WON-TOP ELECTRONICS

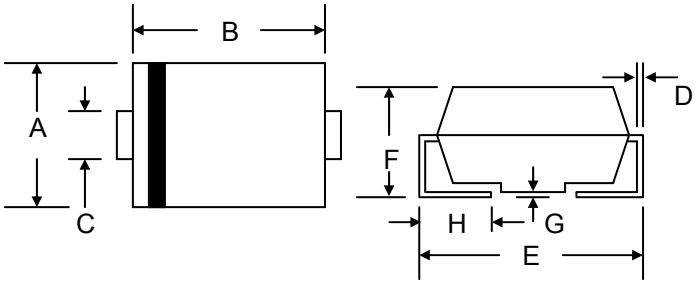
# 1SMA2EZ2.7D5 – 1SMA2EZ330D5

**2.0W SURFACE MOUNT ZENER DIODE**

RoHS Pb

## Features

- Glass Passivated Die Construction
- 2.0W Power Dissipation
- 2.7V – 330V Nominal Zener Voltage
- 5% Standard Vz Tolerance
- Low Inductance
- For Use in Voltage Regulator or Reference
- Plastic Case Material has UL Flammability Classification Rating 94V-0




## Mechanical Data

- Case: SMA/DO-214AC, Molded Plastic
- Terminals: Solder Plated, Solderable per MIL-STD-750, Method 2026
- Polarity: Cathode Band
- Marking: Device Code
- Weight: 0.064 grams (approx.)
- **Lead Free: For RoHS / Lead Free Version, Add "-LF" Suffix to Part Number, See Page 6**

| SMA/DO-214AC | | |
|---|---|---|
| **Dim** | **Min** | **Max** |
| **A** | 2.29 | 2.92 |
| **B** | 4.00 | 4.60 |
| **C** | 1.27 | 1.90 |
| **D** | 0.152 | 0.305 |
| **E** | 4.80 | 5.30 |
| **F** | 2.00 | 2.44 |
| **G** | 0.051 | 0.203 |
| **H** | 0.76 | 1.52 |
| **All Dimensions in mm** | | |

## Maximum Ratings @$T_A$=25°C unless otherwise specified

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Power Dissipation at $T_L$ = 60°C (Note 1) | $P_D$ | 2.0 | W |
| Forward Voltage @ $I_F$ = 200mA | $V_F$ | 1.2 | V |
| Thermal Resistance, Junction to Ambient (Note 2)<br>Thermal Resistance, Junction to Lead (Note 1) | $R_{\theta JA}$<br>$R_{\theta JL}$ | 250<br>50 | °C/W |
| Operating and Storage Temperature Range | $T_J$, $T_{STG}$ | -65 to +150 | °C |

Note: 1. Mounted on FR-4 PCB with 25.4 x 25.4mm copper pads.
2. Mounted on ceramic substrate with minimum recommended pad layout.

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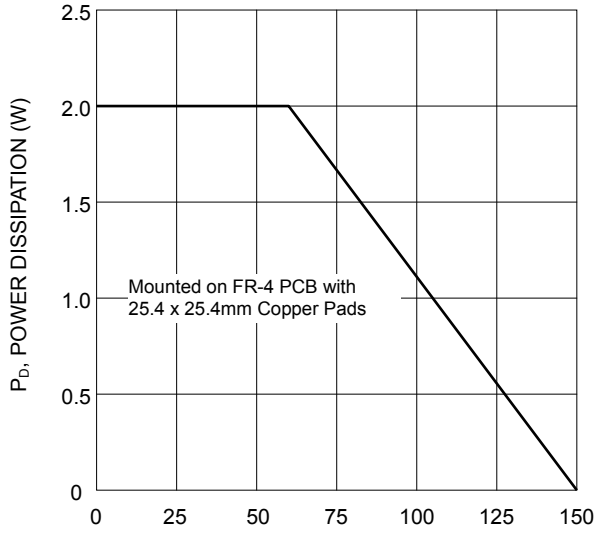


