

APPLICATIONS

- ✓ Cellular Phones
- ✓ MCM Boards
- ✓ Wireless Communication Circuits
- ✓ IR LEDs
- ✓ SMART Cards & PCMCIA Cards

IEC COMPATIBILITY (EN61000-4)

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

FEATURES

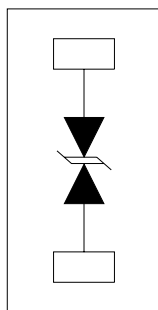
- ✓ ESD Protection > 25 kilovolts
- ✓ Available in Multiple Voltage Types Ranging From 3.3V to 36V
- ✓ 250 Watts Peak Pulse Power Dissipation per Line (8/20μs)
- ✓ Monolithic Structure

MECHANICAL CHARACTERISTICS

- ✓ Standard EIA Chip Size: 0402
- ✓ Weight 0.73 milligrams (Approximate)
- ✓ Flammability Rating UL 94V-0
- ✓ 8mm Plastic & Paper Tape and Reel Per EIA Standard 481-1-A
- ✓ Device Marking On Reel
- ✓ Top Contacts: Solder Bump 0.004" in Height (Nominal)



CIRCUIT DIAGRAM



P0402FC3.3C thru P0402FC36C

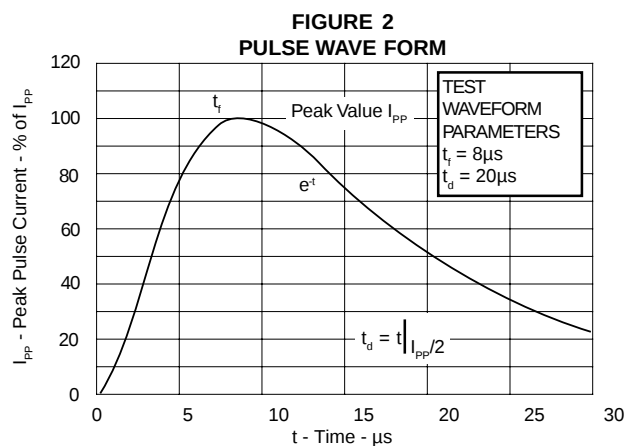
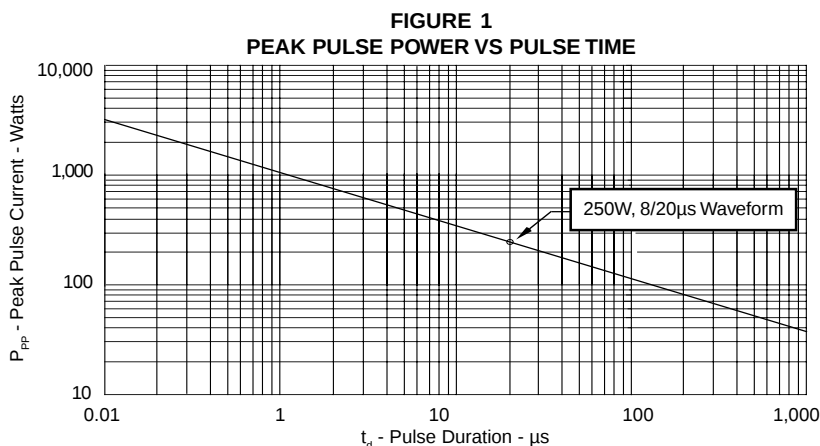
DEVICE CHARACTERISTICS

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}	250	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 (See Note 1 & Note 2)	RATED STAND-OFF VOLTAGE V_{WM} VOLTS	MINIMUM BREAKDOWN VOLTAGE @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ $I_p = 1A$ V_C VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2) @ 8/20 μs V_C @ I_{PP}	MAXIMUM LEAKAGE CURRENT @ V_{WM} I_D μA	TYPICAL CAPACITANCE 0V @ 1 MHz C pF
P0402FC3.3C	3.3	4.0	7.0	12.5V @ 20A	75	150
P0402FC05C	5.9	6.0	9.8	14.7V @ 17A	10	100
P0402FC08C	8.0	8.5	13.4	19.2V @ 13A	10	75
P0402FC12C	12.0	13.3	19.0	29.7V @ 9.0A	1	50
P0402FC15C	15.0	16.7	24.0	35.7V @ 7.0A	1	40
P0402FC24C	24.0	26.7	43.0	55.0V @ 5.0A	1	30
P0402FC36C	36.0	40.0	64.0	84.0V @ 3.0A	1	25

Note 1: All devices are bidirectional. Electrical characteristics apply in both directions.

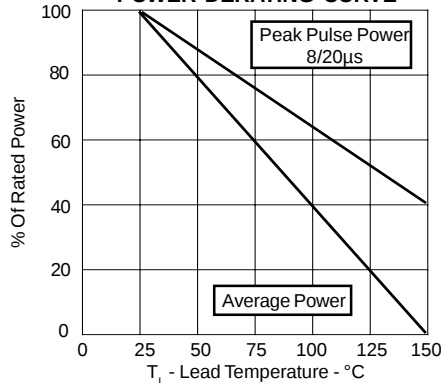
Note 2: SPICE model and parameters are available for the P0402FC05C on the ProTek Devices website: <http://www.protekdevices.com/spice>.



