

STANDARD CAPACITANCE TVS ARRAY

APPLICATIONS

- ✓ Notebook Computers
- ✓ Cellular Phone Base Stations
- ✓ Personal Digital Assistant (PDA)
- ✓ Digital Cameras

IEC COMPATIBILITY (EN61000-4)

- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns

FEATURES

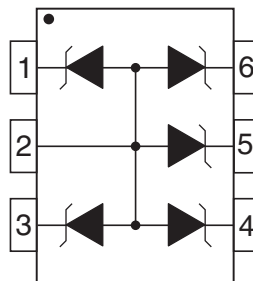
- ✓ 100 Watts Peak Pulse Power per Line (tp=8/20µs)
- ✓ Monolithic Design
- ✓ Available in Multiple Voltage Types Ranging From 5V to 24V
- ✓ Protect 4 Lines Bidirectional and 5 Lines Unidirectional
- ✓ ESD Protection > 25 kilovolts
- ✓ Low Clamping Voltage
- ✓ RoHS Compliant in Lead-Free Versions

MECHANICAL CHARACTERISTICS

- ✓ Molded JEDEC SC-70-6L Package
- ✓ Weight 7 milligrams (Approximate)
- ✓ Available in Tin-Lead or Lead-Free Pure-Tin Plating(Annealed)
- ✓ Solder Reflow Temperature:
 - Tin-Lead - Sn/Pb, 85/15: 240-245°C
 - Pure-Tin - Sn, 100: 260-270°C
- ✓ Flammability rating UL 94V-0
- ✓ 8mm Tape and Reel Per EIA Standard 481
- ✓ Marking: Marking Code & Pin One Defined By DOT on Package



PIN CONFIGURATIONS



DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified			
PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power ($t_p = 8/20\mu s$) - See Figure 1	P_{PP}	100	Watts
Operating Temperature	T_J	-55°C to 150°C	°C
Storage Temperature	T_{STG}	-55°C to 150°C	°C

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified							
PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE	MINIMUM BREAKDOWN VOLTAGE	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM LEAKAGE CURRENT	TYPICAL CAPACITANCE (See Note 1)
		V_{WM} VOLTS	@ 1mA $V_{(BR)}$ VOLTS	@ $I_p = 5A$ V_C VOLTS	@ 8/20 μs $V_C @ I_{PP}$	@ V_{WM} I_D μA	@ 0V, 1 MHz C_J pF
SMF05C	05C	5.0	6.0	9.8	12.0V @ 9.0A	5	60
SMF12C	12C	12.0	13.3	-	23.8V @ 4.2A	1	30
SMF15C	15C	15.0	16.7	-	33.3V @ 3.0A	1	25
SMF24C	24C	24.0	26.7	-	55.5V @ 1.8A	1	20

Note 1: Pins 1, 3, 4, 5 or 6 to pin 2.

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

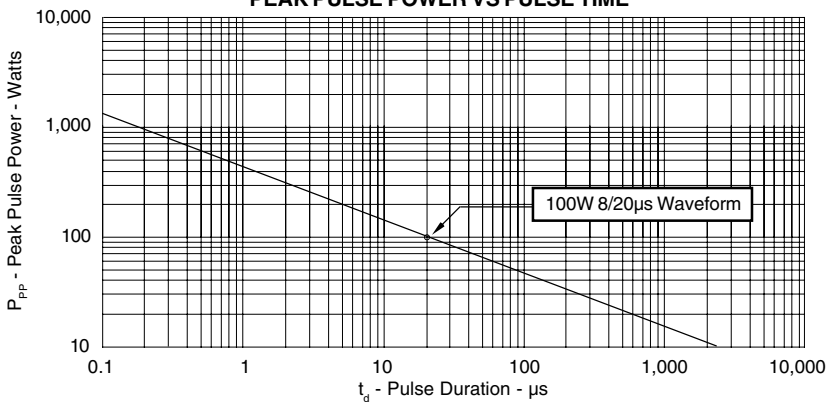
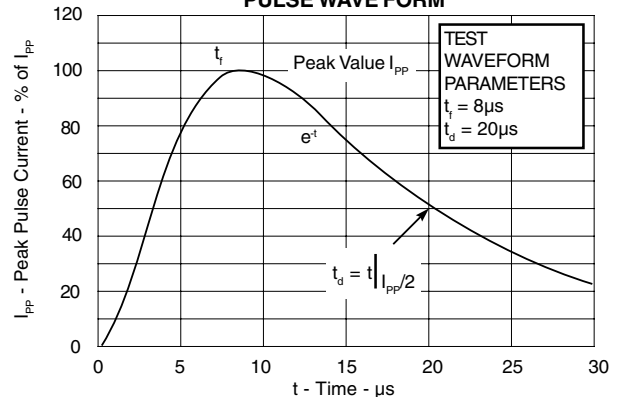
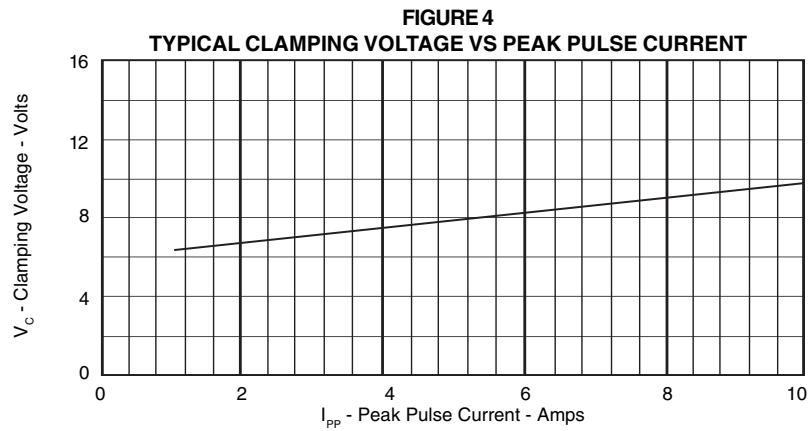
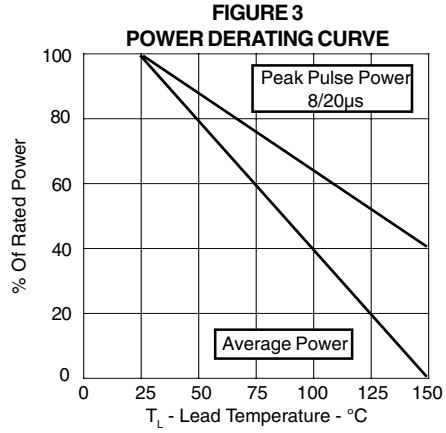


