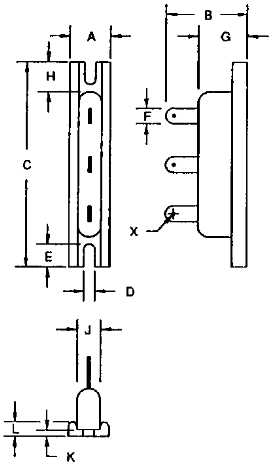
- V_R = 7.5kV & 15kV
- I_F = 800mA
- t_{rr} = 2.0μS
- I_R = 1.0μA

7

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage V_{RWM}	Average Rectified Current		1 Cycle Surge Current t_p = 8.3mS @ 25°C	Operating and storage temp. ranges. T_{OP} & T_{STG}	Case Length
		air 25 °C	oil 55 °C			dim C
	Volts	Amps	Amps	Amps	°C	inches
SDHD7.5K SDHD15K	7500 15000	0.4 0.4	0.4 0.4	16 16	-55 to + 150	4.72 6.09
SDHN7.5K SDHN15K	7500 15000	0.8 0.8	0.8 0.8	8 8	-55 to + 150	4.72 6.09
SDHP7.5K SDHP15K	7500 15000	0.8 0.8	0.8 0.8	8 8	-55 to + 150	4.72 6.09

MECHANICAL



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DIM"	DIMENSIONS MM		DIMENSIONS INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	15.2	16.8	.60	.66	-
B	-	33.5	-	1.32	-
C	SEE TABLE				-
D	3.6	5.1	.14	.20	-
E	8.6	10.2	.34	.40	-
F	5.6	7.1	.22	.28	-
G	19.6	21.1	.77	.83	-
H	11.9	13.5	.47	.53	-
J	8.9	10.4	.35	.41	-
K	2.3	3.8	.09	.15	-
L	5.6	7.1	.22	.28	-
X	1.0	-	.04	-	DIA

7

CHARACTERISTICS (ratings apply per leg)

Device Type	Reverse Current @ V_{RWM}		Maximum Forward Voltage V_F @ 0.2A @ 25°C	Maximum Reverse Recovery Time [1] @ 25°C
	@ 25 °C	@ 100 °C		
	µA	µA	Volts	µS
SDHD7.5K	1.0	20	10.0	2.0
SDHD15K	1.0	20	20.0	2.0
SDHN7.5K	1.0	20	10.0	2.0
SDHN15K	1.0	20	20.0	2.0
SDHP7.5K	1.0	20	10.0	2.0
SDHP15K	1.0	20	20.0	2.0

[1] Measured on discrete devices prior to assembly

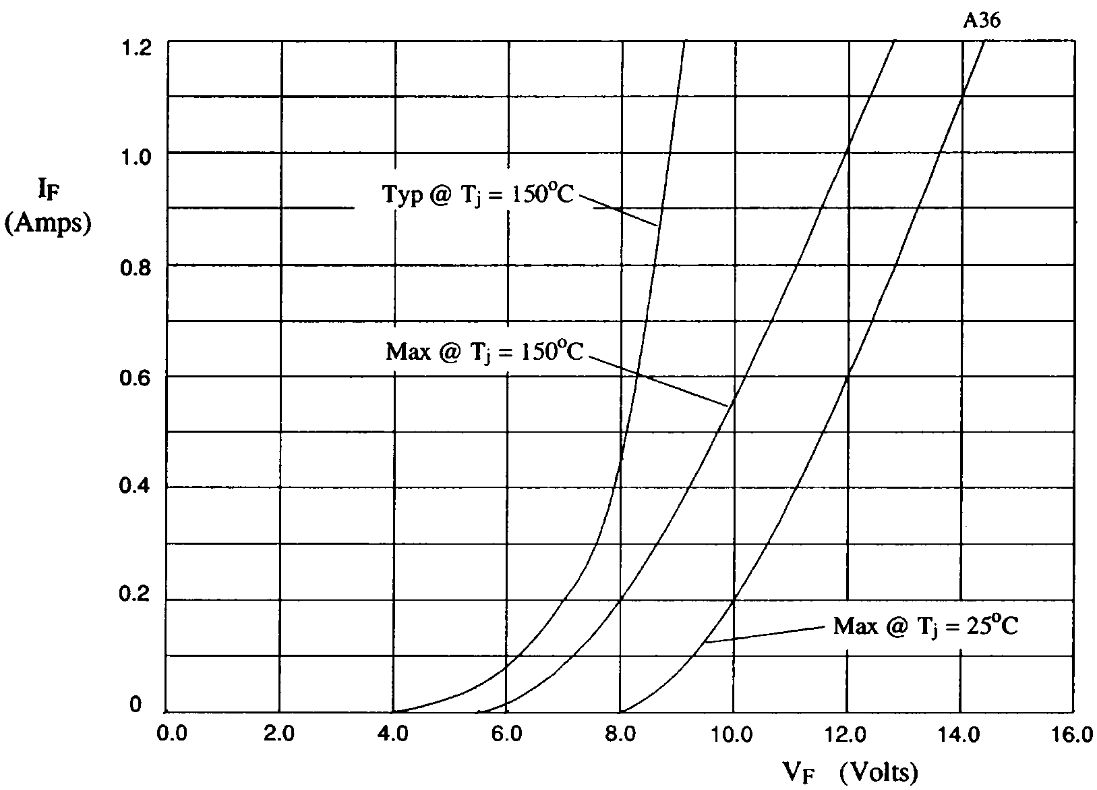


Figure 1. Maximum and typical forward voltage drop per leg as a function of forward current (T_j = 25°C & 150°C) for SDH*7.5K. For SDH*15K multiply X-axis by 2.

SEMTECH

HIGH CURRENT, 1-PHASE CENTER TAPS AND DOUBLER

SET0303**
SET0319**
SET0312**
SET0304**
SET0311**

HIGH CURRENT, HIGH DENSITY, ISOLATED , SILICON POWER RECTIFIER STUD

- Low thermal impedance
- Small size and low weight
- High current applications
- Isolated for direct heatsink mounting
- High surge ratings

QUICK REFERENCE DATA

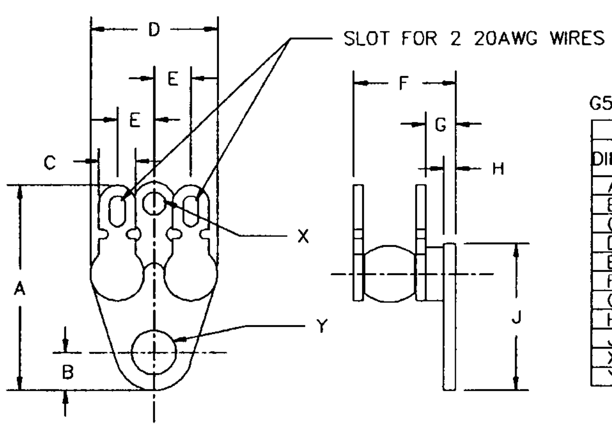
- V_R = 150V - 1000V
- I_F = 15A
- t_{rr} = 30nS - 2µS
- $I_{FSM} \geq$ 150A

ABSOLUTE MAXIMUM RATINGS

Device Type	Working Reverse Voltage	Average Rectified Current $I_{F(AV)}$ @ T_{MB} see note 1			1 Cycle Surge I_{FSM} @ t_P = 8.3mS		Operating & Storage Temperature Range
		@ 55°C	100°C	125°C	@ 25 °C	@ 100°C	(T_{OP}) (T_{STG})
	Volts	Amps	Amps	Amps	Amps	Amps	°C
SET03**03	1000	30	22	16	150	100	-55 to +175
SET03**19	1000	20	16	12	150	80	-55 to +175
SET03**12	600	30	22	16	150	100	-55 to +175
SET03**04	400	30	22	16	150	80	-55 to +175
SET03**11	150	30	20	14	175	175	-55 to +150

1/ Average Rectified Current = $0.5 \mathrm{x} I_{F(AV)}$ for Doubler
$R_{\theta JMB}$ = 1.5°C/W for all varieties, see next page for circuit configurations.

MECHANICAL



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DIMENSIONS					
DIM"	MM		INCHES		NOTE
	MIN	MAX	MIN	MAX	
A	–	17.3	–	.68	–
B	2.9	3.4	.115	.135	–
C	3.0	3.3	.12	.13	2 PL
D	10.0	10.4	.39	.41	–
E	2.8	3.0	.11	.12	–
F	–	10.7	–	.42	–
G	2.3	3.0	.09	.12	–
H	1.0	1.3	.04	.05	–
J	11.2	11.9	.44	.47	–
X	1.8	2.0	.072	.077	DIA
Y	3.5	3.8	.139	.149	DIA

NOTES:
CONFIGURATION AND POLARITY SHOWN BY COLORED DOTS
POSITIVE CENTER TAP – RED DOT ON POSITIVE TERMINAL
NEGATIVE CENTER TAP – BLACK DOT ON NEGATIVE TERMINAL
DOUBLER – RED, POSITIVE; BLACK, NEGATIVE; YELLOW, AC.

ELECTRICAL CHARACTERISTICS (Apply per leg)

Device Type	Maximum Leakage Current @ V_{RWM}		Maximum Forward Voltage @ 9.0 A	Maximum Reverse Recovery Time
	T_j = 25 °C	T_j = 100 °C		
	μA	μA	Volts	nS
SET03**03	1.0	20	1.2	2000
SET03**19	1.0	25	2.2	150
SET03**12	1.0	20	1.2	2000
SET03**04	1.0	20	1.5	150
SET03**11	10.0	500	1.1	30

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CIRCUIT CONFIGURATIONS

** = 06 Positive Center Tap
** = 08 Negative Center Tap
** = 10 Doubler

eg. SET030603 = Positive Center Tap
1000V, 2000nS

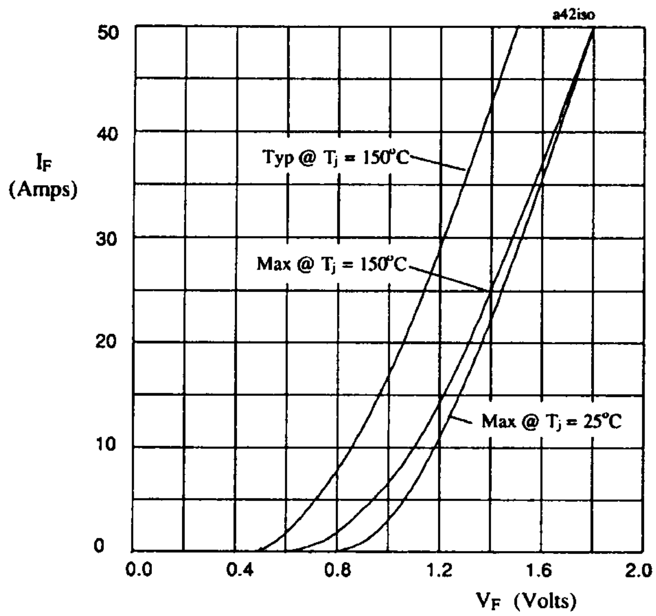

Figure 1. Forward voltage drop as a function of forward current for SET03**03 & SET03**12.

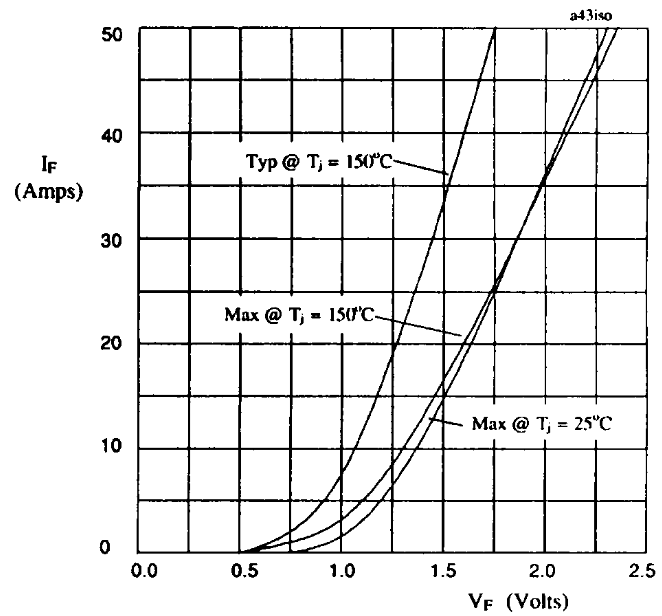

Figure 2. Forward voltage drop as a function of forward current for SET03**04.

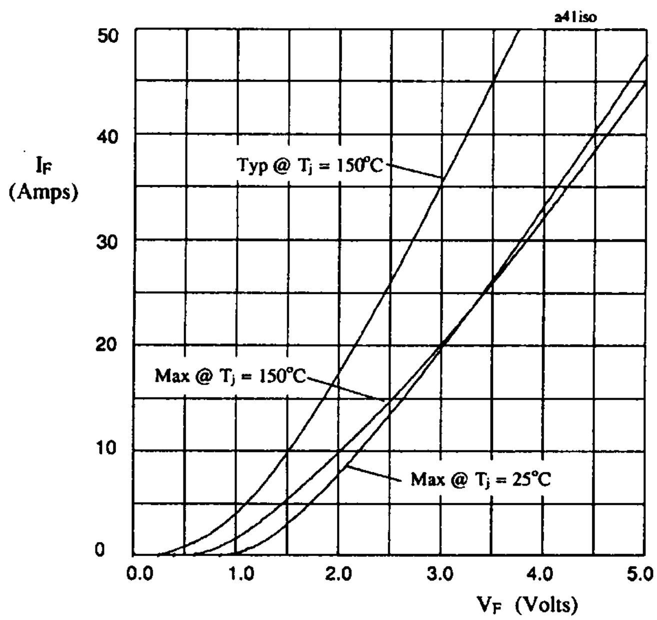

Figure 3. Forward voltage drop as a function of forward current for SET03**19.

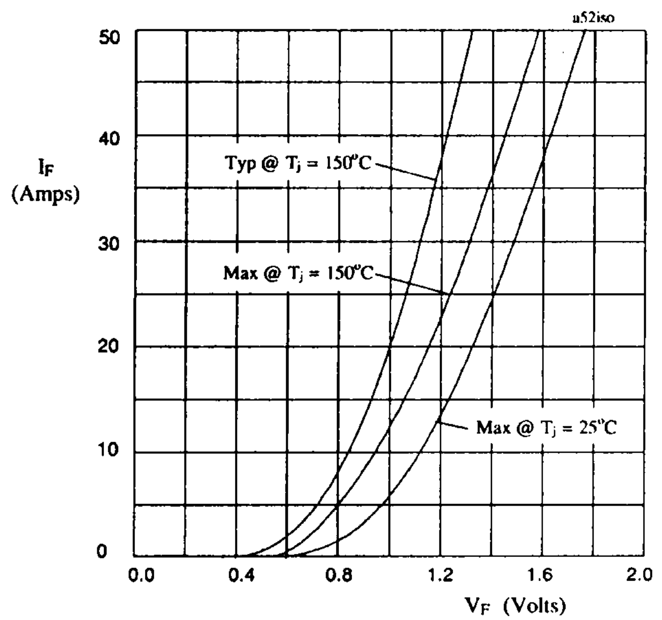

Figure 4. Forward voltage drop as a function of forward current for SET03**11.

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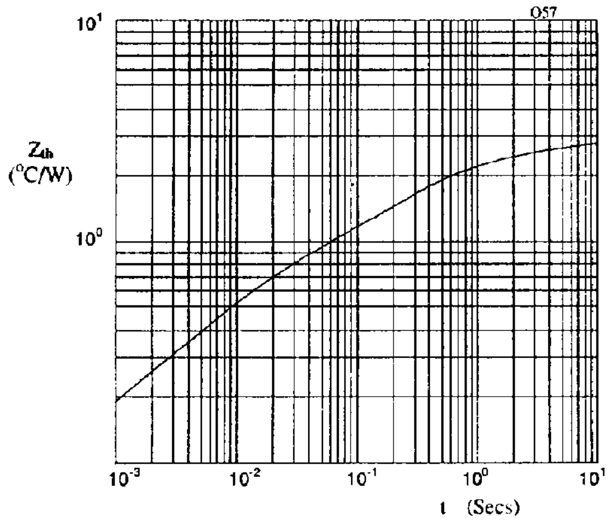

Figure 5. Typical transient thermal impedance characteristic.

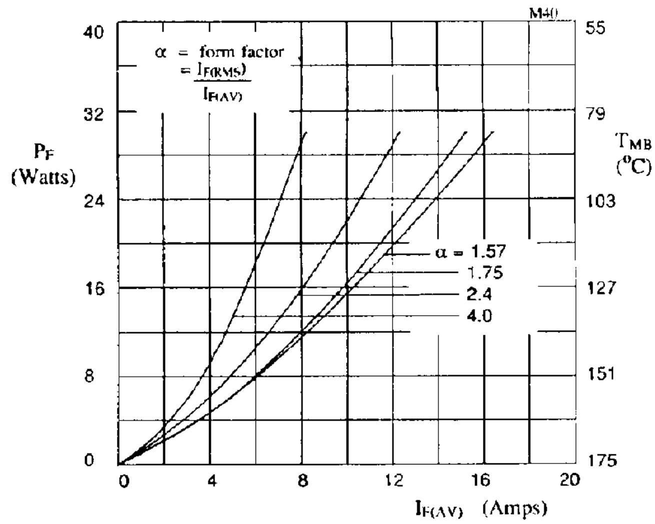

Figure 6. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET03**03 and SET03**12.

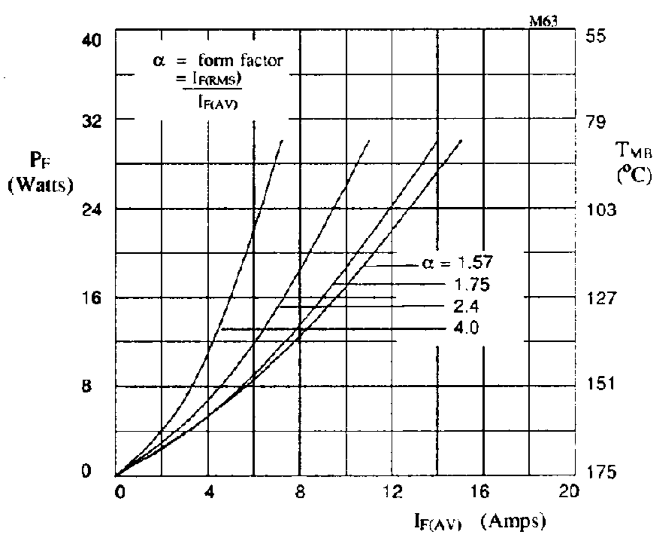

Figure 7. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET03**04.

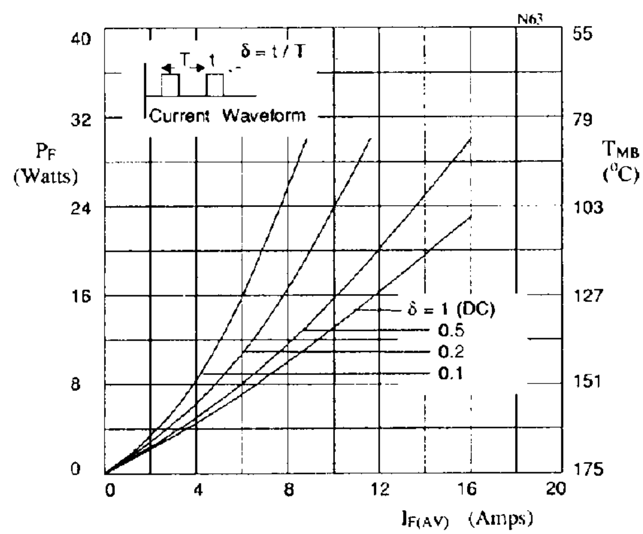

Figure 8. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET03**04

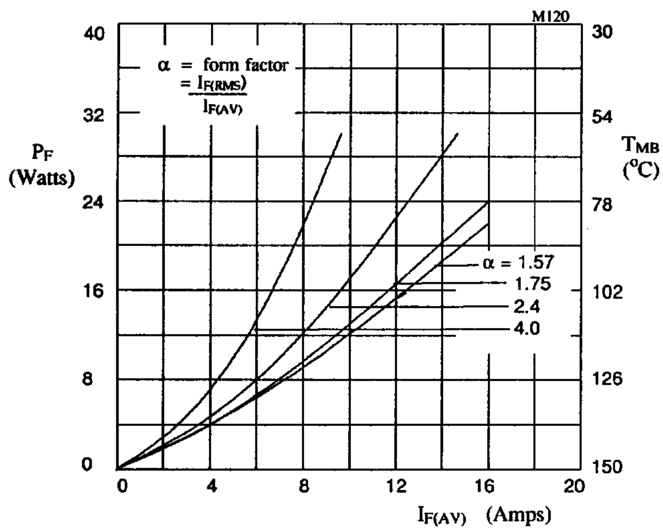

Figure 9. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for sinusoidal operation, for SET03**11.

