

## 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

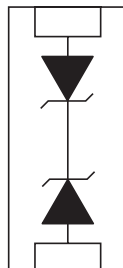
- ✓ ESD Protection > 25 kilovolts
- ✓ Available in Voltages Ranging From 3.3V to 36V
- ✓ 250 Watts Peak Pulse Power per Line (tp = 8/20µs)
- ✓ Bidirectional Configuration & Monolithic Structure
- ✓ Protects 1 Line
- ✓ RoHS Compliant

## MECHANICAL CHARACTERISTICS

- ✓ Standard EIA Chip Size: 0402
- ✓ Weight 0.73 milligrams (Approximate)
- ✓ Available in Lead-Free Plating
- ✓ Solder Reflow Temperature:  
 Lead-Free - Sn/Ag/Cu, 96/3.5/0.5: 260-270°C
- ✓ Consult Factory for Leaded Device Availability
- ✓ 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



# P0402FC3.3C\* thru P0402FC36C\*

## DEVICE CHARACTERISTICS

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

PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power (tp = 8/20μs) - See Figure 1	P <sub>PP</sub>	250	Watts
Operating Temperature	T <sub>A</sub>	-55 to 150	°C
Storage Temperature	T <sub>STG</sub>	-55 to 150	°C

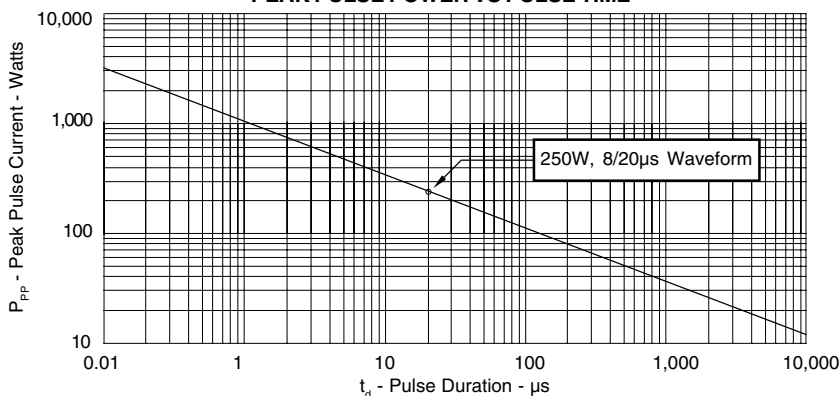
### ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (See Note 1)	RATED STAND-OFF VOLTAGE  V <sub>WM</sub> VOLTS	MINIMUM BREAKDOWN VOLTAGE  @ 1mA V <sub>(BR)</sub> VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)  @ I <sub>p</sub> = 1A V <sub>C</sub> VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)  @8/20μs V <sub>C</sub> @ I <sub>PP</sub>	MAXIMUM LEAKAGE CURRENT (See Note 2)  @V <sub>WM</sub> I <sub>D</sub> 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	11.0	14.7V @ 17A	10**	100
P0402FC08C	8.0	8.5	13.2	19.2V @ 13A	10***	75
P0402FC12C	12.0	13.3	19.8	29.7V @ 9.0A	1	50
P0402FC15C	15.0	16.7	25.4	35.7V @ 7.0A	1	40
P0402FC24C	24.0	26.7	37.2	55.0V @ 5.0A	1	30
P0402FC36C	36.0	40.0	70.0	84.0V @ 3.0A	1	25

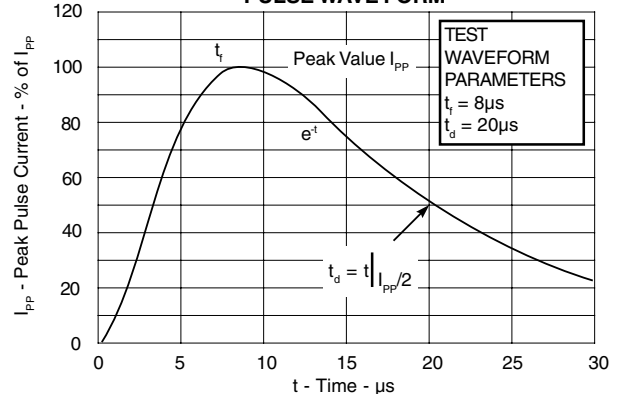
**Note 1:** All devices are bidirectional. Electrical characteristics apply in both directions.

