

### Surface Mount Zener Diodes

**(Pb)** Lead(Pb)-Free

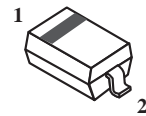
#### Features:

- \*500mw Power Dissipation
- \*Ideal for Surface Mounted Application
- \*Zener Breakdown Voltage Range 2.4V to 110V

#### Mechanical Data:

- \*Case : SOD-123 Molded plastic
- \*Terminals: Solderable per MIL-STD-202, Method 208
- \*Polarity: Cathode Indicated by Polarity Band
- \*Marking: Marking Code (See Table on Page 3)
- \*Weigh: 0.01grams(approx)

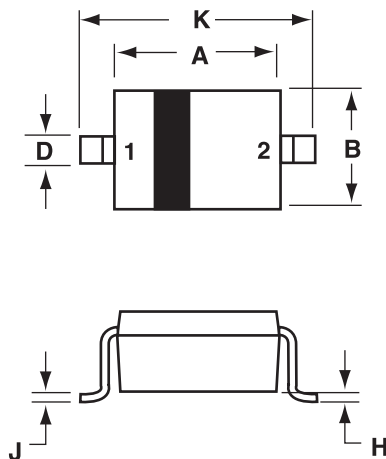
**SMALL SIGNAL  
ZENER DIODES  
500m WATTS**



**SOD-123**

### SOD-123 Outline Dimensions

Unit:mm



| SOD-123 |          |      |
|---------|----------|------|
| Dim     | Min      | Max  |
| A       | 2.55     | 2.85 |
| B       | 1.40     | 1.80 |
| C       | 0.95     | 1.35 |
| D       | 0.50     | 0.70 |
| E       | 0.30 REF |      |
| H       | -        | 0.10 |
| J       | -        | 0.15 |
| K       | 3.55     | 3.85 |

PIN 1. CATHODE  
2. ANODE

## Maximum Ratings and Electrical Characteristics (TA=25 °C Unless Otherwise Noted)

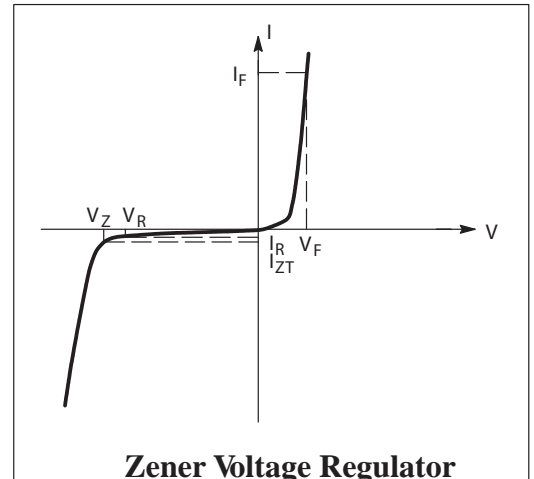
| Characteristics  | Symbol  | Value      | Unit |
|--|---------|------------|------|
| Total Power Dissipation on FR-5 Board <sup>(1)</sup><br>@T <sub>L</sub> =75 °C | PD      | 500        | mW   |
| Thermal Resistance Junction to Ambient Air <sup>(2)</sup>                      | R θJA   | 340        | °C/W |
| Forward Voltage @ IF=10mA  | VF      | 0.9        | V    |
| Junction and Storage Temperature Range   | Tj,TSTG | -55 to+125 | °C   |

NOTES:1. FR-5=3.5×1.5inches, using the on minimum recommedned footprint.  
2. Thermal Resistance measurement obtained via infrared scan method.

