

# MMSZ4xxxT1G Series, SZMMSZ4xxxT1G Series

## Zener Voltage Regulators

### 500 mW SOD-123 Surface Mount

Three complete series of Zener diodes are offered in the convenient, surface mount plastic SOD-123 package. These devices provide a convenient alternative to the leadless 34-package style.

#### Features

- 500 mW Rating on FR-4 or FR-5 Board
- Wide Zener Reverse Voltage Range – 1.8 V to 43 V
- Package Designed for Optimal Automated Board Assembly
- Small Package Size for High Density Applications
- ESD Rating of Class 3 (> 16 kV) per Human Body Model
- SZ Prefix for Automotive and Other Applications Requiring Unique Site and Control Change Requirements; AEC-Q101 Qualified and PPAP Capable
- Pb-Free Packages are Available\*

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

Stresses exceeding Maximum Ratings may damage the device. Maximum Ratings are stress ratings only. Functional operation above the Recommended Operating Conditions is not implied. Extended exposure to stresses above the Recommended Operating Conditions may affect device reliability.

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

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

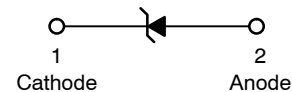


**ON Semiconductor®**

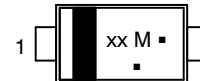
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**SOD-123  
CASE 425  
STYLE 1**



#### MARKING DIAGRAM



xx = Device Code (Refer to page 3)

M = Date Code

▪ = Pb-Free Package

(Note: Microdot may be in either location)

#### ORDERING INFORMATION

| Device        | Package              | Shipping†               |
|---------------|----------------------|-------------------------|
| MMSZ4xxxT1G   | SOD-123<br>(Pb-Free) | 3,000 /<br>Tape & Reel  |
| SZMMSZ4xxxT1G | SOD-123<br>(Pb-Free) | 3,000 /<br>Tape & Reel  |
| MMSZ4xxxT3G   | SOD-123<br>(Pb-Free) | 10,000 /<br>Tape & Reel |
| SZMMSZ4xxxT3G | SOD-123<br>(Pb-Free) | 10,000 /<br>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.

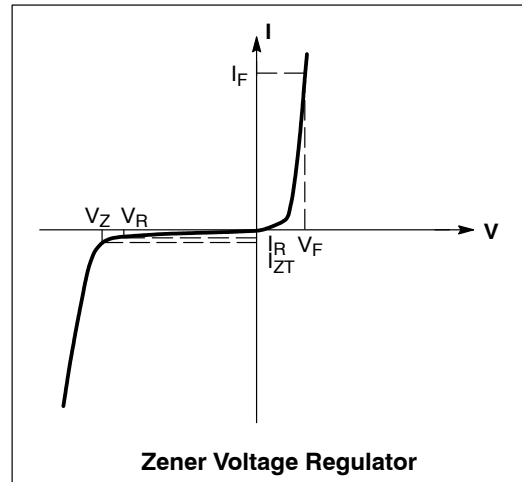
#### DEVICE MARKING INFORMATION

See specific marking information in the device marking column of the Electrical Characteristics table on page 3 of this data sheet.

## MMSZ4xxxT1G Series, SZMMSZ4xxxT1G Series

**ELECTRICAL CHARACTERISTICS** ( $T_A = 25^\circ\text{C}$  unless otherwise noted,  $V_F = 0.95\text{ V Max. @ } I_F = 10\text{ mA}$ )

