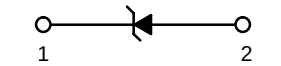
**Features**

- 500 mW Rating on FR−4 or FR−5 Board
- Wide Zener Reverse Voltage Range − 2.4 V to 110 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- General Purpose, Medium Current
- ESD Rating of Class 3 (>16 kV) per Human Body Model
- We declare that the material of product compliance with RoHS requirements.


**SOD−123**

**Mechanical Characteristics:**

**CASE:** Void-free, transfer-molded, thermosetting plastic case
**FINISH:** Corrosion resistant finish, easily solderable
**MAXIMUM CASE TEMPERATURE FOR SOLDERING PURPOSES:**
260°C for 10 Seconds
**POLARITY:** Cathode indicated by polarity band
**FLAMMABILITY RATING:** UL 94 V−0




**MAXIMUM RATINGS**

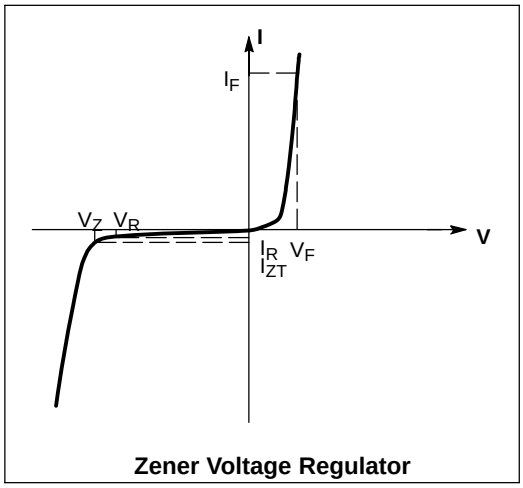
| Rating | Symbol | Max | Unit |
|---|---|---|---|
| Total Power Dissipation on FR−5 Board, (Note 1) @ $T_L$ = 75°C<br>Derated above 75°C | $P_D$ | 500<br>6.7 | mW<br>mW/°C |
| Thermal Resistance, Junction−to−Ambient (Note 2) | $R_{\theta JA}$ | 340 | °C/W |
| Thermal Resistance, Junction−to−Lead (Note 2) | $R_{\theta JL}$ | 150 | °C/W |
| Junction and Storage Temperature Range | $T_J$, $T_{stg}$ | −55 to +125 | °C |

Maximum ratings are those values beyond which device damage can occur. Maximum ratings applied to the device are individual stress limit values (not normal operating conditions) and are not valid simultaneously. If these limits are exceeded, device functional operation is not implied, damage may occur and reliability may be affected.

1. FR−5 = 3.5 X 1.5 inches, using the minimum recommended footprint.
2. Thermal Resistance measurement obtained via infrared Scan Method.

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted, $V_F$ = 0.95 V Max. @ $I_F$ = 10 mA)

| Symbol | Parameter |
|---|---|
| $V_Z$ | Reverse Zener Voltage @ $I_{ZT}$ |
| $I_{ZT}$ | Reverse Current |
| $Z_{ZT}$ | Maximum Zener Impedance @ $I_{ZT}$ |
| $I_{ZK}$ | Reverse Current |
| $Z_{ZK}$ | Maximum Zener Impedance @ $I_{ZK}$ |
| $I_R$ | Reverse Leakage Current @ $V_R$ |
| $V_R$ | Reverse Voltage |
| $I_F$ | Forward Current |
| $V_F$ | Forward Voltage @ $I_F$ |




**Zener Voltage Regulator**

**ELECTRICAL CHARACTERISTICS** ($T_A$ = 25°C unless otherwise noted, $V_F$ = 0.9 V Max. @ $I_F$ = 10 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 | Ω | Ω | mA | μA | 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 |

3. The type numbers shown have a standard tolerance of ±5% on the nominal Zener voltage.
4. Nominal Zener voltage is measured with the device junction in thermal equilibrium at $T_L$ = 30°C ±1°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

