

250W FLIP CHIP TVS ARRAY

DESCRIPTION

The P0404FCxxC Series Flip Chips employ advanced silicon P/N junction technology for unmatched board-level transient voltage protection against Electrostatic Discharge (ESD) and Electrical Fast Transients (EFT). Developed specifically for high-density circuit protection, this series meets the IEC 61000-4-2 and 61000-4-4 requirements. These devices are ideally suited for handheld devices, PCMCIA and SMART cards.

This series provides ESD protection greater than 25 kilovolts with a peak pulse power dissipation of 250 Watts per line for an 8/20 μ s waveform. In addition, the P0404FCxxC series features superior clamping performance, low leakage current characteristics and a response time of less than a nanosecond. Their low inductance virtually eliminates overshoot voltage due to package inductance.

FEATURES

- Compatible with IEC 61000-4-2 (ESD): Air 15kV, Contact 8kV
- Compatible with IEC 61000-4-4 (EFT): 40A, 5/50ns
- ESD Protection > 25 kilovolts
- Available in Voltages Ranging from 3.3V to 36V
- 250 Watts Peak Pulse Power per Line (tp = 8/20 μ s)
- Bidirectional Configuration & Monolithic Structure
- Protection for 1 to 3 Lines
- RoHS Compliant
- REACH Compliant

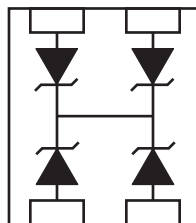
APPLICATIONS

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

MECHANICAL CHARACTERISTICS

- Standard EIA Chip Size: 0404
- Approximate Weight: 0.73 milligrams
- Lead-Free Plating
- Solder Reflow Temperature:
 - Lead-Free - Sn/Ag/Cu, 96/3.5/0.5: 260-270°C
- Flammability Rating UL 94V-0
- 8mm Tape per EIA Standard 481
- Top Contacts: Solder Bump 0.004" in Height (Nominal)

PIN CONFIGURATION



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}	250	Watts
Operating Temperature	T _A	-55 to 150	°C
Storage Temperature	T _{STG}	-55 to 150	°C

ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER (Note 1)	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 CLAMPING VOLTAGE (Fig. 2) @ 8/20μS V _c @ I _{PP}	MAXIMUM LEAKAGE CURRENT (Note 2) @ V _{WM} I _D μA	TYPICAL CAPACITANCE @ 0V, 1MHz C pF
P0404FC3.3C	3.3	4.0	7.0	12.5V @ 20A	75*	150
P0404FC05C	5.0	6.0	11.0	14.7V @ 17A	10**	100
P0404FC08C	8.0	8.5	13.2	19.2V @ 13A	10***	75
P0404FC12C	12.0	13.3	19.8	29.7V @ 9A	1	50
P0404FC15C	15.0	16.7	25.4	35.7V @ 7A	1	40
P0404FC24C	24.0	26.7	37.2	55.0V @ 5A	1	30
P0404FC36C	36.0	40.0	60.0	70.0V @ 3A	1	25

NOTES

- All devices are bidirectional. Electrical characteristics apply in both directions.
- *Maximum leakage current < 5μA @ 2.8V. **Maximum leakage current < 500nA @ 3.3V. ***Maximum leakage current < 200nA @ 5V.