**Note 2:** \*Maximum leakage current < 5μA @ 2.8V. \*\*Maximum leakage current <500nA @ 3.3V. \*\*\*Maximum leakage current <200nA @ 5V.

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



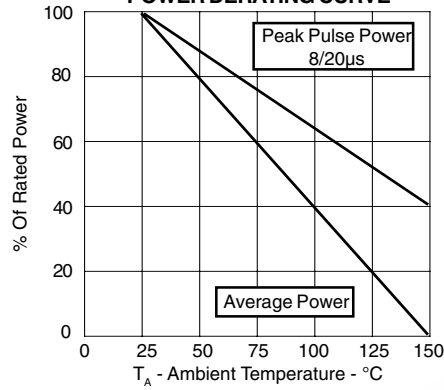
**FIGURE 2  
PULSE WAVEFORM**



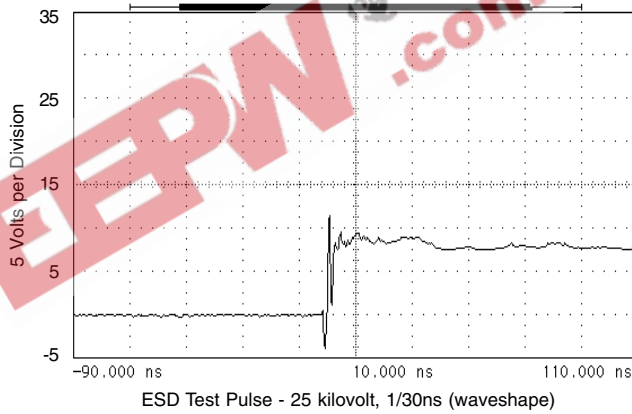
**P0402FC3.3C\***  
**thru**  
**P0402FC36C\***

