# THE DATASHEET OF

# 1N5229B-TR

# Small Signal Zener Diodes

## FEATURES

- Silicon planar power Zener diodes
- Standard Zener voltage tolerance is ± 5 % with a “B” suffix in the ordering code (e.g.: 1N5221B), suffix “C” is ± 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

RoHS COMPLIANT
HALOGEN FREE

## DESIGN SUPPORT TOOLS AVAILABLE

3D Models

## APPLICATIONS

- Voltage stabilization

| PRIMARY CHARACTERISTICS | | |
|---|---|---|
| PARAMETER | VALUE | UNIT |
| $V_Z$ range nom. | 2.4 to 75 | V |
| Test current $I_{ZT}$ | 1.7 to 20 | mA |
| $V_Z$ specification | Thermal equilibrium | |
| Circuit configuration | Single | |

| 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 ammopack (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 ($T_{amb}$ = 25 °C, unless otherwise specified) | | | | |
|---|---|---|---|---|
| PARAMETER | TEST CONDITION | SYMBOL | VALUE | UNIT |
| Power dissipation | $T_L \leq 25$ °C | $P_{tot}$ | 500 | mW |
| Zener current | | $I_Z$ | $P_{tot}/V_Z$ | mA |
| Thermal resistance junction to ambient air | l = 4 mm, $T_L$ = constant | $R_{thJA}$ | 300 | K/W |
| Junction temperature | | $T_j$ | 175 | °C |
| Storage temperature range | | $T_{stg}$ | -65 to +175 | °C |
| Forward voltage (max.) | $I_F$ = 200 mA | $V_F$ | 1.1 | V |



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**ELECTRICAL CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

| PART NUMBER | ZENER VOLTAGE RANGE (1) | TEST CURRENT | | REVERSE LEAKAGE CURRENT | | DYNAMIC RESISTANCE f = 1 kHz | | TEMPERATURE COEFFICIENT |
|---|---|---|---|---|---|---|---|---|
| | $V_Z$ at $I_{ZT1}$ | $I_{ZT1}$ | $I_{ZT2}$ | $I_R$ at $V_R$ | | $Z_Z$ at $I_{ZT1}$ (1) | $Z_{ZK}$ at $I_{ZT2}$ | $\alpha_{VZ}$ |
| | 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**

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


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**BASIC CHARACTERISTICS** ($T_{amb}$ = 25 °C, unless otherwise specified)

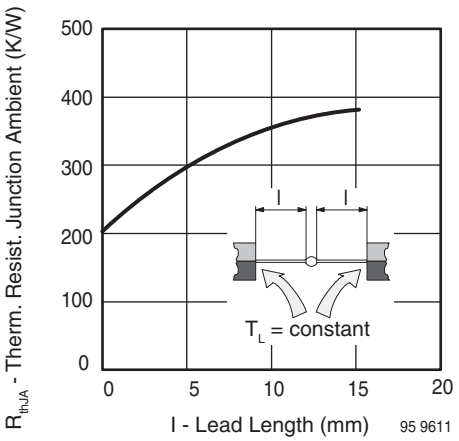


Fig. 1 - Thermal Resistance vs. Lead Length

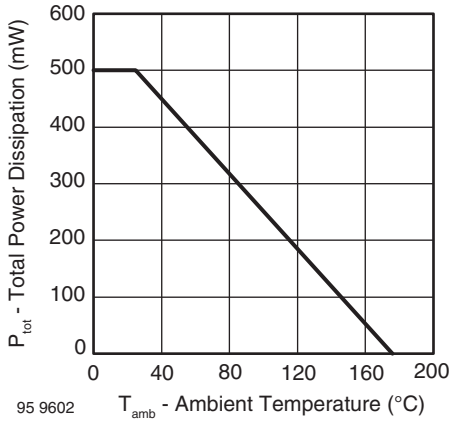


Fig. 4 - Total Power Dissipation vs. Ambient Temperature

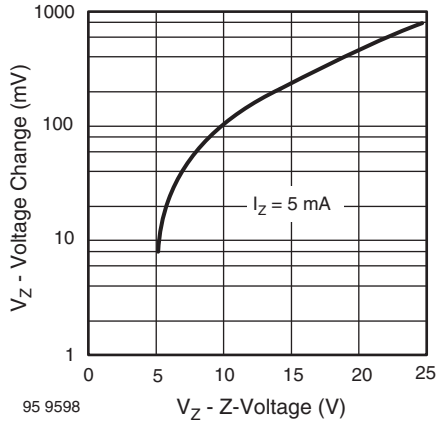


Fig. 2 - Typical Change of Working Voltage under Operating Conditions at $T_{amb}$= 25 °C

