PROTEK DEVICES
. . . engineered solutions for the transient environment™

SMF05C thru SMF24C

SUBMINATURE MONOLITHIC TVS ARRAYS

APPLICATIONS

✔ Notebook Computers
✔ Cellular Phone Base Stations
✔ Handheld Electronics
✔ Personal Digital Assistants (PDAs)
✔ Digital Cameras

SC-70-6L

IEC COMPATIBILITY (EN61000-4)

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

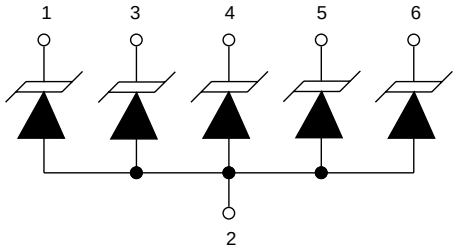
FEATURES

✔ ESD Protection > 25 kilovolts
✔ 100 Watts Peak Pulse Power Dissipation per Line (8/20µs)
✔ Low Clamping Voltage
✔ Available in 4 Voltage Types Ranging From 5V to 24V
✔ Up to Five (4) Lines of Bidirectional Protection & Five (5) Lines of Unidirectional Protection

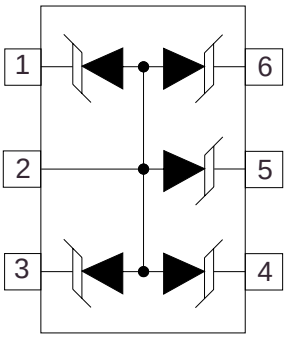
MECHANICAL CHARACTERISTICS

✔ Molded JEDEC SC-70-6L
✔ Weight 0.014 grams (Approximate)
✔ Flammability Rating UL 94V-0
✔ 8mm Tape and Reel Per EIA Standard 481
✔ Device Marking: Marking Code

CIRCUIT DIAGRAM



PIN CONFIGURATION



DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified			
PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (t_p = 8/20µs) - 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 = 5A V_C VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @8/20µs V_C @ I_{PP}	MAXIMUM LEAKAGE CURRENT @V_{WM} I_D µA	TYPICAL CAPACITANCE (See Note 1) 0V @ 1 MHz C 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

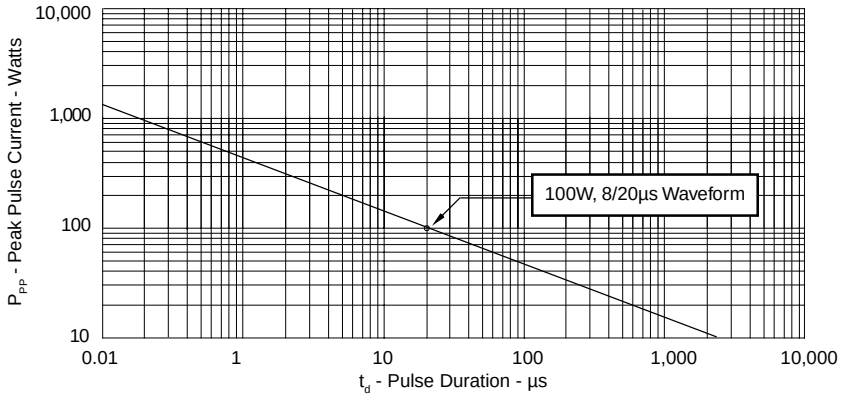
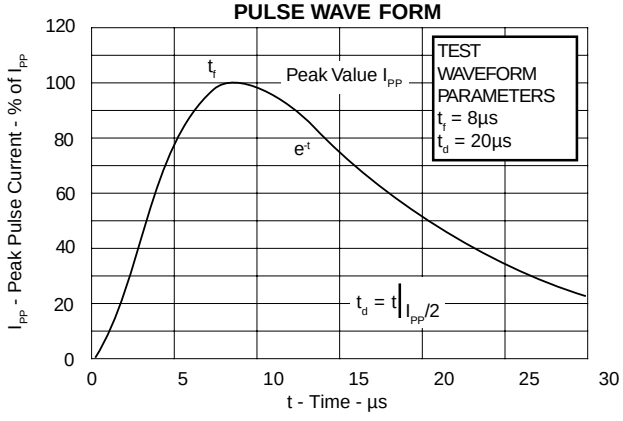


FIGURE 2
PULSE WAVE FORM



GRAPHS

FIGURE 3
POWER DERATING CURVE

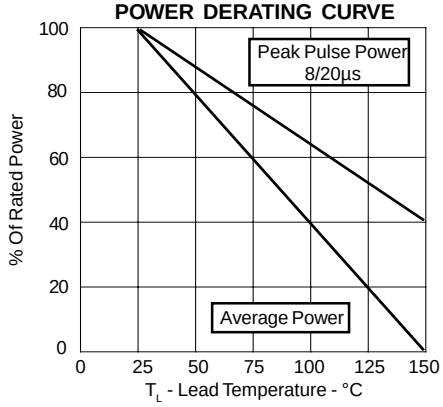
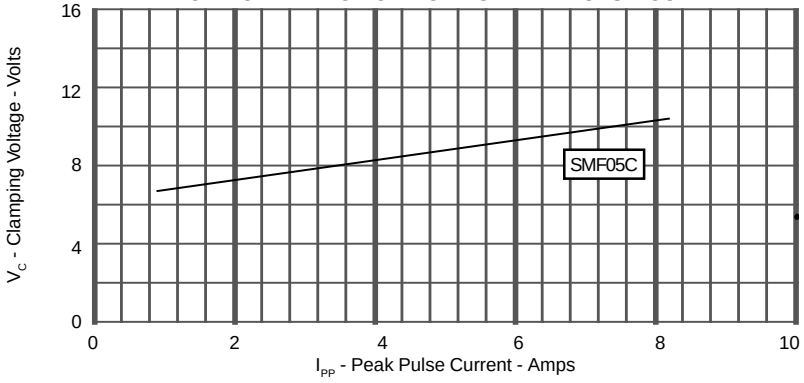


FIGURE 4
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT



APPLICATION NOTES

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

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 1)
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.

