



## Small Signal Zener Diodes



## FEATURES

- Silicon planar Zener diodes
- Standard Zener voltage tolerance is  $\pm 5\%$  with a "B" suffix (e.g.: MMSZ5225B), suffix "C" is  $\pm 2\%$  tolerance
- AEC-Q101 qualified available
- ESD capability according to AEC-Q101:  
Human body model  $> 8\text{ kV}$   
Machine model  $> 800\text{ V}$
- Base P/N-E3 - RoHS-compliant, commercial grade
- Base P/N-HE3 - RoHS-compliant, AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)

AUTOMOTIVE  
GRADE  
AvailableRoHS  
COMPLIANT

## PRIMARY CHARACTERISTICS

| PARAMETER             | VALUE               | UNIT |
|-----------------------|---------------------|------|
| $V_Z$ range nom.      | 3.3 to 75           | V    |
| Test current $I_{ZT}$ | 1.7 to 20           | mA   |
| $V_Z$ specification   | Thermal equilibrium |      |
| Int. construction     | Single              |      |

## ORDERING INFORMATION

| DEVICE NAME          | ORDERING CODE                        | TAPED UNITS PER REEL           | MINIMUM ORDER QUANTITY |
|----------------------|--------------------------------------|--------------------------------|------------------------|
| MMSZ5225 to MMSZ5267 | MMSZ5225B-E3-08 to MMSZ5267B-E3-08   | 3000 (8 mm tape on 7" reel)    | 15 000/box             |
|                      | MMSZ5225C-E3-08 to MMSZ5267C-E3-08   |                                |                        |
|                      | MMSZ5225B-HE3-08 to MMSZ5267B-HE3-08 |                                |                        |
|                      | MMSZ5225C-HE3-08 to MMSZ5267C-HE3-08 |                                |                        |
|                      | MMSZ5225B-E3-18 to MMSZ5267B-E3-18   | 10 000 (8 mm tape on 13" reel) | 10 000/box             |
|                      | MMSZ5225C-E3-18 to MMSZ5267C-E3-18   |                                |                        |
|                      | MMSZ5225B-HE3-18 to MMSZ5267B-HE3-18 |                                |                        |
|                      | MMSZ5225C-HE3-18 to MMSZ5267C-HE3-18 |                                |                        |

## PACKAGE

| PACKAGE NAME | WEIGHT  | MOLDING COMPOUND<br>FLAMMABILITY RATING | MOISTURE SENSITIVITY<br>LEVEL        | SOLDERING CONDITIONS     |
|--------------|---------|-----------------------------------------|--------------------------------------|--------------------------|
| SOD-123      | 10.3 mg | UL 94 V-0                               | MSL level 1<br>(according J-STD-020) | 260 °C/10 s at terminals |

ABSOLUTE MAXIMUM RATINGS ( $T_{amb} = 25\text{ °C}$ , unless otherwise specified)

| PARAMETER                                  | TEST CONDITION                                                                              | SYMBOL     | VALUE       | UNIT |
|--------------------------------------------|---------------------------------------------------------------------------------------------|------------|-------------|------|
| Power dissipation                          | $T_L = 75\text{ °C}$ , on FR - 4 or FR - 5 board with minimum recommended solder pad layout | $P_{tot}$  | 500         | mW   |
| Zener current                              | See table "Electrical Characteristics"                                                      |            |             |      |
| Thermal resistance junction to ambient air | On FR - 4 or FR - 5 board with minimum recommended solder pad layout                        | $R_{thJA}$ | 340         | K/W  |
| Junction temperature                       |                                                                                             | $T_j$      | 150         | °C   |
| Storage temperature range                  |                                                                                             | $T_{stg}$  | -65 to +150 |      |
| Operating temperature range                |                                                                                             | $T_{op}$   | -55 to +150 |      |

