



# 1SMB5913BG THRU 1SMB5956BG

## Surface Mount Zener Voltage Regulators

### FEATURES

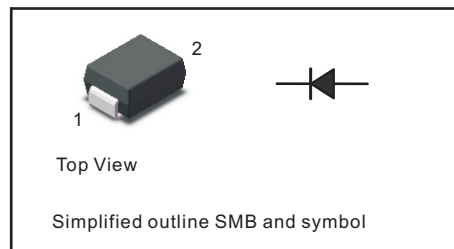
- Total power dissipation: Max. 3 W.
- Wide zener reverse voltage range 3.3V to 200V.
- Small plastic package suitable for surface mounted design.

### MECHANICAL DATA

- Case: SMB
- Terminals: Solderable per MIL-STD-750, Method 2026
- Approx. Weight: 0.095g / 0.0034oz

### PINNING

| PIN | DESCRIPTION |
|-----|-------------|
| 1   | Cathode     |
| 2   | Anode       |



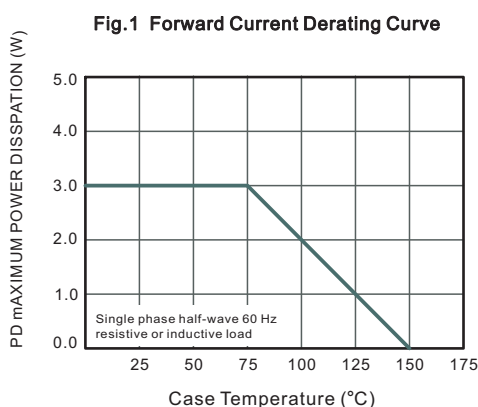
### Maximum Ratings and Electrical characteristics

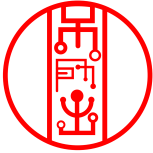
Ratings at 25 °C ambient temperature unless otherwise specified. Single phase half-wave 60 Hz, resistive or inductive load, for capacitive load current derate by 20 %.

### ABSOLUTE MAXIMUM RATINGS AND THERMAL PERFORMANCE ( Ta = 25 °C )

| Parameter                                                                               | Symbol            | Value         | Unit  |
|-----------------------------------------------------------------------------------------|-------------------|---------------|-------|
| DC power dissipation at TL=75°C, measure at zero lead length (Note 1) derate above 75°C | P <sub>D</sub>    | 3.0           | W     |
|                                                                                         |                   | 40            | mW/°C |
| Maximum Steady State Power Dissipation @ TA=25°C<br>Derate above 25°C                   | P <sub>D</sub>    | 550           | mW    |
|                                                                                         |                   | 4.4           | mW/°C |
| Junction to ambient thermal resistance                                                  | R <sub>thJA</sub> | 226           | °C/W  |
| Junction to lead thermal resistance                                                     | R <sub>thJL</sub> | 25            | °C/W  |
| Junction Temperature Range                                                              | T <sub>J</sub>    | - 55 to + 150 | °C    |
| Storage Temperature Range                                                               | T <sub>STG</sub>  | - 55 to + 150 | °C    |

**Note:** 1. Mounted on Cu-Pad size 5mm x 5mm on PCB.



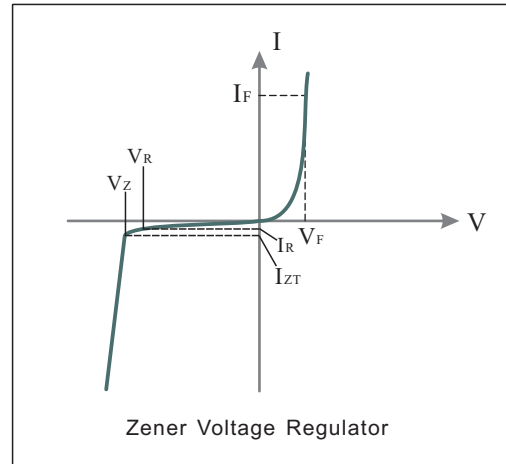


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## ELECTRICAL CHARACTERISTICS

( $T_L = 30^\circ\text{C}$  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           |



