

# ESDH3Z15C

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# ESDH3Z15C

## Surface Mount Bi-Directional TVS For ESD Protection Diode : 15V

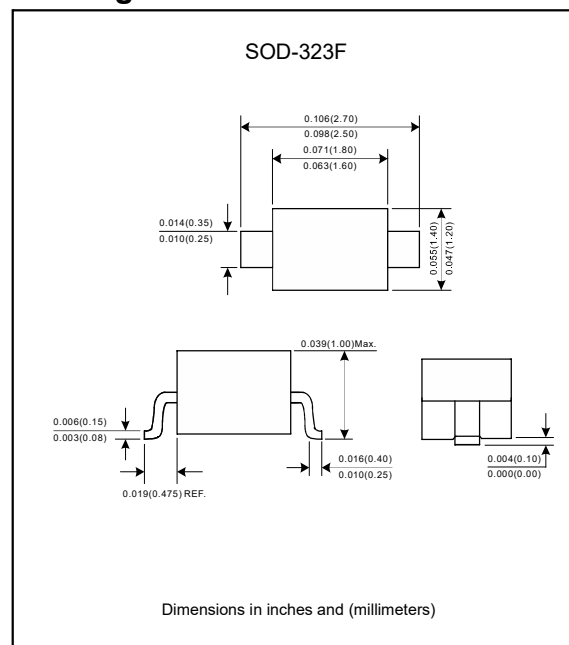
### Features

- 380 Watts Peak Pulse Power per Line (8/20 $\mu$ s).
- Replacement for MLV (0805).
- Protects one I/O or power line.
- Complies with following standards:
- IEC 61000-4-2 (ESD) immunity test : Air discharge:  $\pm 30$ kV.  
Contact discharge:  $\pm 30$ kV.
- IEC61000-4-5 (Lightning) 10A (8/20 $\mu$ s).
- IEC 61000-4-4 (EFT) 40A (5/50ns).
- Lead-free parts meet RoHS requirements.
- Suffix "-H" indicates Halogen-free part, ex.ESDH3Z15C-H.

### Mechanical data

- Epoxy:UL94-V0 rated flame retardant.
- Case : Molded plastic, SOD-323F.
- Terminals : Solder plated, solderable per MIL-STD-750, Method 2026.
- Mounting Position : Any.
- Weight : Approximated 0.005 gram.

### Package outline



### Maximum ratings (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                                                        | Symbol    | Value       | Unit               |
|------------------------------------------------------------------|-----------|-------------|--------------------|
| Peak pulse power ( $t_p = 8/20\mu\text{s}$ )                     | $P_{PK}$  | 350         | W                  |
| Peak Pulse Current ( $t_p = 8/20\mu\text{s}$ ), (Pin 1 to Pin 2) | $I_{PP}$  | 10          | A                  |
| ESD Per IEC 61000-4-2 (Air)                                      | $V_{ESD}$ | $\pm 30$    | KV                 |
| ESD Per IEC 61000-4-2 (Contact)                                  |           | $\pm 30$    |                    |
| Operating temperature range                                      | $T_J$     | -55 to +125 | $^{\circ}\text{C}$ |
| Storage temperature range                                        | $T_{STG}$ | -55 to +150 | $^{\circ}\text{C}$ |

### Electrical characteristics (At $T_A=25^{\circ}\text{C}$ unless otherwise noted)

| Parameter                      | Symbol    | Conditions                                             | Min  | Typ  | Max | Unit     |
|--------------------------------|-----------|--------------------------------------------------------|------|------|-----|----------|
| Reverse working voltage        | $V_{RWM}$ |                                                        |      |      | 15  | V        |
| Breakdown voltage              | $V_{BR}$  | $I_T = 1\text{mA}$                                     | 16.7 |      | 20  | V        |
| Reverse leakage current        | $I_R$     | $V_{RWM} = 15\text{V}$                                 |      |      | 200 | nA       |
| Clamping voltage               | $V_C$     | $I_{PP} = 10\text{A}$ ( $t_p = 8/20\mu\text{s}$ )      |      | 32   | 35  | V        |
| Dynamic resistance (Note 1, 2) | $R_{DYN}$ | TLP = 0.2/100ns                                        |      | 0.25 |     | $\Omega$ |
| ESD Clamping Voltage (Note 1)  | $V_{ESD}$ | $I_{PP} = 4\text{A}$ , $t_p = 0.2/100\text{ns}$ (TLP)  |      | 22.6 |     | V        |
|                                |           | $I_{PP} = 16\text{A}$ , $t_p = 0.2/100\text{ns}$ (TLP) |      | 25.5 |     |          |
| Junction capacitance           | $C_J$     | $V_R = 0\text{V}$ , $f = 1\text{MHz}$                  |      | 25   | 35  | pF       |