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

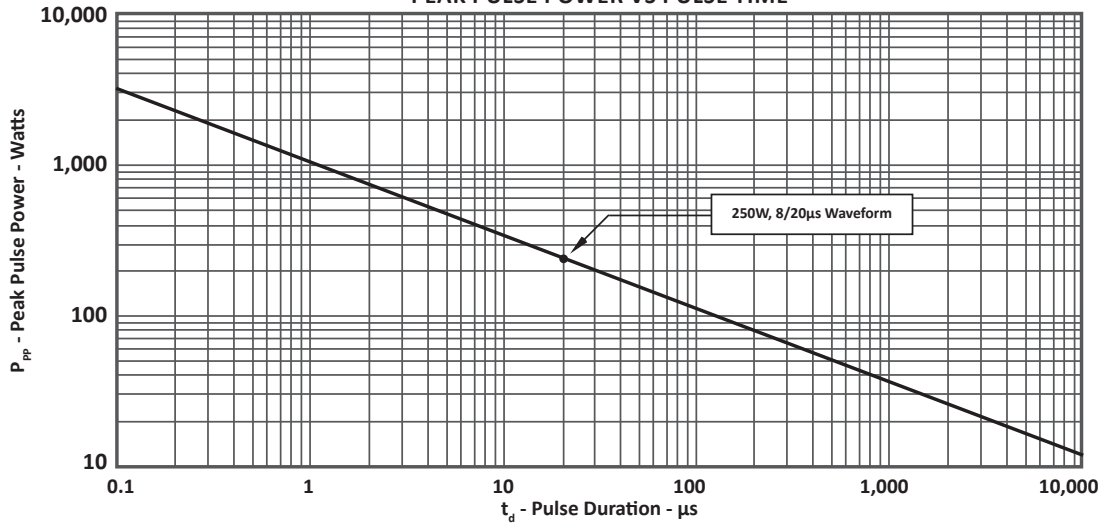


FIGURE 2
PULSE WAVE FORM

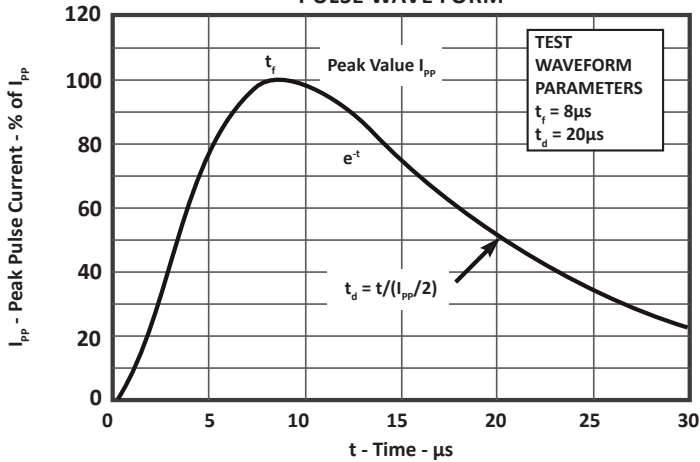
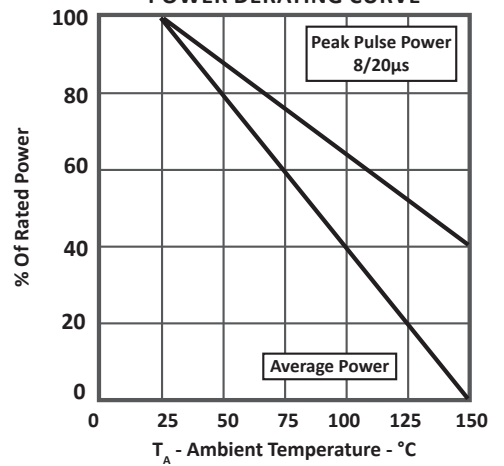
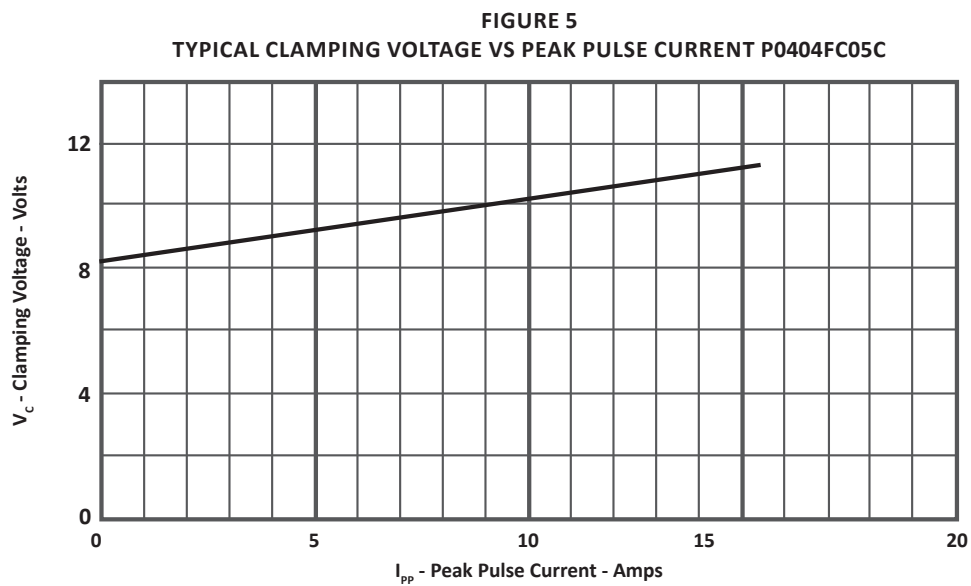
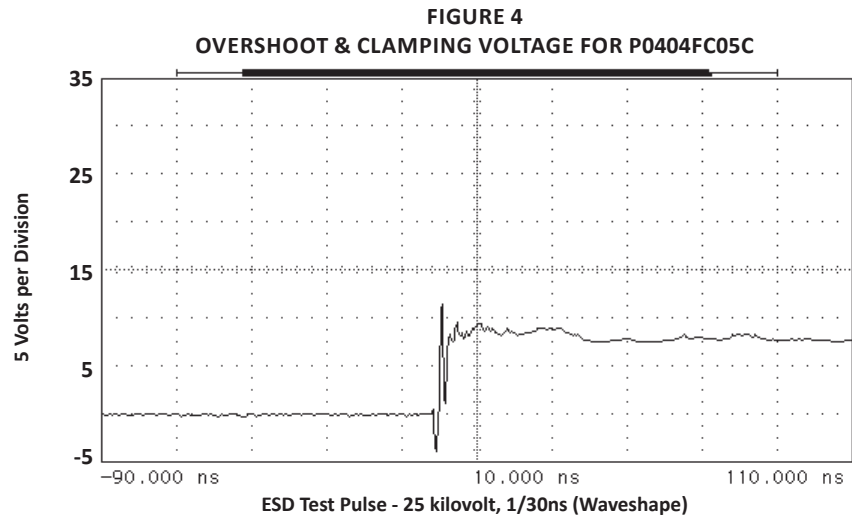


