

PROTECTION PRODUCTS

**LC03-3.3 Testing to
 Bellcore 1089 Intra-building**

Test Setup

The intra-building lightning surge required by Bellcore 1089 is defined by a double exponential waveform. For testing purposes this is achieved with a voltage source and a resistor/capacitor network. The lines are tested in both metallic (line-to-line) and longitudinal (line-to-ground) configuration. For metallic mode, the standard calls for an 800V (open circuit voltage) surge with a 100A minimum (short circuit current) coming out of the tester. For a longitudinal mode, it calls for a 1500V (open circuit voltage) surge with a 100A (short circuit current) minimum coming out of the tester. The

derived current waveform has a duration of $2/10\mu\text{s}$. Since this is a test using a voltage source, the impedance of the unit under test can decrease the amount of current actually seen by the circuit. The test performed on Semtech's LC03-3.3 is a current source test. The purpose of using a current source tester is to insure that the current through the device is actually 100A. This provides for a worse case scenario and insures that the part will operate under worse case conditions. In addition, the test performed is an $8 \times 20\mu\text{s}$ surge. The $8/20\mu\text{s}$ pulse is longer in duration than the $2/10\mu\text{s}$. This means the test performed on the devices is actually a higher energy pulse than required by the Bellcore intra-building standard. Figure 1 shows the test setup for common mode. Figure 2 shows the test setup for differential mode.

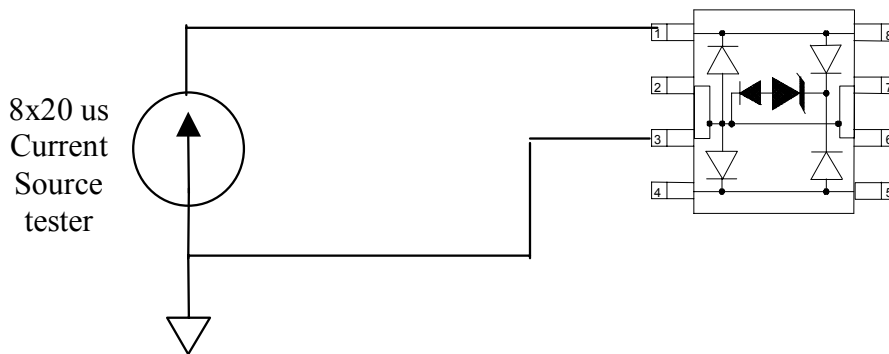


Figure 1 . Common Mode

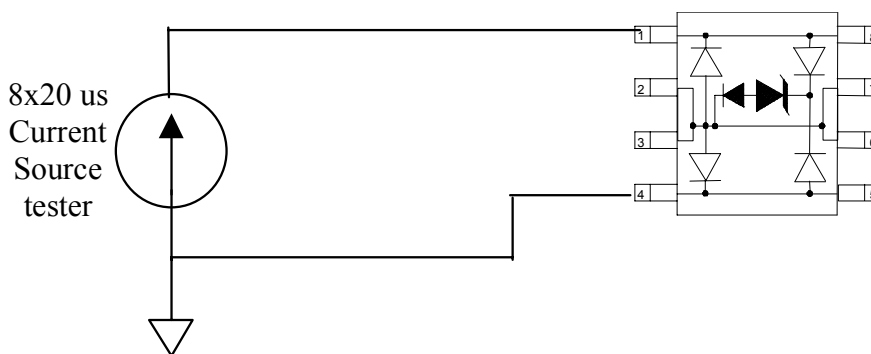


Figure 2 . Differential Mode

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Test Results

An oscilloscope was used to display the voltage across the LC03-3.3 during a 100A 8/20 μ s double exponential pulse. Figure 1 is the configuration of the test performed. The current output by the tester is monitored on Ch1. The current ratio is 20A/100mV. The voltage between pin 1 and 2 of the LC03-3.3 is monitored on Ch2. Figure 3 shows the clamping

voltage of the LC03-3.3 from pin 1 to 2 during a 100A 8/20 μ s surge. The part is electrically tested after each surge to verify that the device is still operative. Figure 4 shows the typical clamping curve of the LC03-3.3 during an 8/20 μ s surge from 1 to 100A. Two curves are shown, line to line (differential mode) and line to ground (common mode).

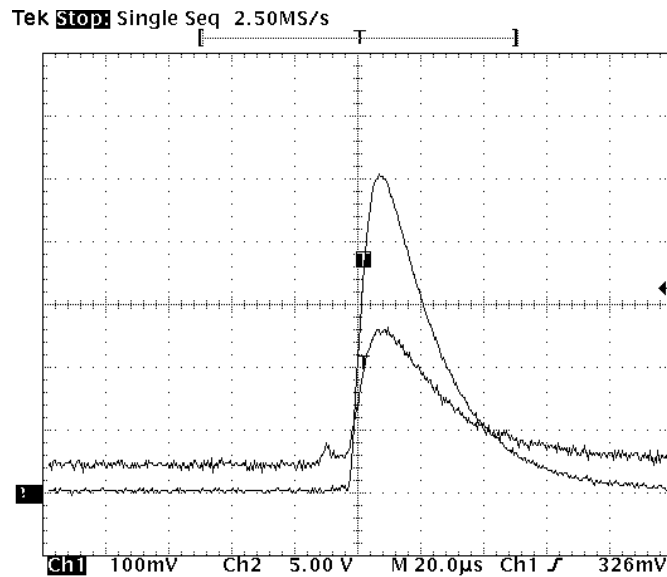


Figure 3. LC03-3.3 Clamping Voltage During 100A 8x20 μ s Surge

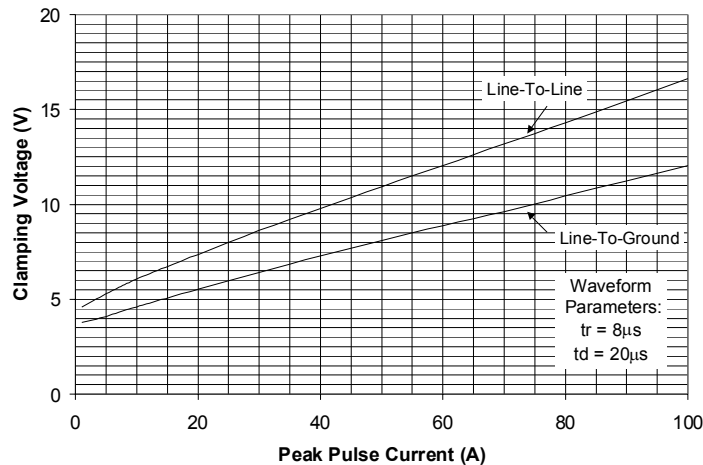


Figure 4. LC03-3.3 Typical Clamping Voltage vs. Peak Pulse Current