Fig. 1 Power Derating Curve

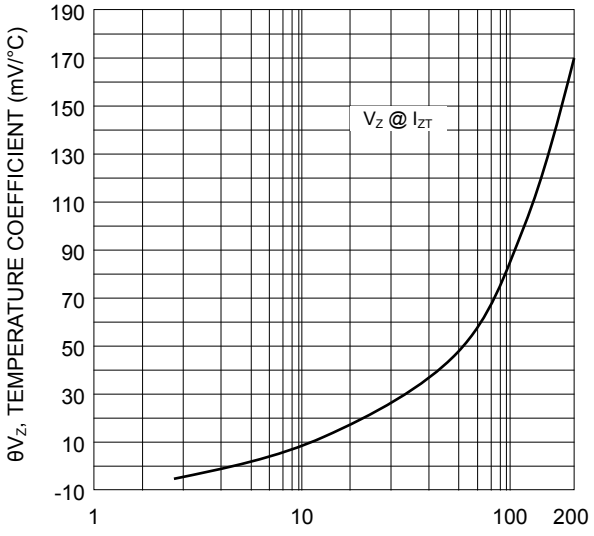


Fig. 2 Typical Temperature Coefficients

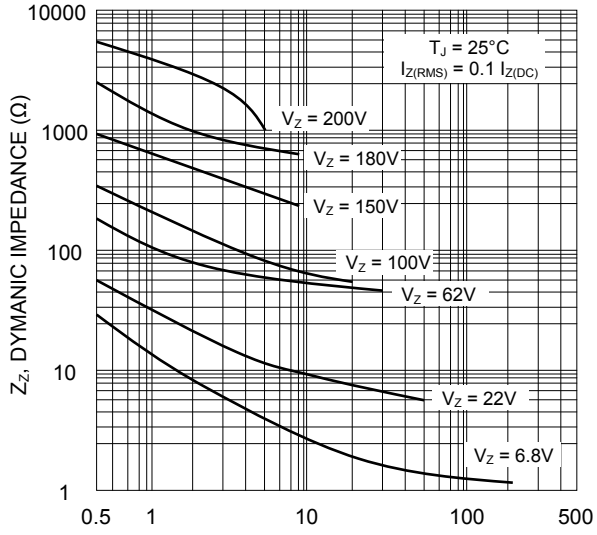


Fig. 3 Dynamic Resistance vs. Zener Current

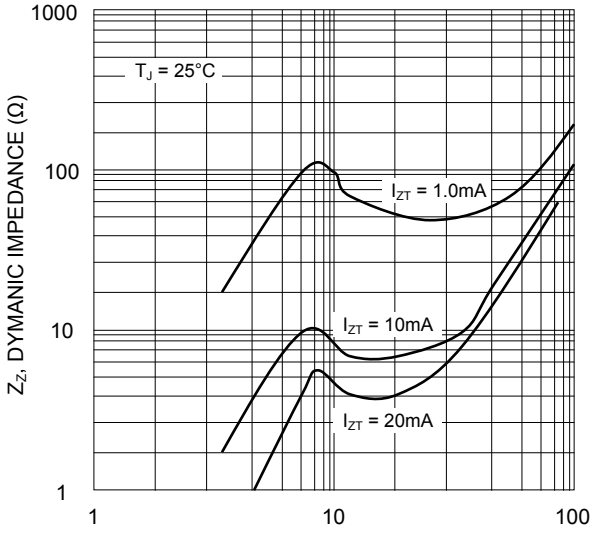


Fig. 3 Dynamic Resistance vs. Zener Voltage

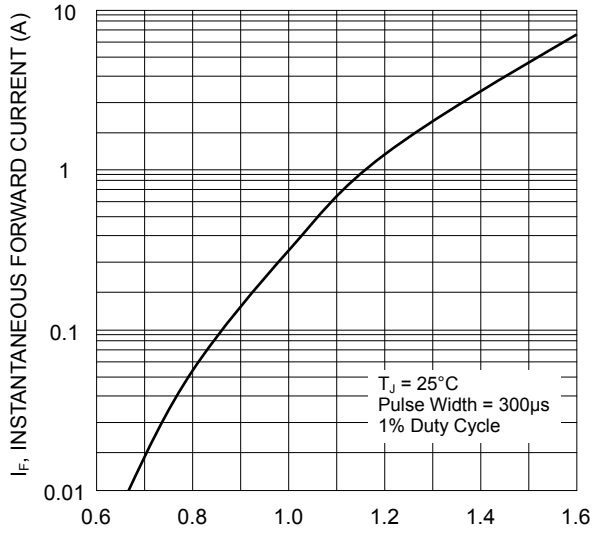


Fig. 5 Typical Forward Characteristics

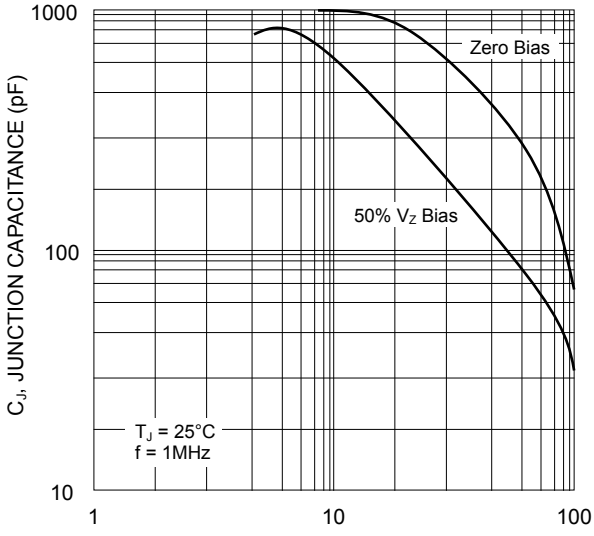


Fig. 6 Junction Capacitance vs. Nominal Zener Voltage

## Electrical Characteristics (@$T_A$=25°C unless otherwise specified) Table 1

| Type Number (Note 1) | Device Marking Code | Nominal Zener Voltage (Note 2) | Test Current | Maximum Zener Impedance (Note 3) | | | Maximum Leakage Current | | Max DC Zener Current |
|---|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ @ $I_{ZT}$ | $I_{ZT}$ | $Z_{ZT}$ @ $I_{ZT}$ | $Z_{ZK}$ @ $I_{ZK}$ | $I_{ZK}$ | $I_R$ @ $V_R$ | | $I_{ZM}$ |
| | | (V) | (mA) | (Ω) | (Ω) | (mA) | (μA) | (V) | (mA) |
| 1SMA2EZ2.7D5 | 2H0 | 2.7 | 180.0 | 10.0 | 400 | 1.00 | 100 | 1.0 | 670 |
| 1SMA2EZ3.0D5 | 2H1 | 3.0 | 160.0 | 8.0 | 400 | 1.00 | 100 | 1.0 | 603 |
| 1SMA2EZ3.3D5 | 2H2 | 3.3 | 145.0 | 8.0 | 400 | 1.00 | 80 | 1.0 | 548 |
| 1SMA2EZ3.6D5 | 2H3 | 3.6 | 139.0 | 5.0 | 400 | 1.00 | 80 | 1.0 | 504 |
