3 Watt Plastic Surface Mount Zener Voltage Regulators

SZ1SMB59xxT3G-VF01 Series

This complete new line of 3 W Zener diodes offers the following advantages.

Features

- Zener Voltage Range – 3.3 V to 100 V
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- Flat Handling Surface for Accurate Placement
- Package Design for Top Side or Bottom Circuit Board Mounting
- SZ 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: Void-free, transfer-molded plastic

FINISH: All external surfaces are corrosion resistant and leads are readily solderable

MAXIMUM LEAD TEMPERATURE FOR SOLDERING PURPOSES: 260°C for 10 Seconds

LEADS: Modified L−Bend providing more contact area to bond pads

POLARITY: Cathode indicated by polarity band

FLAMMABILITY RATING: UL 94 V−0

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Maximum Steady State Power Dissipation @ T_L = 75°C Measured at Zero Lead Length Derate Above 75°C Thermal Resistance from Junction−to−Lead	P_D $R_{\theta JL}$	3.0 40 25	W mW/°C °C/W
Maximum Steady State Power Dissipation @ T_A = 25°C (Note) Derate Above 25°C Thermal Resistance from Junction−to−Ambient	P_D $R_{\theta JA}$	550 4.4 226	mW mW/°C °C/W
Operating and Storage Temperature Range	T_J, T_{stg}	−65 to +150	°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. FR−4 board, using recommended footprint.

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

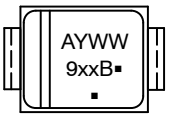
PLASTIC SURFACE MOUNT ZENER VOLTAGE REGULATOR DIODES 3.3−100 V, 3 W DC POWER



SMB
CASE 403A
PLASTIC



MARKING DIAGRAM



A = Assembly Location
Y = Year
WW = Work Week
9xxB = Device Code (Refer to page 2)
▪ = Pb−Free Package

(Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping†
SZ1SMB59xxBT3G−VF01	SMB (Pb−Free)	2,500 / 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.

DEVICE MARKING INFORMATION

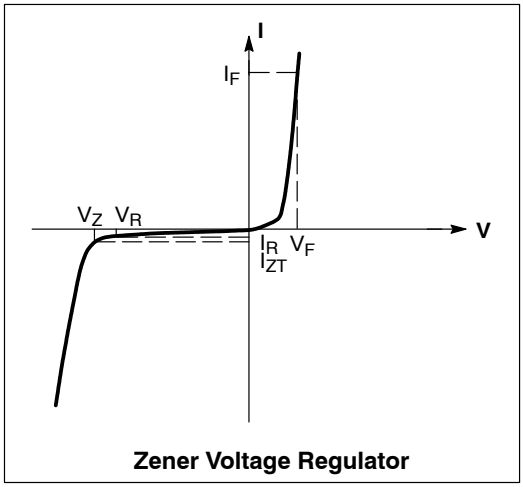
See specific marking information in the device marking column of the Electrical Characteristics table on page 2 of this data sheet.

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ELECTRICAL CHARACTERISTICS

(T_L = 30°C unless otherwise noted,
V_F = 1.5 V Max. @ I_F = 200 mA(dc) for all types)

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
I_{ZM}	Maximum DC Zener Current



Zener Voltage Regulator

ELECTRICAL CHARACTERISTICS (T_L = 30°C unless otherwise noted, V_F = 1.5 V Max. @ I_F = 200 mA(dc) for all types)
(Devices listed in ***bold, italic*** are **onsemi** Preferred devices.)

