

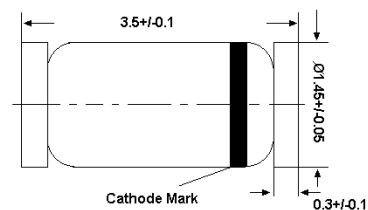


## Silicon Epitaxial Planar Zener Diodes

in MiniMELF case especially for automatic insertion.

The Zener voltages are graded according to the international E24 standard. Smaller voltage tolerances and higher Zener voltages are upon request.

LL-34



Glass case MiniMELF  
Dimensions in mm

### Absolute Maximum Ratings ( $T_a = 25^\circ\text{C}$ )

| Parameter                                                                    | Symbol           | Value             | Unit             |
|------------------------------------------------------------------------------|------------------|-------------------|------------------|
| Power Dissipation                                                            | $P_{\text{tot}}$ | 500 <sup>1)</sup> | mW               |
| Junction Temperature                                                         | $T_j$            | 175               | $^\circ\text{C}$ |
| Storage Temperature Range                                                    | $T_{\text{stg}}$ | - 55 to + 175     | $^\circ\text{C}$ |
| <sup>1)</sup> Valid provided that electrodes are kept at ambient temperature |                  |                   |                  |

### Characteristics at $T_a = 25^\circ\text{C}$

| Parameter                                                                    | Symbol           | Max.              | Unit |
|------------------------------------------------------------------------------|------------------|-------------------|------|
| Thermal Resistance Junction to Ambient Air                                   | $R_{\text{thA}}$ | 0.3 <sup>1)</sup> | K/mW |
| Forward Voltage<br>at $I_F = 100\text{ mA}$                                  | $V_F$            | 1                 | V    |
| <sup>1)</sup> Valid provided that electrodes are kept at ambient temperature |                  |                   |      |



### Characteristics at $T_a = 25^\circ\text{C}$

| Type   | Zener Voltage Range <sup>1)</sup> |             |             | Dynamic Resistance |                   |             | Reverse Leakage Current  |                           |          | Temp. Coefficient<br>of Zener Voltage |
|--------|-----------------------------------|-------------|-------------|--------------------|-------------------|-------------|--------------------------|---------------------------|----------|---------------------------------------|
|        | $V_{Znom}$                        | $V_{ZT}$    | at $I_{ZT}$ | $Z_{ZT}$           | $Z_{ZK}$          | at $I_{ZK}$ | $T_a = 25^\circ\text{C}$ | $T_a = 125^\circ\text{C}$ | at $V_R$ |                                       |
|        | (V)                               | (V)         | (mA)        | Max. ( $\Omega$ )  | Max. ( $\Omega$ ) | (mA)        | Max. ( $\mu\text{A}$ )   | Max. ( $\mu\text{A}$ )    | (V)      |                                       |
| ZMM1V0 | 0.75                              | 0.7...0.8   | 5           | 8                  | 50                | 1           | -                        | -                         | -        | -0.26...-0.23                         |
| ZMM2V0 | 2                                 | 1.8...2.15  | 5           | 85                 | 600               | 1           | 100                      | 200                       | 1        | -0.09...-0.06                         |
| ZMM2V2 | 2.2                               | 2.08...2.33 | 5           | 85                 | 600               | 1           | 75                       | 160                       | 1        | -0.09...-0.06                         |
| ZMM2V4 | 2.4                               | 2.28...2.56 | 5           | 85                 | 600               | 1           | 50                       | 100                       | 1        | -0.09...-0.06                         |
| ZMM2V7 | 2.7                               | 2.5...2.9   | 5           | 85                 | 600               | 1           | 10                       | 50                        | 1        | -0.09...-0.06                         |
| ZMM3V0 | 3                                 | 2.8...3.2   | 5           | 85                 | 600               | 1           | 4                        | 40                        | 1        | -0.08...-0.05                         |
| ZMM3V3 | 3.3                               | 3.1...3.5   | 5           | 85                 | 600               | 1           | 2                        | 40                        | 1        | -0.08...-0.05                         |
| ZMM3V6 | 3.6                               | 3.4...3.8   | 5           | 85                 | 600               | 1           | 2                        | 40                        | 1        | -0.08...-0.05                         |
| ZMM3V9 | 3.9                               | 3.7...4.1   | 5           | 85                 | 600               | 1           | 2                        | 40                        | 1        | -0.08...-0.05                         |
| ZMM4V3 | 4.3                               | 4...4.6     | 5           | 75                 | 600               | 1           | 1                        | 20                        | 1        | -0.06...-0.03                         |
| ZMM4V7 | 4.7                               | 4.4...5     | 5           | 60                 | 600               | 1           | 0.5                      | 10                        | 1        | -0.05...+0.02                         |
| ZMM5V1 | 5.1                               | 4.8...5.4   | 5           | 35                 | 550               | 1           | 0.1                      | 2                         | 1        | -0.02...+0.02                         |
| ZMM5V6 | 5.6                               | 5.2...6     | 5           | 25                 | 450               | 1           | 0.1                      | 2                         | 1        | -0.05...+0.05                         |
| ZMM6V2 | 6.2                               | 5.8...6.6   | 5           | 10                 | 200               | 1           | 0.1                      | 2                         | 2        | 0.03...0.06                           |
| ZMM6V8 | 6.8                               | 6.4...7.2   | 5           | 8                  | 150               | 1           | 0.1                      | 2                         | 3        | 0.03...0.07                           |
| ZMM7V5 | 7.5                               | 7...7.9     | 5           | 7                  | 50                | 1           | 0.1                      | 2                         | 5        | 0.03...0.07                           |
| ZMM8V2 | 8.2                               | 7.7...8.7   | 5           | 7                  | 50                | 1           | 0.1                      | 2                         | 6.2      | 0.03...0.08                           |
| ZMM9V1 | 9.1                               | 8.5...9.6   | 5           | 10                 | 50                | 1           | 0.1                      | 2                         | 6.8      | 0.03...0.09                           |
| ZMM10V | 10                                | 9.4...10.6  | 5           | 15                 | 70                | 1           | 0.1                      | 2                         | 7.5      | 0.03...0.1                            |
| ZMM11V | 11                                | 10.4...11.6 | 5           | 20                 | 70                | 1           | 0.1                      | 2                         | 8.2      | 0.03...0.11                           |
| ZMM12V | 12                                | 11.4...12.7 | 5           | 20                 | 90                | 1           | 0.1                      | 2                         | 9.1      | 0.03...0.11                           |
| ZMM13V | 13                                | 12.4...14.1 | 5           | 26                 | 110               | 1           | 0.1                      | 2                         | 10       | 0.03...0.11                           |
| ZMM15V | 15                                | 13.8...15.6 | 5           | 30                 | 110               | 1           | 0.1                      | 2                         | 11       | 0.03...0.11                           |
| ZMM16V | 16                                | 15.3...17.1 | 5           | 40                 | 170               | 1           | 0.1                      | 2                         | 12       | 0.03...0.11                           |
| ZMM18V | 18                                | 16.8...19.1 | 5           | 50                 | 170               | 1           | 0.1                      | 2                         | 13       | 0.03...0.11                           |
| ZMM20V | 20                                | 18.8...21.2 | 5           | 55                 | 220               | 1           | 0.1                      | 2                         | 15       | 0.03...0.11                           |
| ZMM22V | 22                                | 20.8...23.3 | 5           | 55                 | 220               | 1           | 0.1                      | 2                         | 16       | 0.04...0.12                           |
| ZMM24V | 24                                | 22.8...25.6 | 5           | 80                 | 220               | 1           | 0.1                      | 2                         | 18       | 0.04...0.12                           |
| ZMM27V | 27                                | 25.1...28.9 | 5           | 80                 | 220               | 1           | 0.1                      | 2                         | 20       | 0.04...0.12                           |
| ZMM30V | 30                                | 28...32     | 5           | 80                 | 220               | 1           | 0.1                      | 2                         | 22       | 0.04...0.12                           |
| ZMM33V | 33                                | 31...35     | 5           | 80                 | 220               | 1           | 0.1                      | 2                         | 24       | 0.04...0.12                           |
| ZMM36V | 36                                | 34...38     | 5           | 80                 | 220               | 1           | 0.1                      | 2                         | 27       | 0.04...0.12                           |
| ZMM39V | 39                                | 37...41     | 2.5         | 90                 | 500               | 0.5         | 0.1                      | 5                         | 30       | 0.04...0.12                           |
| ZMM43V | 43                                | 40...46     | 2.5         | 90                 | 500               | 0.5         | 0.1                      | 5                         | 33       | 0.04...0.12                           |
| ZMM47V | 47                                | 44...50     | 2.5         | 110                | 600               | 0.5         | 0.1                      | 5                         | 36       | 0.04...0.12                           |
| ZMM51V | 51                                | 48...54     | 2.5         | 125                | 700               | 0.5         | 0.1                      | 10                        | 39       | 0.04...0.12                           |
| ZMM56V | 56                                | 52...60     | 2.5         | 135                | 700               | 0.5         | 0.1                      | 10                        | 43       | 0.04...0.12                           |
| ZMM62V | 62                                | 58...66     | 2.5         | 150                | 1000              | 0.5         | 0.1                      | 10                        | 47       | 0.04...0.12                           |
| ZMM68V | 68                                | 64...72     | 2.5         | 200                | 1000              | 0.5         | 0.1                      | 10                        | 51       | 0.04...0.12                           |
| ZMM75V | 75                                | 70...79     | 2.5         | 250                | 1000              | 0.5         | 0.1                      | 10                        | 56       | 0.04...0.12                           |

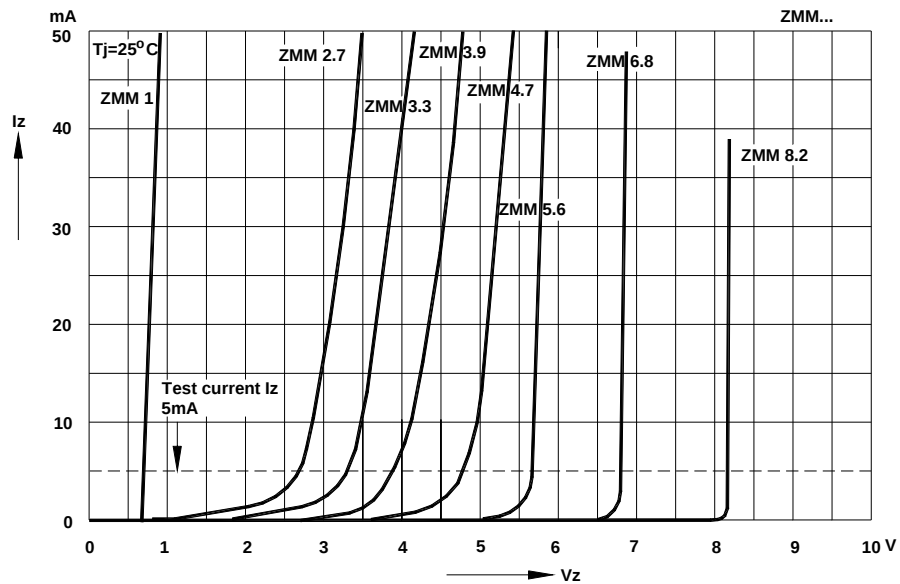
<sup>1)</sup> Tested with pulses  $t_p = 20$  ms.

<sup>2)</sup> The ZMM1 is a silicon diode with operation in forward direction. Hence, the index of all parameters should be "F" instead of "Z". Connect the cathode electrode to the negative pole.



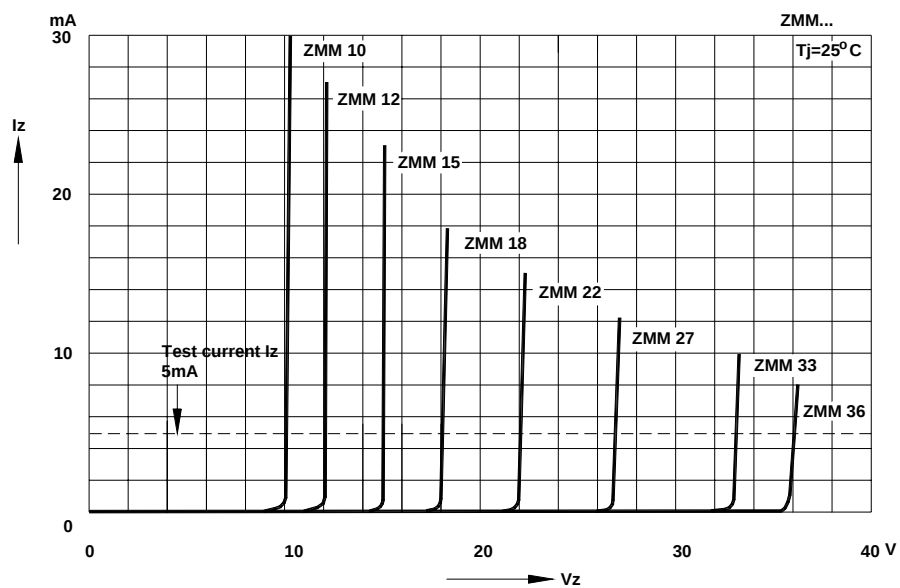
## Breakdown characteristics

$T_j = \text{constant (pulsed)}$



## Breakdown characteristics

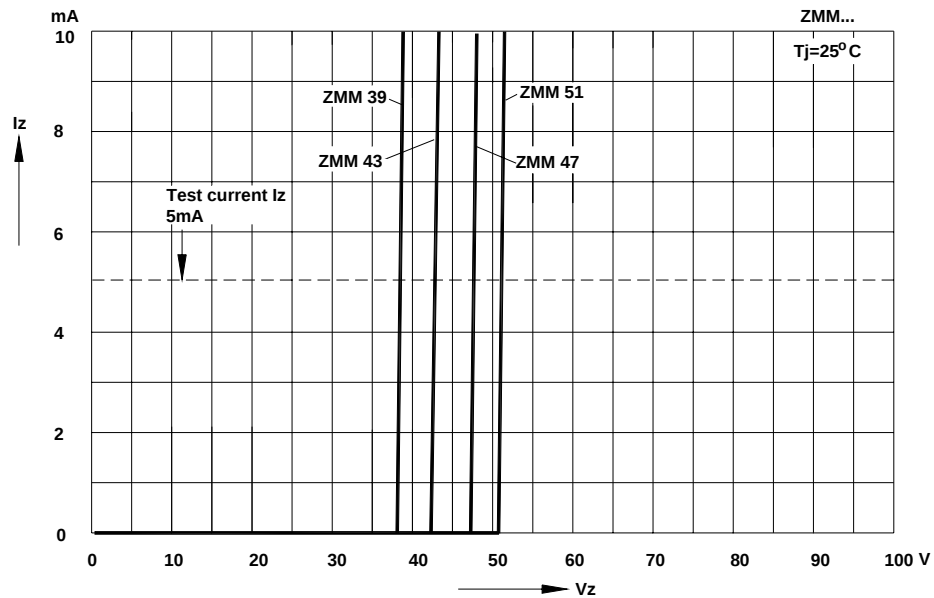
$T_j = \text{constant (pulsed)}$



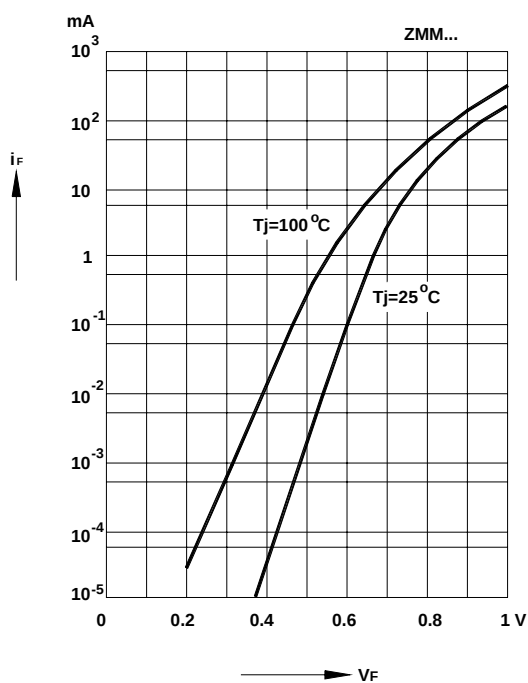


## Breakdown characteristics

$T_j = \text{constant (pulsed)}$

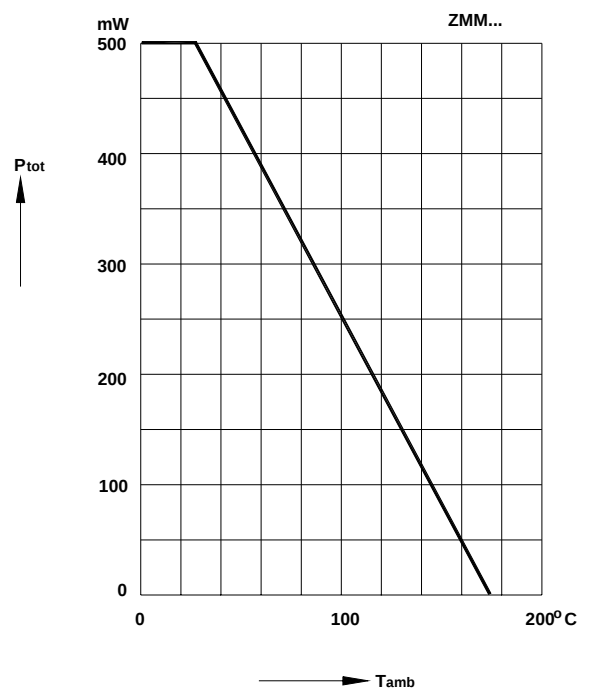


## Forward characteristics



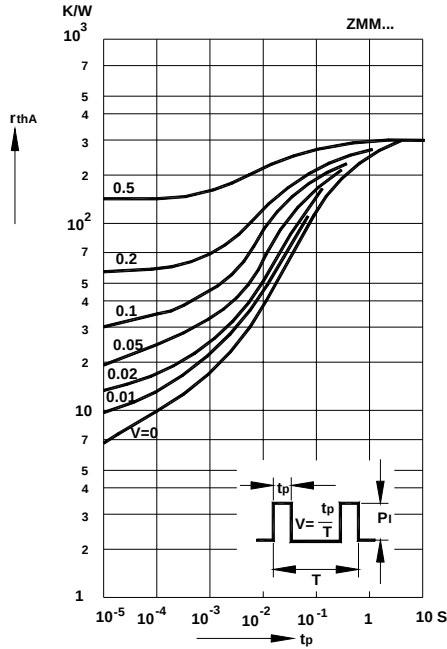