**ELECTRICAL CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)

| PART NUMBER | MARKING CODE | ZENER VOLTAGE RANGE <sup>(1)</sup> | TEST CURRENT |           | REVERSE LEAKAGE CURRENT |     | DYNAMIC RESISTANCE <sup>(2)</sup> |                       | TEMPERATURE COEFFICIENT |
|-------------|--------------|------------------------------------|--------------|-----------|-------------------------|-----|-----------------------------------|-----------------------|-------------------------|
|             |              | $V_Z$ at $I_{ZT1}$                 | $I_{ZT1}$    | $I_{ZT2}$ | $I_R$ at $V_R$          |     | $Z_Z$ at $I_{ZT1}$                | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$           |
|             |              | V                                  | mA           |           | $\mu\text{A}$           | V   | $\Omega$                          |                       | %/ $^{\circ}\text{C}$   |
|             |              | NOM.                               |              |           | MAX.                    |     | MAX.                              | MAX.                  | TYP.                    |
| MMSZ5225    | C5           | 3                                  | 20           | 0.25      | 50                      | 1   | 30                                | 1600                  | -0.075                  |
| MMSZ5226    | D1           | 3.3                                | 20           | 0.25      | 25                      | 1   | 28                                | 1600                  | -0.07                   |
| MMSZ5227    | D2           | 3.6                                | 20           | 0.25      | 15                      | 1   | 24                                | 1700                  | -0.065                  |
| MMSZ5228    | D3           | 3.9                                | 20           | 0.25      | 10                      | 1   | 23                                | 1900                  | -0.06                   |
| MMSZ5229    | D4           | 4.3                                | 20           | 0.25      | 5                       | 1   | 22                                | 2000                  | -0.055                  |
| MMSZ5230    | D5           | 4.7                                | 20           | 0.25      | 5                       | 2   | 19                                | 1900                  | $\pm 0.030$             |
| MMSZ5231    | E1           | 5.1                                | 20           | 0.25      | 5                       | 2   | 17                                | 1600                  | $\pm 0.030$             |
| MMSZ5232    | E2           | 5.6                                | 20           | 0.25      | 5                       | 3   | 11                                | 1600                  | 0.038                   |
| MMSZ5233    | E3           | 6                                  | 20           | 0.25      | 5                       | 3.5 | 7                                 | 1600                  | 0.038                   |
| MMSZ5234    | E4           | 6.2                                | 20           | 0.25      | 5                       | 4   | 7                                 | 1000                  | 0.045                   |
| MMSZ5235    | E5           | 6.8                                | 20           | 0.25      | 3                       | 5   | 5                                 | 750                   | 0.05                    |
| MMSZ5236    | F1           | 7.5                                | 20           | 0.25      | 3                       | 6   | 6                                 | 500                   | 0.058                   |
| MMSZ5237    | F2           | 8.2                                | 20           | 0.25      | 3                       | 6.5 | 8                                 | 500                   | 0.062                   |
| MMSZ5238    | F3           | 8.7                                | 20           | 0.25      | 3                       | 6.5 | 8                                 | 600                   | 0.065                   |
| MMSZ5239    | F4           | 9.1                                | 20           | 0.25      | 3                       | 7   | 10                                | 600                   | 0.068                   |
| MMSZ5240    | F5           | 10                                 | 20           | 0.25      | 3                       | 8   | 17                                | 600                   | 0.075                   |
| MMSZ5241    | H1           | 11                                 | 20           | 0.25      | 2                       | 8.4 | 22                                | 600                   | 0.076                   |
| MMSZ5242    | H2           | 12                                 | 20           | 0.25      | 1                       | 9.1 | 30                                | 600                   | 0.077                   |
| MMSZ5243    | H3           | 13                                 | 9.5          | 0.25      | 0.5                     | 9.9 | 13                                | 600                   | 0.079                   |
| MMSZ5244    | H4           | 14                                 | 9            | 0.25      | 0.1                     | 10  | 15                                | 600                   | 0.082                   |
| MMSZ5245    | H5           | 15                                 | 8.5          | 0.25      | 0.1                     | 11  | 16                                | 600                   | 0.082                   |
| MMSZ5246    | J1           | 16                                 | 7.8          | 0.25      | 0.1                     | 12  | 17                                | 600                   | 0.083                   |
| MMSZ5247    | J2           | 17                                 | 7.4          | 0.25      | 0.1                     | 13  | 19                                | 600                   | 0.084                   |
| MMSZ5248    | J3           | 18                                 | 7            | 0.25      | 0.1                     | 14  | 21                                | 600                   | 0.085                   |
| MMSZ5249    | J4           | 19                                 | 6.6          | 0.25      | 0.1                     | 14  | 23                                | 600                   | 0.086                   |
| MMSZ5250    | J5           | 20                                 | 6.2          | 0.25      | 0.1                     | 15  | 25                                | 600                   | 0.086                   |
| MMSZ5251    | K1           | 22                                 | 5.6          | 0.25      | 0.1                     | 17  | 29                                | 600                   | 0.087                   |
| MMSZ5252    | K2           | 24                                 | 5.2          | 0.25      | 0.1                     | 18  | 33                                | 600                   | 0.087                   |
| MMSZ5253    | K3           | 25                                 | 5            | 0.25      | 0.1                     | 19  | 35                                | 600                   | 0.089                   |
| MMSZ5254    | K4           | 27                                 | 4.6          | 0.25      | 0.1                     | 21  | 41                                | 600                   | 0.09                    |
| MMSZ5255    | K5           | 28                                 | 4.5          | 0.25      | 0.1                     | 21  | 44                                | 600                   | 0.091                   |
| MMSZ5256    | M1           | 30                                 | 4.2          | 0.25      | 0.1                     | 23  | 49                                | 600                   | 0.091                   |
| MMSZ5257    | M2           | 33                                 | 3.8          | 0.25      | 0.1                     | 25  | 58                                | 700                   | 0.092                   |
| MMSZ5258    | M3           | 36                                 | 3.4          | 0.25      | 0.1                     | 27  | 70                                | 700                   | 0.093                   |
| MMSZ5259    | M4           | 39                                 | 3.2          | 0.25      | 0.1                     | 30  | 80                                | 800                   | 0.094                   |
| MMSZ5260    | M5           | 43                                 | 3            | 0.25      | 0.1                     | 33  | 93                                | 900                   | 0.095                   |
| MMSZ5261    | N1           | 47                                 | 2.7          | 0.25      | 0.1                     | 36  | 105                               | 1000                  | 0.095                   |
| MMSZ5262    | N2           | 51                                 | 2.5          | 0.25      | 0.1                     | 39  | 125                               | 1100                  | 0.096                   |
| MMSZ5263    | N3           | 56                                 | 2.2          | 0.25      | 0.1                     | 43  | 150                               | 1300                  | 0.096                   |
| MMSZ5264    | N4           | 60                                 | 2.1          | 0.25      | 0.1                     | 46  | 170                               | 1400                  | 0.097                   |
| MMSZ5265    | N5           | 62                                 | 2            | 0.25      | 0.1                     | 47  | 185                               | 1400                  | 0.097                   |
| MMSZ5266    | P1           | 68                                 | 1.8          | 0.25      | 0.1                     | 52  | 230                               | 1600                  | 0.097                   |
| MMSZ5267    | P2           | 75                                 | 1.7          | 0.25      | 0.1                     | 56  | 270                               | 1700                  | 0.098                   |

