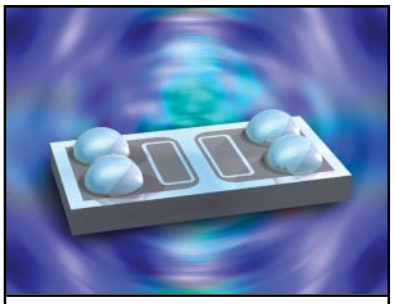
PROTEK DEVICES
Only One Name Means ProTek'Tion™

LC0404FC3.3C thru LC0404FC36C

LOW CAPACITANCE FLIP CHIP ARRAY

APPLICATIONS

- ✔ Cellular Phones
- ✔ Personal Digital Assistant (PDA)
- ✔ Notebook Computers
- ✔ SMART Cards



0404
(Single Chip Shown)

IEC COMPATIBILITY (EN61000-4)

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

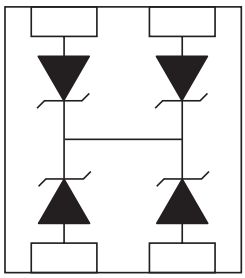
FEATURES

- ✔ ESD Protection > 25 kilovolts
- ✔ Available in Voltages Ranging From 3.3V to 36V
- ✔ 200 Watts Peak Pulse Power per Line (tp = 8/20µs)
- ✔ Low Clamping Voltage
- ✔ Bidirectional Configuration & Monolithic Structure
- ✔ Protects 1 to 3 Lines
- ✔ ***LOW CAPACITANCE***
- ✔ ***LOW LEAKAGE CURRENT***
- ✔ RoHS Compliant in Lead-Free Versions

MECHANICAL CHARACTERISTICS

- ✔ Standard EIA Chip Size: 0404
- ✔ 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 = 8/20µs) - See Figure 1	P_{PP}	200	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) @8/20µs V_C @ I_{PP}	MAXIMUM LEAKAGE CURRENT (See Note 2) @V_{WM} I_D µA	TYPICAL CAPACITANCE @0V, 1 MHz C pF
LC0404FC3.3C	3.3	4.0	7.0	12.5V @ 16A	75*	70
LC0404FC05C	5.9	6.0	11.0	13V @ 15A	10**	35
LC0404FC08C	8.0	8.5	13.2	18V @ 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

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.

FIGURE 1
PEAK PULSE POWER VS PULSE TIME

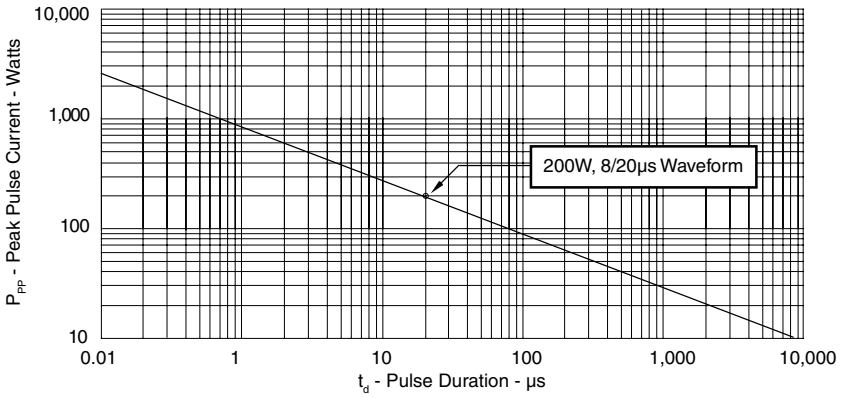
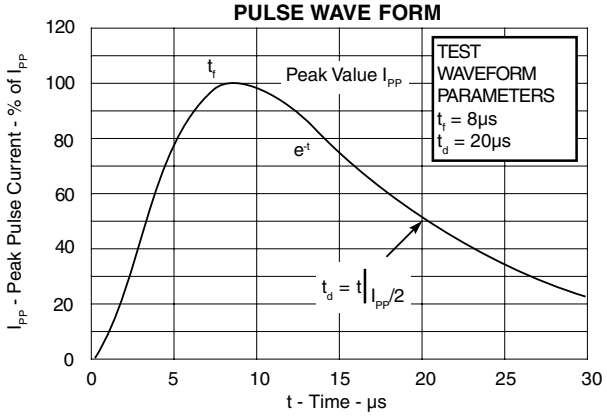