Note : 1. TLP Setting :  $t_p=100\text{ns}$ ,  $t_r=0.2\text{ns}$ ,  $I_{TLp}$  and  $V_{TLp}$  sample window :  $t_1=70\text{ns}$  to  $t_2=90\text{ns}$ .

2. Dynamic resistance calculated from  $I_{PP}=4\text{A}$  to  $I_{PP}=16\text{A}$  using "Best Fit".

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## Rating and characteristic curves

Figure 1: Peak Pulse Power vs . Pulse Time

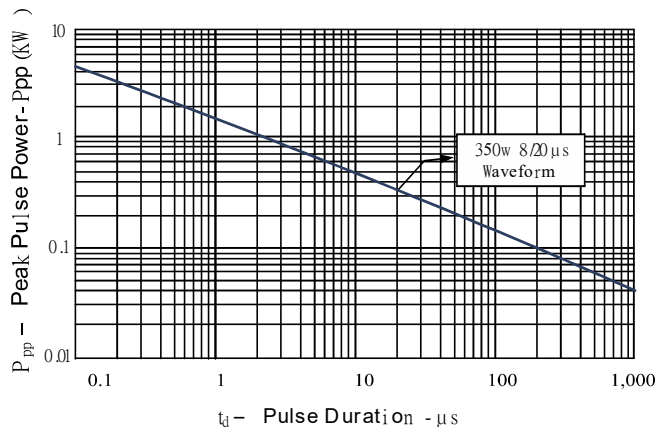


Figure 2: Power Derating Curve

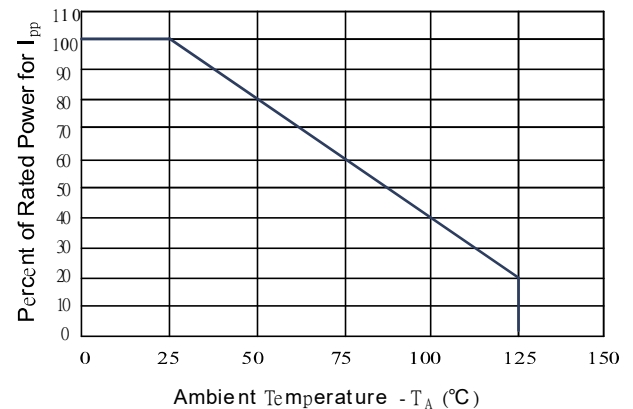


Figure 3: Clamping Voltage vs . Peak Pulse Current

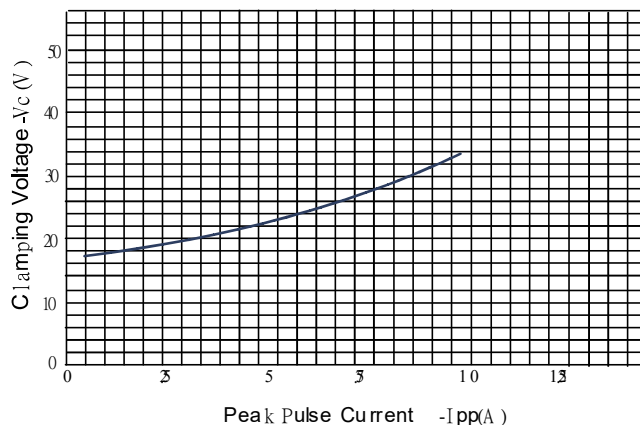


