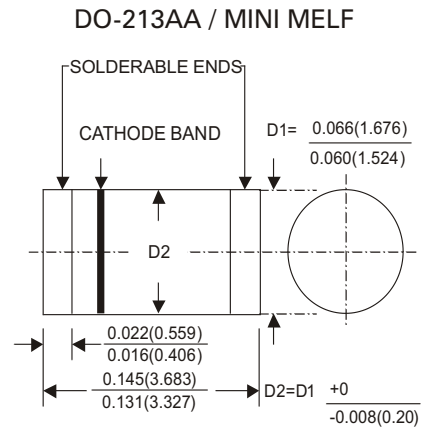


# ZMM1 thru ZMM200

## SURFACE MOUNT ZENER DIODES



Dimension in inches (millimeters)

### FEATURES

- Silicon Planar Zener Diodes in MiniMELF case especially for automatic insertion. The Zener voltages are graded according to the international E 24 standard. Smaller voltage tolerances and higher Zener voltages on request.
- These diodes are also available in DO-35 case with the type designation ZPD1 thru ZPD51.
- These diodes are delivered taped.  
Details see .Taping..
- Weight approx. : 0.05g
- High temperature soldering : 260°C / 10 seconds at terminals
- Pb free product at available : 99% Sn above meet RoHS environment substance directive request

### MECHANICAL DATA

Case : MINI MELF Molded Glass (SOD-80)  
Weight : Approx .0.05g

### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

#### Absolute Maximum Ratings (Ta=25°C )

|                                           | Symbols | Values      | Units |
|-------------------------------------------|---------|-------------|-------|
| Zener current see Table "Characteristics" |         |             |       |
| Power dissipation at Tamb=25°C            | Ptot    | 500 1)      | mW    |
| Junction temperature                      | Tj      | 175         | °C    |
| Storage temperature range                 | TS      | -55 to +175 | °C    |

Note:

(1) Valid provided that electrodes are kept at ambient temperature.

#### Characteristics at Tamb=25°C

|                                            | Symbols | Min. | Typ. | Max.   | Units |
|--------------------------------------------|---------|------|------|--------|-------|
| Thermal resistance junction to ambient Air | RthA    | -    | -    | 0.3 1) | K/mW  |

Note:

(1) Valid provided that electrodes are kept at ambient temperature.

