

## Zener Diodes



### LINKS TO ADDITIONAL RESOURCES



### 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 24 standard. Smaller voltage tolerances are available upon request
- These diodes are also available in the DO-41 case with the type designation ZPY3V9 to ZPY75
- 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 |
|-----------------------|---------------|------|
| $V_Z$ range nom.      | 3.9 to 75     | V    |
| Test current $I_{ZT}$ | 10 to 100     | mA   |
| $V_Z$ specification   | Pulse current |      |
| Circuit configuration | Single        |      |

### ORDERING INFORMATION

| DEVICE NAME     | ORDERING CODE               | TAPED UNITS PER REEL           | MINIMUM ORDER QUANTITY |
|-----------------|-----------------------------|--------------------------------|------------------------|
| ZMY3V9 to ZMY75 | ZMY3V9 to ZMY75-series-GS18 | 5 000 (12 mm tape on 13" reel) | 10 000/box             |
| ZMY3V9 to ZMY75 | ZMY3V9 to ZMY75-series-GS08 | 1 500 (12 mm tape on 7" reel)  | 12 000/box             |

### PACKAGE

| PACKAGE NAME          | WEIGHT         | MOLDING COMPOUND FLAMMABILITY RATING | MOISTURE SENSITIVITY LEVEL        | SOLDERING CONDITIONS         |
|-----------------------|----------------|--------------------------------------|-----------------------------------|------------------------------|
| MELF (DO-213AB) glass | approx. 135 mg | UL 94 V-0                            | MSL level 1 (according J-STD-020) | Peak temperature max. 260 °C |

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

| PARAMETER                     | TEST CONDITION                                                 | SYMBOL     | VALUE       | UNIT |
|-------------------------------|----------------------------------------------------------------|------------|-------------|------|
| Power dissipation             | Valid provided that electrodes are kept at ambient temperature | $P_{tot}$  | 1000        | mW   |
| Zener current                 | See table "Characteristics"                                    |            |             |      |
| Junction to ambient air       | Valid provided that electrodes are kept at ambient temperature | $R_{thJA}$ | 170         | K/W  |
| Junction to ambient case      |                                                                | $R_{thJC}$ | 60          | K/W  |
| Junction temperature, maximum |                                                                | $T_j$      | 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 <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 $I_{ZT1}$                       |      | $I_Z$                                   | $\alpha_{VZ}$ at $I_{ZT1}$               |      |
|             | V                                  |      |      | mA           | V               | $\mu\text{A}$ | $\Omega$                                 |      | mA                                      | $10^{-4}/^{\circ}\text{C}$               |      |
|             | MIN.                               | NOM. | MAX. |              |                 |               | MAX.                                     | TYP. |                                         | MIN.                                     | MAX. |
| ZMY3V9      | 3.7                                | 3.9  | 4.1  | 100          | -               | 0.5           | 7                                        | 4    | 203                                     | - 7                                      | 2    |
| ZMY4V3      | 4                                  | 4.3  | 4.6  | 100          | -               | 0.5           | 7                                        | 4    | 182                                     | - 7                                      | 3    |
| ZMY4V7      | 4.4                                | 4.7  | 5    | 100          | -               | 0.5           | 7                                        | 4    | 165                                     | - 7                                      | 4    |
| ZMY5V1      | 4.8                                | 5.1  | 5.4  | 100          | 0.7             | 0.5           | 5                                        | 2    | 150                                     | - 6                                      | 5    |
| ZMY5V6      | 5.2                                | 5.6  | 6    | 100          | 1.5             | 0.5           | 2                                        | 1    | 135                                     | - 3                                      | 5    |
| ZMY6V2      | 5.8                                | 6.2  | 6.6  | 100          | 2               | 0.5           | 2                                        | 1    | 128                                     | - 1                                      | 6    |
| ZMY6V8      | 6.4                                | 6.8  | 7.2  | 100          | 3               | 0.5           | 2                                        | 1    | 110                                     | 0                                        | 7    |
| ZMY7V5      | 7                                  | 7.5  | 7.9  | 100          | 5               | 0.5           | 2                                        | 1    | 100                                     | 0                                        | 7    |
| ZMY8V2      | 7.7                                | 8.2  | 8.7  | 100          | 6               | 0.5           | 2                                        | 1    | 89                                      | 3                                        | 8    |
| ZMY9V1      | 8.5                                | 9.1  | 9.6  | 50           | 7               | 0.5           | 4                                        | 2    | 82                                      | 3                                        | 8    |
| ZMY10       | 9.4                                | 10   | 10.6 | 50           | 7.5             | 0.5           | 4                                        | 2    | 74                                      | 5                                        | 9    |
| ZMY11       | 10.4                               | 11   | 11.6 | 50           | 8.5             | 0.5           | 7                                        | 3    | 66                                      | 5                                        | 10   |
| ZMY12       | 11.4                               | 12   | 12.7 | 50           | 9               | 0.5           | 7                                        | 3    | 60                                      | 5                                        | 10   |
| ZMY13       | 12.4                               | 13   | 14.1 | 50           | 10              | 0.5           | 9                                        | 4    | 55                                      | 5                                        | 10   |
| ZMY15       | 13.8                               | 15   | 15.8 | 50           | 11              | 0.5           | 9                                        | 4    | 49                                      | 5                                        | 10   |
| ZMY16       | 15.3                               | 16   | 17.1 | 25           | 12              | 0.5           | 10                                       | 5    | 44                                      | 7                                        | 11   |
| ZMY18       | 16.8                               | 18   | 19.1 | 25           | 14              | 0.5           | 11                                       | 5    | 40                                      | 7                                        | 11   |
| ZMY20       | 18.8                               | 20   | 21.2 | 25           | 15              | 0.5           | 12                                       | 6    | 36                                      | 7                                        | 11   |
| ZMY22       | 20.8                               | 22   | 23.3 | 25           | 17              | 0.5           | 13                                       | 7    | 34                                      | 7                                        | 11   |
| ZMY24       | 22.8                               | 24   | 25.6 | 25           | 18              | 0.5           | 14                                       | 8    | 29                                      | 7                                        | 12   |
| ZMY27       | 25.1                               | 27   | 28.9 | 25           | 20              | 0.5           | 15                                       | 9    | 27                                      | 7                                        | 12   |
| ZMY30       | 28                                 | 30   | 32   | 25           | 22.5            | 0.5           | 20                                       | 10   | 25                                      | 7                                        | 12   |
| ZMY33       | 31                                 | 33   | 35   | 25           | 25              | 0.5           | 20                                       | 11   | 22                                      | 7                                        | 12   |
| ZMY36       | 34                                 | 36   | 38   | 10           | 27              | 0.5           | 60                                       | 25   | 20                                      | 7                                        | 12   |
| ZMY39       | 37                                 | 39   | 41   | 10           | 29              | 0.5           | 60                                       | 30   | 18                                      | 8                                        | 12   |
| ZMY43       | 40                                 | 43   | 46   | 10           | 32              | 0.5           | 80                                       | 35   | 17                                      | 8                                        | 13   |
| ZMY47       | 44                                 | 47   | 50   | 10           | 35              | 0.5           | 80                                       | 40   | 15                                      | 8                                        | 13   |
| ZMY51       | 48                                 | 51   | 54   | 10           | 38              | 0.5           | 100                                      | 45   | 14                                      | 8                                        | 13   |
| ZMY56       | 52                                 | 56   | 60   | 10           | 42              | 0.5           | 100                                      | 50   | 13                                      | 8                                        | 13   |
| ZMY62       | 58                                 | 62   | 66   | 10           | 47              | 0.5           | 130                                      | 60   | 11                                      | 8                                        | 13   |
| ZMY68       | 64                                 | 68   | 72   | 10           | 51              | 0.5           | 130                                      | 65   | 10                                      | 8                                        | 13   |
| ZMY75       | 70                                 | 75   | 79   | 10           | 56              | 0.5           | 160                                      | 70   | 9                                       | 8                                        | 13   |

**Notes**<sup>(1)</sup> Valid provided that electrodes are kept at ambient temperature<sup>(2)</sup> Tested with pulses  $t_p = 5\text{ ms}$

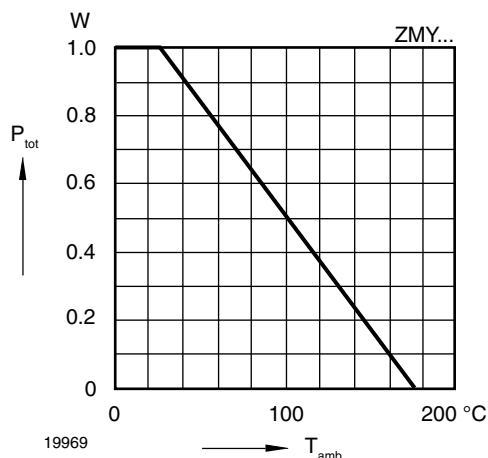
**BASIC CHARACTERISTICS** ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)


Fig. 1 - Admissible Power Dissipation vs. Ambient Temperature

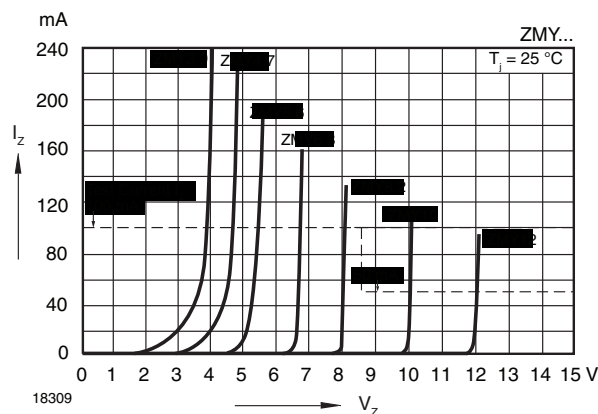


Fig. 4 - Typical Breakdown Characteristics

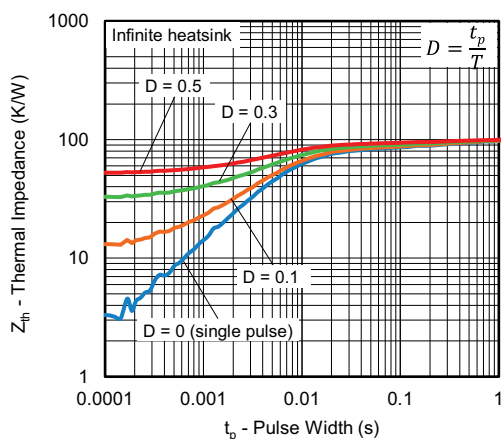


Fig. 2 - Thermal Impedance vs. Time

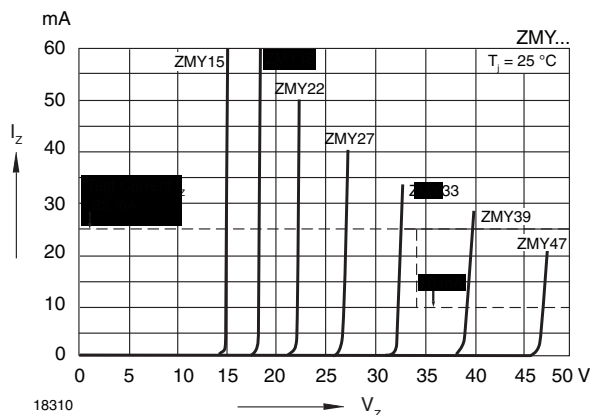
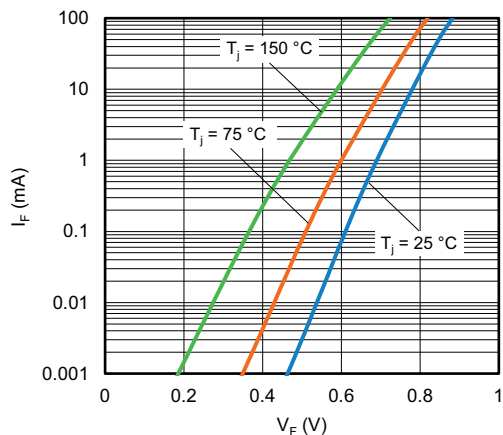
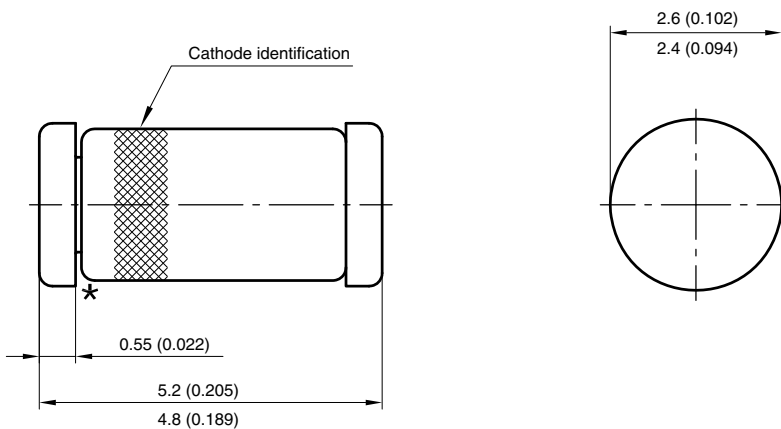


Fig. 5 - Typical Breakdown Characteristics


Fig. 3 - Typical Forward Current  $I_F$  vs. Forward Voltage  $V_F$

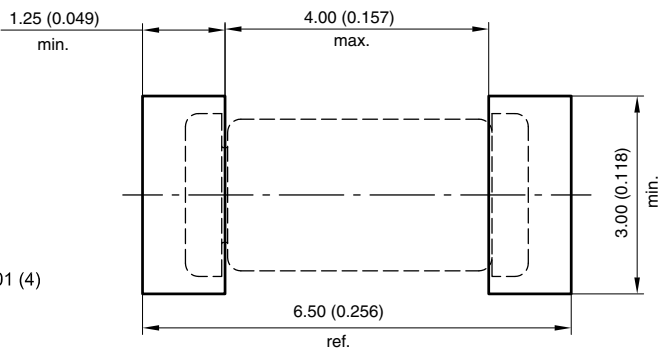


**PACKAGE DIMENSIONS** in millimeters (inches): **MELF DO-213AB (glass)**



★ The gap between plug and glass can be either on cathode or anode side

Foot print recommendation:



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