PROTEK DEVICES

P0402FC3.3C* thru P0402FC36C*

FLIP CHIP ARRAY

0402

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

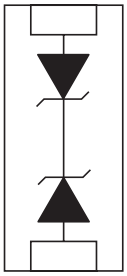
FEATURES

✔ 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



*U.S. Patent No. Des. “D456,367S”

DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified			
PARAMETER	**SYMBOL**	**VALUE**	**UNITS**
Peak Pulse Power (tp = 8/20µs) - See Figure 1	P_{PP}	250	Watts
Operating Temperature	T_A	-55 to 150	℃
Storage Temperature	T_{STG}	-55 to 150	℃

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) @8/20µs 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	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

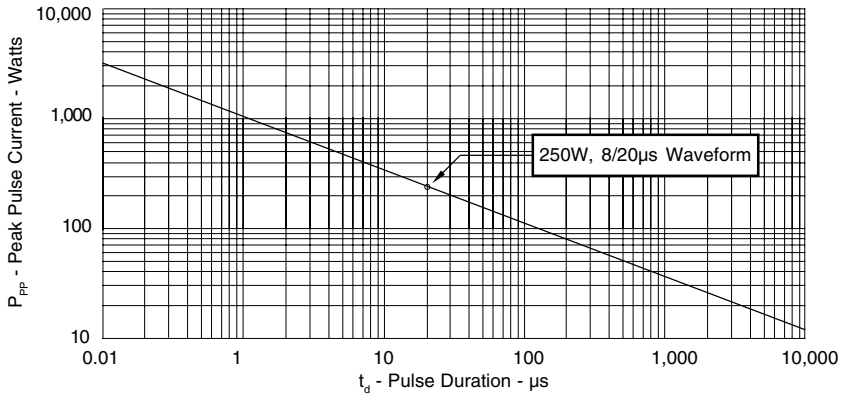
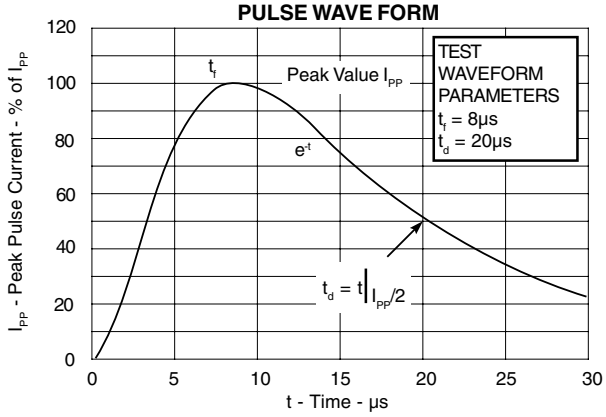


FIGURE 2
PULSE WAVE FORM



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GRAPHS

FIGURE 3
POWER DERATING CURVE

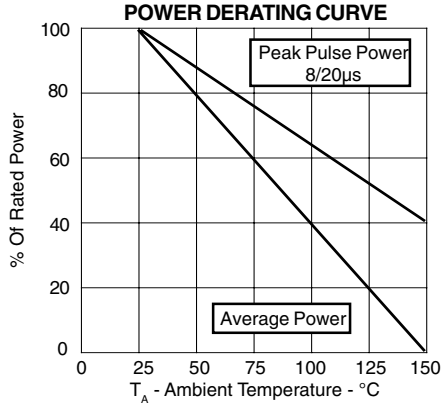


FIGURE 4
OVERSHOOT & CLAMPING VOLTAGE FOR P0402FC05C

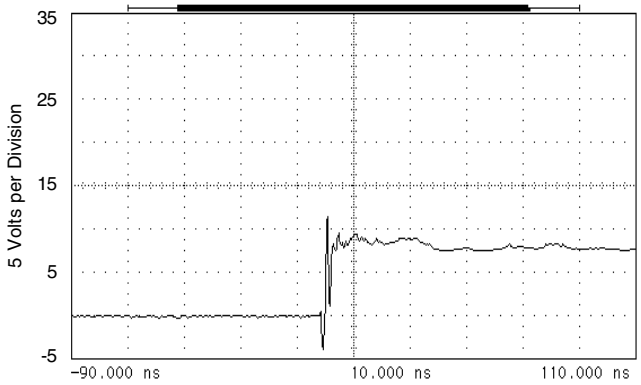
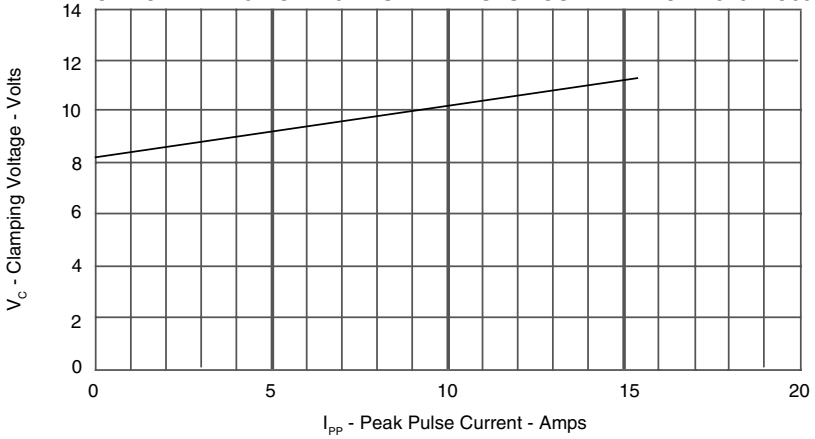