| 1SMA2EZ3.9D5 | 2H4 | 3.9 | 128.0 | 5.0 | 400 | 1.00 | 30 | 1.0 | 468 |
| 1SMA2EZ4.3D5 | 2H5 | 4.3 | 116.0 | 4.5 | 400 | 1.00 | 20 | 1.0 | 434 |
| 1SMA2EZ4.7D5 | 2H6 | 4.7 | 106.0 | 4.5 | 550 | 1.00 | 5.0 | 1.0 | 386 |
| 1SMA2EZ5.1D5 | 2H7 | 5.1 | 98.0 | 3.5 | 600 | 1.00 | 5.0 | 1.0 | 356 |
| 1SMA2EZ5.6D5 | 2H8 | 5.6 | 89.5 | 2.5 | 500 | 1.00 | 5.0 | 2.0 | 324 |
| 1SMA2EZ6.2D5 | 2A0 | 6.2 | 80.5 | 1.5 | 700 | 1.00 | 5.0 | 3.0 | 292 |
| 1SMA2EZ6.8D5 | 2A1 | 6.8 | 73.5 | 2.0 | 700 | 1.00 | 5.0 | 4.0 | 266 |
| 1SMA2EZ7.5D5 | 2A2 | 7.5 | 66.5 | 2.0 | 700 | 0.50 | 5.0 | 5.0 | 242 |
| 1SMA2EZ8.2D5 | 2A3 | 8.2 | 61.0 | 2.3 | 700 | 0.50 | 5.0 | 6.0 | 220 |
| 1SMA2EZ9.1D5 | 2A4 | 9.1 | 55.0 | 2.5 | 700 | 0.50 | 3.0 | 7.0 | 200 |
| 1SMA2EZ10D5 | 2A5 | 10 | 50.0 | 3.5 | 700 | 0.25 | 3.0 | 7.6 | 182 |
| 1SMA2EZ11D5 | 2A6 | 11 | 45.5 | 4.0 | 700 | 0.25 | 1.0 | 8.4 | 166 |
| 1SMA2EZ12D5 | 2A7 | 12 | 41.5 | 4.5 | 700 | 0.25 | 1.0 | 9.1 | 152 |
| 1SMA2EZ13D5 | 2A8 | 13 | 38.5 | 5.0 | 700 | 0.25 | 0.5 | 9.9 | 138 |
| 1SMA2EZ14D5 | 2A9 | 14 | 35.7 | 5.5 | 700 | 0.25 | 0.5 | 10.6 | 130 |
| 1SMA2EZ15D5 | 2B0 | 15 | 33.4 | 7.0 | 700 | 0.25 | 0.5 | 11.4 | 122 |
| 1SMA2EZ16D5 | 2B1 | 16 | 31.2 | 8.0 | 700 | 0.25 | 0.5 | 12.2 | 114 |
| 1SMA2EZ17D5 | 2B2 | 17 | 29.4 | 9.0 | 750 | 0.25 | 0.5 | 13.0 | 107 |
