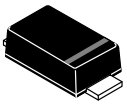
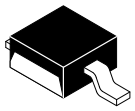
# Very Low Forward Voltage Trench-based Schottky Rectifier

# NRVTS2H60ESF, NRVTSM260EV2

**TRENCH SCHOTTKY RECTIFIER**
**2.0 AMPERES**
**60 VOLTS**



**SOD−123FL**
**CASE 498**



**POWERMITE**
**CASE 457**

### Features

- Fine Lithography Trench−based Schottky Technology for Very Low Forward Voltage and Low Leakage
- Fast Switching with Exceptional Temperature Stability
- Low Power Loss and Lower Operating Temperature
- Higher Efficiency for Achieving Regulatory Compliance
- Low Thermal Resistance
- High Surge Capability
- NRV Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC−Q101 Qualified and PPAP Capable
- These Devices are Pb−Free, Halogen Free/BFR Free and are RoHS Compliant

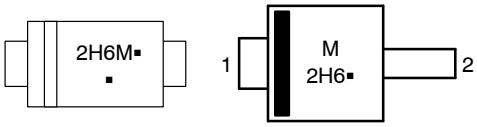
### Mechanical Characteristics:

- Case: Molded Epoxy
- Epoxy Meets UL 94 V−0 @ 0.125 in
- Weight: 11.7 mg (Approximately)
- Lead and Mounting Surface Temperature for Soldering Purposes: 260°C Maximum for 10 Seconds
- MSL 1

### Typical Applications

- Switching Power Supplies including Compact Adapters and Flat Panel Display
- High Frequency and DC−DC Converters
- Freewheeling and OR−ing diodes
- Reverse Battery Protection
- Instrumentation

### MARKING DIAGRAMS




2H6 = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

### ORDERING INFORMATION

| Device | Package | Shipping† |
|---|---|---|
| NRVTS2H60ESFT1G | SOD−123FL (Pb−Free) | 3,000 / Tape & Reel |
| NRVTS2H60ESFT3G | SOD−123FL (Pb−Free) | 10,000 / Tape & Reel |
| NRVTSM260EV2T1G | Powermite (Pb−Free) | 3,000 / Tape & Reel |
| NRVTSM260EV2T3G | Powermite (Pb−Free) | 12,000 / Tape & Reel |

†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specification Brochure, BRD8011/D.

## MAXIMUM RATINGS

| Rating | Symbol | Value | Unit |
|---|---|---|---|
| Peak Repetitive Reverse Voltage<br>Working Peak Reverse Voltage<br>DC Blocking Voltage | $V_{RRM}$<br>$V_{RWM}$<br>$V_R$ | 60 | V |
| Average Rectified Forward Current<br>($T_L$ = 125°C) | $I_O$ | 2.0 | A |
| Peak Repetitive Forward Current<br>(Square Wave, 20 kHz, $T_L$ = 139°C) | $I_{FRM}$ | 4.0 | A |
| Non−Repetitive Peak Surge Current<br>(Surge Applied at Rated Load Conditions Halfwave, Single Phase, 60 Hz) | $I_{FSM}$ | 50 | A |
| Storage and Operating Junction Temperature Range (Note 1) | $T_{stg}$, $T_J$ | −65 to +175 | °C |

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. The heat generated must be less than the thermal conductivity from Junction−to−Ambient: $dP_D/dT_J < 1/R_{\theta JA}$.

## THERMAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| **SOD−123FL** | | | |
| Thermal Resistance, Junction−to−Lead (Note 2) | $\Psi_{JCL}$ | 24.4 | °C/W |
| Thermal Resistance, Junction−to−Ambient (Note 2) | $R_{\theta JA}$ | 85 | °C/W |
| Thermal Resistance, Junction−to−Ambient (Note 3) | $R_{\theta JA}$ | 330 | °C/W |
| **POWERMITE** | | | |
| Thermal Resistance, Junction−to−Lead (Note 2) | $\Psi_{JCL}$ | 8.6 | °C/W |
| Thermal Resistance, Junction−to−Ambient (Note 2) | $R_{\theta JA}$ | 80 | °C/W |
| Thermal Resistance, Junction−to−Ambient (Note 3) | $R_{\theta JA}$ | 237 | °C/W |

## ELECTRICAL CHARACTERISTICS

| Characteristic | Symbol | Value | Unit |
|---|---|---|---|
| Maximum Instantaneous Forward Voltage (Note 4)<br>($I_F$ = 1.0 A, $T_J$ = 25°C)<br>($I_F$ = 2.0 A, $T_J$ = 25°C)<br>($I_F$ = 1.0 A, $T_J$ = 125°C)<br>($I_F$ = 2.0 A, $T_J$ = 125°C) | $V_F$ | <br>0.55<br>0.65<br>0.47<br>0.58 | V |
| Maximum Instantaneous Reverse Current (Note 4)<br>(Rated dc Voltage, $T_J$ = 25°C)<br>(Rated dc Voltage, $T_J$ = 125°C) | $I_R$ | <br>12<br>3 | <br>μA<br>mA |

Product parametric performance is indicated in the Electrical Characteristics for the listed test conditions, unless otherwise noted. Product performance may not be indicated by the Electrical Characteristics if operated under different conditions.

2. Mounted with 700 $mm^2$ copper pad size (Approximately 1 $in^2$) 1 oz FR4 Board.
3. Mounted with pad size approximately 20 $mm^2$ copper, 1 oz FR4 Board.
4. Pulse Test: Pulse Width ≤ 380 μs, Duty Cycle ≤ 2.0%.

