



Zener Diodes



FEATURES

- Silicon planar power Zener diodes
- For use in stabilizing and clipping circuits with high power rating
- The Zener voltages are graded according to the international E 12 standard.
- These diodes are also available in the MELF case with the type designation ZMY3V9 to ZMY100
- AEC-Q101 qualified
- Material categorization: for definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

DESIGN SUPPORT TOOLS AVAILABLE



| PRIMARY CHARACTERISTICS | | |
|------------------------------|---------------|------|
| PARAMETER | VALUE | UNIT |
| V _Z range nom. | 3.9 to 100 | V |
| Test current I _{ZT} | 5 to 100 | mA |
| V _Z specification | Pulse current | |
| Circuit configuration | Single | |

| ORDERING INFORMATION | | | |
|----------------------|-----------------------------|-------------------------------|------------------------|
| DEVICE NAME | ORDERING CODE | TAPED UNITS PER REEL | MINIMUM ORDER QUANTITY |
| ZPY3V9 to ZPY100 | ZPY3V9 to ZPY100-series-TR | 5000 (52 mm tape on 13" reel) | 25 000/box |
| ZPY3V9 to ZPY100 | ZPY3V9 to ZPY100-series-TAP | 5000 per ammpack (52 mm tape) | 25 000/box |

| PACKAGE | | | | |
|------------------|--------|--------------------------------------|-----------------------------------|------------------------------|
| PACKAGE NAME | WEIGHT | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL | SOLDERING CONDITIONS |
| DO-41 (DO-204AL) | 310 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 | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature | P _{tot} | 1300 | mW |
| Zener current | See table "Characteristics" | | | |
| Junction to ambient air | Valid provided that leads at a distance of 4 mm from case are kept at ambient temperature | R _{thJA} | 110 | K/W |
| Junction temperature | | T _j | 175 | °C |
| Storage temperature range | | T _{stg} | -55 to +175 | °C |



| ELECTRICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified) | | | | | | | | | | |
|--|------------------------------------|------|------|--------------|-----------------|---------------|--|---|--|------|
| PART NUMBER | ZENER VOLTAGE RANGE ⁽²⁾ | | | TEST CURRENT | REVERSE VOLTAGE | | DYNAMIC RESISTANCE $f = 1\text{ kHz}$ | ADMISSIBLE ZENER CURRENT ⁽¹⁾ | TEMPERATURE COEFFICIENT OF ZENER VOLTAGE | |
| | V_Z at I_{ZT1} | | | I_{ZT1} | V_R at I_R | | Z_Z at I_{ZT1} | I_Z | TC_{VZ} at I_{ZT1} | |
| | V | | | mA | V | μA | Ω | mA | $10^{-4}/^{\circ}\text{C}$ | |
| | MIN. | NOM. | MAX. | | | | TYP. | | MIN. | MAX. |
| ZPY3V9 | 3.7 | 3.9 | 4.1 | 100 | - | 0.5 | 4 (< 7) | 290 | - 7 | 2 |
| ZPY4V3 | 4 | 4.3 | 4.6 | 100 | - | 0.5 | 4 (< 7) | 260 | - 7 | 3 |
| ZPY4V7 | 4.4 | 4.7 | 5 | 100 | - | 0.5 | 4 (< 7) | 235 | - 7 | 4 |
| ZPY5V1 | 4.8 | 5.1 | 5.4 | 100 | > 0.7 | 0.5 | 2 (< 5) | 215 | - 6 | 5 |
| ZPY5V6 | 5.2 | 5.6 | 6 | 100 | > 1.5 | 0.5 | 1 (< 2) | 193 | - 3 | 5 |
| ZPY6V2 | 5.8 | 6.2 | 6.6 | 100 | > 2.0 | 0.5 | 1 (< 2) | 183 | - 1 | 6 |
| ZPY6V8 | 6.4 | 6.8 | 7.2 | 100 | > 3.0 | 0.5 | 1 (< 2) | 157 | 0 | 7 |
| ZPY7V5 | 7 | 7.5 | 7.9 | 100 | > 5.0 | 0.5 | 1 (< 2) | 143 | 0 | 7 |
| ZPY8V2 | 7.7 | 8.2 | 8.7 | 100 | > 6.0 | 0.5 | 1 (< 2) | 127 | 3 | 8 |
| ZPY9V1 | 8.5 | 9.1 | 9.6 | 50 | > 7.0 | 0.5 | 2 (< 4) | 117 | 3 | 8 |
| ZPY10 | 9.4 | 10 | 10.6 | 50 | > 7.5 | 0.5 | 2 (< 4) | 105 | 5 | 9 |
| ZPY11 | 10.4 | 11 | 11.6 | 50 | > 8.5 | 0.5 | 3 (< 7) | 94 | 5 | 10 |
| ZPY12 | 11.4 | 12 | 12.7 | 50 | > 9.0 | 0.5 | 3 (< 7) | 85 | 5 | 10 |
| ZPY13 | 12.4 | 13 | 14.1 | 50 | > 10 | 0.5 | 4 (< 9) | 78 | 5 | 10 |
| ZPY15 | 13.8 | 15 | 15.8 | 50 | > 11 | 0.5 | 4 (< 9) | 70 | 5 | 10 |
| ZPY16 | 15.3 | 16 | 17.1 | 25 | > 12 | 0.5 | 5 (< 10) | 63 | 7 | 11 |
| ZPY18 | 16.8 | 18 | 19.1 | 25 | > 14 | 0.5 | 5 (< 11) | 57 | 7 | 11 |
| ZPY20 | 18.8 | 20 | 21.2 | 25 | > 15 | 0.5 | 6 (< 12) | 52 | 7 | 11 |
| ZPY22 | 20.8 | 22 | 23.3 | 25 | > 17 | 0.5 | 7 (< 13) | 48 | 7 | 11 |
| ZPY24 | 22.8 | 24 | 25.6 | 25 | > 18 | 0.5 | 8 (< 14) | 42 | 7 | 12 |
| ZPY27 | 25.1 | 27 | 28.9 | 25 | > 20 | 0.5 | 9 (< 15) | 38 | 7 | 12 |
| ZPY30 | 28 | 30 | 32 | 25 | > 22.5 | 0.5 | 10 (< 20) | 35 | 7 | 12 |
| ZPY33 | 31 | 33 | 35 | 25 | > 25 | 0.5 | 11 (< 20) | 31 | 7 | 12 |
| ZPY36 | 34 | 36 | 38 | 10 | > 27 | 0.5 | 25 (< 60) | 29 | 7 | 12 |
| ZPY39 | 37 | 39 | 41 | 10 | > 29 | 0.5 | 30 (< 60) | 26 | 8 | 12 |
| ZPY43 | 40 | 43 | 46 | 10 | > 32 | 0.5 | 35 (< 80) | 24 | 8 | 13 |
| ZPY47 | 44 | 47 | 50 | 10 | > 35 | 0.5 | 40 (< 80) | 22 | 8 | 13 |
| ZPY51 | 48 | 51 | 54 | 10 | > 38 | 0.5 | 45 (< 100) | 20 | 8 | 13 |
| ZPY56 | 52 | 56 | 60 | 10 | > 42 | 0.5 | 50 (< 100) | 18 | 8 | 13 |
| ZPY62 | 58 | 62 | 66 | 10 | > 47 | 0.5 | 60 (< 130) | 16 | 8 | 13 |
| ZPY68 | 64 | 68 | 72 | 10 | > 51 | 0.5 | 65 (< 130) | 14 | 8 | 13 |
| ZPY75 | 70 | 75 | 79 | 10 | > 56 | 0.5 | 70 (< 160) | 13 | 8 | 13 |
| ZPY82 | 77 | 82 | 88 | 10 | > 61 | 0.5 | 80 (< 160) | 12 | 8 | 13 |
| ZPY91 | 85 | 91 | 96 | 5 | > 68 | 0.5 | 120 (< 250) | 11 | 9 | 13 |
| ZPY100 | 94 | 100 | 106 | 5 | > 75 | 0.5 | 130 (< 250) | 10 | 9 | 13 |

Notes

⁽¹⁾ Valid provided that leads are kept at ambient temperature at a distance of 10 mm from case

