

ESD9FN3.3C

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60W Surface Mount TVS Bi-directional For ESD Protection-3.3V

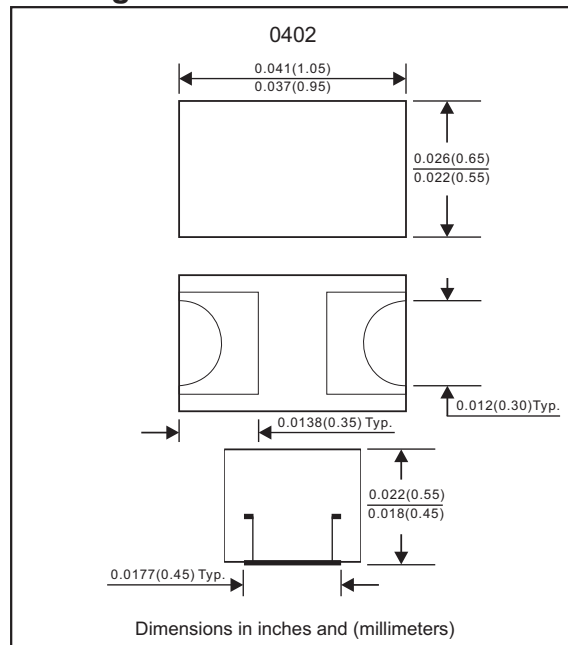
Features

- Small body outline dimensions: 0.039" X 0.024" (1.0mm X 0.60mm).
- Halogen free.
- Provide transient protection:
 - IEC 61000-4-2 (ESD) Level 4
 - IEC 61000-4-4 (EFT) 80A (5/50ns)
 - IEC 61000-4-5 (Surge) (8/20us)
- Low leakage current.
- Suffix "-H" indicates Halogen-free parts, ex. ESD9FN3.3C-H.

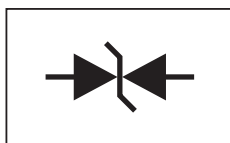
Mechanical data

- Epoxy: UL94-V0 rated flame retardant
- Case: Molded plastic,0402
- Terminals: Golden Plated terminals, solderable per MIL-STD-750,Method 2026
- Marking Code: Z
- Weight: Approximated 0.001gram

Package outline



Schematic & Pin Configuration



Maximum ratings (at T_A=25°C unless otherwise noted)

| PARAMETER | CONDITIONS | Symbol | MIN. | TYP. | MAX. | UNIT |
|--------------------------------------|-----------------------------|------------------|------|------|------|------|
| Peak pulse power | tp = 8/20us | P _{PP} | | | 60 | W |
| Peak pulse current | tp = 8/20us (IEC 61000-4-5) | I _{PP} | | | 5 | A |
| ESD per IEC 61000-4-2 | Air discharge | ESD | | | ±15 | kV |
| | Contact discharge | | | | ±8 | |
| Operating junction temperature range | | T _J | -55 | | +125 | °C |
| Storage temperature range | | T _{STG} | -55 | | +150 | °C |

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

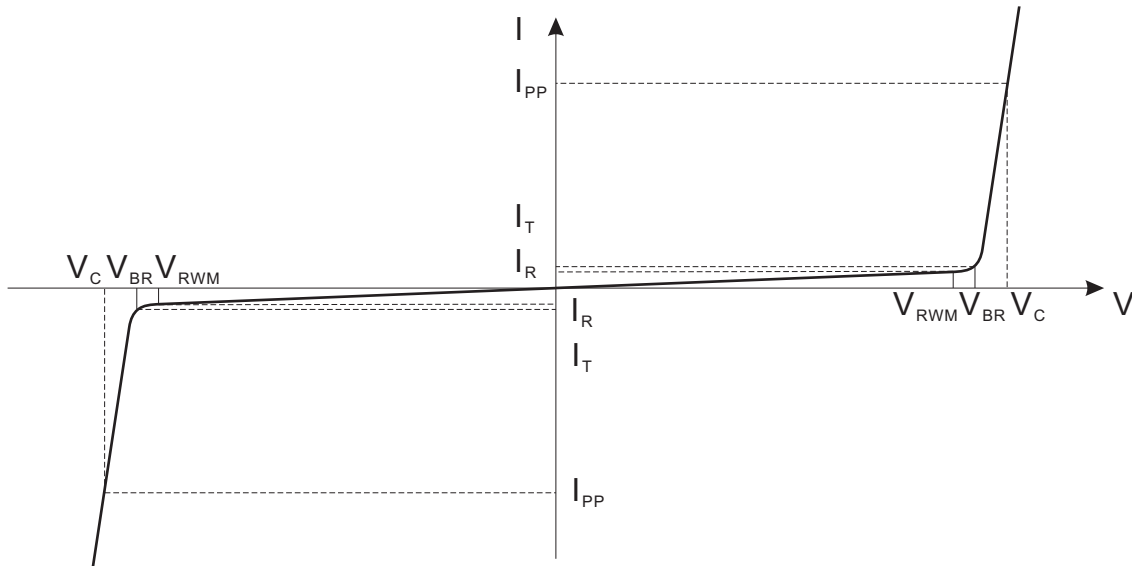
Electrical characteristics (at T_A=25°C unless otherwise noted)

