



# Small Signal Zener Diodes



## FEATURES

- Silicon planar power Zener diodes
- Standard Zener voltage tolerance is  $\pm 5\%$  with a "B" suffix in the ordering code (e.g.: 1N5221B), suffix "C" is  $\pm 2\%$  tolerance
- These diodes are also available in MiniMELF case with the type designation TZM5221 to TZM5267, SOT-23 case with the type designations MMBZ5225 to MMBZ5267 and SOD-123 case with the types designations MMSZ5225 to MMSZ5267
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see [www.vishay.com/doc?99912](http://www.vishay.com/doc?99912)



**RoHS**  
COMPLIANT  
HALOGEN  
**FREE**

## DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS      |                     |      |
|------------------------------|---------------------|------|
| PARAMETER                    | VALUE               | UNIT |
| V <sub>Z</sub> range nom.    | 2.4 to 75           | V    |
| Test current I <sub>ZT</sub> | 1.7 to 20           | mA   |
| V <sub>Z</sub> specification | Thermal equilibrium |      |
| Circuit configuration        | Single              |      |

## APPLICATIONS

- Voltage stabilization

| ORDERING INFORMATION |                               |                                 |                        |
|----------------------|-------------------------------|---------------------------------|------------------------|
| DEVICE NAME          | ORDERING CODE                 | TAPED UNITS PER REEL            | MINIMUM ORDER QUANTITY |
| 1N5221B to 1N5267B   | 1N5221B to 1N5267B-series-TR  | 10 000 per 13" reel             | 30 000/box             |
| 1N5221C to 1N5267C   | 1N5221C to 1N5267C-series-TR  |                                 |                        |
| 1N5221B to 1N5267B   | 1N5221B to 1N5267B-series-TAP | 10 000 per ammpack (52 mm tape) |                        |
| 1N5221C to 1N5267C   | 1N5221C to 1N5267C-series-TAP |                                 |                        |

| PACKAGE          |        |                                      |                                   |                              |
|------------------|--------|--------------------------------------|-----------------------------------|------------------------------|
| PACKAGE NAME     | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS         |
| DO-35 (DO-204AH) | 125 mg | UL 94 V-0                            | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                     |                   |                                  |      |
|---|-------------------------------------|-------------------|----------------------------------|------|
| PARAMETER   | TEST CONDITION                      | SYMBOL            | VALUE                            | UNIT |
| Power dissipation   | T <sub>L</sub> ≤ 25 °C              | P <sub>tot</sub>  | 500                              | mW   |
| Zener current   |                                     | I <sub>Z</sub>    | P <sub>tot</sub> /V <sub>Z</sub> | mA   |
| Thermal resistance junction to ambient air                                      | l = 4 mm, T <sub>L</sub> = constant | R <sub>thJA</sub> | 300                              | K/W  |
| Junction temperature  |                                     | T <sub>j</sub>    | 175                              | °C   |
| Storage temperature range   |                                     | T <sub>stg</sub>  | -65 to +175                      | °C   |
| Forward voltage (max.)  | I <sub>F</sub> = 200 mA             | V <sub>F</sub>    | 1.1                              | V    |



