

## APPLICATIONS

- ✓ Cellular Phones
- ✓ Personal Digital Assistant (PDA)
- ✓ Ground Positioning System (GPS)
- ✓ SMART & PCMCIA Cards

## IEC COMPATIBILITY (EN61000-4)

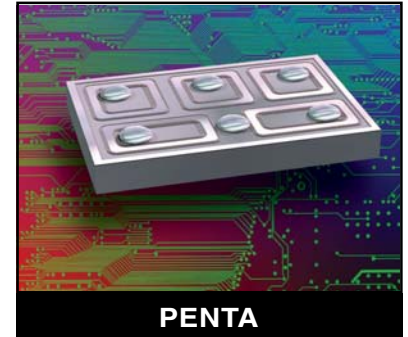
- ✓ 61000-4-2 (ESD): Air - 15kV, Contact - 8kV
- ✓ 61000-4-4 (EFT): 40A - 5/50ns
- ✓ 61000-4-5 (Surge): 24A, 8/20 $\mu$ s - Level 2(Line-Gnd) & Level 3(Line-Line)

## FEATURES

- ✓ ESD Protection > 25 kilovolts
- ✓ 250 Watts Peak Pulse Power per Line ( $t_p = 8/20\mu$ s)
- ✓ Protects up to Five (5) Unidirectional and Four (4) Bidirectional Lines
- ✓ RoHS Compliant

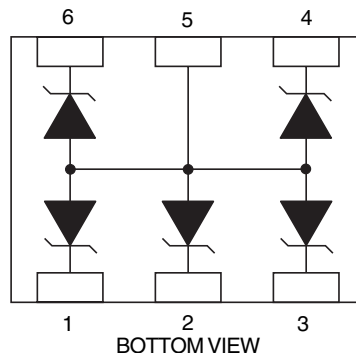
## MECHANICAL CHARACTERISTICS

- ✓ Penta Flip Chip Package
- ✓ Weight 0.73 milligrams (Approximate)
- ✓ Available in Lead-Free Plating
- ✓ Solder Reflow Temperature:  
Lead-Free - Sn/Ag/Cu, 96/3.5/0.5: 260-270°C
- ✓ Consult Factory for Leaded Device Availability
- ✓ Flammability Rating UL 94V-0
- ✓ 8mm Plastic & Paper Tape and Reel Per EIA Standard 481
- ✓ Top Contacts: Solder Bump 0.004" in Height (Nominal)



PENTA

## PIN CONFIGURATION



## DEVICE CHARACTERISTICS

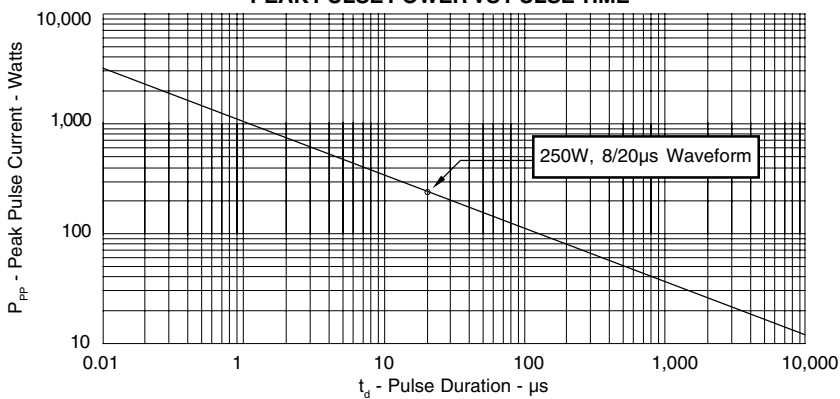
### MAXIMUM RATINGS @ 25°C Unless Otherwise Specified

PARAMETER	SYMBOL	VALUE	UNITS
Peak Pulse Power ( $t_p = 8/20\mu s$ ) - See Figure 1	$P_{PP}$	250	Watts
Operating Temperature	$T_A$	-55 to 150	°C
Storage Temperature	$T_{STG}$	-55 to 150	°C

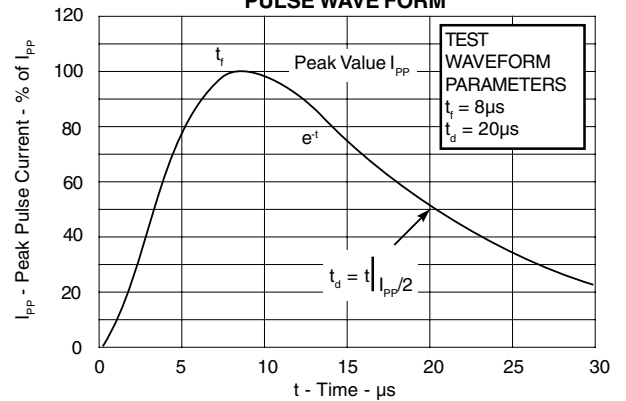
### ELECTRICAL CHARACTERISTICS PER LINE @ 25°C Unless Otherwise Specified