FIGURE 3
POWER DERATING CURVE



TYPICAL DEVICE CHARACTERISTICS



SOLDER REFLOW 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

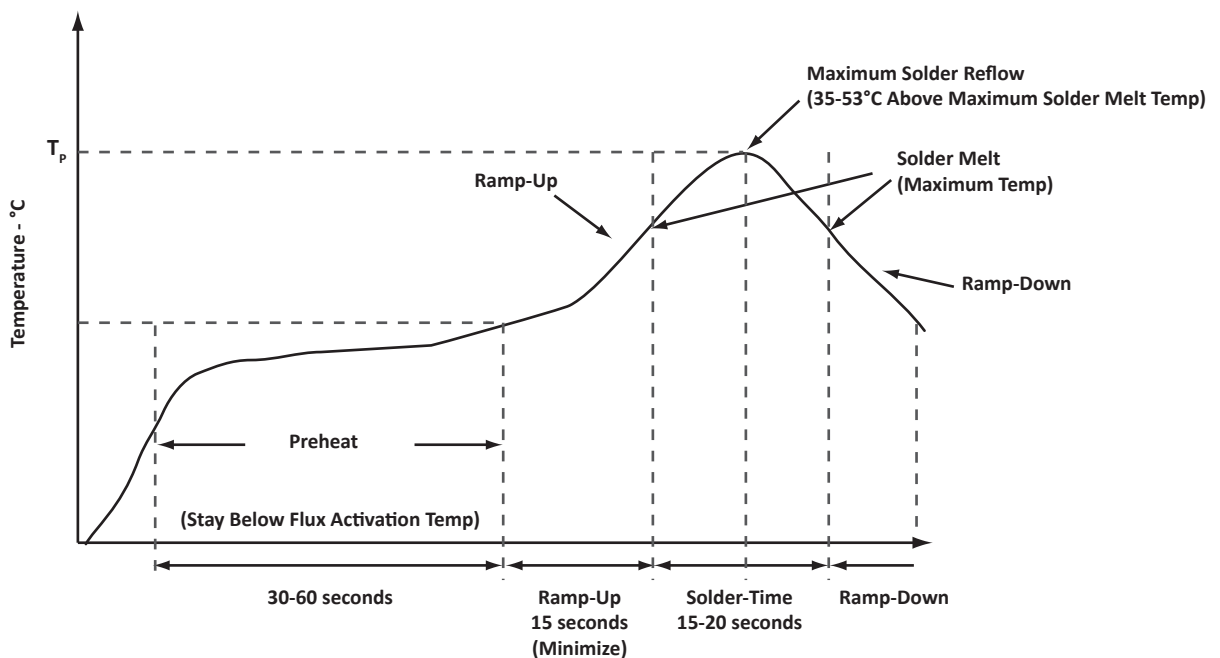
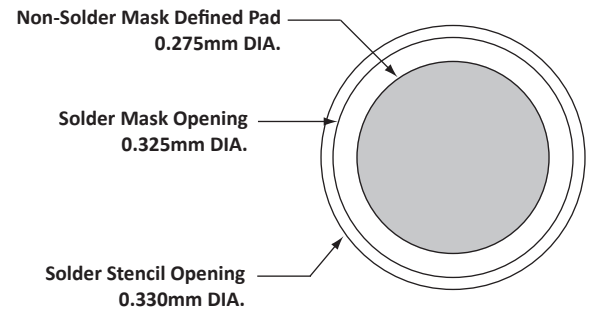
Temperature:

T_p for Lead-Free (Sn/Ag/Cu): 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 and plating.

RECOMMENDED NON-SOLDER MASK DEFINED PAD ILLUSTRATION



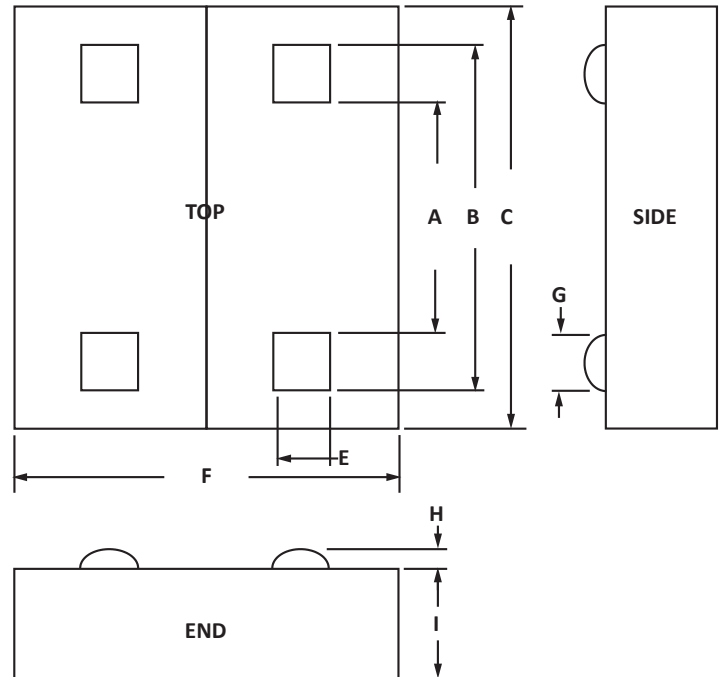
0404 PACKAGE INFORMATION

OUTLINE DIMENSIONS

DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.46	0.56	0.018	0.022
B	0.86		0.034	
C	0.98	1.02	0.038	0.040
E	0.15 SQ	0.15 SQ	0.006 SQ	0.006 SQ
F	0.975	1.025	0.038	0.040
G	0.15		0.006	
H	0.076	0.127	0.003	0.005
I	0.406		0.016	

NOTES

- Controlling dimensions in inches.
- Decimal tolerance: .xxx ± 0.05mm (0.002").