| Part No. | V _{RWM} (V) | I _R (uA) @V _{RWM} | I _T (mA) | V _{BR} (V) @I _T | V _C (V) @I _{PP} =5A | C _J (pF) @V _R =0V,F=1MHz |
|------------|----------------------|--|---------------------|--|--|---|
| | Max. | Max. | | Min. | Max. | Max. |
| ESD9FN3.3C | 3.3 | 2.0 | 1.0 | 3.8 | 12 | 15 |

Over voltage available upon request.
 1. V_{BR} is measured with a pulse test current I_T at an ambient temperature of 25°C.
 2. Surge current waveform per Figure 1.

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Typical characteristics (at $T_a=25^\circ\text{C}$ unless otherwise noted)



Bi-Directional TVS

- V_C : Clamping Voltage @ I_{PP}
- I_{PP} : Maximum Reverse Peak Pulse Current
- V_{RWM} : Maximum Reverse Working voltage
- I_R : Maximum Reverse Leakage Current @ V_{RWM}
- V_{BR} : Breakdown voltage @ I_T
- I_T : Test Current
- P_{PP} : Peak Pulse Power
- C_J : Max. Capacitance @ $V_R = 0\text{V}$ and $f = 1\text{MHz}$

Rating and characteristic curves (ESD9FN3.3C)

FIG.1- 8 X 20us PULSE WAVEFORM

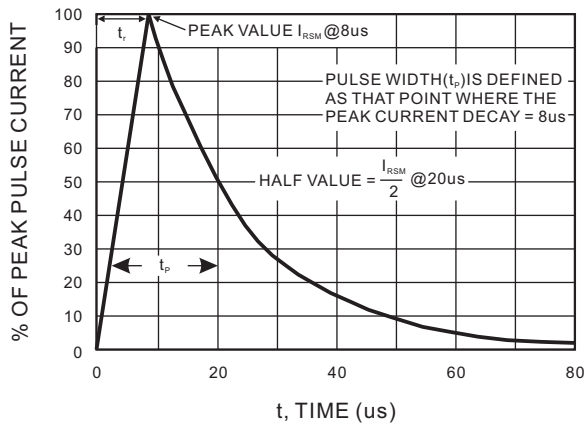


FIG.2- POWER RATING DERATING CURVE

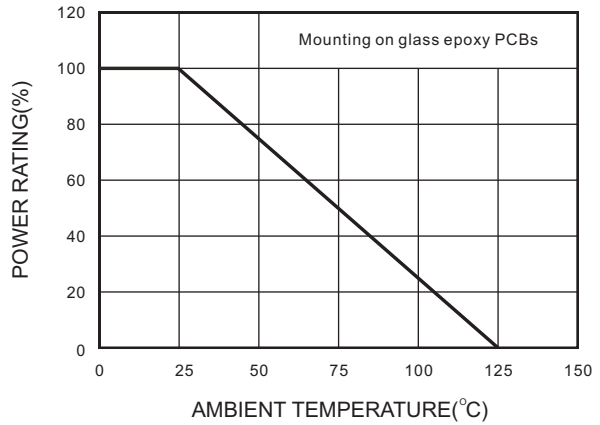
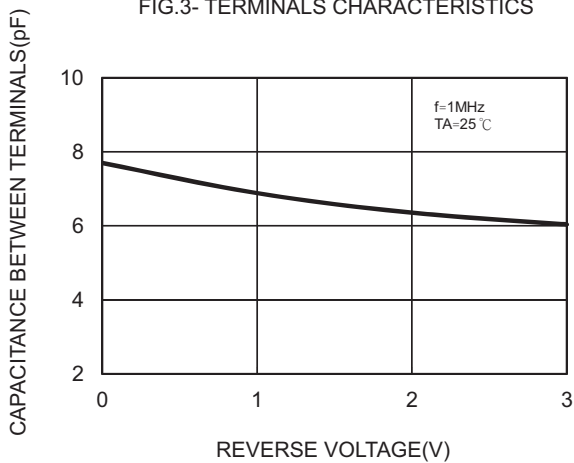




