

POWER MANAGEMENT

Description

SC202A EVB is the EVB (Evaluation Board) for the SC202A Synchronous Step Down Converter in the MLPQ 2.5×3.0 (mm) 13-lead package. The EVB is designed to provide a working demonstration of the SC202A.

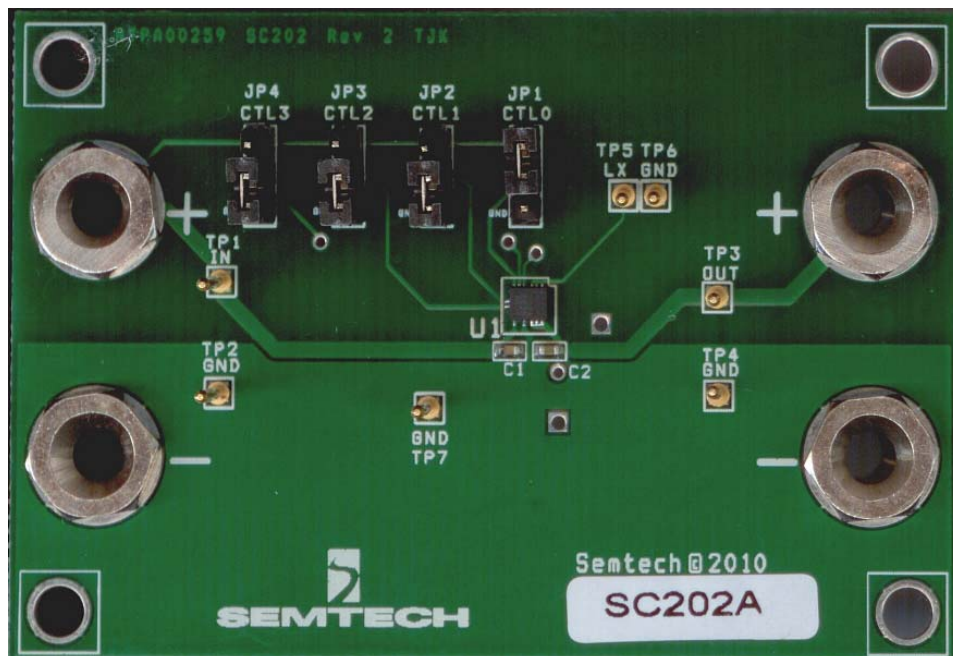
This guide contains information relating to the usage of the Rev. 2 version of the EVB and should be used in conjunction with the datasheet for the device. Component values on the EVB may vary per specific customer requirements. The datasheet contains detailed information including the electrical characteristics and the detailed features of the device.

