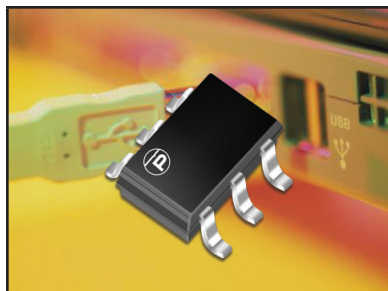


## MULTI-LINE TVS ARRAY



**SOT-23-6 PACKAGE**

### DESCRIPTION

The CPxx and CPxxC series are subminiature monolithic TVS suppressor arrays designed for the protection of sensitive IC components from the damaging effects of Electrostatic Discharge (ESD). This series is ideally suited for use in portable electronics such as SMART phones, laptops, and other wireless devices.

The CPxx and CPxxC series is usable on I/O ports where the signal voltage is positive. These devices will also provide protection in accordance with IEC 61000-4-2 and IEC 61000-4-4 requirements. This series is available in a SOT-23-6 package configuration and is rated at 200 Watts peak pulse power (8/20 $\mu$ s) per line.

### FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air 15kV, Contact 8kV
- Compatible with IEC 61000-4-4 (EFT): 40A, 5/50ns
- Compatible with IEC 61000-4-5 (Surge): 12A, 8/20 $\mu$ s - Level 1(Line-Gnd) & Level 2(Line-Line)
- 200 Watts Peak Pulse Power per Line(tp = 8/20 $\mu$ s)
- Monolithic Design
- Protects 4 Bidirectional Lines & 5 Unidirectional Lines
- Unidirectional & Bidirectional Configurations
- ESD Protection > 25 kilovolts
- Available in Multiple Voltages
- Low Clamping Voltage
- Low Leakage Current
- RoHS Compliant
- REACH Compliant

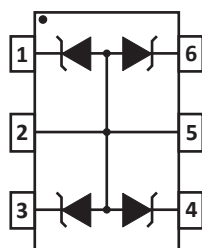
### APPLICATIONS

- SMART Phones
- Portable Electronics
- Multiple I/O Ports and Power Supplies
- FireWire, Ethernet and USB Interfaces

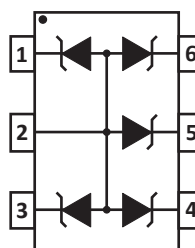
### MECHANICAL CHARACTERISTICS

- Molded JEDEC SOT-23-6 Package
- Approximate Weight: 16 milligrams
- Lead-Free Pure-Tin Plating (Annealed)
- Solder Reflow Temperature:  
Pure-Tin - Sn, 100: 260-270°C
- Flammability Rating UL 94V-0
- 8mm Tape and Reel per EIA Standard 481

### PIN CONFIGURATIONS



**UNIDIRECTIONAL**



**BIDIRECTIONAL**

**TYPICAL DEVICE CHARACTERISTICS**
**MAXIMUM RATINGS @ 25°C Unless Otherwise Specified**

PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 8/20μs) - See Figure 1	$P_{PP}$	200	Watts
Operating Temperature	$T_L$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C

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

PART NUMBER (Notes 1-3)	DEVICE MARKING	RATED STAND-OFF VOLTAGE  $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE  @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (Fig. 2)  @ $I_p = 1A$ $V_c$ VOLTS	MAXIMUM LEAKAGE CURRENT  @ $V_{WM}$ $I_D$ μA	TYPICAL CAPACITANCE  @0V, 1MHz $C_j$ pF
CP05	QRH	5.0	6.0	9.8	20	70
CP05C	QRL	5.0	6.0	9.8	20	70
CP12	QRI	12.0	13.3	19.0	1	50
CP12C	QRM	12.0	13.3	19.0	1	50
CP15	QRJ	15.0	16.7	24.0	1	30
CP15C	QRN	15.0	16.7	24.0	1	30
CP24	QRK	24.0	26.7	43.0	1	25
CP24C	QRO	24.0	26.7	43.0	1	25

**NOTES**

1. Part numbers with an additional "C" suffix are bidirectional, i.e., CP05C.
2. Unidirectional Only: For CPxx, test between pin 1 to 2 or 5, 4 to 2 or 5, 6 to 2 or 5, 3 to 2 or 5. For CPxxC, test between 2 to 1, 3, 4, 5, or 6.
3. Bidirectional Only: For CPxxC, test between pin 5 to 1 or 3 or 4 or 6. Electrical characteristics apply in both directions.
4. Unidirectional Only: For CPxx, capacitance measured between pins 1, 3, 4, 6 to 2. For CPxxC, capacitance measured between pins 2 to 1, 3, 4, 5, or 6.