## ELECTRICAL CHARACTERISTICS

(TA = 25 °C unless otherwise noted, VF = 0.9 V Max. @ IF = 10 mA)

| Symbol | Parameter                     |
|--------|-------------------------------|
| VZ     | Reverse Zener Voltage @ IZT   |
| IZT    | Reverse Current               |
| ZZT    | Maximum Zener Impedance @ IZT |
| IR     | Reverse Leakage Current @ VR  |
| VR     | Reverse Voltage               |
| IF     | Forward Current               |
| VF     | Forward Voltage @ IF          |
| Izk    | Reverse Current               |
| Zzk    | Maximun Zener Impedance @ Izk |



## Device Marking

| Item             | Marking   | Equivalent Circuit Diagram |
|------------------|---|----------------------------|
| MMSZ5221B Series | XX=Specific Device Code<br>(See Table on page3) |                            |

ELECTRICAL CHARACTERISTICS ( $T_A = 25\text{ }^\circ\text{C}$  unless otherwise noted,  $V_F = 0.9\text{ V Max.}$  @  $I_F = 10\text{ mA}$ )

| Device    | Device Marking | Zener Voltage (Notes 3 and 4) |     |       |            | Zener Impedance (Note 5) |                     |      | Leakage Current |       |
|-----------|----------------|-------------------------------|-----|-------|------------|--------------------------|---------------------|------|-----------------|-------|
|           |                | $V_Z$ (Volts)                 |     |       | @ $I_{ZT}$ | $Z_{ZT}$ @ $I_{ZT}$      | $Z_{ZK}$ @ $I_{ZK}$ |      | $I_R$ @ $V_R$   |       |
|           |                | Min                           | Nom | Max   | mA         | $\Omega$                 | $\Omega$            | mA   | $\mu\text{A}$   | Volts |
| MMSZ5221B | C1             | 2.28                          | 2.4 | 2.52  | 20         | 30                       | 1200                | 0.25 | 100             | 1     |
| MMSZ5222B | C2             | 2.38                          | 2.5 | 2.63  | 20         | 30                       | 1250                | 0.25 | 100             | 1     |
| MMSZ5223B | C3             | 2.57                          | 2.7 | 2.84  | 20         | 30                       | 1300                | 0.25 | 75              | 1     |
| MMSZ5224B | C4             | 2.66                          | 2.8 | 2.94  | 20         | 30                       | 1400                | 0.25 | 75              | 1     |
| MMSZ5225B | C5             | 2.85                          | 3.0 | 3.15  | 20         | 29                       | 1600                | 0.25 | 50              | 1     |
| MMSZ5226B | D1             | 3.14                          | 3.3 | 3.47  | 20         | 28                       | 1600                | 0.25 | 25              | 1     |
| MMSZ5227B | D2             | 3.42                          | 3.6 | 3.78  | 20         | 24                       | 1700                | 0.25 | 15              | 1     |
| MMSZ5228B | D3             | 3.71                          | 3.9 | 4.10  | 20         | 23                       | 1900                | 0.25 | 10              | 1     |
| MMSZ5229B | D4             | 4.09                          | 4.3 | 4.52  | 20         | 22                       | 2000                | 0.25 | 5               | 1     |
| MMSZ5230B | D5             | 4.47                          | 4.7 | 4.94  | 20         | 19                       | 1900                | 0.25 | 5               | 2     |
| MMSZ5231B | E1             | 4.85                          | 5.1 | 5.36  | 20         | 17                       | 1600                | 0.25 | 5               | 2     |
| MMSZ5232B | E2             | 5.32                          | 5.6 | 5.88  | 20         | 11                       | 1600                | 0.25 | 5               | 3     |
| MMSZ5233B | E3             | 5.70                          | 6.0 | 6.30  | 20         | 7                        | 1600                | 0.25 | 5               | 3.5   |
| MMSZ5234B | E4             | 5.89                          | 6.2 | 6.51  | 20         | 7                        | 1000                | 0.25 | 5               | 4     |
| MMSZ5235B | E5             | 6.46                          | 6.8 | 7.14  | 20         | 5                        | 750                 | 0.25 | 3               | 5     |
| MMSZ5236B | F1             | 7.13                          | 7.5 | 7.88  | 20         | 6                        | 500                 | 0.25 | 3               | 6     |
| MMSZ5237B | F2             | 7.79                          | 8.2 | 8.61  | 20         | 8                        | 500                 | 0.25 | 3               | 6.5   |
| MMSZ5238B | F3             | 8.27                          | 8.7 | 9.14  | 20         | 8                        | 600                 | 0.25 | 3               | 6.5   |
| MMSZ5239B | F4             | 8.65                          | 9.1 | 9.56  | 20         | 10                       | 600                 | 0.25 | 3               | 7     |
| MMSZ5240B | F5             | 9.50                          | 10  | 10.50 | 20         | 17                       | 600                 | 0.25 | 3               | 8     |
| MMSZ5241B | H1             | 10.45                         | 11  | 11.55 | 20         | 22                       | 600                 | 0.25 | 2               | 8.4   |
| MMSZ5242B | H2             | 11.40                         | 12  | 12.60 | 20         | 30                       | 600                 | 0.25 | 1               | 9.1   |
| MMSZ5243B | H3             | 12.35                         | 13  | 13.65 | 9.5        | 13                       | 600                 | 0.25 | 0.5             | 9.9   |
| MMSZ5244B | H4             | 13.30                         | 14  | 14.70 | 9.0        | 15                       | 600                 | 0.25 | 0.1             | 10    |
| MMSZ5245B | H5             | 14.25                         | 15  | 15.75 | 8.5        | 16                       | 600                 | 0.25 | 0.1             | 11    |
| MMSZ5246B | J1             | 15.20                         | 16  | 16.80 | 7.8        | 17                       | 600                 | 0.25 | 0.1             | 12    |
| MMSZ5247B | J2             | 16.15                         | 17  | 17.85 | 7.4        | 19                       | 600                 | 0.25 | 0.1             | 13    |
| MMSZ5248B | J3             | 17.10                         | 18  | 18.90 | 7.0        | 21                       | 600                 | 0.25 | 0.1             | 14    |
| MMSZ5250B | J5             | 19.00                         | 20  | 21.00 | 6.2        | 25                       | 600                 | 0.25 | 0.1             | 15    |
| MMSZ5251B | K1             | 20.90                         | 22  | 23.10 | 5.6        | 29                       | 600                 | 0.25 | 0.1             | 17    |
| MMSZ5252B | K2             | 22.80                         | 24  | 25.20 | 5.2        | 33                       | 600                 | 0.25 | 0.1             | 18    |
| MMSZ5253B | K3             | 23.75                         | 25  | 26.25 | 5.0        | 35                       | 600                 | 0.25 | 0.1             | 19    |
| MMSZ5254B | K4             | 25.65                         | 27  | 28.35 | 4.6        | 41                       | 600                 | 0.25 | 0.1             | 21    |
| MMSZ5255B | K5             | 26.60                         | 28  | 29.40 | 4.5        | 44                       | 600                 | 0.25 | 0.1             | 21    |
| MMSZ5256B | M1             | 28.50                         | 30  | 31.50 | 4.2        | 49                       | 600                 | 0.25 | 0.1             | 23    |
| MMSZ5257B | M2             | 31.35                         | 33  | 34.65 | 3.8        | 58                       | 700                 | 0.25 | 0.1             | 25    |
| MMSZ5258B | M3             | 34.20                         | 36  | 37.80 | 3.4        | 70                       | 700                 | 0.25 | 0.1             | 27    |
| MMSZ5259B | M4             | 37.05                         | 39  | 40.95 | 3.2        | 80                       | 800                 | 0.25 | 0.1             | 30    |
| MMSZ5260B | M5             | 40.85                         | 43  | 45.15 | 3.0        | 93                       | 900                 | 0.25 | 0.1             | 33    |
| MMSZ5261B | N1             | 44.65                         | 47  | 49.35 | 2.7        | 105                      | 1000                | 0.25 | 0.1             | 36    |
| MMSZ5262B | N2             | 48.45                         | 51  | 53.55 | 2.5        | 125                      | 1100                | 0.25 | 0.1             | 39    |
| MMSZ5263B | N3             | 53.20                         | 56  | 58.80 | 2.2        | 150                      | 1300                | 0.25 | 0.1             | 43    |
| MMSZ5264B | N4             | 57.00                         | 60  | 63.00 | 2.1        | 170                      | 1400                | 0.25 | 0.1             | 46    |
| MMSZ5265B | N5             | 58.90                         | 62  | 65.10 | 2.0        | 185                      | 1400                | 0.25 | 0.1             | 47    |
| MMSZ5266B | P1             | 64.60                         | 68  | 71.40 | 1.8        | 230                      | 1600                | 0.25 | 0.1             | 52    |
| MMSZ5267B | P2             | 71.25                         | 75  | 78.75 | 1.7        | 270                      | 1700                | 0.25 | 0.1             | 56    |
| MMSZ5268B | P3             | 77.90                         | 82  | 86.10 | 1.5        | 330                      | 2000                | 0.25 | 0.1             | 62    |
| MMSZ5269B | P4             | 82.65                         | 87  | 91.35 | 1.4        | 370                      | 2200                | 0.25 | 0.1             | 68    |
| MMSZ5270B | P5             | 86.45                         | 91  | 95.55 | 1.4        | 400                      | 2300                | 0.25 | 0.1             | 69    |
| MMSZ5272B | R2             | 104.5                         | 110 | 115.5 | 1.1        | 750                      | 3000                | 0.25 | 0.1             | 84    |

