

## 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](http://www.vishay.com/doc?99912)



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

| PRIMARY CHARACTERISTICS      |               |      |
|------------------------------|---------------|------|
| PARAMETER                    | VALUE         | UNIT |
| V <sub>Z</sub> range nom.    | 3.9 to 100    | V    |
| Test current I <sub>ZT</sub> | 5 to 100      | mA   |
| V <sub>Z</sub> specification | Pulse current |      |
| Int. construction            | 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        | 310 mg | -                                    | MSL level 1 (according J-STD-020) | 260 °C/10 s at terminals |

| ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 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 <sub>tot</sub>  | 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 <sub>thJA</sub> | 110         | K/W  |
| Junction temperature                                                            |                                                                                           | T <sub>j</sub>    | 175         | °C   |
| Storage temperature range                                                       |                                                                                           | T <sub>stg</sub>  | -55 to +175 | °C   |



| <b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified) |                                    |      |      |              |                 |               |                                          |                                         |                                          |      |
|----------------------------------------------------------------------------------------------------------|------------------------------------|------|------|--------------|-----------------|---------------|------------------------------------------|-----------------------------------------|------------------------------------------|------|
| PART NUMBER                                                                                              | ZENER VOLTAGE RANGE <sup>(2)</sup> |      |      | TEST CURRENT | REVERSE VOLTAGE |               | DYNAMIC RESISTANCE<br>$f = 1\text{ kHz}$ | ADMISSIBLE ZENER CURRENT <sup>(1)</sup> | 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               | $\mu\text{A}$ | $\Omega$                                 | 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**

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

<sup>(2)</sup> Tested with pulses  $t_p = 5\text{ ms}$

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

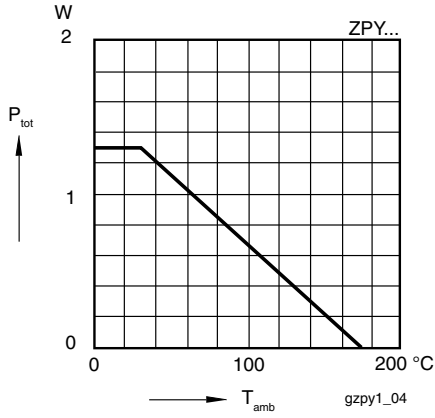


Fig. 1 - Admissible Power Dissipation vs. Ambient Temperature



Fig. 4 - Dynamic Resistance vs. Zener Current

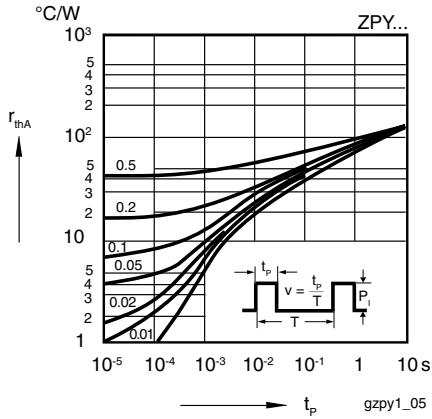


Fig. 2 - Pulse Thermal Resistance vs. Pulse Duration

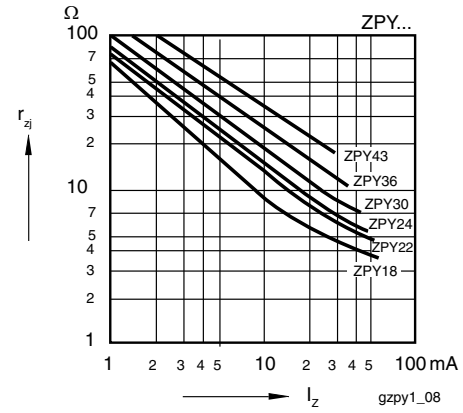


Fig. 5 - Dynamic Resistance vs. Zener Current

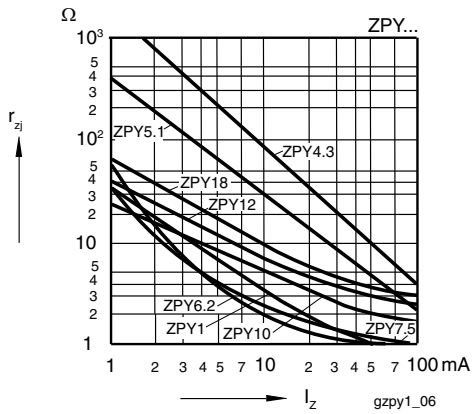


Fig. 3 - Dynamic Resistance vs. Zener Current

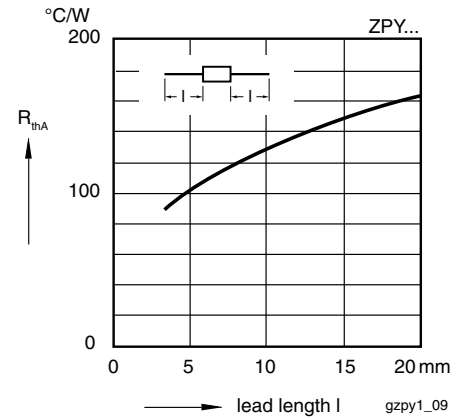


Fig. 6 - Thermal Resistance vs. Lead Length

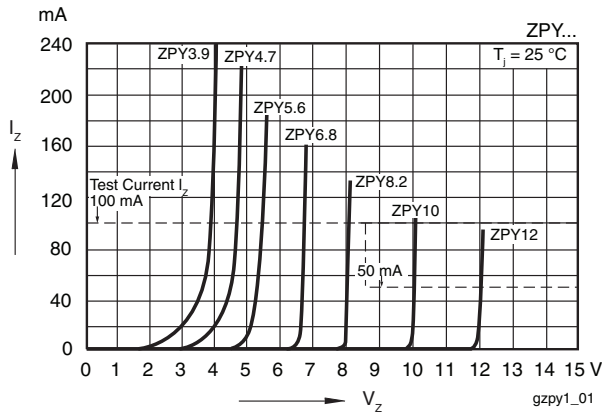


Fig. 7 - Breakdown Characteristics

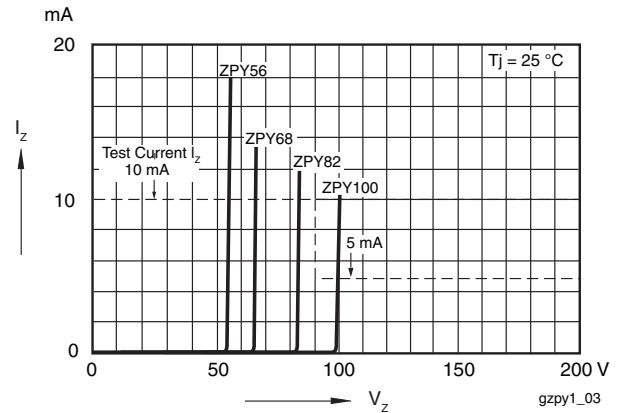


Fig. 9 - Breakdown Characteristics

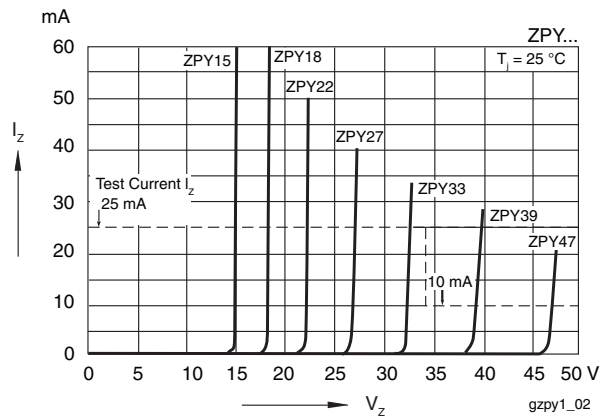
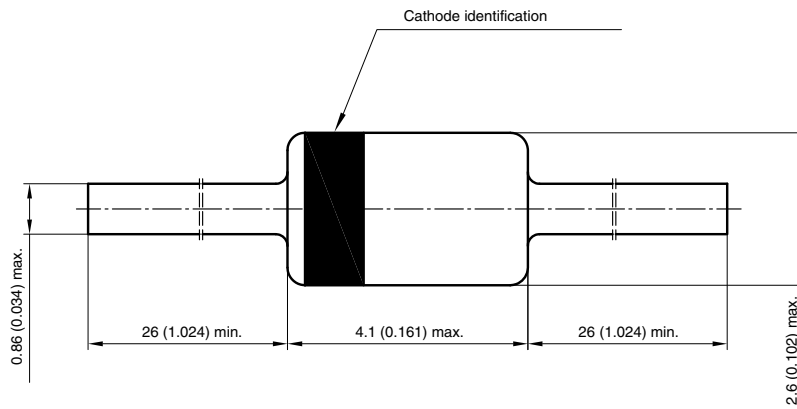


Fig. 8 - Breakdown Characteristics

## PACKAGE DIMENSIONS in millimeters (inches): DO-41



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