Device (Note 2)	Device Marking	Zener Voltage (Note 3) V_Z (Volts) Min	Nom	Max	@ I_{ZT} mA	Zener Impedance (Note 4) Z_{ZT} @ I_{ZT} Ω	Z_{ZK} @ I_{ZK} Ω	mA	Leakage Current I_R @ V_R μA	Volts	I_{ZM} mA(dc)
SZ1SMB5914BT3G−VF01	914B	3.42	3.6	3.78	104.2	9	500	1	75	1	416
SZ1SMB5915BT3G−VF01	***915B***	***3.70***	***3.9***	***4.10***	***96.1***	***7.5***	***500***	***1***	***25***	***1***	***384***
SZ1SMB5917BT3G−VF01	***917B***	***4.46***	***4.7***	***4.94***	***79.8***	***5***	***500***	***1***	***5***	***1.5***	***319***
SZ1SMB5918BT3G−VF01	***918B***	***4.84***	***5.1***	***5.36***	***73.5***	***4***	***350***	***1***	***5***	***2***	***294***
SZ1SMB5919BT3G−VF01	***919B***	***5.32***	***5.6***	***5.88***	***66.9***	***2***	***250***	***1***	***5***	***3***	***267***
SZ1SMB5920BT3G−VF01	***920B***	***5.89***	***6.2***	***6.51***	***60.5***	***2***	***200***	***1***	***5***	***4***	***241***
SZ1SMB5923BT3G−VF01	***923B***	***7.79***	***8.2***	***8.61***	***45.7***	***3.5***	***400***	***0.5***	***5***	***6.5***	***182***
SZ1SMB5924BT3G−VF01	924B	8.64	9.1	9.56	41.2	4	500	0.5	5	7	164
SZ1SMB5925BT3G−VF01	***925B***	***9.5***	***10***	***10.5***	***37.5***	***4.5***	***500***	***0.25***	***5***	***8***	***150***
SZ1SMB5926BT3G−VF01	***926B***	***10.45***	***11***	***11.55***	***34.1***	***5.5***	***550***	***0.25***	***1***	***8.4***	***136***
SZ1SMB5927BT3G−VF01	***927B***	***11.4***	***12***	***12.6***	***31.2***	***6.5***	***550***	***0.25***	***1***	***9.1***	***125***
SZ1SMB5928BT3G−VF01	928B	12.35	13	13.65	28.8	7	550	0.25	1	9.9	115
SZ1SMB5929BT3G−VF01	***929B***	***14.25***	***15***	***15.75***	***25***	***9***	***600***	***0.25***	***1***	***11.4***	***100***
SZ1SMB5930BT3G−VF01	930B	15.2	16	16.8	23.4	10	600	0.25	1	12.2	93
SZ1SMB5931BT3G−VF01	***931B***	***17.1***	***18***	***18.9***	***20.8***	***12***	***650***	***0.25***	***1***	***13.7***	***83***
SZ1SMB5932BT3G−VF01	932B	19	20	21	18.7	14	650	0.25	1	15.2	75
SZ1SMB5933BT3G−VF01	933B	20.9	22	23.1	17	17.5	650	0.25	1	16.7	68
SZ1SMB5934BT3G−VF01	***934B***	***22.8***	***24***	***25.2***	***15.6***	***19***	***700***	***0.25***	***1***	***18.2***	***62***
SZ1SMB5935BT3G−VF01	***935B***	***25.65***	***27***	***28.35***	***13.9***	***23***	***700***	***0.25***	***1***	***20.6***	***55***
SZ1SMB5936BT3G−VF01	***936B***	***28.5***	***30***	***31.5***	***12.5***	***28***	***750***	***0.25***	***1***	***22.8***	***50***
SZ1SMB5937BT3G−VF01	937B	31.35	33	34.65	11.4	33	800	0.25	1	25.1	45
SZ1SMB5938BT3G−VF01	***938B***	***34.2***	***36***	***37.8***	***10.4***	***38***	***850***	***0.25***	***1***	***27.4***	***41***
SZ1SMB5939BT3G−VF01	939B	37.05	39	40.95	9.6	45	900	0.25	1	29.7	38
SZ1SMB5940BT3G−VF01	940B	40.85	43	45.15	8.7	53	950	0.25	1	32.7	34
SZ1SMB5941BT3G−VF01	941B	44.65	47	49.35	8	67	1000	0.25	1	35.8	31
SZ1SMB5944BT3G−VF01	944B	58.9	62	65.1	6	100	1500	0.25	1	47.1	24
SZ1SMB5945BT3G−VF01	945B	64.6	68	71.4	5.5	120	1700	0.25	1	51.7	22
SZ1SMB5949BT3G−VF01	***949B***	***95***	***100***	***105***	***3.7***	***250***	***3100***	***0.25***	***1***	***76***	***15***

2. **TOLERANCE AND TYPE NUMBER DESIGNATION** The type numbers listed indicate a tolerance of ±5%.
3. **ZENER VOLTAGE (V_Z) MEASUREMENT**
   Nominal Zener voltage is measured with the device junction in thermal equilibrium with ambient temperature at 25°C.
4. **ZENER IMPEDANCE (Z_Z) DERIVATION** 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 = 60 Hz.