| 1SMA2EZ18D5 | 2B3 | 18 | 27.8 | 10.0 | 750 | 0.25 | 0.5 | 13.7 | 100 |
| 1SMA2EZ19D5 | 2B4 | 19 | 26.3 | 11.0 | 750 | 0.25 | 0.5 | 14.4 | 95 |
| 1SMA2EZ20D5 | 2B5 | 20 | 25.0 | 11.0 | 750 | 0.25 | 0.5 | 15.2 | 90 |
| 1SMA2EZ22D5 | 2B6 | 22 | 22.8 | 12.0 | 750 | 0.25 | 0.5 | 16.7 | 82 |
| 1SMA2EZ24D5 | 2B7 | 24 | 20.8 | 13.0 | 750 | 0.25 | 0.5 | 18.2 | 76 |
| 1SMA2EZ27D5 | 2B8 | 27 | 18.5 | 18.0 | 750 | 0.25 | 0.5 | 20.6 | 68 |
| 1SMA2EZ30D5 | 2B9 | 30 | 16.6 | 20.0 | 1000 | 0.25 | 0.5 | 22.5 | 60 |
| 1SMA2EZ33D5 | 2C0 | 33 | 15.1 | 23.0 | 1000 | 0.25 | 0.5 | 25.1 | 55 |
| 1SMA2EZ36D5 | 2C1 | 36 | 13.9 | 25.0 | 1000 | 0.25 | 0.5 | 27.4 | 50 |
| 1SMA2EZ39D5 | 2C2 | 39 | 12.8 | 30.0 | 1000 | 0.25 | 0.5 | 29.7 | 47 |
| 1SMA2EZ43D5 | 2C3 | 43 | 11.6 | 35.0 | 1500 | 0.25 | 0.5 | 32.7 | 43 |
| 1SMA2EZ47D5 | 2C4 | 47 | 10.6 | 40.0 | 1500 | 0.25 | 0.5 | 35.8 | 39 |
| 1SMA2EZ51D5 | 2C5 | 51 | 9.8 | 48.0 | 1500 | 0.25 | 0.5 | 38.8 | 36 |
| 1SMA2EZ56D5 | 2C6 | 56 | 9.0 | 55.0 | 2000 | 0.25 | 0.5 | 42.6 | 32 |
| 1SMA2EZ62D5 | 2C7 | 62 | 8.1 | 60.0 | 2000 | 0.25 | 0.5 | 47.1 | 29 |
| 1SMA2EZ68D5 | 2C8 | 68 | 7.4 | 75.0 | 2000 | 0.25 | 0.5 | 51.7 | 27 |
| 1SMA2EZ75D5 | 2C9 | 75 | 6.7 | 90.0 | 2000 | 0.25 | 0.5 | 56.0 | 24 |
| 1SMA2EZ82D5 | 2F0 | 82 | 6.1 | 100.0 | 3000 | 0.25 | 0.5 | 62.2 | 22 |