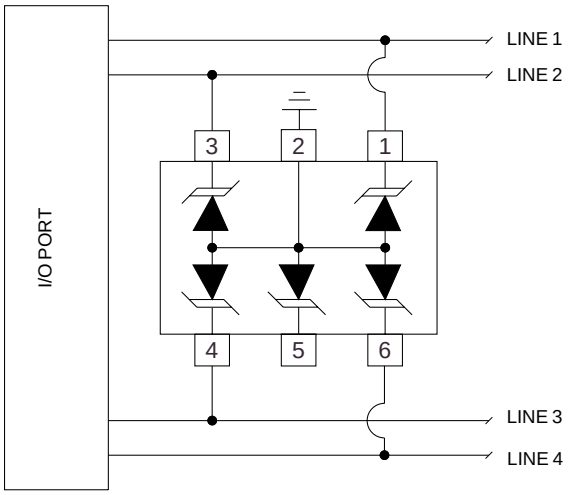


Figure 1 - Unidirectional Configuration
Common-Mode I/O Port Protection

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.

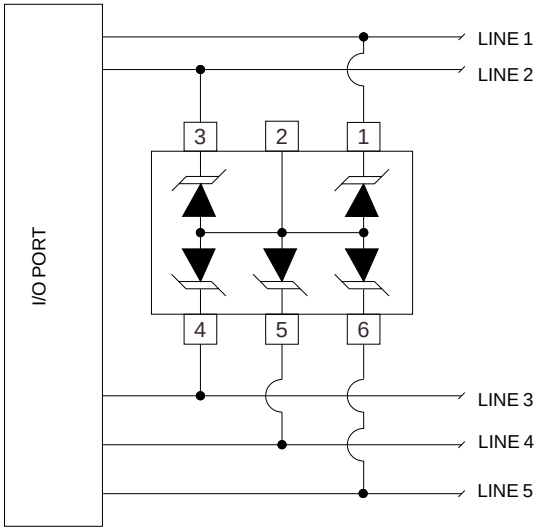
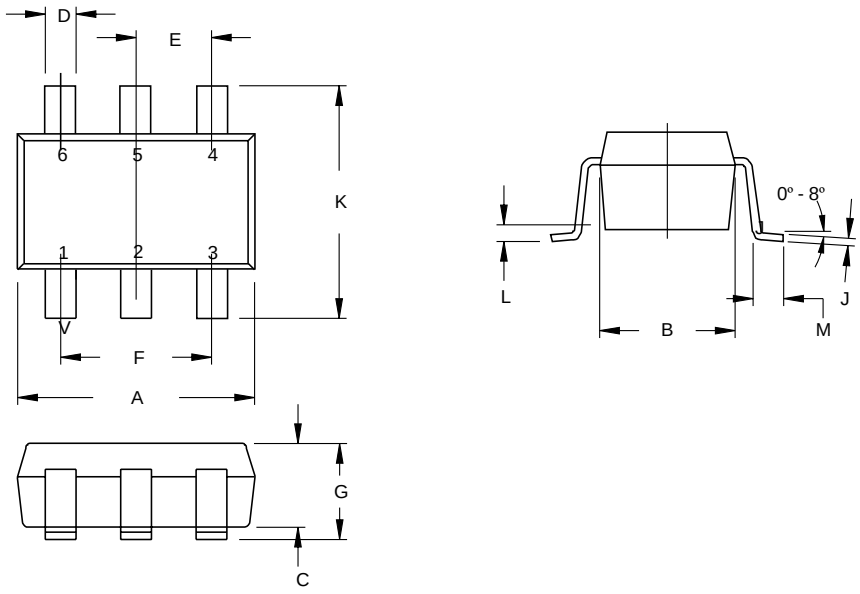


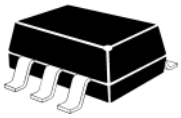
Figure 2 - Bidirectional Configuration
Differential-Mode I/O Port Protection

PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE



SC70-6L

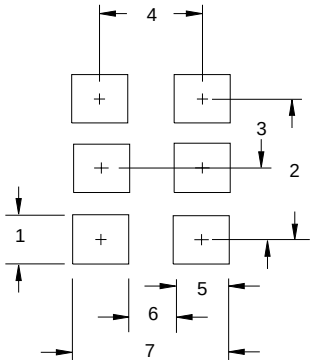


PACKAGE DIMENSIONS

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

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



NOTES:
1. Dimensioning and tolerances per ANSI Y14.5M, 1985.
2. Controlling Dimension: Inches
3. Dimensions are exclusive of mold flash and metal burrs.

06019 Rev 1 - 11/01

PART NUMBER SUFFIXES USED FOR TAPE & REEL ORDERING:
Surface mount product is taped and reeled in accordance with EIA-481.
Suffix-T7 = 7 Inch Reel - 3,000 pieces per reel i.e.: SMF05C - T7
Suffix-T13 = 13 Inch Reel - 10,000 pieces per reel i.e: SMF05C - T13

Protek Devices
2929 South Fair Lane, Tempe, AZ 85282
Tel: 602-431-8101 Fax: 602-431-2288
E-Mail: sales@protekdevices.com
Web Site: www.protekdevices.com