**Notes**

- Maximum  $V_F = 0.9\text{ V}$ , at  $I_F = 10\text{ mA}$

<sup>(1)</sup> Measured with device junction in thermal equilibrium

<sup>(2)</sup> The Zener Impedance is derived from the 1 kHz AC voltage which results when an AC current having an RMS value equal to 10 % of the Zener current ( $I_{ZT1}$  or  $I_{ZT2}$ ) is superimposed on  $I_{ZT1}$  or  $I_{ZT2}$ . Zener Impedance is measured at two points to insure a sharp knee on the breakdown curve and to eliminate unstable units

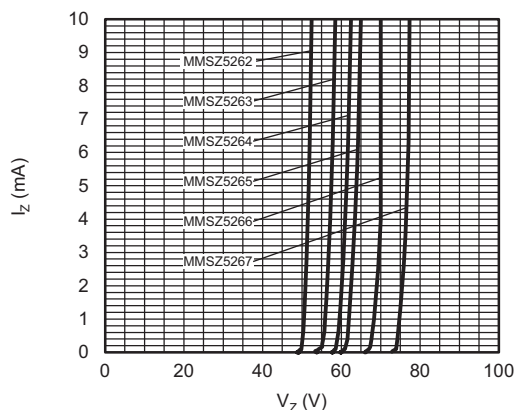


Fig. 1 - Breakdown Characteristics