FIGURE 2
PULSE WAVE FORM



GRAPHS



APPLICATION NOTE

The SMFC Series are TVS arrays designed to protect I/O or data lines from the damaging effects of ESD or EFT. This product provides both unidirectional and bidirectional protection, with a surge capability of 100 Watts P_{PP} per line for an 8/20 μ s waveshape and ESD protection > 25 kilovolts.

UNIDIRECTIONAL COMMON-MODE CONFIGURATION (Figure 1)

The SMFC Series provides up to four (4) lines of protection in a common-mode configuration as depicted in Figure 1.

Circuit connectivity is as follows:

- ✓ Line 1 is connected to Pin 1.
- ✓ Line 2 is connected to Pin 3.
- ✓ Line 3 is connected to Pin 4.
- ✓ Line 4 is connected to Pin 6.
- ✓ Pin 2 is connected to ground.

BIDIRECTIONAL DIFFERENTIAL-MODE CONFIGURATION (Figure 2)

The SMFC Series provides up to five (5) lines of protection in a differential-mode configuration as depicted in Figure 2.

Circuit connectivity is as follows:

- ✓ Line 1 is connected to Pin 1.
- ✓ Line 2 is connected to Pin 3.
- ✓ Line 3 is connected to Pin 4.
- ✓ Line 4 is connected to Pin 5.
- ✓ Line 5 is connected to Pin 6.
- ✓ Pin 2 is not connected.

CIRCUIT BOARD LAYOUT RECOMMENDATIONS

Circuit board layout is critical for Electromagnetic Compatibility (EMC) protection. The following guidelines are recommended:

- ✓ The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- ✓ The path length between the TVS device and the protected line should be minimized.
- ✓ All conductive loops including power and ground loops should be minimized.
- ✓ The transient current return path to ground should be kept as short as possible to reduce parasitic inductance.
- ✓ Ground planes should be used whenever possible. For multilayer PCBs, use ground vias.

Figure 1 - Unidirectional Configuration
Common-Mode I/O Port Protection

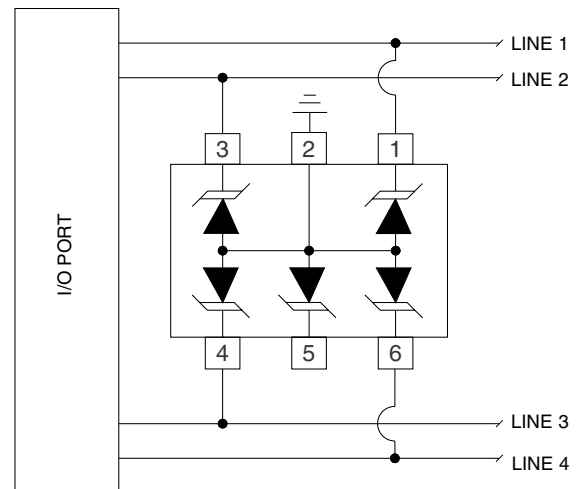
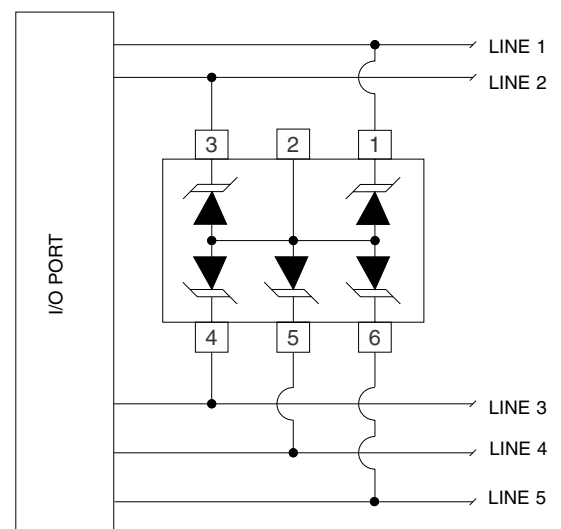