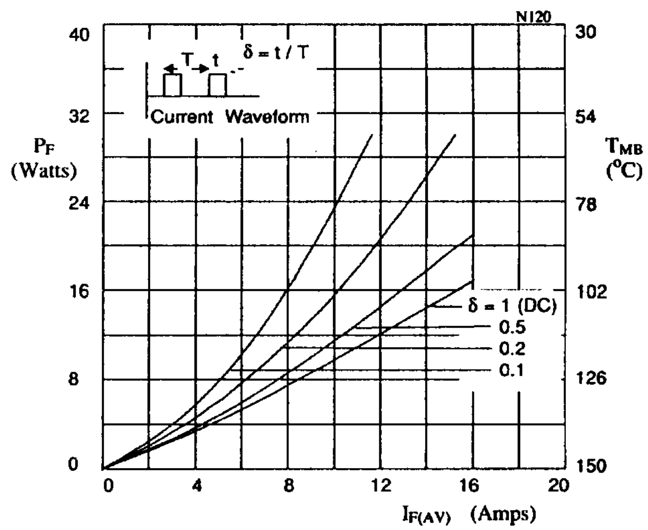

Figure 10. Forward power dissipation and maximum allowable mounting base temperature as a function of forward current for square wave operation, for SET03**11.

Chapter 8
TVS Rectifiers

AXIAL LEADED, HERMETICALLY SEALED, 500 WATT TRANSIENT VOLTAGE SUPPRESSORS

- Low dynamic impedance
- Hermetically sealed in Metoxilite fused metal oxide
- 500 Watt peak pulse power
- 1.5 Watt continuous
- Available in JAN, JANTX and JANTXV versions

QUICK REFERENCE DATA

- $V_{BR\ MIN}$ = 6.12 - 180V
- $I_{(BR)}$ = 5 - 175mA
- V_{RWM} = 5.2 - 152V
- $V_{C\ MAX}$ = 11 - 273V

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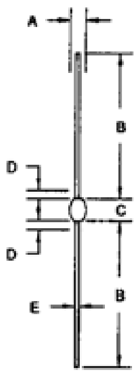
ELECTRIAL SPECIFICATIONS (@ 25°C UNLESS OTHERWISE SPECIFIED)

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Max. Reverse Current I_R	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P t_P = 8.3mS	Temp. Coeff of $V_{(BR)}$ α_{VZ}	Maximum Reverse Current I_R @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6102	6.12	175	5.2	100	11.0	45.4	.05	4000
1N6103	6.75	175	5.7	50	11.8	42.4	.06	750
1N6104	7.38	150	6.2	20	12.7	39.4	.06	500
1N6105	8.19	150	6.9	20	14.0	35.7	.06	300
1N6106	9.00	125	7.6	20	15.2	32.9	.07	200
1N6107	9.90	125	8.4	20	16.3	30.7	.07	200
1N6108	10.8	100	9.1	20	17.7	28.2	.07	150
1N6109	11.7	100	9.9	20	19.0	26.3	.08	150
1N6110	13.5	75	11.4	20	21.9	22.8	.08	100
1N6111	14.4	75	12.2	20	23.4	21.4	.08	100
1N6112	16.2	65	13.7	1	26.3	19.0	.085	100
1N6113	18.0	65	15.2	1	29.0	17.2	.085	100
1N6114	19.8	50	16.7	1	31.9	15.7	.085	100
1N6115	21.6	50	18.2	1	34.8	14.4	.09	100
1N6116	24.3	50	20.6	1	39.2	12.8	.09	100
1N6117	27.0	40	22.8	1	43.6	11.5	.09	100
1N6118	29.7	40	25.1	1	47.9	10.4	.095	100
1N6119	32.4	30	27.4	1	52.3	9.6	.095	100
1N6120	35.1	30	29.7	1	56.2	8.9	.095	100
1N6121	38.7	30	32.7	1	62.0	8.1	.095	100
1N6122	42.3	25	35.8	1	67.7	7.4	.095	100
1N6123	45.9	25	38.8	1	73.5	6.8	.095	100
1N6124	50.4	20	42.6	1	80.7	6.2	.095	100
1N6125	55.8	20	47.1	1	89.3	5.6	.100	100
1N6126	61.2	20	51.7	1	98.0	5.1	.100	100
1N6127	67.5	20	56.0	1	108.1	4.6	.100	100
1N6128	73.8	15	62.2	1	118.2	4.2	.100	100
1N6129	81.9	15	69.2	1	131.1	3.8	.100	100
1N6130	90.0	12	76.0	1	144.1	3.5	.100	100
1N6131	99.0	12	83.6	1	158.5	3.2	.100	100
1N6132	108.0	10	91.2	1	172.9	2.9	.100	100
1N6133	117.0	10	98.8	1	187.3	2.7	.100	100
1N6134	135.0	8	114.0	1	216.2	2.3	.100	100
1N6135	144.0	8	121.6	1	228.8	2.2	.100	100
1N6136	162.0	5	136.8	1	257.4	1.9	.100	100
1N6137	180.0	5	152.0	1	286.0	1.7	.100	100

These parts are qualified to MIL-PRF-19500/516 and are preferred parts as listed in MIL-STD-701
They can be supplied fully released as JAN, JANTX and JANTXV versions.
* Parts listed are 10% tolerance. 5% tolerance can be ordered by placing an "A" suffix on part numbers, eg. 1N6110A



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DIM*	DIMENSIONS MM MIN	MM MAX	INCHES MIN	INCHES MAX	NOTE
A	2.1	3.6	.085	.140	-
B	25.4	33.0	1.00	1.30	-
C	3.5	4.7	.140	.185	-
D	-	.80	-	.030	1
E	.66	.84	.026	.033	-

NOTES:

1. LEAD DIAMETER UNCONTROLLED OVER THIS REGION.

OPERATING TEMP -65°C to +175°C
STORAGE TEMP -65°C to +175°C

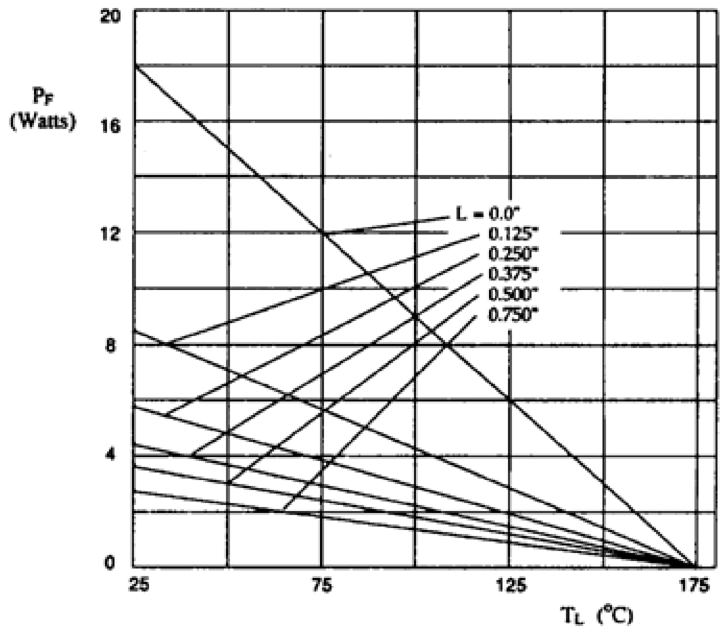

Figure 1. Maximum power versus lead temperature.

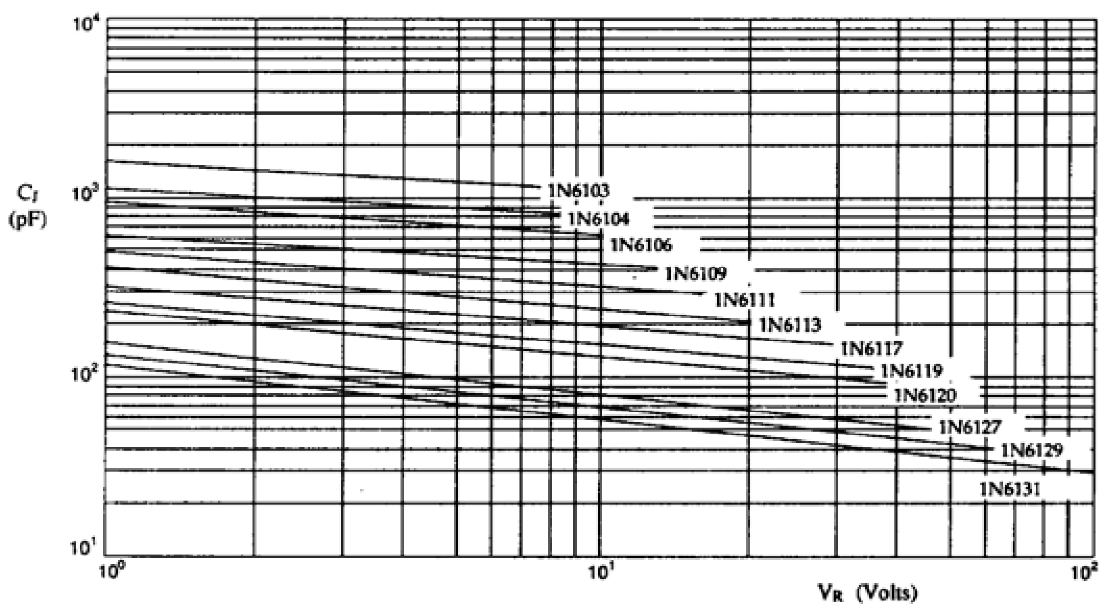

Fig 2. Typical junction capacitance versus reverse voltage.

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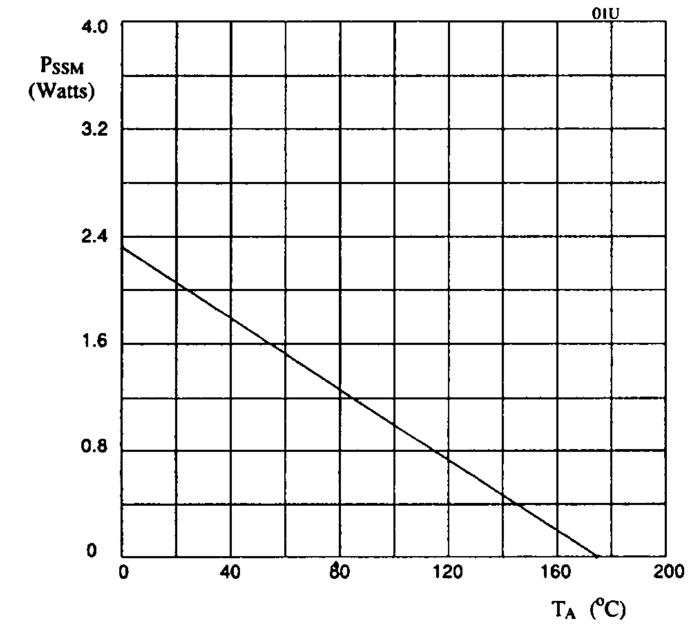

Fig 3. Steady state derating characteristic for free air mounting

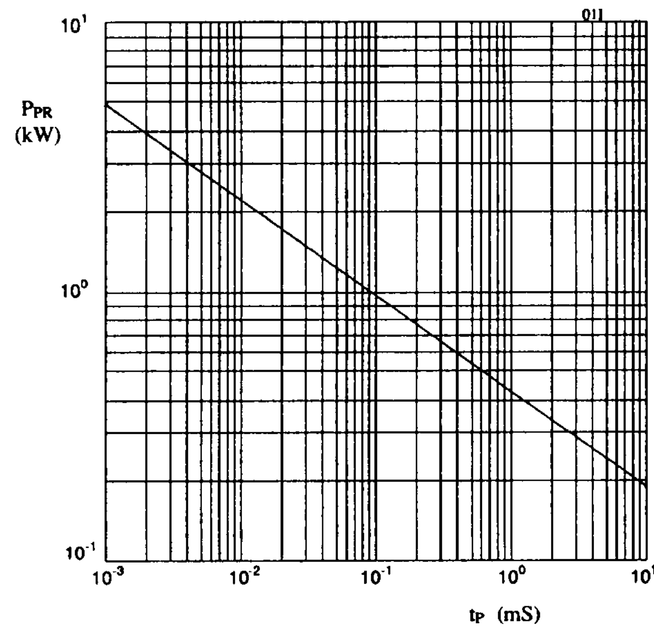

Fig 4. Peak pulse power versus pulse time.

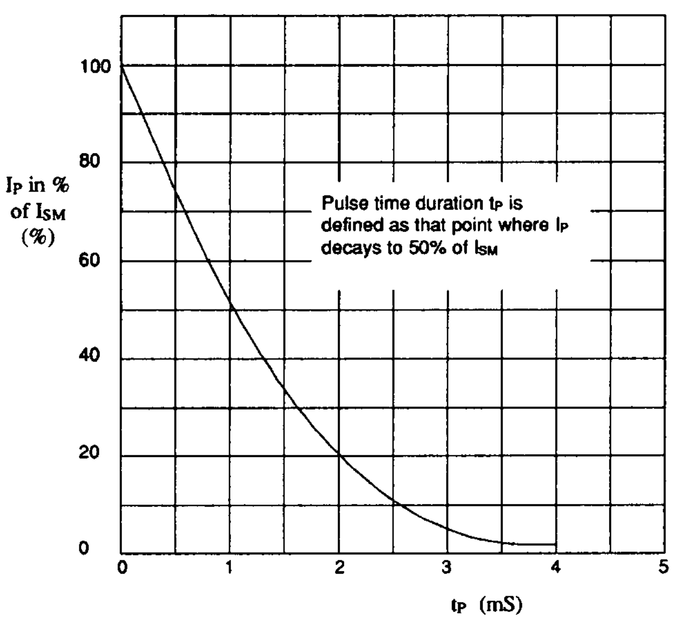

Fig 5. Pulse waveform

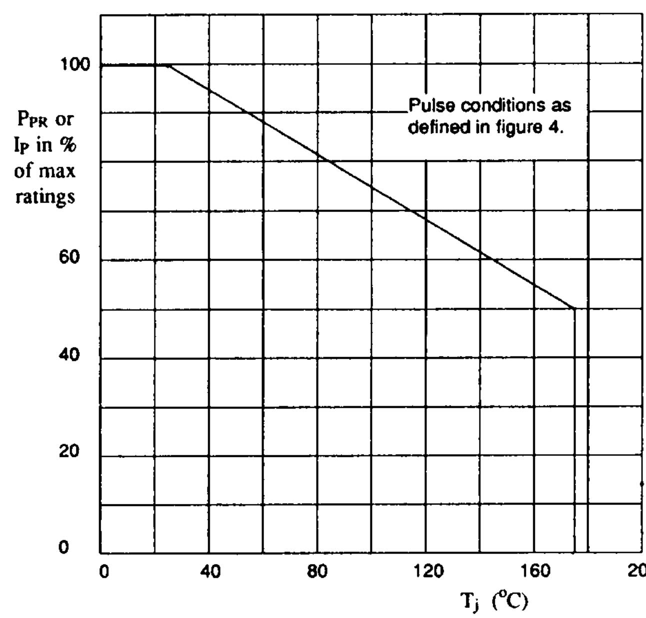

Fig 6. Pulse derating curve

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SEMTECH

QPL
500 Watt Axial Leaded TVS

1N6102A
Thru
1N6137A

DESCRIPTION

The 1N61xx series of transient voltage suppressors are designed to protect military and commercial electronic equipment from overvoltages caused by lightning, ESD, EFT, inductive load switching, and EMP. These devices are constructed using two p-n junction TVS diodes in a back-to-back configuration, hermetically sealed in a voidless glass package. The hermetically sealed package provides high reliability in harsh environmental conditions. TVS diodes are further characterized by their high surge capability, low operating and clamping voltages, and a theoretically instantaneous response time. This makes them ideal for use as board level protection for sensitive semiconductor components.

FEATURES:

- 500 Watts Peak Pulse Power (tp = 10/1000μs)
- Voidless hermetically sealed glass package
- Metallurgically bonded
- High surge capacity
- Military & Industrial applications
- Available in **JAN**, **JTX**, and **JTXV** versions per MIL-S-19500/516

MECHANICAL CHARACTERISTICS:

- Hermetically sealed glass package
- Tinned copper leads
- Marking : P/N, date code, logo

MAXIMUM RATINGS

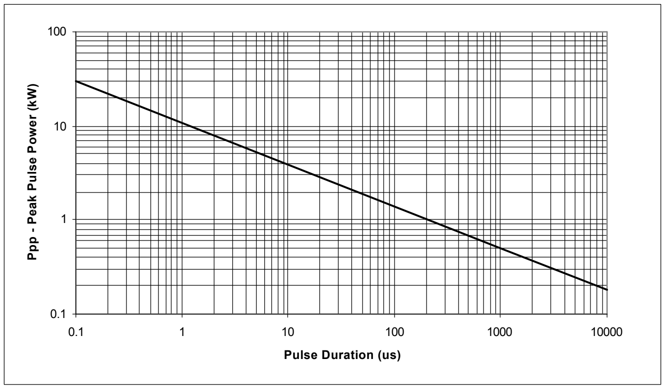
RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 10 x 1000μs)	Ppk	500	Watts
Operating Temperature	Tj	-65 to +175	°C
Storage Temperature	Tstg	-65 to +175	°C
Steady-State Power Dissipation @ TL = 75ºC (3/8”)	PD	3	Watts

ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

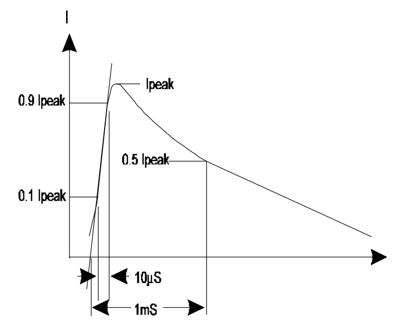
DEVICE TYPE	REVERSE STAND-OFF VOLTAGE V_{RWM}	REVERSE LEAKAGE CURRENT I_R	MINIMUM BREAKDOWN VOLTAGE V_{BR} @ I_T	TEST CURRENT I_T	MAXIMUM CLAMPING VOLTAGE VC @ I_{PP}	PEAK PULSE CURRENT Ipp tp = 1ms	TEMPERATURE COEFFICIENT OF V_{BR} αVz	MAXIMUM REVERSE LEAKAGE CURRENT (Ir2) TA=+150°C
	(V)	(μA)	(V)	(mA)	(V)	(A)	% / °C	(A)
1N6102A	5.2	100	6.46	175	10.5	47.6	0.05	4000
1N6103A	5.7	50	7.13	175	11.2	44.6	0.06	750
1N6104A	6.2	20	7.79	150	12.1	41.3	0.06	500
1N6105A	6.9	20	8.65	150	13.4	37.3	0.06	300
1N6106A	7.6	20	9.50	125	14.5	34.5	0.07	200
1N6107A	8.4	20	10.45	125	15.6	32.0	0.07	200
1N6108A	9.1	20	11.40	100	16.9	29.6	0.07	150
1N6109A	9.9	20	12.35	100	18.2	27.5	0.08	150
1N6110A	11.4	20	14.25	75	21.0	23.8	0.08	100
1N6111A	12.2	20	15.20	75	22.3	22.4	0.08	100
1N6112A	13.7	1	17.10	65	25.1	19.9	0.085	100
1N6113A	15.2	1	19.0	65	27.7	18.0	0.085	100
1N6114A	16.7	1	20.9	50	30.5	16.4	0.085	100
1N6115A	18.2	1	22.8	50	33.3	15.0	0.09	100
1N6116A	20.6	1	25.7	50	37.4	13.4	0.09	100
1N6117A	22.8	1	28.5	40	41.6	12.0	0.09	100
1N6118A	25.1	1	31.4	40	45.7	10.9	0.095	100
1N6119A	27.4	1	34.2	30	49.9	10.0	0.095	100
1N6120A	29.7	1	37.1	30	53.6	9.3	0.095	100
1N6121A	32.7	1	40.9	30	59.1	8.5	0.095	100
1N6122A	35.8	1	44.7	25	64.6	7.7	0.095	100
1N6123A	38.8	1	48.5	25	70.1	7.1	0.095	100
1N6124A	42.6	1	53.2	20	77.0	6.5	0.095	100
1N6125A	47.1	1	58.9	20	85.3	5.9	0.100	100
1N6126A	51.7	1	64.6	20	97.1	5.1	0.100	100
1N6127A	56.0	1	71.3	20	103.1	4.8	0.100	100
1N6128A	62.2	1	77.9	15	112.8	4.4	0.100	100
1N6129A	69.2	1	86.5	15	125.1	4.0	0.100	100
1N6130A	76.0	1	95.0	12	137.6	3.6	0.100	100
1N6131A	83.6	1	104.5	12	151.3	3.3	0.100	100
1N6132A	91.2	1	114.0	10	165.1	3.0	0.100	100
1N6133A	98.8	1	123.5	10	178.8	2.8	0.105	100
1N6134A	114.0	1	142.5	8	206.3	2.4	0.105	100
1N6135A	121.6	1	152.0	8	218.4	2.3	0.105	100
1N6136A	136.8	1	171.0	5	245.7	2.0	0.110	100
1N6137A	152.0	1	190.0	5	273.0	1.8	0.110	100