Figure 4: Normalized Junction Capacitance vs. Reverse Voltage

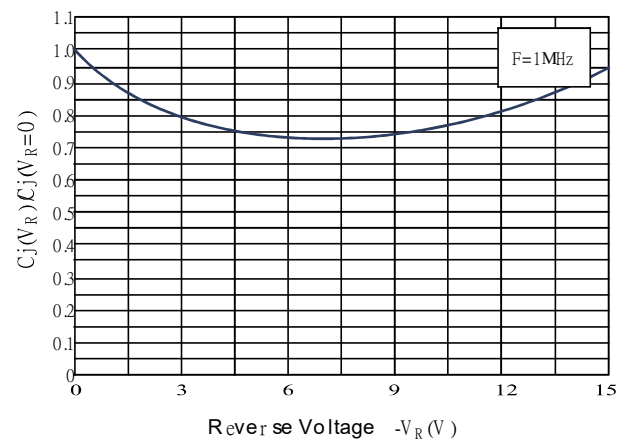


Figure 5: TLP Positive I -V Curve

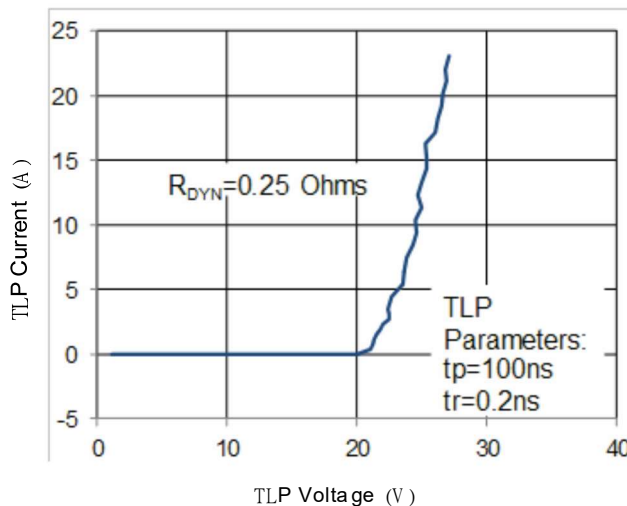
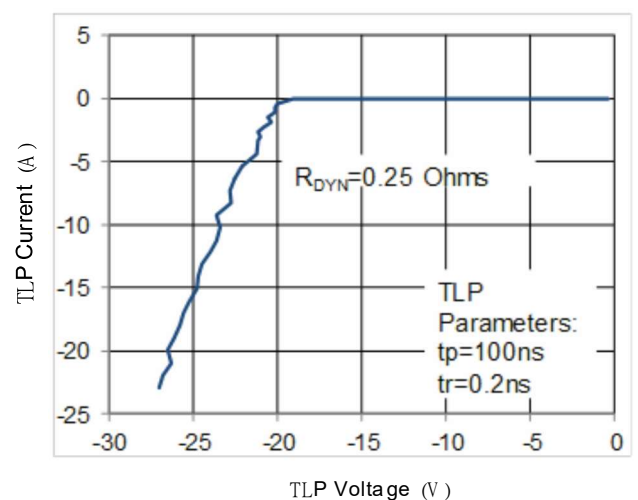


Figure 6: TLP Negative I -V Curve

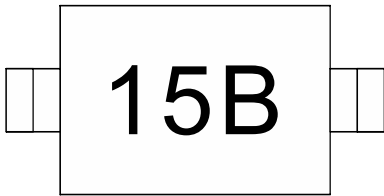


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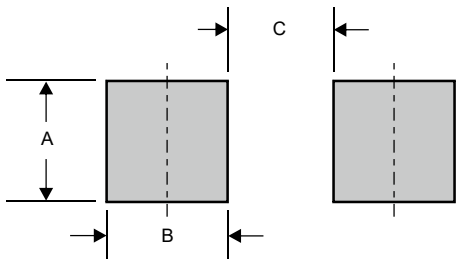
Pinning information

| Simplified outline                                                                | Symbol                                                                            |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|  |  |

