

UNBUMPED LOW CAPACITANCE FLIP CHIP ARRAY

**APPLICATIONS**

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

**IEC COMPATIBILITY (EN61000-4)**

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

**FEATURES**

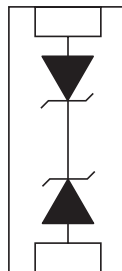
- ✓ ESD Protection > 25 kilovolts
- ✓ Available in Voltages Ranging From 3.3V to 36V
- ✓ 200 Watts Peak Pulse Power per Line ( $t_p = 8/20\mu s$ )
- ✓ Low Clamping Voltage
- ✓ Bidirectional Configuration & Monolithic Structure
- ✓ Protects 1 Line
- ✓ **LOW CAPACITANCE**
- ✓ **LOW LEAKAGE CURRENT**
- ✓ RoHS Compliant

**MECHANICAL CHARACTERISTICS**

- ✓ Standard EIA Chip Size: 0402
- ✓ Weight 0.73 milligrams (Approximate)
- ✓ Solder Reflow Temperature:
  - Tin-Lead - Sn/Pb: 240-245°C
  - Lead-Free: 260-270°C
- ✓ Flammability Rating UL 94V-0
- ✓ 8mm Plastic & Paper Tape and Reel Per EIA Standard 481
- ✓ Device Marking On Reel



**PIN CONFIGURATION**



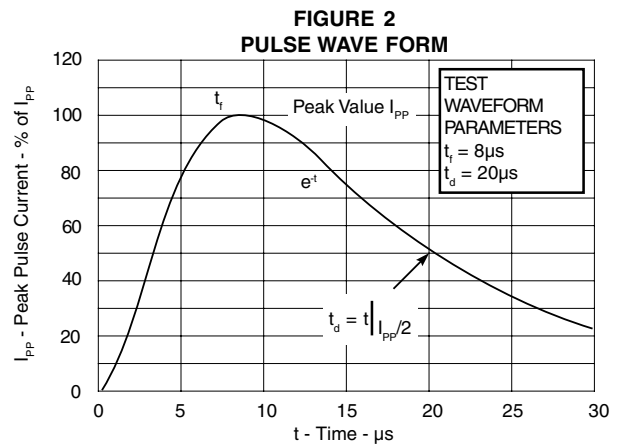
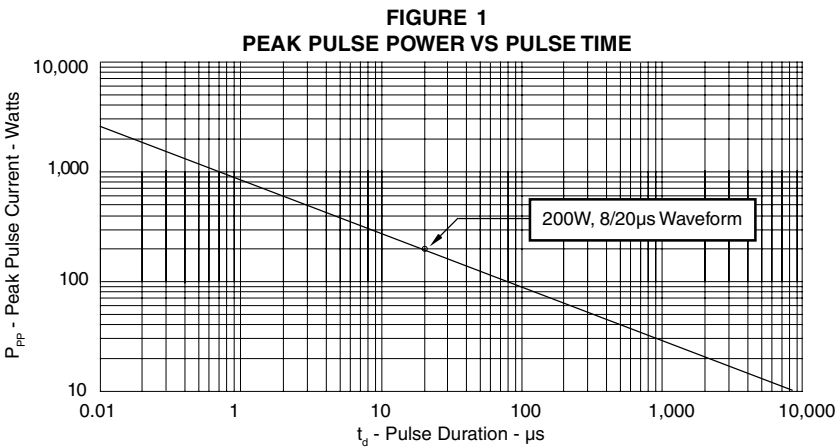
## DEVICE CHARACTERISTICS

MAXIMUM RATINGS @ 25°C Unless Otherwise Specified			
PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power ( $t_p = 8/20\mu s$ ) - 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