PART NUMBER	RATED STAND-OFF VOLTAGE	MINIMUM BREAKDOWN VOLTAGE	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM CLAMPING VOLTAGE (See Fig. 2)	MAXIMUM LEAKAGE CURRENT	TYPICAL CAPACITANCE
	$V_{WM}$ VOLTS	@ 1mA $V_{(BR)}$ VOLTS	@ $I_p = 5A$ $V_C$ VOLTS	@ $8/20\mu s$ $V_C @ I_{PP}$	@ $V_{WM}$ $I_D$ $\mu A$	@ 0V, 1 MHz $C_j$ pF
SFC05-5	5.0	6.0	9.5	11.0V @ 24A	10	150

**FIGURE 1  
PEAK PULSE POWER VS PULSE TIME**

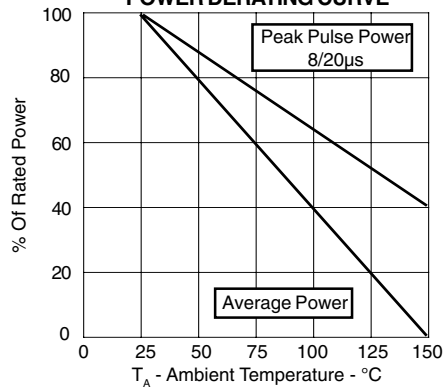


**FIGURE 2  
PULSE WAVE FORM**

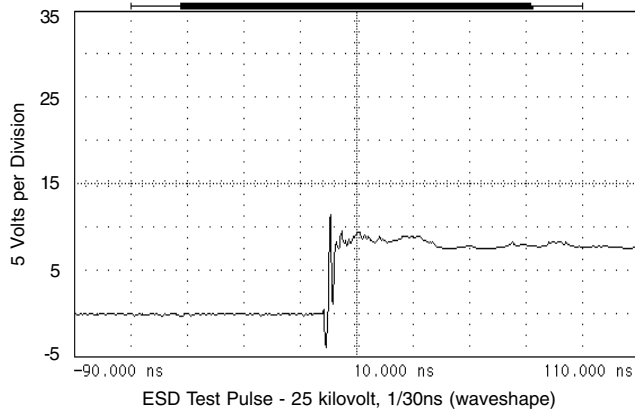


## GRAPHS

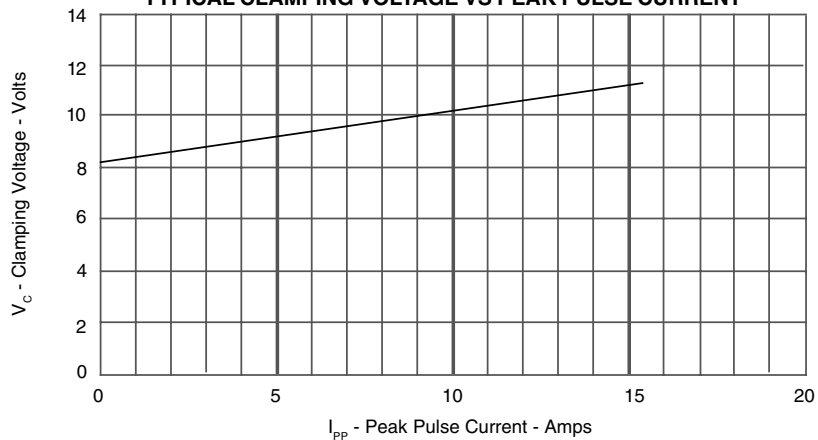
**FIGURE 3  
POWER DERATING CURVE**



**FIGURE 4  
OVERSHOOT & CLAMPING VOLTAGE**



**FIGURE 5  
TYPICAL CLAMPING VOLTAGE VS PEAK PULSE CURRENT**