| ELECTRICAL CHARACTERISTICS (T <sub>amb</sub> = 25 °C, unless otherwise specified) |                                    |                  |                  |                                  |     |   |                                     |                         |
|---|------------------------------------|------------------|------------------|----------------------------------|-----|---|-------------------------------------|-------------------------|
| PART NUMBER   | ZENER VOLTAGE RANGE <sup>(1)</sup> | TEST CURRENT     |                  | REVERSE LEAKAGE CURRENT          |     | DYNAMIC RESISTANCE f = 1 kHz                      |                                     | TEMPERATURE COEFFICIENT |
|   | V <sub>Z</sub> at I <sub>ZT1</sub> | I <sub>ZT1</sub> | I <sub>ZT2</sub> | I <sub>R</sub> at V <sub>R</sub> |     | Z <sub>Z</sub> at I <sub>ZT1</sub> <sup>(1)</sup> | Z <sub>ZK</sub> at I <sub>ZT2</sub> | α <sub>VZ</sub>         |
|   | V                                  | mA               |                  | μA                               | V   | Ω   |                                     | %/K                     |
|   | NOM.                               |                  |                  | MAX.                             |     | MAX.  | MAX.                                | TYP.                    |
| 1N5221  | 2.4                                | 20               | 0.25             | 100                              | 1   | 30  | 1200                                | - 0.085                 |
| 1N5222  | 2.5                                | 20               | 0.25             | 100                              | 1   | 30  | 1250                                | - 0.085                 |
| 1N5223  | 2.7                                | 20               | 0.25             | 75                               | 1   | 30  | 1300                                | - 0.08                  |
| 1N5224  | 2.8                                | 20               | 0.25             | 75                               | 1   | 30  | 1400                                | - 0.08                  |
| 1N5225  | 3                                  | 20               | 0.25             | 50                               | 1   | 29  | 1600                                | - 0.075                 |
| 1N5226  | 3.3                                | 20               | 0.25             | 25                               | 1   | 28  | 1600                                | - 0.07                  |
| 1N5227  | 3.6                                | 20               | 0.25             | 15                               | 1   | 24  | 1700                                | - 0.065                 |
| 1N5228  | 3.9                                | 20               | 0.25             | 10                               | 1   | 23  | 1900                                | - 0.06                  |
| 1N5229  | 4.3                                | 20               | 0.25             | 5                                | 1   | 22  | 2000                                | 0.055                   |
| 1N5230  | 4.7                                | 20               | 0.25             | 5                                | 2   | 19  | 1900                                | 0.03                    |
| 1N5231  | 5.1                                | 20               | 0.25             | 5                                | 2   | 17  | 1600                                | 0.03                    |
| 1N5232  | 5.6                                | 20               | 0.25             | 5                                | 3   | 11  | 1600                                | 0.038                   |
| 1N5233  | 6                                  | 20               | 0.25             | 5                                | 3.5 | 7   | 1600                                | 0.038                   |
| 1N5234  | 6.2                                | 20               | 0.25             | 5                                | 4   | 7   | 1000                                | 0.045                   |
| 1N5235  | 6.8                                | 20               | 0.25             | 3                                | 5   | 5   | 750                                 | 0.05                    |
| 1N5236  | 7.5                                | 20               | 0.25             | 3                                | 6   | 6   | 500                                 | 0.058                   |
| 1N5237  | 8.2                                | 20               | 0.25             | 3                                | 6.5 | 8   | 500                                 | 0.062                   |
| 1N5238  | 8.7                                | 20               | 0.25             | 3                                | 6.5 | 8   | 600                                 | 0.065                   |
| 1N5239  | 9.1                                | 20               | 0.25             | 3                                | 7   | 10  | 600                                 | 0.068                   |
| 1N5240  | 10                                 | 20               | 0.25             | 3                                | 8   | 17  | 600                                 | 0.075                   |
| 1N5241  | 11                                 | 20               | 0.25             | 2                                | 8.4 | 22  | 600                                 | 0.076                   |
| 1N5242  | 12                                 | 20               | 0.25             | 1                                | 9.1 | 30  | 600                                 | 0.077                   |
| 1N5243  | 13                                 | 9.5              | 0.25             | 0.5                              | 9.9 | 13  | 600                                 | 0.079                   |
| 1N5244  | 14                                 | 9                | 0.25             | 0.1                              | 10  | 15  | 600                                 | 0.082                   |
| 1N5245  | 15                                 | 8.5              | 0.25             | 0.1                              | 11  | 16  | 600                                 | 0.082                   |
| 1N5246  | 16                                 | 7.8              | 0.25             | 0.1                              | 12  | 17  | 600                                 | 0.083                   |
| 1N5247  | 17                                 | 7.4              | 0.25             | 0.1                              | 13  | 19  | 600                                 | 0.084                   |
| 1N5248  | 18                                 | 7                | 0.25             | 0.1                              | 14  | 21  | 600                                 | 0.085                   |
| 1N5249  | 19                                 | 6.6              | 0.25             | 0.1                              | 14  | 23  | 600                                 | 0.086                   |
| 1N5250  | 20                                 | 6.2              | 0.25             | 0.1                              | 15  | 25  | 600                                 | 0.086                   |
| 1N5251  | 22                                 | 5.6              | 0.25             | 0.1                              | 17  | 29  | 600                                 | 0.087                   |
| 1N5252  | 24                                 | 5.2              | 0.25             | 0.1                              | 18  | 33  | 600                                 | 0.088                   |
| 1N5253  | 25                                 | 5                | 0.25             | 0.1                              | 19  | 35  | 600                                 | 0.089                   |
| 1N5254  | 27                                 | 4.6              | 0.25             | 0.1                              | 21  | 41  | 600                                 | 0.09                    |
| 1N5255  | 28                                 | 4.5              | 0.25             | 0.1                              | 21  | 44  | 600                                 | 0.091                   |
| 1N5256  | 30                                 | 4.2              | 0.25             | 0.1                              | 23  | 49  | 600                                 | 0.091                   |
| 1N5257  | 33                                 | 3.8              | 0.25             | 0.1                              | 25  | 58  | 700                                 | 0.092                   |
| 1N5258  | 36                                 | 3.4              | 0.25             | 0.1                              | 27  | 70  | 700                                 | 0.093                   |
| 1N5259  | 39                                 | 3.2              | 0.25             | 0.1                              | 30  | 80  | 800                                 | 0.094                   |
| 1N5260  | 43                                 | 3                | 0.25             | 0.1                              | 33  | 93  | 900                                 | 0.095                   |
| 1N5261  | 47                                 | 2.7              | 0.25             | 0.1                              | 36  | 105   | 1000                                | 0.095                   |
| 1N5262  | 51                                 | 2.5              | 0.25             | 0.1                              | 39  | 125   | 1100                                | 0.096                   |
| 1N5263  | 56                                 | 2.2              | 0.25             | 0.1                              | 43  | 150   | 1300                                | 0.096                   |
| 1N5264  | 60                                 | 2.1              | 0.25             | 0.1                              | 46  | 170   | 1400                                | 0.097                   |
| 1N5265  | 62                                 | 2                | 0.25             | 0.1                              | 47  | 185   | 1400                                | 0.097                   |
| 1N5266  | 68                                 | 1.8              | 0.25             | 0.1                              | 52  | 230   | 1600                                | 0.097                   |
| 1N5267  | 75                                 | 1.7              | 0.25             | 0.1                              | 56  | 270   | 1700                                | 0.098                   |

