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## SMD Zener Diode

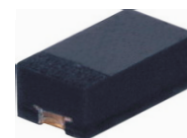


# CZRF52C2 Thru. CZRF52C39

Voltage 2 to 39 Volts

Power 350 mWatts

RoHS Device

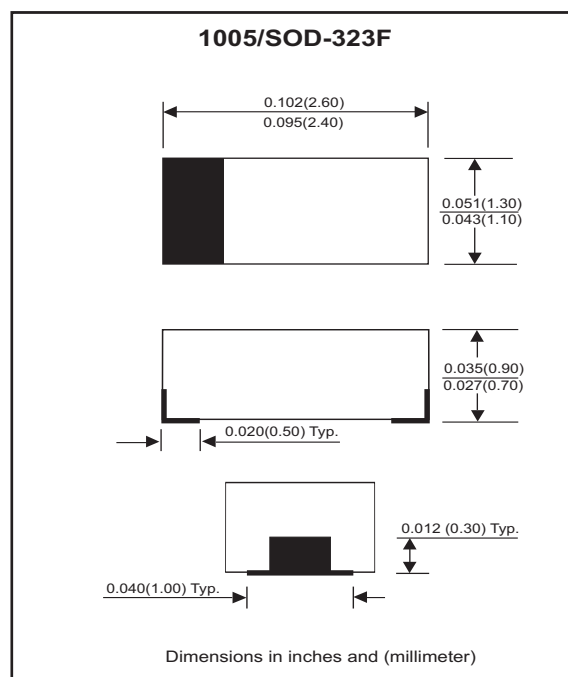


## Features

- 350mW Power Dissipation.
- High Voltages from 2 ~ 39 V.
- Designed for mounting on small surface.
- Extremely thin/leadless package.
- Pb free product.

## Mechanical data

- Case: 1005/SOD-323F Standard package  
Molded plastic.
- Terminals: Gold plated, solderable per  
MIL-STD-750, method 2026.
- Polarity: Indicated by cathode band.
- Weight: 0.006 gram(approx.).



## Circuit Diagram



## Maximum Rating And Electrical Characteristics (at TA=25°C unless otherwise noted)

| Parameter                                                                                                 | Symbol    | Value       | Unit |
|-----------------------------------------------------------------------------------------------------------|-----------|-------------|------|
| Maximum Forward Voltage Drop at $I_F = 10 \text{ mA}$                                                     | $V_F$     | 0.9         | V    |
| Maximum Power Dissipation at 25 °C                                                                        | $P_D$     | 350         | mW   |
| Forward current , surge peak<br>8.3 ms single half sine-wave superimposed<br>on rate load( JEDEC method ) | $I_{FSM}$ | 2.0         | A    |
| Peak ESD voltage capability (IEC 61000-4-2)                                                               | $V_{PV}$  | 8           | kV   |
| Operating Junction and Storage Temperature Range                                                          | $T_J$     | -55 to +125 | °C   |