1. Non-A Part has 5% higher clamping voltage, 5% lower minimum breakdown voltage, and 5% lower peak pulse current.

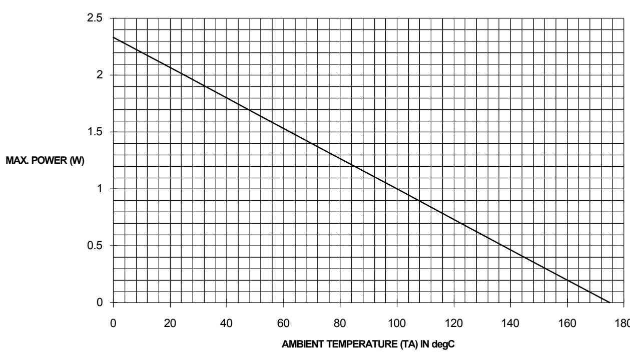
PEAK PULSE POWER vs. PULSE TIME



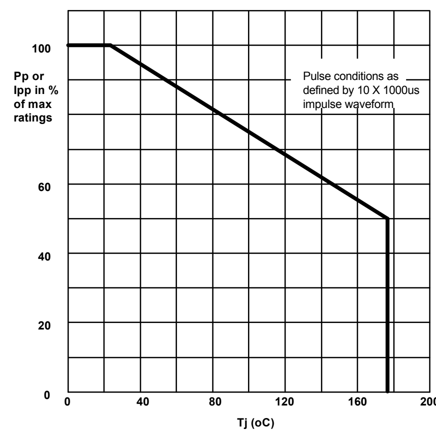
10x1000µs IMPULSE WAVEFORM



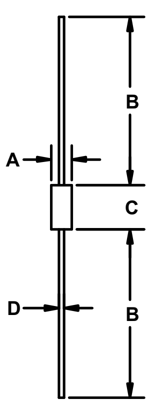
STEADY STATE DERATING CHARACTERISTICS FOR FREE AIR MOUNTING



PULSE DERATING CURVE



MECHANICAL OUTLINE

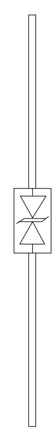


DIM N	DIMENSIONS INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.085	0.140	2.1	3.6	
B	1.00	1.300	25.4	33.0	
C	0.140	0.245	3.5	6.3	2
D	0.026	0.033	0.66	0.84	

NOTES :

1. Controlling dimension is inches.
2. Includes uncontrolled area of device leads.

SCHEMATIC



8

1N6102US thru 1N6137US
500W Bipolar Transient Voltage Suppressor Surface Mount (US)

SEMTECH

POWER DISCRETES

Description

Quick reference data

$V_{BR\ MIN}$ = 6.12 -180V
V_{RWM} = 5.2 - 152V
V_C (max) = 11 - 273V
$I_{(BR)}$ 1N6102 - 1N6137 = 5mA - 175mA

Features

- Low dynamic impedance
- Hermetically sealed non-cavity construction
- 500 watt peak pulse power
- 1.5W continuous

These products are qualified to MIL-PRF-19500/516 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6102	6.12	175	5.2	100	11.0	45.4	0.05	4,000
1N6103	6.75	175	5.7	50	11.8	42.4	0.06	750
1N6104	7.38	150	6.2	20	12.7	39.4	0.06	500
1N6105	8.19	150	6.9	20	14.0	35.7	0.06	300
1N6106	9.0	125	7.6	20	15.2	32.9	0.07	200
1N6107	9.9	125	8.4	20	16.3	30.7	0.07	200
1N6108	10.8	100	9.1	20	17.7	28.2	0.07	150
1N6109	11.7	100	9.9	20	19.0	26.3	0.08	150
1N6110	13.5	75	11.4	20	21.9	22.8	0.08	100
1N6111	14.4	75	12.2	20	23.4	21.4	0.08	100
1N6112	16.2	65	13.7	1	26.3	19.0	0.085	100
1N6113	18.0	65	15.2	1	29.0	17.2	0.085	100
1N6114	19.8	50	16.7	1	31.9	15.7	0.085	100
1N6115	21.6	50	18.2	1	34.8	14.4	0.09	100
1N6116	24.3	50	20.6	1	39.2	12.8	0.09	100
1N6117	27.0	40	22.8	1	43.6	11.5	0.09	100
1N6118	29.7	40	25.1	1	47.9	10.4	0.095	100

SEMTECH

POWER DISCRETES

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	μA	Volts	Amps	%/°C	μA
1N6119	32.4	30	27.4	1	52.3	9.6	0.095	100
1N6120	35.1	30	29.7	1	56.2	8.9	0.095	100
1N6121	38.7	30	32.7	1	62.0	8.1	0.095	100
1N6122	42.3	25	35.8	1	67.7	7.4	0.095	100
1N6123	45.9	25	38.8	1	73.5	6.8	0.095	100
1N6124	50.4	20	42.6	1	80.7	6.2	0.095	100
1N6125	55.8	20	47.1	1	89.3	5.6	0.1	100
1N6126	61.2	20	51.7	1	98.0	5.1	0.1	100
1N6127	67.5	20	56.0	1	108.1	4.6	0.1	100
1N6128	73.8	15	62.2	1	118.2	4.2	0.1	100
1N6129	81.9	15	69.2	1	131.1	3.8	0.1	100
1N6130	90.0	12	76.0	1	144.1	3.5	0.1	100
1N6131	99.0	12	83.6	1	158.5	3.2	0.1	100
1N6132	108.0	10	91.2	1	172.9	2.9	0.1	100
1N6133	117.0	10	98.8	1	187.3	2.7	0.105	100
1N6134	135.0	8	114.0	1	216.2	2.3	0.150	100
1N6135	144	8	121.6	1	228.8	2.2	0.105	100
1N6136	162	5	136.8	1	257.4	1.9	0.11	100
1N6137	180	5	152.0	1	286.0	1.7	0.11	100

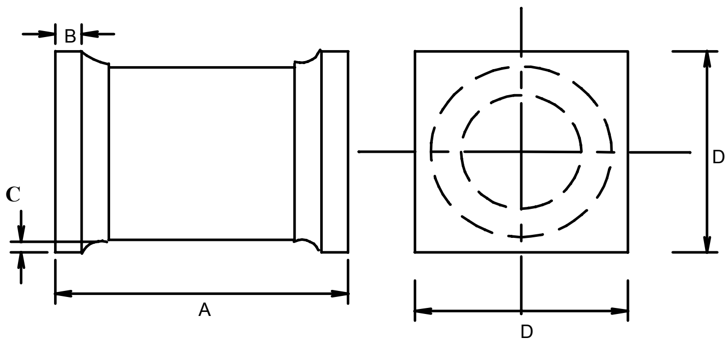
POWER DISCRETES

Ordering Information

Part Number	Description
1N6102US thru 1N6137US	Surface Mount(US) [(1)]

Note:
(1) Available in trays or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



	Dimensions	
	1N6102US - 1N6137US	
	Inches	
	MIN	MAX
A	0.2	0.225
B	0.019	0.028
C	0.003	-
D	0.137	0.148

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Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

POWER DISCRETES

Description

Quick reference data

$V_{BR\ MIN}$ = 7.13 - 190V
V_{RWM} = 5.7 - 152V
V_C (max) = 11.2 - 273V
$I_{(BR)}$ 1N6103A - 1N6137A = 5mA - 175mA

Features

- Low dynamic impedance
- Hermetically sealed non-cavity construction
- 500 watt peak pulse power
- 1.5W continuous

These products are qualified to MIL-PRF-19500/516 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6103A	7.13	175	5.7	50	11.2	44.6	0.06	750
1N6104A	7.79	150	6.2	20	12.1	41.3	0.06	500
1N6105A	8.65	150	6.9	20	13.4	37.3	0.06	300
1N6106A	9.50	125	7.6	20	14.5	34.5	0.07	200
1N6107A	10.45	125	8.4	20	15.6	32.0	0.07	200
1N6108A	11.4	100	9.1	20	16.9	29.6	0.07	150
1N6109A	12.35	100	9.9	20	18.2	27.5	0.08	150
1N6110A	14.25	75	11.4	20	21.0	23.8	0.08	100
1N6111A	15.2	75	12.2	20	22.3	22.4	0.08	100
1N6112A	17.1	65	13.7	1	25.1	19.9	0.085	100
1N6113A	19.0	65	15.2	1	27.7	18.0	0.085	100
1N6114A	20.9	50	16.7	1	30.5	16.4	0.085	100
1N6115A	22.8	50	18.2	1	33.3	15.0	0.09	100
1N6116A	25.7	50	20.6	1	37.4	13.4	0.09	100
1N6117A	28.5	40	22.8	1	41.6	12.0	0.09	100
1N6118A	31.4	40	25.1	1	45.7	10.9	0.095	100
1N6119A	34.2	30	27.4	1	49.9	10.0	0.095	100

SEMTECH

POWER DISCRETES

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6120A	37.1	30	29.7	1	53.6	9.3	0.095	100
1N6121A	40.9	30	32.7	1	59.1	8.5	0.095	100
1N6122A	44.7	25	35.8	1	64.6	7.7	0.095	100
1N6123A	48.5	25	38.8	1	70.1	7.1	0.095	100
1N6124A	53.2	20	42.6	1	77.0	6.5	0.095	100
1N6125A	58.9	20	47.1	1	85.3	5.9	0.1	100
1N6126A	64.6	20	51.7	1	97.1	5.1	0.1	100
1N6127A	71.3	20	56.0	1	103.1	4.8	0.1	100
1N6128A	77.9	15	62.2	1	112.8	4.4	0.1	100
1N6129A	86.5	15	69.2	1	125.1	4.0	0.1	100
1N6130A	95.0	12	76.0	1	137.6	3.6	0.1	100
1N6131A	104.5	12	83.6	1	151.3	3.3	0.1	100
1N6132A	114.0	10	91.2	1	165.1	3.0	0.1	100
1N6133A	123.5	10	98.8	1	178.8	2.8	0.105	100
1N6134A	142.5	8	114.0	1	206.3	2.4	0.105	100
1N6135A	152	8	121.6	1	218.4	2.3	0.105	100
1N6136A	171	5	136.8	1	245.7	2.0	0.11	100
1N6137A	190	5	152.0	1	273.0	1.8	0.11	100

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SEMTECH

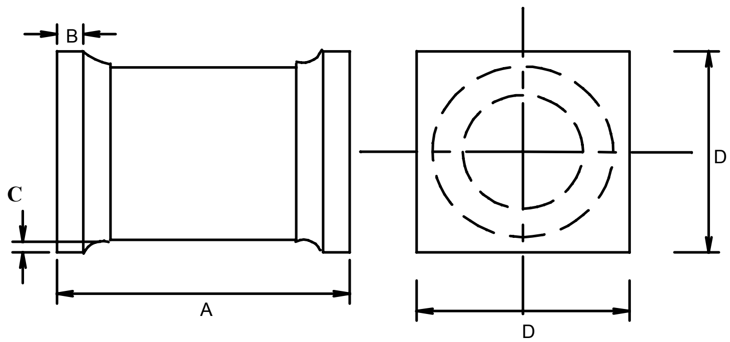
POWER DISCRETES

Ordering Information

Part Number	Description
1N6103AUS thru 1N6137AUS	Surface Mount(US) (1)

Note:
(1) Available in trays or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



	Dimensions	
	1N6103AUS - 1N6137AUS	
	Inches	
	MIN	MAX
A	0.2	0.225
B	0.019	0.028
C	0.003	-
D	0.137	0.148

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

1N6138 thru 1N6173
1500W Bipolar Transient Voltage Suppressors

POWER DISCRETES

Description

Quick reference data

$V_{BR\ MIN}$ = 6.12 -180V
$I_{(BR)}$ = 5mA - 175mA
V_{RWM} = 5.2 - 152V
V_C (max) = 11V - 286V

Features

- Low dynamic impedance
- 1500 watt peak pulse power
- 7.5W continuous at T_L = 25°C

These products are qualified to MIL-PRF-19500/516 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_R	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = (1)	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6138	6.12	175	5.2	500	11.0	136.4	0.05	12,000
1N6139	6.75	175	5.7	300	11.8	127.1	0.06	3,000
1N6140	7.38	150	6.2	100	12.7	118.1	0.06	2,000
1N6141	8.19	150	6.9	100	14.0	107.1	0.06	1,200
1N6142	9.0	125	7.6	100	15.2	98.7	0.07	800
1N6143	9.9	125	8.4	20	16.3	92.0	0.07	800
1N6144	10.8	100	9.1	20	17.7	84.7	0.07	600
1N6145	11.7	100	9.9	20	19.0	78.9	0.08	600
1N6146	13.5	75	11.4	20	21.9	68.5	0.08	400
1N6147	14.4	75	12.2	20	23.4	64.1	0.08	400
1N6148	16.2	65	13.7	10	26.3	57.0	.085	400
1N6149	18.0	65	15.2	5	29.0	51.7	.085	400
1N6150	19.8	50	16.7	5	31.9	47.0	.085	400
1N6151	21.6	50	18.2	5	34.8	43.1	.09	400
1N6152	24.3	50	20.6	5	39.2	38.3	.09	400
1N6153	27.0	40	22.8	5	43.6	34.4	.09	400
1N6154	29.7	40	25.1	5	47.9	31.3	.095	400
1N6155	32.4	30	27.4	5	52.3	28.7	.095	400

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POWER DISCRETES

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = (1)	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	μA	Volts	Amps	%/°C	μA
1N6156	35.1	30	29.7	5	56.2	26.7	0.095	400
1N6157	38.7	30	32.7	5	62.0	24.2	0.095	400
1N6158	42.3	25	35.8	5	67.7	22.2	0.095	400
1N6159	45.9	25	38.8	5	73.5	20.4	0.095	400
1N6160	50.4	20	42.6	5	80.7	18.6	0.095	400
1N6161	55.8	20	47.1	5	89.3	16.8	.100	400
1N6162	61.2	20	51.7	5	98.0	15.3	.100	400
1N6163	67.5	20	56.0	5	108.1	13.9	.100	400
1N6164	73.8	15	62.2	5	118.2	12.7	.100	400
1N6165	81.9	15	69.2	5	131.1	11.4	.100	400
1N6166	90.0	12	76.0	5	144.1	10.4	.100	400
1N6167	99.0	12	83.6	5	158.5	9.5	.100	400
1N6168	108.0	10	91.2	5	172.9	8.7	.100	400
1N6169	117.0	10	98.8	5	187.3	8.0	.100	400
1N6170	135.0	8	114.0	5	216.2	6.9	.100	400
1N6171	144.0	8	121.6	5	228.8	6.6	.100	400
1N6172	162.0	5	136.8	5	257.4	5.8	.100	400
1N6173	180.0	5	152.0	5	286.0	5.2	.100	400

Note:
(1) See Figure 4 graph.

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Typical Characteristics

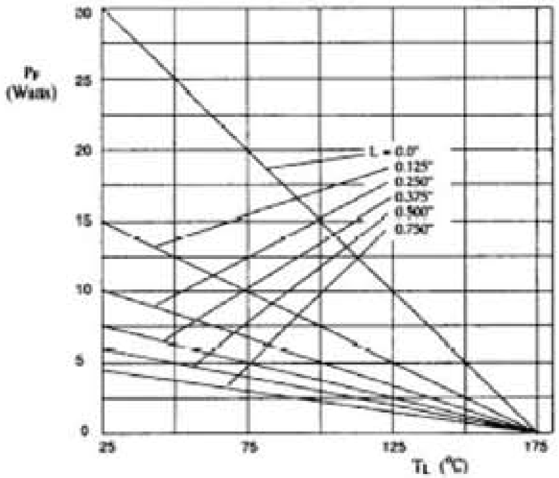

Figure 1. Maximum power vs. lead temperature

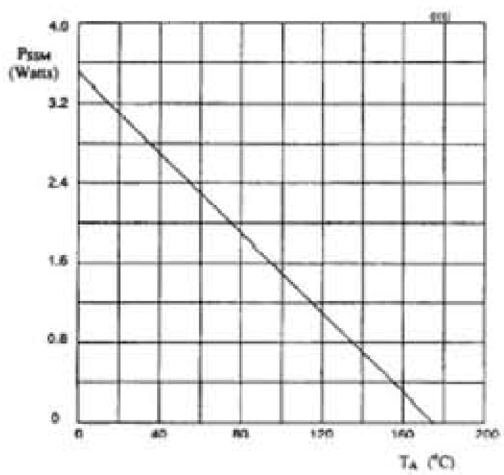

Figure 2. Steady state derating characteristic
for free air mounting

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Typical Characteristics

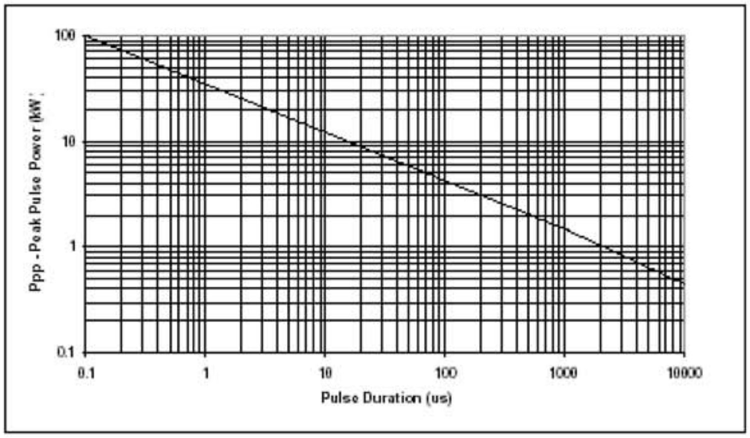


Figure 3. Peak pulse power vs. pulse time

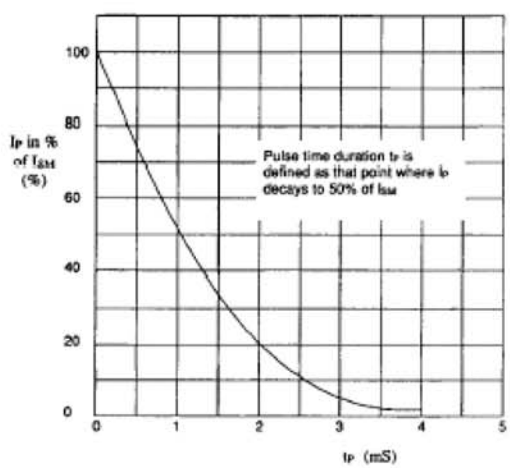


Figure 4. Pulse waveform

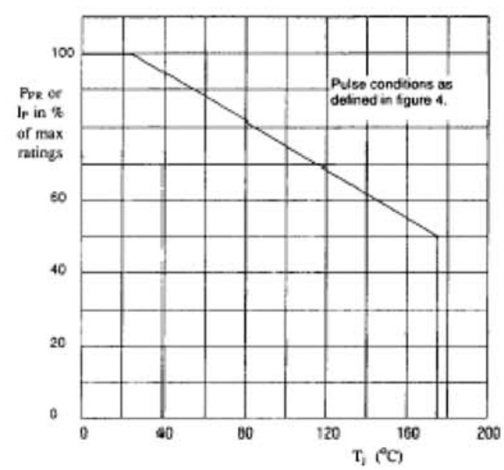


Figure 5. Pulse derating curve

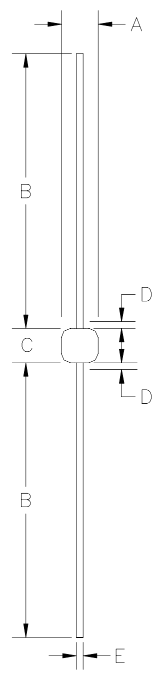
8

Ordering Information

Part Number	Description
1N6138 thru 1N6173	Axial leaded hermetically sealed(1)

Note:
(1) Available in bulk and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



Dimensions					
DIMN	Inches		Millimeters		Note
	MIN	MAX	MIN	MAX	
A	.135	0.185	3.4	4.7	-
B	.90	1.30	22.9	33.0	-
C	.140	.195	3.5	5.0	-
D	-	.030	-	.80	1
E	0.036	.042	.91	1.07	-

Note:
(1) Lead diameter uncontrolled over this region.

8

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

QPL 1500 Watt Axial Leaded TVS

1N6138A Thru 1N6173A

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DESCRIPTION

The 1N61xx series of transient voltage suppressors are designed to protect military and commercial electronic equipment from overvoltages caused by lightning, ESD, EFT, inductive load switching, and EMP. These devices are constructed using two p-n junction TVS diodes in a back-to-back configuration, hermetically sealed in a voidless glass package. The hermetically sealed package provides high reliability in harsh environmental conditions. TVS diodes are further characterized by their high surge capability, low operating and clamping voltages, and a theoretically instantaneous response time. This makes them ideal for use as board level protection for sensitive semiconductor components.