FIGURE 2
PULSE WAVE FORM



GRAPHS

FIGURE 3
POWER DERATING CURVE

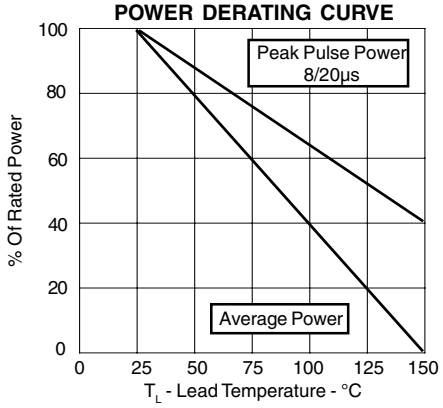
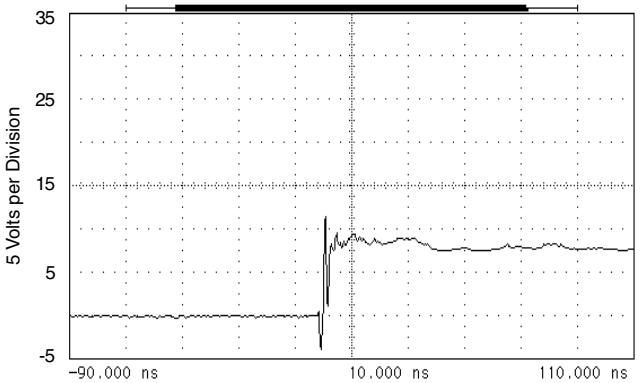
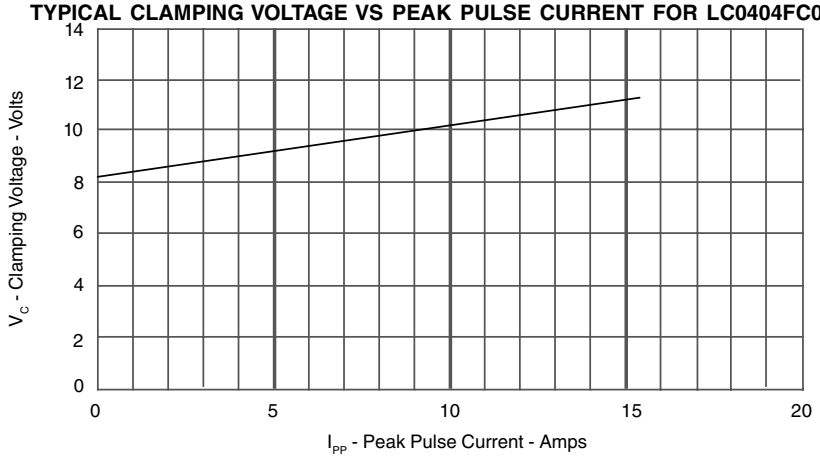


FIGURE 4
OVERSHOOT & CLAMPING VOLTAGE FOR LC0404FC05C



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

FIGURE 5
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT FOR LC0404FC05C



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

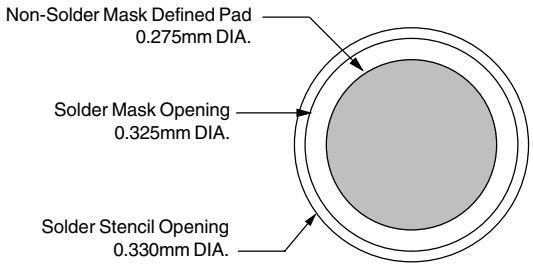
Temperature:

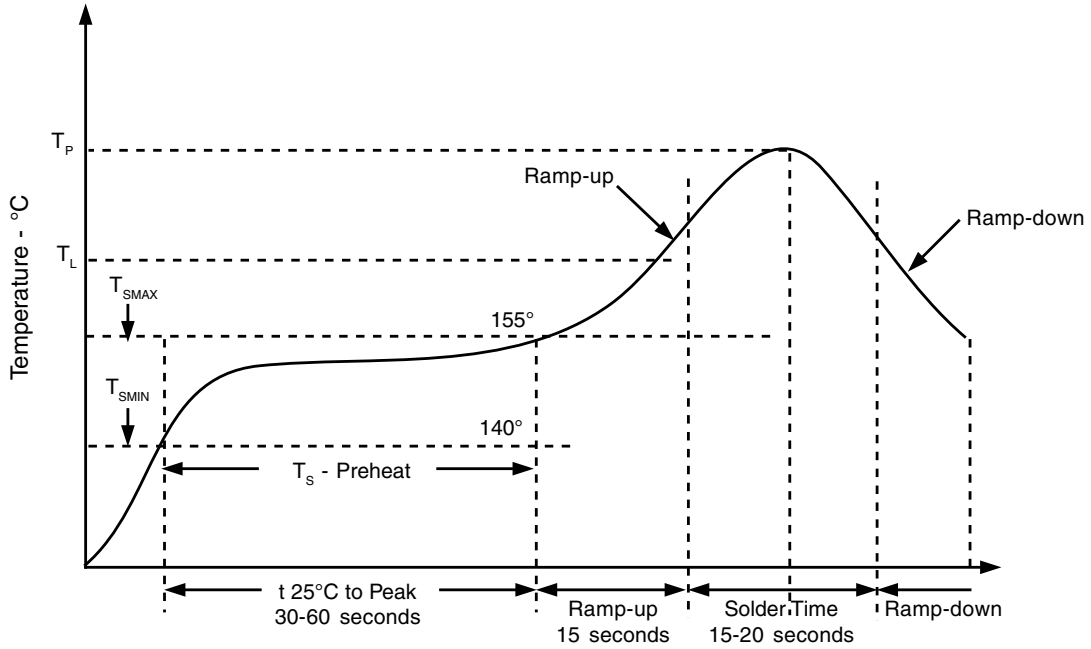
T_P for Lead-Free (SnAgCu): 260-265°C

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.