FIG.3- TERMINALS CHARACTERISTICS

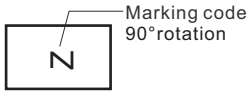


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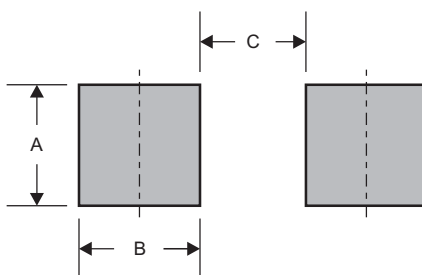
Pinning information

| Pin | Simplified outline | Symbol |
|----------------|---|---|
| Bi-Directional |  |  |

Marking

| Type number | Marking code | Example |
|-------------|--------------|--|
| ESD9FN3.3C | Z |  |

Suggested solder pad layout

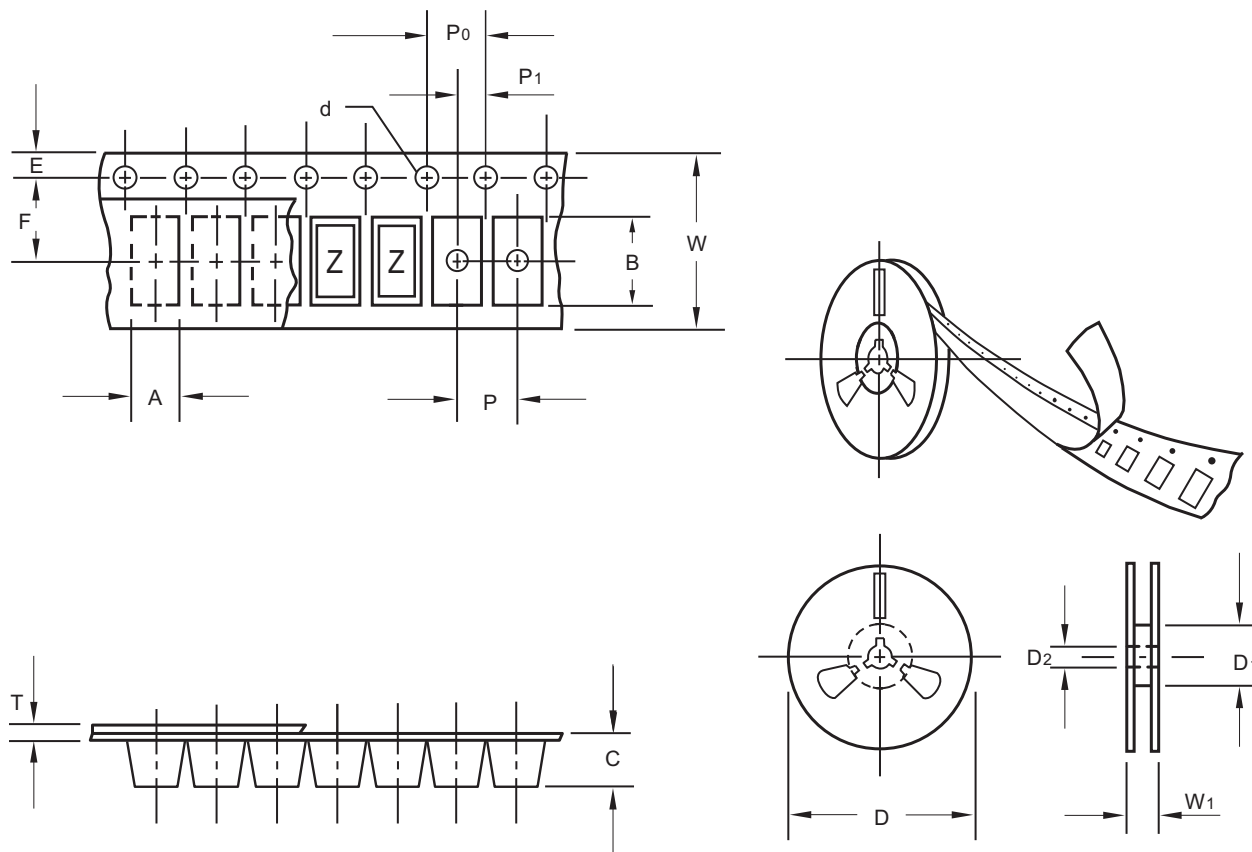


Dimensions in inches and (millimeters)

| PACKAGE | A | B | C |
|---------|--------------|--------------|--------------|
| 0402 | 0.028 (0.70) | 0.020 (0.50) | 0.010 (0.25) |