### Notes On Page 3:

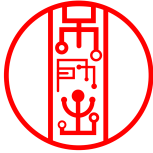
1. Tolerance and type number designation the type numbers listed indicate a tolerance of 5%
2. Zener voltage ( $V_Z$ ) measurement Nominal Zener voltage is measured with the device junction in thermal equilibrium with ambient temperature  $25^\circ\text{C}$
3. Zener impedance ( $Z_Z$ ) derivation :  $Z_{ZT}$  and  $Z_{ZK}$  are measured by dividing the AC voltage drop across the device by the AC current applied. The specified limits are for  $I_Z(\text{AC}) = 0.1 I_Z(\text{DC})$  with the AC frequency = 60 Hz



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Characteristics at Ta = 25°C (Devices listed in bold, italic are ON Semiconductor Preferred devices.)  
(TL = 30°C unless otherwise noted, VF = 1.5 V Max. @ IF = 200 mA (DC) for all types)

| Type       | Marking | Nominal Zener Voltage <sup>(3)</sup> |                          |           |                 | Zener Impedance <sup>(4)</sup>    |                                   |                                 | Leakage Current |       | Maximum DC Zener Current |
|------------|---------|--------------------------------------|--------------------------|-----------|-----------------|-----------------------------------|-----------------------------------|---------------------------------|-----------------|-------|--------------------------|
|            |         | V <sub>z</sub>                       |                          |           | I <sub>zT</sub> | Z <sub>zT</sub> @ I <sub>zT</sub> | Z <sub>zK</sub> @ I <sub>zK</sub> | I <sub>R</sub> @ V <sub>R</sub> |                 |       |                          |
|            |         | Min ( V )                            | Nom ( V ) <sup>(2)</sup> | Max ( V ) | (mA)            | (Ω)                               | (Ω)                               | (mA)                            | ( μA )          | ( V ) |                          |
| 1SMB5913BG | 913B    | 3.13                                 | 3.3                      | 3.47      | 113.6           | 10                                | 500                               | 1                               | 100             | 1     | 454                      |
| 1SMB5914BG | 914B    | 3.42                                 | 3.6                      | 3.78      | 104.2           | 9                                 | 500                               | 1                               | 75              | 1     | 416                      |
| 1SMB5915BG | 915B    | 3.70                                 | 3.9                      | 4.10      | 96.1            | 7.5                               | 500                               | 1                               | 25              | 1     | 384                      |
| 1SMB5916BG | 916B    | 4.08                                 | 4.3                      | 4.52      | 87.2            | 6                                 | 500                               | 1                               | 5               | 1     | 348                      |
| 1SMB5917BG | 917B    | 4.46                                 | 4.7                      | 4.94      | 79.8            | 5                                 | 500                               | 1                               | 5               | 1.5   | 319                      |
| 1SMB5918BG | 918B    | 4.84                                 | 5.1                      | 5.36      | 73.5            | 4                                 | 350                               | 1                               | 5               | 2     | 294                      |
| 1SMB5919BG | 919B    | 5.32                                 | 5.6                      | 5.88      | 66.9            | 2                                 | 250                               | 1                               | 5               | 3     | 267                      |
| 1SMB5920BG | 920B    | 5.89                                 | 6.2                      | 6.51      | 60.5            | 2                                 | 200                               | 1                               | 5               | 4     | 241                      |
| 1SMB5921BG | 921B    | 6.46                                 | 6.8                      | 7.14      | 55.1            | 2.5                               | 200                               | 1                               | 5               | 5.2   | 220                      |
| 1SMB5922BG | 922B    | 7.12                                 | 7.5                      | 7.88      | 50              | 3                                 | 400                               | 0.5                             | 5               | 6     | 200                      |
| 1SMB5923BG | 923B    | 7.79                                 | 8.2                      | 8.61      | 45.7            | 3.5                               | 400                               | 0.5                             | 5               | 6.5   | 182                      |
| 1SMB5924BG | 924B    | 8.64                                 | 9.1                      | 9.56      | 41.2            | 4                                 | 500                               | 0.5                             | 5               | 7     | 164                      |
| 1SMB5925BG | 925B    | 9.5                                  | 10                       | 10.5      | 37.5            | 4.5                               | 500                               | 0.25                            | 5               | 8     | 150                      |
| 1SMB5926BG | 926B    | 10.45                                | 11                       | 11.55     | 34.1            | 5.5                               | 550                               | 0.25                            | 1               | 8.4   | 136                      |
| 1SMB5927BG | 927B    | 11.4                                 | 12                       | 12.6      | 31.2            | 6.5                               | 550                               | 0.25                            | 1               | 9.1   | 125                      |
| 1SMB5928BG | 928B    | 12.35                                | 13                       | 13.65     | 28.8            | 7                                 | 550                               | 0.25                            | 1               | 9.9   | 115                      |
| 1SMB5929BG | 929B    | 14.25                                | 15                       | 15.75     | 25              | 9                                 | 600                               | 0.25                            | 1               | 11.4  | 100                      |
| 1SMB5930BG | 930B    | 15.2                                 | 16                       | 16.8      | 23.4            | 10                                | 600                               | 0.25                            | 1               | 12.2  | 93                       |
| 1SMB5931BG | 931B    | 17.1                                 | 18                       | 18.9      | 20.8            | 12                                | 650                               | 0.25                            | 1               | 13.7  | 83                       |
