

## UNBUMPED LOW CAPACITANCE FLIP CHIP TVS ARRAY

### DESCRIPTION

The ULLC0408FC05C Flip Chip employs 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. This low capacitance device is ideally suited for handheld devices, PCMCIA and SMART cards.

The ULLC0408FC05C provides ESD protection greater than 25 kilovolts and features superior clamping performance, low leakage current characteristics and a response time of less than a nanosecond. The 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
- Low ESD Overshoot Voltage
- Bidirectional Configuration & Monolithic Structure
- Protects 4 Isolated Lines
- Low Capacitance: 6pF
- Low Leakage Current
- RoHS Compliant
- REACH Compliant

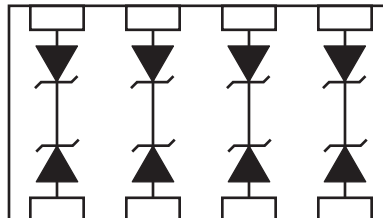
### APPLICATIONS

- Cellular Phones
- Portable Electronics
- SMART Cards

### MECHANICAL CHARACTERISTICS

- Standard EIA Chip Size: 0408
- 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

### PIN CONFIGURATION



**TYPICAL DEVICE CHARACTERISTICS**
**MAXIMUM RATINGS @ 25°C Unless Otherwise Specified**

| PARAMETER             | SYMBOL    | VALUE      | UNITS |
|-----------------------|-----------|------------|-------|
| 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<br>(Note 1) | RATED STAND-OFF VOLTAGE<br><br>$V_{WM}$<br>VOLTS | MINIMUM BREAKDOWN VOLTAGE<br><br>@ 1mA<br>$V_{(BR)}$<br>VOLTS | MAXIMUM LEAKAGE CURRENT<br><br>@ $V_{WM}$<br>$I_D$<br>$\mu A$ | TYPICAL CAPACITANCE<br><br>@ 0V, 1MHz<br>C<br>pF |
|-------------------------|--|---|---|--|
| ULLC0408FC05C           | 5.0  | 6.0   | 5.0   | 6  |

**NOTES**

1. Device is bidirectional.

## TYPICAL DEVICE CHARACTERISTICS

FIGURE 1  
OVERSHOOT & CLAMPING VOLTAGE

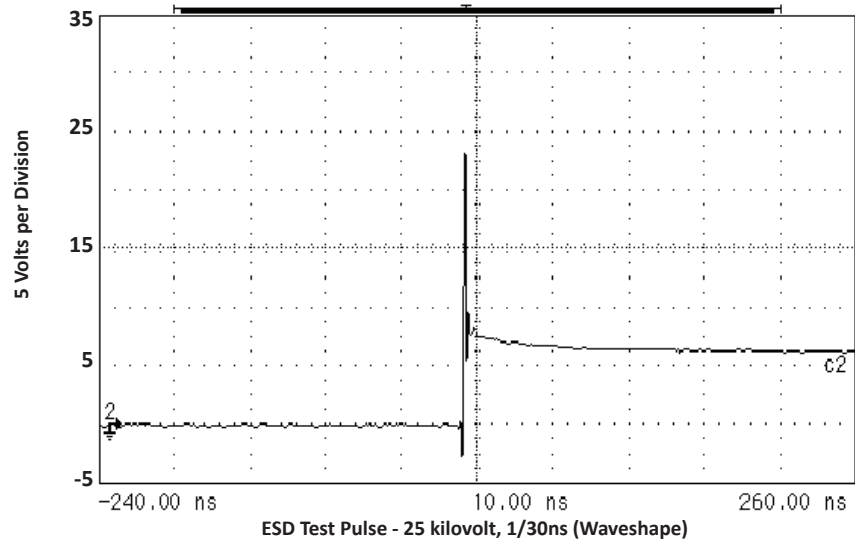
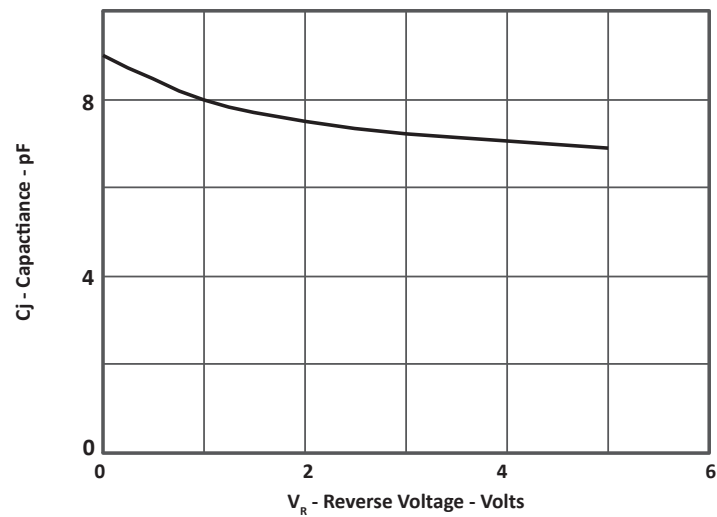