FEATURES:

- 1500 Watts Peak Pulse Power (tp = 10/1000μs)
- Voidless hermetically sealed glass package
- Metallurgically bonded
- High surge capacity
- Military & Industrial applications
- Available in **JAN**, **JTX**, and **JTXV** versions per MIL-S-19500/516

MECHANICAL CHARACTERISTICS:

- Hermetically sealed glass package
- Tinned copper leads
- Marking : P/N, date code, logo

MAXIMUM RATINGS

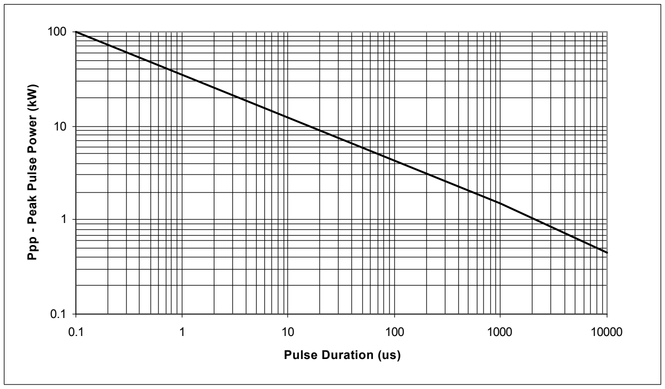
RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 10 x 1000μs)	Ppk	1500	Watts
Operating Temperature	Tj	-65 to +175	°C
Storage Temperature	Tstg	-65 to +175	°C
Steady-State Power Dissipation @ TL = 75ºC (3/8”)	PD	5	Watts

ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

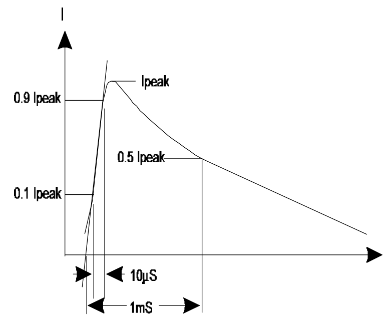
DEVICE TYPE	REVERSE STAND-OFF VOLTAGE V_{RWM}	REVERSE LEAKAGE CURRENT I_R	MINIMUM BREAKDOWN VOLTAGE V_{BR} @ I_T	TEST CURRENT I_T	MAXIMUM CLAMPING VOLTAGE VC @ I_{PP}	PEAK PULSE CURRENT Ipp tp = 1mS	TEMPERATURE COEFFICIENT OF V_{BR} αVz	MAXIMUM REVERSE LEAKAGE CURRENT (Ir2) TA=+150°C
	(V)	(μA)	(V)	(mA)	(V)	(A)	% / °C	(A)
1N6138A	5.2	500	6.46	175	10.5	142.8	0.05	12000
1N6139A	5.7	300	7.13	175	11.2	133.9	0.06	3000
1N6140A	6.2	100	7.79	150	12.1	124.0	0.06	2000
1N6141A	6.9	100	8.65	150	13.4	111.9	0.06	1200
1N6142A	7.6	100	9.50	125	14.5	103.4	0.07	800
1N6143A	8.4	20	10.45	125	15.6	96.2	0.07	800
1N6144A	9.1	20	11.40	100	16.9	88.8	0.07	600
1N6145A	9.9	20	12.35	100	18.2	82.4	0.08	600
1N6146A	11.4	20	14.25	75	21.0	71.4	0.08	400
1N6147A	12.2	20	15.20	75	22.3	67.3	0.08	400
1N6148A	13.7	10	17.10	65	25.1	59.8	0.085	400
1N6149A	15.2	5	19.0	65	27.7	54.2	0.085	400
1N6150A	16.7	5	20.9	50	30.5	49.2	0.085	400
1N6151A	18.2	5	22.8	50	33.3	45.0	0.09	400
1N6152A	20.6	5	25.7	50	37.4	40.1	0.09	400
1N6153A	22.8	5	28.5	40	41.6	36.0	0.09	400
1N6154A	25.1	5	31.4	40	45.7	32.8	0.095	400
1N6155A	27.4	5	34.2	30	49.9	30.1	0.095	400
1N6156A	29.7	5	37.1	30	53.6	28.0	0.095	400
1N6157A	32.7	5	40.9	30	59.1	25.4	0.095	400
1N6158A	35.8	5	44.7	25	64.6	23.2	0.095	400
1N6159A	38.8	5	48.5	25	70.1	21.4	0.095	400
1N6160A	42.6	5	53.2	20	77.0	19.5	0.095	400
1N6161A	47.1	5	58.9	20	85.3	17.6	0.100	400
1N6162A	51.7	5	64.6	20	97.1	15.4	0.100	400
1N6163A	56.0	5	71.3	20	103.1	14.5	0.100	400
1N6164A	62.2	5	77.9	15	112.8	13.3	0.100	400
1N6165A	69.2	5	86.5	15	125.1	12.0	0.100	400
1N6166A	76.0	5	95.0	12	137.6	10.9	0.100	400
1N6167A	83.6	5	104.5	12	151.3	9.9	0.100	400
1N6168A	91.2	5	114.0	10	165.1	9.1	0.100	400
1N6169A	98.8	5	123.5	10	178.8	8.4	0.105	400
1N6170A	114.0	5	142.5	8	206.3	7.3	0.105	400
1N6171A	121.6	5	152.0	8	218.4	6.9	0.105	400
1N6172A	136.8	5	171.0	5	245.7	6.1	0.110	400
1N6173A	152.0	5	190.0	5	273.0	5.5	0.110	400

1. Non-A Part has 5% higher clamping voltage, 5% lower minimum breakdown voltage, and 5% lower peak pulse current.

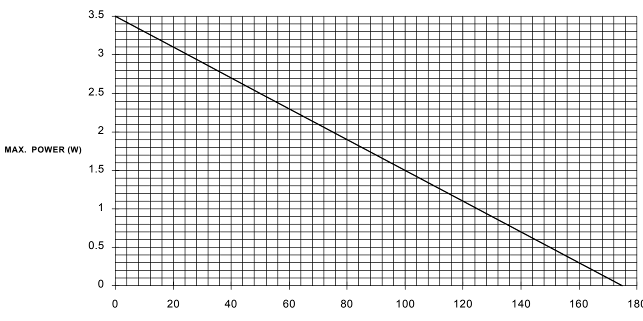
PEAK PULSE POWER vs. PULSE TIME



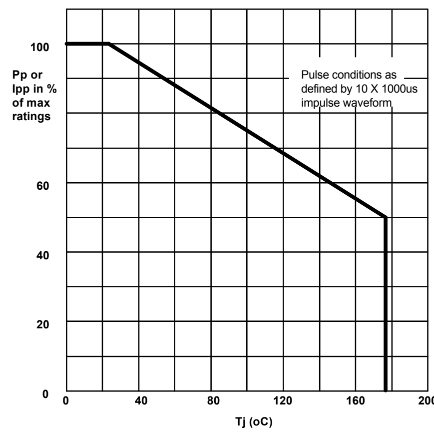
10x1000µs IMPULSE WAVEFORM



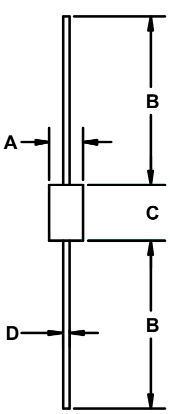
STEADY STATE DERATING CHARACTERISTICS FOR FREE AIR MOUNTING



PULSE DERATING CURVE



MECHANICAL OUTLINE

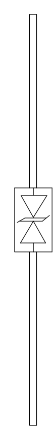


DIMENSIONS					
DIM N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.135	0.185	3.40	4.70	
B	0.900	1.300	22.86	33.02	
C	0.140	0.195	3.5	4.95	2
D	0.036	0.042	0.91	1.07	

NOTES :

1. Controlling dimension is inches.
2. Includes uncontrolled area of device leads.

SCHEMATIC



1N6138US thru 1N6173US
1500W Bipolar Transient Voltage Suppressor Surface Mount (US)

SEMTECH

POWER DISCRETES

Description

Quick reference data

$V_{BR\ MIN}$ = 6.12 -180V
V_{RWM} = 5.2 - 152V
V_C (max) = 11 - 286V
$I_{(BR)}$ 1N6138 - 1N6173 = 5mA - 175mA

Features

- Low dynamic impedance
- Hermetically sealed non-cavity construction
- 1500 watt peak pulse power
- 7.5W continuous

These products are qualified to MIL-PRF-19500/516 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	μA	Volts	Amps	%/°C	μA
1N6138	6.12	175	5.2	500	11.0	136.4	0.05	12,000
1N6139	6.75	175	5.7	300	11.8	127.1	0.06	3,000
1N6140	7.38	150	6.2	100	12.7	118.1	0.06	2,000
1N6141	8.19	150	6.9	100	14.0	107.1	0.06	1,200
1N6142	9.0	125	7.6	100	15.2	98.7	0.07	800
1N6143	9.9	125	8.4	20	16.3	92.0	0.07	800
1N6144	10.8	100	9.1	20	17.7	84.7	0.07	600
1N6145	11.7	100	9.9	20	19.0	78.9	0.08	600
1N6146	13.5	75	11.4	20	21.9	68.5	0.08	400
1N6147	14.4	75	12.2	20	23.4	64.1	0.08	400
1N6148	16.2	65	13.7	10	26.3	57.0	0.085	400
1N6149	18.0	65	15.2	5	29.0	51.7	0.085	400
1N6150	19.8	50	16.7	5	31.9	47.0	0.085	400
1N6151	21.6	50	18.2	5	34.8	43.1	0.09	400
1N6152	24.3	50	20.6	5	39.2	38.3	0.09	400
1N6153	27.0	40	22.8	5	43.6	34.4	0.09	400
1N6154	29.7	40	25.1	5	47.9	31.3	0.095	400
1N6155	32.4	30	27.4	5	52.3	28.7	0.095	400

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SEMTECH

POWER DISCRETES

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	μA	Volts	Amps	%/°C	μA
1N6156	35.1	30	29.7	5	56.2	26.7	0.095	400
1N6157	38.7	30	32.7	5	62.0	24.2	0.095	400
1N6158	42.3	25	35.8	5	67.7	22.2	0.095	400
1N6159	45.9	25	38.8	5	73.5	20.4	0.095	400
1N6160	50.4	20	42.6	5	80.7	18.6	0.095	400
1N6161	55.8	20	47.1	5	89.3	16.8	0.1	400
1N6162	61.2	20	51.7	5	98.0	15.3	0.1	400
1N6163	67.5	20	56.0	5	108.1	13.9	0.1	400
1N6164	73.8	15	62.2	5	118.2	12.7	0.1	400
1N6165	81.9	15	69.2	5	131.1	11.4	0.1	400
1N6166	90.0	12	76.0	5	144.1	10.4	0.1	400
1N6167	99.0	12	83.6	5	158.5	9.5	0.1	400
1N6168	108.0	10	91.2	5	172.9	8.7	0.1	400
1N6169	117.0	10	98.8	5	187.3	8.0	0.105	400
1N6170	135.0	8	114.0	5	216.2	6.9	0.105	400
1N6171	144	8	121.6	5	228.8	6.6	0.105	400
1N6172	162	5	136.8	5	257.4	5.8	0.11	400
1N6173	180	5	152.0	5	286.0	5.2	0.11	400

SEMTECH

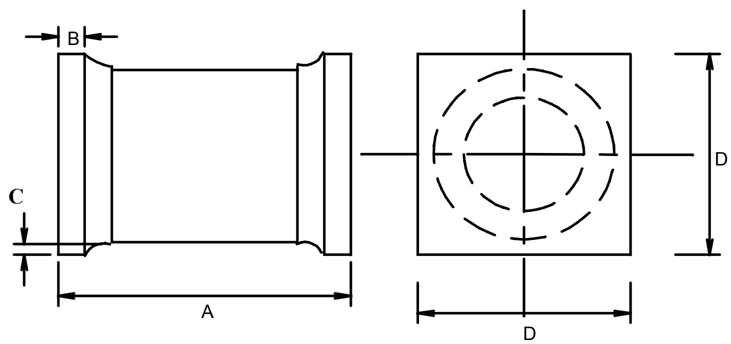
POWER DISCRETES

Ordering Information

Part Number	Description
1N6138US thru 1N6173US	Surface Mount(US) (1)

Note:
(1) Available in trays or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



	Dimensions	
	1N6138US - 1N6173US	
	Inches	
	MIN	MAX
A	0.205	0.245
B	0.019	0.028
C	0.003	-
D	0.183	0.202

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Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

1N6139AUS thru 1N6173AUS
1500W Bipolar Transient Voltage Suppressor Surface Mount (US)

SEMTECH

POWER DISCRETES

Description

Quick reference data

$V_{BR\ MIN}$ = 7.13 - 190V
V_{RWM} = 5.7 - 152V
V_C (max) = 11.2 - 273V
$I_{(BR)}$ 1N6139A - 1N6173A = 5mA - 175mA

Features

- Low dynamic impedance
- Hermetically sealed non-cavity construction
- 1500 watt peak pulse power
- 7.5W continuous

These products are qualified to MIL-PRF-19500/516 and are preferred parts as listed in MIL-HDBK-5961. They can be supplied fully released as JANTX and JANTXV versions.

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6139A	7.13	175	5.7	300	11.2	133.9	0.06	3,000
1N6140A	7.79	150	6.2	100	12.1	124.0	0.06	2,000
1N6141A	8.65	150	6.9	100	13.4	111.9	0.06	1,200
1N6142A	9.5	125	7.6	100	14.5	103.4	0.07	800
1N6143A	10.45	125	8.4	20	15.6	96.2	0.07	800
1N6144A	11.4	100	9.1	20	16.9	88.8	0.07	600
1N6145A	12.35	100	9.9	20	18.2	82.4	0.08	600
1N6146A	14.25	75	11.4	20	21.0	71.4	0.08	400
1N6147A	15.2	75	12.2	20	22.3	67.3	0.08	400
1N6148A	17.1	65	13.7	10	25.1	59.8	0.085	400
1N6149A	19.0	65	15.2	5	27.7	54.2	0.085	400
1N6150A	20.9	50	16.7	5	30.5	49.2	0.085	400
1N6151A	22.8	50	18.2	5	33.3	45.0	0.09	400
1N6152A	25.7	50	20.6	5	37.4	40.1	0.09	400
1N6153A	28.5	40	22.8	5	41.6	36.0	0.09	400
1N6154A	31.4	40	25.1	5	45.7	32.8	0.095	400
1N6155A	34.2	30	27.4	5	49.9	30.1	0.095	400

SEMTECH

POWER DISCRETES

Electrical Specifications

Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Minimum Breakdown Voltage $V_{(BR)}$ @ $I_{(BR)}$	Test Current $I_{(BR)}$	Working Pk. Reverse Voltage V_{RWM}	Maximum Reverse Current I_{R1}	Maximum Clamping Voltage V_C @ I_P	Maximum Pk. Pulse Current I_P T_P = 1mS	Temp. Coeff. of $V_{(BR)}$ $\alpha_{(VZ)}$	Maximum Reverse Current I_{R2} @ 150°C
	Volts	mA	Volts	µA	Volts	Amps	%/°C	µA
1N6156A	37.1	30	29.7	5	53.6	28.0	0.095	400
1N6157A	40.9	30	32.7	5	59.1	25.4	0.095	400
1N6158A	44.7	25	35.8	5	64.6	23.2	0.095	400
1N6159A	48.5	25	38.8	5	70.1	21.4	0.095	400
1N6160A	53.2	20	42.6	5	77.0	19.5	0.095	400
1N6161A	58.9	20	47.1	5	85.3	17.6	0.1	400
1N6162A	64.6	20	51.7	5	97.1	15.4	0.1	400
1N6163A	71.3	20	56.0	5	103.1	14.5	0.1	400
1N6164A	77.9	15	62.2	5	112.8	13.3	0.1	400
1N6165A	86.5	15	69.2	5	125.1	12.0	0.1	400
1N6166A	95.0	12	76.0	5	137.6	10.9	0.1	400
1N6167A	104.5	12	83.6	5	151.3	9.9	0.1	400
1N6168A	114.0	10	91.2	5	165.1	9.1	0.1	400
1N6169A	123.5	10	98.8	5	178.8	8.4	0.105	400
1N6170A	142.5	8	114.0	5	206.3	7.3	0.105	400
1N6171A	152	8	121.6	5	218.4	6.9	0.105	400
1N6172A	171	5	136.8	5	245.7	6.1	0.11	400
1N6173A	190	5	152.0	5	273.0	5.5	0.11	400

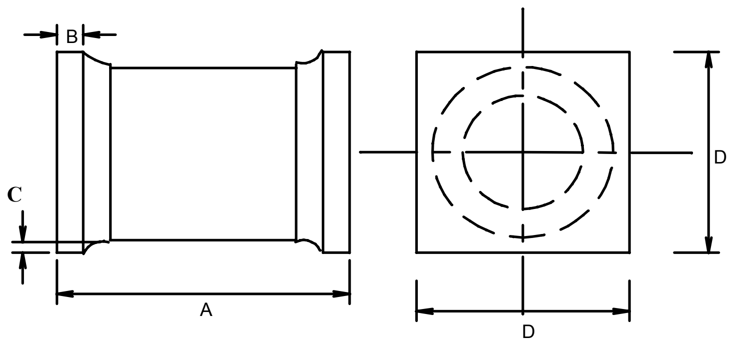
POWER DISCRETES

Ordering Information

Part Number	Description
1N6139AUS thru 1N6173AUS	Surface Mount(US) (1)

Note:
(1) Available in trays or tape and reel packaging. Please consult factory for quantities.

Outline Drawing



	Dimensions	
	1N6139AUS - 1N6173AUS	
	Inches	
	MIN	MAX
A	0.205	0.245
B	0.019	0.028
C	0.003	-
D	0.183	0.202

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

DESCRIPTION

The 1N64xx series of transient voltage suppressors are designed to protect military and commercial electronic equipment from overvoltages caused by lightning, ESD, EFT, inductive load switching, and EMP. These devices are constructed using a p-n junction TVS diode in a hermetically sealed, voidless glass package. The hermetically sealed package provides high reliability in harsh environmental conditions. TVS diodes are further characterized by their high surge capability, low operating and clamping voltages, and a theoretically instantaneous response time. This makes them ideal for use as board level protection for sensitive semiconductor components. These devices are DESC QPL qualified to MIL-S-19500/551.

APPLICATIONS:

- Aerospace & Industrial Electronics
- Board Level Protection
- Airborne Systems
- Shipboard Systems
- Ground Systems

FEATURES:

- 500 Watts Peak Pulse Power (tp = 10/1000µs)
- Voidless hermetically sealed glass package
- Metallurgically bonded
- High surge capacity
- Unidirectional
- Available in **JTX**, and **JTXV** versions per MIL-PRF-19500/551

MECHANICAL CHARACTERISTICS:

- Hermetically sealed glass package
- Tinned copper leads
- Marking : P/N, date code, logo, & cathode band

MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 10 x 1000µs)	Ppk	500	Watts
Operating Temperature	Tj	-65 to +175	°C
Storage Temperature	Tstg	-65 to +175	°C
Steady-State Power Dissipation @ TL = 75°C (3/8")	PD	3	Watts

ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

DEVICE TYPE	REVERSE STAND-OFF VOLTAGE V_{RWM}	REVERSE LEAKAGE CURRENT I_R	MINIMUM BREAKDOWN VOLTAGE V_{BR} @ I_T	TEST CURRENT I_T	MAXIMUM CLAMPING VOLTAGE V_C @ Ipp	PEAK PULSE CURRENT Ipp Tp = 1mS	PEAK PULSE CURRENT Ipp Tp = 20µS	TEMPERATURE COEFFICIENT OF V_{BR} αVz
	(V)	(µA)	(V)	(mA)	(V)	(A)	(A)	% /°C
1N6461	5	3000	5.6	25	9.0	56	315	0.040
1N6462	6	2500	6.5	20	11.0	46	258	0.040
1N6463	12	500	13.6	5	22.6	22	125	0.050
1N6464	15	500	16.4	5	26.5	19	107	0.060
1N6465	24	50	27.0	2	41.4	12	69	0.084
1N6466	30.5	3	33.0	1	47.5	11	63	0.093
1N6467	40.3	2	43.7	1	63.5	8	45	0.094
1N6468	51.6	2	54.0	1	78.5	6	35	0.096

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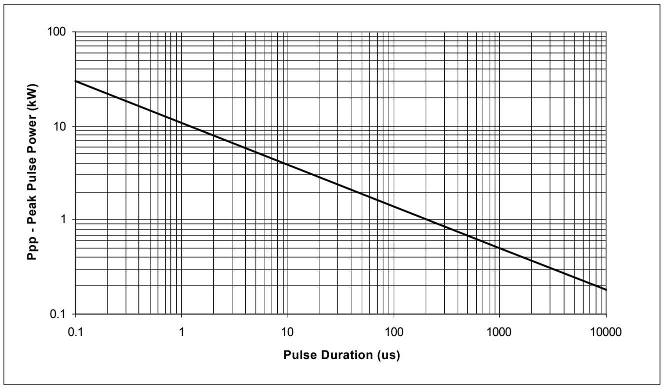
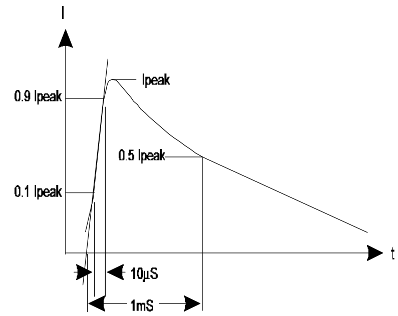
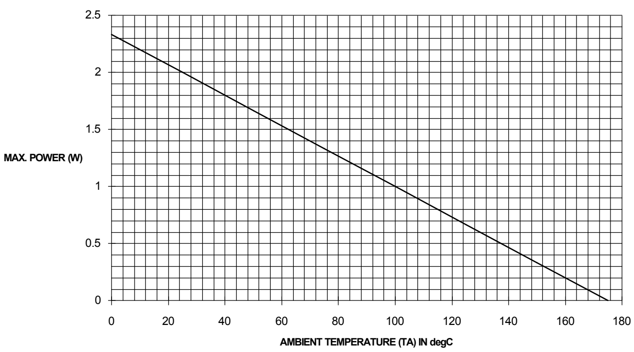
PEAK PULSE POWER vs. PULSE TIME



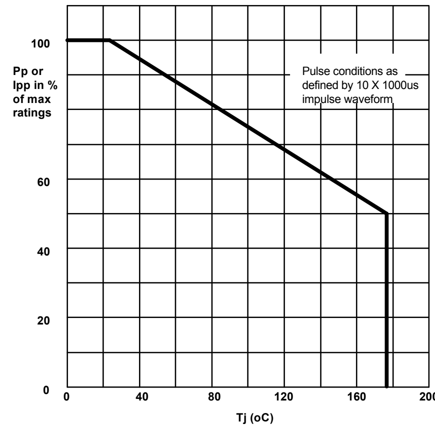
10x1000µs IMPULSE WAVEFORM



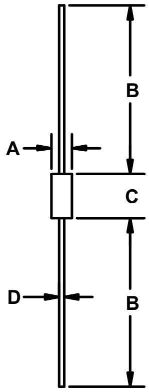
STEADY STATE DERATING CHARACTERISTICS FOR FREE AIR MOUNTING



PULSE DERATING CURVE



MECHANICAL OUTLINE

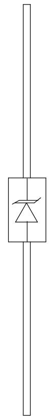


DIMENSIONS					
DIM N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.115	0.140	2.92	3.56	
B	0.900	1.300	22.86	33.02	
C	0.150	0.300	3.81	7.62	2
D	0.037	0.042	0.94	1.07	2

NOTES :

1. Controlling dimension is inches.
2. Includes uncontrolled area of device leads.

SCHEMATIC



8

SEMTECH

POWER DISCRETES

Description

The 1N64xx series of transient voltage suppressors are designed to protect military and commercial electronic equipment from overvoltages caused by lightning, ESD, EFT, inductive load switching, and EMP. These devices are constructed using a p-n junction TVS diode in a hermetically sealed, voidless glass package. The hermetically sealed package provides high reliability in harsh environmental conditions. TVS diodes are further characterized by their high surge capability, low operating and clamping voltages, and a theoretically instantaneous response time. This makes them ideal for use as board level protection for sensitive semiconductor components. These devices are DESC QPL qualified to MIL-S-19500/551.