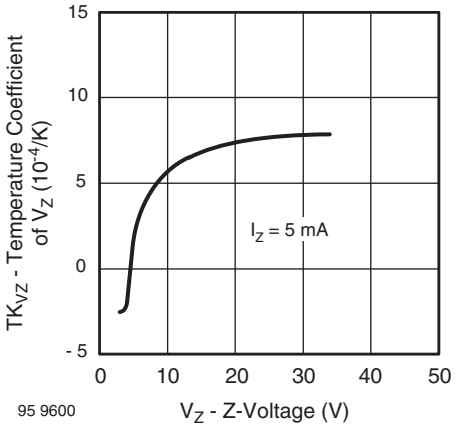


Fig. 5 - Temperature Coefficient of $V_Z$ vs. Z-Voltage

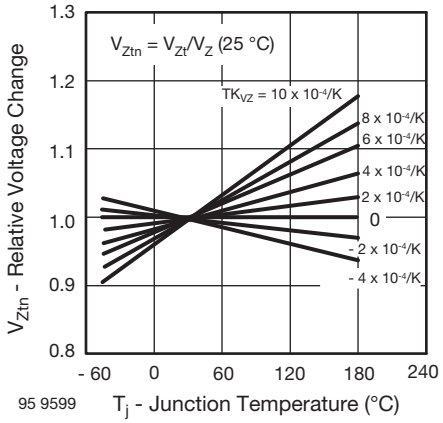


Fig. 3 - Typical Change of Working Voltage vs. Junction Temperature

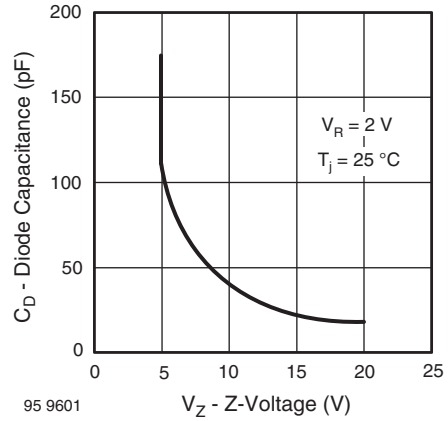


Fig. 6 - Diode Capacitance vs. Z-Voltage


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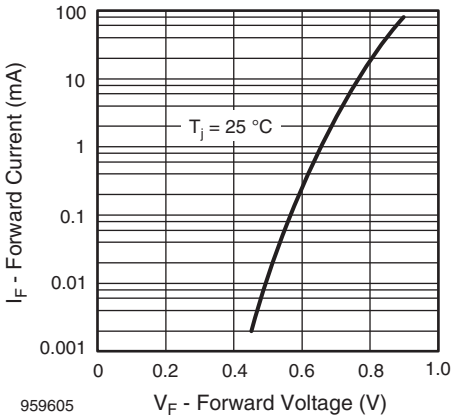