FIGURE 2  
CAPACITANCE VS REVERSE VOLTAGE



## 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 (Only applies to bumped devices) | ±20µm                        |
| Maximum Dwell Time Above Liquidous (183°C)                    | 60 seconds                   |
| Soldering Maximum Temperature                                 | 270°C                        |

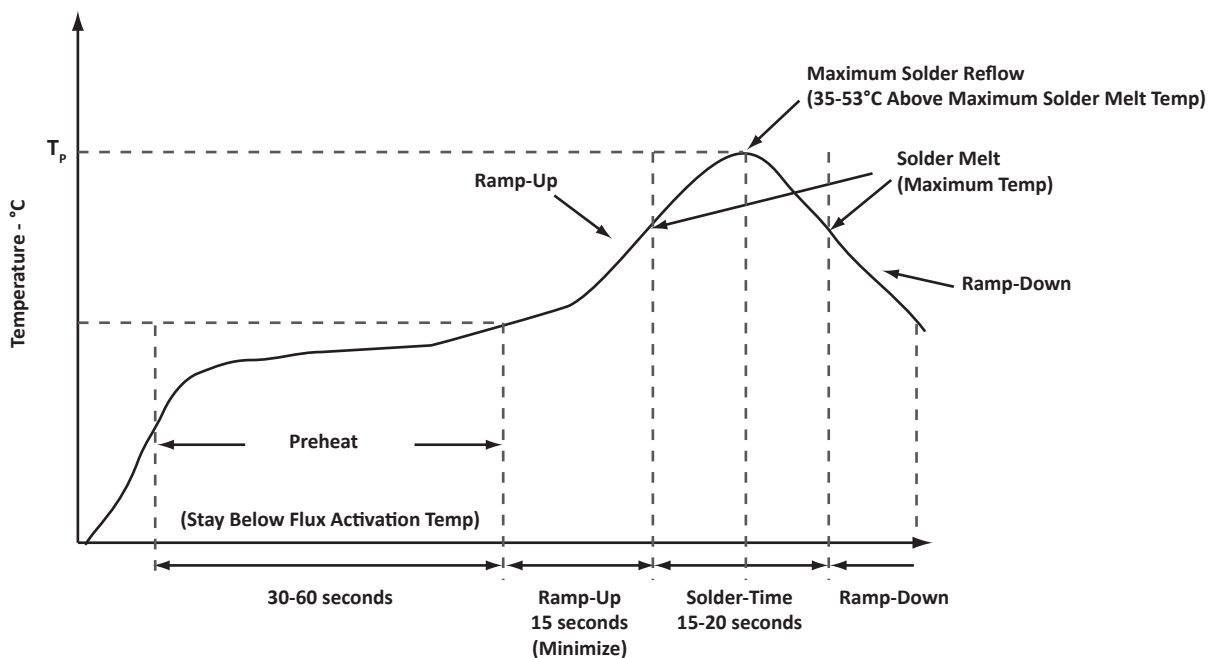
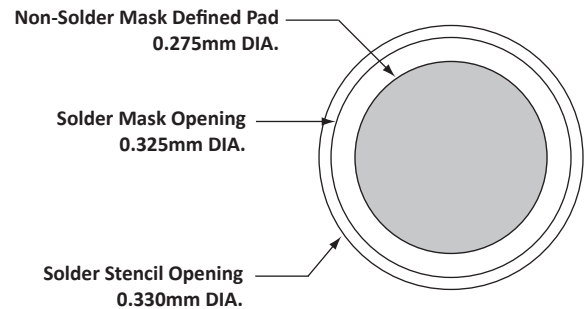
### REQUIREMENTS

Temperature:

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

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

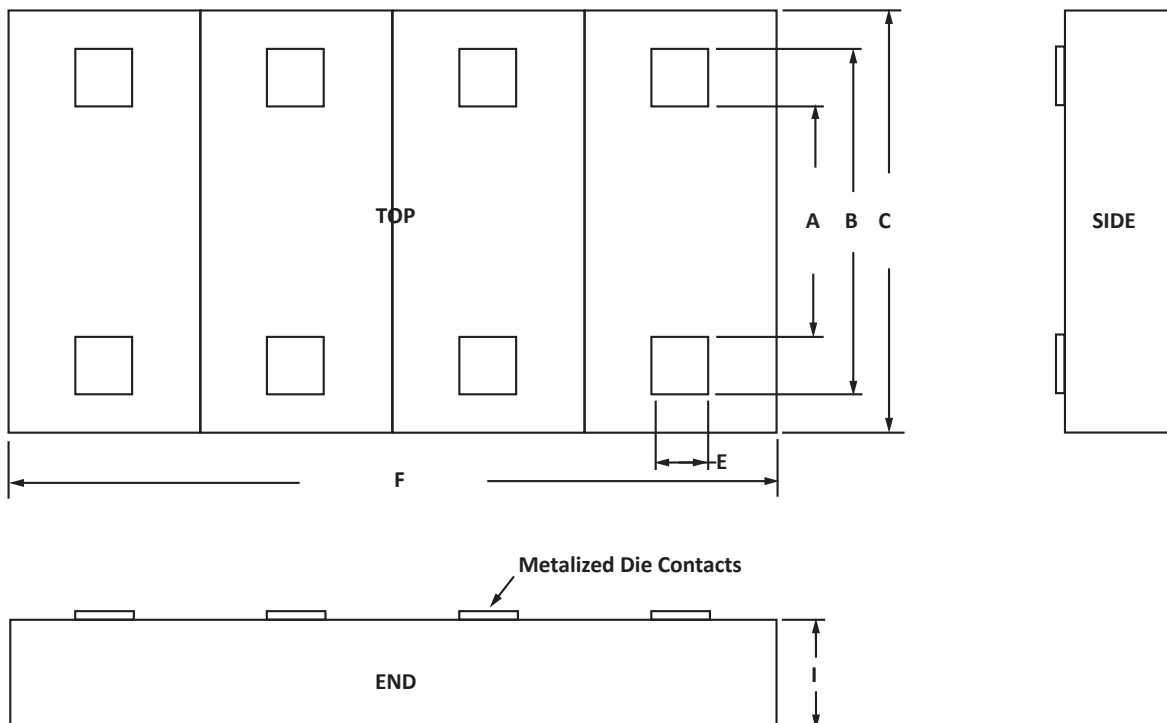


**U0408 PACKAGE INFORMATION**
**OUTLINE DIMENSIONS**

| DIM | MILLIMETERS |      | INCHES   |       |
|-----|-------------|------|----------|-------|
|     | MIN         | MAX  | MIN      | MAX   |
| A   | 0.56        |      | 0.022    |       |
| B   | 0.86        |      | 0.034    |       |
| C   | 0.98        | 1.02 | 0.038    | 0.040 |
| E   | 0.15 SQ     |      | 0.006 SQ |       |
| F   | 1.97        | 2.03 | 0.078    | 0.080 |
| I   | 0.406       |      | 0.016    |       |