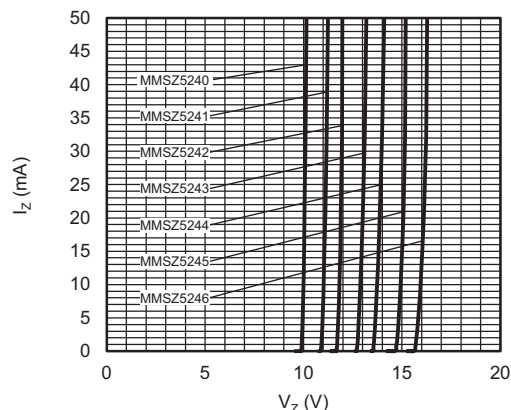


Fig. 4 - Breakdown Characteristics

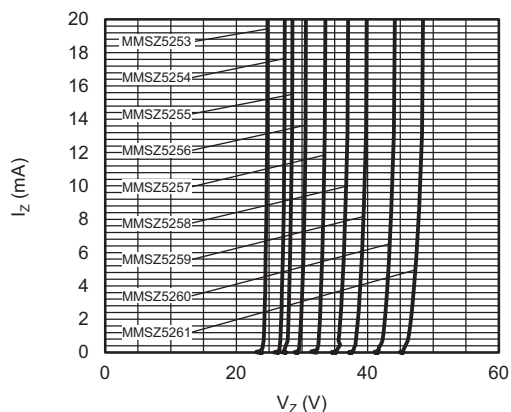


Fig. 2 - Breakdown Characteristics

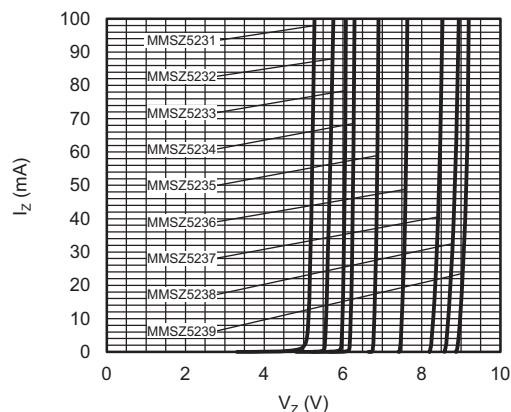


Fig. 5 - Breakdown Characteristics

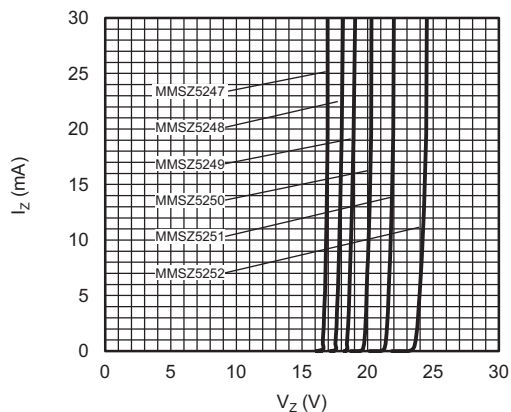


Fig. 3 - Breakdown Characteristics

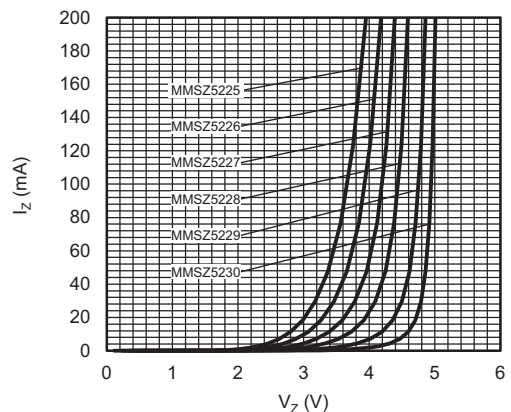
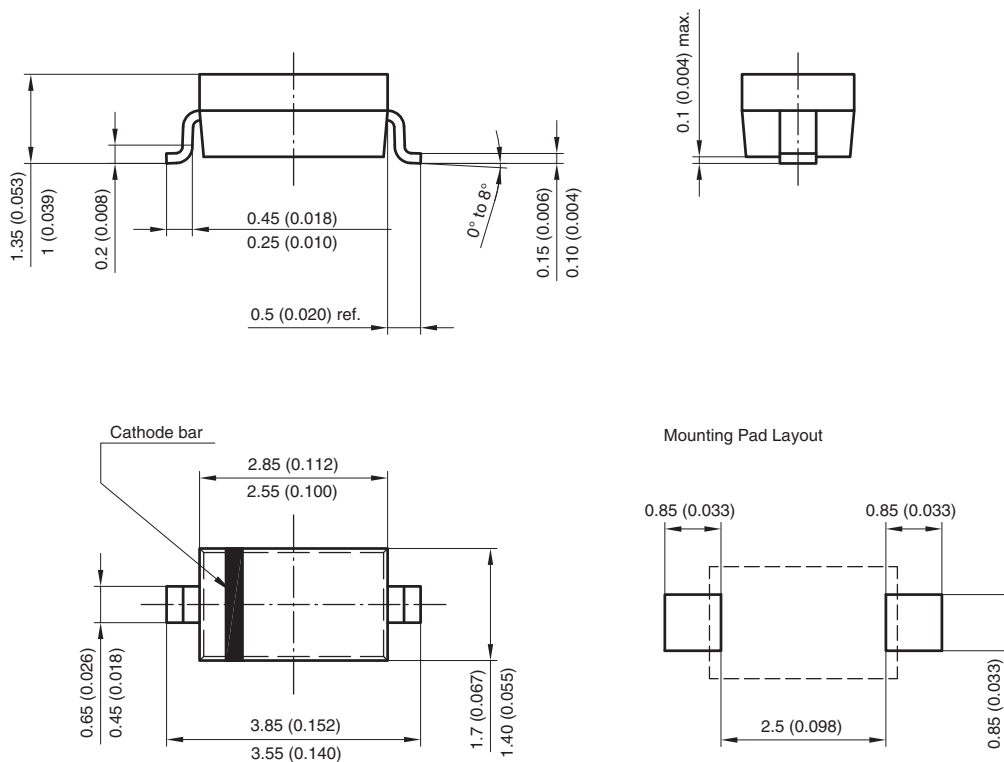


Fig. 6 - Breakdown Characteristics



**PACKAGE DIMENSIONS** in millimeters (inches): **SOD-123**



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