Features

- 500 Watts peak pulse power (tp = 10/1000μs)
- Voidless hermetically sealed glass package
- Metallurgically bonded
- High surge capacity
- Unidirectional
- Available in JTX, and JTXV versions per MIL-PRF-19500/551

Applications

- Aerospace and industrial electronics
- Board level protection
- Airborne systems
- Shipboard systems
- Ground systems

Mechanical Characteristics

- Hermetically sealed glass package

Absolute Maximum Ratings

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 10 x 1000μs)	Ppk	500	Watts
Storage Temperature Range	T_{STG}	-65 to +175	°C
Steady-State Power Dissipation @ TL = 75°C (3/8")	PD	3	Watts

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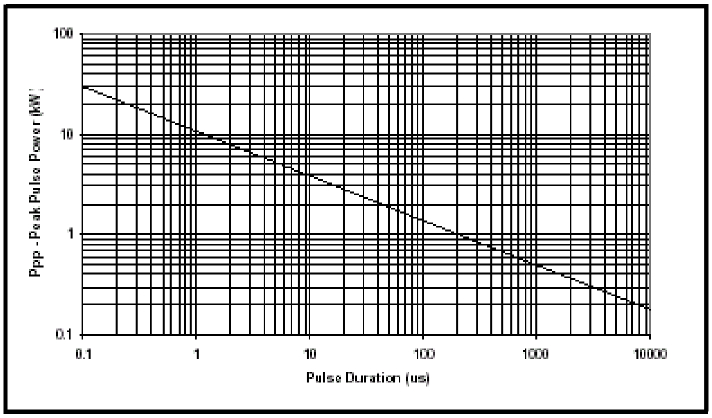
Electrical Characteristics

Electrical specifications @ T_A = 25°C unless otherwise specified.

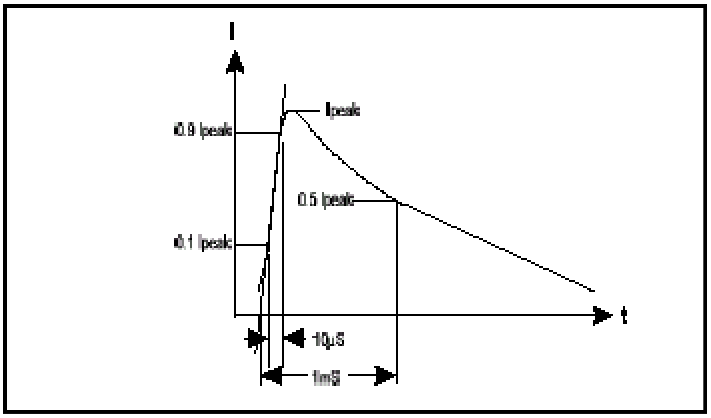
Device Type	Reverse Standoff Voltage V_{RWM}	Reverse Leakage Current I_R	Minimum Breakdown Voltage V_{BR} @ I_T	Test Current I_T	Maximum Clamping Voltage V_C @ I_{PP}	Peak Pulse Current I_{PP} T_P = 1mS	Peak Pulse Current I_{PP} T_P = 20μS	Temp. Coef. of V_{BR} αV_Z
	V	μA	V	mA	V	A	A	% / °C
1N6461US	5	3000	5.6	25	9.0	56	315	0.040
1N6462US	6	2500	6.5	20	11.0	46	258	0.040
1N6463US	12	500	13.6	5	22.6	22	125	0.050
1N6464US	15	500	16.4	5	26.5	19	107	0.060
1N6465US	24	50	27.0	2	41.4	12	69	0.084
1N6466US	30.5	3	33.0	1	47.5	11	63	0.093
1N6467US	40.3	2	43.7	1	63.5	8	45	0.094
1N6468US	51.6	2	54.0	1	78.5	6	35	0.096

POWER DISCRETES
Electrical Characteristics

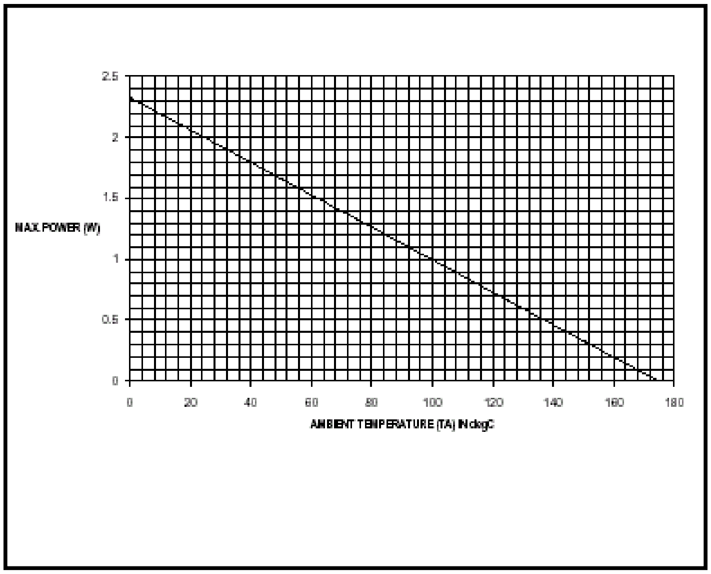
PEAK PULSE POWER vs. PULSE TIME



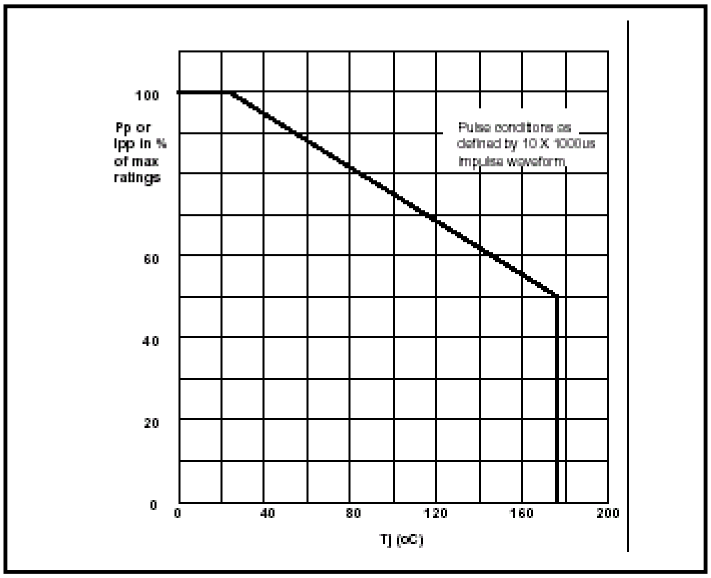
10 x 1000µs IMPULSE WAVEFORM



STEADY STATE DERATING CHARACTERISTICS
FOR FREE AIR MOUNTING



PULSE DERATING CURVE



8

SEMTECH

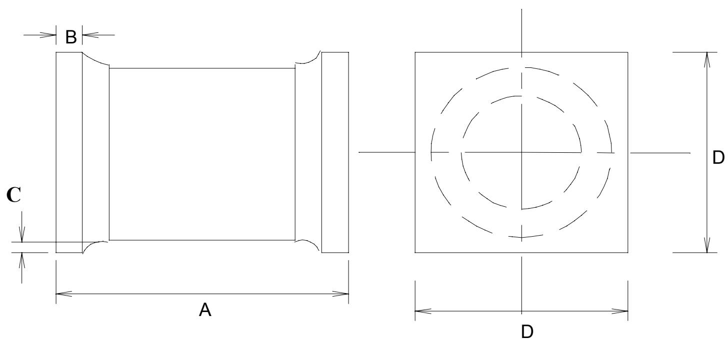
POWER DISCRETES

Ordering Information

Part Number	Description
1N6461US, 1N6462US, 1N6463US, 1N6464US, 1N6465US, 1N6466US, 1N6467US, 1N6468US	Surface Mount (US)(1)

Note:
(1) Available in trays and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



	Dimensions			
	1N6461US - 1N6468US			
	Inches		Millimeters	
	MIN	MAX	MIN	MAX
A	0.200	0.225	5.08	5.72
B	0.019	0.028	0.48	0.71
C	0.003	-	0.08	-
D	0.137	0.148	3.48	3.76

Notes:
(1) Dimensions are in inches.
(2) Metric equivalents are given for general information only.

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

8

SEMTECH QPL 1500 Watt Axial Leaded TVS

1N6469
Thru
1N6476

DESCRIPTION

The 1N64xx series of transient voltage suppressors are designed to protect military and commercial electronic equipment from overvoltages caused by lightning, ESD, EFT, inductive load switching, and EMP. These devices are constructed using a p-n junction TVS diode in a hermetically sealed, voidless glass package. The hermetically sealed package provides high reliability in harsh environmental conditions. TVS diodes are further characterized by their high surge capability, low operating and clamping voltages, and a theoretically instantaneous response time. This makes them ideal for use as board level protection for sensitive semiconductor components. These devices are DSCC QPL qualified to MIL-PRF-19500/552.

APPLICATIONS:

- Aerospace & Industrial Electronics
- Board Level Protection
- Airborne Systems
- Shipboard Systems
- Ground Systems

FEATURES:

- 1500 Watts Peak Pulse Power (tp = 10/1000µs)
- Voidless hermetically sealed glass package
- Metallurgically bonded
- High surge capacity
- Unidirectional
- Available in **JAN**, **JTX**, and **JTXV** versions per MIL-PRF-19500/552

MECHANICAL CHARACTERISTICS:

- Hermetically sealed glass package
- Tinned copper leads
- Marking : P/N, date code, logo, & cathode band

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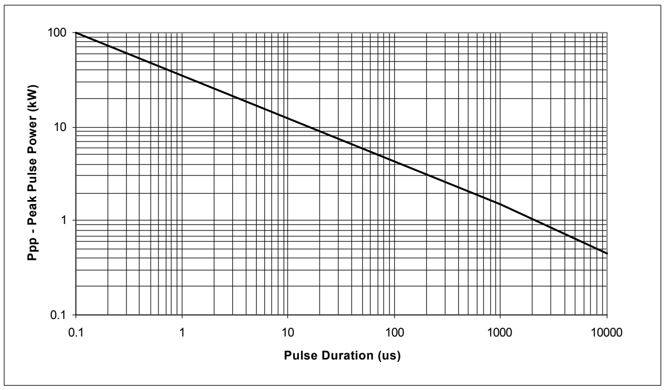
MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 10 x 1000µs)	Ppk	1500	Watts
Operating Temperature	Tj	-65 to +175	°C
Storage Temperature	Tstg	-65 to +175	°C
Steady-State Power Dissipation @ TL = 75°C (3/8")	PD	5	Watts

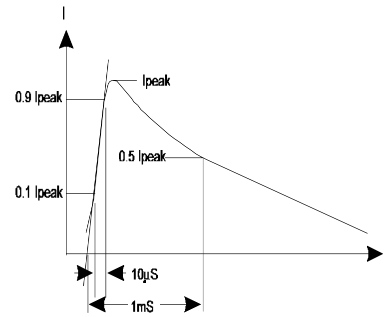
ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

DEVICE TYPE	REVERSE STAND-OFF VOLTAGE V_{RWM}	REVERSE LEAKAGE CURRENT I_R	MINIMUM BREAKDOWN VOLTAGE V_{BR} @ I_T	TEST CURRENT I_T	MAXIMUM CLAMPING VOLTAGE Vc @ Ipp	PEAK PULSE CURRENT Ipp Tp = 1mS	PEAK PULSE CURRENT Ipp Ip = 20µS	TEMPERATURE COEFFICIENT OF V_{BR} αVz
	(V)	(µA)	(V)	(mA)	(V)	(A)	(A)	% /°C
1N6469	5	1500	5.6	50	9.0	167	945	0.040
1N6470	6	1000	6.5	50	11.0	137	775	0.040
1N6471	12	20	13.6	10	22.6	66	374	0.050
1N6472	15	10	16.4	10	26.5	57	322	0.060
1N6473	24	5	27.0	5	41.4	36.5	206	0.084
1N6474	30.5	5	33.0	1	47.5	32	190	0.093
1N6475	40.3	5	43.7	1	63.5	24	136	0.094
1N6476	51.6	5	54.0	1	78.5	19	106	0.096

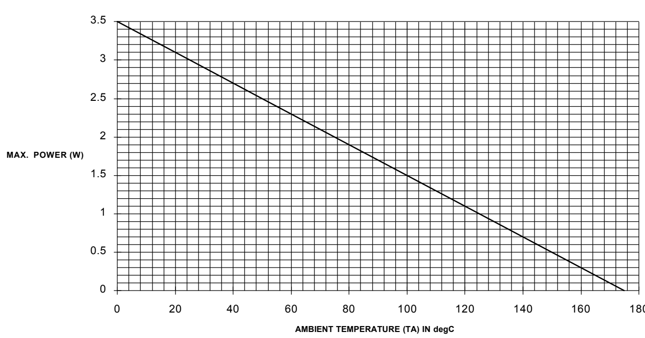
PEAK PULSE POWER vs. PULSE TIME



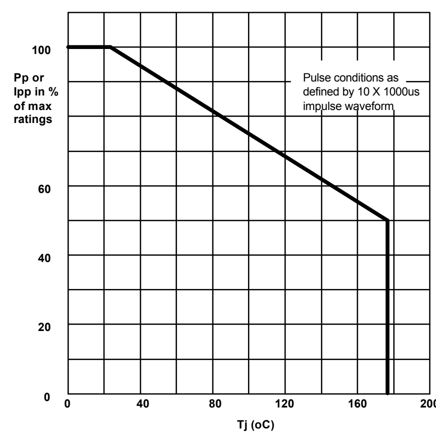
10x1000µs IMPULSE WAVEFORM



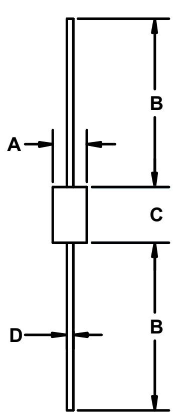
STEADY STATE DERATING CHARACTERISTICS FOR FREE AIR MOUNTING



PULSE DERATING CURVE



MECHANICAL OUTLINE

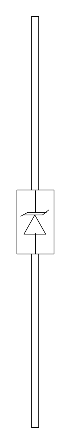


DIMENSIONS					
DIM^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	0.150	0.185	3.81	4.70	
B	0.900	1.300	22.86	33.02	
C	0.160	0.375	4.06	9.53	2
D	0.037	0.042	0.94	1.07	2

NOTES :

1. Controlling dimension is inches.
2. Includes uncontrolled area of device leads.

SCHEMATIC



POWER DISCRETES

Description

The 1N64xx series of transient voltage suppressors are designed to protect military and commercial electronic equipment from overvoltages caused by lightning, ESD, EFT, inductive load switching, and EMP. These devices are constructed using a p-n junction TVS diode in a hermetically sealed, voidless glass package. The hermetically sealed package provides high reliability in harsh environmental conditions. TVS diodes are further characterized by their high surge capability, low operating and clamping voltages, and a theoretically instantaneous response time. This makes them ideal for use as board level protection for sensitive semiconductor components. These devices are DSCC QPL qualified to MIL-PRF-19500/552.

Features

- 1500 Watts peak pulse power (tp = 10/1000µs)
- Voidless hermetically sealed glass package
- Metallurgically bonded
- High surge capacity
- Unidirectional
- Available in JAN, JTX, and JTXV versions per MIL-PRF-19500/552

Applications

- Aerospace and industrial electronics
- Board level protection
- Airborne systems
- Shipboard systems
- Ground systems

Mechanical Characteristics

- Hermetically sealed glass package

Absolute Maximum Ratings

Rating	Symbol	Value	Units
Peak Pulse Power (tp = 10 x 1000µs)	Ppk	1500	Watts
Operating Temperature Range	Tj	-65 to +175	°C
Storage Temperature Range	T_{STG}	-65 to +175	°C
Steady-State Power Dissipation @ TL = 75°C (3/8")	PD	5	Watts

Electrical Characteristics

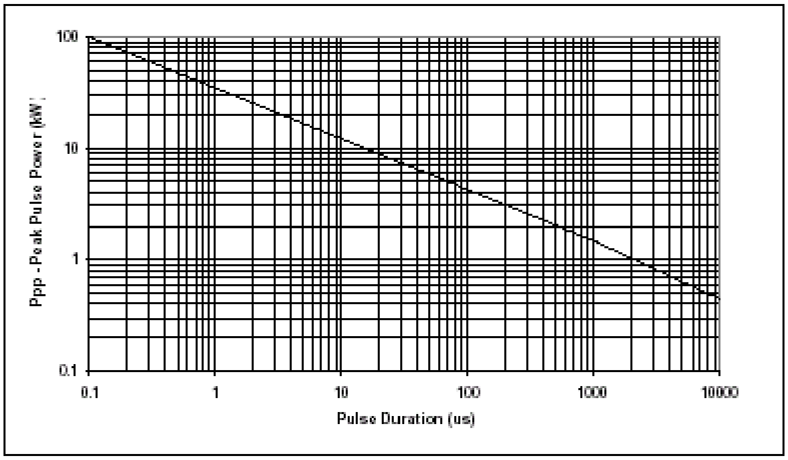
Electrical specifications @ T_A = 25°C unless otherwise specified.