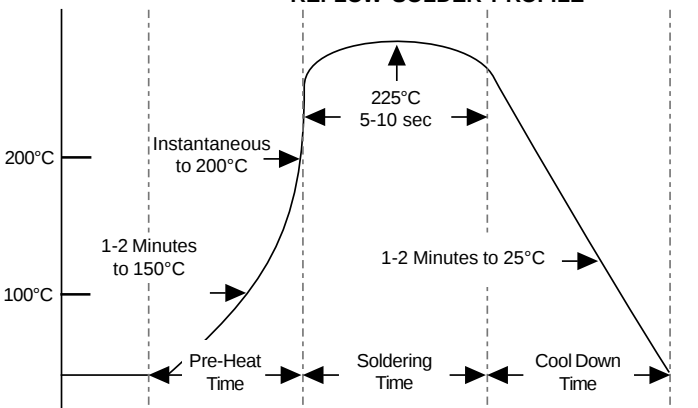
P0402FC3.3C thru P0402FC36C

GRAPHS

**FIGURE 3
POWER DERATING CURVE**

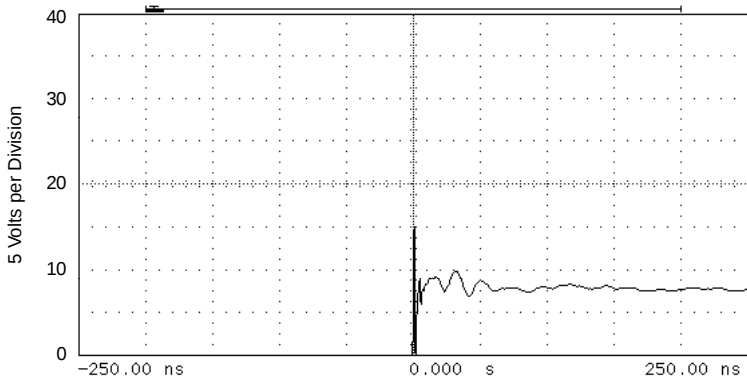


**FIGURE 4
REFLOW SOLDER PROFILE**



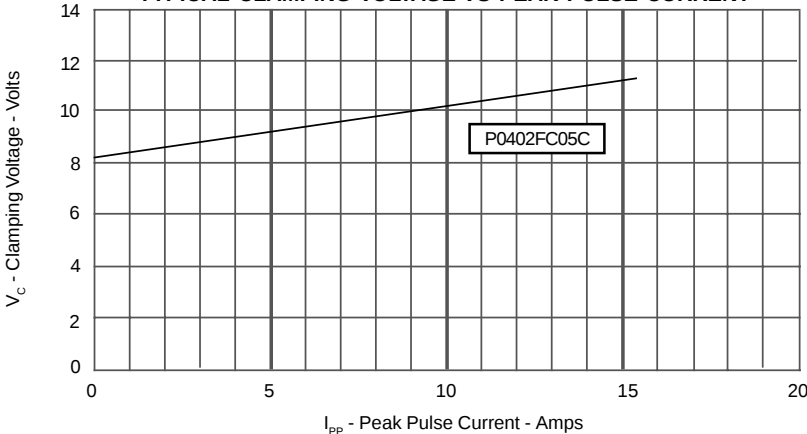
Note: This reflow profile does not take into account the printed circuit board (PCB) material heating time. Additional time may be required for the preheat time and cool down time upon the PCB or board material.

**FIGURE 5
OVERSHOOT & CLAMPING VOLTAGE FOR P0402FC05C**



ESD Test Pulse - 12 kilovolt, 1/30ns (waveshape)

**FIGURE 6
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT**



P0402FC3.3C thru P0402FC36C

APPLICATION NOTE

The P0402FC Series are flip-chip components that provide board level EFT and ESD protection > 25 kilovolts with an additional surge capability of 250 Watts P_{pp} per line for an 8/20 μ s waveform.

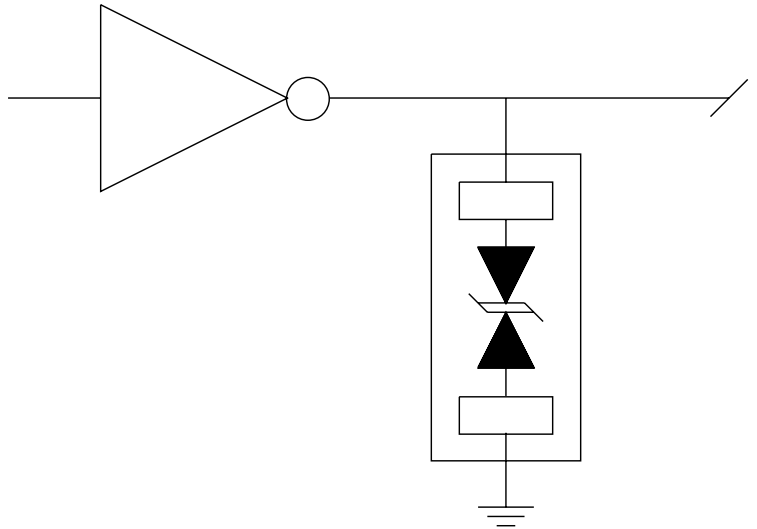
BIDIRECTIONAL COMMON MODE CONFIGURATION (Figure 1)

The 0402FC Series provides single line, bidirectional protection in a common mode configuration as depicted in Figure 1.