## TYPICAL CHARACTERISTICS

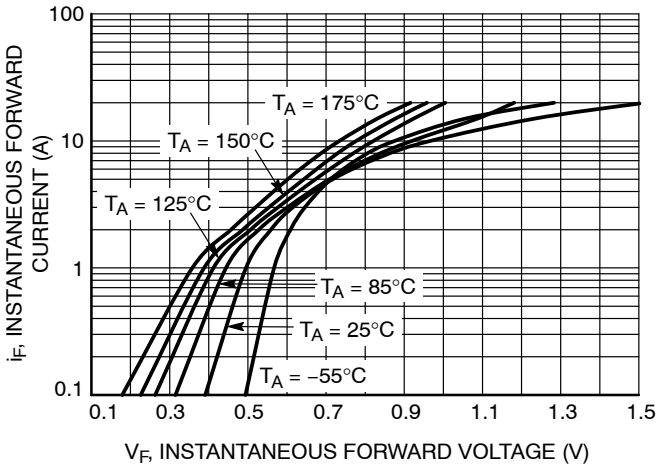



**Figure 1. Typical Instantaneous Forward Characteristics**

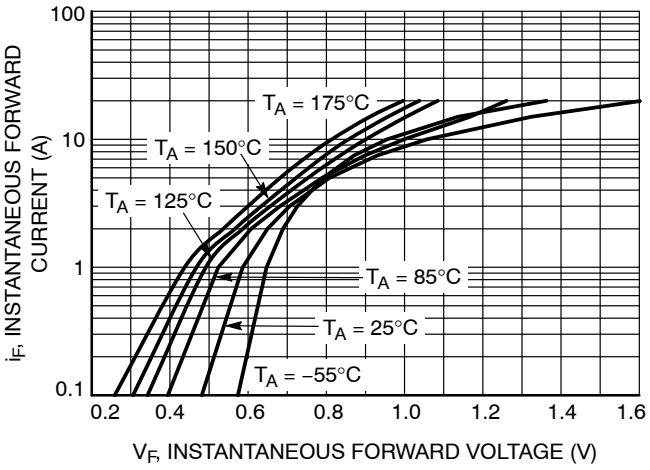



**Figure 2. Maximum Instantaneous Forward Characteristics**

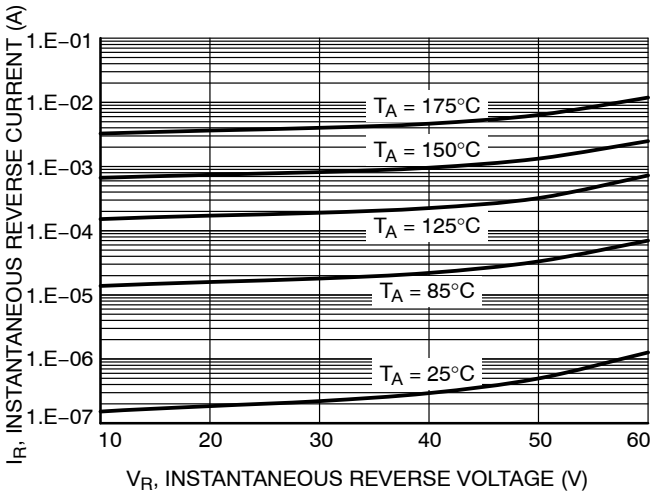



**Figure 3. Typical Reverse Characteristics**

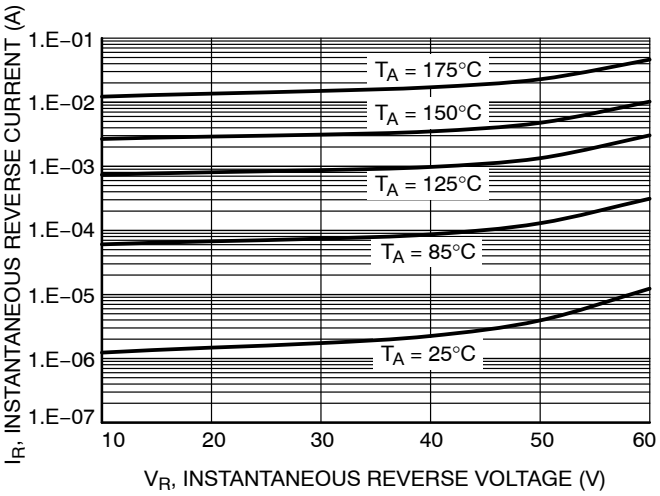