NOTE: 3. The type numbers shown have a standard tolerance of  $\pm 5\%$  on the nominal Zener voltage.

4. Nominal Zener voltage is measured with the device junction in thermal equilibrium at  $T_L = 30\text{ }^\circ\text{C} \pm 1\text{ }^\circ\text{C}$

5.  $Z_{ZT}$  and  $Z_{ZK}$  are measured by dividing the AC voltage drop across the device by the ac current applied.

The specified limits are for  $I_{Z(AC)} = 0.1 I_{Z(dc)}$  with the AC frequency = 1 KHz.

TYPICAL CHARACTERISTICS

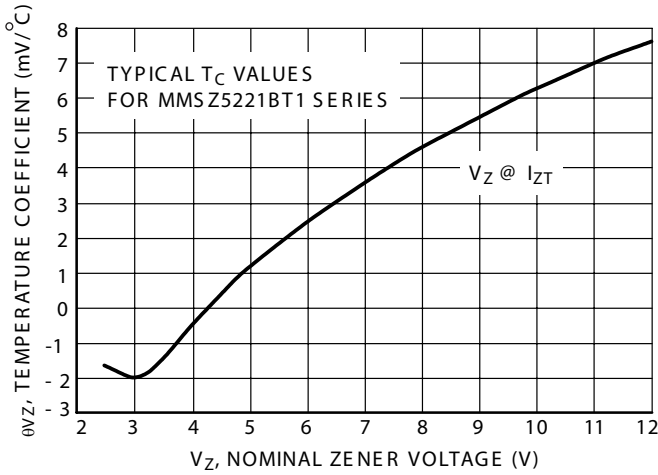


Figure 1. Temperature Coefficients (Temperature Range -55°C to +150°C)

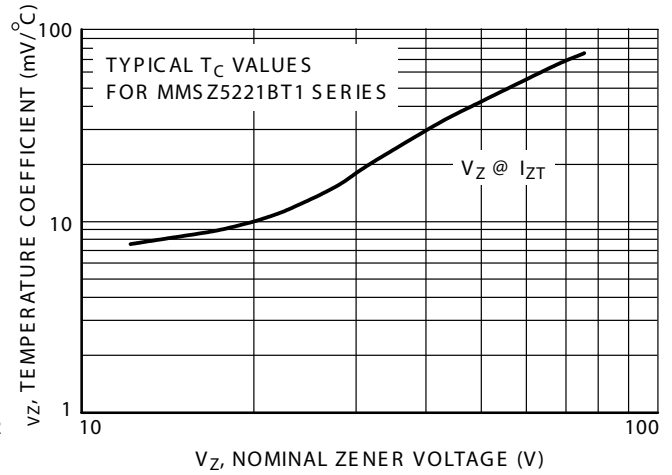


Figure 2. Temperature Coefficients (Temperature Range -55°C to +150°C)