**NOTES**

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



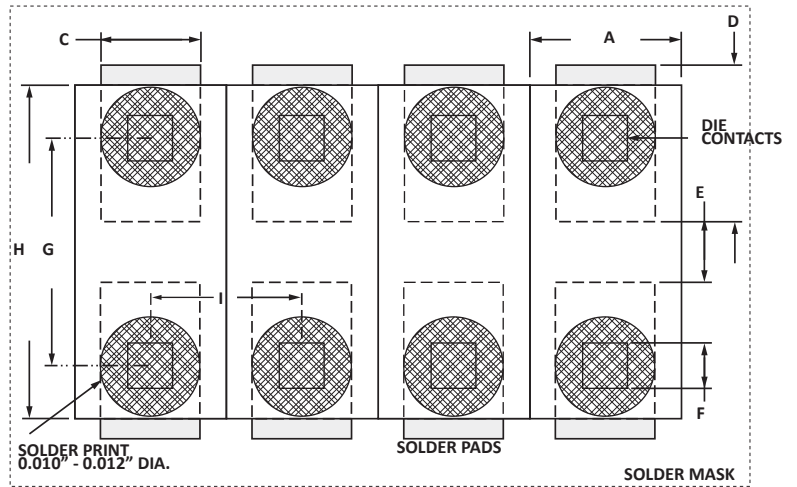
## U0408 PACKAGE INFORMATION

## OPTION 1 - 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.

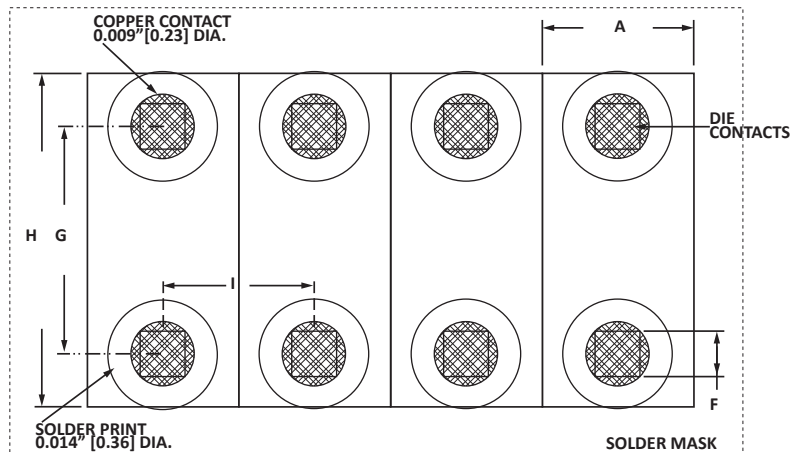


## OPTION 2 - LAYOUT DIMENSIONS

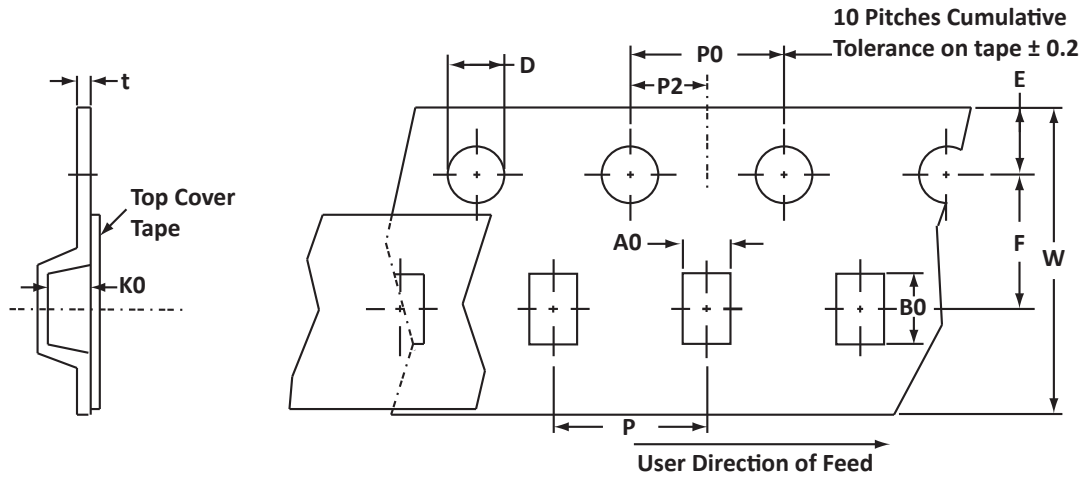
| DIM | MILLIMETERS | INCHES   |
|-----|-------------|----------|
|     | NOMINAL     | NOMINAL  |
| A   | 0.51        | 0.020    |
| F   | 0.15 SQ     | 0.006 SQ |
| G   | 0.71        | 0.028    |
| H   | 0.99        | 0.039    |
| I   | 0.51        | 0.020    |

## NOTES

1. Controlling dimensions in inches.
2. Decimal tolerance: .xxx ± 0.05mm (0.002").
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## TAPE AND REEL INFORMATION



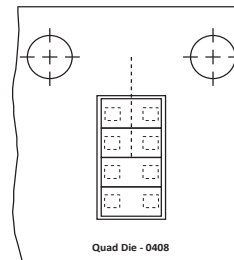
### SPECIFICATIONS

| 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

- Dimensions in millimeters.
- Top view of tape. Metal contacts are face down in tape package.
- Orientation: preferred stencil - 0.1mm (0.004").
- Surface mount product is taped and reeled in accordance with EIA 481.
- 8mm plastic tape: 7" Reels - 5,000
- Marking on reel: Part Number, Date Code and Lot Number.

#### TAPE & REEL ORIENTATION



Package outline, pad layout and tape specifications per document number 06026.R4 9/09.

### ORDERING INFORMATION

| BASE PART NUMBER | LEADFREE SUFFIX | TAPE SUFFIX | QTY/REEL | REEL SIZE | TUBE QTY |
|------------------|-----------------|-------------|----------|-----------|----------|
| ULLC0408FC05C    | n/a             | -T75-1      | 5,000    | 7"        | n/a      |

## COMPANY INFORMATION

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### COMPANY PROFILE

ProTek Devices, based in Tempe, Arizona USA, is a manufacturer of Transient Voltage Suppression (TVS) products designed specifically for the protection of electronic systems from the effects of lightning, Electrostatic Discharge (ESD), Nuclear Electromagnetic Pulse (NEMP), inductive switching and EMI/RFI. With over 25 years of engineering and manufacturing experience, ProTek designs TVS devices that provide application specific protection solutions for all electronic equipment/systems.

ProTek Devices Analog Products Division, also manufactures analog interface, control, RF and power management products.

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