RATING AND TYPICAL CHARACTERISTIC CURVES (T_A = 25°C)

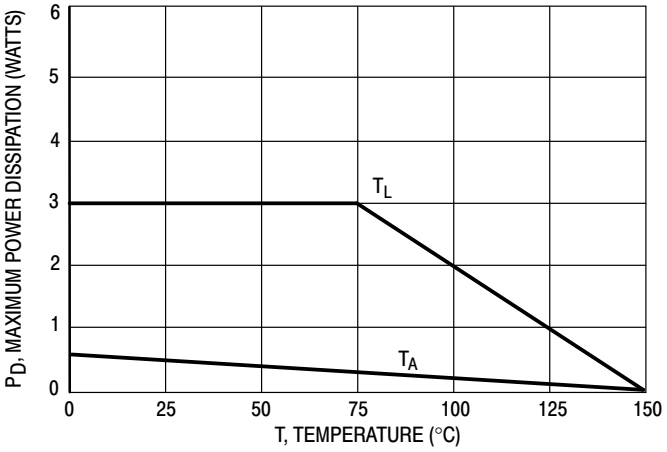


Figure 1. Steady State Power Derating

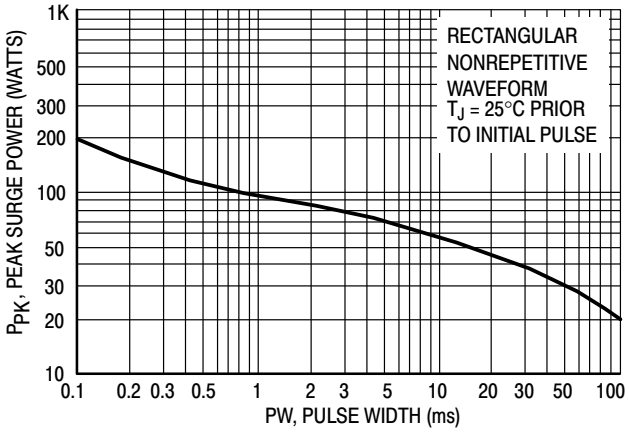


Figure 2. Maximum Surge Power

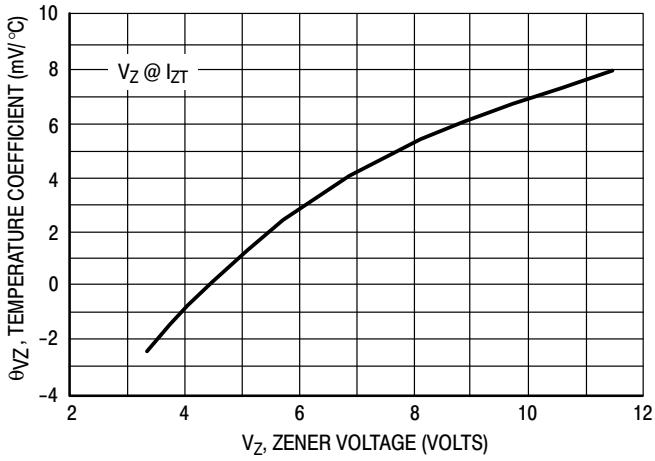


Figure 3. Zener Voltage − To 12 Volts