Device Type	Reverse Standoff Voltage V_{RWM}	Reverse Leakage Current I_R	Minimum Breakdown Voltage V_{BR} @ I_T	Test Current I_T	Maximum Clamping Voltage V_C @ I_{PP}	Peak Pulse Current I_{PP} T_P = 1mS	Peak Pulse Current I_{PP} T_P = 20µS	Temp. Coef. of V_{BR} αV_Z
	V	µA	V	mA	V	A	A	% / °C
1N6469	5	1500	5.6	50	9	167	945	0.040
1N6470	6	1000	6.5	50	11.0	137	775	0.040
1N6471	12	20	13.6	10	22.6	66	374	0.050
1N6472	15	10	16.4	10	26.5	57	322	0.060
1N6473	24	5	27.0	5	41.4	36.5	206	0.084
1N6474	30.5	5	33.0	1	47.5	32	190	0.093
1N6475	40.3	5	43.7	1	63.5	24	136	0.094
1N6476	51.6	5	54.0	1	78.5	19	106	0.096

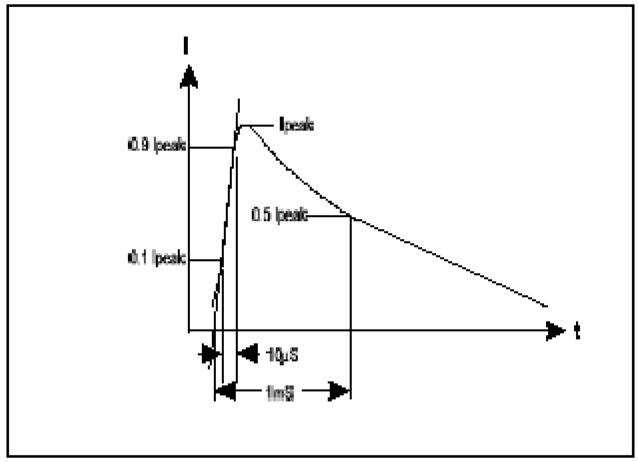
POWER DISCRETES

Electrical Characteristics

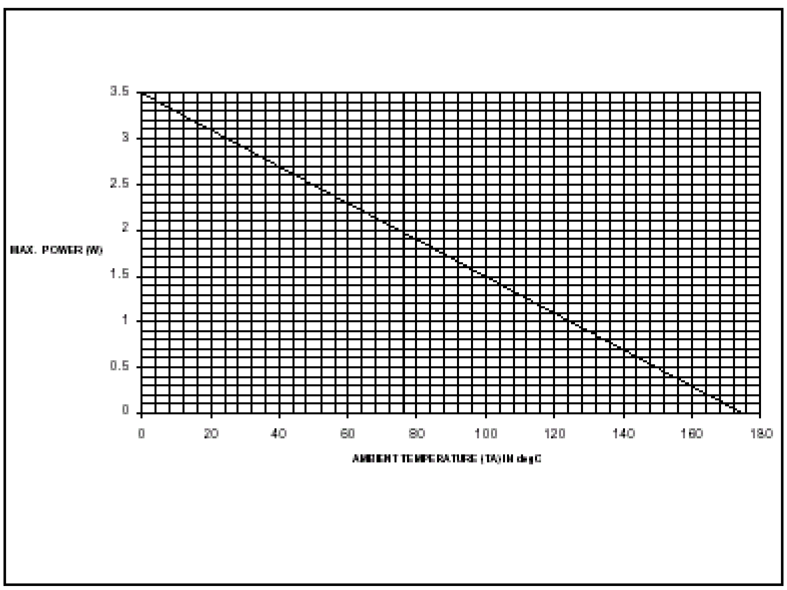
PEAK PULSE POWER vs. PULSE TIME



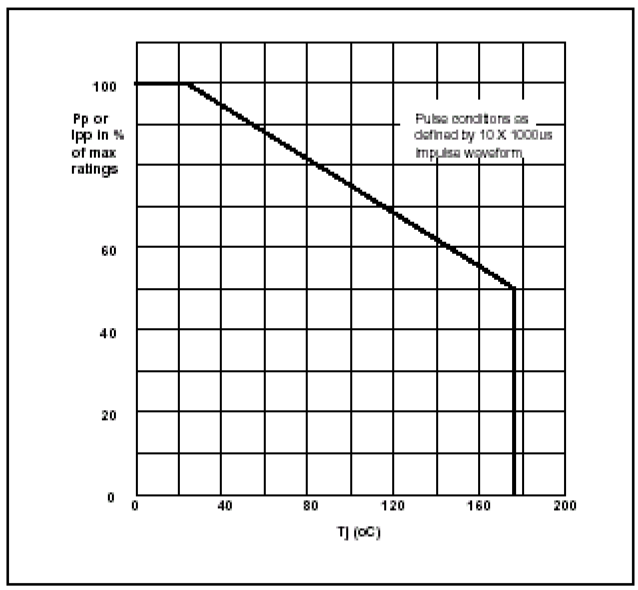
10 x 1000µs IMPLUSE WAVEFORM



STEADY STATE DERATING CHARACTERISTICS
FOR FREE AIR MOUNTING



PULSE DERATING CURVE



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SEMTECH

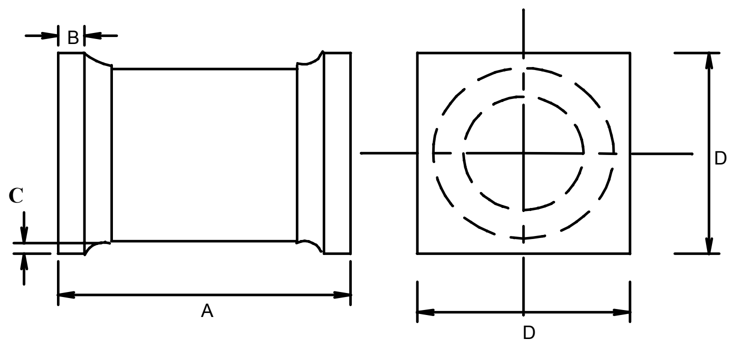
POWER DISCRETES

Ordering Information

Part Number	Description
1N6469US, 1N6470US, 1N6471US, 1N6472US, 1N6473US, 1N6474US, 1N6475US, 1N6476US	Surface Mount (US) (1)

Note:
(1) Available in trays and tape and reel packaging. Please consult factory for quantities.

Outline Drawing



	Dimensions	
	1N6469US - 1N6476US	
	Inches	
	MIN	MAX
A	0.205	0.245
B	0.019	0.028
C	0.003	-
D	0.183	0.202

Contact Information

Semtech Corporation
Power Discretes Products Division
200 Flynn Road, Camarillo, CA 93012
Phone: (805)498-2111 FAX (805)498-3804

SEMTECH

60,000 & 90,000 Watt TVS Module

60KS200C
90KS200C

DESCRIPTION

The 60KS200C & 90KS200C series of bidirectional transient voltage suppression modules are designed for use in shipboard equipment and other power servicing equipment. These modules protect sensitive semiconductor components from transients resulting from power interuptions and shore power switch-over. The sub-assemblies are metallurgically bonded and packaged in a hermetically sealed package. The hermetically sealed package provides high reliability in harsh environmental conditions.
TVS modules are most often used in applications where discrete TVS diodes do not have high enough surge handling capabality to suppress large power surges.

FEATURES:

- 60,000 & 90,000 watts Peak Pulse Power (tp = 1.5 x 40µs)
- 200 Volts Bidirectional
- For use in shipboard power servicing equipment
- Bidirectional
- Custom voltages available from factory.

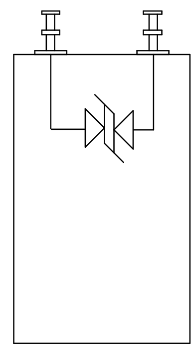
MECHANICAL CHARACTERISTICS:

- Molded Case
- Readily solderable terminals
- Marking : Logo, part number, and date code

SCREENING:

100% Screening is available per MIL-S-19500/516. For ordering use the following suffix:
H1 - Submodule screening
H2 - Submodule & module screening
H3 - Submodule & module screening + Group B & C

SCHEMATIC



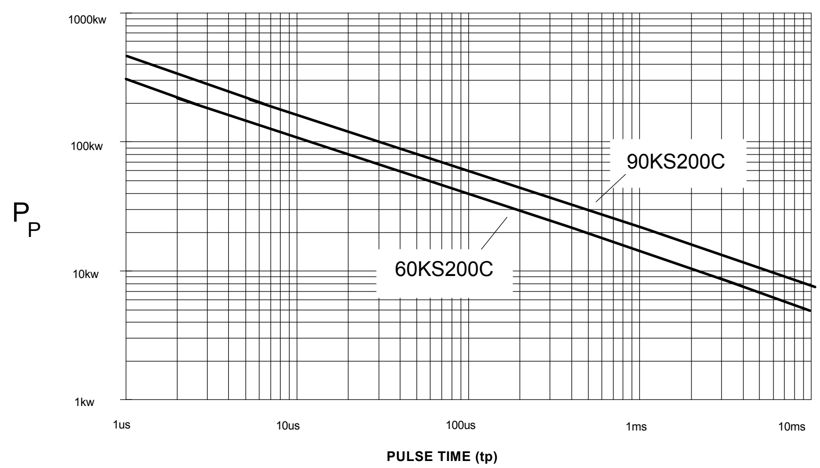
MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 1.5 x 40µs)	Ppk	60,000 & 90,000	Watts
Operating Temperature	Tj	-65 to +150	°C
Storage Temperature	Tstg	-65 to +150	°C

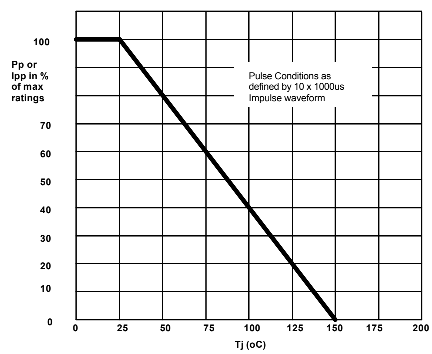
ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

PART NUMBER	REVERSE STAND-OFF VOLTAGE V_{RWM} (V)	REVERSE LEAKAGE CURRENT I_R (µA)	BREAKDOWN VOLTAGE V_{BR} @ I_T Min. - Max (V)	TEST CURRENT I_T (mA)	MAXIMUM CLAMPING VOLTAGE Vc @ Ipp (V)	PEAK PULSE CURRENT Ipp tp = 1.5 x 40µs (A)	MAXIMUM PEAK PULSE POWER tp = 1.5 x 40µs (kw)
60KS200C	180	10	200 - 225	1	335	180	60
90KS200C	180	0.5	200 - 225	1	280	180	90

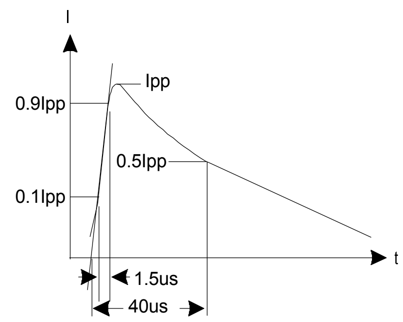
PEAK PULSE POWER vs. PULSE TIME



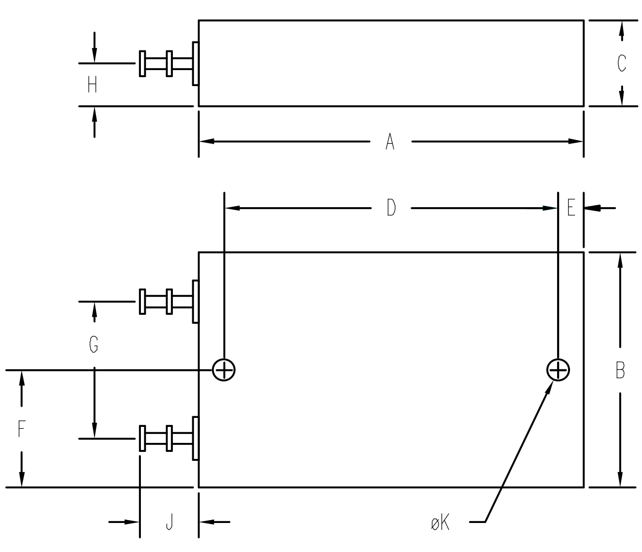
PULSE DERATING CURVE



1.5x40µs IMPULSE WAVEFORM



MECHANICAL OUTLINE



90KS200C

DIMENSIONS					
DIMᴺ	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	2.22	2.50	56.3	63.5	
B	1.35	1.90	34.2	48.3	
C	.47	0.55	11.9	13.9	
D	1.88	1.92	47.8	48.8	
E	.135	0.30	3.4	7.6	
F	.66	0.95	16.7	24.1	
G	.98	1.02	24.9	25.9	
H	.26	.29	6.5	7.5	
J	.325	.365	8.2	9.3	
K	.193	.205	5.35	5.65	DIA.

60KS200C

DIMENSIONS					
DIMᴺ	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	2.22	2.28	56.3	58.0	
B	1.35	1.40	34.2	35.6	
C	.47	.53	11.9	13.5	
D	1.93	1.97	49.0	50.1	
E	.135	.165	3.4	4.2	
F	.66	.72	16.7	18.3	
G	.77	.83	19.5	21.1	
H	.22	.28	5.5	7.2	
J	.325	.365	8.2	9.3	
K	.120	.130	3.0	3.3	DIA.

8

DESCRIPTION

The 704-15K36 & 704-15K36T series of transient voltage suppression modules are for use primarily in avionics equipment. This series meets all applicable enviromental requirements of MIL-S-19500. The sub-assemblies are metallurgically bonded and packaged in a hermetically sealed package. The hermetically sealed package provides high reliability in harsh environmental conditions. In addition, the subassemblies can be 100% TX screened per MIL-S-19500/516 or /507. Although this series has been designed for 28 voltt aircraft applications, different voltages may be special ordered for specific applications.
TVS modules are most often used in applications where discrete TVS diodes do not have high enough surge handling capabality to suppress large power surges.

SCREENING:

100% Screening is available per MIL-S-19500/516. For ordering use the following suffix:
H1 - Submodule screening
H2 - Submodule & module screening
H3 - Submodule & module screening + Group B & C

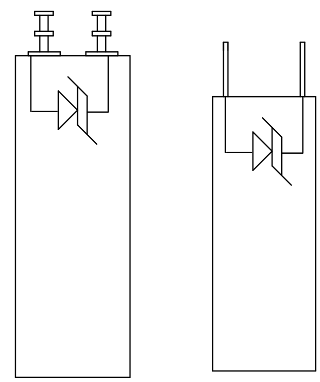
FEATURES:

- 15,000 watts Peak Pulse Power (tp = 10 x 1000μs)
- 28 Volt power supply protection
- For use in airborne equipment
- Unidirectional
- Custom voltages available from factory.

MECHANICAL CHARACTERISTICS:

- Molded Case
- Readily solderable terminals
- Marking : Logo, part number, and date code

SCHEMATIC



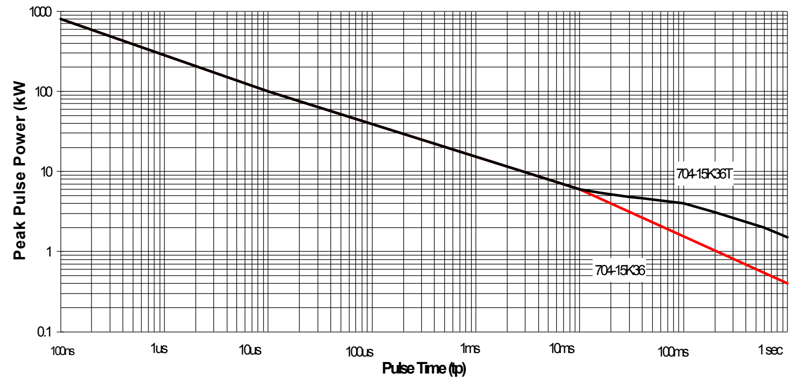
MAXIMUM RATINGS

RATING	SYMBOL	VALUE	UNIT
Peak Pulse Power (tp = 10 x 1000μs)	Ppk	15,000	Watts
Operating Temperature	Tj	-65 to +150	°C
Storage Temperature	Tstg	-65 to +150	°C

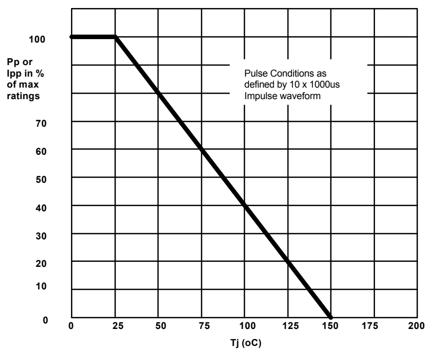
ELECTRICAL CHARACTERISTICS @ 25°C (unless otherwise specified)

PART NUMBER	REVERSE STAND-OFF VOLTAGE V_{RWM} (V)	REVERSE LEAKAGE CURRENT I_R (μA)	MINIMUM BREAKDOWN VOLTAGE V_{BR} @ I_T (V)	TEST CURRENT I_T (mA)	MAXIMUM CLAMPING VOLTAGE Vc @ Ipp (V)	PEAK PULSE CURRENT Ipp Tp = 1ms (A)	MAXIMUM FORWARD VOLTAGE 8.3ms I_F = 100A (V)
704-15K36	31.5	100	36	10	51	300	3.0
704-15K36T	31.5	500	36	10	51	300	15.0

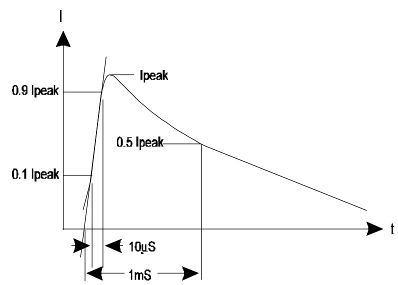
PEAK PULSE POWER vs. PULSE TIME



PULSE DERATING CURVE

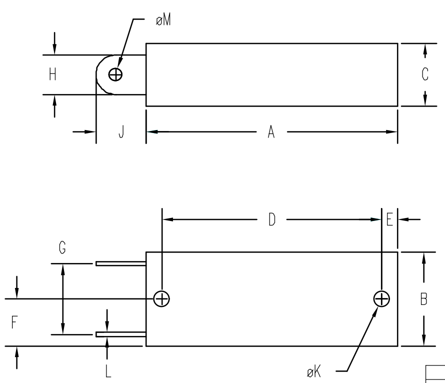


10/1000µs IMPULSE WAVEFORM



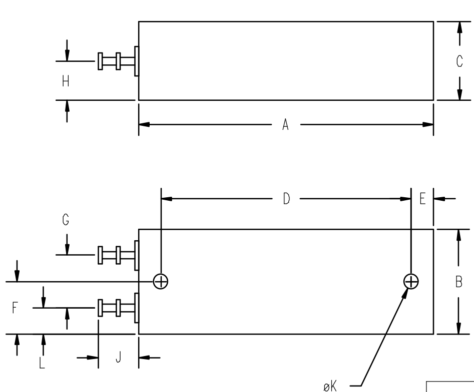
8

MECHANICAL OUTLINE - 704-15K36



DIMENSIONS					
DIM^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	1.97	2.03	50.0	51.6	
B	.72	.78	18.2	19.9	
C	.47	.53	11.9	13.5	
D	1.73	1.77	43.9	45.0	
E	.110	.140	2.7	3.6	
F	.345	.405	8.7	10.3	
G	.532	.592	13.5	15.1	
H	.306	.320	7.7	8.2	
J	.350	.450	8.8	11.5	
øK	.120	.130	3.0	3.3	
L	.027	.037	.68	.94	
øM	.095	.115	2.4	3.0	

MECHANICAL OUTLINE - 704-15K36T



DIMENSIONS					
DIM^N	INCHES		MM		NOTE
	MIN	MAX	MIN	MAX	
A	2.47	2.53	62.7	64.3	
B	.86	.92	21.8	23.4	
C	.64	.70	16.2	17.8	
D	2.10	2.14	53.3	54.4	
E	.17	.21	4.3	5.4	
F	.415	.475	10.5	12.1	
G	.42	.48	10.6	12.2	
H	.305	.365	7.7	9.3	
J	.325	.365	8.2	9.3	
øK	.120	.130	3.0	3.3	
L	.19	.25	4.8	6.4	

Chapter 9
High Voltage Capacitors

POWER DISCRETES

Description

Semtech Premium Dielectric
High Voltage Capacitors
Monolithic Ceramic type

Semtech's premium dielectric capacitors demonstrate minimum capacitance change over the operation voltage and temperature range, high current carrying capability and high volumetric efficiency. This X7R body has been designed into the most demanding applications: from the one extreme of satellite, missile, space shuttle, and avionics programs to the other extreme of "down hole" oil exploration equipment.

Features

- X7R dielectric
- 1kV to 5kV voltage range

General Specifications

- Operating temperature range -55°C to 125°C
- Aging rate <1.0% per decade hour
- Insulation resistance: 100k megΩ or 1000megΩ microfarads, whichever is less, at 500VDC, 25°C
- Dissipation factor: 2.5% max at 1kHz 1 VAC, 25°C
- Dielectric withstanding voltage: 1.2 x rated voltage at 25°C (Test conducted with charging current limited to 10mA and discharge current limited to 10A)
- Temperature coefficient: ± 15% over -55°C to 125°C range
- "S" size package type available

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SEMTECH

POWER DISCRETES

Capability Matrix

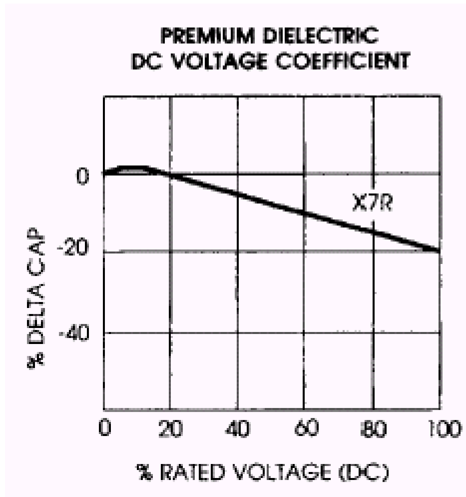
	1kV					2kV					3kV					4kV					5kV					EIA CODE
SIZE	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6	2	3	4	5	6	
VALUE																										
180pF																										181
220pF																										221
270pF																										271
330pF																										331
390pF																										391
470pF																										471
560pF																										561
680pF																										681
820pF																										821
1000pF																										102
1200pF																										122
1500pF																										152
1800pF																										182
2200pF																										222
2700pF																										272
3300pF																										332
3900pF																										392
4700pF																										472
5600pF																										562
6800pF																										682
8200pF																										822
.010uF																										103
.012uF																										123
.015uF																										153
.018uF																										183
.022uF																										223
.027uF																										273
.033uF																										333
.039uF																										393
.047uF																										473
.056uF																										563
.068uF																										683
.082uF																										823
.10uF																										104
.12uF																										124
.15uF																										154
.18uF																										184
.22uF																										224
.27uF																										274
.33uF																										334
.39uF																										394

= Standard range K tolerance available from stock.

= Non standard capabilities

9

Typical Characteristic



Ordering Information

3	A		X	103	K	2
PART SIZE CODE	**FORM**		**DIELECTRIC MATERIAL**	**CAPACITANCE (EIA CODE)**	**CAPACITANCE TOLERANCE**	**VOLTAGE RATING**
2	CHIP	LEADED	X = X7R	Last digit indicates number of zeroes following the first two digits Example: 103=10000pF	K = 10% M = 20% V = +100% - 0% Z = +80% - 20%	1 = 1kV 2 = 2kV 3 = 3kV 4 = 4kV 5 = 5kV
3	A = Silver Termination D = Palladium Silver Termination H = Capable of handling temperature excursions of up to 200°C	E = Epoxy Encapsulated L = Leaded only				
4						
5						
6						

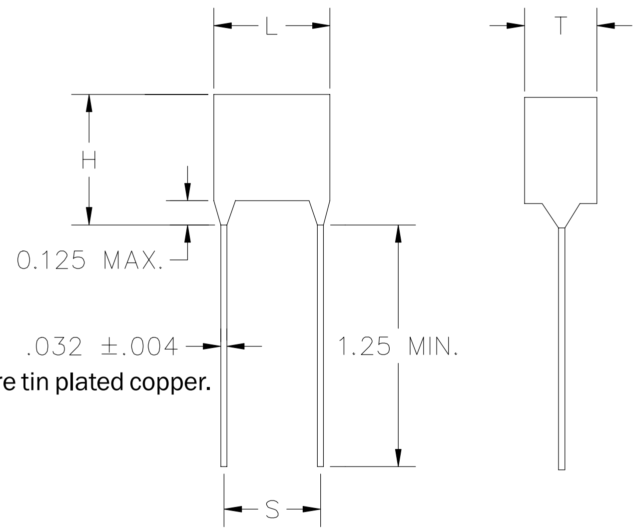
Note:

1. For “S” size package type, please order part as “SXXXXXXXX” e.g. S3AX103K2.

SEMTECH

POWER DISCRETES

Outline Drawing - Encapsulated



Leads are tin plated copper.