| 1SMB5932BG | 932B    | 19                                   | 20                       | 21        | 18.7            | 14                                | 650                               | 0.25                            | 1               | 15.2  | 75                       |
| 1SMB5933BG | 933B    | 20.9                                 | 22                       | 23.1      | 17              | 17.5                              | 650                               | 0.25                            | 1               | 16.7  | 68                       |
| 1SMB5934BG | 934B    | 22.8                                 | 24                       | 25.2      | 15.6            | 19                                | 700                               | 0.25                            | 1               | 18.2  | 62                       |
| 1SMB5935BG | 935B    | 25.65                                | 27                       | 28.35     | 13.9            | 23                                | 700                               | 0.25                            | 1               | 20.6  | 55                       |
| 1SMB5936BG | 936B    | 28.5                                 | 30                       | 31.5      | 12.5            | 28                                | 750                               | 0.25                            | 1               | 22.8  | 50                       |
| 1SMB5937BG | 937B    | 31.35                                | 33                       | 34.65     | 11.4            | 33                                | 800                               | 0.25                            | 1               | 25.1  | 45                       |
| 1SMB5938BG | 938B    | 34.2                                 | 36                       | 37.8      | 10.4            | 38                                | 850                               | 0.25                            | 1               | 27.4  | 41                       |
| 1SMB5939BG | 939B    | 37.05                                | 39                       | 40.95     | 9.6             | 45                                | 900                               | 0.25                            | 1               | 29.7  | 38                       |
| 1SMB5940BG | 940B    | 40.85                                | 43                       | 45.15     | 8.7             | 53                                | 950                               | 0.25                            | 1               | 32.7  | 34                       |
| 1SMB5941BG | 941B    | 44.65                                | 47                       | 49.35     | 8               | 67                                | 1000                              | 0.25                            | 1               | 35.8  | 31                       |
| 1SMB5942BG | 942B    | 48.45                                | 51                       | 53.55     | 7.3             | 70                                | 1100                              | 0.25                            | 1               | 38.8  | 29                       |
| 1SMB5943BG | 943B    | 53.2                                 | 56                       | 58.8      | 6.7             | 86                                | 1300                              | 0.25                            | 1               | 42.6  | 26                       |
| 1SMB5944BG | 944B    | 58.9                                 | 62                       | 65.1      | 6               | 100                               | 1500                              | 0.25                            | 1               | 47.1  | 24                       |
| 1SMB5945BG | 945B    | 64.6                                 | 68                       | 71.4      | 5.5             | 120                               | 1700                              | 0.25                            | 1               | 51.7  | 22                       |
| 1SMB5946BG | 946B    | 71.25                                | 75                       | 78.75     | 5               | 140                               | 2000                              | 0.25                            | 1               | 56    | 20                       |
| 1SMB5947BG | 947B    | 77.9                                 | 82                       | 86.1      | 4.6             | 160                               | 2500                              | 0.25                            | 1               | 62.2  | 18                       |
| 1SMB5948BG | 948B    | 86.45                                | 91                       | 95.55     | 4.1             | 200                               | 3000                              | 0.25                            | 1               | 69.2  | 16                       |
| 1SMB5949BG | 949B    | 95                                   | 100                      | 105       | 3.7             | 250                               | 3100                              | 0.25                            | 1               | 76    | 15                       |
| 1SMB5950BG | 950B    | 104.5                                | 110                      | 115.5     | 3.4             | 300                               | 4000                              | 0.25                            | 1               | 83.6  | 13                       |
| 1SMB5951BG | 951B    | 114                                  | 120                      | 126       | 3.1             | 380                               | 4500                              | 0.25                            | 1               | 91.2  | 12                       |
| 1SMB5952BG | 952B    | 123.5                                | 130                      | 136.5     | 2.9             | 450                               | 5000                              | 0.25                            | 1               | 98.8  | 11                       |
| 1SMB5953BG | 953B    | 142.5                                | 150                      | 157.5     | 2.5             | 600                               | 6000                              | 0.25                            | 1               | 114   | 10                       |
| 1SMB5954BG | 954B    | 152                                  | 160                      | 168       | 2.3             | 700                               | 6500                              | 0.25                            | 1               | 121.6 | 9                        |
| 1SMB5955BG | 955B    | 171                                  | 180                      | 189       | 2.1             | 900                               | 7000                              | 0.25                            | 1               | 136.8 | 8                        |
| 1SMB5956BG | 956B    | 190                                  | 200                      | 210       | 1.9             | 1200                              | 8000                              | 0.25                            | 1               | 152   | 7                        |