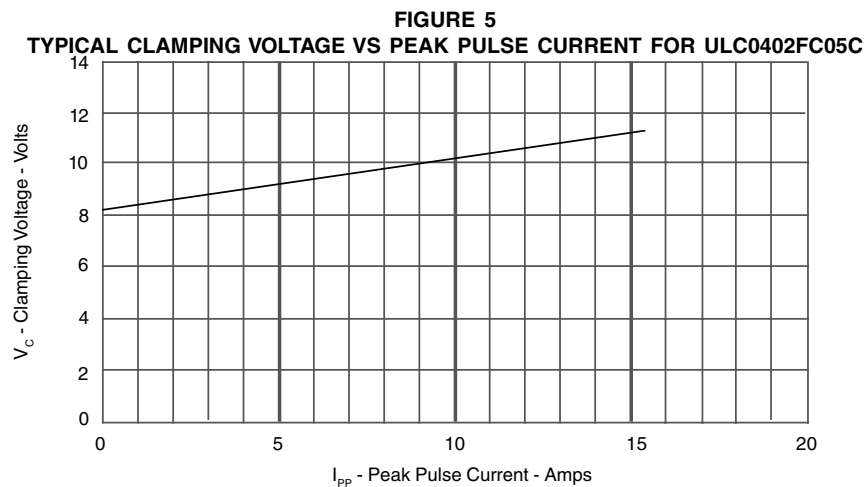
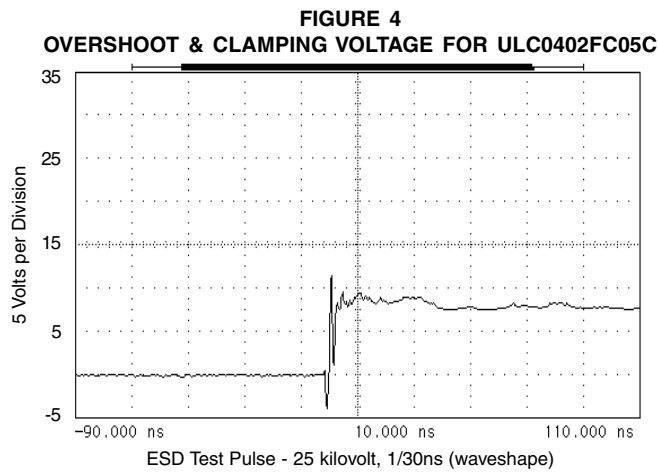
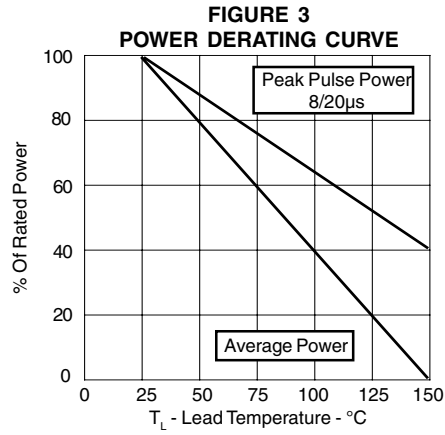
ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified						
PART NUMBER (See Note 1)	RATED STAND-OFF VOLTAGE  $V_{WM}$ VOLTS	MINIMUM BREAKDOWN VOLTAGE  @ 1mA $V_{(BR)}$ VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)  @ $I_p = 1A$ $V_C$ VOLTS	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)  @ 8/20 $\mu s$ $V_C @ I_{PP}$	MAXIMUM LEAKAGE CURRENT (See Note 2)  @ $V_{WM}$ $I_D$ $\mu A$	TYPICAL CAPACITANCE  @ 0V, 1 MHz C pF
ULC0402FC3.3C	3.3	4.0	7.0	12.5V @ 16A	75*	70
ULC0402FC05C	5.9	6.0	11.0	13V @ 15A	10**	35
ULC0402FC08C	8.0	8.5	13.2	18V @ 11A	1	32
ULC0402FC12C	12.0	13.3	19.8	26.9V @ 7.4A	1	30
ULC0402FC15C	15.0	16.7	25.4	34.5V @ 5.8A	1	25
ULC0402FC24C	24.0	26.7	37.2	50.6V @ 4A	1	20
ULC0402FC36C	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 < 5 $\mu A$  @ 2.8V. \*\*Maximum leakage current < 500nA @ 3.3V.