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



## MMSZ4xxxT1G Series, SZMMSZ4xxxT1G Series

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

| Device*         | Device Marking | Zener Voltage (Note 3) |     |       |                   | Leakage Current                 |       |
|-----------------|----------------|------------------------|-----|-------|-------------------|---------------------------------|-------|
|                 |                | V <sub>Z</sub> (Volts) |     |       | @ I <sub>ZT</sub> | I <sub>R</sub> @ V <sub>R</sub> |       |
|                 |                | Min                    | Nom | Max   | μA                | μA                              | Volts |
| MMSZ4678T1G     | CC             | 1.71                   | 1.8 | 1.89  | 50                | 7.5                             | 1     |
| MMSZ4679T1G     | CD             | 1.90                   | 2.0 | 2.10  | 50                | 5                               | 1     |
| MMSZ4680T1G     | CE             | 2.09                   | 2.2 | 2.31  | 50                | 4                               | 1     |
| MMSZ4681T1G     | CF             | 2.28                   | 2.4 | 2.52  | 50                | 2                               | 1     |
| MMSZ4682T1G     | CH             | 2.565                  | 2.7 | 2.835 | 50                | 1                               | 1     |
| MMSZ4683T1G     | CJ             | 2.85                   | 3.0 | 3.15  | 50                | 0.8                             | 1     |
| MMSZ4684T1G     | CK             | 3.13                   | 3.3 | 3.47  | 50                | 7.5                             | 1.5   |
| MMSZ4685T1G     | CM             | 3.42                   | 3.6 | 3.78  | 50                | 7.5                             | 2     |
| MMSZ4686T1G     | CN             | 3.70                   | 3.9 | 4.10  | 50                | 5                               | 2     |
| MMSZ4687T1G     | CP             | 4.09                   | 4.3 | 4.52  | 50                | 4                               | 2     |
| MMSZ4688T1G     | CT             | 4.47                   | 4.7 | 4.94  | 50                | 10                              | 3     |
| MMSZ4689T1G     | CU             | 4.85                   | 5.1 | 5.36  | 50                | 10                              | 3     |
| MMSZ4690T1G/T3G | CV             | 5.32                   | 5.6 | 5.88  | 50                | 10                              | 4     |
| MMSZ4691T1G     | CA             | 5.89                   | 6.2 | 6.51  | 50                | 10                              | 5     |
| MMSZ4692T1G     | CX             | 6.46                   | 6.8 | 7.14  | 50                | 10                              | 5.1   |
| MMSZ4693T1G     | CY             | 7.13                   | 7.5 | 7.88  | 50                | 10                              | 5.7   |
| MMSZ4694T1G     | CZ             | 7.79                   | 8.2 | 8.61  | 50                | 1                               | 6.2   |
| MMSZ4695T1G     | DC             | 8.27                   | 8.7 | 9.14  | 50                | 1                               | 6.6   |
| MMSZ4696T1G     | DD             | 8.65                   | 9.1 | 9.56  | 50                | 1                               | 6.9   |
| MMSZ4697T1G     | DE             | 9.50                   | 10  | 10.50 | 50                | 1                               | 7.6   |
| MMSZ4698T1G     | DF             | 10.45                  | 11  | 11.55 | 50                | 0.05                            | 8.4   |
| MMSZ4699T1G     | DH             | 11.40                  | 12  | 12.60 | 50                | 0.05                            | 9.1   |
| MMSZ4700T1G     | DJ             | 12.35                  | 13  | 13.65 | 50                | 0.05                            | 9.8   |
| MMSZ4701T1G     | DK             | 13.30                  | 14  | 14.70 | 50                | 0.05                            | 10.6  |
| MMSZ4702T1G     | DM             | 14.25                  | 15  | 15.75 | 50                | 0.05                            | 11.4  |
| MMSZ4703T1G †   | DN             | 15.20                  | 16  | 16.80 | 50                | 0.05                            | 12.1  |
| MMSZ4704T1G     | DP             | 16.15                  | 17  | 17.85 | 50                | 0.05                            | 12.9  |
| MMSZ4705T1G     | DT             | 17.10                  | 18  | 18.90 | 50                | 0.05                            | 13.6  |
| MMSZ4706T1G     | DU             | 18.05                  | 19  | 19.95 | 50                | 0.05                            | 14.4  |
| MMSZ4707T1G     | DV             | 19.00                  | 20  | 21.00 | 50                | 0.01                            | 15.2  |
| MMSZ4708T1G     | DA             | 20.90                  | 22  | 23.10 | 50                | 0.01                            | 16.7  |
| MMSZ4709T1G     | DX             | 22.80                  | 24  | 25.20 | 50                | 0.01                            | 18.2  |
| MMSZ4710T1G     | DY             | 23.75                  | 25  | 26.25 | 50                | 0.01                            | 19.0  |
| MMSZ4711T1G †   | EA             | 25.65                  | 27  | 28.35 | 50                | 0.01                            | 20.4  |
| MMSZ4712T1G     | EC             | 26.60                  | 28  | 29.40 | 50                | 0.01                            | 21.2  |
| MMSZ4713T1G     | ED             | 28.50                  | 30  | 31.50 | 50                | 0.01                            | 22.8  |
| MMSZ4714T1G     | EE             | 31.35                  | 33  | 34.65 | 50                | 0.01                            | 25.0  |
| MMSZ4715T1G     | EF             | 34.20                  | 36  | 37.80 | 50                | 0.01                            | 27.3  |
| MMSZ4716T1G     | EH             | 37.05                  | 39  | 40.95 | 50                | 0.01                            | 29.6  |
| MMSZ4717T1G     | EJ             | 40.85                  | 43  | 45.15 | 50                | 0.01                            | 32.6  |

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

\*Include SZ-prefix devices where applicable.