Dimensions				
Size Code	**L(Max) In. (mm)**	**S In.(mm)**	**T(Max) In.(mm)**	**H(Ref) (1) In.(mm)**
2	.400 (10.2)	.300 ± .032 (7.62 ± .82)	.275 (7.00)	.475 (12.1)
3	.500 (12.7)	.400 ± .032 (10.2 ± .82)	.300 (7.62)	.575 (14.6)
4	.600 (15.3)	.500 ± .032 (12.7 ± .82)	.375 (9.53)	.675 (17.1)
5	.700 (17.8)	.600 ± .032 (15.3 ± .82)	.375 (9.53)	.775 (19.7)
6	.800 (20.4)	.700 ± .032 (17.8 ± .82)	.375 (9.53)	.875 (22.2)

Dimensions for "S" Size(2)				
Size Code	**L(Max) In. (mm)**	**S In.(mm)**	**T(Max) In.(mm)**	**H(Ref) (1) In.(mm)**
S2	0.42 (10.7)	.275 ± .03 (6.96 ± .76)	0.35 (8.89)	0.3 (8.89)
S3	0.49 (12.4)	.375 ± .03 (9.52 ± .76)	0.35 (8.89)	0.4 (10.16)
S4	0.59 (14.9)	.475 ± .03 (12.06 ± .76)	0.35 (8.89)	0.5 (12.7)
S5	0.69 (17.5)	.575 ± .03 (14.6 ± .76)	0.35 (8.89)	0.6 (15.24)
S6	0.79 (20.0)	.675 ± .03 (17.14 ± .76)	0.35 (8.89)	0.72 (18.28)

Notes:
1. Maximum mounting height. Leads shall be solderable beyond this point.
2. When ordering “S” size package type please see Dimension Table “S”.

9

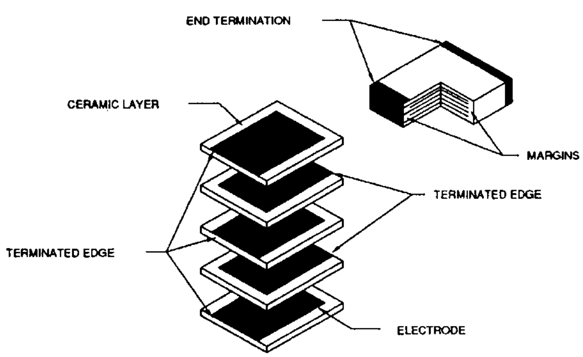
HIGH VOLTAGE CERAMIC CAPACITORS

I. FUNCTION

A Capacitor is a component that stores electrical charge. In its simplest form it consists of two conductive surfaces separated by an electrical insulator or dielectric. The stored charge is determined by the dielectric constant of the insulator material and the geometry of the construction.

Figure 1 shows the internal structure of a typical monolithic ceramic capacitor.

Fig.1 CAPACITOR CONSTRUCTION



II. BASIC PROPERTIES

(Electrical, sizes, configuration)

A. Electrical

1. **Capacitance.** Table 1 compares the dielectric constants of air, glass, mica, and paper with three of the commonly used ceramics. As can be seen the crystalline ceramics have extememly high K in comparison to the others. Barium Titanate is the basic material used in the manufacture of ceramic dielectric. It is produced by reacting barium oxide with titanium dioxide under controlled conditions. Barium Titanate has ferroelectric properties. As a dielectric it exhibits strong hysteresis. Capacitance varies widely over a fairly narrow temperature range which limits use of Barium Titanate as a ceramic dielectric in its pure form. By adding other oxides the basic characteristics can be modified to make the dielectric more desirable electrically and flatten its response over the operating temperature range. These additives are variously referred to as shifters, depressors, fluxes, or stabilizers, depending on how they effect the Barium Titanate characteristics

Table 1 DIELECTRIC CONSTANTS

MATERIAL	"K"
AIR	1.0006
GLASS	7.0 - 10.0
MICA	5.0 - 7.0
PAPER	4.0 - 7.0
NPO (Class I-A)	25 - 100
X7R (Class II-A)	300 - 1800
Z5U (Class II-B)	2500 - 15000

As noted in Table 1, there are three basic ceramic formulations available in capacitors. They are NPO, X7R, and Z5U. Mathematically capacitance can be described as $C = \frac{n\,(0.224KA)}{t}$.

Where C is capacitance in picofarads

n is the number of capacitors in parallel,

K is the dielectric constant

A is the area of opposed conductors in inches squared

0.224 is the dimensional constant, and is the dielectric thickness in inches.

Capacitance then is directly proportional to dielectric constant, K.

2. **Dissipation Factor.** The dissipation factor is an overall measure of losses in the capacitor. It is related to dielectric type temperature and frequency. Figure 2 shows typical values for X7R. NPO is nearly unchanged with temperature.

B. TEMPERATURE EFFECTS

Barium Titanate is cubic above 120°C. As it is cooled through this temperature (the Curie temperature) the structure becomes tetragonal and disorted such that electric dipoles exist. Additional transformations occur at about 0°C and -85°C. The dipoles produce a large dielectric constant due to their ability to respond to an electric field and store energy. The transformation at 120°C produces an anomolously large dielectric constant (up to 160000). Commercial ceramics are made by adding chemicals which shift or surpress the Curie point to some degree (Z5U and X7R) or squash it entirely by eliminating the cubic to tetragonal transformation (NPO). Figure 3 shows the typical responses of commercial bodies to temperature.

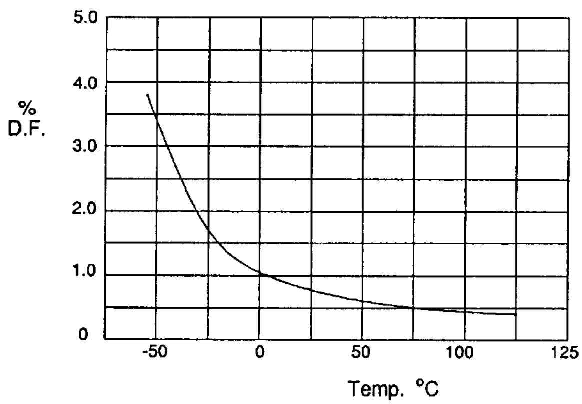
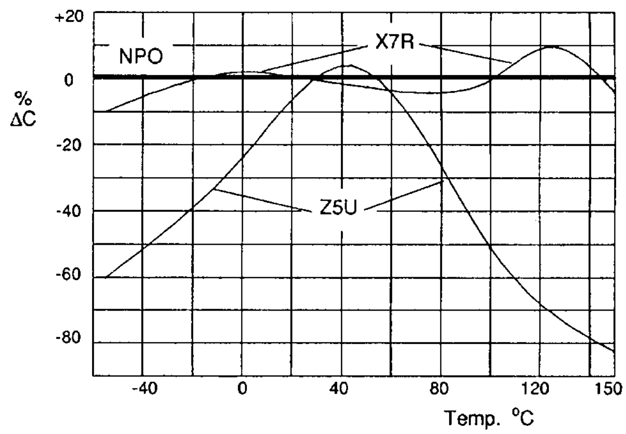


Fig 2. Typical Dissipation Factor vs Temperature

C. Voltage Effects

When voltage is applied the capacitance shifts considerably as shown in Figure 4 and Table 2. The overall volume efficiency of capacitors also change as shown in Table 2. Here, dielectric constants are assumed to be 70, 1250, and 7000 for NPO, X7R, and Z5U respectively.

Figure 3. Temperature Coefficient



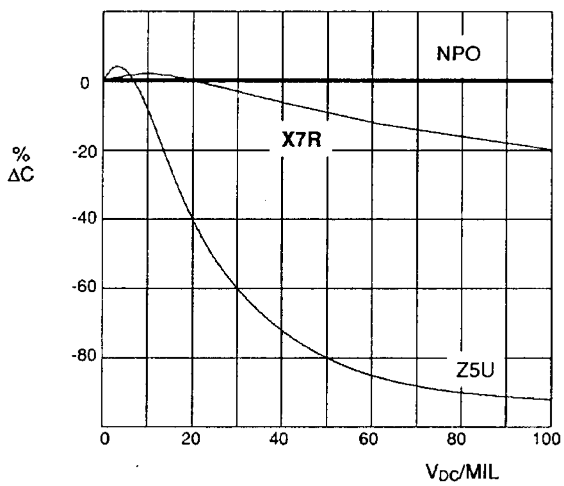


Figure 4. DC voltage Coefficient

Table 2. Volume Efficiency Comparison, Applied Working Voltage

DC Volts	0	2000	4000
DC/MIL	0	50	100
NPO	0.513/14.25	0.513/14.25	0.513/14.25
X7R	**4.24/120**	**4.00/111**	**3.47/96**
Z5U	5.26/156	1.12/31.1	0.592/16.4

Legend: (CAP/EFFICIENCY) nF/(nF/in^3)

Fig 3 TEMPERATURE COEFFICIENT

For the same part size, say 0.45 x 0.40 x 0.20, and voltage rating, say 5KV the required dielectric thickness would be about 25, 37, and 80 mils for the three materials. The capacitance for such parts is shown in Table 2 as a function of the applied voltage.

The efficiency of X7R for high voltage comes from a combination of good voltage withstanding properties, modest capacitance loss with voltage, and a relatively high basic dielectric constant. Another parameter to consider is break-down voltage or dielectric strength of a capacitor body. For any given thickness there a is maximum stress that can safely be applied to a dielectric before breakdown occurs (Figure 5). For example, a 6kV flash breakdown requirement for Z5U dielectric would result in a dielectric thickness of about 80 mils. An X7R dielectric of about 37 mils would easily meet the 6KV requirement. The Z5U part does not have adequate volumetric efficiency at high working voltages. The flash voltage, or over-rating as it is sometimes referred to, is a value which should be based on potential transient voltages that a capacitor may encounter. Instead the flash voltage is often determined by an arbitrary safety factor of 1.5 to 2 times the working voltage. Safety factors are mandatory for

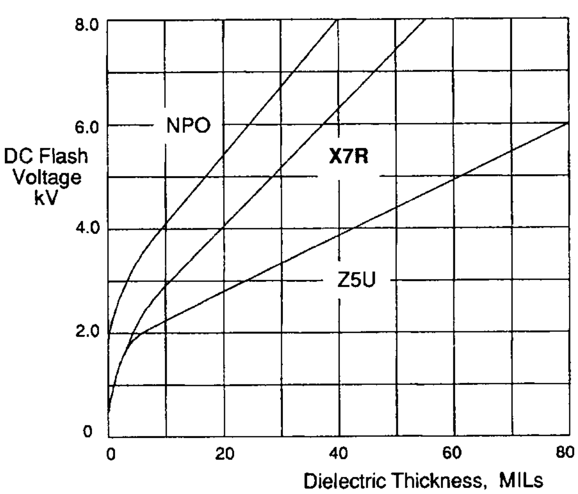


Figure 5. Relative Flash Test Voltage

reliable operation, however excessive over-rating creates problems for designer and user alike.

An X7R unit with a dielectric strength requirement of 4kV is 22 mils thick. If a traditional 50% safety margin is used, flash voltage increase to 6kV and the dielectric thickness increases to 40 mils. This in turn reduces capacitance and volume efficiency by 50%. Unnecessary over-rating similarly effects all type of dielectrics. When voltage is applied to a ceramic dielectric, the degree of polarization, and thus the capacitance, will vary as a function of voltage stress. (Figure 4). This property is known as the voltage coefficient of capacitance. The amount of variation is determined by the specific dielectric formulation, consequently each dielectric type has a distinct characteristic voltage coefficient curve. At 100 V/Mil, for example, NPO is virtually unaffected by the voltage, while Z5U has only 10% of its 1VDC biased capacitance. It is important to note that capacitors are normally specified at zero or 1V DC bias even though they do not operate at that bias level. The circuit designer should have access to data that reflects the true capacitance at operating voltage.

D. Frequency Effects

Frequency effects are like voltage effects in that NPO is less affected than X7R which is less affected than Z5U. NPO shows virtually no capacitance change up to 1MHz and although the DF may double between 1 KHz and 1 MHz the values are typically 0.02 to 0.04%.

E. Aging

When a ceramic capacitor is fired to a solid monolithic its internal grain structure is permanently set. When the ferroelectric types are cooled through the Curie point the grains divide into domains which reduces the strain energy of the body. With time these domains continue to divide until a balance is reached between stress relief and the energy required to form additional domain walls. The result is a decrease in capacitance with time. X7R bodies age at 2% per decade hour (depending upon type). Z5U ages at 3 to 4% per decade hour and NPO does not age as it is not ferroelectric. The aging cycle restarts every time the capacitor is heated above the Curie temperature such as during a soldering operation or a high temperature burn-in.

III. APPLICATION NOTES

A. Capacitor Mounting Techniques

Some Semtech High Voltage Ceramic Capacitors are supplied without leads. Because they are high voltage rated, connections should be solid and large in proportion to the termination area. Soldering is one of the strongest of the bonding methods and is the least electrically resistive. To prevent catastrophic thermal shock, the chip should be slowly elevated in temperature to approximately 120°C prior to soldering. A good hot plate will provide an even temperature surface. Solder connections shoud be made quickly removing the soldering iron as soon as the connection is made to prevent leaching of the electrodes. Silver bearing solders are recommended to prevent leaching.

B. Surge Current

Charge and discharge currents are directly proportional to voltage. Exessive charging current can trigger a piezoelectric effect and result in destruction of the part. Excessive rate of discharge is not critical in terms of piezoelectric effect, but can result in loss of metallization during the discharge arc.

9

Chapter 10
TVS Application Notes

What Are TVS Diodes?

TVS diodes are solid state pn junction devices specifically designed to protect sensitive semiconductors from the damaging effects of transient voltages. TVS diode schematic symbols are shown in Figure 1. The electrical characteristics of the device are determined by factors such as junction area, doping concentration, and substrate resistivity. The surge power and surge current capability of the TVS diode are proportional to the junction area. TVS diodes are constructed with large cross sectional area junctions for absorbing high transient currents. While the VI characteristic curve of the TVS diode is similar to that of a zener diode, TVS diodes are specifically designed, characterized, and tested for transient voltage suppression. By contrast, zener diodes are designed and specified for voltage regulation.

TVS diodes serve as parallel protection elements (Figure 2). Under normal operating conditions, the TVS diode presents a high impedance to the protected circuit. Ideally, the device appears as an open circuit, although a small amount of leakage current is present. When the normal operating voltage of the protected circuit is exceeded, the TVS diode junction avalanches providing a low impedance path for the transient current. As a result, the transient current is diverted away from the protected components and shunted through the TVS diode. The voltage across the protected circuit is limited to the clamping voltage of the TVS diode. The device returns to a high impedance state after the transient threat passes. TVS diodes will not wear out nor will there be any degradation of the electrical parameters as long as the device is operated within specified limits.

A primary attribute of the TVS diode is its reaction time. Avalanche breakdown theoretically occurs in picoseconds. This is very difficult to measure however. Therefore, TVS diodes are often specified as responding "almost instantaneously". The fast response time of the TVS diode means that any voltage overshoot is primarily due to lead inductance and PC board traces.

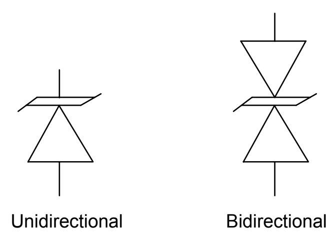


Figure 1 - TVS Diode Schematic Symbols

TVS diodes are available in a wide range of operating voltages. Traditional device voltages range from 5V to 440V for discrete devices. Recent innovations in TVS technology have yielded devices, such as Semtech's SLV series, which operate at 2.8 and 3.3V.

The TVS diodes fast response time and low clamping voltages make them ideal for use as board level protectors for semiconductors and other sensitive components. Applications include data and signal lines, microprocessors & MOS memory, AC power lines, and telecommunication equipment.

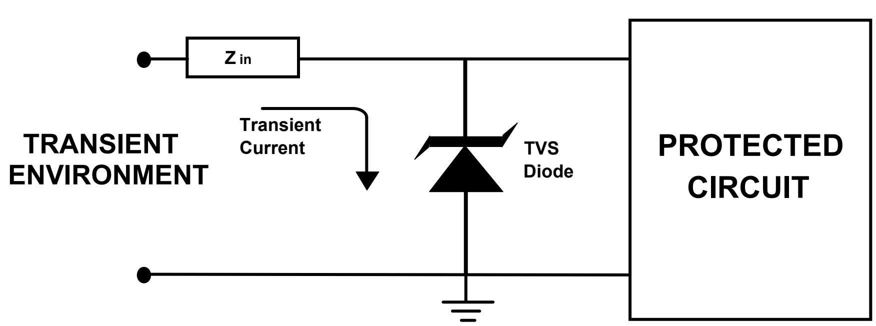


Figure 2 - TVS Diode Operation

TVS Diode Selection

Selection of a suitable component will depend on the number of lines to be protected, the available board space, and the electrical characteristics of the circuit to be protected. TVS diodes are available in a variety of packages and configurations suitable for use today's advanced electronic systems. For high power applications, single device surface mount and axial leaded packages are used. TVS arrays available in standard JEDEC SO packages may be used to protect multiple lines. In situations where board space is at a premium, devices available in SOT23 packages are a low cost alternative.
No matter what the application however, certain device parameters and guidelines form the basis for device selection.

TVS Diode Terminology

A typical IV characteristic curve for a bidirectional TVS diode is shown in Figure 1. The key device parameters are:
Reverse Standoff Voltage (V_{RWM}) : This is the normal dc operating voltage of the device. At this point, the device will appear as a high impedance to the protected circuit. Discrete devices are available with standoff voltages ranging from 2.8V - 440V. This parameter is also referred to as working voltage.
Reverse Breakdown Voltage (V_{BR}) : This is the point where the device begins to conduct in avalanche mode and becomes a low impedance path for the transient. Breakdown voltage is measured at a test current (I_T), typically 1mA or 10mA.

Peak Pulse Current (I_{PP}) : Maximum permissible surge current which the device can withstand without damage. TVS diode data sheets specify a peak pulse capability for a particular transient waveform. Most TVS diodes are rated using an 8/20μs or 10/1000μs impulse waveform.
TVS diodes can withstand higher peak pulse current for shorter duration pulses.
Clamping Voltage (V_C) : Maximum voltage drop across the TVS for a particular peak pulse current.

Selection Guidelines

TVS diode selection involves comparison of device parameters with circuit conditions. The following selection guidelines are recommended:

1 Select a device with a reverse standoff voltage greater than or equal to the normal operating voltage of the circuit.
2 Select a device which is capable of dissipating the expected transient peak pulse current.
3 The device clamping voltage should be less than the maximum voltage handling capability of the protected circuit for the same pulse waveform.
4 For systems using high speed data rates, device junction capacitance will have to be considered. Semtech manufactures special low capacitance devices for those applications.

There may be applications where the actual transient current cannot be defined. Often, the designer will have to meet the requirements of certain transient immunity specifications. At the very least, identification of the source of the threat is necessary; lightning, inductive switching, ESD, etc.

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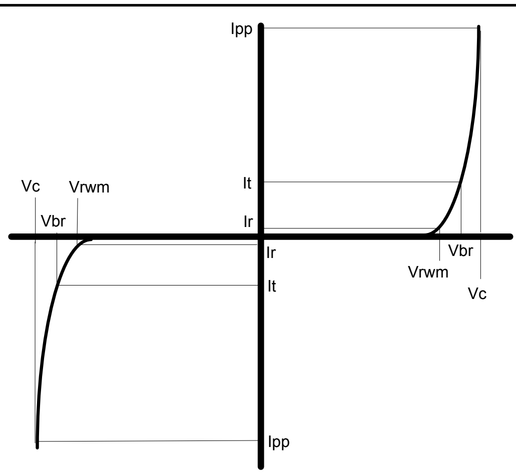

Figure 1 - Bidirectional IV Characteristic Curve

Device Parameter		Circuit Conditions
V_{RWM}	≥	Normal circuit operating voltage
I_{PP}	≥	Expected transient current
V_C	≤	Maximum allowable voltage across the protected component
C_J	<	Maximum loading capacitance for signal integrity

Figure 2 - Selection Summary

TVS Peak Pulse Power vs. Pulse Duration

The peak pulse power (P_{pp}) rating of a TVS diode is defined as the instantaneous power dissipated by a device for a given pulse condition. The peak pulse power rating is calculated using the following relationship :

$$P_{pp} = V_c \times I_{pp}$$

Where
P_{pp} = Peak pulse power (W)
V_c = Clamping Voltage (V)
I_{pp} = Peak pulse current (A)

Common peak pulse power ratings are normally given for 8/20µs and 10/1000µs double exponential impulse waveforms (see SI96-09 for definition). Many applications specify different surge pulse widths which can range from a few nanoseconds to several milliseconds. To determine the power handling capability of a TVS device for different pulse widths, a peak pulse power vs. pulse width curve is included on device data sheets. An example of a curve for a device rated at 1500W (10/1000µs) is shown in Figure 1. As the surge pulse width decreases, the peak pulse power capability of the device increases logarithmically. Additionally, for shorter pulse widths, the TVS can withstand higher peak pulse currents. For example, for a 1.2/50µs impulse waveform (per IEC 61000-4-5), the peak power handling capability is 6kW, 4x the rating at 1000µs. The peak current handling capability is also increased by approximately a factor of four. Conversely, as the surge pulse width is increases, the peak power and current handling capability of the device decreases.