GRAPHS

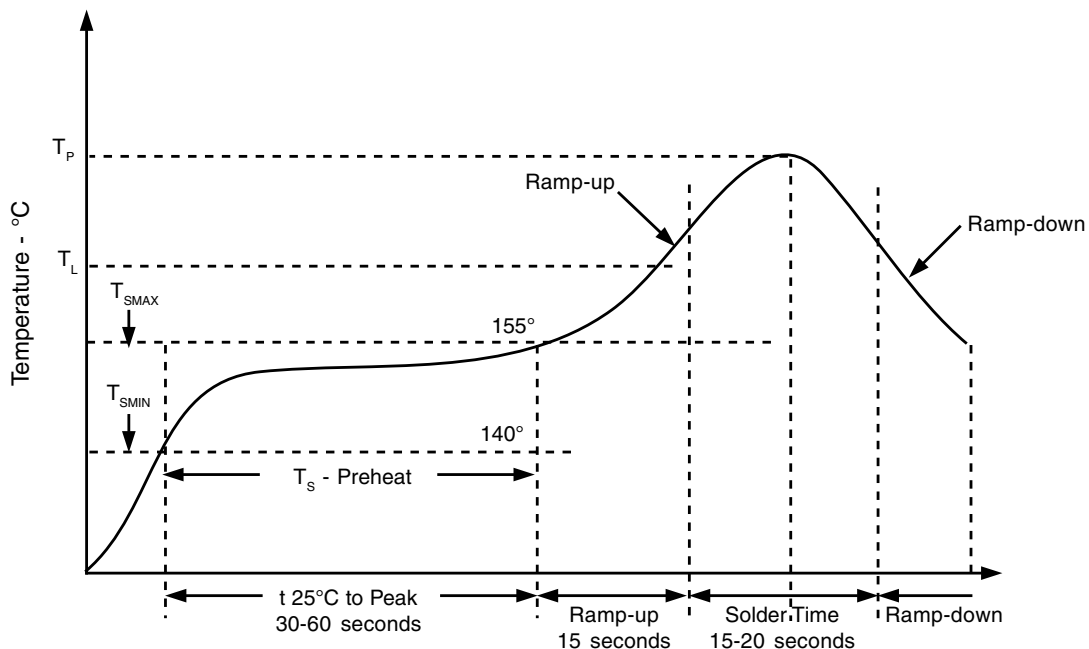
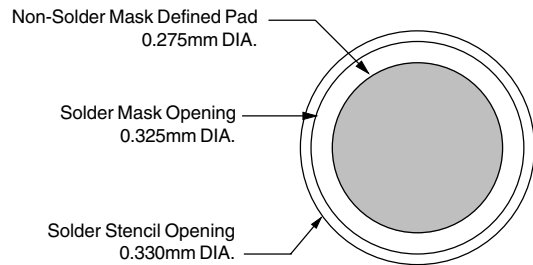


**APPLICATION INFORMATION**

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><b>Temperature:</b>  <math>T_p</math> for Lead-Free (SnAgCu): 260-265°C  <math>T_p</math> for Tin-Lead: 240-245°C                      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**



# ULC0402FC3.3C thru ULC0402FC36C

## PACKAGE OUTLINE & DIMENSIONS

PACKAGE OUTLINE		U0402	
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	
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	
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	
<b>NOTE:</b> 1. Top view of tape. Metal contacts are face down in tape package.			
TAPE & REEL ORIENTATION			
<p>Single Die - 0402</p>			
<b>NOTE:</b> 1. Preferred: Using 0.1 mm (0.004") stencil.			
<b>Outline &amp; Dimensions: Rev 3 - 11/02, 06020</b>			
<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., ULC0402FC05C-T75-1). 3. 8mm Paper Tape: 7 Inch Reels - 10,000 pieces per reel. Ordering Suffix: -T710-2 (i.e., ULC0402FC05C-T710-2).			

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