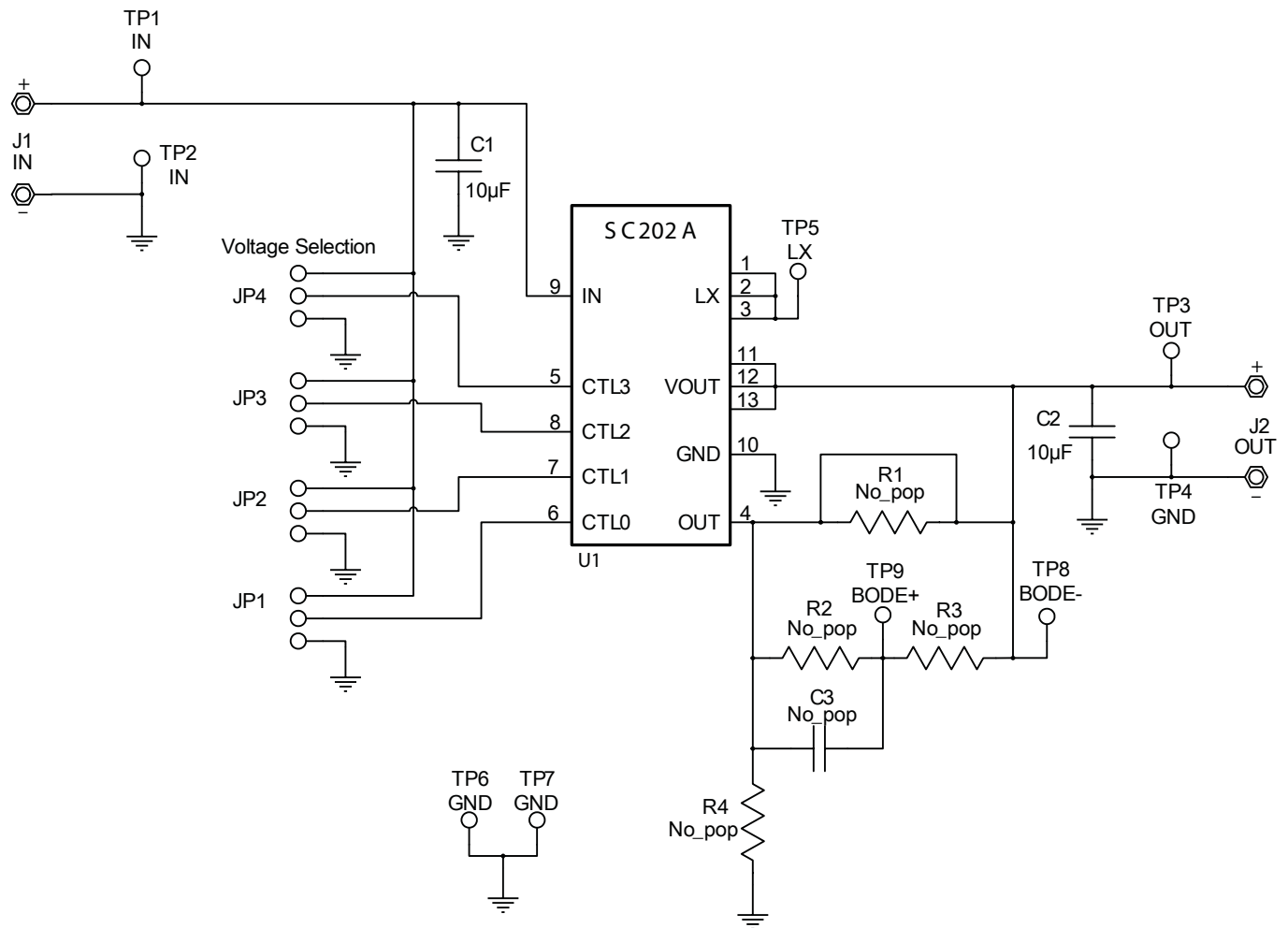
This guide can be used to familiarize the user with the features of the device and for testing electrical characteristics of particular interest to the reader.