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1  
PEAK PULSE POWER VS PULSE TIME

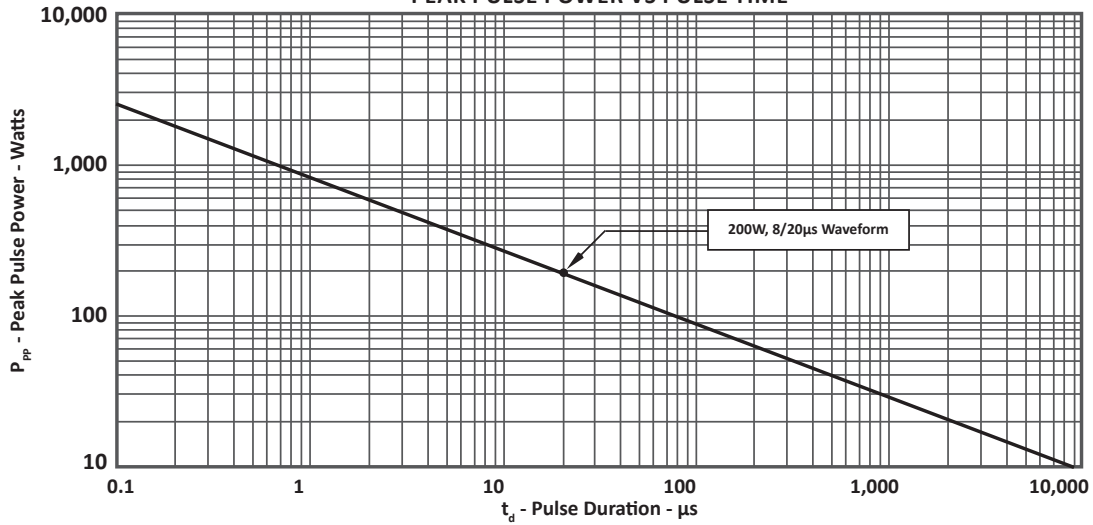


FIGURE 2  
PULSE WAVE FORM

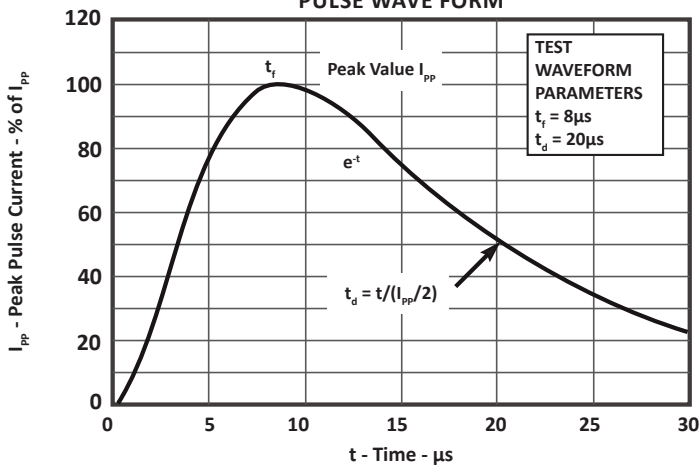
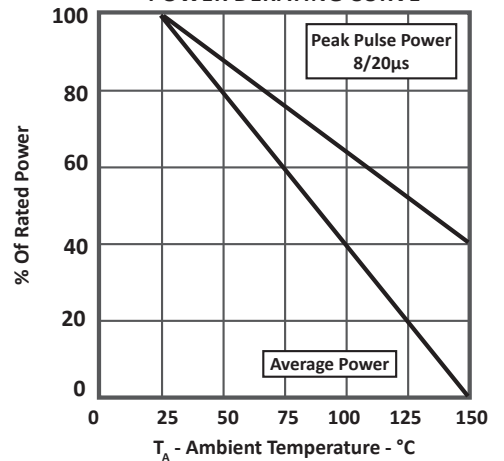


