

SZ1SMB59xxT3G-VF01 Series

3 Watt Plastic Surface Mount Zener Voltage Regulators

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 @ $T_L = 75^\circ\text{C}$ Measured at Zero Lead Length Derate Above 75°C	P_D	3.0	W
Thermal Resistance from Junction-to-Lead	$R_{\theta JL}$	40	$\text{mW}/^\circ\text{C}$
		25	$^\circ\text{C}/\text{W}$
Maximum Steady State Power Dissipation @ $T_A = 25^\circ\text{C}$ (Note) Derate Above 25°C	P_D	550	mW
Thermal Resistance from Junction-to-Ambient	$R_{\theta JA}$	4.4	$\text{mW}/^\circ\text{C}$
		226	$^\circ\text{C}/\text{W}$
Operating and Storage Temperature Range	T_J, T_{stg}	-65 to +150	$^\circ\text{C}$

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 ON Semiconductor Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.



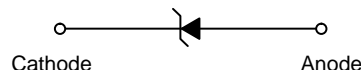
ON Semiconductor®

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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 Specifications 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.

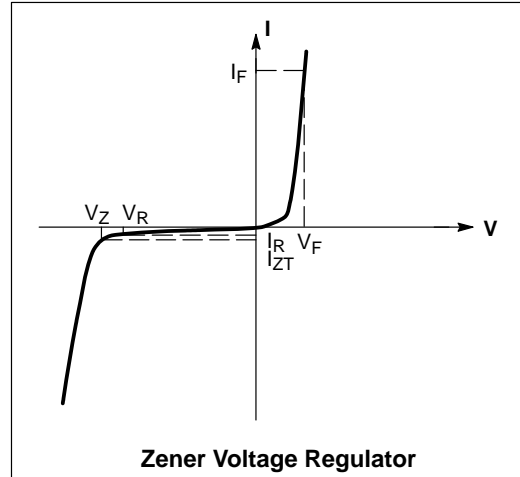
SZ1SMB59xxT3G-VF01 Series

ELECTRICAL CHARACTERISTICS

($T_L = 30^\circ\text{C}$ unless otherwise noted,

$V_F = 1.5\text{ V Max.}$ @ $I_F = 200\text{ mA(dc)}$ 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



ELECTRICAL CHARACTERISTICS ($T_L = 30^\circ\text{C}$ unless otherwise noted, $V_F = 1.5\text{ V Max.}$ @ $I_F = 200\text{ mA(dc)}$ for all types)

(Devices listed in **bold, italic** are ON Semiconductor Preferred devices.)

Device (Note 2)	Device Marking	Zener Voltage (Note 3)				Zener Impedance (Note 4)			Leakage Current		I_{ZM} mA(dc)
		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	
SZ1SMB5914BT3G-VF01 SZ1SMB5915BT3G-VF01	914B 915B	3.42 3.70	3.6 3.9	3.78 4.10	104.2 96.1	9 7.5	500 500	1 1	75 25	1 1	416 384
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 $\pm 5\%$.

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.

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RATING AND TYPICAL CHARACTERISTIC CURVES ($T_A = 25^\circ\text{C}$)