**GRAPHS**

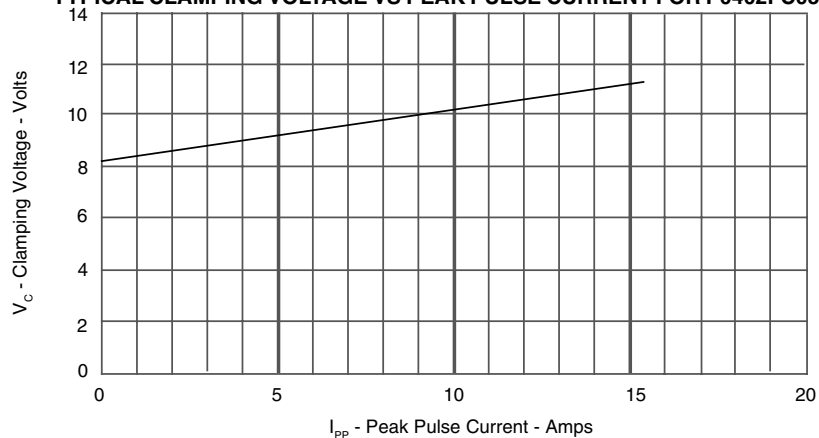
**FIGURE 3  
 POWER DERATING CURVE**



**FIGURE 4  
 OVERSHOOT & CLAMPING VOLTAGE FOR P0402FC05C**



**FIGURE 5  
 TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT FOR P0402FC05C**



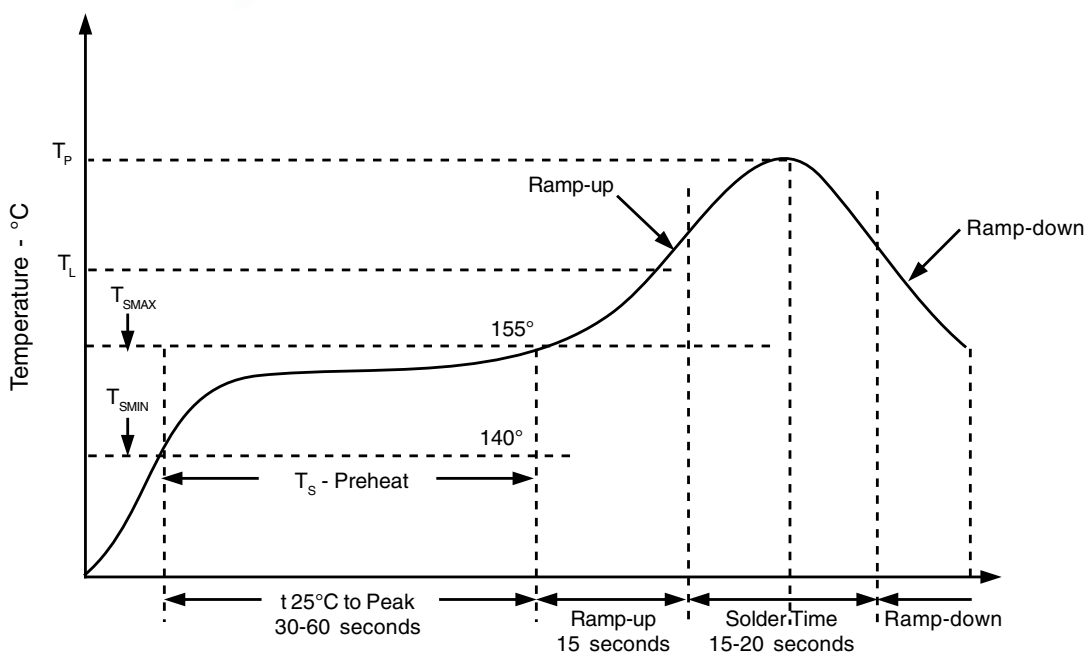
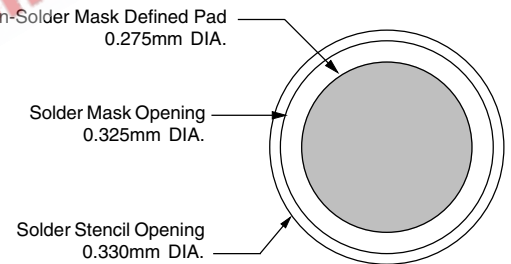
# P0402FC3.3C\* thru P0402FC36C\*

## 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
<p>Temperature:</p> <p><math>T_p</math> for Lead-Free (SnAgCu): 260-270°C</p> <p><math>T_p</math> for Tin-Lead: 240-245°C</p> <p>Preheat time and temperature depends on solder paste and flux activation temperature, component size, weight, surface area &amp; plating.</p>

### RECOMMENDED NON-SOLDER MASK DEFINED PAD ILLUSTRATION



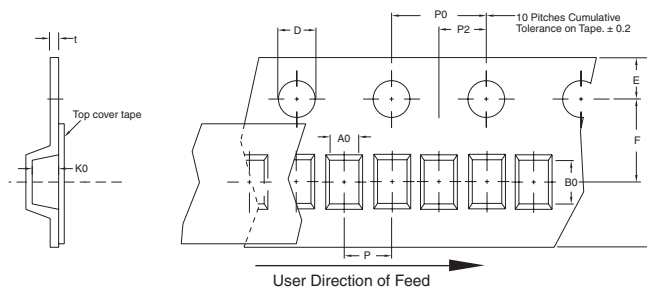
# P0402FC3.3C\* thru P0402FC36C\*

## 0402 PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE		PACKAGE DIMENSIONS		
		<b>DIM</b>	<b>MILLIMETERS</b>	<b>INCHES</b>
		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 0.076 MIN	0.005 MAX 0.003 MIN
		I	0.406 NOM	0.016 NOM
<b>NOTES:</b> 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").				
MOUNTING PAD		PAD DIMENSIONS		
		<b>DIM</b>	<b>MILLIMETERS</b>	<b>INCHES</b>
		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
<b>NOTE:</b> 1. Top view of tape. Metal contacts are face down in tape package.				
TAPE & REEL ORIENTATION				
<b>NOTE:</b> 1. Preferred: Using 0.1mm (0.004") stencil.				
<b>TAPE &amp; REEL ORDERING NOMENCLATURE</b> 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.				
<b>Outline &amp; Dimensions: Rev 3 - 11/02, 06001</b>				

### Tape & Reel Specifications (Dimensions in millimeters)

Reel Dia.	Tape Width	A0	B0	K0	D	E	F	W	P0	P2	P	tmax
178mm (7")/330mm(13")	8mm	0.80 ± 0.10	1.20 ± 0.10	0.70 ± 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	2.00 ± 0.10	0.25



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