FIGURE 3  
POWER DERATING CURVE



## TYPICAL DEVICE CHARACTERISTICS

FIGURE 4  
 OVERTHOOT & CLAMPING VOLTAGE FOR CP05C

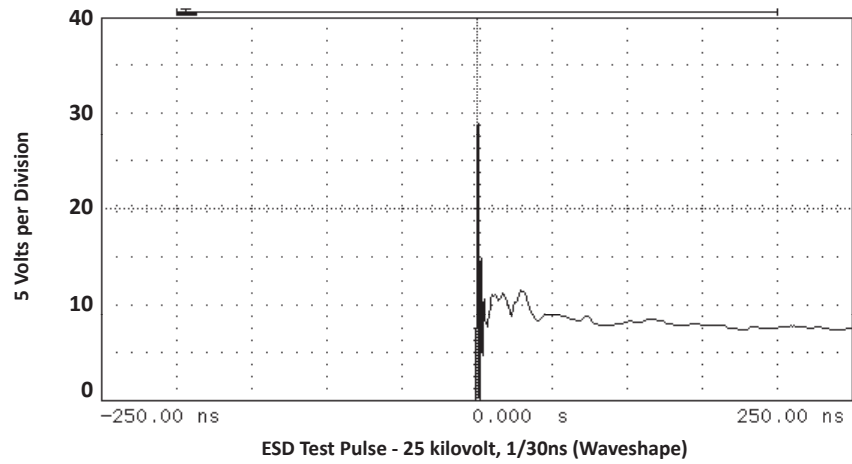
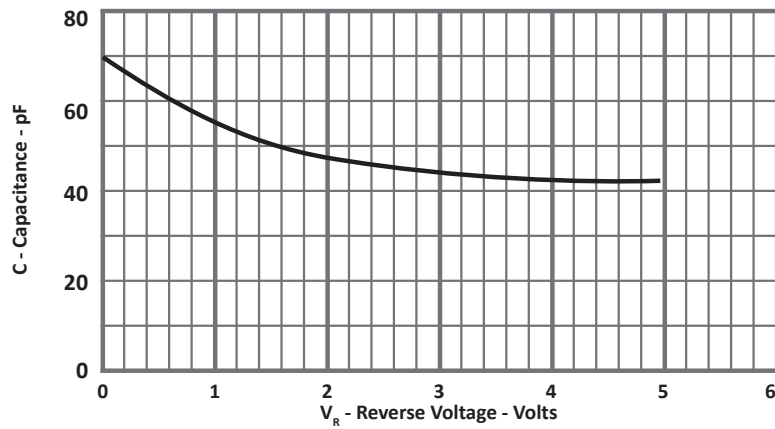
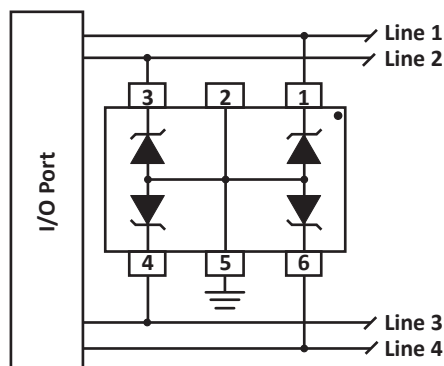


FIGURE 5  
 TYPICAL REVERSE VOLTAGE VS CAPACITANCE FOR CP05C



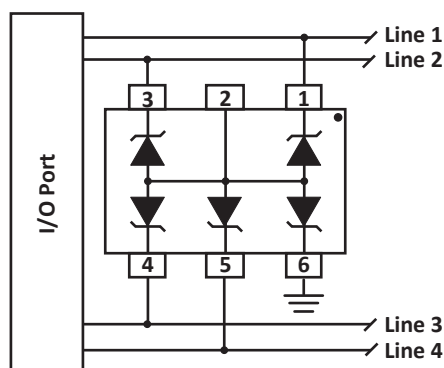
## APPLICATION INFORMATION



**FIGURE 1 - COMMON-MODE I/O PORT PROTECTION (UNIDIRECTIONAL)**

Circuit connectivity is as follows:

- Line 1 connected to pin 1.
- Line 2 connected to pin 3.
- Line 3 connected to pin 4.
- Line 4 connected to pin 6.
- Pin 5 connected to ground.
- Pin 6 not connected.



**FIGURE 1 - COMMON-MODE I/O PORT PROTECTION (BIDIRECTIONAL)**

Circuit connectivity is as follows:

- Line 1 connected to pin 1.
- Line 2 connected to pin 3.
- Line 3 connected to pin 4.
- Line 4 connected to pin 5.
- Pin 6 connected to ground.
- Pin 2 not connected.

## CIRCUIT BOARD RECOMMENDATIONS

Circuit board layout is critical for electromagnetic compatibility 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.