†MMSZ4703 and MMSZ4711 Not Available in 10,000/Tape & Reel

TYPICAL CHARACTERISTICS

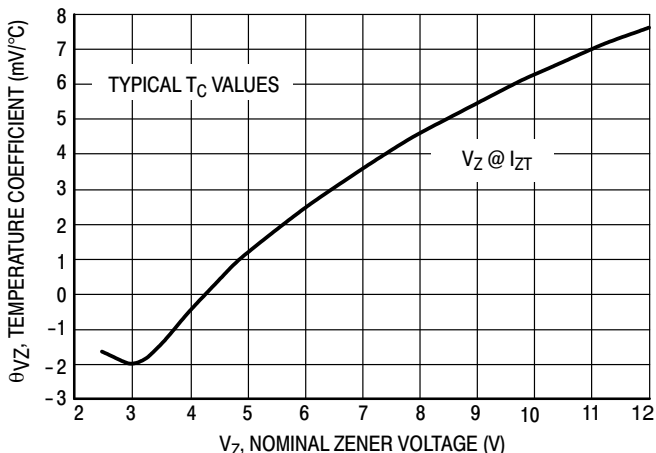


Figure 1. Temperature Coefficients (Temperature Range -55°C to +150°C)

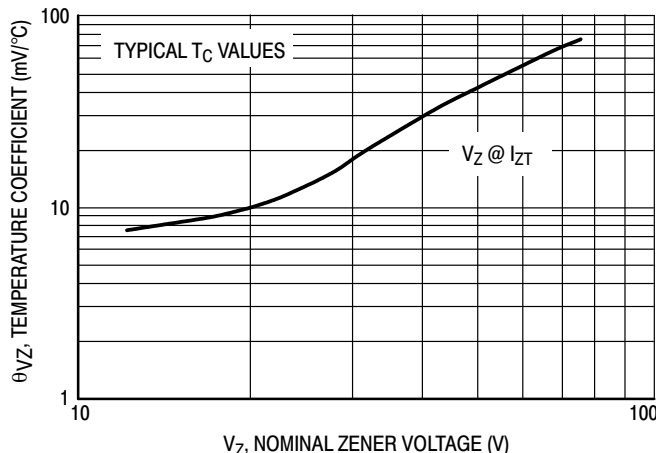


Figure 2. Temperature Coefficients (Temperature Range -55°C to +150°C)