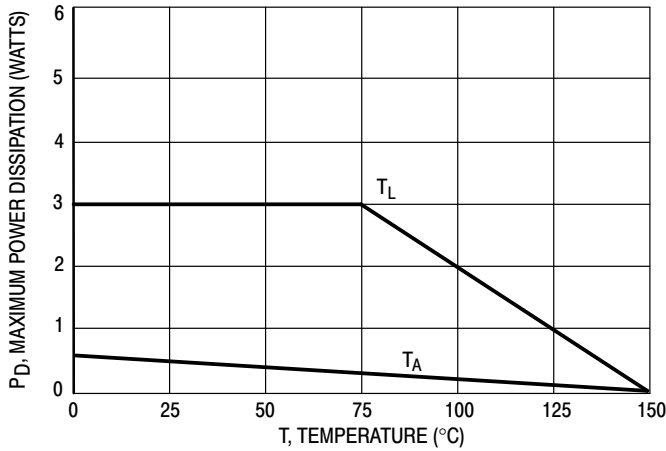


Figure 1. Steady State Power Derating

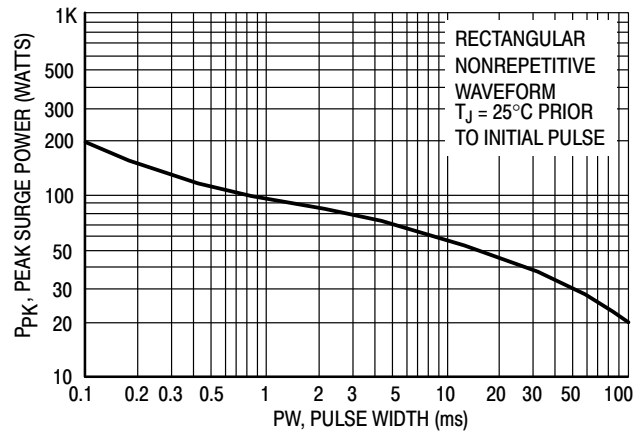


Figure 2. Maximum Surge Power

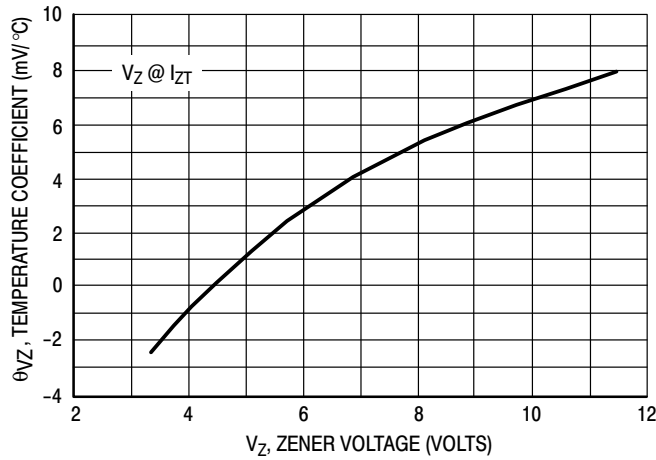


Figure 3. Zener Voltage - To 12 Volts

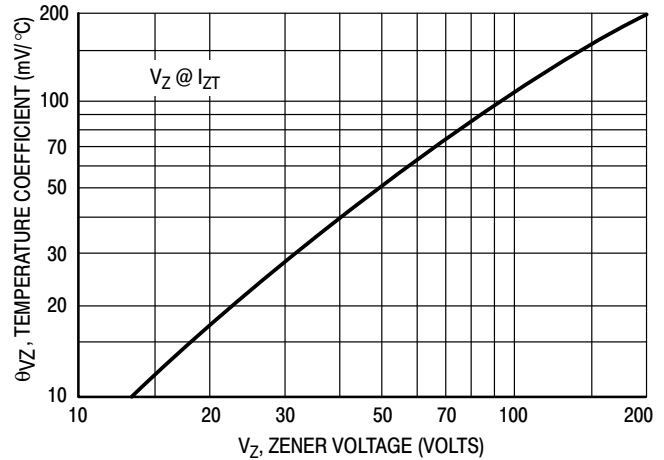


Figure 4. Zener Voltage - 14 To 200 Volts

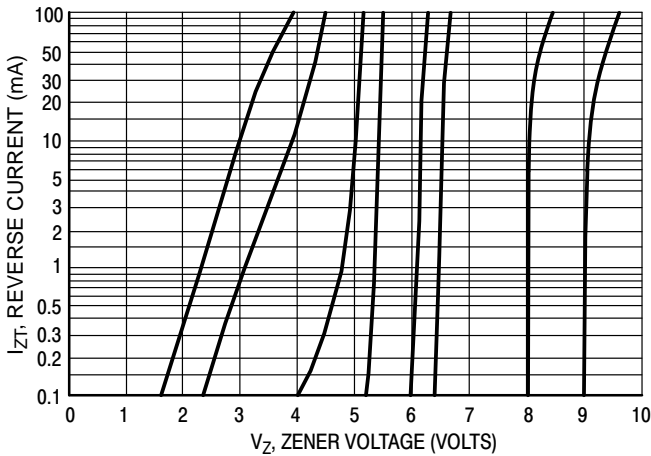


Figure 5. $V_Z = 3.3$ thru 10 Volts

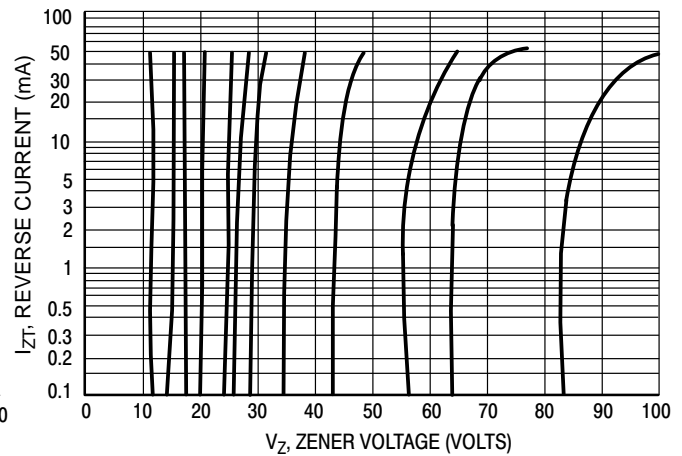


Figure 6. $V_Z = 12$ thru 82 Volts

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RATING AND TYPICAL CHARACTERISTIC CURVES ($T_A = 25^\circ\text{C}$)