Feature Content

- Schematic
- Bill of Materials
- Layout Drawings
- Operation

SC202A EVB — R2



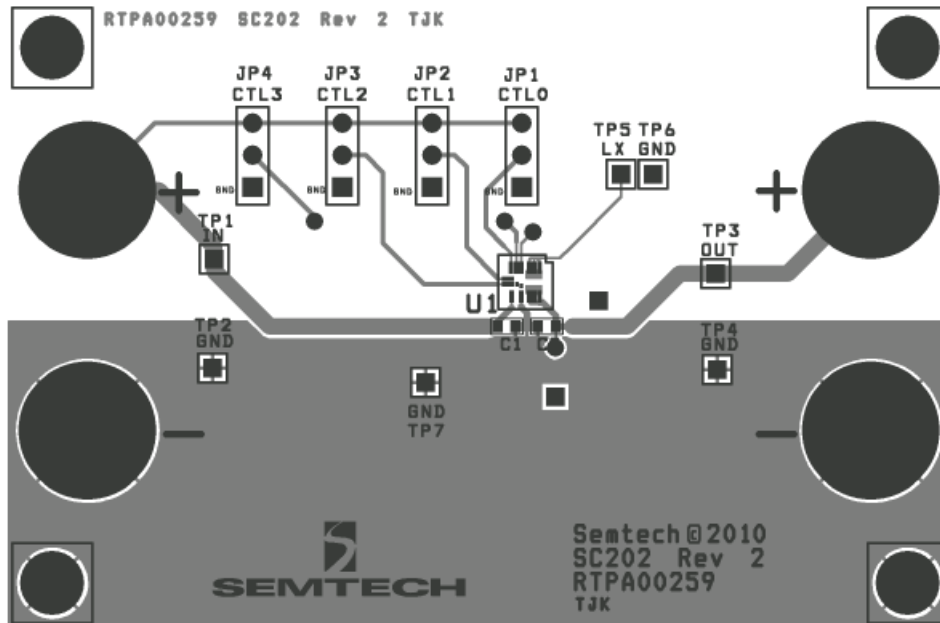
Schematic


Bill of Materials

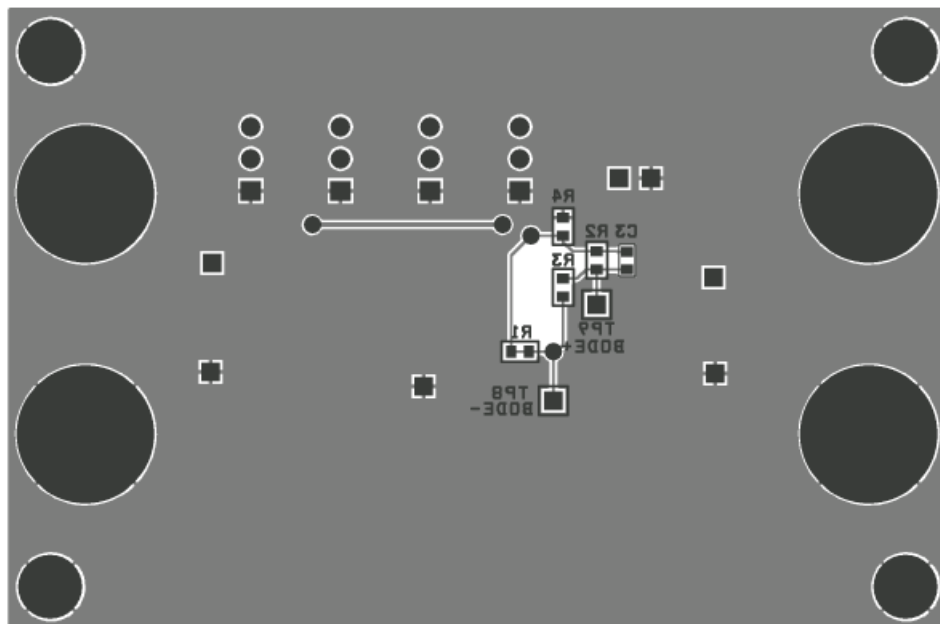
Reference	Value	Footprint	Hardware Notes
C1, C2	10 μ F	0603	
C3	no-pop		Pads are included to add a feed-forward capacitor when external resistors are used.
J1	banana jack pair		IN
J2	banana jack pair		OUT
JP1, JP2, JP3, JP4	3 pos. jumper	0.100 (in)	Jumpers are used to set the CTL pins in either a high or low state.
R1, R2, R3, R4	no-pop	0603	External pads included for adding external feedback, measuring loop stability.
TP1	test point	0.040 (in)	IN
TP3	test point	0.040 (in)	OUT
TP5	test point	0.040 (in)	LX
TP8	no-pop	0.040 (in)	BODE- (used for measuring loop stability)
TP9	no-pop	0.040 (in)	BODE+ (used for measuring loop stability)
TP2, TP4, TP6, TP7	test point	0.040 (in)	Ground
U1	SC202A	2.5 x 3.0 (mm)	Semtech integrated circuit

Layout Drawings

Top Layer with Silkscreen



Bottom Layer with Silkscreen



Operation

The SC202A EVB provides several features that make it easy for the user to evaluate performance without adding external circuitry or requiring unique test equipment. All reference designators from the schematic drawing are used in these descriptions.

