

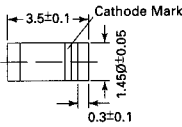
ZMM 1 ... ZMM 200

Silicon Planar Zener Diodes

in MiniMELF case especially for automatic insertion. The Zener voltages are graded according to the international E 24 standrad. Smaller voltage tolerances and higher Zener voltages on request.

These diodes are also available in DO-35 case with the type designation BZX55C...

These diodes are delivered taped.  
Details see "Taping".



Glass case MiniMELF

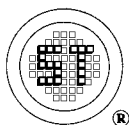
Weight approx. 0.05g  
Dimensions in mm

Absolute Maximum Ratings (T<sub>a</sub> = 25 °C)

|                                                                               | Symbol           | Value             | Unit |
|-------------------------------------------------------------------------------|------------------|-------------------|------|
| Zener Current see Table "Characteristics"                                     |                  |                   |      |
| Power Dissipation at T <sub>amb</sub> = 25 °C                                 | P <sub>tot</sub> | 500 <sup>1)</sup> | mW   |
| Junction Temperature                                                          | T <sub>j</sub>   | 175               | °C   |
| Storage Temperature Range                                                     | T <sub>s</sub>   | -55 to + 175      | °C   |
| <sup>1)</sup> Valid provided that electrodes are kept at ambient temperature. |                  |                   |      |

Characteristics at T<sub>amb</sub> = 25 °C

|                                                                               | Symbol           | Min. | Typ. | Max.              | Unit |
|-------------------------------------------------------------------------------|------------------|------|------|-------------------|------|
| Thermal Resistance<br>Junction to Ambient Air                                 | R <sub>thA</sub> | -    | -    | 0.3 <sup>1)</sup> | K/mW |
| <sup>1)</sup> Valid provided that electrodes are kept at ambient temperature. |                  |      |      |                   |      |



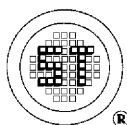
# ZMM 1 ... ZMM 200

| Type               | Zener Voltage range <sup>1)</sup> |                                                   |               | Dynamic resistance   |                                    |      | Reverse leakage current                    |      |                                       | Temp. coefficient of Zener Voltage |
|--------------------|-----------------------------------|---------------------------------------------------|---------------|----------------------|------------------------------------|------|--------------------------------------------|------|---------------------------------------|------------------------------------|
|                    | V <sub>Znom</sub><br>V            | I <sub>ZT</sub> for V <sub>ZT</sub> <sup>2)</sup> |               | r <sub>zT</sub><br>Ω | r <sub>zK</sub> at I <sub>ZK</sub> |      | T <sub>a</sub> =25°C T <sub>a</sub> =125°C |      | I <sub>R</sub> at V <sub>R</sub><br>V | TK <sub>VZ</sub><br>%/K            |
|                    |                                   | mA                                                | V             |                      | Ω                                  | mA   | μA                                         | μA   |                                       |                                    |
| ZMM1 <sup>3)</sup> | 0.75                              | 5                                                 | 0.7 ... 0.8   | <8                   | <50                                | 1    | --                                         | --   | --                                    | -0.26 ... -0.23                    |
| ZMM2.0             | 2.0                               | 5                                                 | 1.9 ... 2.1   | <85                  | <600                               | 1    | <100                                       | <200 | 1                                     | -0.09 ... -0.06                    |
| ZMM2.2             | 2.2                               | 5                                                 | 2.08 ... 2.33 | <85                  | <600                               | 1    | <75                                        | <160 | 1                                     | -0.09 ... -0.06                    |
| ZMM2.4             | 2.4                               | 5                                                 | 2.28 ... 2.56 | <85                  | <600                               | 1    | <50                                        | <100 | 1                                     | -0.09 ... -0.06                    |
| ZMM2.7             | 2.7                               | 5                                                 | 2.5 ... 2.9   | <85                  | <600                               | 1    | <10                                        | <50  | 1                                     | -0.09 ... -0.06                    |
| ZMM3.0             | 3.0                               | 5                                                 | 2.8 ... 3.2   | <85                  | <600                               | 1    | <4                                         | <40  | 1                                     | -0.08 ... -0.05                    |
| ZMM3.3             | 3.3                               | 5                                                 | 3.1 ... 3.5   | <85                  | <600                               | 1    | <2                                         | <40  | 1                                     | -0.08 ... -0.05                    |
| ZMM3.6             | 3.6                               | 5                                                 | 3.4 ... 3.8   | <85                  | <600                               | 1    | <2                                         | <40  | 1                                     | -0.08 ... -0.05                    |
| ZMM3.9             | 3.9                               | 5                                                 | 3.7 ... 4.1   | <85                  | <600                               | 1    | <2                                         | <40  | 1                                     | -0.08 ... -0.05                    |
| ZMM4.3             | 4.3                               | 5                                                 | 4.0 ... 4.6   | <75                  | <600                               | 1    | <1                                         | <20  | 1                                     | -0.06 ... -0.03                    |
| ZMM4.7             | 4.7                               | 5                                                 | 4.4 ... 5.0   | <60                  | <600                               | 1    | <0.5                                       | <10  | 1                                     | -0.05 ... +0.02                    |
| ZMM5.1             | 5.1                               | 5                                                 | 4.8 ... 5.4   | <35                  | <550                               | 1    | <0.1                                       | <2   | 1                                     | -0.02 ... +0.02                    |
| ZMM5.6             | 5.6                               | 5                                                 | 5.2 ... 6.0   | <25                  | <450                               | 1    | <0.1                                       | <2   | 1                                     | -0.05 ... +0.05                    |
| ZMM6.2             | 6.2                               | 5                                                 | 5.8 ... 6.6   | <10                  | <200                               | 1    | <0.1                                       | <2   | 2                                     | 0.03 ... 0.06                      |
| ZMM6.8             | 6.8                               | 5                                                 | 6.4 ... 7.2   | <8                   | <150                               | 1    | <0.1                                       | <2   | 3                                     | 0.03 ... 0.07                      |
| ZMM7.5             | 7.5                               | 5                                                 | 7.0 ... 7.9   | <7                   | <50                                | 1    | <0.1                                       | <2   | 5                                     | 0.03 ... 0.07                      |
| ZMM8.2             | 8.2                               | 5                                                 | 7.7 ... 8.7   | <7                   | <50                                | 1    | <0.1                                       | <2   | 6.2                                   | 0.03 ... 0.08                      |
| ZMM9.1             | 9.1                               | 5                                                 | 8.5 ... 9.6   | <10                  | <50                                | 1    | <0.1                                       | <2   | 6.8                                   | 0.03 ... 0.09                      |
| ZMM10              | 10                                | 5                                                 | 9.4 ... 10.6  | <15                  | <70                                | 1    | <0.1                                       | <2   | 7.5                                   | 0.03 ... 0.1                       |
| ZMM11              | 11                                | 5                                                 | 10.4 ... 11.6 | <20                  | <70                                | 1    | <0.1                                       | <2   | 8.2                                   | 0.03 ... 0.11                      |
| ZMM12              | 12                                | 5                                                 | 11.4 ... 12.7 | <20                  | <90                                | 1    | <0.1                                       | <2   | 9.1                                   | 0.03 ... 0.11                      |
| ZMM13              | 13                                | 5                                                 | 12.4 ... 14.1 | <26                  | <110                               | 1    | <0.1                                       | <2   | 10                                    | 0.03 ... 0.11                      |
| ZMM15              | 15                                | 5                                                 | 13.8 ... 15.6 | <30                  | <110                               | 1    | <0.1                                       | <2   | 11                                    | 0.03 ... 0.11                      |
| ZMM16              | 16                                | 5                                                 | 15.3 ... 17.1 | <40                  | <170                               | 1    | <0.1                                       | <2   | 12                                    | 0.03 ... 0.11                      |
| ZMM18              | 18                                | 5                                                 | 16.8 ... 19.1 | <50                  | <170                               | 1    | <0.1                                       | <2   | 13                                    | 0.03 ... 0.11                      |
| ZMM20              | 20                                | 5                                                 | 18.8 ... 21.2 | <55                  | <220                               | 1    | <0.1                                       | <2   | 15                                    | 0.03 ... 0.11                      |
| ZMM22              | 22                                | 5                                                 | 20.8 ... 23.3 | <55                  | <220                               | 1    | <0.1                                       | <2   | 16                                    | 0.04 ... 0.12                      |
| ZMM24              | 24                                | 5                                                 | 22.8 ... 25.6 | <80                  | <220                               | 1    | <0.1                                       | <2   | 18                                    | 0.04 ... 0.12                      |
| ZMM27              | 27                                | 5                                                 | 25.1 ... 28.9 | <80                  | <220                               | 1    | <0.1                                       | <2   | 20                                    | 0.04 ... 0.12                      |
| ZMM30              | 30                                | 5                                                 | 28 ... 32     | <80                  | <220                               | 1    | <0.1                                       | <2   | 22                                    | 0.04 ... 0.12                      |
| ZMM33              | 33                                | 5                                                 | 31 ... 35     | <80                  | <220                               | 1    | <0.1                                       | <2   | 24                                    | 0.04 ... 0.12                      |
| ZMM36              | 36                                | 5                                                 | 34 ... 38     | <80                  | <220                               | 1    | <0.1                                       | <2   | 27                                    | 0.04 ... 0.12                      |
| ZMM39              | 39                                | 2.5                                               | 37 ... 41     | <90                  | <500                               | 0.5  | <0.1                                       | <5   | 30                                    | 0.04 ... 0.12                      |
| ZMM43              | 43                                | 2.5                                               | 40 ... 46     | <90                  | <500                               | 0.5  | <0.1                                       | <5   | 33                                    | 0.04 ... 0.12                      |
| ZMM47              | 47                                | 2.5                                               | 44 ... 50     | <110                 | <600                               | 0.5  | <0.1                                       | <5   | 36                                    | 0.04 ... 0.12                      |
| ZMM51              | 51                                | 2.5                                               | 48 ... 54     | <125                 | <700                               | 0.5  | <0.1                                       | <10  | 39                                    | 0.04 ... 0.12                      |
| ZMM56              | 56                                | 2.5                                               | 52 ... 60     | <135                 | <700                               | 0.5  | <0.1                                       | <10  | 43                                    | 0.04 ... 0.12                      |
| ZMM62              | 62                                | 2.5                                               | 58 ... 66     | <150                 | <1000                              | 0.5  | <0.1                                       | <10  | 47                                    | 0.04 ... 0.12                      |
| ZMM68              | 68                                | 2.5                                               | 64 ... 72     | <200                 | <1000                              | 0.5  | <0.1                                       | <10  | 51                                    | 0.04 ... 0.12                      |
| ZMM75              | 75                                | 2.5                                               | 70 ... 79     | <250                 | <1000                              | 0.5  | <0.1                                       | <10  | 56                                    | 0.04 ... 0.12                      |
| ZMM82              | 82                                | 2.5                                               | 77 ... 87     | <300                 | <1500                              | 0.25 | <0.1                                       | <10  | 62                                    | 0.05 ... 0.12                      |
| ZMM91              | 91                                | 1                                                 | 85 ... 96     | <450                 | <2000                              | 0.1  | <0.1                                       | <10  | 68                                    | 0.05 ... 0.12                      |
| ZMM100             | 100                               | 1                                                 | 94 ... 106    | <450                 | <5000                              | 0.1  | <0.1                                       | <10  | 75                                    | 0.05 ... 0.12                      |
| ZMM110             | 110                               | 1                                                 | 104 ... 116   | <600                 | <5000                              | 0.1  | <0.1                                       | <10  | 82                                    | 0.05 ... 0.12                      |
| ZMM120             | 120                               | 1                                                 | 114 ... 127   | <800                 | <5500                              | 0.1  | <0.1                                       | <10  | 91                                    | 0.05 ... 0.12                      |
| ZMM130             | 130                               | 1                                                 | 124 ... 141   | <950                 | <6000                              | 0.1  | <0.1                                       | <10  | 100                                   | 0.05 ... 0.12                      |
| ZMM150             | 150                               | 1                                                 | 138 ... 156   | <1250                | <6500                              | 0.1  | <0.1                                       | <10  | 110                                   | 0.05 ... 0.12                      |
| ZMM160             | 160                               | 1                                                 | 153 ... 171   | <1400                | <7000                              | 0.1  | <0.1                                       | <10  | 120                                   | 0.05 ... 0.12                      |
| ZMM180             | 180                               | 1                                                 | 168 ... 191   | <1700                | <8500                              | 0.1  | <0.1                                       | <10  | 130                                   | 0.05 ... 0.12                      |
| ZMM200             | 200                               | 1                                                 | 188 ... 212   | <2000                | <10000                             | 0.1  | <0.1                                       | <10  | 150                                   | 0.05 ... 0.12                      |

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

<sup>2)</sup> Valid provided that electrodes are kept at ambient temperature.

<sup>3)</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.

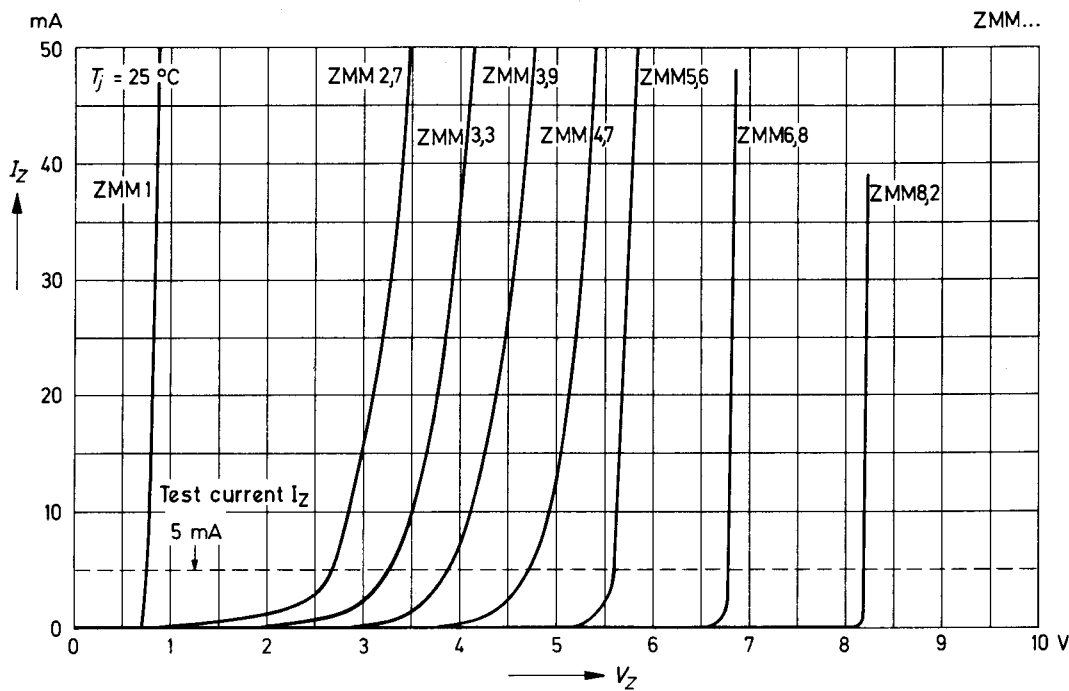


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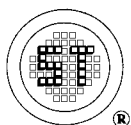
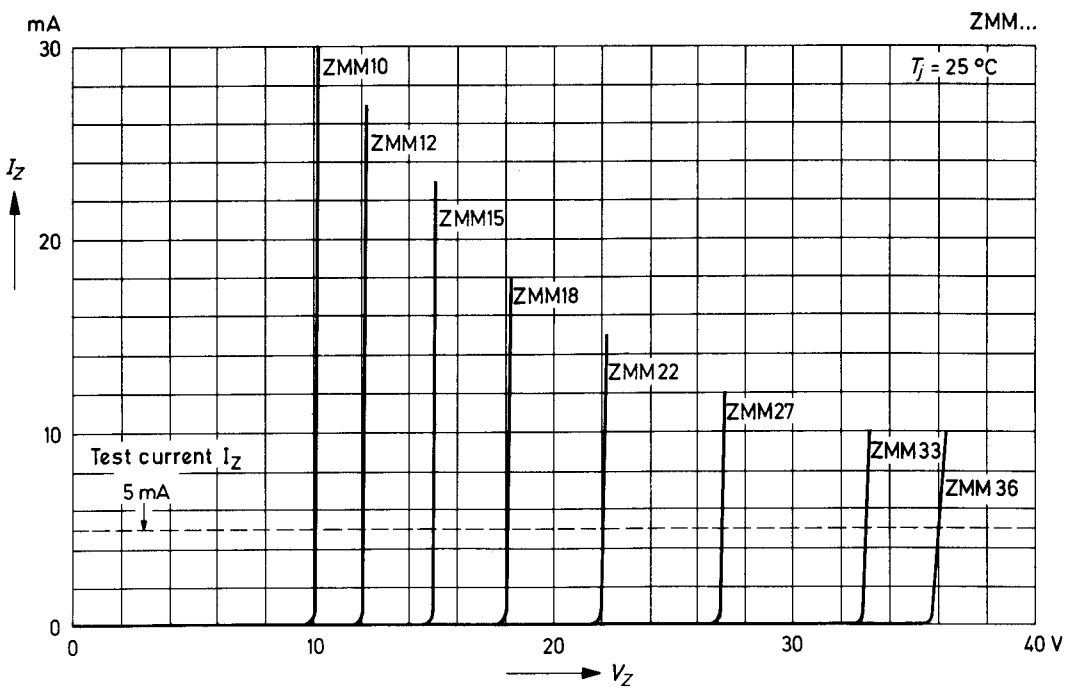
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Breakdown characteristics  
 $T_j = \text{constant (pulsed)}$

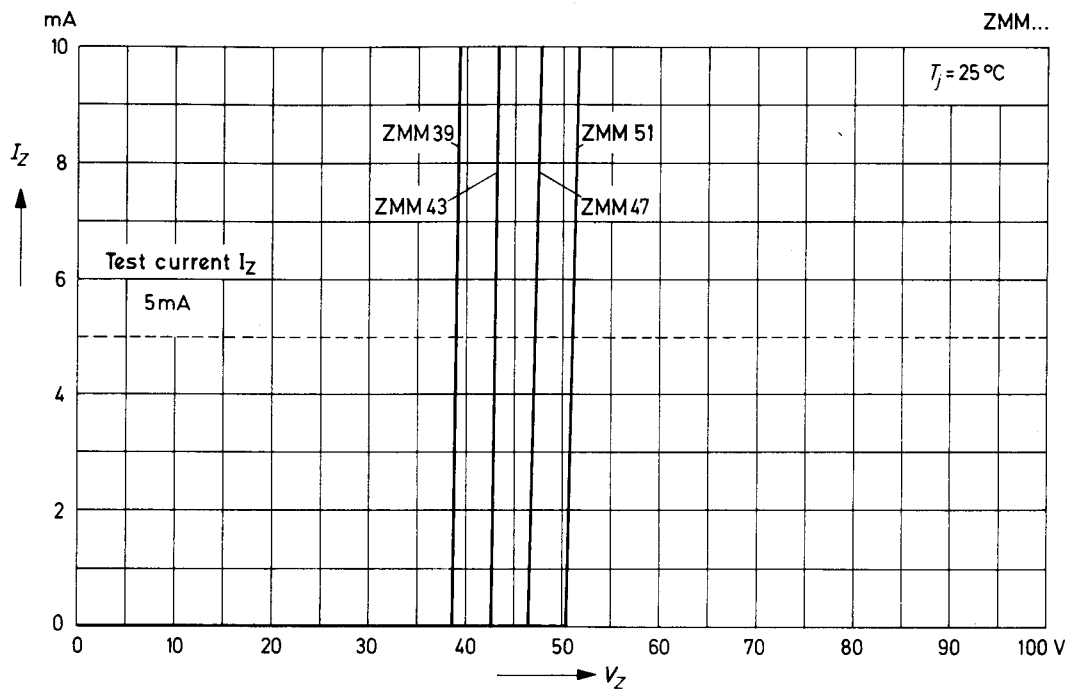


Breakdown characteristics  
 $T_j = \text{constant (pulsed)}$

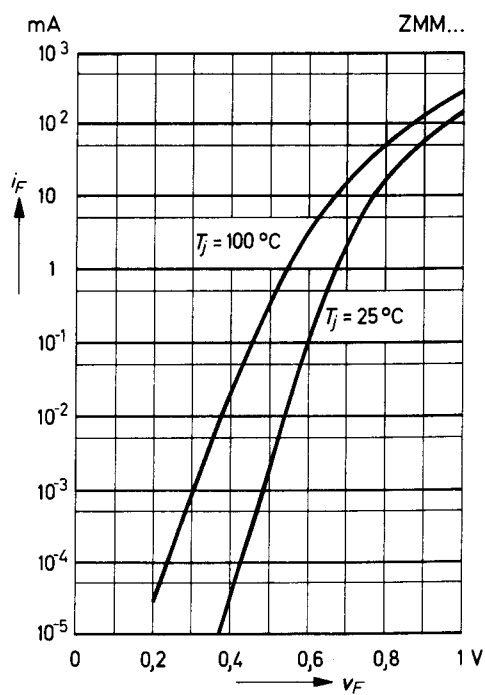


## Breakdown characteristics

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

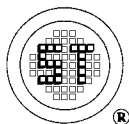
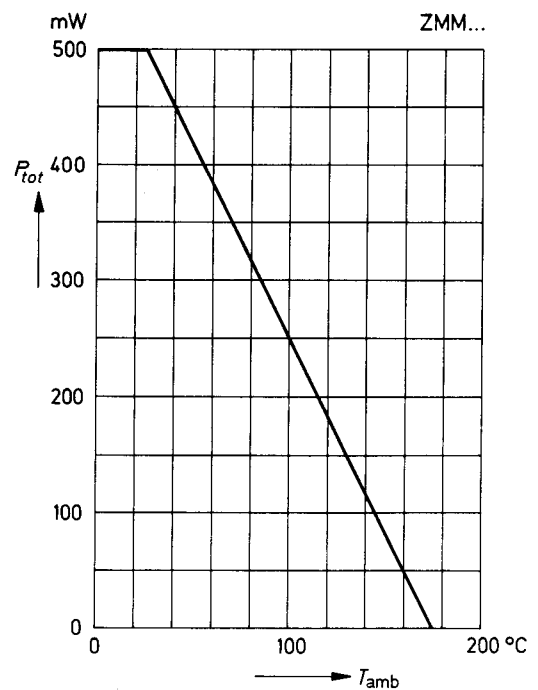


## Forward characteristics



## Admissible power dissipation versus ambient temperature

Valid provided that electrodes are kept at ambient temperature.