Fig. 7 - Forward Current vs. Forward Voltage

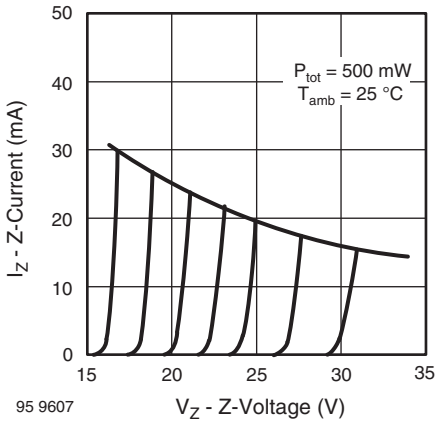


Fig. 9 - Z-Current vs. Z-Voltage

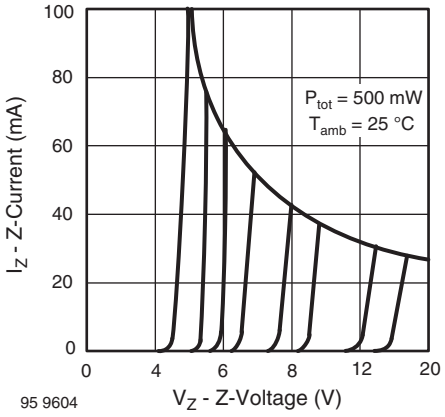


Fig. 8 - Z-Current vs. Z-Voltage

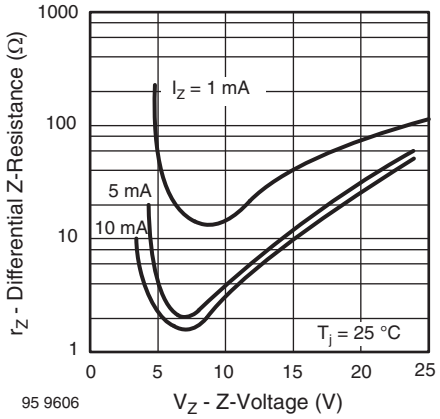


Fig. 10 - Differential Z-Resistance vs. Z-Voltage

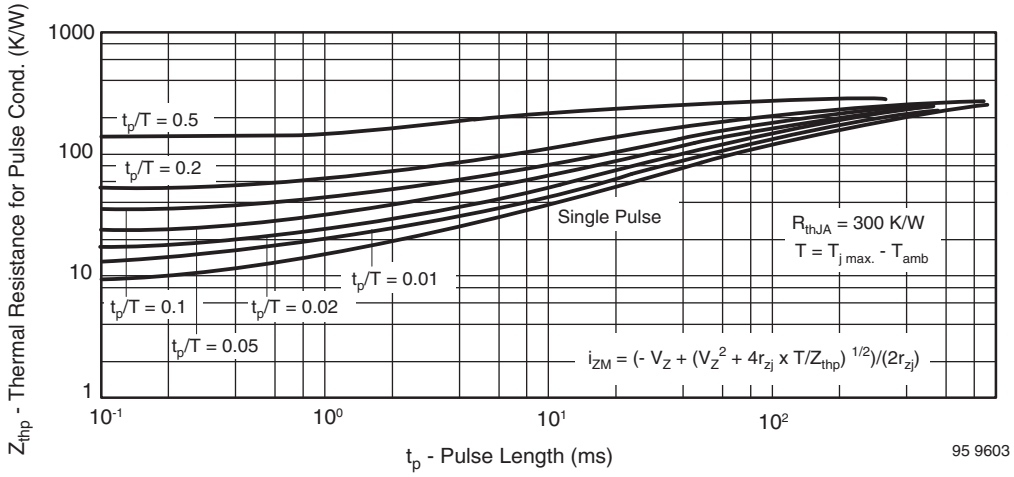


Fig. 11 - Thermal Response


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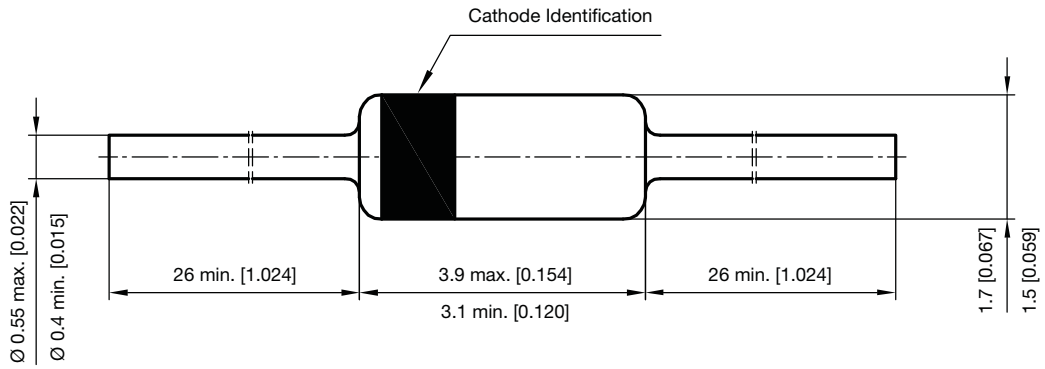
**PACKAGE DIMENSIONS** in millimeters (inches): **DO-35 (DO-204AH)_1N52xx**

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