Marking



Suggested solder pad layout

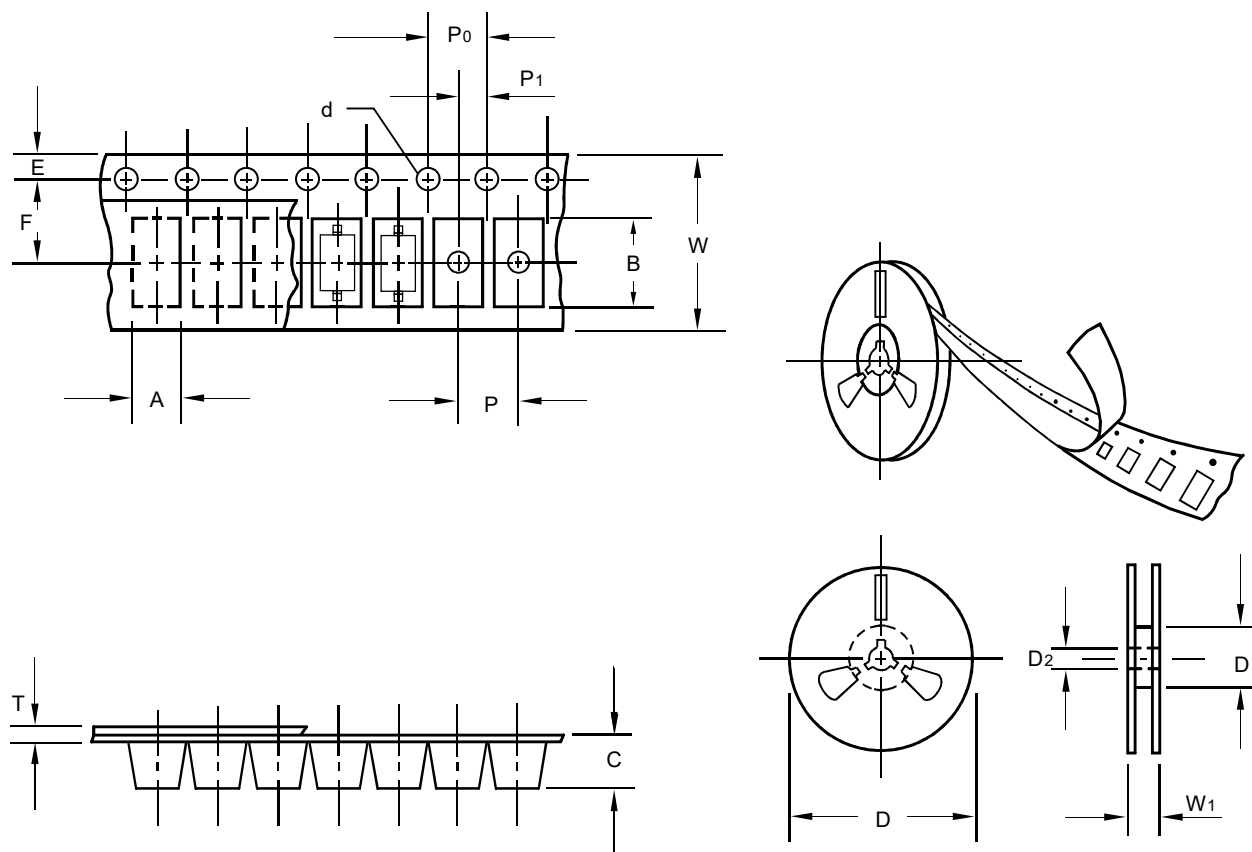


Dimensions in inches and (millimeters)

| PACKAGE  | A            | B            | C            |
|----------|--------------|--------------|--------------|
| SOD-323F | 0.031 (0.80) | 0.031 (0.80) | 0.056 (1.40) |

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## Packing information



unit:mm

| Item                      | Symbol         | Tolerance | SOD-323F |
|---------------------------|----------------|-----------|----------|
| Carrier width             | A              | 0.1       | 1.48     |
| Carrier length            | B              | 0.1       | 3.30     |
| Carrier depth             | C              | 0.1       | 1.25     |
| Sprocket hole             | d              | 0.1       | 1.50     |
| 13" Reel outside diameter | D              | 2.0       | -        |
| 13" Reel inner diameter   | D <sub>1</sub> | min       | -        |
| 7" Reel outside diameter  | D              | 2.0       | 178.00   |
| 7" Reel inner diameter    | D <sub>1</sub> | min       | 55.00    |
| Feed hole diameter        | D <sub>2</sub> | 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       | 4.00     |
| Sprocket hole pitch       | P <sub>0</sub> | 0.1       | 4.00     |
| Embossment center         | P <sub>1</sub> | 0.1       | 2.00     |
| Overall tape thickness    | T              | 0.1       | 0.23     |
| Tape width                | W              | 0.3       | 8.00     |
| Reel width                | W <sub>1</sub> | 1.0       | 9.50     |