**Figure 4. Maximum Reverse Characteristics**

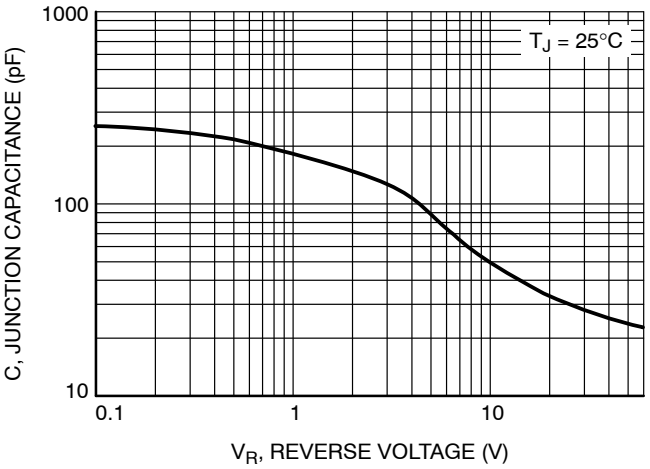



**Figure 5. Typical Junction Capacitance**

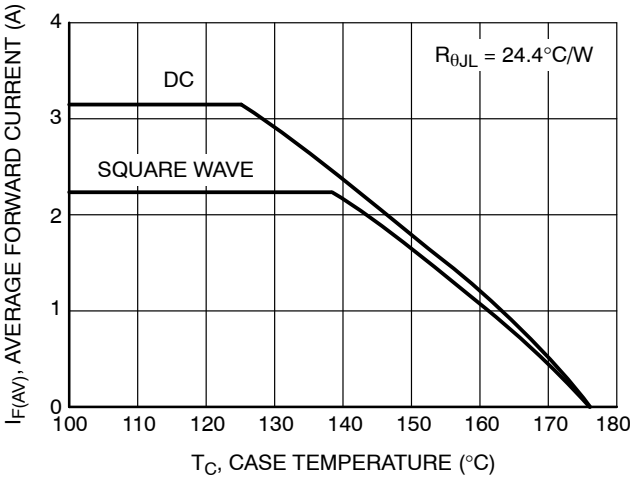



**Figure 6. Current Derating**

## TYPICAL CHARACTERISTICS

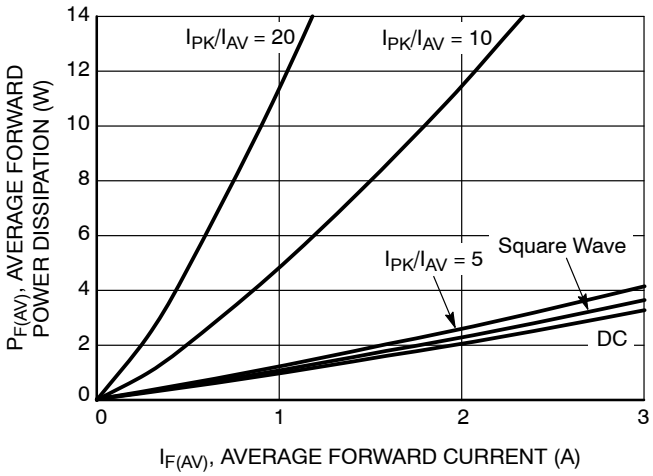