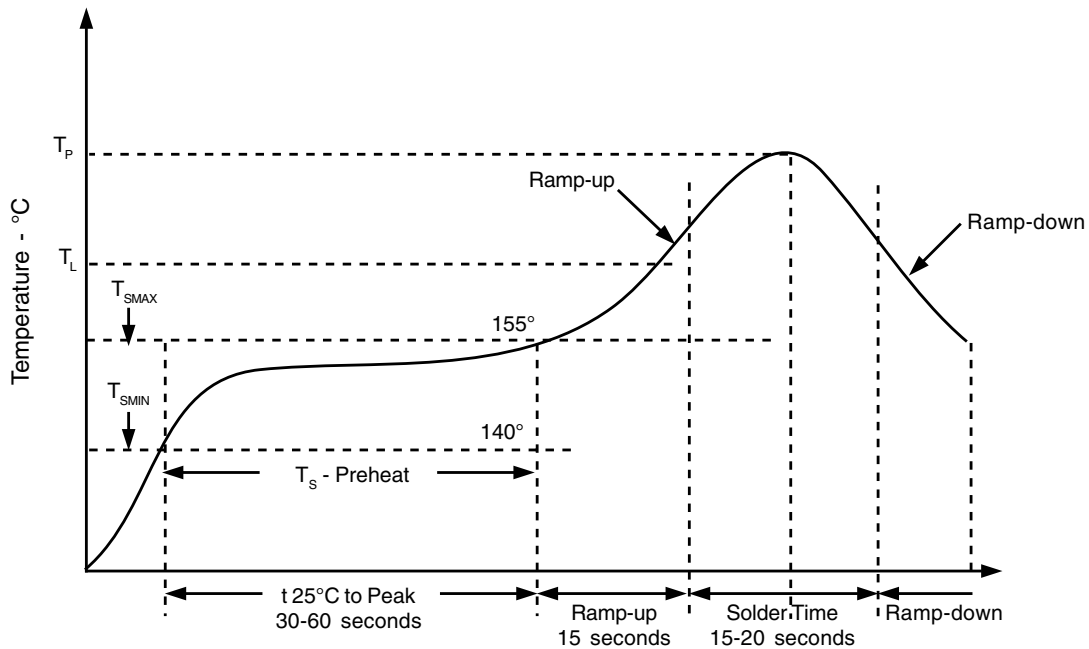
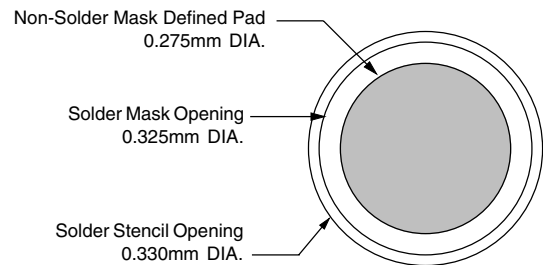


## APPLICATION INFORMATION

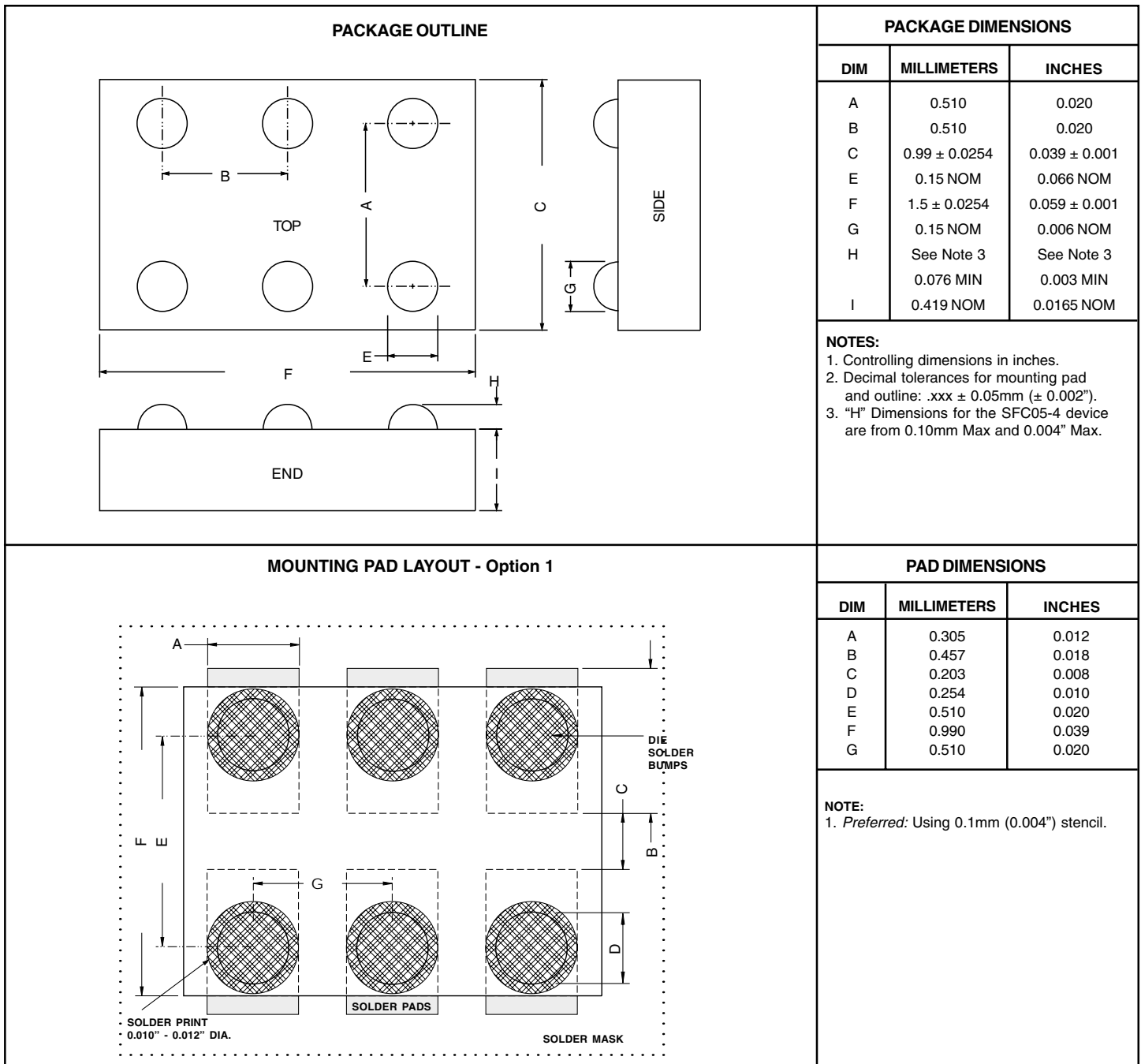
PRINTED CIRCUIT BOARD RECOMMENDATIONS	
PARAMETER	VALUE
Pad Size on PCB	0.275mm
Pad Shape	Round
Pad Definition	Non-Solder Mask Defined Pads
Solder Mask Opening	0.325mm Round
Solder Stencil Thickness	0.150mm
Solder Stencil Aperture Opening (laser cut, 5% tapered walls)	0.330mm Round
Solder Paste Type	No Clean
Pad Protective Finish	OSP (Entek Cu Plus 106A)
Tolerance - Edge To Corner Ball	$\pm 50\mu\text{m}$
Solder Ball Side Coplanarity	$\pm 20\mu\text{m}$
Maximum Dwell Time Above Liquidous (183°C)	60 Seconds
Soldering Maximum Temperature	270°C

