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**STANDARD CAPACITANCE TVS ARRAY**


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**APPLICATIONS**

- ✓ Notebook Computers
- ✓ Cellular Phone Base Stations
- ✓ Personnal 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**

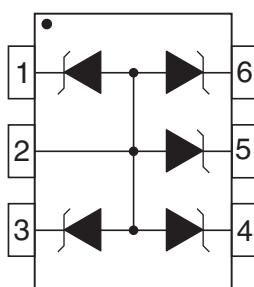
- ✓ 100 Watts Peak Pulse Power per Line (tp=8/20μs)
- ✓ Monolithic Design
- ✓ Available in Multiple Voltage Types Ranging From 5V to 24V
- ✓ Protect 4 Lines Bidirectional and 5 Lines Unidirectional
- ✓ ESD Protection > 25 kilovolts
- ✓ Low Clamping Voltage

**MECHANICAL CHARACTERISTICS**

- ✓ Molded JEDEC SC-70-6L Package
- ✓ Weight 14 milligrams (Approximate)
- ✓ Flammability rating UL 94V-0
- ✓ 8mm Tape and Reel Per EIA Standard 481
- ✓ Marking: Marking Code & Pin One Defined By DOT on Package




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**PIN CONFIGURATIONS**


## DEVICE CHARACTERISTICS

### MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

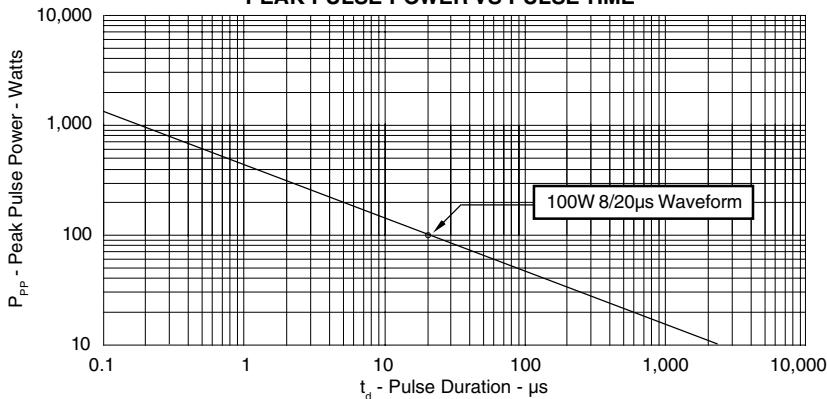
PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power ( $t_p = 8/20\mu\text{s}$ ) - See Figure 1	$P_{PP}$	100	Watts
Operating Temperature	$T_J$	-55°C to 150°C	°C
Storage Temperature	$T_{STG}$	-55°C to 150°C	°C

### ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

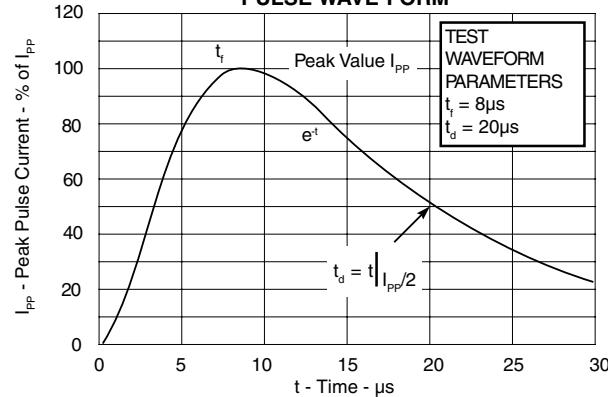
PART NUMBER	DEVICE MARKING	RATED STAND-OFF VOLTAGE $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ $I_p = 5\text{A}$ $V_c$ VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ 8/20 $\mu\text{s}$ $V_c$ @ $I_{PP}$	MAXIMUM LEAKAGE CURRENT @ $V_{WM}$ $I_d$ $\mu\text{A}$	TYPICAL CAPACITANCE (See Note 1) @ 0V, 1 MHz $C_J$ pF
SMF05C	05C	5.0	6.0	9.8	10.0V @ 10.0A	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.