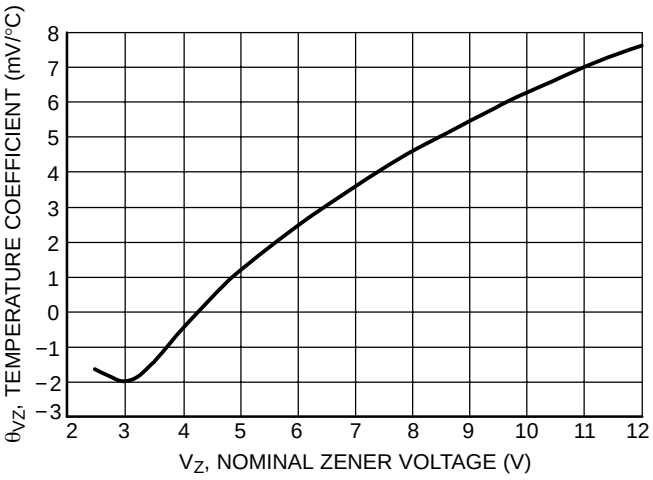



**Figure 1. Temperature Coefficients (Temperature Range −55°C to +150°C)**

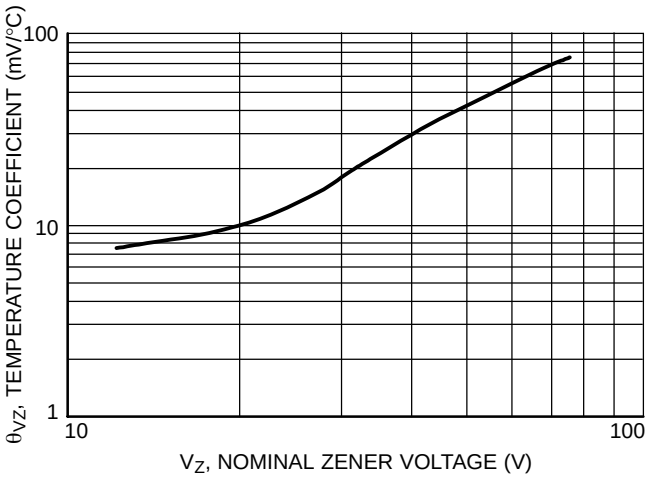



**Figure 2. Temperature Coefficients (Temperature Range −55°C to +150°C)**

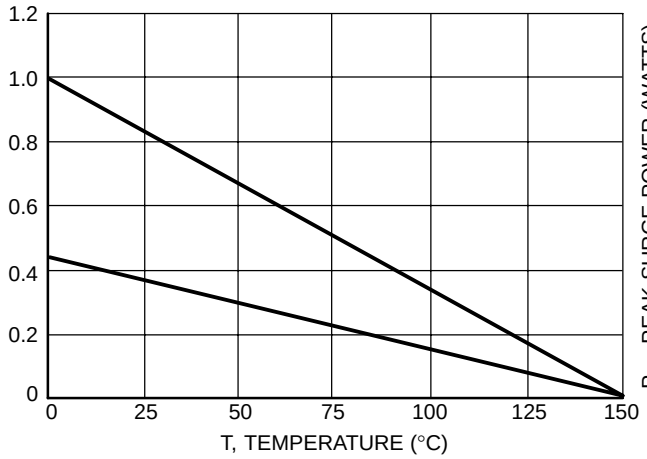



**Figure 3. Steady State Power Derating**

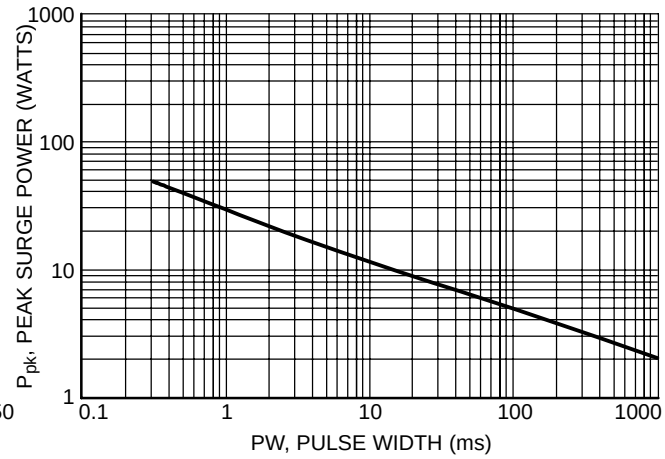



**Figure 4. Maximum Nonrepetitive Surge Power**

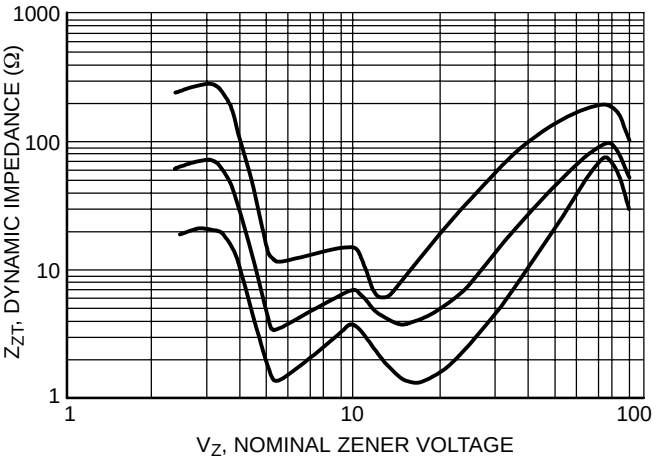



**Figure 5. Effect of Zener Voltage on Zener Impedance**

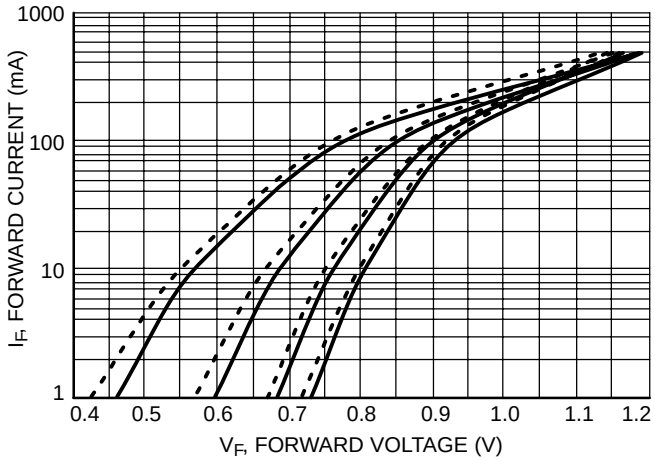