CIRCUIT BOARD LAYOUT RECOMMENDATIONS

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

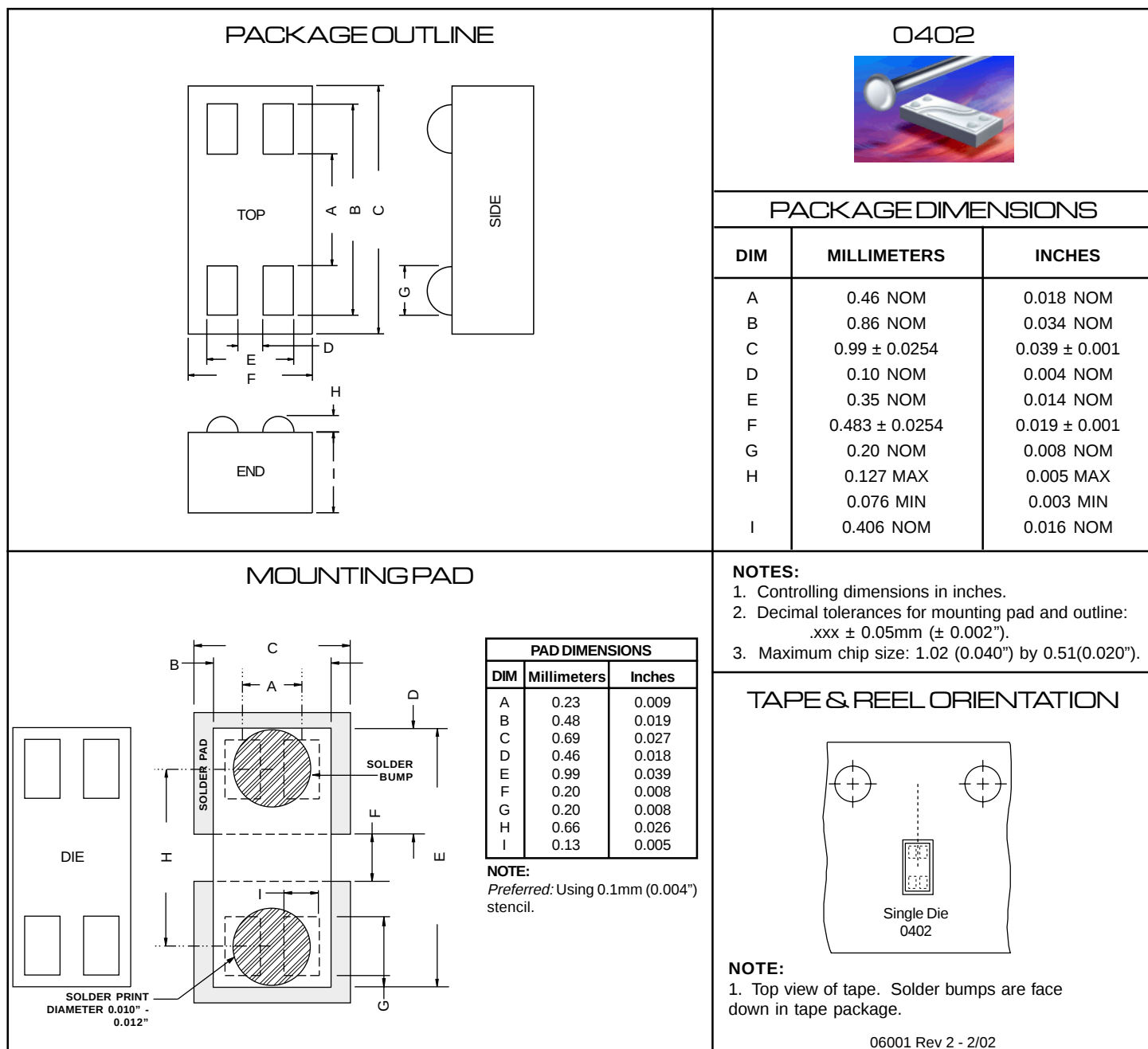
- “ The protection device should be placed near the input terminals or connectors, the device will divert the transient current immediately before it can be coupled into the nearby traces.
- “ The path length between the TVS device and the protected line should be minimized.
- “ All conductive loops 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 - Bidirectional Configuration
Common-Mode I/O Port Protection**

P0402FC3.3C thru P0402FC36C

PACKAGE OUTLINE & DIMENSIONS



TAPE & REEL PACKAGING:
Surface mount product is taped and reeled in accordance with EIA-481, reel quantities and sizes are as follows:
Paper Tape: 7 Inch Reel - 10,000 pieces per reel. Plastic Tape: 7 Inch Reel - 3,000 or 5,000 per reel.

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