Note: 1. Type numbers listed have standard tolerance on the nominal zener voltage of ±5%.
2. Measured under thermal equilibrium and DC ($I_{ZT}$) test conditions.
3. The Zener impedance is derived from the 60Hz AC voltage which results when an AC current having an RMS value equal to 10% of the Zener current ($I_{ZT}$ or $I_{ZK}$) is superimposed on $I_{ZT}$ or $I_{ZK}$. Zener impedance is measured at two points to insure a sharp knee on the breakdown curve and to eliminate unstable units.

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## Electrical Characteristics (@$T_A$=25°C unless otherwise specified) Table 1 (Cont'd)

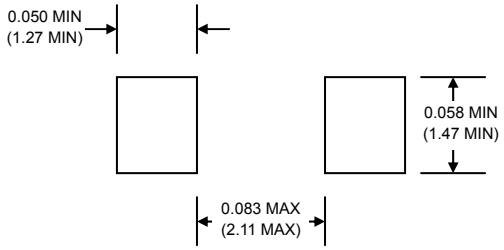
| Type Number (Note 1) | Device Marking Code | Nominal Zener Voltage (Note 2) | Test Current | Maximum Zener Impedance (Note 3) | | | Maximum Leakage Current | | Max DC Zener Current |
|---|---|---|---|---|---|---|---|---|---|
| | | $V_Z$ @ $I_{ZT}$ | $I_{ZT}$ | $Z_{ZT}$ @ $I_{ZT}$ | $Z_{ZK}$ @ $I_{ZK}$ | $I_{ZK}$ | $I_R$ @ $V_R$ | | $I_{ZM}$ |
| | | (V) | (mA) | (Ω) | (Ω) | (mA) | (μA) | (V) | (mA) |
| 1SMA2EZ91D5 | 2F1 | 91 | 5.5 | 125.0 | 3000 | 0.25 | 0.5 | 69.2 | 20 |
| 1SMA2EZ100D5 | 2F2 | 100 | 5.0 | 175.0 | 3000 | 0.25 | 0.5 | 76.0 | 18 |
| 1SMA2EZ110D5 | 2F3 | 110 | 4.5 | 250.0 | 4000 | 0.25 | 0.5 | 83.6 | 17 |
| 1SMA2EZ120D5 | 2F4 | 120 | 4.2 | 325.0 | 4500 | 0.25 | 0.5 | 91.2 | 15 |
| 1SMA2EZ130D5 | 2F5 | 130 | 3.8 | 400.0 | 5000 | 0.25 | 0.5 | 98.8 | 14 |
| 1SMA2EZ140D5 | 2F6 | 140 | 3.6 | 500.0 | 5500 | 0.25 | 0.5 | 106.4 | 13 |
| 1SMA2EZ150D5 | 2F7 | 150 | 3.3 | 575.0 | 6000 | 0.25 | 0.5 | 114.0 | 12 |
| 1SMA2EZ160D5 | 2F8 | 160 | 3.1 | 650.0 | 6500 | 0.25 | 0.5 | 121.6 | 11 |
| 1SMA2EZ170D5 | 2F9 | 170 | 2.9 | 675.0 | 7000 | 0.25 | 0.5 | 130.4 | 11 |
| 1SMA2EZ180D5 | 2G1 | 180 | 2.8 | 725.0 | 7000 | 0.25 | 0.5 | 136.8 | 10 |
| 1SMA2EZ190D5 | 2G2 | 190 | 2.6 | 825.0 | 8000 | 0.25 | 0.5 | 144.8 | 10 |
| 1SMA2EZ200D5 | 2G3 | 200 | 2.5 | 900.0 | 8000 | 0.25 | 0.5 | 152.0 | 9.0 |
| 1SMA2EZ220D5 | 2G4 | 220 | 2.0 | 2000.0 | 8500 | 0.25 | 0.5 | 167.0 | 8.0 |
| 1SMA2EZ270D5 | 2G5 | 270 | 1.6 | 2200.0 | 8500 | 0.25 | 0.5 | 205.0 | 6.7 |
| 1SMA2EZ300D5 | 2G6 | 300 | 1.5 | 2200.0 | 9000 | 0.25 | 0.5 | 228.0 | 5.9 |
| 1SMA2EZ330D5 | 2G7 | 330 | 1.4 | 2300.0 | 9000 | 0.25 | 0.5 | 250.0 | 5.4 |