**Figure 7. Forward Power Dissipation**

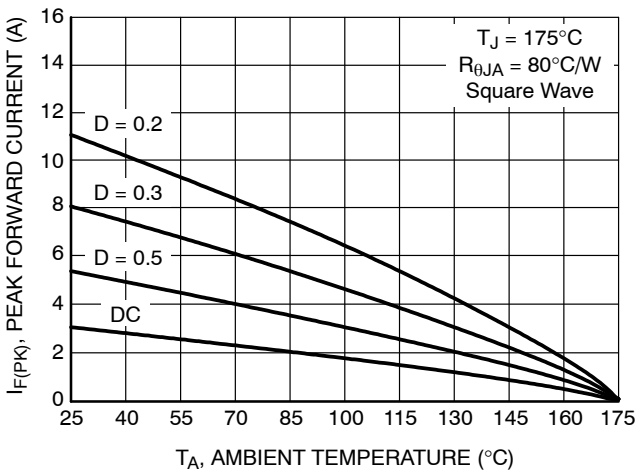



**Figure 8. Forward Current Derating of Ambient Temperature**

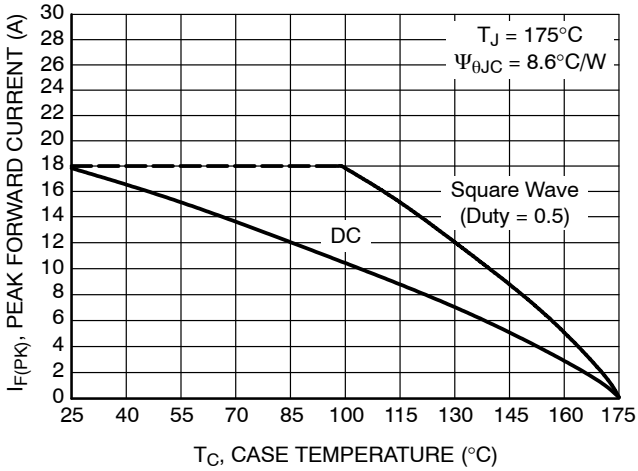



**Figure 9. Forward Current Derating of Case Temperature**

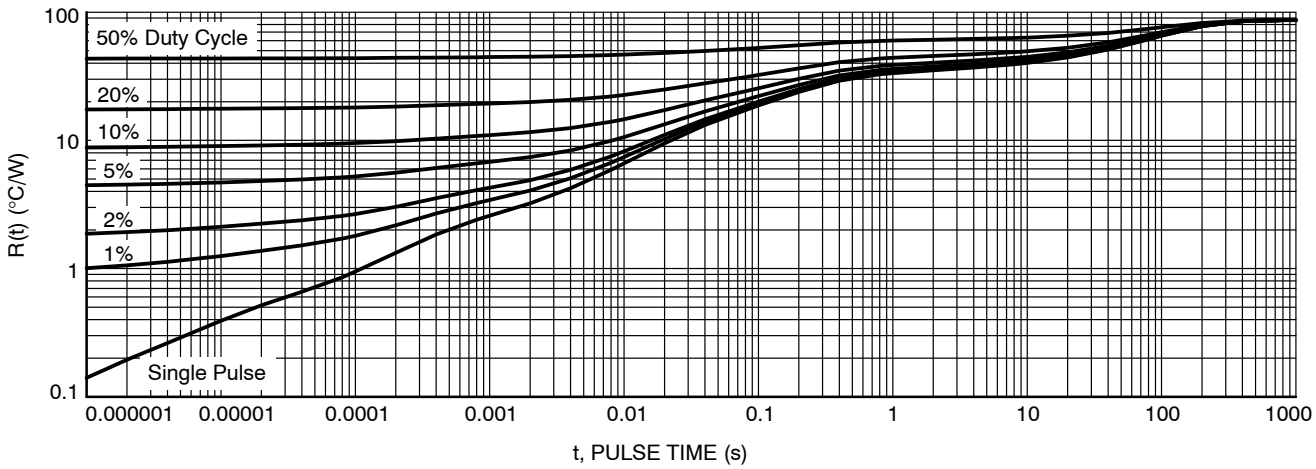
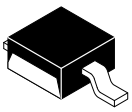