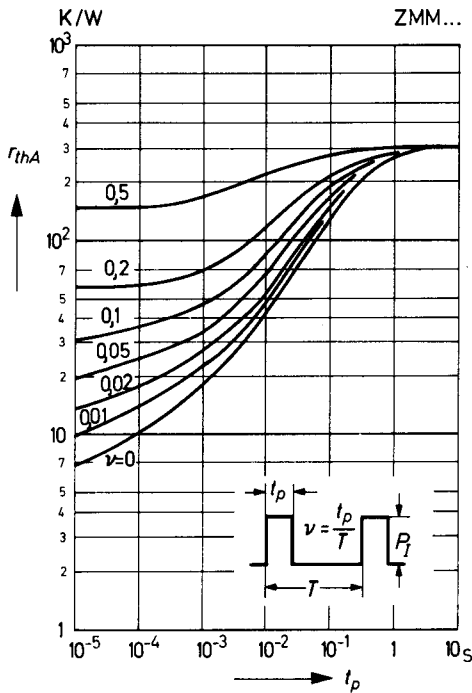
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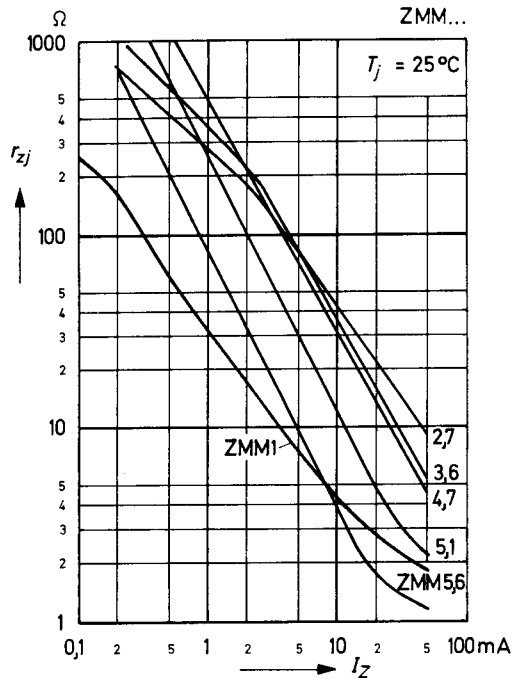


Pulse thermal resistance  
versus pulse duration

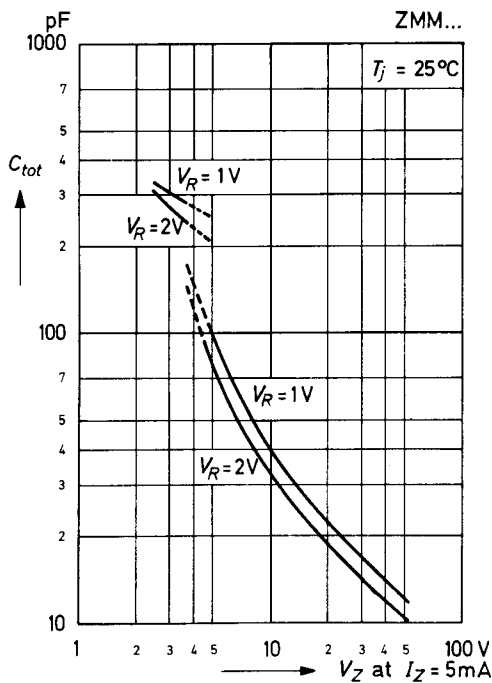
Valid provided that the electrodes are kept  
at ambient temperature.



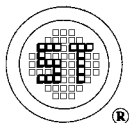
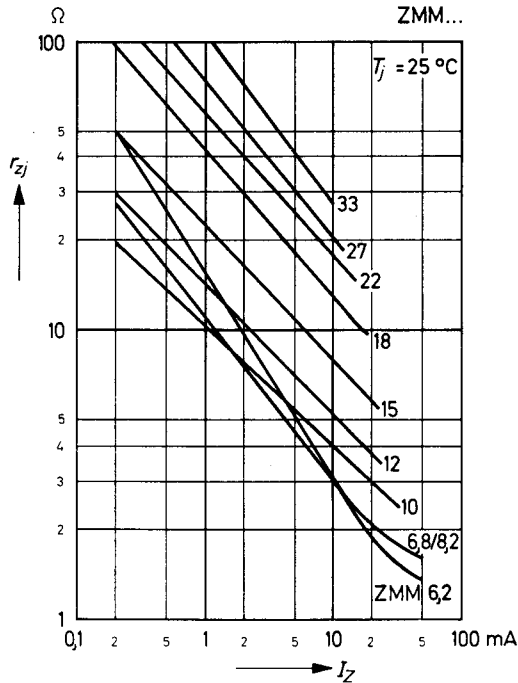
Dynamic resistance  
versus Zener current



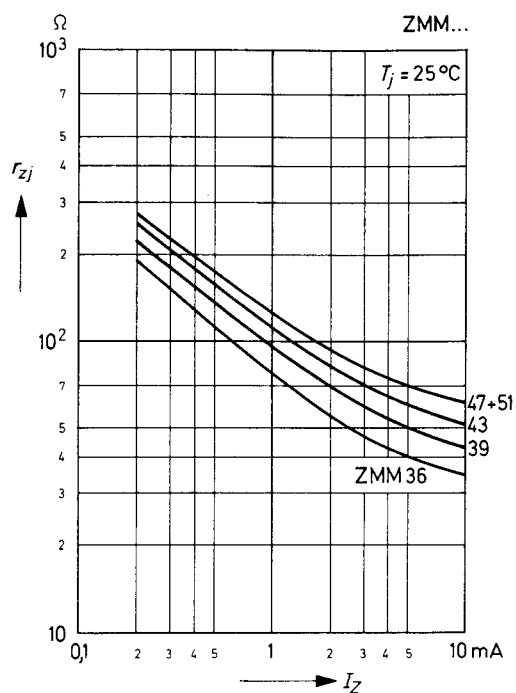
Capacitance versus  
Zener voltage



Dynamic resistance  
versus Zener current

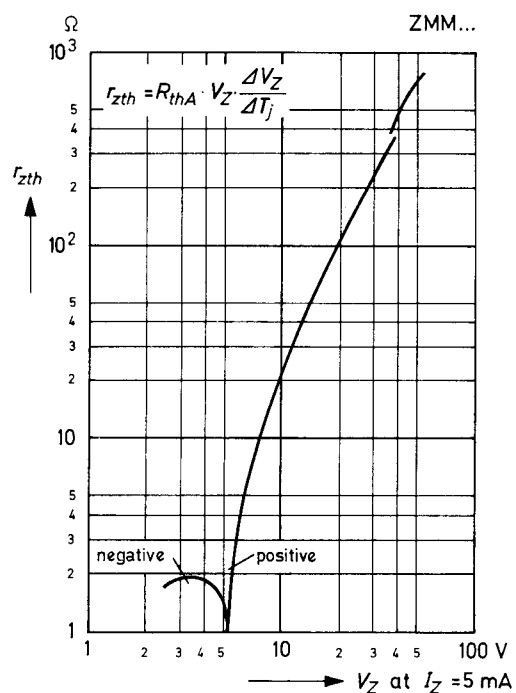


## Dynamic resistance versus Zener current

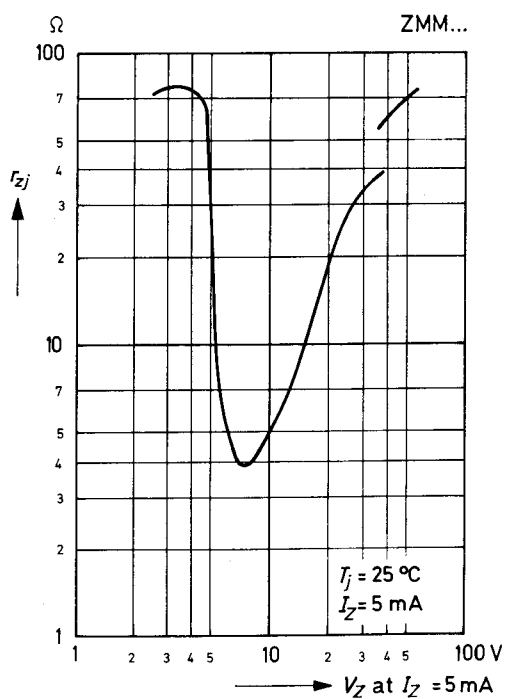


## Thermal differential resistance versus Zener voltage

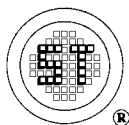
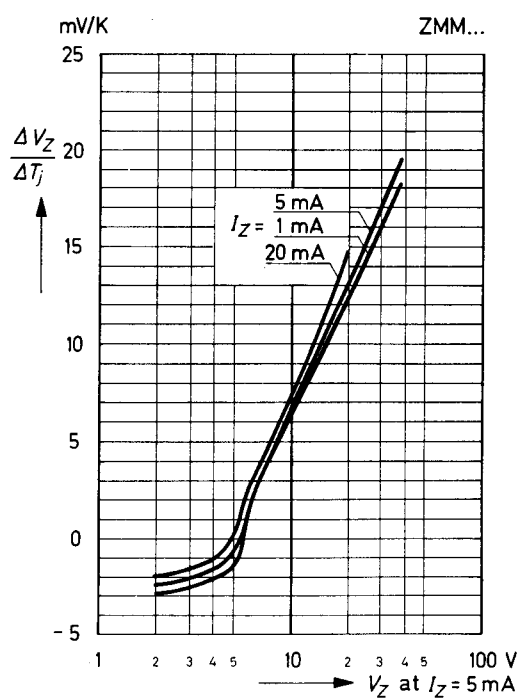
Valid provided that electrodes are kept at ambient temperature.



## Dynamic resistance versus Zener voltage



## Temperature dependence of Zener voltage versus Zener voltage

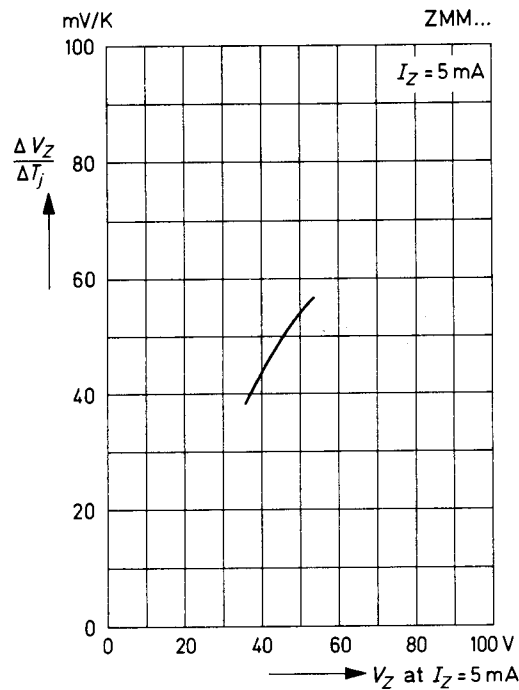