Note: 1. Type numbers listed have standard tolerance on the nominal zener voltage of ±5%.
2. Measured under thermal equilibrium and DC ($I_{ZT}$) test conditions.
3. The Zener impedance is derived from the 60Hz AC voltage which results when an AC current having an RMS value equal to 10% of the Zener current ($I_{ZT}$ or $I_{ZK}$) is superimposed on $I_{ZT}$ or $I_{ZK}$. Zener impedance is measured at two points to insure a sharp knee on the breakdown curve and to eliminate unstable units.

## MARKING INFORMATION


Cathode = Polarity Band
xx = Device Code, See Table 1

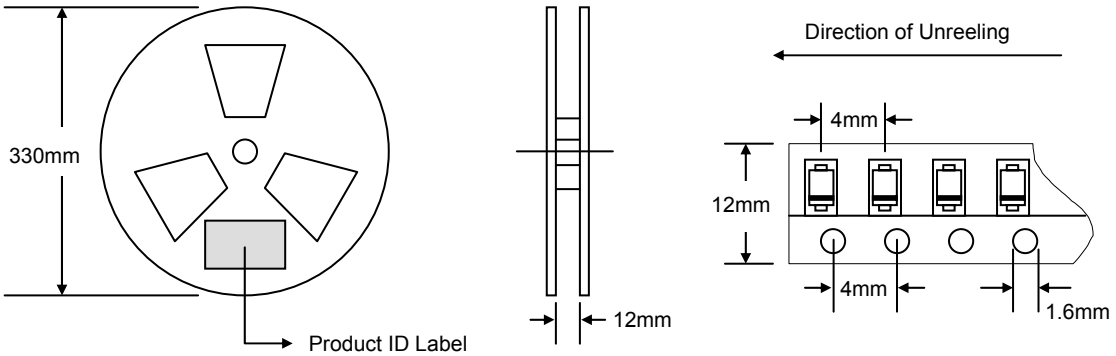
## RECOMMENDED FOOTPRINT




inches(mm)

## PACKAGING INFORMATION

### TAPE & REEL




| Reel Diameter (mm) | Quantity (PCS) | Inner Box Size L x W x H (mm) | Quantity (PCS) | Carton Size L x W x H (mm) | Quantity (PCS) | Approx. Gross Weight (KG) |
|---|---|---|---|---|---|---|
| 330 | 5,000 | 340 x 337 x 45 | 10,000 | 370 x 370 x 420 | 80,000 | 14.0 |

**Note:** 1. Paper reel, white or gray color.
2. Components are packed in accordance with EIA standard 481-1 and 481-2.

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## ORDERING INFORMATION

| Product No. | Package Type | Shipping Quantity |
|---|---|---|
| 1SMA2EZxxD5-T3 | SMA | 5000/Tape & Reel |

1. Shipping quantity given is for minimum packing quantity only. For minimum order quantity, please consult the Sales Department.
2. **To order RoHS / Lead Free version (with Lead Free finish), add "-LF" suffix to part number above. For example, 1SMA2EZ2.7D5-T3-LF**.



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