Figure 2 - Bidirectional Configuration
Differential-Mode I/O Port Protection

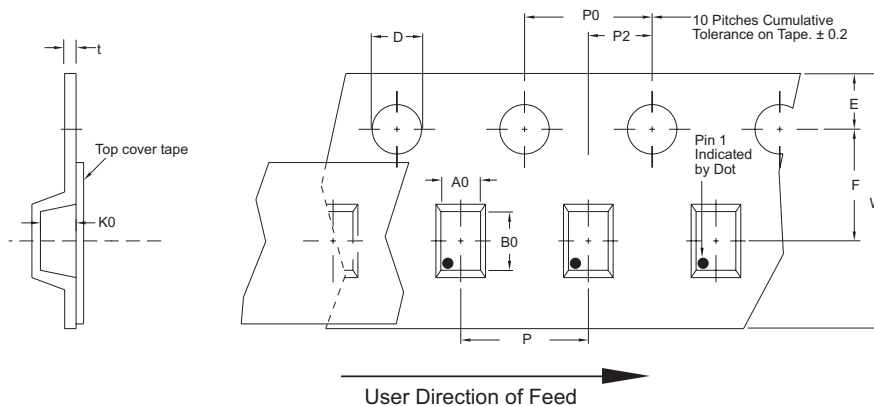


PACKAGE OUTLINE & DIMENSIONS

<p style="text-align: center;">PACKAGE OUTLINE</p>	<p style="text-align: center;">SC70-6L</p> <p style="text-align: center;">PACKAGE DIMENSIONS</p> <table border="1" style="width: 100%; border-collapse: collapse; text-align: center;"> <thead> <tr> <th rowspan="2">DIM</th> <th colspan="2">MILLIMETERS</th> <th colspan="2">INCHES</th> </tr> <tr> <th>MIN</th> <th>MAX</th> <th>MIN</th> <th>MAX</th> </tr> </thead> <tbody> <tr><td>A</td><td>1.90</td><td>2.15</td><td>0.074</td><td>0.084</td></tr> <tr><td>B</td><td>1.15</td><td>1.35</td><td>0.045</td><td>0.055</td></tr> <tr><td>C</td><td>0.80</td><td>1.00</td><td>0.031</td><td>0.040</td></tr> <tr><td>D</td><td>0.15</td><td>0.30</td><td>0.006</td><td>0.012</td></tr> <tr><td>E</td><td>0.65 BSC</td><td>-</td><td>0.0255 BSC</td><td>-</td></tr> <tr><td>F</td><td>1.30 BSC</td><td>-</td><td>0.0512 BSC</td><td>-</td></tr> <tr><td>G</td><td>0.80</td><td>1.10</td><td>0.031</td><td>0.043</td></tr> <tr><td>J</td><td>0.08</td><td>0.25</td><td>0.003</td><td>0.010</td></tr> <tr><td>K</td><td>2.00</td><td>2.20</td><td>0.078</td><td>0.086</td></tr> <tr><td>L</td><td>0</td><td>0.10</td><td>0</td><td>0.004</td></tr> <tr><td>M</td><td>0.26</td><td>0.46</td><td>0.010</td><td>0.018</td></tr> </tbody> </table>	DIM	MILLIMETERS		INCHES		MIN	MAX	MIN	MAX	A	1.90	2.15	0.074	0.084	B	1.15	1.35	0.045	0.055	C	0.80	1.00	0.031	0.040	D	0.15	0.30	0.006	0.012	E	0.65 BSC	-	0.0255 BSC	-	F	1.30 BSC	-	0.0512 BSC	-	G	0.80	1.10	0.031	0.043	J	0.08	0.25	0.003	0.010	K	2.00	2.20	0.078	0.086	L	0	0.10	0	0.004	M	0.26	0.46	0.010	0.018
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Tape & Reel Specifications (Dimensions in millimeters)

Reel Dia.	Tape Width	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	8mm	2.25 ± 0.10	2.34 ± 0.10	1.22 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	3.50 ± 0.05	8.00 ± 0.30	4.00 ± 0.10	2.00 ± 0.05	4.00 ± 0.10	0.25



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