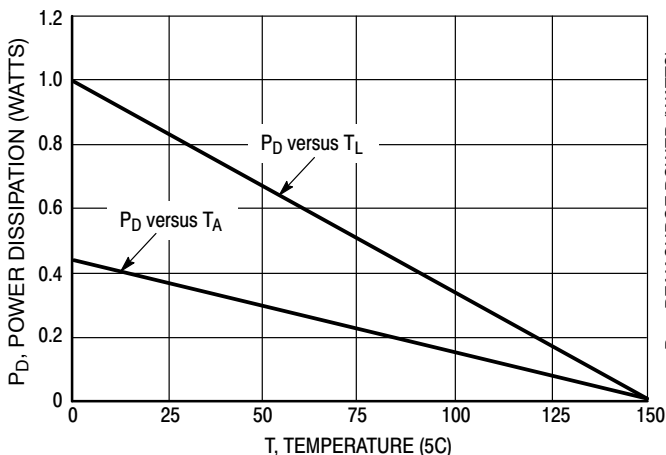


Figure 3. Steady State Power Derating

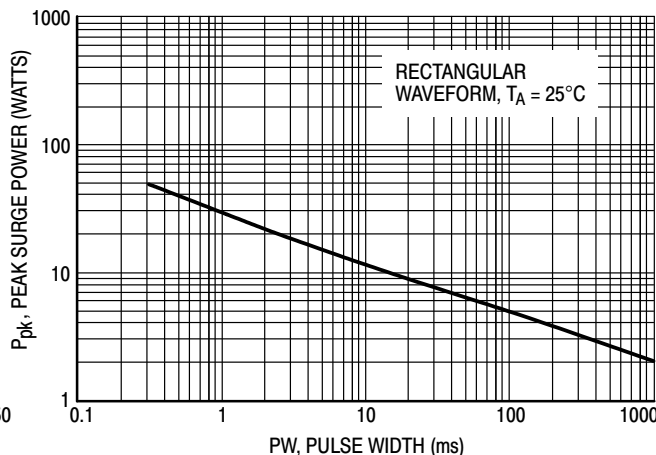


Figure 4. Maximum Nonrepetitive Surge Power

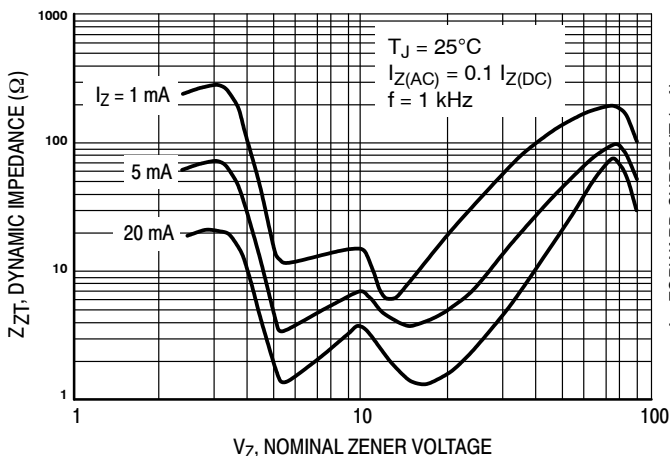


Figure 5. Effect of Zener Voltage on Zener Impedance

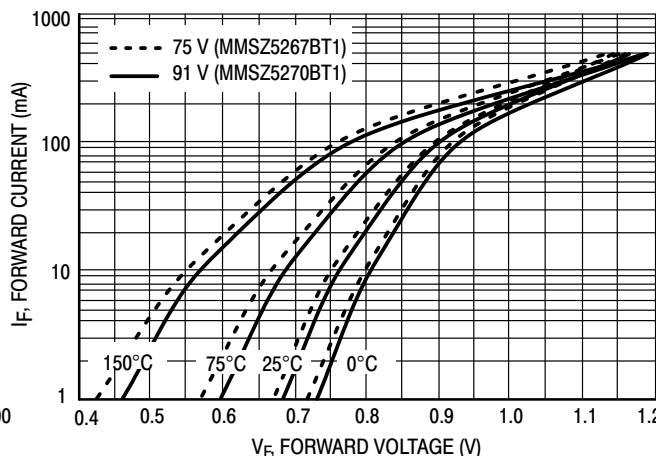


Figure 6. Typical Forward Voltage

TYPICAL CHARACTERISTICS

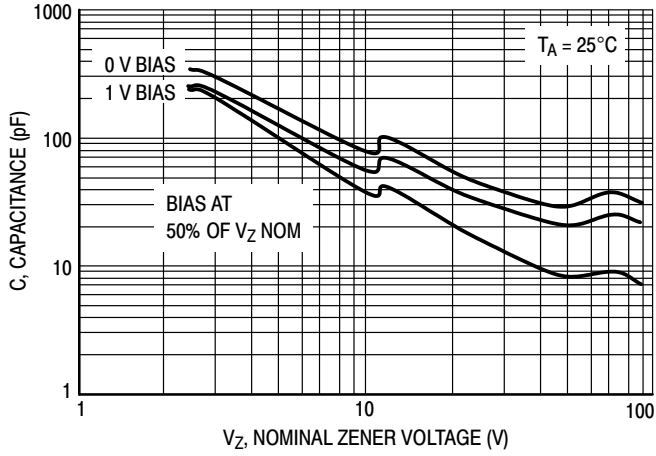


Figure 7. Typical Capacitance

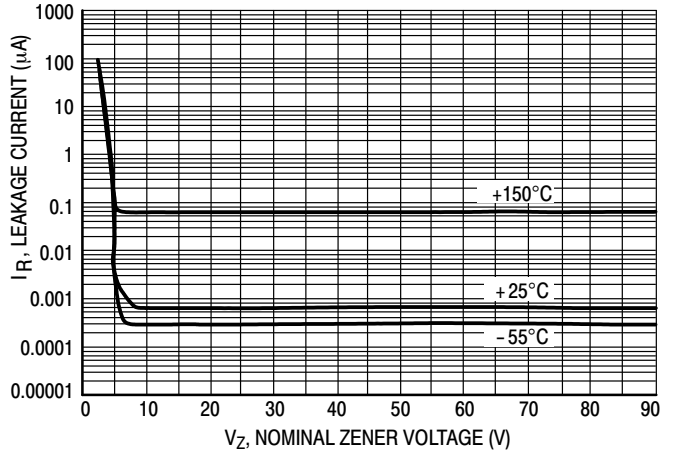


Figure 8. Typical Leakage Current

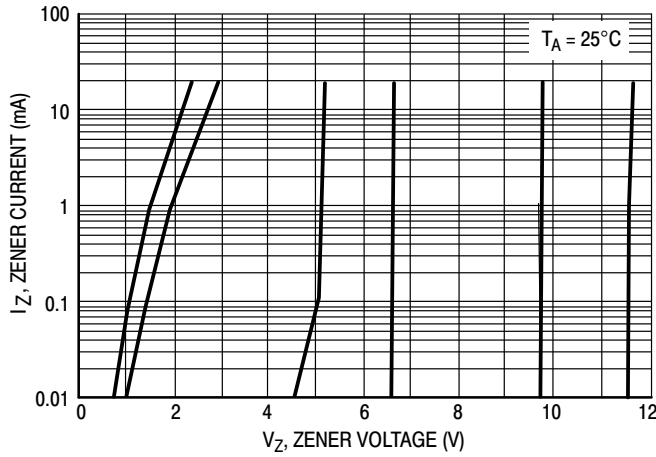


Figure 9. Zener Voltage versus Zener Current ( $V_Z$  Up to 12 V)

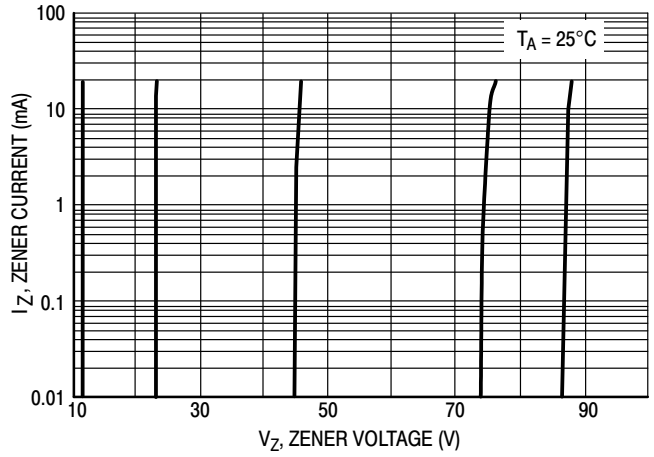
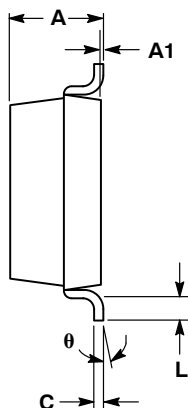
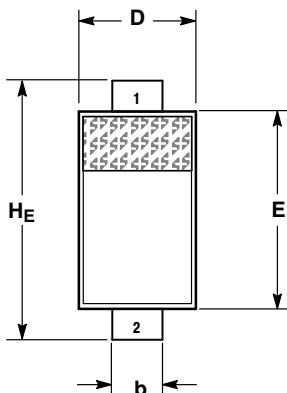


Figure 10. Zener Voltage versus Zener Current (12 V to 91 V)

# MMSZ4xxxT1G Series, SZMMSZ4xxxT1G Series

## PACKAGE DIMENSIONS

SOD-123  
CASE 425-04  
ISSUE G

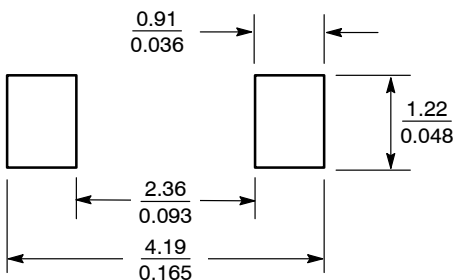


- NOTES:  
1. DIMENSIONING AND TOLERANCING PER ANSI Y14.5M, 1982.  
2. CONTROLLING DIMENSION: INCH.

| DIM | MILLIMETERS |      |      | INCHES |       |       |
|-----|-------------|------|------|--------|-------|-------|
|     | 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 |
| HE  | 3.56        | 3.68 | 3.86 | 0.140  | 0.145 | 0.152 |
| L   | 0.25        | ---  | ---  | 0.010  | ---   | ---   |
| θ   | 0°          | ---  | 10°  | 0°     | ---   | 10°   |

STYLE 1:  
PIN 1. CATHODE  
2. ANODE

## SOLDERING FOOTPRINT\*



SCALE 10:1 (mm/inches)

\*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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- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
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- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



#### Как с нами связаться

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