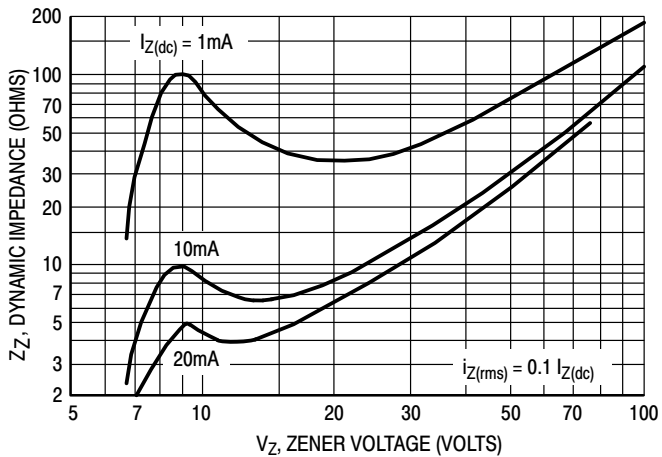


Figure 7. Effect of Zener Voltage

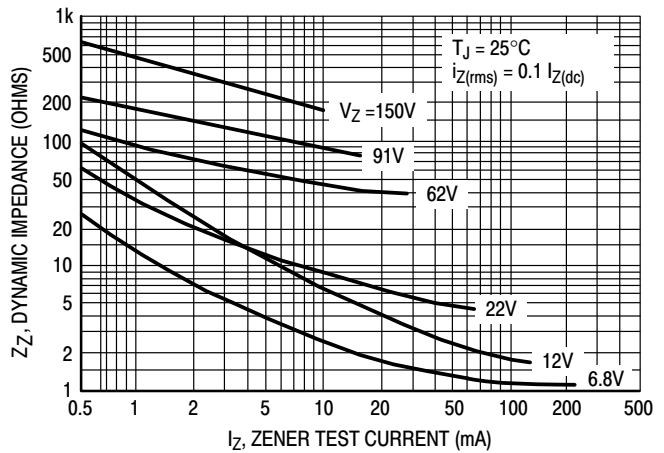


Figure 8. Effect of Zener Current

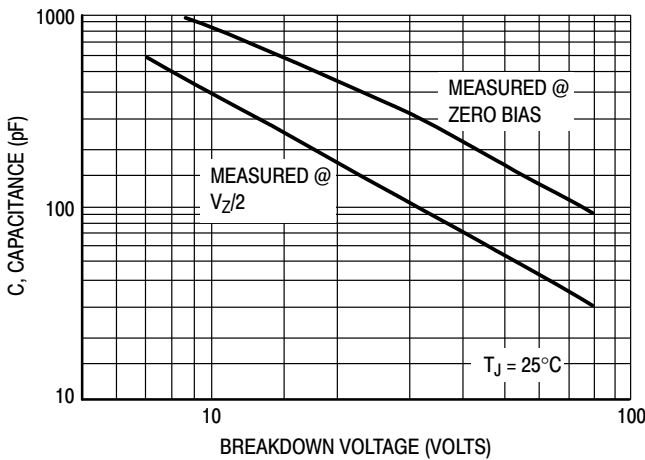


Figure 9. Capacitance Curve

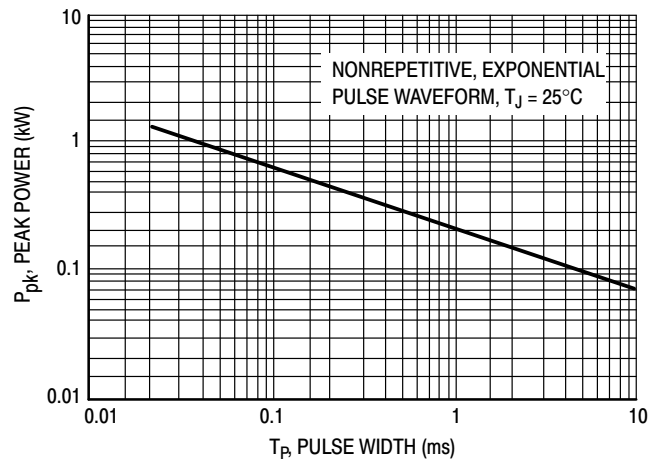


Figure 10. Typical Pulse Rating Curve

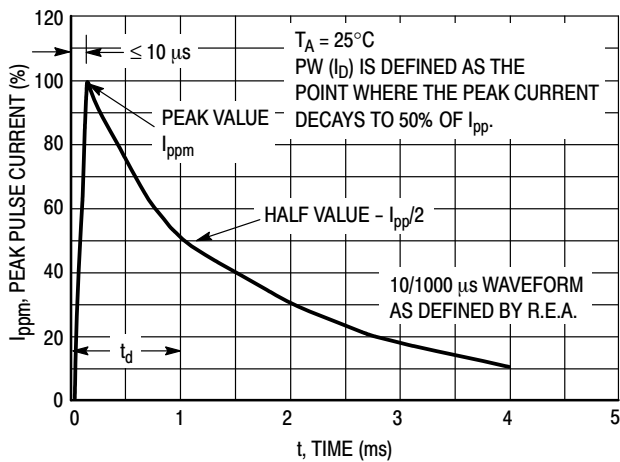


Figure 11. Pulse Waveform

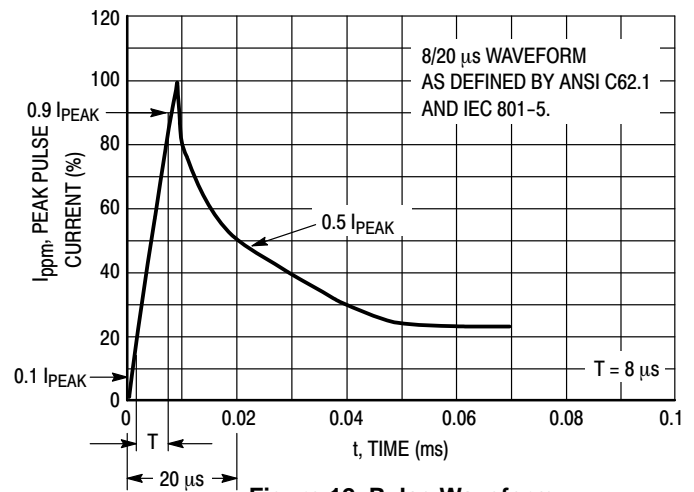
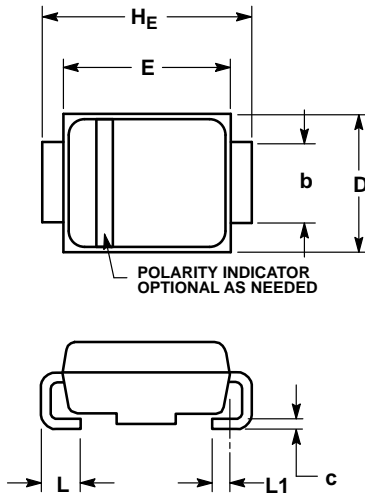


Figure 12. Pulse Waveform

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PACKAGE DIMENSIONS

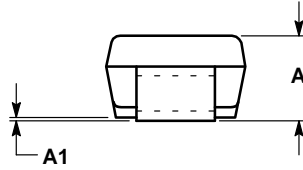
SMB
CASE 403A-03
ISSUE J



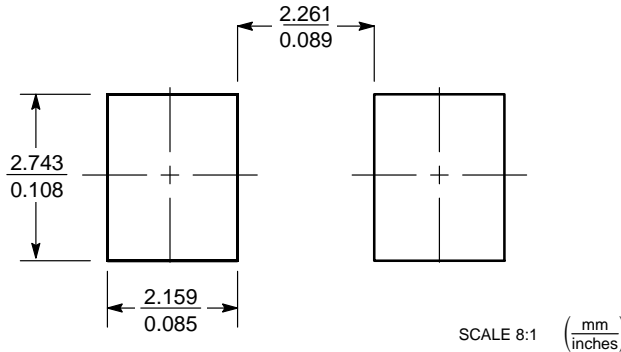
NOTES:

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

DIM	MILLIMETERS			INCHES		
	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
HE	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*



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

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