**Figure 6. Typical Forward Voltage**

## TYPICAL CHARACTERISTICS

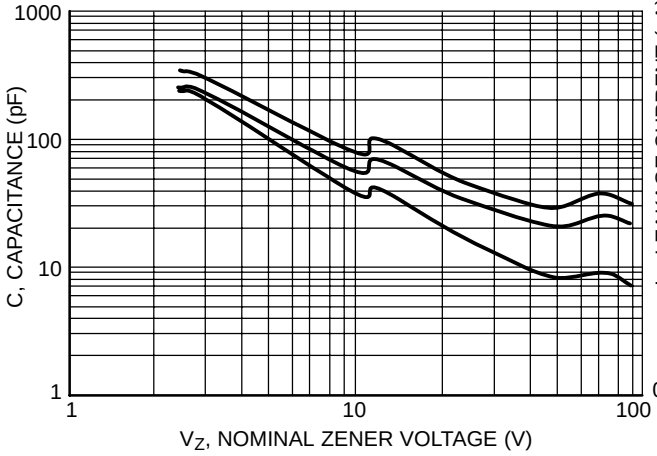



**Figure 7. Typical Capacitance**

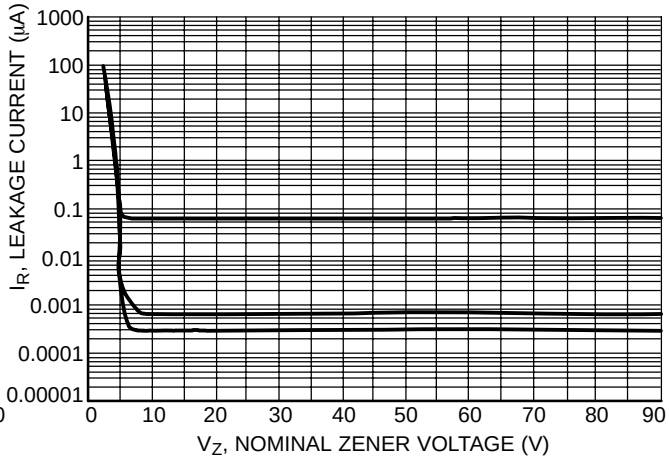



**Figure 8. Typical Leakage Current**

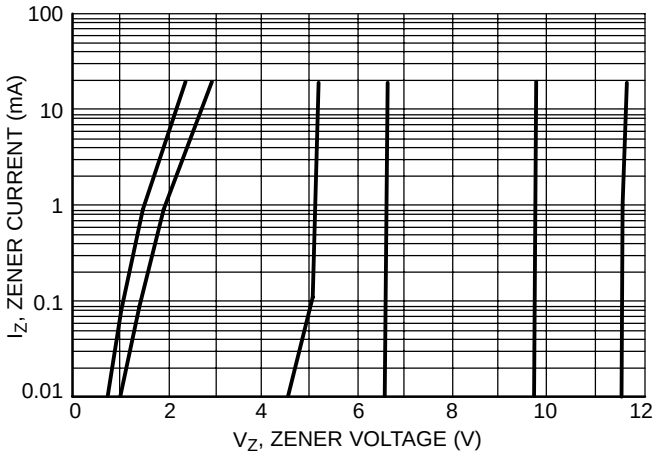



**Figure 9. Zener Voltage versus Zener Current ($V_Z$ Up to 12 V)**

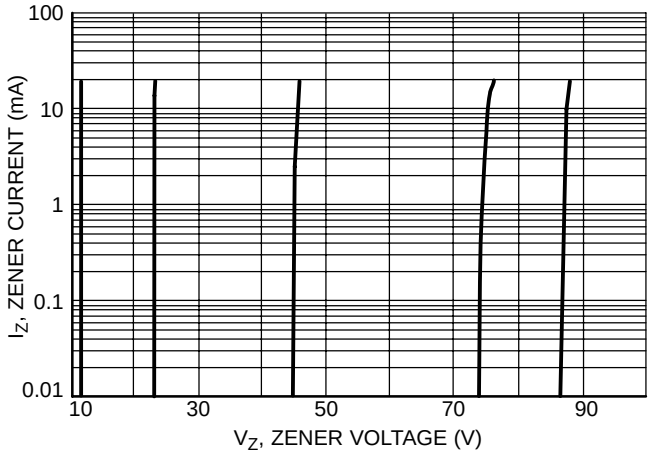
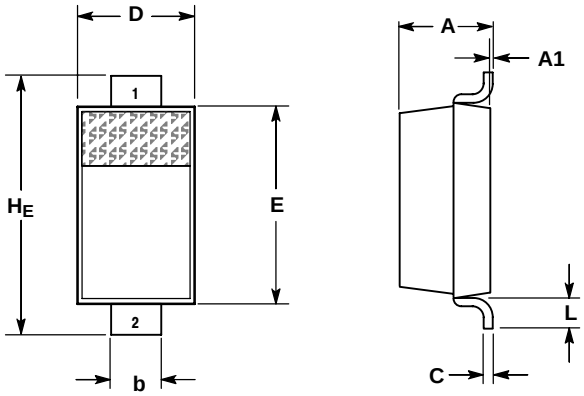



**Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)**

## SOD−123

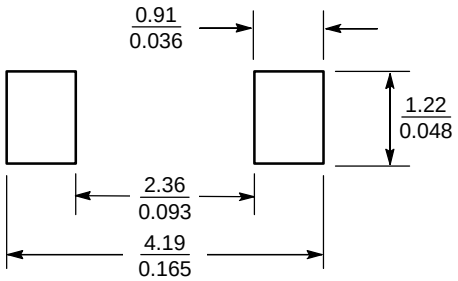



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.

| | MILLIMETERS | | | INCHES | | |
|---|---|---|---|---|---|---|
| DIM | MIN | NOM | MAX | MIN | NOM | MAX |
| A | 0.94 | 1.17 | 1.35 | 0.037 | 0.046 | 0.053 |
| A1 | 0.00 | 0.05 | 0.10 | 0.000 | 0.002 | 0.004 |
| b | 0.51 | 0.61 | 0.71 | 0.020 | 0.024 | 0.028 |
| c | --- | --- | 0.15 | --- | --- | 0.006 |
| D | 1.40 | 1.60 | 1.80 | 0.055 | 0.063 | 0.071 |
| E | 2.54 | 2.69 | 2.84 | 0.100 | 0.106 | 0.112 |
| $H_E$ | 3.56 | 3.68 | 3.86 | 0.140 | 0.145 | 0.152 |
| L | 0.25 | --- | --- | 0.010 | --- | --- |

STYLE 1:
PIN 1. CATHODE
2. ANODE

### SOLDERING FOOTPRINT*




SCALE 10:1 $\left(\frac{mm}{inches}\right)$