## SMD Zener Diode

### Electrical Characteristics(Ta = 25°C)

| Part Number | Marking Code | Zener Voltage      |       |                     | Operating resistance |                     | Rising operating Resistance |                     | Reverse current |                    |
|-------------|--------------|--------------------|-------|---------------------|----------------------|---------------------|-----------------------------|---------------------|-----------------|--------------------|
|             |              | V <sub>Z</sub> (V) |       |                     | ZZT(Ohm)             |                     | ZZK(Ohm)                    |                     | IR(uA)          |                    |
|             |              | Min                | Max   | I <sub>Z</sub> (mA) | Max                  | I <sub>Z</sub> (mA) | Max                         | I <sub>Z</sub> (mA) | Max             | V <sub>R</sub> (V) |
| CZRF52C2    | Z0           | 1.90               | 2.10  | 5                   | 100                  | 5                   | 600                         | 1                   | 100             | 1                  |
| CZRF52C2V2  | Z1           | 2.09               | 2.31  | 5                   | 100                  | 5                   | 600                         | 1                   | 100             | 1                  |
| CZRF52C2V4  | Z2           | 2.28               | 2.52  | 5                   | 85                   | 5                   | 600                         | 1                   | 100             | 1                  |
| CZRF52C2V7  | Z3           | 2.57               | 2.84  | 5                   | 83                   | 5                   | 500                         | 1                   | 75              | 1                  |
| CZRF52C3    | Z4           | 2.85               | 3.15  | 5                   | 95                   | 5                   | 500                         | 1                   | 50              | 1                  |
| CZRF52C3V3  | Z5           | 3.14               | 3.47  | 5                   | 95                   | 5                   | 500                         | 1                   | 25              | 1                  |
| CZRF52C3V6  | Z6           | 3.42               | 3.78  | 5                   | 95                   | 5                   | 500                         | 1                   | 15              | 1                  |
| CZRF52C3V9  | Z7           | 3.71               | 4.10  | 5                   | 95                   | 5                   | 500                         | 1                   | 10              | 1                  |
| CZRF52C4V3  | Z8           | 4.09               | 4.52  | 5                   | 95                   | 5                   | 500                         | 1                   | 5               | 1                  |
| CZRF52C4V7  | Z9           | 4.47               | 4.94  | 5                   | 78                   | 5                   | 500                         | 1                   | 5               | 2                  |
| CZRF52C5V1  | ZA           | 4.85               | 5.36  | 5                   | 60                   | 5                   | 480                         | 1                   | 0.1             | 0.8                |
| CZRF52C5V6  | ZB           | 5.32               | 5.88  | 5                   | 40                   | 5                   | 400                         | 1                   | 0.1             | 1                  |
| CZRF52C6V2  | ZC           | 5.89               | 6.51  | 5                   | 10                   | 5                   | 200                         | 1                   | 0.1             | 2                  |
| CZRF52C6V8  | ZE           | 6.46               | 7.14  | 5                   | 8                    | 5                   | 150                         | 1                   | 0.1             | 3                  |
| CZRF52C7V5  | ZF           | 7.13               | 7.88  | 5                   | 7                    | 5                   | 50                          | 1                   | 0.1             | 5                  |
| CZRF52C8V2  | ZG           | 7.79               | 8.61  | 5                   | 7                    | 5                   | 50                          | 1                   | 0.1             | 6                  |
| CZRF52C9V1  | ZH           | 8.65               | 9.56  | 5                   | 10                   | 5                   | 50                          | 1                   | 0.1             | 7                  |
| CZRF52C10   | ZJ           | 9.50               | 10.50 | 5                   | 15                   | 5                   | 70                          | 1                   | 0.1             | 7.5                |
| CZRF52C11   | ZK           | 10.45              | 11.55 | 5                   | 20                   | 5                   | 70                          | 1                   | 0.1             | 8.5                |
| CZRF52C12   | ZM           | 11.40              | 12.60 | 5                   | 20                   | 5                   | 90                          | 1                   | 0.1             | 9                  |
| CZRF52C13   | ZN           | 12.35              | 13.65 | 5                   | 25                   | 5                   | 110                         | 1                   | 0.1             | 10                 |
| CZRF52C15   | ZP           | 14.25              | 15.75 | 5                   | 30                   | 5                   | 110                         | 1                   | 0.1             | 11                 |
| CZRF52C16   | ZQ           | 15.20              | 16.80 | 5                   | 40                   | 5                   | 170                         | 1                   | 0.1             | 12                 |
| CZRF52C18   | ZR           | 17.10              | 18.90 | 5                   | 50                   | 5                   | 170                         | 1                   | 0.1             | 14                 |
| CZRF52C20   | ZS           | 19.00              | 21.00 | 5                   | 50                   | 5                   | 220                         | 1                   | 0.1             | 15                 |
| CZRF52C22   | ZT           | 20.90              | 23.10 | 5                   | 55                   | 5                   | 220                         | 1                   | 0.1             | 17                 |
| CZRF52C24   | ZU           | 22.80              | 25.20 | 5                   | 80                   | 5                   | 220                         | 1                   | 0.1             | 18                 |
| CZRF52C27   | ZV           | 25.65              | 28.35 | 5                   | 80                   | 5                   | 250                         | 1                   | 0.1             | 20                 |
| CZRF52C30   | ZW           | 28.50              | 31.50 | 5                   | 80                   | 5                   | 250                         | 1                   | 0.1             | 23                 |
| CZRF52C33   | ZX           | 31.35              | 34.65 | 5                   | 80                   | 5                   | 250                         | 1                   | 0.1             | 25                 |
| CZRF52C36   | ZY           | 34.20              | 37.80 | 5                   | 90                   | 5                   | 250                         | 1                   | 0.1             | 27                 |
| CZRF52C39   | ZZ           | 37.05              | 40.95 | 5                   | 90                   | 5                   | 300                         | 1                   | 0.1             | 29                 |