Input and Output Connections

This EVB is designed with two different connection points for the supply and load. Banana jacks are provided at both the input (J1) and the output (J2) to provide a simple connection method for standard power supplies and electronic loads. An alternative connection is included for each jack so that clip leads can be connected or wires directly soldered to the PCB. TP1-TP2 serve as the connections for the input supply and TP3-TP4 serve as the connections for connecting a load to the output.

Enabling the Device

The SC202A is enabled when at least one CTL pin is pulled high. Jumpers JP1 through JP4 are used to control each CTL pin according Table 1.

Table 1 — Jumper to Control Pin Assignments

Jumper	Control Pin
JP4	CTL3
JP3	CTL2
JP2	CTL1
JP1	CTL0

The SC202A output voltage is set by putting the jumpers in the proper configuration to produce the desired control pin states. Table 2 describes the state of each jumper for each corresponding output voltage setting.

Table 2 — Jumper States for Each Output Setting

JP4	JP3	JP2	JP1	Output Voltage (V)
R	R	R	R	Shutdown
R	R	R	L	0.8
R	R	L	R	1.0
R	R	L	L	1.2
R	L	R	R	1.4
R	L	R	L	1.5
R	L	L	R	1.6
R	L	L	L	1.8
L	R	R	R	1.85
L	R	R	L	1.9
,L	R	L	R	2.0
L	R	L	L	2.2
L	L	R	R	2.5
L	L	R	L	2.8
L	L	L	R	3.0
L	L	L	L	3.3

Note: R = Right hand position, L = Left hand position

If dynamic control is desired, the jumpers can be removed and a digital I/O source can be connected to the middle pin of each jumper. Be careful to set the high and low voltage levels of the digital I/O source to match the requirements for these pins as described in the SC202A product datasheet.

Operation (continued)

Other Test Points and Components

LX Switching Node

This evaluation board includes other test points to provide convenient connection points when testing different performance parameters of the SC202A. One test point is connected to the LX pin (TP5) so that the LX switching waveform can be monitored with minimal noise impact. A ground connection test point (TP6) is included next to TP5 so a standard 100mil jumper connection can be used to connect a scope probe to this node. Another ground connection test point (TP7) is included on the bottom side of the PCB for use when making measurement in that vicinity.

Frequency Response Testing

Two other test points are included for measuring the feedback loop frequency response. TP9 (BODE+) and TP8 (BODE-) are included with resistor pads (R3) that allow the loop to be broken and replaced with a 20 Ω resistor. These connections can be used with a network analyzer to calculate the gain and phase response of the loop. Note that the trace connecting the pads of R1 must be cut with a knife before this measurement can be made. If the board must be returned to normal after completing these tests, R3 should be removed and a 0 Ω resistor should be placed in the R1 location.

Programming Other Output Voltages

The SC202A datasheet describes a method for programming output voltages that are not included in the selection list. This method requires a pair of resistors and a feed-forward capacitor configured as shown in the schematic on page 2. In this circuit, R2 is in series with the OUT pin and R4 is connected from the OUT pin to ground. C3 is the feed-forward capacitor that properly shifts the frequency response to maintain stability. The following steps can be used to program an output voltage not included in the device:

- Cut the trace connecting the pads on R1.
- Place a 0 Ω resistor at R3.
- Calculate R2, R4, and C3 using the method described in the datasheet.
- Configure JP1 to JP4 to produce the programmed voltage used in the calculations.

In the normal configuration, this EVB does not include any of these components.



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