⁽²⁾ Tested with pulses $t_p = 5\text{ ms}$

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

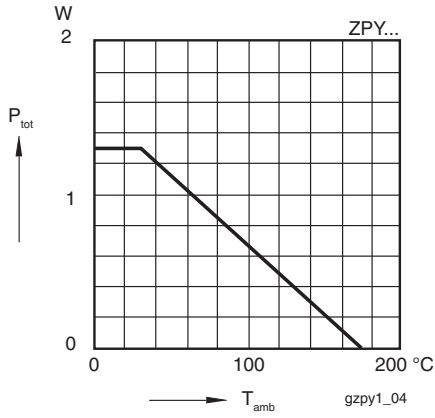


Fig. 1 - Admissible Power Dissipation vs. Ambient Temperature

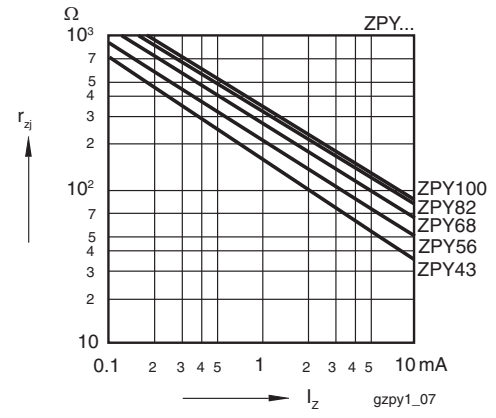


Fig. 4 - Dynamic Resistance vs. Zener Current

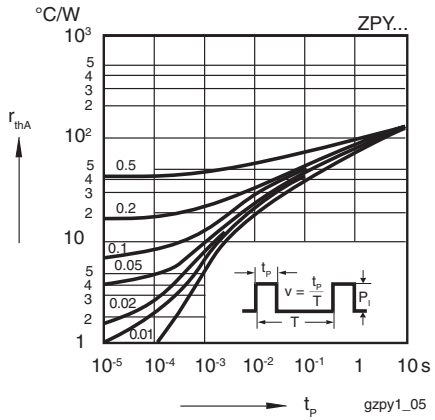


Fig. 2 - Pulse Thermal Resistance vs. Pulse Duration

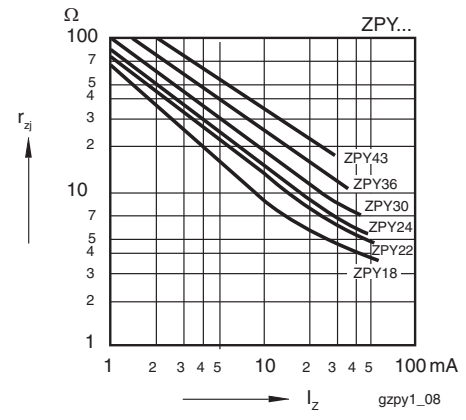


Fig. 5 - Dynamic Resistance vs. Zener Current

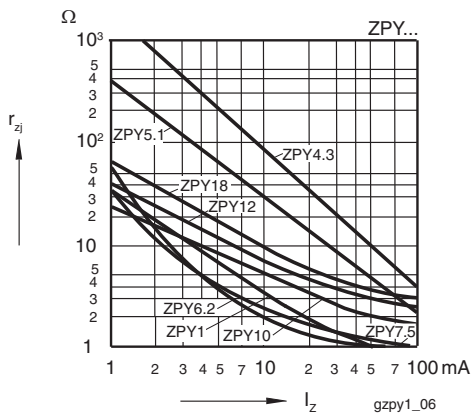