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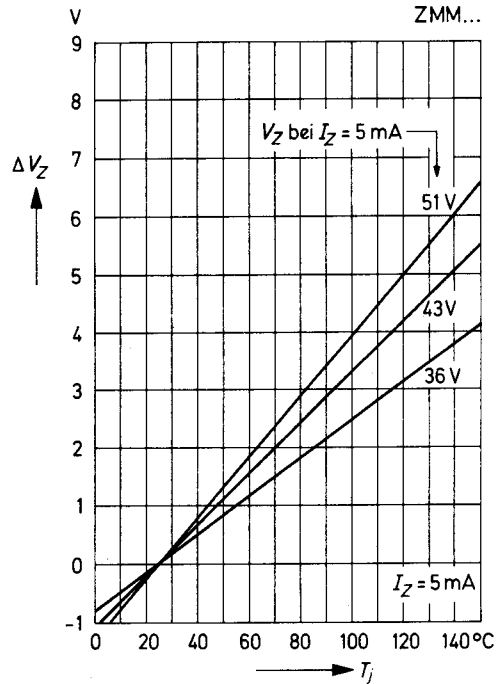
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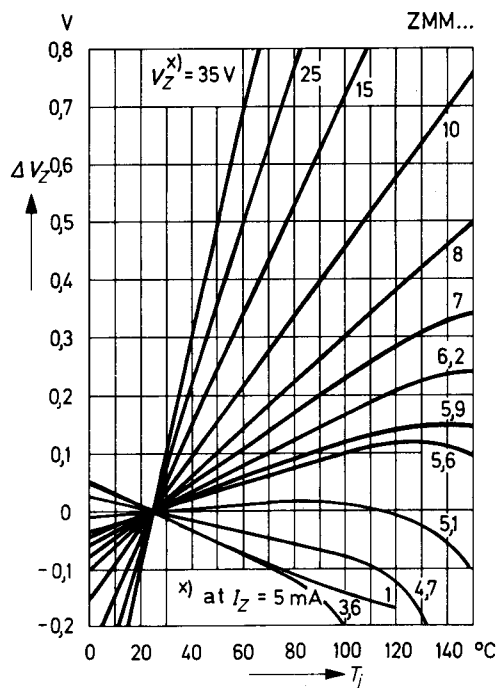
Temperature dependence of Zener voltage  
versus Zener voltage



Change of Zener voltage  
versus junction temperature



Change of Zener voltage  
versus junction temperature



Change of Zener voltage from turn-on  
up to the point of thermal equilibrium  
versus Zener voltage