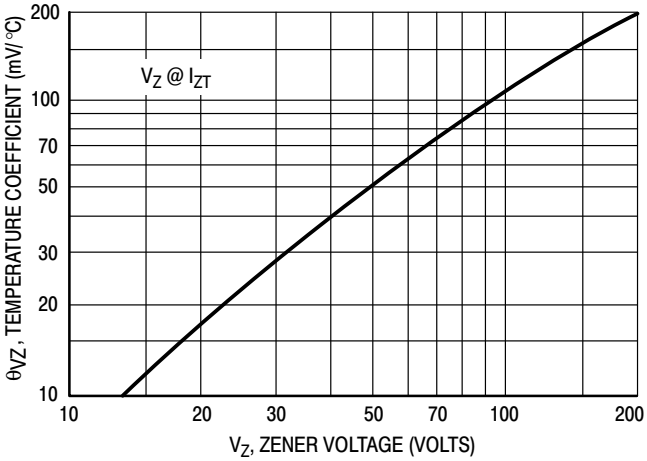


Figure 4. Zener Voltage − 14 To 200 Volts

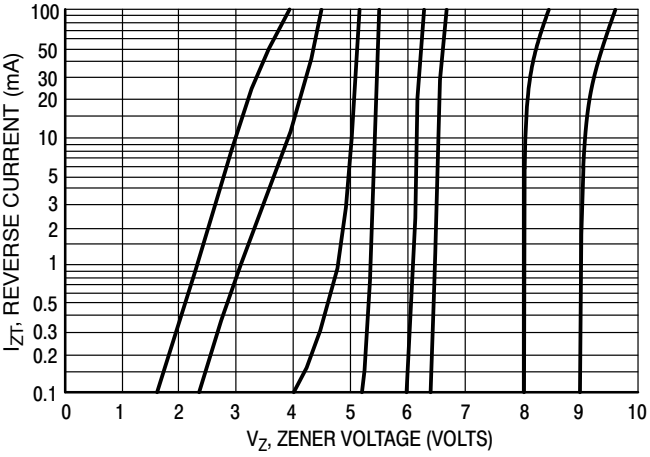


Figure 5. V_Z = 3.3 thru 10 Volts

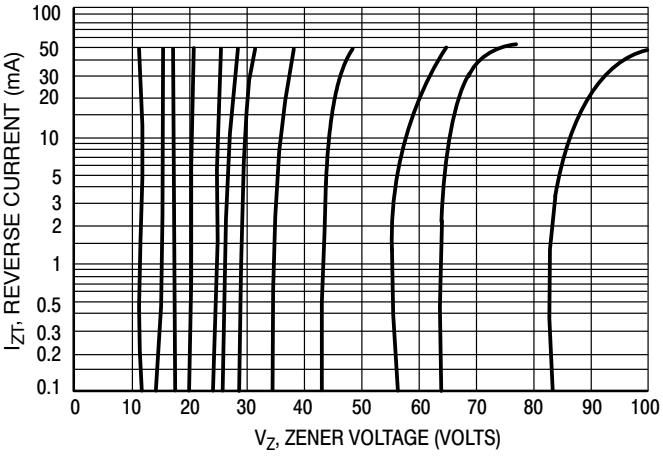


Figure 6. V_Z = 12 thru 82 Volts

RATING AND TYPICAL CHARACTERISTIC CURVES (T_A = 25°C)