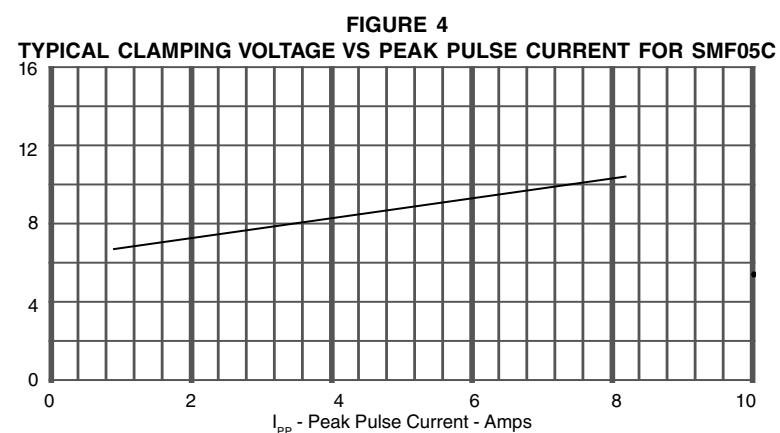
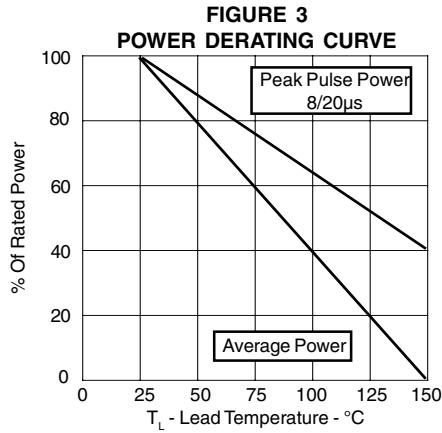
**FIGURE 1**  
PEAK PULSE POWER VS PULSE TIME



**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 $\mu$ 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.

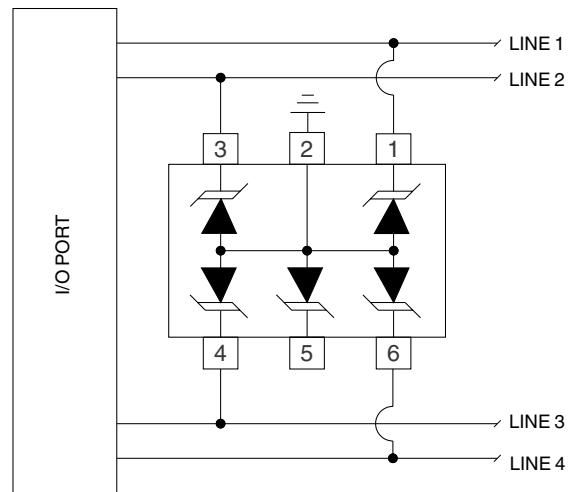
### BIDIRECTIONAL DIFFERENTIAL-MODE CONFIGURATION (Figure 2)

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.