**Note**

<sup>(1)</sup> Based on DC measurement at thermal equilibrium; lead length = 9.5 (3/8"); thermal resistance of heat sink = 30 K/W

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

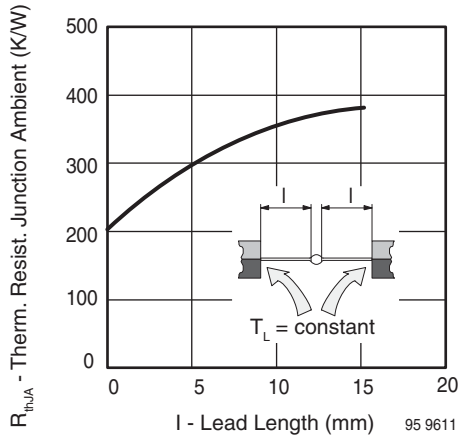


Fig. 1 - Thermal Resistance vs. Lead Length

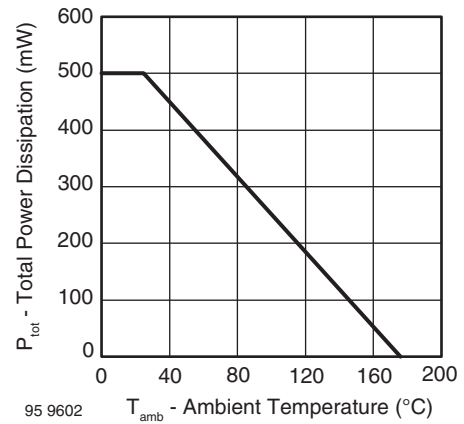


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

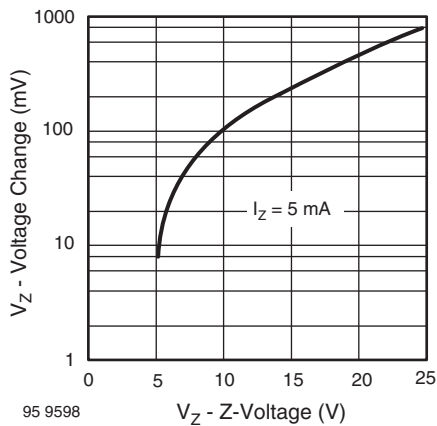


Fig. 2 - Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25\text{ }^{\circ}\text{C}$