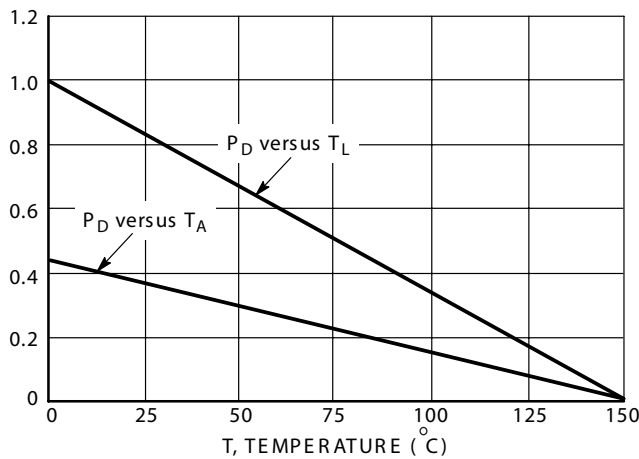


Figure 3. Steady State Power Derating

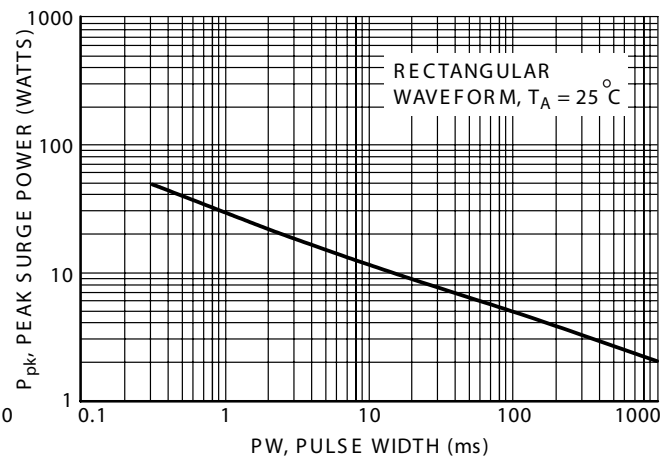


Figure 4. Maximum Nonrepetitive Surge Power

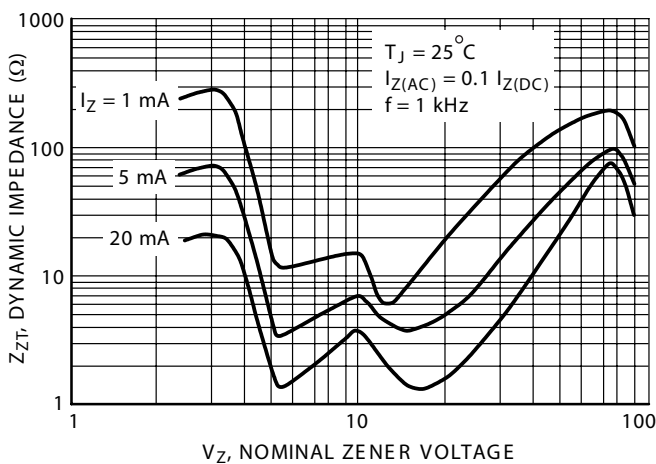


Figure 5. Effect of Zener Voltage on Zener Impedance

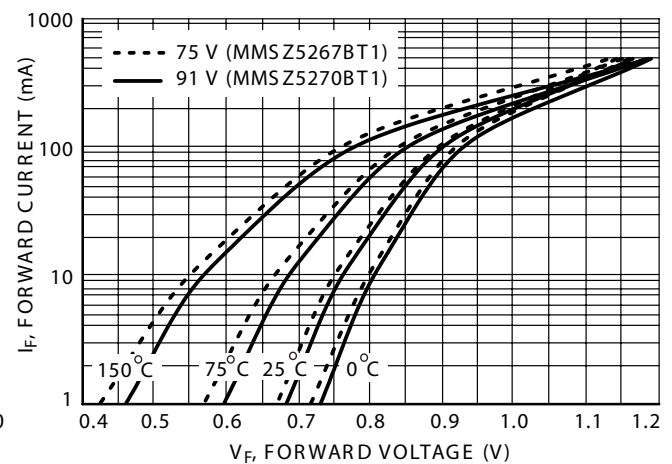


Figure 6. Typical Forward Voltage

TYPICAL CHARACTERISTICS