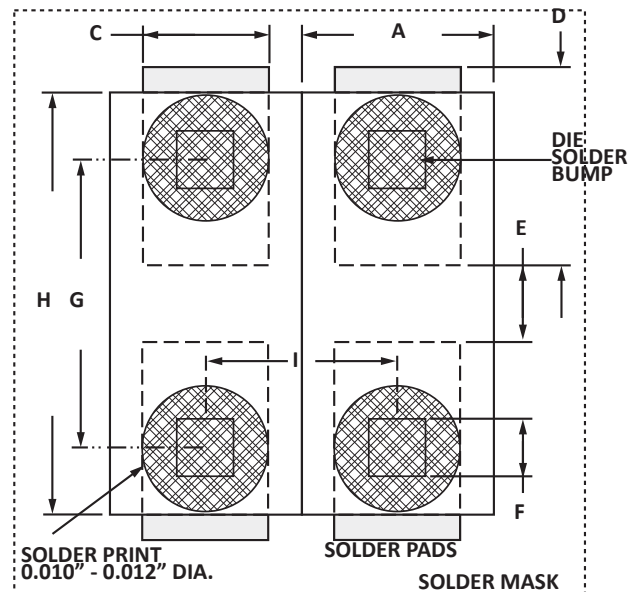


LAYOUT DIMENSIONS

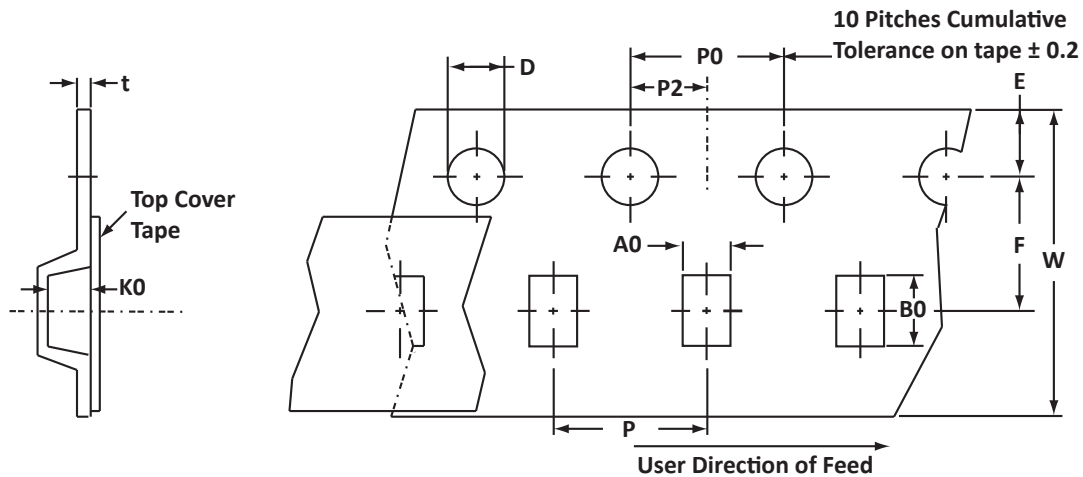
DIM	MILLIMETERS	INCHES
	NOMINAL	NOMINAL
A	0.51	0.020
C	0.30	0.012
D	0.46	0.018
E	0.20	0.008
F	0.15 SQ	0.006 SQ
G	0.71	0.028
H	0.99	0.039
I	0.51	0.020

NOTES

- Controlling dimensions in inches.
- Decimal tolerance: .xxx ± 0.05mm (0.002").
- Preferred: Usign 0.1mm (0.004") stencil.



TAPE AND REEL INFORMATION



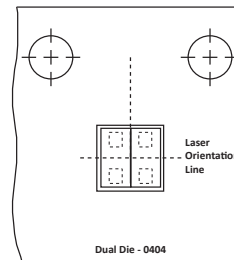
SPECIFICATIONS

REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	Tmax
178(7")	8	0.80 \pm 0.10	1.20 \pm 0.10	0.70 \pm 0.10	1.50 \pm 0.10	1.75 \pm 0.10	3.50 \pm 0.05	8.00 \pm 0.20	4.00 \pm 0.12	2.00 \pm 0.05	2.00 \pm 0.10	0.25

NOTES

1. Dimensions in millimeters.
2. Top view of tape. Solder bumps are face down in tape package.
3. Orientation: preferred stencil - 0.1mm (0.004").
4. Surface mount product is taped and reeled in accordance with EIA 481.
5. 8mm plastic tape: 7" Reels - 5,000.

TAPE & REEL ORIENTATION



Package outline, pad layout and tape specifications per document number 06022.R5 9/09.

ORDERING INFORMATION

BASE PART NUMBER (xx = Voltage)	LEADFREE SUFFIX	TAPE SUFFIX	QTY/REEL	REEL SIZE	TUBE QTY
P0404FCxxC	-LF	-T75-1	5,000	7"	n/a

This device is only available in a Lead-Free configuration.

COMPANY INFORMATION

COMPANY PROFILE

In business more than 25 years, ProTek Devices™ is a privately held semiconductor company. The company offers a product line of overvoltage protection and overcurrent protection components. These include transient voltage suppressor array (TVS arrays) avalanche breakdown diode, steering diode TVS array and electronics SMD chip fuses. These components deliver circuit protection in electronic systems from numerous overvoltage and overcurrent events. They include lightning; electrostatic discharge (ESD); nuclear electromagnetic pulses (NEMP); inductive switching; and electromagnetic interference (EMI) / radio frequency interference (RFI). ProTek Devices also offers LED wafer die for ESD protection and related high frequency products. ProTek Devices is ISO 9001:2015 certified.

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PATENT INFORMATION: This device is patented under U.S. Patent No. Des. "D456,367S".