## Admissible power dissipation versus ambient temperature

Valid provided that electrodes are kept at ambient temperature.

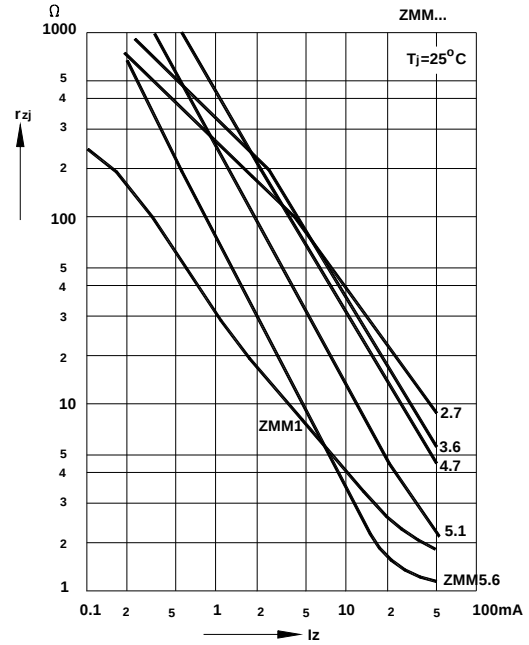




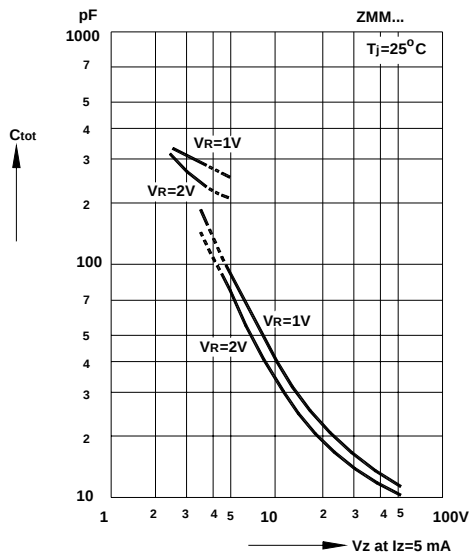
**Pulse thermal resistance versus pulse duration**  
Valid provided that the electrodes are kept at ambient temperature.



**Dynamic resistance versus Zener current**



**Capacitance versus Zener voltage**



**Dynamic resistance versus Zener current**