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

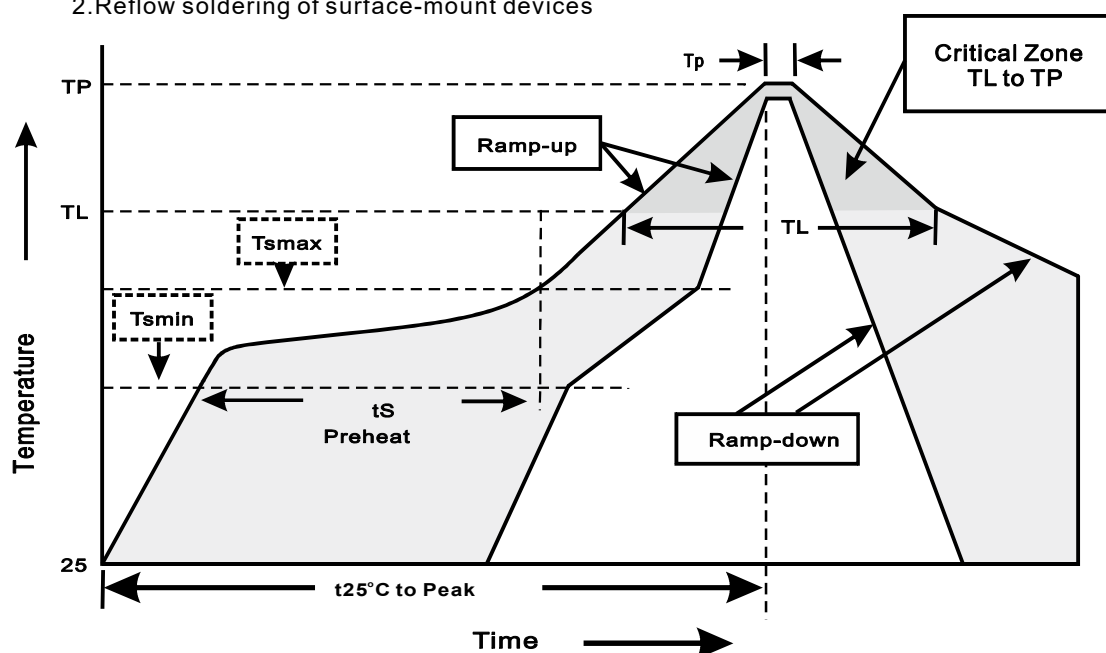
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## Reel packing

| 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) |
|----------|-----------|------------|-------------------------|-----------|-----------------|-----------------|-------------------|--------------|---------------------------|
| SOD-323F | 7"        | 3,000      | 4.0                     | 30,000    | 183*123*183     | 178             | 382*257*387       | 240,000      | 8.0                       |

## 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(T <sub>L</sub> to T <sub>P</sub> )                                                                       | <3°C/sec                    |
| Preheat<br>-Temperature Min(T <sub>smIn</sub> )<br>-Temperature Max(T <sub>smax</sub> )<br>-Time(min to max)(t <sub>s</sub> ) | 150°C<br>200°C<br>60~120sec |
| T <sub>smax</sub> to T <sub>L</sub><br>-Ramp-upRate                                                                           | <3°C/sec                    |
| Time maintained above:<br>-Temperature(T <sub>L</sub> )<br>-Time(t <sub>L</sub> )                                             | 217°C<br>60~260sec          |
| Peak Temperature(T <sub>P</sub> )                                                                                             | 255°C-0/+5°C                |
| Time within 5°C of actual Peak Temperature(t <sub>P</sub> )                                                                   | 10~30sec                    |
| Ramp-down Rate                                                                                                                | <6°C/sec                    |
| Time 25°C to Peak Temperature                                                                                                 | <6minutes                   |