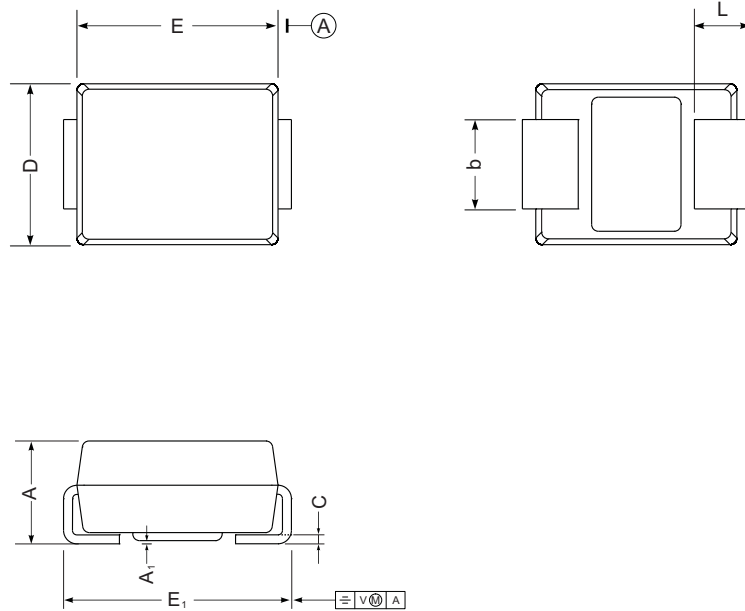


# 1SMB5913BG THRU 1SMB5956BG

## PACKAGE OUTLINE

Plastic surface mounted package; 2 leads

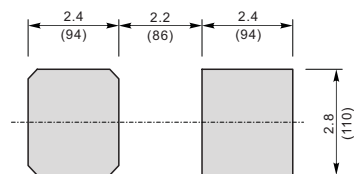
SMB



SMB mechanical data

| UNIT |     | A    | E    | D    | E <sub>1</sub> | A <sub>1</sub> | L   | C     | b   |
|------|-----|------|------|------|----------------|----------------|-----|-------|-----|
| mm   | max | 2.44 | 4.70 | 3.94 | 5.59           | 0.20           | 1.5 | 0.305 | 2.2 |
|      | min | 2.13 | 4.06 | 3.3  | 5.08           | 0.05           | 0.8 | 0.152 | 1.9 |
| mil  | max | 96   | 185  | 155  | 220            | 7.9            | 59  | 12    | 87  |
|      | min | 84   | 160  | 130  | 200            | 2.0            | 32  | 6     | 75  |

## The recommended mounting pad size



Unit :  $\frac{\text{mm}}{(\text{mil})}$