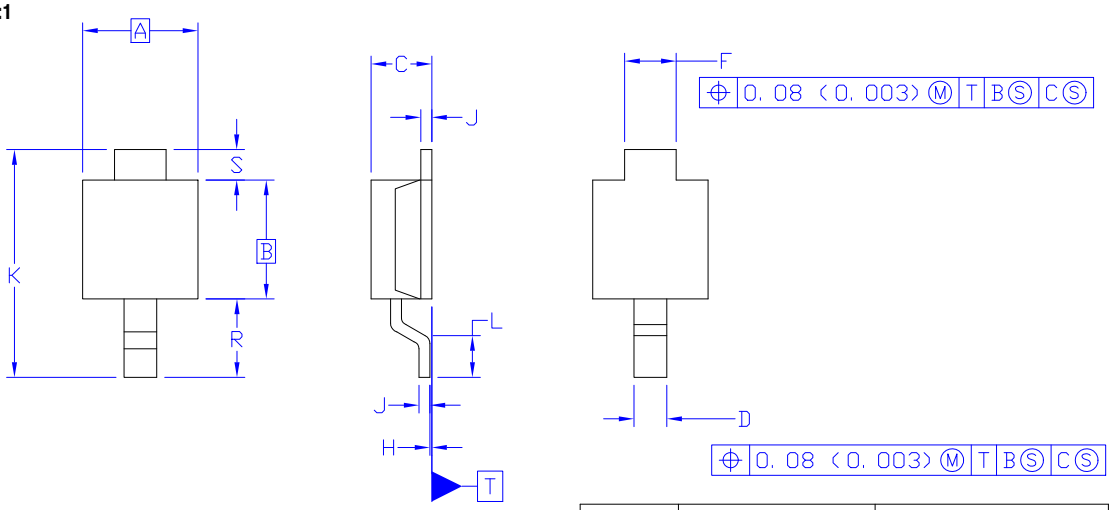

**Figure 10. Thermal Characteristics**

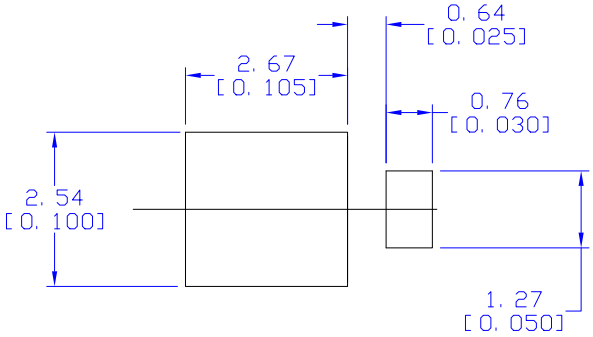


**SCALE 4:1**

**POWERMITE**
CASE 457
ISSUE G

DATE 12 JAN 2022



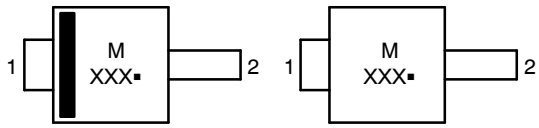

RECOMMENDED
MOUNTING FOOTPRINT

| DIM | MILLIMETERS | | INCHES | |
|---|---|---|---|---|
| | MIN. | MAX. | MIN. | MAX. |
| A | 1.75 | 2.05 | 0.069 | 0.081 |
| B | 1.75 | 2.18 | 0.069 | 0.086 |
| C | 0.85 | 1.15 | 0.033 | 0.045 |
| D | 0.40 | 0.69 | 0.016 | 0.027 |
| F | 0.70 | 1.00 | 0.028 | 0.039 |
| H | −0.05 | 0.10 | −0.002 | 0.004 |
| J | 0.10 | 0.25 | 0.004 | 0.010 |
| K | 3.60 | 3.90 | 0.142 | 0.154 |
| L | 0.50 | 0.80 | 0.020 | 0.031 |
| R | 1.20 | 1.50 | 0.047 | 0.059 |
| S | 0.50 REF | | 0.019 REF | |

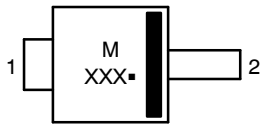
NOTES:

1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSION b APPLIES TO PLATED TERMINAL AND IS MEASURED BETWEEN 0.15 AND 0.30mm FROM THE TERMINAL TIP.

**GENERIC**
**MARKING DIAGRAMS***




**STYLE 1** **STYLE 2**




**STYLE 3**

XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

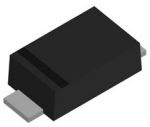
STYLE 1:
PIN 1. CATHODE
2. ANODE

STYLE 2:
PIN 1. ANODE OR CATHODE
2. CATHODE OR ANODE
(BI−DIRECTIONAL)

STYLE 3:
PIN 1. ANODE
2. CATHODE

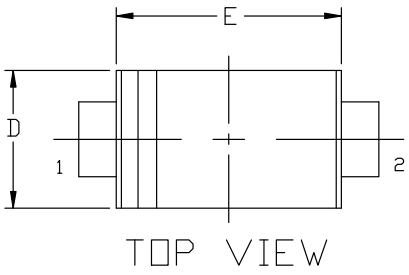
| | | |
|---|---|---|
| **DOCUMENT NUMBER:** | **98ASB14853C** | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
| **DESCRIPTION:** | **POWERMITE** | **PAGE 1 OF 1** |