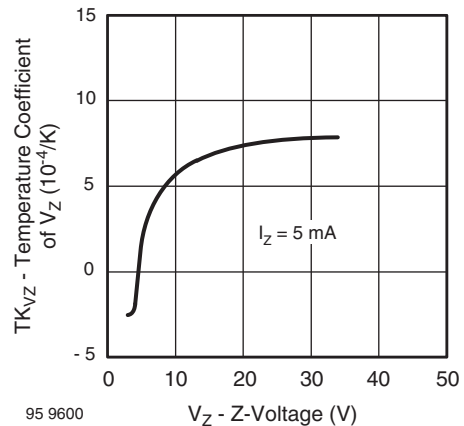


Fig. 5 - Temperature Coefficient of  $V_Z$  vs. Z-Voltage

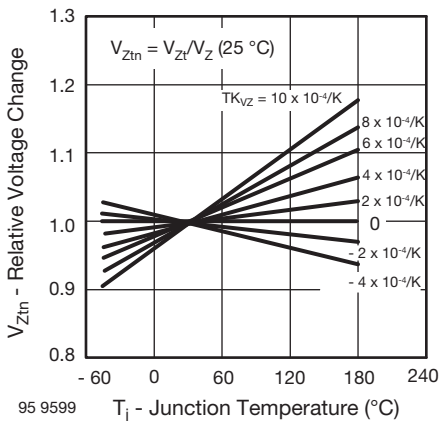


Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

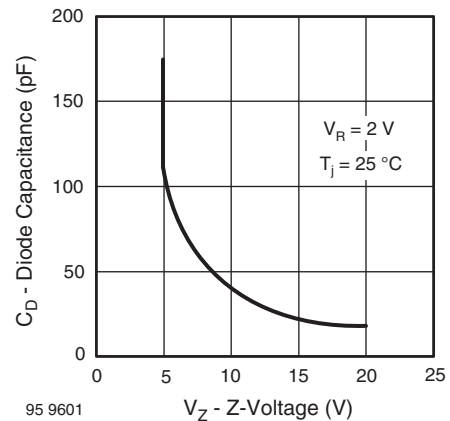


Fig. 6 - Diode Capacitance vs. Z-Voltage

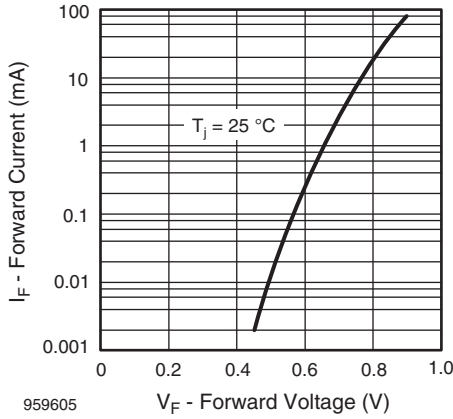


Fig. 7 - Forward Current vs. Forward Voltage

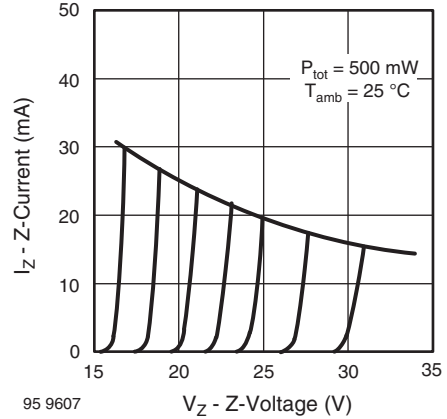


Fig. 9 - Z-Current vs. Z-Voltage