REQUIREMENTS
<p>Temperature:</p> <p><math>T_p</math> for Lead-Free (SnAgCu): 260-270°C</p> <p><math>T_p</math> for Tin-Lead: 240-245°C</p> <p>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

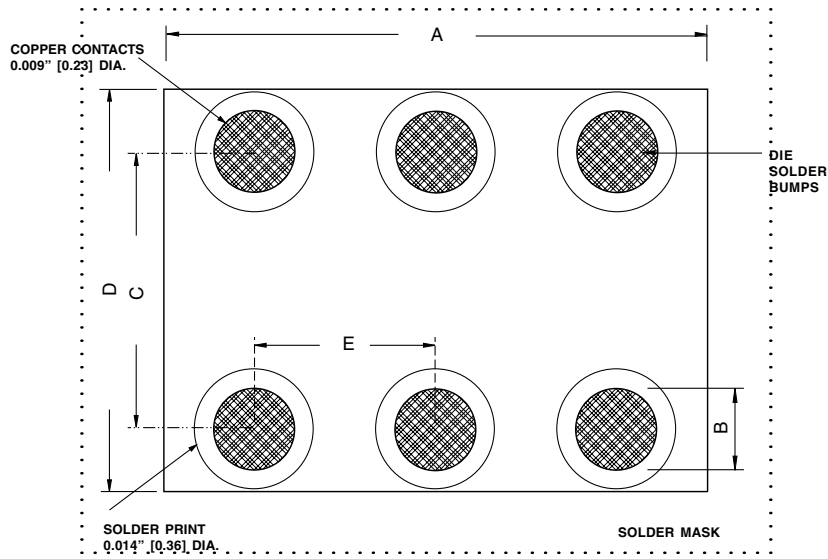


## PENTA PACKAGE OUTLINE & DIMENSIONS



## PENTA PACKAGE OUTLINE & DIMENSIONS

MOUNTING PAD LAYOUT - Option 2



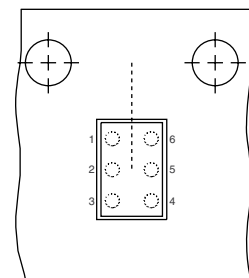
PACKAGE DIMENSIONS

DIM	MILLIMETERS	INCHES
A	1.499	0.059
B	0.152 NOM	0.006 NOM
C	0.510	0.020
D	0.990	0.039
E	0.510	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.

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-, i.e., SFC05-5-T75-1.
3. 8mm Paper Tape: 7 Inch Reels - 5,000 pieces per reel. Ordering Suffix: -T75-2, i.e., SFC05-5-T75-2.
4. Suffix - LF = Lead-Free, i.e., SFC05-5-LF-T75-2.

Outline & Dimensions: Rev 1 - 1/03, 06038

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