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

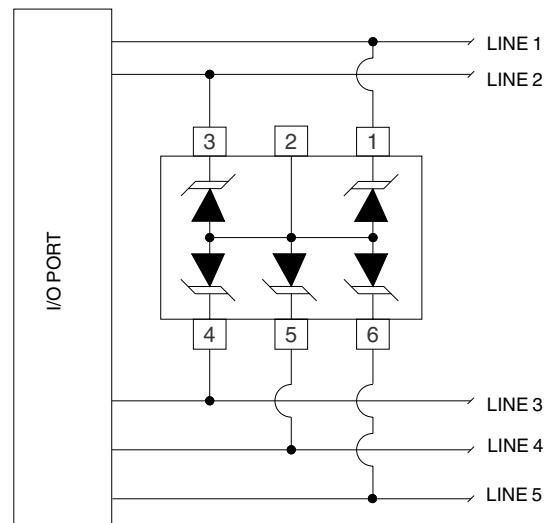


### CIRCUIT BOARD LAYOUT RECOMMENDATIONS

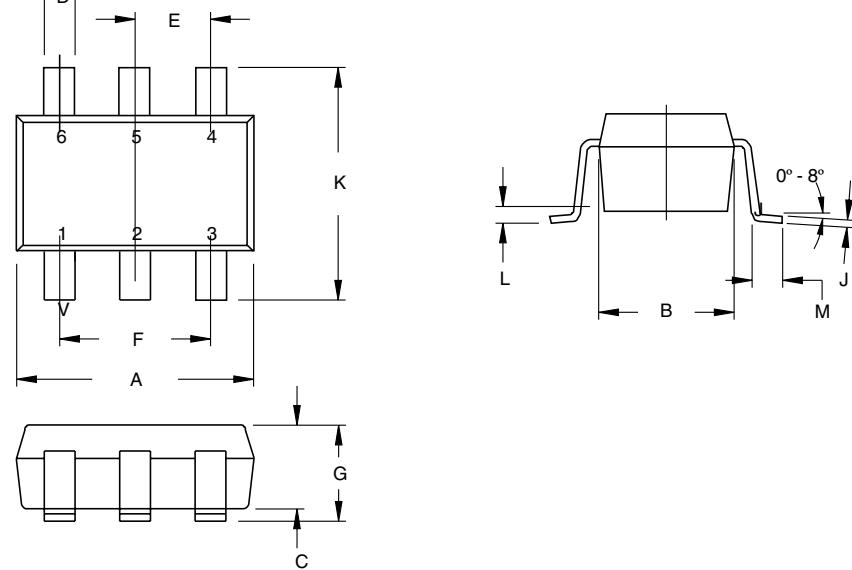
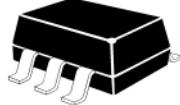
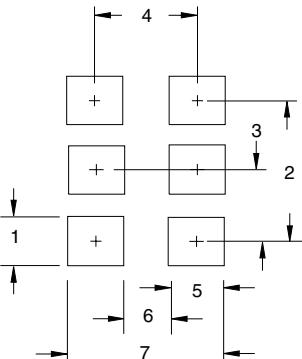
Circuit board layout is critical for Electromagnetic Compatibility (EMC) protection. The following guidelines are recommended:

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



## PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE		SC70-6L																											
																													
PACKAGEDIMENSIONS																													
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																									
MOUNTING PAD		NOTES																											
<table border="1"> <thead> <tr> <th colspan="3">TYPICAL</th> </tr> <tr> <th>DIM</th><th>Millimeters</th><th>Inches</th></tr> </thead> <tbody> <tr><td>1</td><td>0.50</td><td>0.020</td></tr> <tr><td>2</td><td>1.30</td><td>0.051</td></tr> <tr><td>3</td><td>0.65</td><td>0.026</td></tr> <tr><td>4</td><td>2.40</td><td>0.094</td></tr> <tr><td>5</td><td>0.60</td><td>0.024</td></tr> <tr><td>6</td><td>0.70</td><td>0.028</td></tr> <tr><td>7</td><td>2.50</td><td>0.098</td></tr> </tbody> </table> 		TYPICAL			DIM	Millimeters	Inches	1	0.50	0.020	2	1.30	0.051	3	0.65	0.026	4	2.40	0.094	5	0.60	0.024	6	0.70	0.028	7	2.50	0.098	<p>1. Dimensioning and tolerances per ANSI Y14.5M, 1985.    2. Controlling Dimension: Inches    3. Dimensions are exclusive of mold flash and metal burrs.</p> <p><b>TAPE &amp; REEL ORDERING NOMENCLATURE</b></p> <p>1. Surface mount product is taped and reeled in accordance with EIA-481.    2. Suffix-T7 = 7 Inch Reel - 3,000 pieces per 8mm tape, i.e., SMF05C-T7.</p>
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<b>Outline &amp; Dimensions: Rev 1 - 11/01, 06019</b>																													

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