## SMD Zener Diode

### RATING AND CHARACTERISTIC CURVES (CZRF52C2 Thru. CZRF52C39)

Fig.1 TEMPERATURE COEFFICIENTS

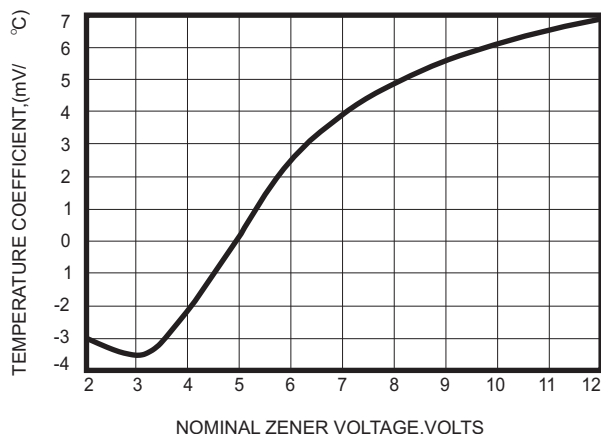


Fig.2 TEMPERATURE COEFFICIENTS

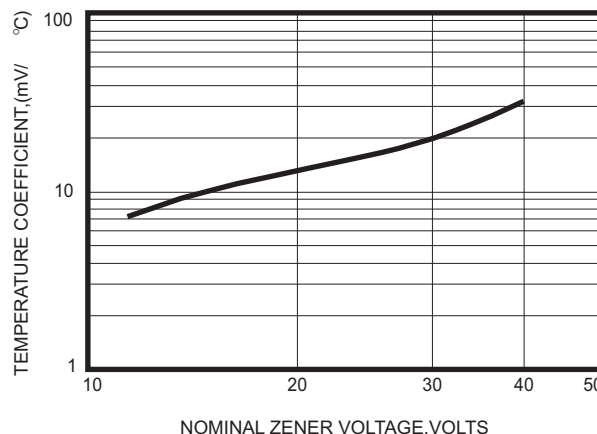


Fig.3 EFFECT OF ZENER VOLTAGE ON ZENER IMPEDANCE

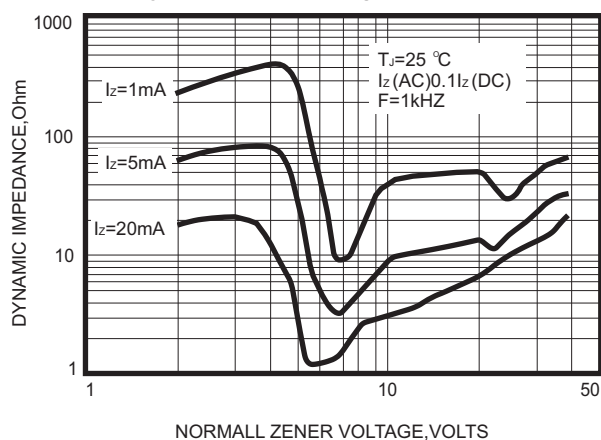


Fig.4 TYPICAL FORWARD VOLTAGE

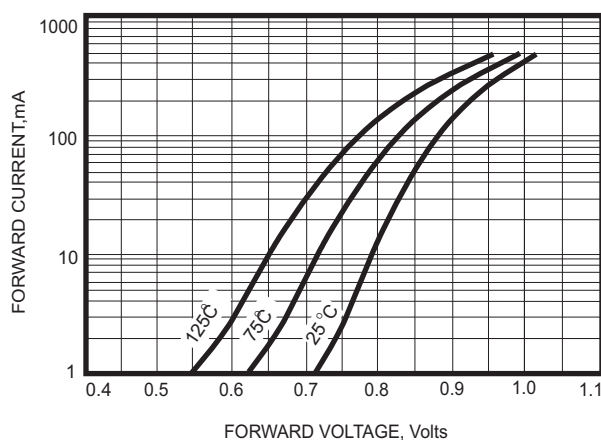


Fig.5 TYPICAL LEAKAGE CURRENT

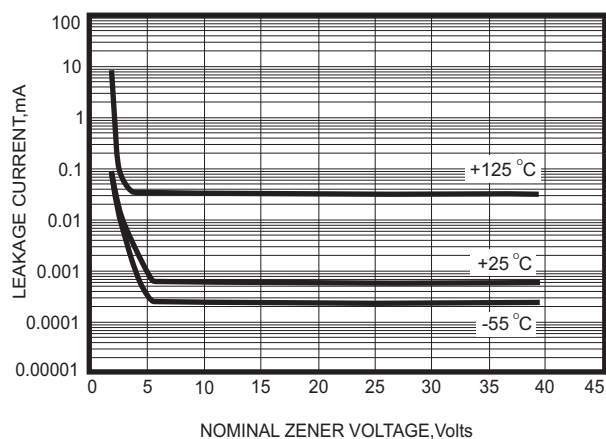
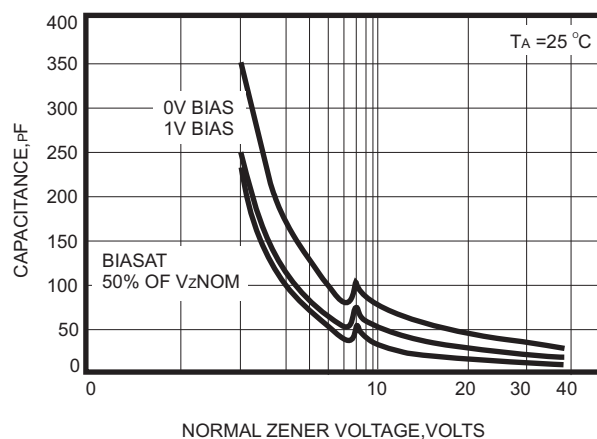