FIGURE 5
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT FOR P0402FC05C



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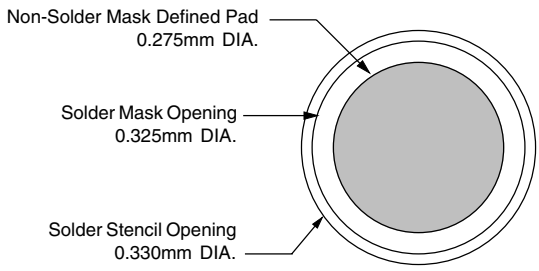
APPLICATION INFORMATION

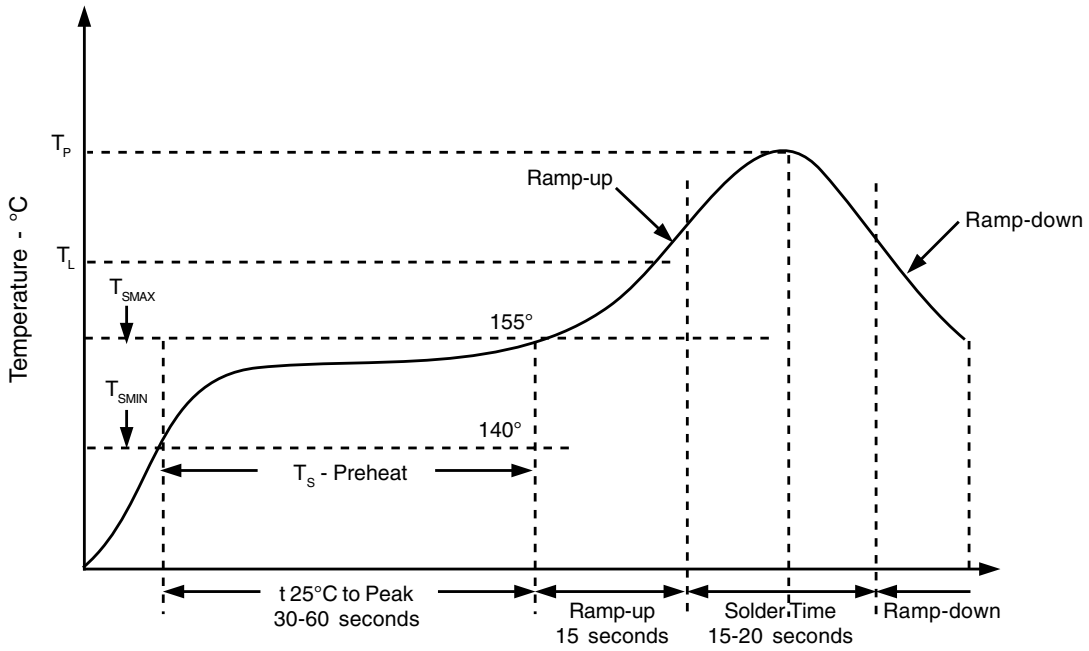
PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	VALUE
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non-Solder Mask Defined Pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm Round
Solder Paste Type	No 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): 260-270°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





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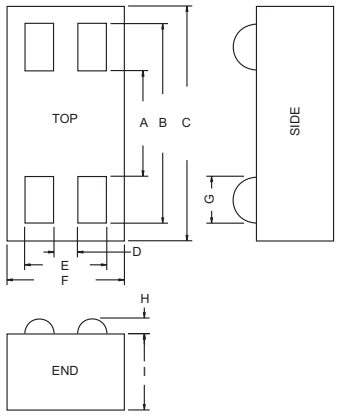
0402 PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE

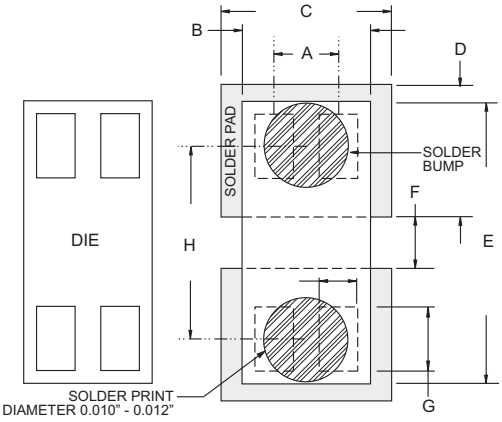


PACKAGE DIMENSIONS

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
	0.076 MIN	0.003 MIN
I	0.406 NOM	0.016 NOM

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").

MOUNTING PAD



PAD DIMENSIONS

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

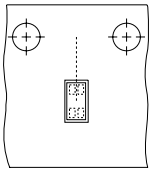
NOTE:
1. Top view of tape. Metal contacts are face down in tape package.

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.*

Outline & Dimensions: Rev 3 - 11/02, 06001

TAPE & REEL ORIENTATION

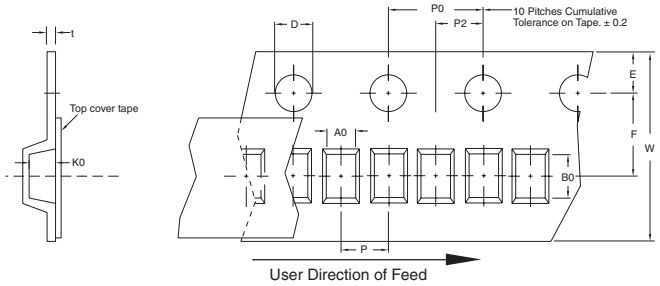


Single Die - 0402

NOTE:
1. *Preferred:* Using 0.1mm (0.004") stencil.

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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