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Packing information



unit:mm

| Item | Symbol | Tolerance | 0402 |
|---------------------------|--------|-----------|--------|
| Carrier width | A | 0.05 | 0.74 |
| Carrier length | B | 0.05 | 1.17 |
| Carrier depth | C | 0.05 | 0.62 |
| Sprocket hole | d | 0.1 | 1.50 |
| 13" Reel outside diameter | D | 2.0 | - |
| 13" Reel inner diameter | D1 | min | - |
| 7" Reel outside diameter | D | 2.0 | 178.00 |
| 7" Reel inner diameter | D1 | min | 62.00 |
| Feed hole diameter | D2 | 0.5 | 13.00 |
| Sprocket hole position | E | 0.1 | 1.75 |
| Punch hole position | F | 0.1 | 3.50 |
| Punch hole pitch | P | 0.1 | 2.00 |
| Sprocket hole pitch | P0 | 0.1 | 4.00 |
| Embossment center | P1 | 0.1 | 2.00 |
| Overall tape thickness | T | 0.1 | 0.23 |
| Tape width | W | 0.3 | 8.00 |
| Reel width | W1 | 1.0 | 11.40 |

Note: Devices are packed in accordance with EIA standard RS-481-A and specifications listed above.

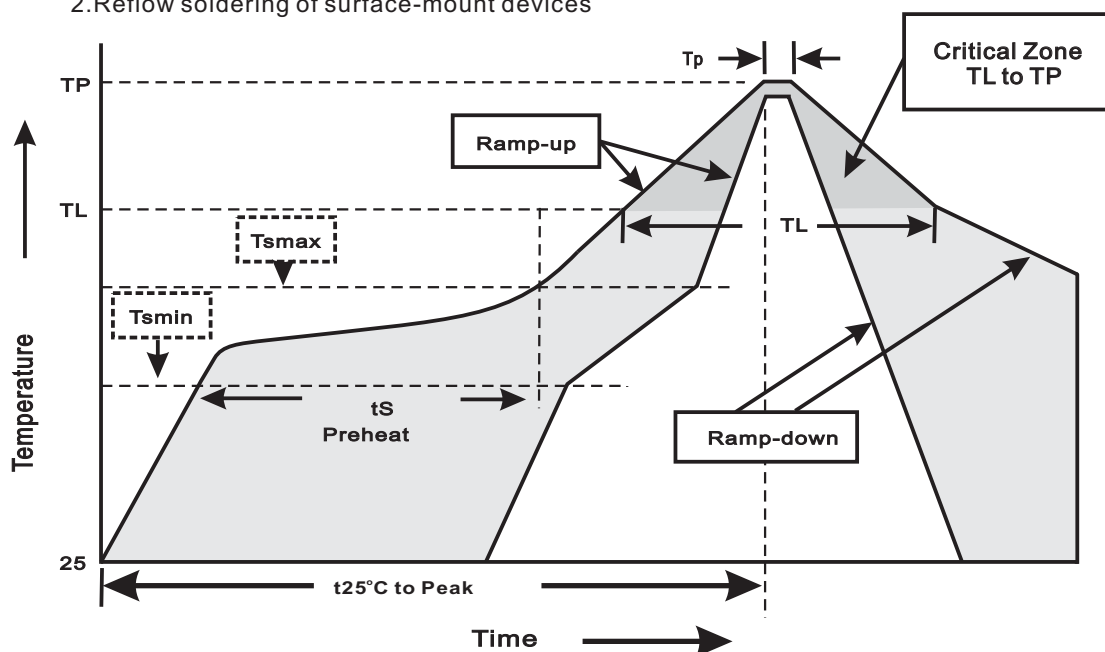
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Reel packing

| PACKAGE | REEL SIZE | REEL (pcs) | COMPONENT SPACING (m/m) | BOX (pcs) | INNER BOX (m/m) | REEL DIA, (m/m) | CARTON SIZE (m/m) | CARTON (pcs) | APPROX. GROSS WEIGHT (kg) |
|---------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| 0402 | 7" | 10,000 | 2.0 | 100,000 | 183*123*183 | 178 | 382*257*387 | 800,000 | 8.5 |

Suggested thermal profiles for soldering processes

- 1.Storage environment: Temperature=5°C~40°C Humidity=55%±25%
- 2.Reflow soldering of surface-mount devices



3.Reflow soldering

| Profile Feature | Soldering Condition |
|--|-----------------------------|
| Average ramp-up rate(TL to TP) | <3°C/sec |
| Preheat -Temperature Min(Tsmin) -Temperature Max(Tsmax) -Time(min to max)(ts) | 150°C 200°C 60~120sec |
| Tsmax to TL -Ramp-upRate | <3°C/sec |
| Time maintained above: -Temperature(TL) -Time(tL) | 217°C 60~260sec |
| Peak Temperature(TP) | 255°C-0/+5°C |
| Time within 5°C of actual Peak Temperature(tp) | 10~30sec |
| Ramp-down Rate | <6°C/sec |
| Time 25°C to Peak Temperature | <6minutes |