The curve below is for a non-repetitive double exponential waveform. To determine the capability of the device for a square wave pulse, derate to 66% of the peak exponential value. For a half sine wave pulse, derate to 75%.

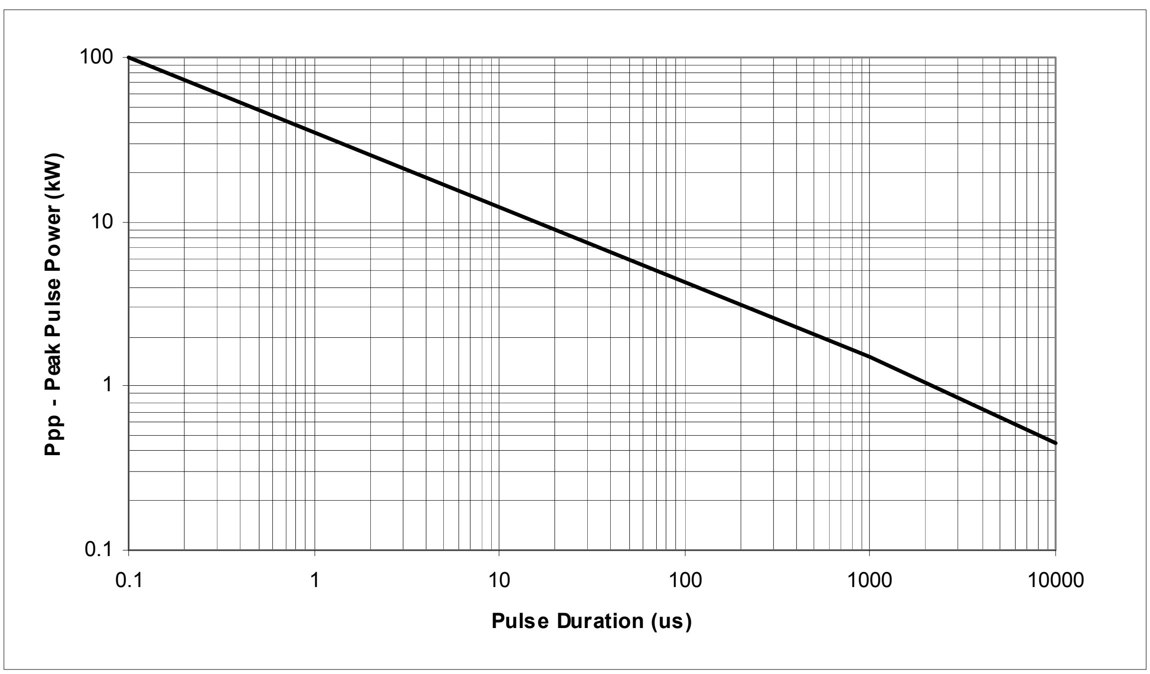

Figure 1 - Peak Pulse Power vs. Pulse Duration for a 1500W TVS Diode

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TVS Power Derating vs. Temperature

Transient voltage suppressors are designed to work over a wide temperature range. If the application requires the TVS to operate at elevated temperatures, the characteristics of the device must be considered at the expected extremes.

Power Derating Curve

During surge conditions, the transient power is dissipated within the TVS diode and is limited by the maximum allowable junction temperature. If the ambient temperature is increased, the power dissipating capability of the device decreases. The peak pulse power capability of the device derates linearly from 25ºC to $T_{(max)}$. To determine the power or current handling capability of the device at elevated temperatures, a power derating curve is used (Figure 1). For example, at an operating temperature of 100ºC, the device is capable of dissipating 40% of the rated peak pulse current.

Clamping Voltage

Device clamping voltage is normally specified for a junction temperature of 25ºC before surge. To extrapolate for other junction temperatures, the following formula may be used :

$$\Delta V_{BR} = \alpha T_{(VBR)} * (T_j - 25) * V_{BR}$$

Where :

ΔV_{BR} = Change in voltage (V)

$\alpha T_{(VBR)}$ = Temperature coefficient of breakdown voltage (V/ºC)

V_{BR} = Breakdown (or clamping) voltage (V)

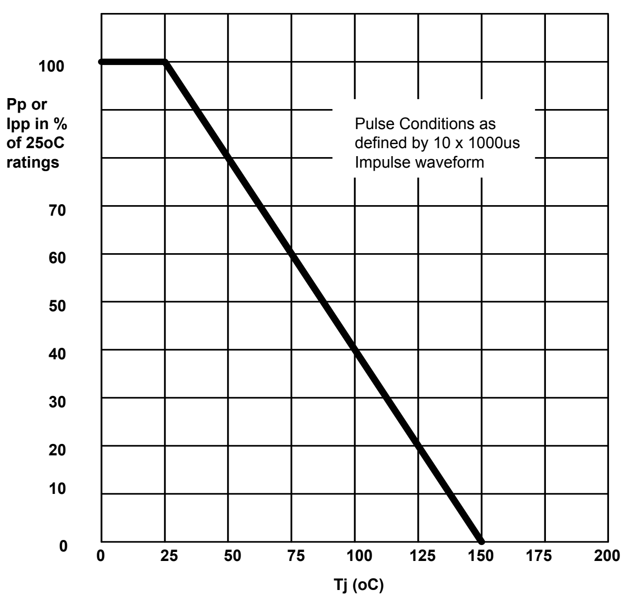

Figure 1 - Peak Pulse Power vs. Pulse Duration for a 1500W TVS Diode

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Sources of Transients : Lightning

Lightning is an atmospheric discharge of electricity resulting from the accumulation of static charges, usually during a thunderstorm. Inside of a thundercloud, static charges are generated by the impact of water and ice particles and separated in strong air currents. Lightning occurs when enough charge has been separated inside the cloud to cause localized electric breakdown of the air.

Lightning is one of the most common causes of transients in electronic systems. Power and telecommunication systems being the most vulnerable. At any given time, there are approximately 1800 thunderstorms in progress around the world generating lightning strikes on the surface of the earth about 100 times every second. Each cloud-to-ground event generally contains 3-5 distinct strokes, but as many as twelve have been observed. Mean peak current for the first stroke is 20kA with subsequent strokes decreasing by 50% or more. While a direct lightning strike is dramatic, it is significant to note that lightning produces intense electric and magnetic fields which can couple into nearby power lines, communication lines, and circuit wiring causing catastrophic or latent damage to semiconductor equipment. The magnitude of the induced voltage varies with the distance from the strike (Figure 1).

Lightning Standards & Waveforms

Transient voltage waveforms representative of induced lightning transients are often described by a double exponential impulse waveform. A double exponential surge waveform is defined as having an exponential rise to the peak and an exponential decay from that peak (Figure 2). The pulse is specified by a rise time from 10 to 90% of the peak value and a decay to 50% of the peak value. Industry standards such as **ANSI/ IEEE C62.41** define a 1.2/50µs voltage waveform and 8/20µs current waveform for induced lightning on power lines. One of the most common double exponential waveforms for induced lighting in U.S. telecommunication systems is the 10/1000µs impulse waveform as defined by Bellcore **TR-NWT-001089** and Rural Electrification Administration **REA PE-60**. International telecommunication standards such as **ITU K17-K20** often specify the 10/700µs impulse for lightning induced transients. The telecommunication lightning waveform is different from the power line waveform because a lightning strike into a large telecommunication cable is distributed among several internal lines. This has the effect of slowing down the rise time and increasing the decay time of the waveform.
IEC 61000-4-5 was set forth by the European Community to define the lightning threat to both power and telecommunication lines. The standard specifies double exponential impulses of 1.2/50µs for power and 10/700µs for telecommunication lines to describe the threat.

References:
1. Stringfellow, Dr Michael F. "Lightning" Power Quality & Assurance, Sept/Oct 1995
2. Clark, O.M. "Lightning Protection for Computer Data Lines" EOS/ESD Symposium Proceedings, Sept., 1981

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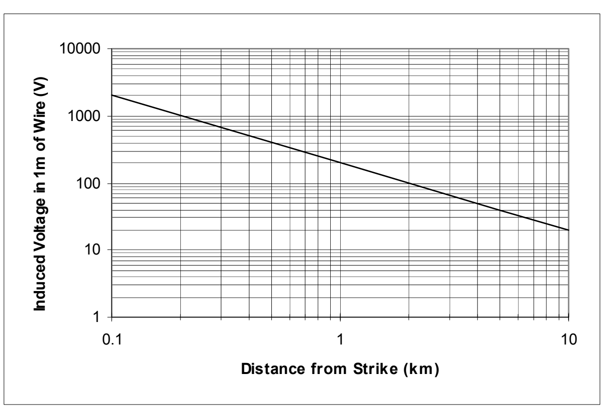

Figure 1 - Lightning Induced Voltages

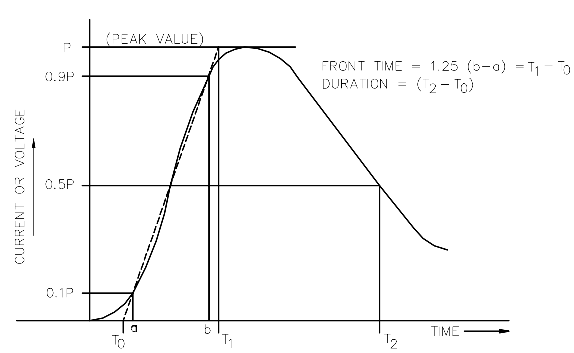

Figure 2 - Lightning Waveform

Sources of Transients : Electrostatic Discharge

Few pieces of electronic equipment today are void of semiconductors. With the focus on lowering the operating levels, the problem of malfunction caused by the environment is critical. Electrostatic discharge (ESD) is a major cause of failure in electronic systems. The products which are most prone are those with external connections to data and I/O lines.

ESD Generation

Electrostatic discharge is the result of a sudden and violent redistribution of electrons between two objects. The excess charge on an object usually results from the contact and separation of two non-conductive materials causing the transfer of electrons from one material to the other, thereby building up a triboelectric charge on the surface (Figure 1). If the discharge path includes semiconductor based equipment, catastrophic or latent damage may occur. The amplitude of the static discharge can exceed 30kV, with currents reaching 30A or more. The rate of the discharge is extremely fast, lasting less than 1ns. The human body is one of the most common generators of ESD. It stores charge capacitively with respect to ground The voltage potential with respect to earth ground can exceed several thousand volts. It is very common in fact for a person to develop voltages as high as 15kV. Higher voltages such as 35kV are possible but rarer.

ESD Threat to Equipment

The ESD pulse contains little energy, but the extremely fast rise time and high power can cause semiconductor devices to fail. Catastrophic destruction of semiconductor devices may occur as a result of the high static potential of ESD or from the discharge current in an ESD event.
One common misconception is that ESD is only a threat during equipment assembly. In reality, ESD is a threat to semiconductors throughout the life of the system. Operator control panels, indicators, and user accessible I/O pins are especially vulnerable to ESD. In a portable computer, for example, when attaching a mouse, printer, or modem, the user can inject a potentially hazardous ESD pulse of 2,000 volts and not even realize it. Component failure may be catastrophic or latent. The latter can be the worse since there is no known way to test for it. The product may simply be perceived as being of poor quality.

ESD Standards : IEC 61000-4-2

Industry standards are now in place which define the ESD immunity requirements of electronic equipment. The most widely accepted standard, set forth by the European Community, is IEC 61000-4-2. IEC 61000-4-2 defines requirements for human generated ESD transients. Test voltages range from 2kV to 15kV with peak currents as high as 30A. The ESD waveform as defined by IEC 61000-4-2 is extremely fast with a maximum rise time of 1ns and a total duration of only 60ns (Figure 2). The total energy contained within the pulse is a few hundred microjoules.
Several countries including the U.S. and Japan are using IEC 61000-4-2 as the model for developing their own ESD immunity standard.

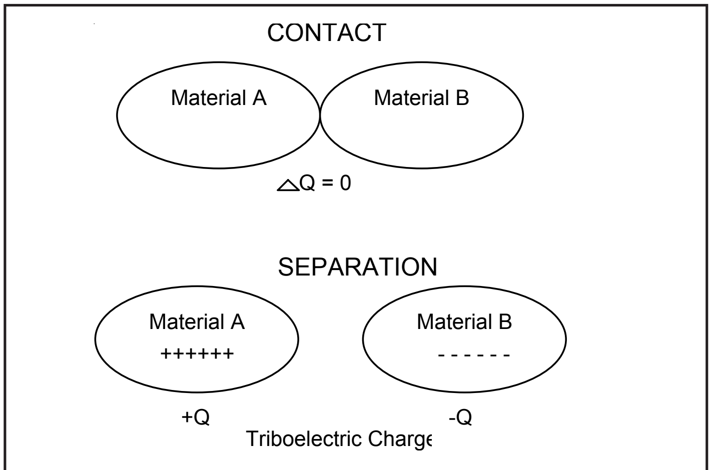

Figure 1 - Triboelectric Charging

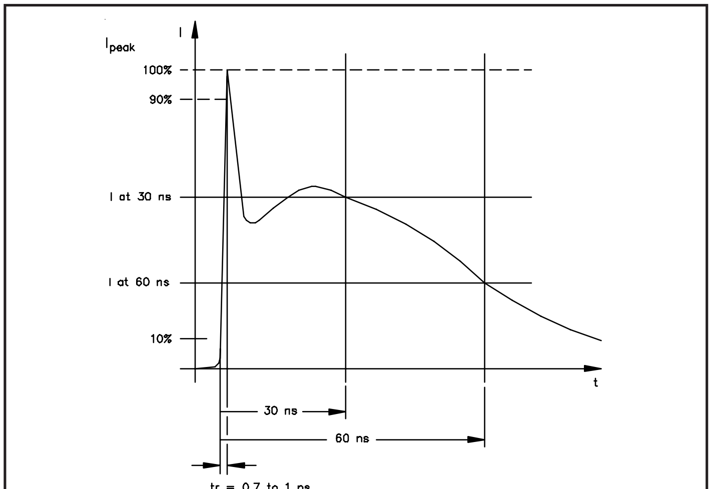

Figure 2 - ESD Waveform per IEC 61000-4-2

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Calculating Transient Energy

This application note explains how to calculate the transient energy which is **absorbed** *by a suppression element. An approximation technique is employed for transient current impulse waveforms, assuming the clamping voltage is almost constant during the surge impulse.*

In the case of transients which are internal to the circuit, such as those created by inductive switching, the energy of the transient waveform may be readily calculated. Transients which are external to the circuit are more difficult to quantify. In this case an approximation technique may then be used to estimate the energy which is absorbed by the suppression element. The energy which is absorbed by the suppression device is given by:

$$E = \int_0^{t_p} V_c I_p \, dt = K V_C I_P t_P$$

Where
E = Energy (Joules)
Vc = Clamping Voltage (Volts)
Ip = Peak Pulse Surge Current (Amps)
tp = Impulse Duration
K = Constant

K values for the most common surge current waveforms are given in Figure 1. For complex waveforms such as a double exponential impulse, the waveform may be divided into two parts to calculate the total energy.

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Example Calculation

A typical waveform representative of lightning induced transients is shown in Figure 2. It is a 10/1000μs double exponential impulse as defined by Bellcore 1089. To calculate the energy absorbed by an LC01-6 first divide the waveform into two parts with part 1 being the section of the waveform from 0 to 10μs and part two the section from the peak to 1000μs (the 50% decay point). From the LC01-6 data sheet, the maximum clamping voltage at 100A is 15V.
Therefore:
Part 1 : E1 = KVclptp = $0.5*15*100*10x10^{-6}$ = 7.5mJ
Part 2 : E2 = KVclptp = $1.4*15*100*1x10^{-3}$ = 2.1J
E = E1 + E2 = .0075 + 2.1 = 2.11J

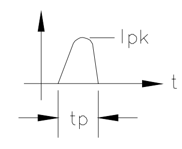
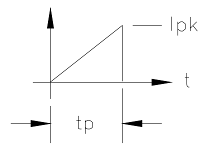
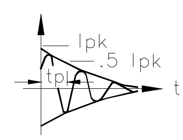
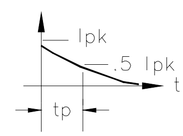
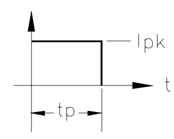
WAVESHAPE	EQUATION	K*
	$I_{pk} \sin(\frac{\pi}{t_p} t)$	0.637
	$I_{pk}(\frac{t}{t_p})$	0.5
	$I_{pk} \sin(\pi t) e^{-t/t_p}$	0.86
	$I_{pk} e^{-t/1.44 t_p}$	1.4
	I_{pk}	1.0

Figure 1 - Energy Waveforms/Form Factor Constants

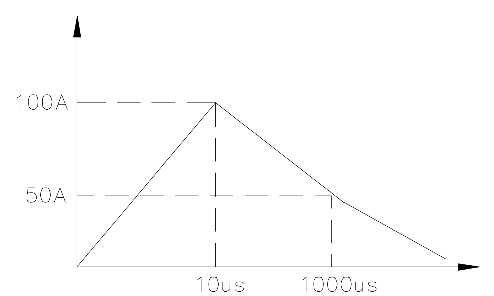


Figure 2 - Double Exponential Impulse Waveform

Calculating Clamping Voltage at Different Peak Pulse Currents

Transient voltage suppressor data sheets define clamping voltage at a specified maximum peak pulse current level. This application note describes how to interpolate the clamping voltage for transients currents other than the rated maximum.

Clamping Voltage Calculation

To determine the clamping voltage (Vc) of the TVS diode at an intermediate point between the breakdown voltage (V_{BR}) and the maximum clamping voltage ($V_{C\ MAX}$), a linear increase in Vc between V_{BR} and $V_{C\ MAX}$ is assumed. Therefore, the relationship between V_C and the test pulse current (I_P) is calculated using the following formula:

$$V_C = (I_P/I_{PP}) * (V_{C\ MAX} - V_{BR\ MAX}) + V_{BR\ MAX}$$

Where:
I_P = Test peak pulse current (Amps)
V_C = Intermediate clamping voltage at I_P (Volts)
I_{PP} = Rated maximum peak pulse current (Amps)
$V_{C\ MAX}$ = Maximum rated clamping voltage (Volts)
$V_{BR\ MAX}$ = Maximum rated breakdown voltage (Volts)

This calculation assumes a worse case condition where the device is at the maximum breakdown voltage limit and is therefore a conservative estimate across most of the distribution. If the value for $V_{BR\ MAX}$ is not stated on the device data sheet, it may be approximated by multiplying the minimum value by 1.25.

Example Calculation

An example of a calculated curve to one obtained through testing for an LC01-6 is shown in Figure 1. The LC01-6 data sheet specifies a minimum V_{BR} of 8 volts yielding a $V_{BR\ MAX}$ of 10 volts (1.25 * 8) for calculation purposes. Values are based on a maximum peak pulse current rating of 100A for a 10/1000µs impulse waveform. The experimental curve has a more shallow slope than the calculated curve, confirming the conservative rating of the device. Note that if I_P equals I_{PP} then V_C will equal $V_{C\ MAX}$.

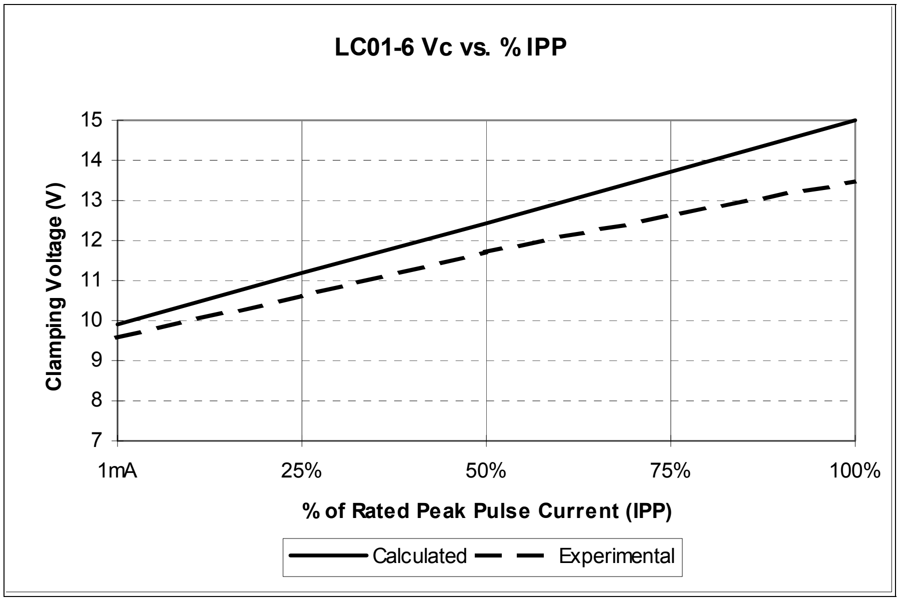


Figure 1 - LC01-6 Clamping Voltage vs. % Peak Pulse Current

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