Fig. 3 - Dynamic Resistance vs. Zener Current

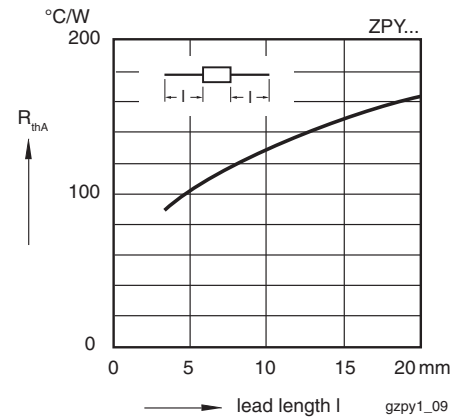


Fig. 6 - Thermal Resistance vs. Lead Length

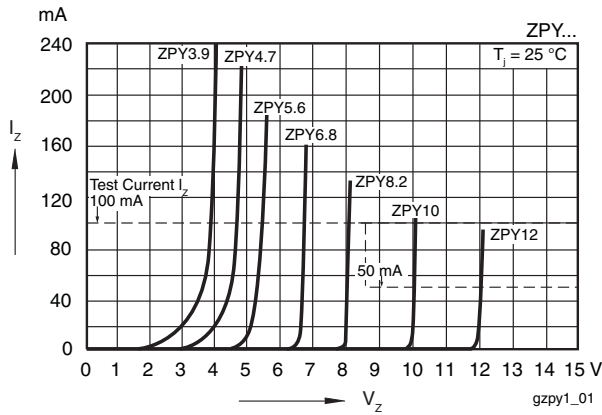


Fig. 7 - Breakdown Characteristics

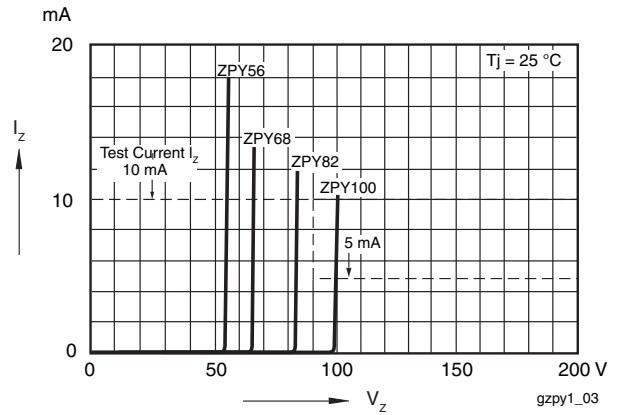


Fig. 9 - Breakdown Characteristics

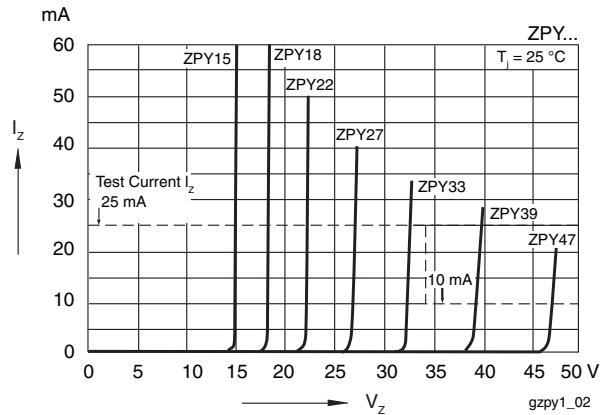
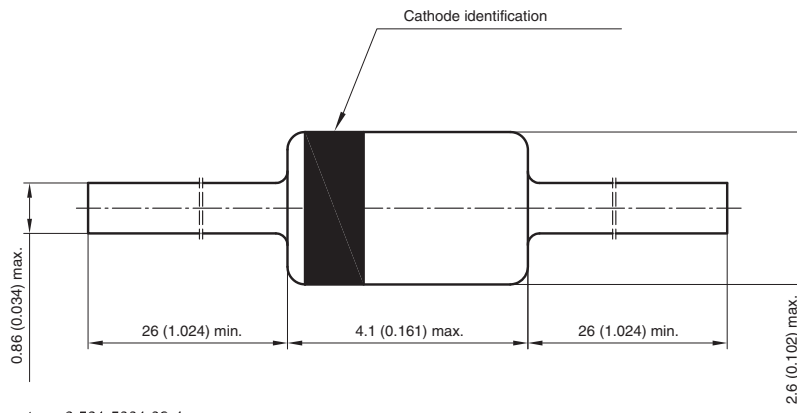


Fig. 8 - Breakdown Characteristics

PACKAGE DIMENSIONS in millimeters (inches): **DO-41 (DO-204AL)**



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