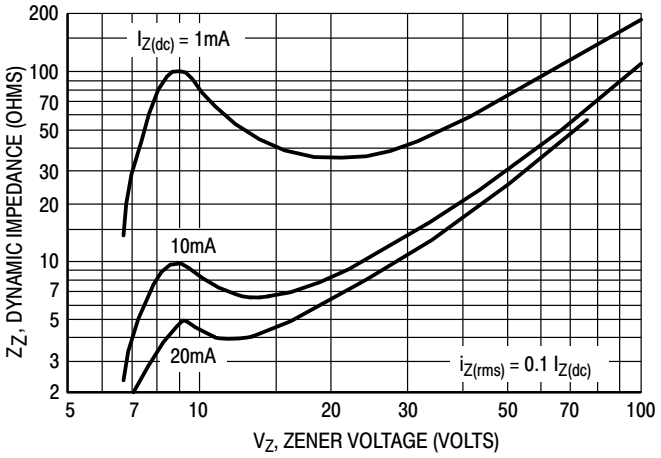


Figure 7. Effect of Zener Voltage

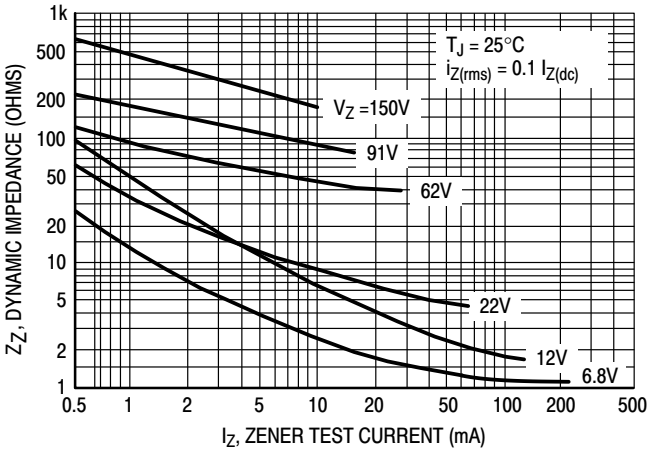


Figure 8. Effect of Zener Current

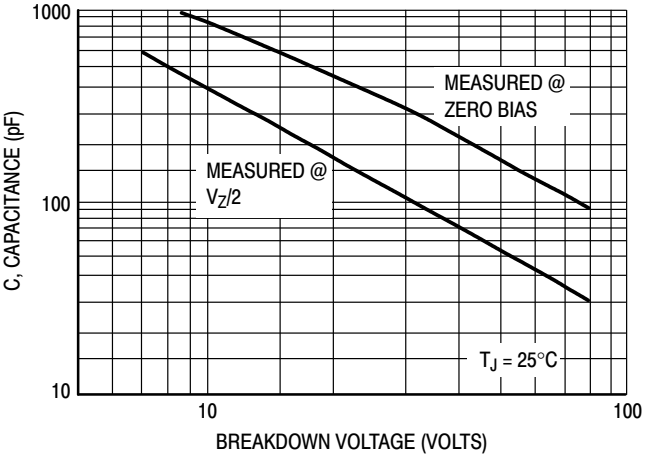


Figure 9. Capacitance Curve

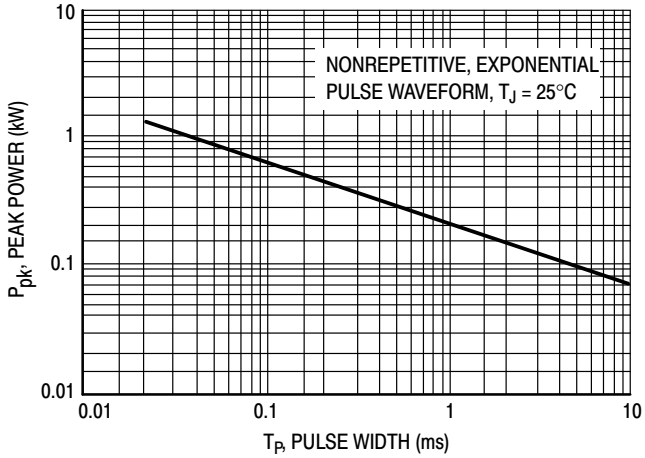


Figure 10. Typical Pulse Rating Curve

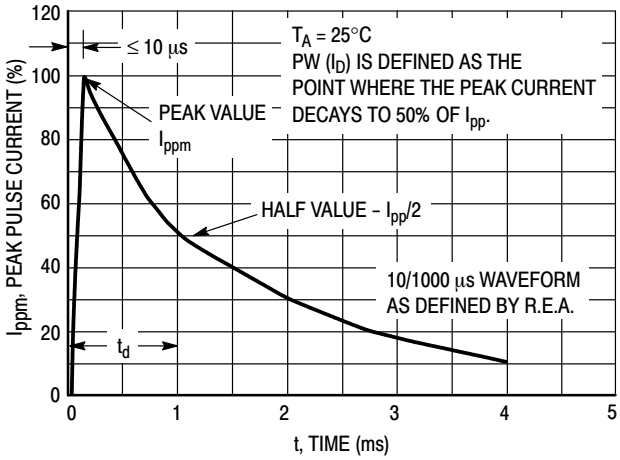


Figure 11. Pulse Waveform

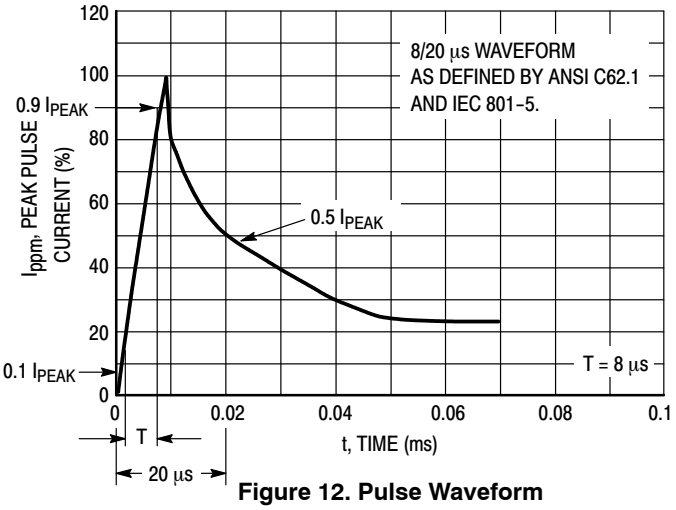


Figure 12. Pulse Waveform

SMB
CASE 403A−03
ISSUE J

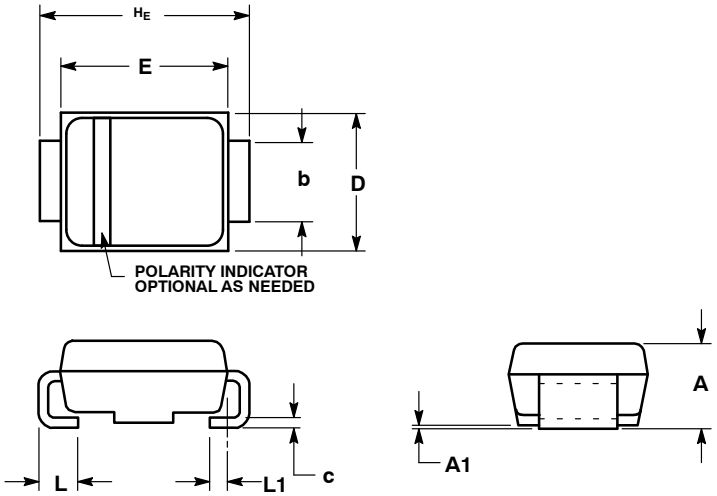
DATE 19 JUL 2012



SCALE 1:1
Polarity Band



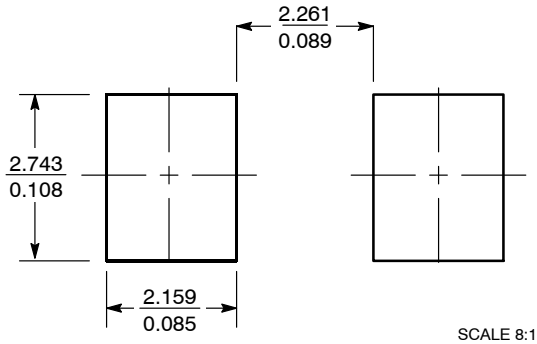
SCALE 1:1
Non−Polarity Band



NOTES:
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.
2. CONTROLLING DIMENSION: INCH.
3. DIMENSION b SHALL BE MEASURED WITHIN DIMENSION L1.

	MILLIMETERS			INCHES		
DIM	MIN	NOM	MAX	MIN	NOM	MAX
A	1.95	2.30	2.47	0.077	0.091	0.097
A1	0.05	0.10	0.20	0.002	0.004	0.008
b	1.96	2.03	2.20	0.077	0.080	0.087
c	0.15	0.23	0.31	0.006	0.009	0.012
D	3.30	3.56	3.95	0.130	0.140	0.156
E	4.06	4.32	4.60	0.160	0.170	0.181
H_E	5.21	5.44	5.60	0.205	0.214	0.220
L	0.76	1.02	1.60	0.030	0.040	0.063
L1	0.51 REF			0.020 REF		

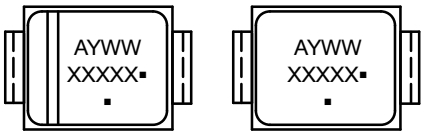
SOLDERING FOOTPRINT*



SCALE 8:1 (mm / inches)

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

GENERIC MARKING DIAGRAM*



Polarity Band **Non−Polarity Band**

XXXXX = Specific Device Code
A = Assembly Location
Y = Year
WW = Work Week
▪ = 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.

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