

APPLICATIONS

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

IEC COMPATIBILITY (EN61000-4)

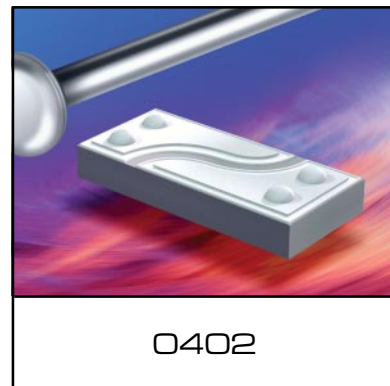
- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns

FEATURES

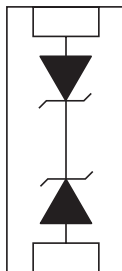
- ✓ ESD Protection > 25 kilovolts
- ✓ Available in Multiple Voltage Types Ranging From 3.3V to 36V
- ✓ 250 Watts Peak Pulse Power per Line ($t_p = 8/20\mu s$)
- ✓ Bidirectional Configuration & Monolithic Structure
- ✓ Protects 1 Line
- ✓ RoHS Compliant in Lead-Free Versions

MECHANICAL CHARACTERISTICS

- ✓ Standard EIA Chip Size: 0402
- ✓ Weight 0.73 milligrams (Approximate)
- ✓ Available in Tin-Lead or Lead-Free Plating
- ✓ Solder Reflow Temperature:
 - Tin-Lead - Sn/Pb, 85/15: 240-245°C
 - Lead-Free - Sn/Ag/Cu, 96/3.5/0.5: 260-270°C
- ✓ Flammability Rating UL 94V-0
- ✓ 8mm Plastic & Paper Tape and Reel Per EIA Standard 481
- ✓ Device Marking On Reel
- ✓ Top Contacts: Solder Bump 0.004" in Height (Nominal)



PIN CONFIGURATION



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)	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 (See Note 2) @ 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	5.0	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: *Maximum leakage current < 5 μA @ 2.8V. **Maximum leakage current < 500nA @ 3.3V. ***Maximum leakage current < 200nA @ 5V.

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

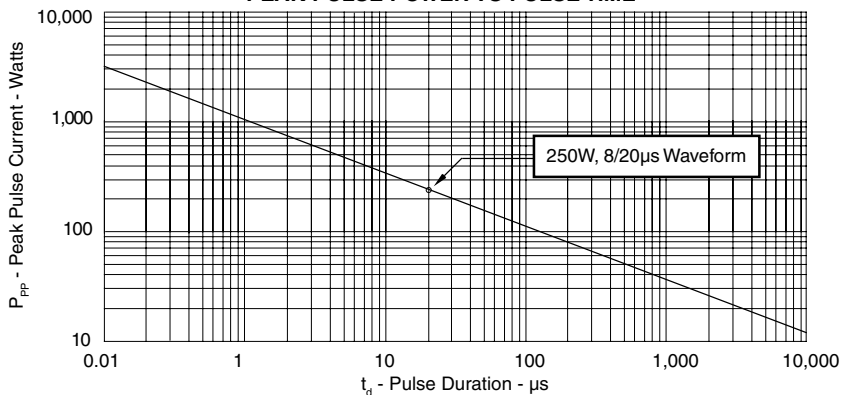
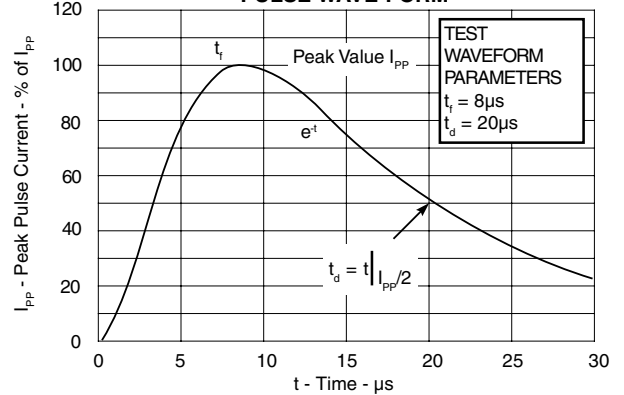
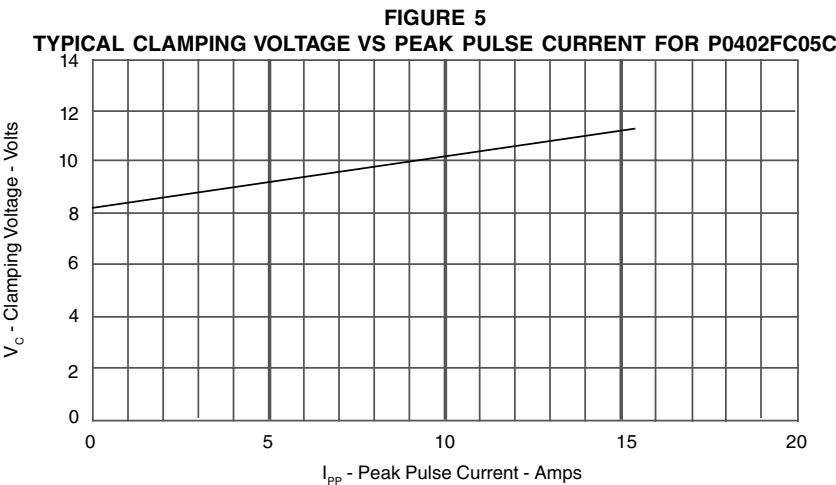
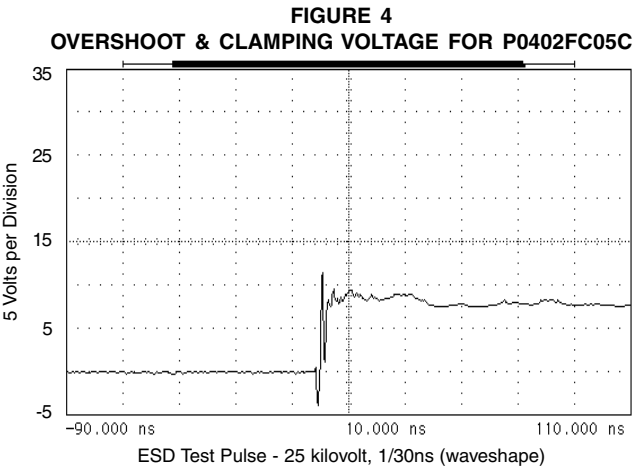
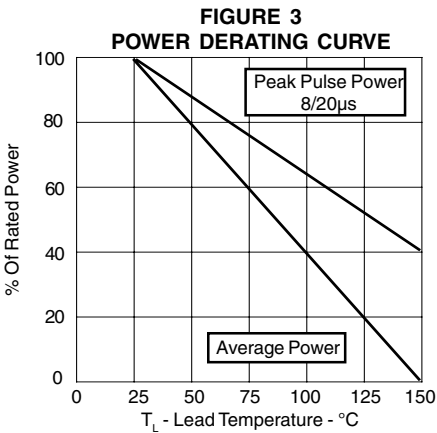


FIGURE 2
PULSE WAVE FORM



GRAPHS

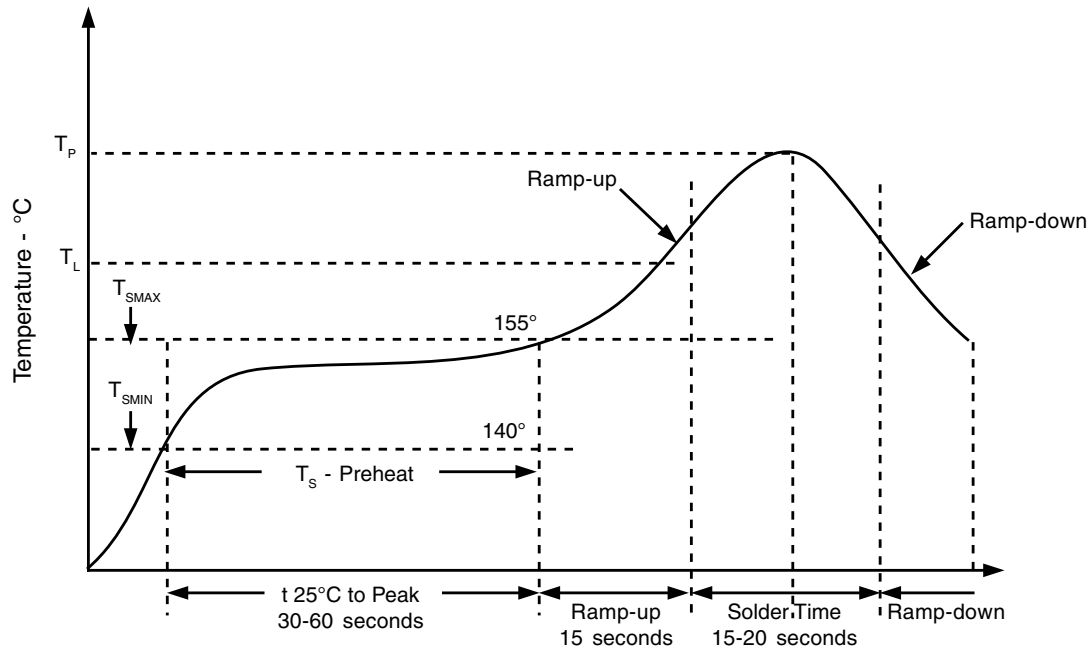
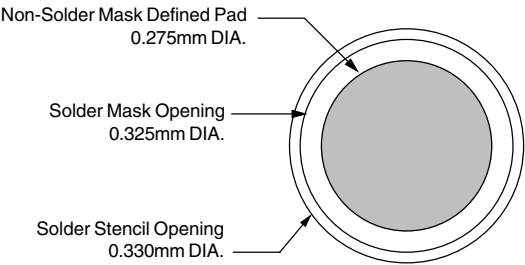


APPLICATION INFORMATION

PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	VALUE
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non-Solder Mask Defined Pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm Round
Solder Paste Type	No Clean
Pad Protective Finish	OSP(Entek Cu Plus 106A)
Tolerance - Edge To Corner Ball	±50µm
Solder Ball Side Coplanarity	±20µm
Maximum Dwell Time Above Liquidous (183°C)	60 Seconds
Soldering Maximum Temperature	270°C

REQUIREMENTS
Temperature: T_p for Lead-Free (SnAgCu): 260-265°C T_p for Tin-Lead: 240-245°C Preheat time and temperature depends on solder paste and flux activation temperature, component size, weight, surface area & plating.

RECOMMENDED NON-SOLDER MASK DEFINED PAD ILLUSTRATION

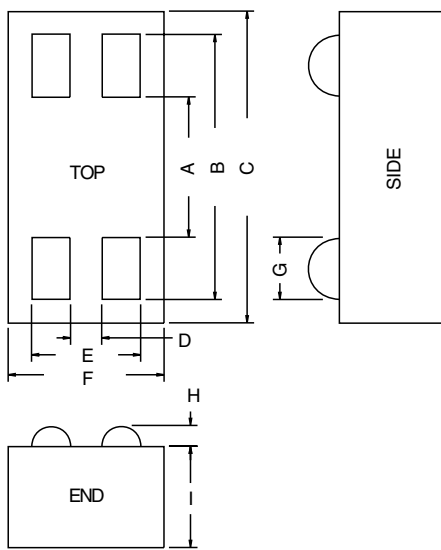
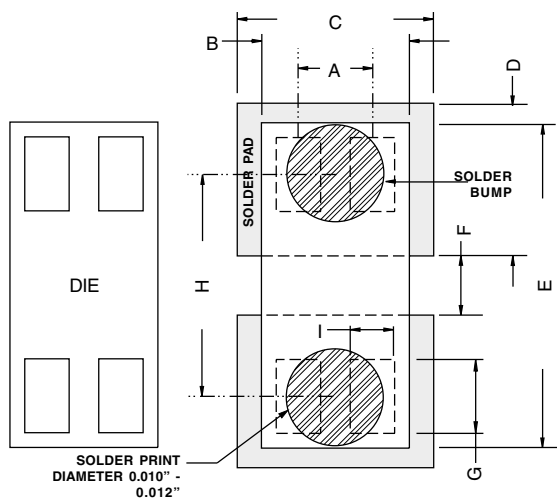
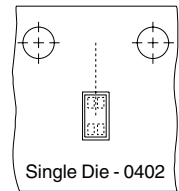


PO402FC3.3C*

thru

PO402FC24C*

PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE 	Q402  PACKAGE DIMENSIONS <table><tr><th>DIM</th><th>MILLIMETERS</th><th>INCHES</th></tr><tr><td>A</td><td>0.46 NOM</td><td>0.018 NOM</td></tr><tr><td>B</td><td>0.86 NOM</td><td>0.034 NOM</td></tr><tr><td>C</td><td>0.99 ± 0.0254</td><td>0.039 ± 0.001</td></tr><tr><td>D</td><td>0.10 NOM</td><td>0.004 NOM</td></tr><tr><td>E</td><td>0.35 NOM</td><td>0.014 NOM</td></tr><tr><td>F</td><td>0.483 ± 0.0254</td><td>0.019 ± 0.001</td></tr><tr><td>G</td><td>0.20 NOM</td><td>0.008 NOM</td></tr><tr><td>H</td><td>0.127 MAX</td><td>0.005 MAX</td></tr><tr><td>I</td><td>0.076 MIN</td><td>0.003 MIN</td></tr><tr><td>I</td><td>0.406 NOM</td><td>0.016 NOM</td></tr></table> NOTES: 1. Controlling dimensions in inches. 2. Decimal tolerances for mounting pad and outline: .xxx ± 0.05mm (± 0.002"). 3. Maximum chip size: 1.02 (0.040") by 0.51(0.020").	DIM	MILLIMETERS	INCHES	A	0.46 NOM	0.018 NOM	B	0.86 NOM	0.034 NOM	C	0.99 ± 0.0254	0.039 ± 0.001	D	0.10 NOM	0.004 NOM	E	0.35 NOM	0.014 NOM	F	0.483 ± 0.0254	0.019 ± 0.001	G	0.20 NOM	0.008 NOM	H	0.127 MAX	0.005 MAX	I	0.076 MIN	0.003 MIN	I	0.406 NOM	0.016 NOM
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MOUNTING PAD  TAPE & REEL ORDERING NOMENCLATURE 1. Surface mount product is taped and reeled in accordance with EIA 481. 2. 8mm Plastic Tape: 7 Inch Reels - 5,000 pieces per reel. Ordering Suffix: -T75-1 (i.e., P0402FC05C-T75-1). 3. 8mm Paper Tape: 7 Inch Reels - 10,000 pieces per reel. Ordering Suffix: -T710-2 (i.e., P0402FC05C-T710-2). 4. Suffix - LF = Lead-Free, i.e., P0402FC05C-LF-T75-1.	PAD DIMENSIONS <table><tr><th>DIM</th><th>MILLIMETERS</th><th>INCHES</th></tr><tr><td>A</td><td>0.23</td><td>0.009</td></tr><tr><td>B</td><td>0.48</td><td>0.019</td></tr><tr><td>C</td><td>0.69</td><td>0.027</td></tr><tr><td>D</td><td>0.46</td><td>0.018</td></tr><tr><td>E</td><td>0.99</td><td>0.039</td></tr><tr><td>F</td><td>0.20</td><td>0.008</td></tr><tr><td>G</td><td>0.20</td><td>0.008</td></tr><tr><td>H</td><td>0.66</td><td>0.026</td></tr><tr><td>I</td><td>0.13</td><td>0.005</td></tr></table> NOTE: 1. Top view of tape. Metal contacts are face down in tape package. TAPE & REEL ORIENTATION  Single Die - 0402 NOTE: 1. Preferred: Using 0.1mm (0.004") stencil. Outline & Dimensions: Rev 3 - 11/02, 06001	DIM	MILLIMETERS	INCHES	A	0.23	0.009	B	0.48	0.019	C	0.69	0.027	D	0.46	0.018	E	0.99	0.039	F	0.20	0.008	G	0.20	0.008	H	0.66	0.026	I	0.13	0.005			
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