# MECHANICAL CASE OUTLINE
## PACKAGE DIMENSIONS

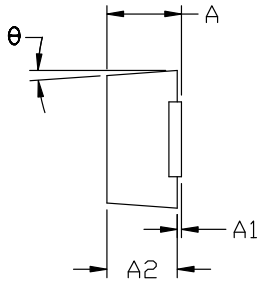


**SOD−123−2 1.65x2.70x0.90**
CASE 498
ISSUE E

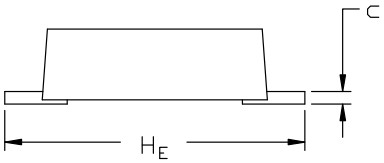
DATE 22 AUG 2023



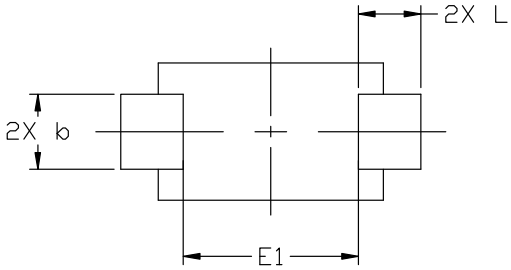

TOP VIEW




END VIEW



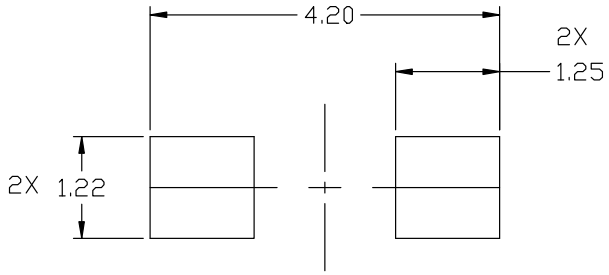

SIDE VIEW




BOTTOM VIEW

| DIM | MILLIMETERS | | |
|---|---|---|---|
| | MIN. | NOM. | MAX. |
| A | 0.90 | 0.95 | 0.98 |
| A1 | 0.00 | 0.05 | 0.10 |
| A2 | 0.85 | 0.90 | 0.95 |
| b | 0.70 | 0.90 | 1.10 |
| c | 0.10 | 0.15 | 0.20 |
| D | 1.50 | 1.65 | 1.80 |
| E | 2.50 | 2.70 | 2.90 |
| E1 | 1.70 | 2.10 | 2.50 |
| $H_E$ | 3.40 | 3.60 | 3.80 |
| L | 0.55 | 0.75 | 0.95 |
| θ | 0° | --- | 8° |

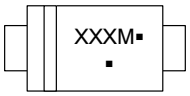
NOTES:
1. DIMENSIONING AND TOLERANCING PER ASME Y14.5M, 1994.
2. CONTROLLING DIMENSION: MILLIMETERS
3. DIMENSIONS b AND L ARE TO BE MEASURED ON A FLAT SECTION OF THE LEAD BETWEEN 0.10 AND 0.25 FROM THE LEAD TIP.
4. DIMENSIONS D AND E DO NOT INCLUDE MOLD FLASH PROTRUSIONS, OR GATE BURRS.
5. FLAT LEAD.




RECOMMENDED
MOUNTING FOOTPRINT

* For additional information on our Pb-Free strategy and soldering details, please download the ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

**GENERIC MARKING DIAGRAM***




XXX = Specific Device Code
M = Date Code
▪ = Pb−Free Package

(Note: Microdot may be in either location)

*This information is generic. Please refer to device data sheet for actual part marking. Pb−Free indicator, “G” or microdot “▪”, may or may not be present. Some products may not follow the Generic Marking.

| DOCUMENT NUMBER: | 98AON11184D | Electronic versions are uncontrolled except when accessed directly from the Document Repository. Printed versions are uncontrolled except when stamped “CONTROLLED COPY” in red. |
|---|---|---|
| DESCRIPTION: | SOD−123−2 1.65x2.70x0.90 | PAGE 1 OF 1 |

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

**ONLINE SUPPORT**: www.onsemi.com/support
**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales