200W LOW CAPACITANCE FLIP CHIP TVS ARRAY

DESCRIPTION

The LC0404FCxxC 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 low capacitance series provides ESD protection greater than 25 kilovolts with a peak pulse power dissipation of 200 Watts per line for an 8/20µs waveform. In addition, the LC0404FCxxC 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
- 200 Watts Peak Pulse Power per Line (tp = 8/20µs)
- Low Clamping Voltage
- Bidirectional Configuration & Monolithic Structure
- Low Capacitance
- Low Leakage Current
- Protection for 1 to 3 Lines
- RoHS Compliant
- REACH Compliant

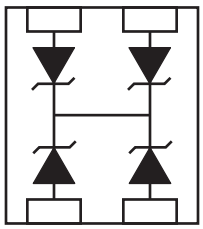
APPLICATIONS

- SMART Phones
- Portable Electronics
- SMART 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}	200	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
LC0404FC3.3C	3.3	4.0	7.0	12.5V @ 16A	75*	70
LC0404FC05C	5.9	6.0	11.0	13.0V @ 15A	10**	35
LC0404FC08C	8.0	8.5	13.2	18.0V @ 11A	1	32
LC0404FC12C	12.0	13.3	19.8	26.9V @ 7.4A	1	30
LC0404FC15C	15.0	16.7	25.4	34.5V @ 5.8A	1	25
LC0404FC24C	24.0	26.7	37.2	50.6V @ 4A	1	20
LC0404FC36C	36.0	40.0	70.0	80.0V @ 2.5A	1	18

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

TYPICAL DEVICE CHARACTERISTICS

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

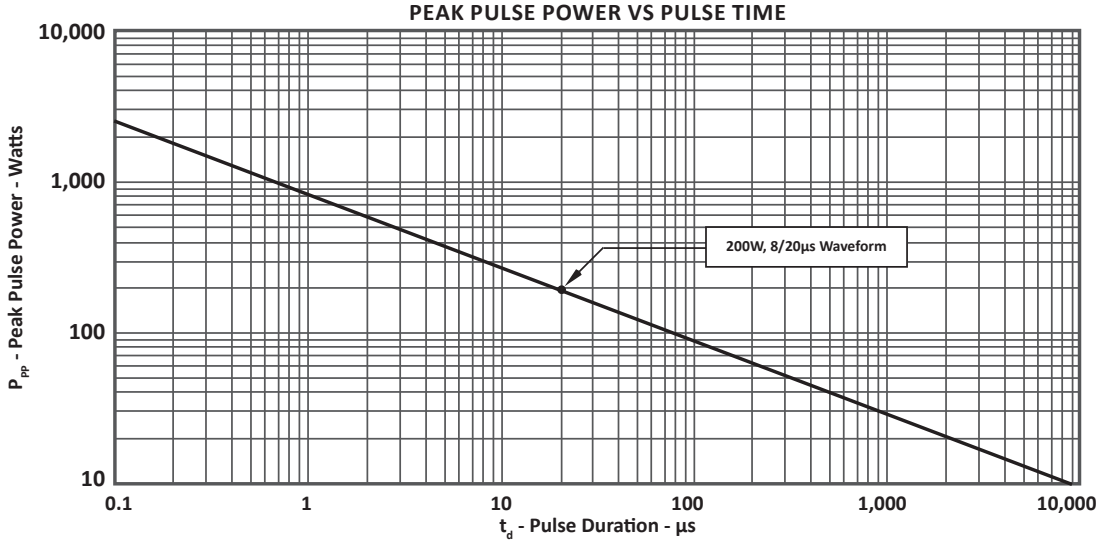


FIGURE 2
PULSE WAVE FORM

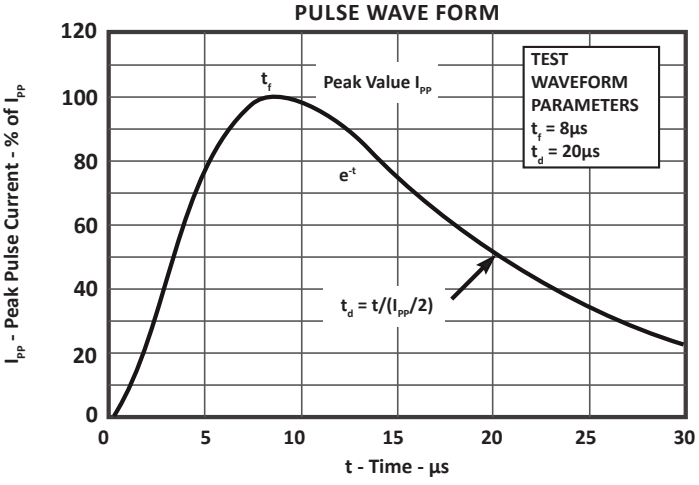
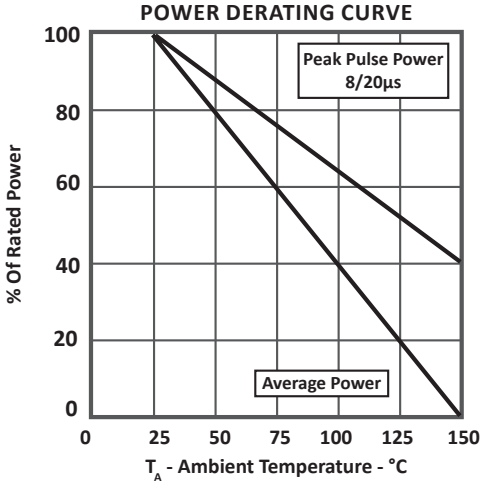
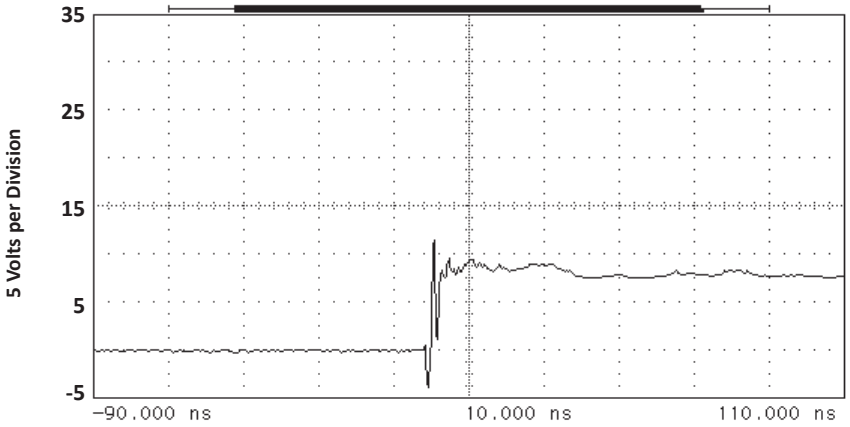


FIGURE 3
POWER DERATING CURVE



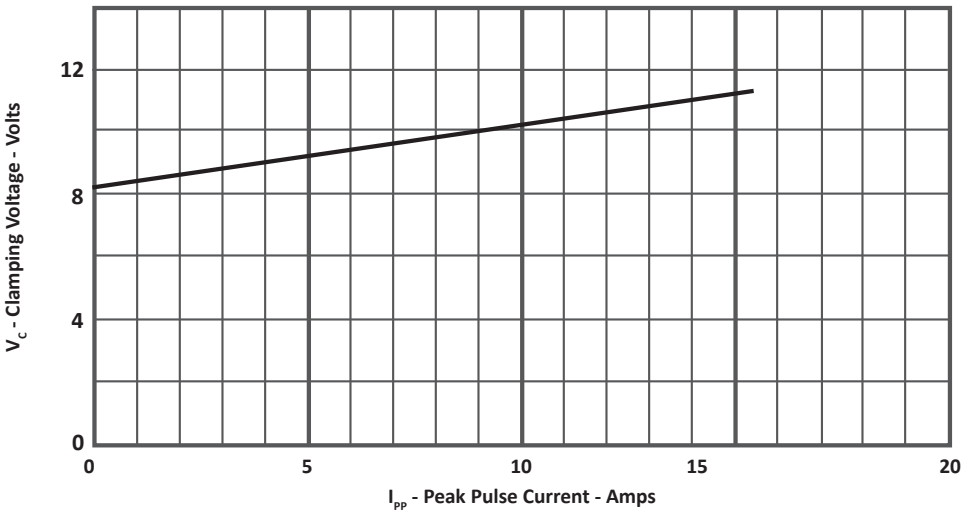
TYPICAL DEVICE CHARACTERISTICS

FIGURE 4
OVERSHOOT & CLAMPING VOLTAGE FOR LC0404FC05C



ESD Test Pulse - 25 kilovolt, 1/30ns (Waveshape)

FIGURE 5
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT LC0404FC05C



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

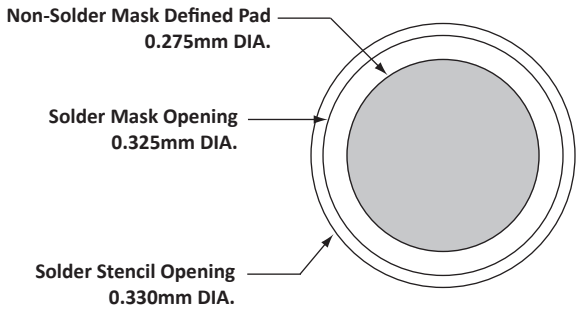
Temperature:

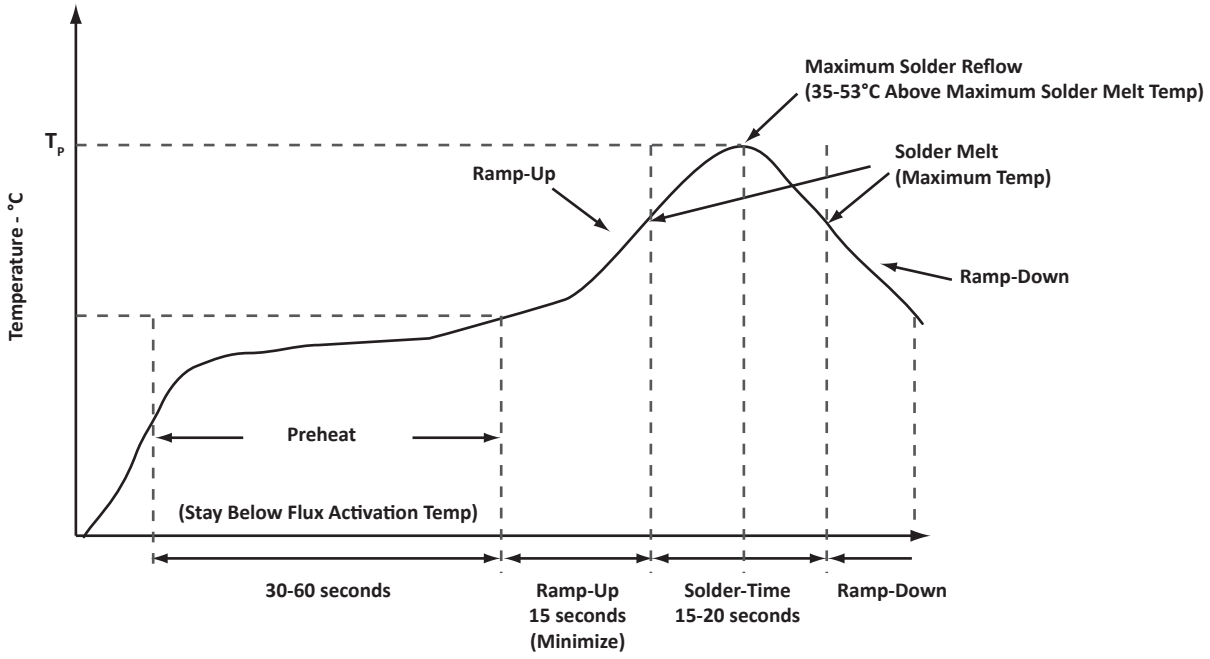
T_P for Lead-Free (Sn/Ag/Cu): 260-270°C

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

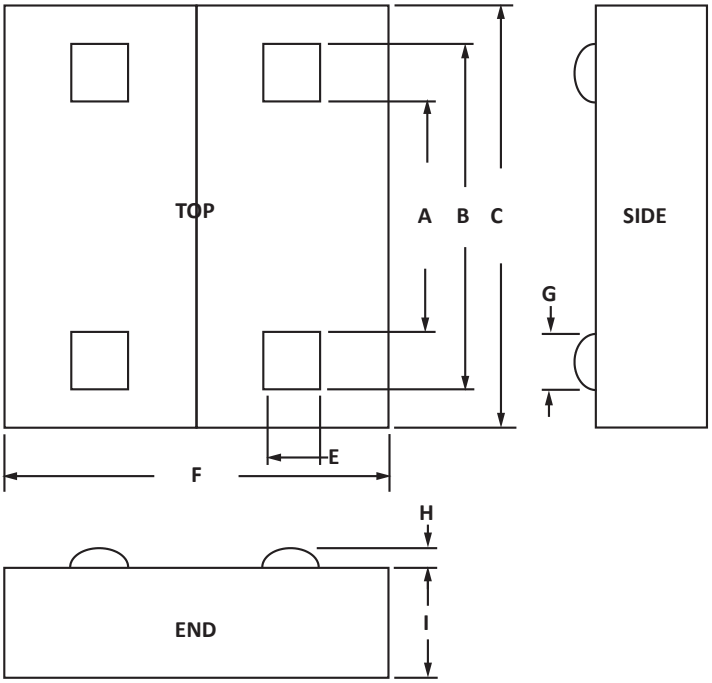




0404 PACKAGE INFORMATION

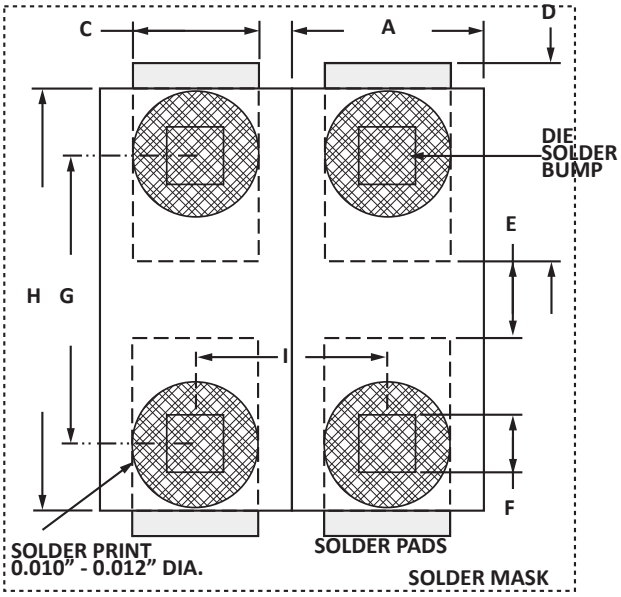
OUTLINE DIMENSIONS				
DIM	MILLIMETERS		INCHES	
	MIN	MAX	MIN	MAX
A	0.46	0.56	0.018	0.022
B	0.86		0.034	
C	0.98	1.02	0.038	0.040
E	0.15 SQ	0.15 SQ	0.006 SQ	0.006 SQ
F	0.975	1.025	0.038	0.040
G	0.15		0.006	
H	0.076	0.127	0.003	0.005
I	0.406		0.016	

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

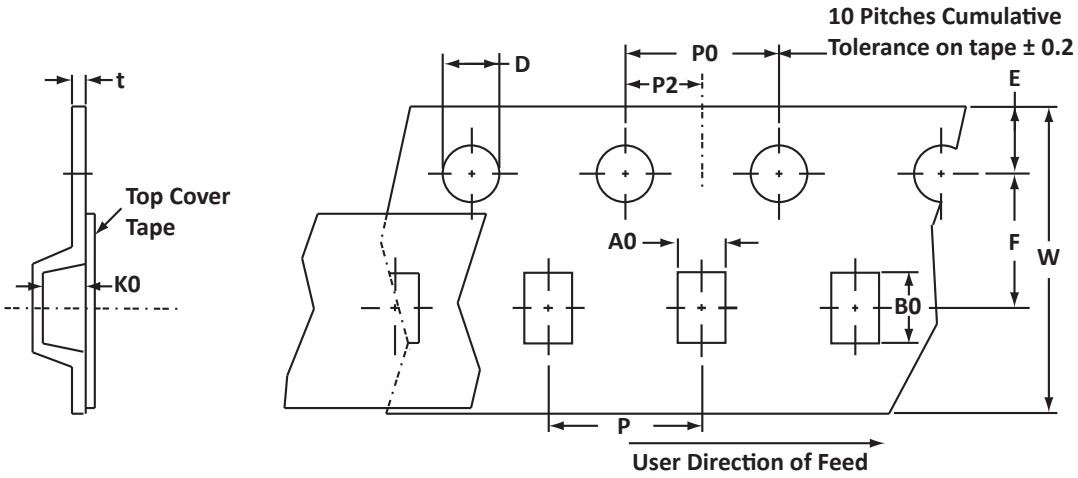


LAYOUT DIMENSIONS		
DIM	MILLIMETERS	INCHES
	NOMINAL	NOMINAL
A	0.51	0.020
C	0.30	0.012
D	0.46	0.018
E	0.20	0.008
F	0.15 SQ	0.006 SQ
G	0.71	0.028
H	0.99	0.039
I	0.51	0.020

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



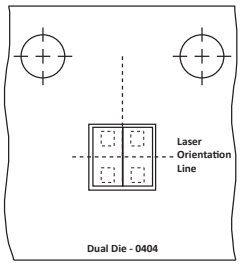
TAPE AND REEL INFORMATION



SPECIFICATIONS												
REEL DIA.	TAPE WIDTH	A0	B0	K0	D	E	F	W	P0	P2	P	Tmax
178(7")	8	0.80 ± 0.10	1.20 ± 0.10	0.70 ± 0.10	1.50 ± 0.10	1.75 ± 0.10	3.50 ± 0.05	8.00 ± 0.20	4.00 ± 0.12	2.00 ± 0.05	2.00 ± 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
LC0404FCxxC	-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 20 years, ProTek Devices™ is a privately-held company located in Tempe, Arizona, that offers a product line of transient voltage suppressors (TVS); avalanche breakdown diodes; steering diode TVS arrays and other surge suppressor component products. These TVS devices protect electronic systems from the effects of lightning, electrostatic discharge (ESD), nuclear electromagnetic pulses (NEMP), inductive switching and EMI / RFI. ProTek Devices also offers high performance interface and linear products that include analog switches; multiplexers; LED drivers; audio control ICs; RF and related high frequency products. The analog devices work in a host of consumer; industrial; automotive and other applications.

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