Fig.6 TYPICAL CAPACITANCE



## SMD Zener Diode



### RATING AND CHARACTERISTIC CURVES (CZRF52C2 Thru. CZRF52C39)

Fig.7 ZENER VOLTAGE VERSUS ZENER CURRENT

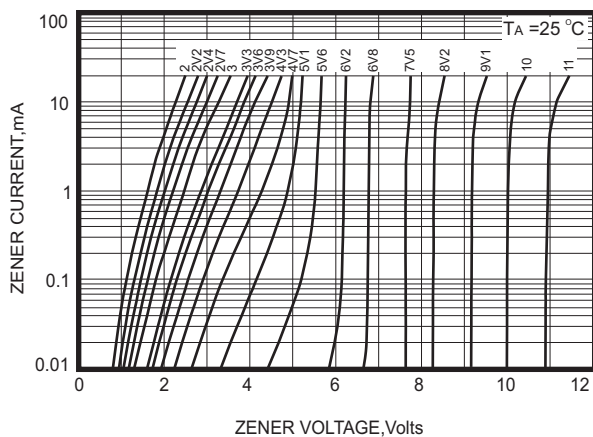


Fig.8 ZENER VOLTAGE VERSUS ZENER CURRENT

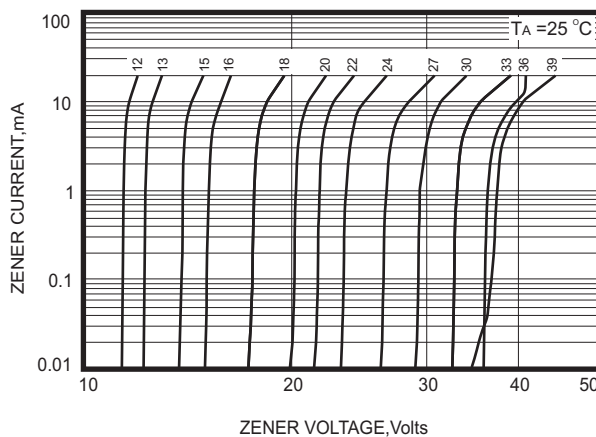
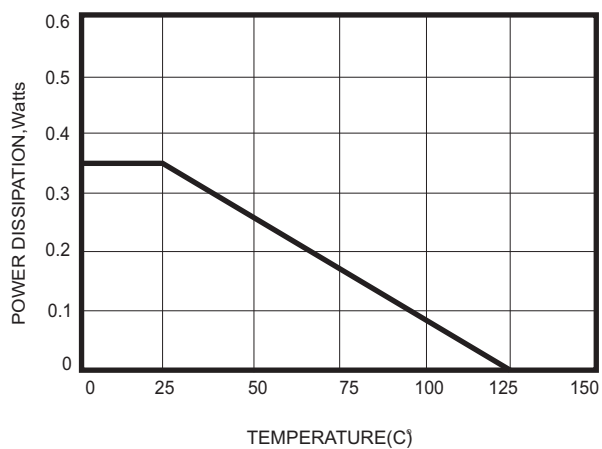
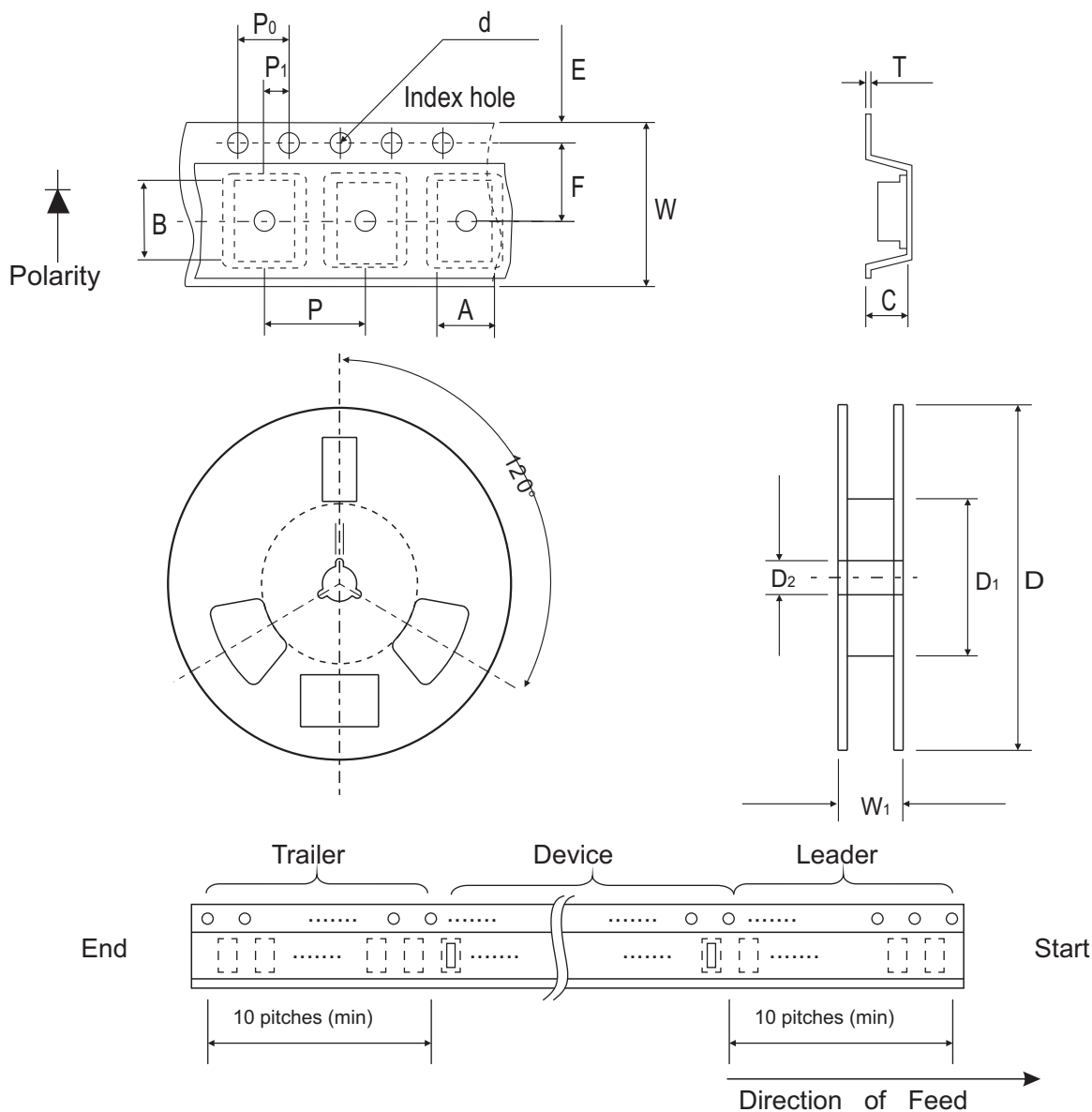