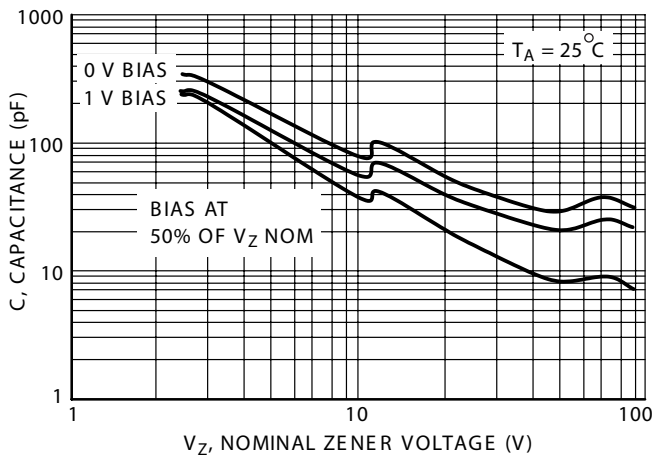


Figure 7. Typical Capacitance

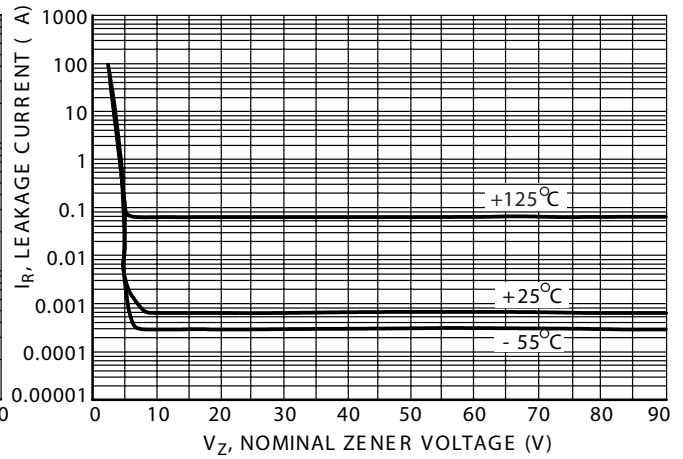


Figure 8. Typical Leakage Current

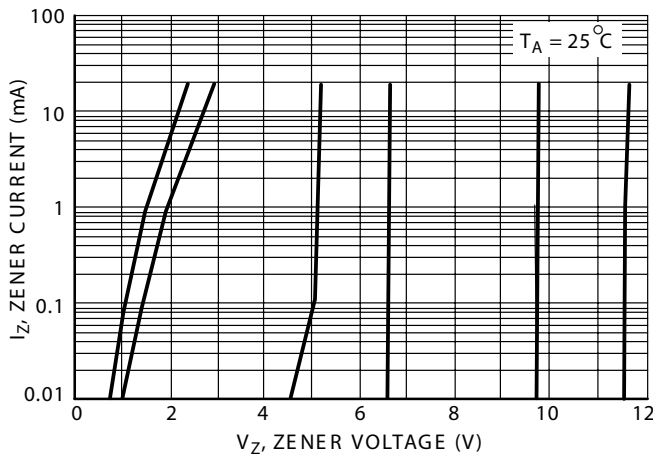


Figure 9. Zener Voltage versus Zener Current ( $V_Z$  Up to 12 V)

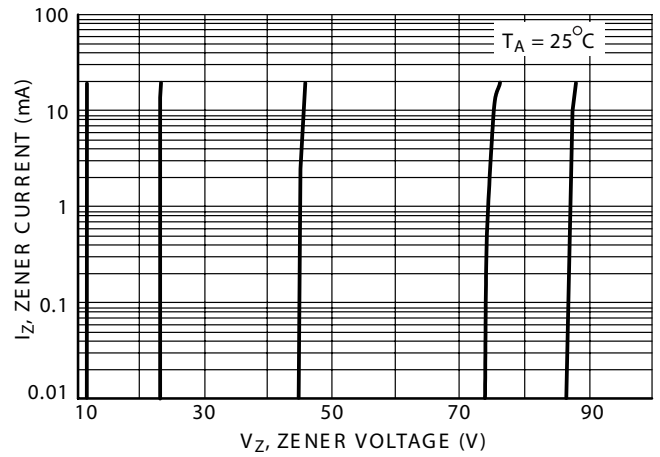


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)