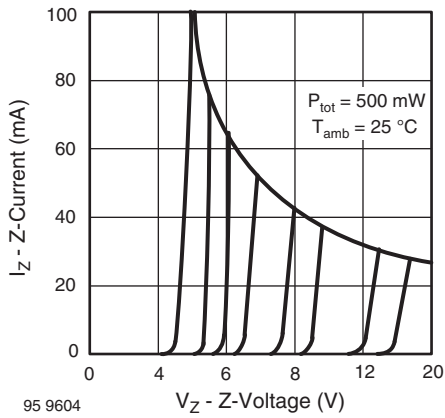


Fig. 8 - Z-Current vs. Z-Voltage

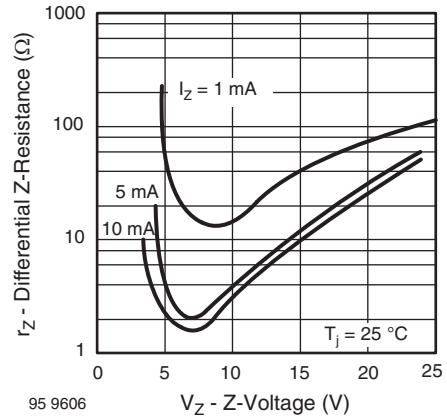


Fig. 10 - Differential Z-Resistance vs. Z-Voltage

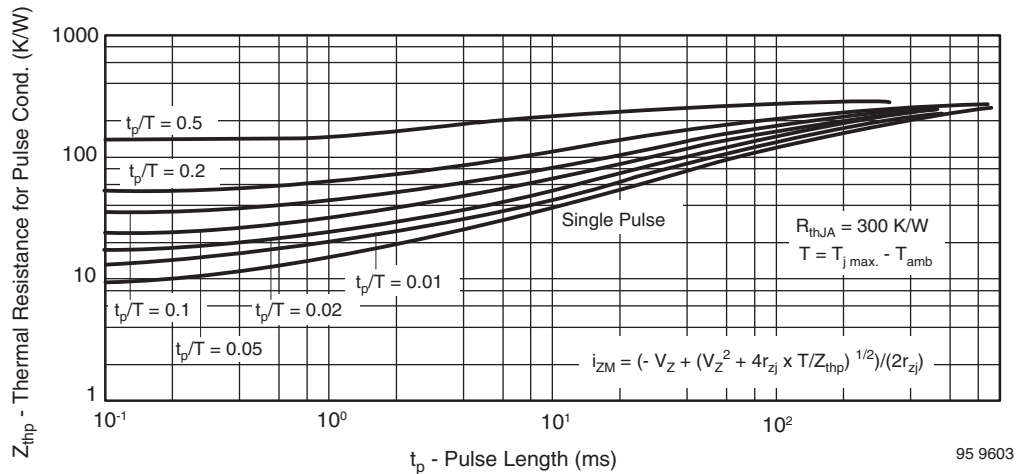
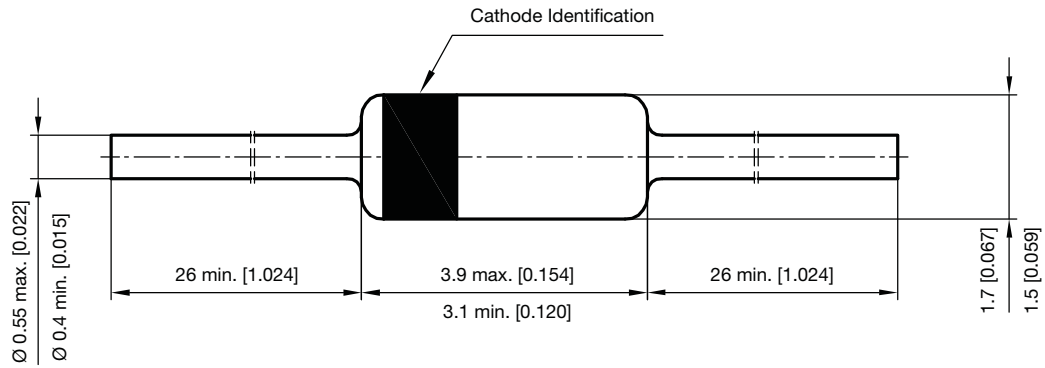


Fig. 11 - Thermal Response



**PACKAGE DIMENSIONS** in millimeters (inches): **DO-35 (DO-204AH)\_1N52xx**



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