Fig.9 STEADY STATE POWER DERATING



## SMD Zener Diode

### Reel Taping Specification



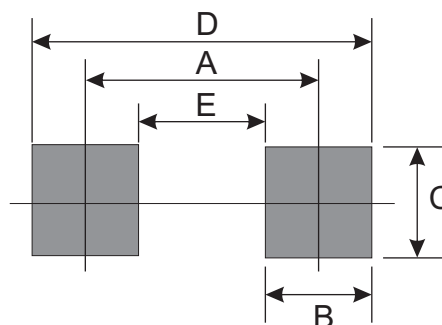
| 1005<br>(SOD-323F) | SYMBOL | A             | B             | C             | d             | D            | D <sub>1</sub> | D <sub>2</sub> |
|--------------------|--------|---------------|---------------|---------------|---------------|--------------|----------------|----------------|
|                    | (mm)   | 1.55 ± 0.10   | 2.65 ± 0.10   | 1.05 ± 0.10   | 1.55 ± 0.05   | 178 ± 1      | 60.0 MIN.      | 13.0 ± 0.20    |
|                    | (inch) | 0.061 ± 0.004 | 0.104 ± 0.004 | 0.041 ± 0.004 | 0.061 ± 0.002 | 7.008 ± 0.04 | 2.362 MIN.     | 0.512 ± 0.008  |

| 1005<br>(SOD-323F) | SYMBOL | E             | F             | P             | P <sub>0</sub> | P <sub>1</sub> | T             | W             | W <sub>1</sub> |
|--------------------|--------|---------------|---------------|---------------|----------------|----------------|---------------|---------------|----------------|
|                    | (mm)   | 1.75 ± 0.10   | 3.50 ± 0.05   | 4.00 ± 0.10   | 4.00 ± 0.10    | 2.00 ± 0.05    | 0.23 ± 0.05   | 8.00 ± 0.20   | 13.5 MAX.      |
|                    | (inch) | 0.069 ± 0.004 | 0.138 ± 0.002 | 0.157 ± 0.004 | 0.157 ± 0.004  | 0.079 ± 0.002  | 0.009 ± 0.002 | 0.315 ± 0.008 | 0.531 MAX.     |

## SMD Zener Diode

### Suggested PAD Layout

| SIZE | 1005/SOD-323F |        |
|------|---------------|--------|
|      | (mm)          | (inch) |
| A    | 2.10          | 0.083  |
| B    | 1.20          | 0.047  |
| C    | 1.20          | 0.047  |
| D    | 3.30          | 0.130  |
| E    | 0.90          | 0.035  |



### Standard Packaging

| Case Type     | Qty per Reel | Reel Size |
|---------------|--------------|-----------|
|               | (Pcs)        | (inch)    |
| 1005/SOD-323F | 4,000        | 7         |