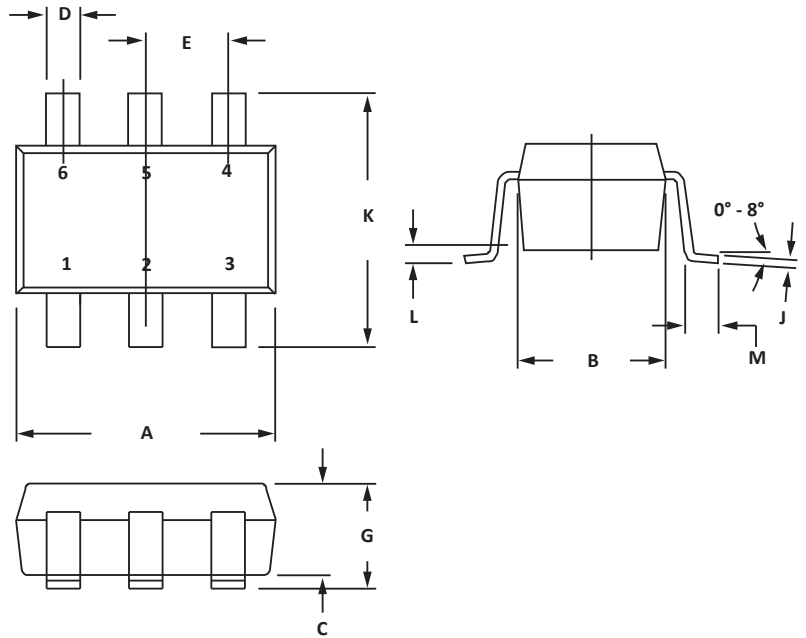
## SOT-23-6 PACKAGE INFORMATION

## OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	2.80	3.05	0.110	0.120
B	1.50	1.75	0.059	0.070
C	0.90	1.30	0.036	0.051
D	0.30	0.40	0.012	0.016
E	0.85	1.05	0.033	0.040
G	0.90	1.45	0.036	0.057
J	0.09	0.20	0.003	0.008
K	2.60	3.00	0.102	0.118
L	0.0	0.15	0.0	0.006
M	0.30	0.60	0.012	0.024

## NOTES

- Controlling dimension: inches.
- Dimensioning and tolerances per ANSI Y14.5M, 1985.
- Dimensions are exclusive of mold flash and metal burrs.

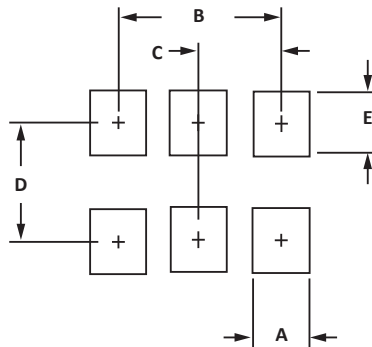


## PAD LAYOUT DIMENSIONS

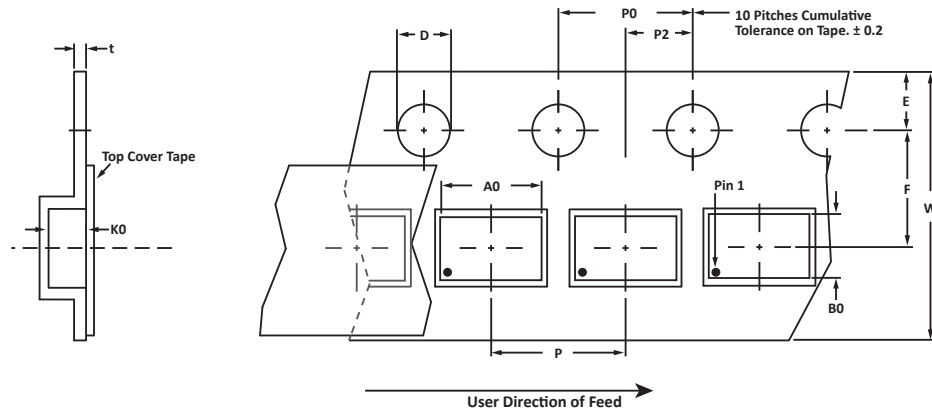
DIM	MILLIMETERS	INCHES
	NOMINAL	NOMINAL
A	0.70	0.028
B	1.90	0.074
C	0.95	0.037
D	2.40	0.094
E	1.00	0.039

## NOTES

- Controlling dimension: inches.



## TAPE AND REEL



## SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")	8mm	3.20 ± 0.10	3.20 ± 0.10	1.65 ± 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

## NOTES

1. Dimensions are in millimeters.
2. Surface mount product is taped and reeled in accordance with EIA-481.
3. Suffix - T7 = 7" Reel - 3,000 pieces per 8mm tape.
4. Marking on Part - marking code (see page 2) and pin one defined by dot on package.

Package outline, pad layout and tape specifications per document number 06013.R5 2/11

## ORDERING INFORMATION

BASE PART NUMBER (xx = Voltage)	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
CPxx/CPxxC	-LF	-T7	3,000	7"	n/a

## COMPANY INFORMATION

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### COMPANY PROFILE

ProTek Devices, based in Tempe, Arizona USA, is a manufacturer of Transient Voltage Suppression (TVS) products designed specifically for the protection of electronic systems from the effects of lightning, Electrostatic Discharge (ESD), Nuclear Electromagnetic Pulse (NEMP), inductive switching and EMI/RFI. With over 25 years of engineering and manufacturing experience, ProTek designs TVS devices that provide application specific protection solutions for all electronic equipment/systems.

ProTek Devices Analog Products Division, also manufactures analog interface, control, RF and power management products.

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