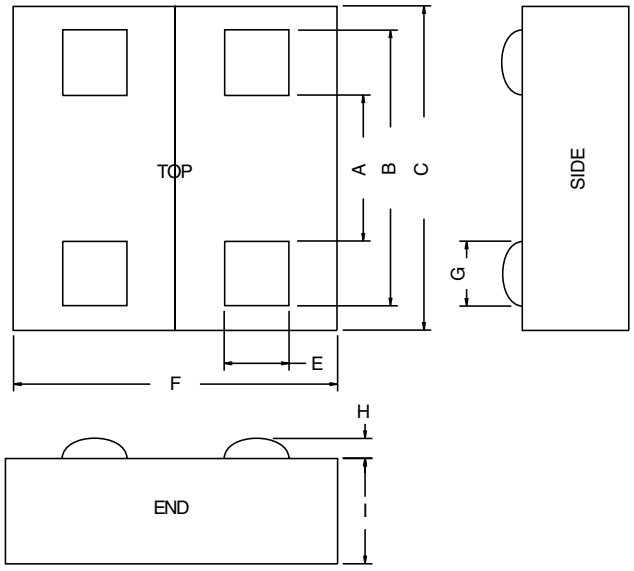
RECOMMENDED NON-SOLDER MASK DEFINED PAD ILLUSTRATION





PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE

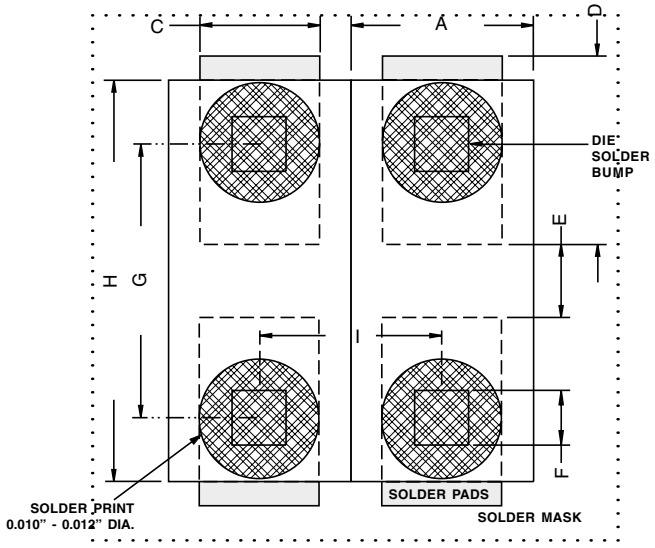


PACKAGE DIMENSIONS

DIM	MILLIMETERS	INCHES
A	0.56 NOM	0.022 NOM
B	0.86 NOM	0.034 NOM
C	1.0 ± 0.02	0.039 ± 0.001
E	0.15 SQ	0.006 SQ
F	1.0 ± 0.0254	0.039 ± 0.001
G	0.15 NOM	0.006 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").

MOUNTING PAD LAYOUT - Option 1



PAD DIMENSIONS

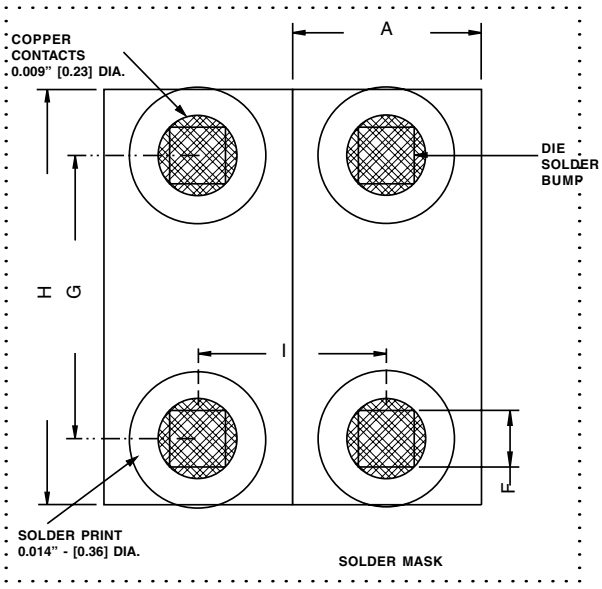
DIM	MILLIMETERS	INCHES
A	0.51	0.020
C	0.30	0.012
D	0.46	0.018
E	0.20	0.008
F	0.15 SQ	0.006 SQ
G	0.71	0.028
H	0.99	0.039
I	0.51	0.020

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

Outline & Dimensions: Rev4 - 9/04, 06022

PACKAGE OUTLINE & DIMENSIONS

MOUNTING PAD LAYOUT - Option 2



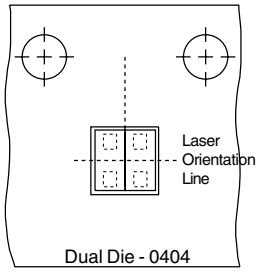
PACKAGE DIMENSIONS

DIM	MILLIMETERS	INCHES
A	0.51	0.020
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 tolerances for mounting pad and outline: .xxx ± 0.05mm (± 0.002").
3. *Preferred:* Using 0.1mm (0.004") stencil.

Outline & Dimensions: Rev4 - 9/04, 06022

TAPE & REEL ORIENTATION



NOTE:
1. Top view of tape. Solder bumps 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., LC0404FC05C-T75-1).
3. *8mm Paper Tape:* 7 Inch Reels - 10,000 pieces per reel. Ordering Suffix: -T710-2 (i.e., LC0404FC05C-T710-2).
4. Suffix - LF = Lead-Free, i.e., *LC0404FC05C-LF-T710-2.*

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