# ZMM1 thru ZMM200

## SURFACE MOUNT ZENER DIODES

| Type   | Zener voltage range 1) |                 |               | Dynamic resistance   |        |      | Reverse leakage current |      |     | Temp.<br>coefficient<br>of Zener Voltage |
|--------|------------------------|-----------------|---------------|----------------------|--------|------|-------------------------|------|-----|------------------------------------------|
|        | Vznom                  | IZT fo r VZT 2) |               | rzjT and rzjk at IZK |        |      | I and I 2) at V         |      |     |                                          |
|        | V                      | mA              | V             | Ω                    | Ω      | mA   | μA                      | μA   | V   |                                          |
| ZMM1V3 | 0.75                   | 5               | 0.7 ... 0.8   | <8                   | <50    | 1    | -                       | -    | -   | -0.26 ... -0.23                          |
| ZMM2V0 | 2.0                    | 5               | 1.9 ... 2.1   | <85                  | <600   | 1    | <100                    | <200 | 1   | -0.09 ... -0.06                          |
| ZMM2V4 | 2.4                    | 5               | 2.28 ... 2.56 | <85                  | <600   | 1    | <50                     | <100 | 1   | -0.09 ... -0.06                          |
| ZMM2V7 | 2.7                    | 5               | 2.5 ... 2.9   | <85                  | <600   | 1    | <10                     | <50  | 1   | -0.09 ... -0.06                          |
| ZMM3V0 | 3.0                    | 5               | 2.8 ... 3.2   | <85                  | <600   | 1    | <4                      | <40  | 1   | -0.08 ... -0.05                          |
| ZMM3V3 | 3.3                    | 5               | 3.1 ... 3.5   | <85                  | <600   | 1    | <2                      | <40  | 1   | -0.08 ... -0.05                          |
| ZMM3V6 | 3.6                    | 5               | 3.4 ... 3.8   | <85                  | <600   | 1    | <2                      | <40  | 1   | -0.08 ... -0.05                          |
| ZMM3V9 | 3.9                    | 5               | 3.7 ... 4.1   | <85                  | <600   | 1    | <2                      | <40  | 1   | -0.08 ... -0.05                          |
| ZMM4V3 | 4.3                    | 5               | 4.0 ... 4.6   | <75                  | <600   | 1    | <1                      | <20  | 1   | -0.06 ... -0.03                          |
| ZMM4V7 | 4.7                    | 5               | 4.4 ... 5.0   | <60                  | <600   | 1    | <0.5                    | <10  | 1   | -0.05 ... +0.02                          |
| ZMM5V1 | 5.1                    | 5               | 4.8 ... 5.4   | <35                  | <550   | 1    | <0.1                    | <2   | 1   | -0.02 ... +0.02                          |
| ZMM5V6 | 5.6                    | 5               | 5.2 ... 6.0   | <25                  | <450   | 1    | <0.1                    | <2   | 1   | -0.05 ... +0.05                          |
| ZMM6V2 | 6.2                    | 5               | 5.8 ... 6.6   | <10                  | <200   | 1    | <0.1                    | <2   | 2   | 0.03 ... 0.06                            |
| ZMM6V8 | 6.8                    | 5               | 6.4 ... 7.2   | <8                   | <150   | 1    | <0.1                    | <2   | 3   | 0.03 ... 0.07                            |
| ZMM7V5 | 7.5                    | 5               | 7.0 ... 7.9   | <7                   | <50    | 1    | <0.1                    | <2   | 5   | 0.03 ... 0.07                            |
| ZMM8V2 | 8.2                    | 5               | 7.7 ... 8.7   | <7                   | <50    | 1    | μA                      | <2   | 6.2 | 0.03 ... 0.08                            |
| ZMM9V1 | 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  | μA                      | <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                            |

Notes:

(1) Tested with pulses tp=20ms.

(2) Valid provided that electrodes are kept at ambient temperature.

(3) The ZMM1 is a silicon diode with operation in forward direction. Hence, the index of all parameters should be .F. instead of .Z..

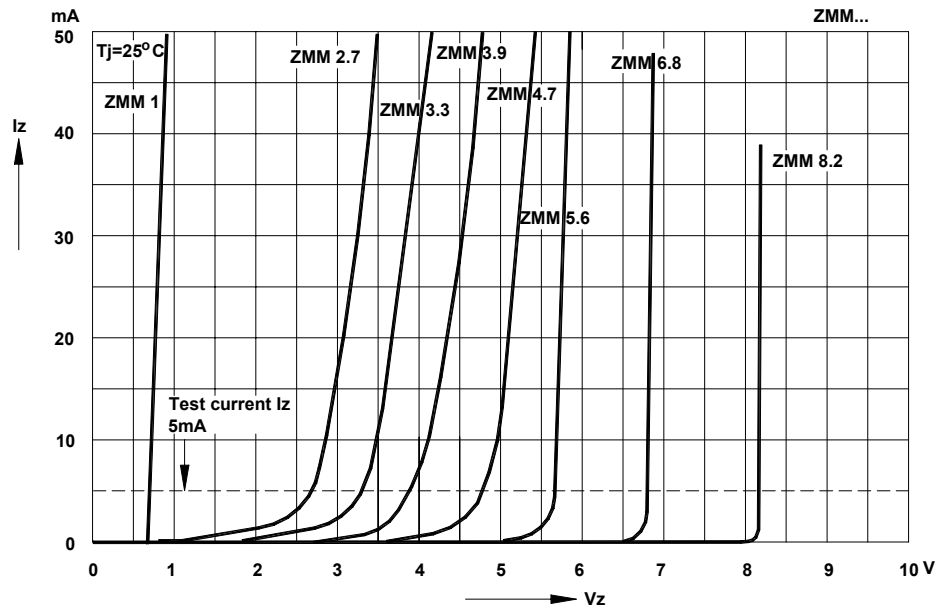
Connect the cathode electrode to the negative pole.

# ZMM1 thru ZMM200

## SURFACE MOUNT ZENER DIODES

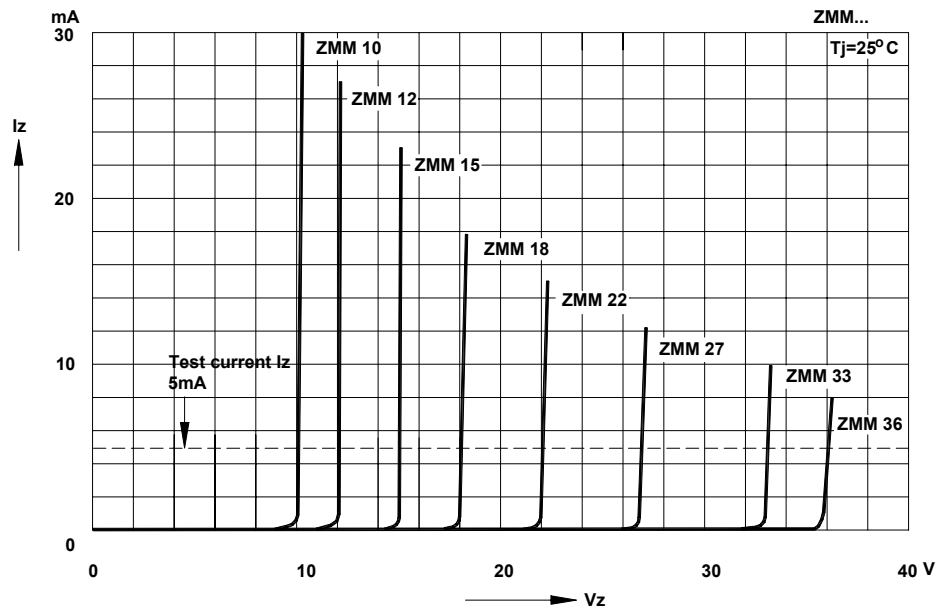
Breakdown characteristics

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



Breakdown characteristics

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

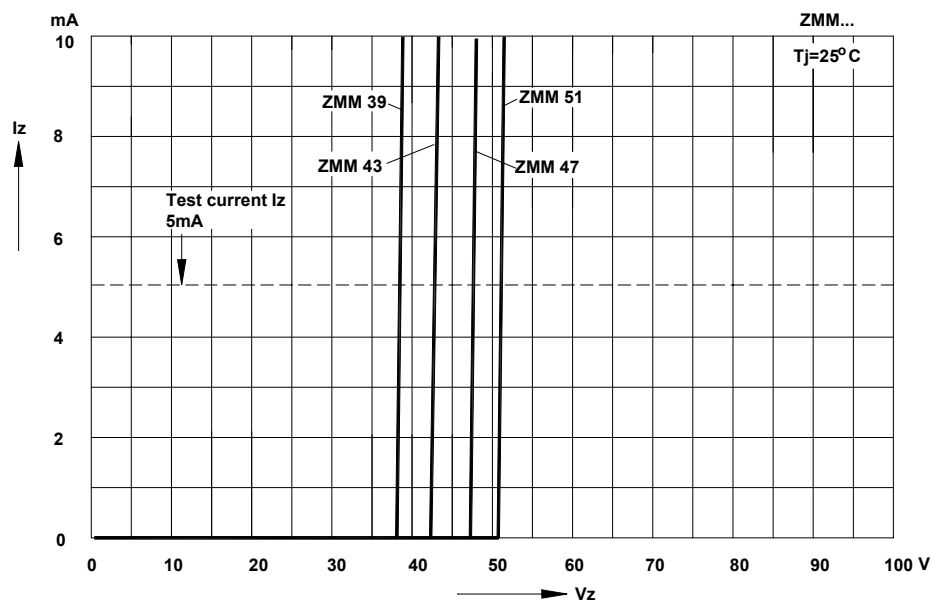


# ZMM1 thru ZMM200

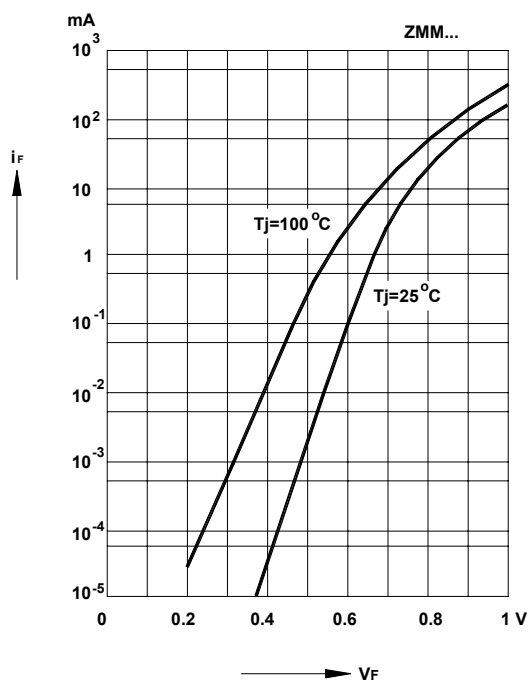
## SURFACE MOUNT ZENER DIODES

**Breakdown characteristics**

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

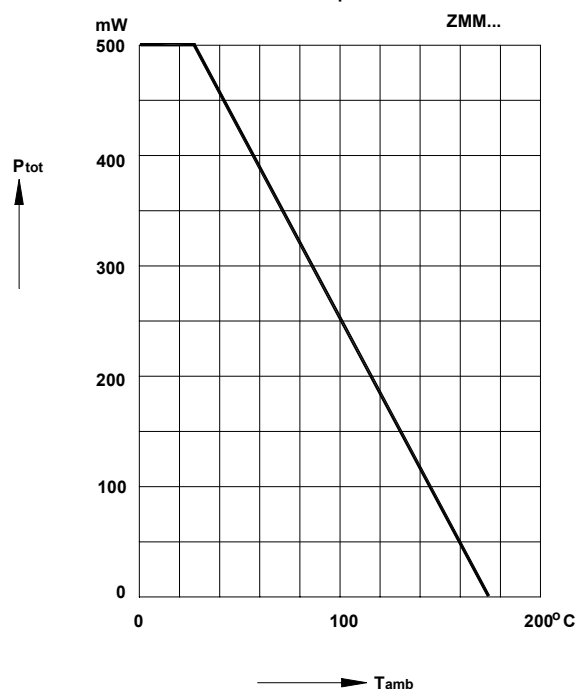


**Forward characteristics**



**Admissible power dissipation versus ambient temperature**

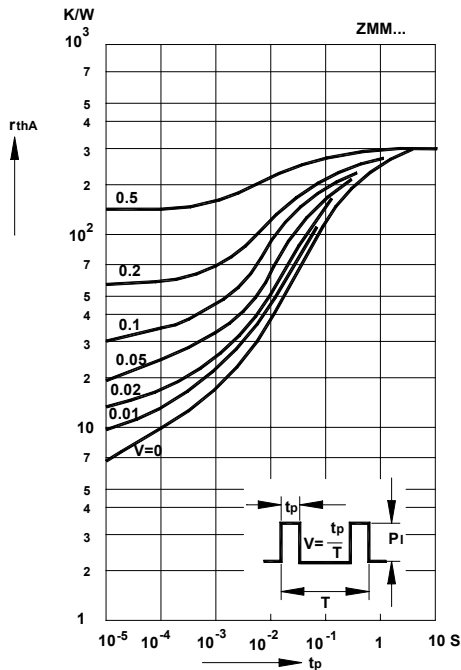
Valid provided that electrodes are kept at ambient temperature.



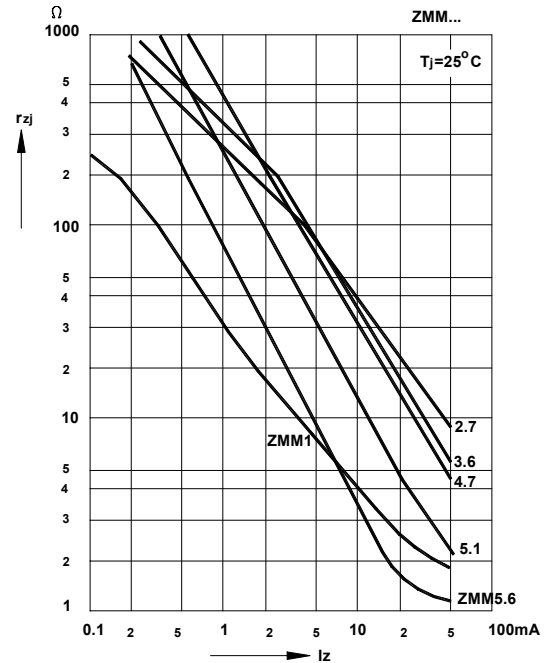
# ZMM1 thru ZMM200

## SURFACE MOUNT ZENER DIODES

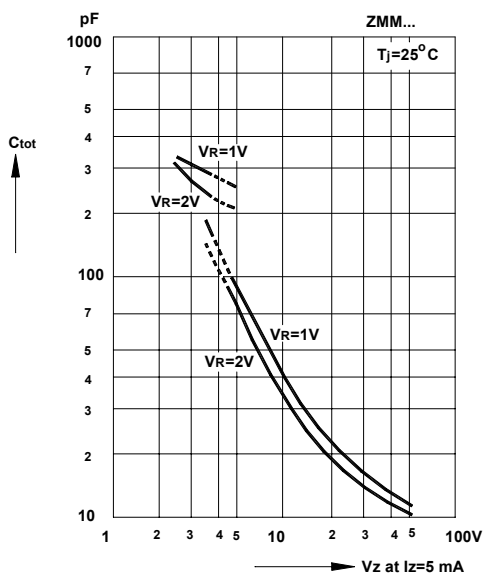
**Pulse thermal resistance  
versus pulse duration**  
Valid provided that the electrodes are kept  
at ambient temperature.



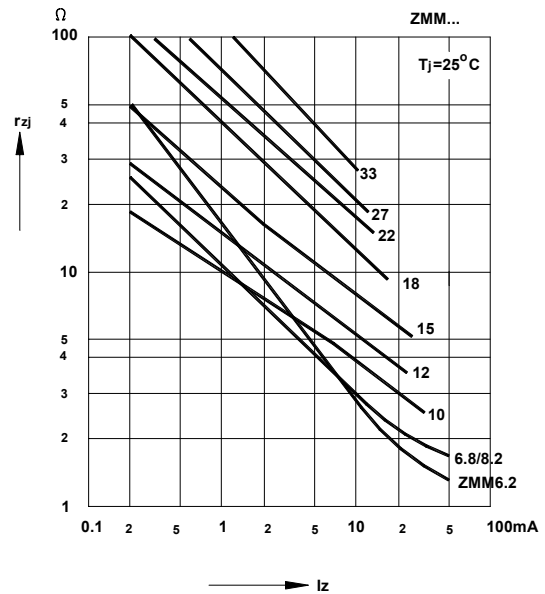
**Dynamic resistance  
versus Zener current**



**Capacitance versus  
Zener voltage**



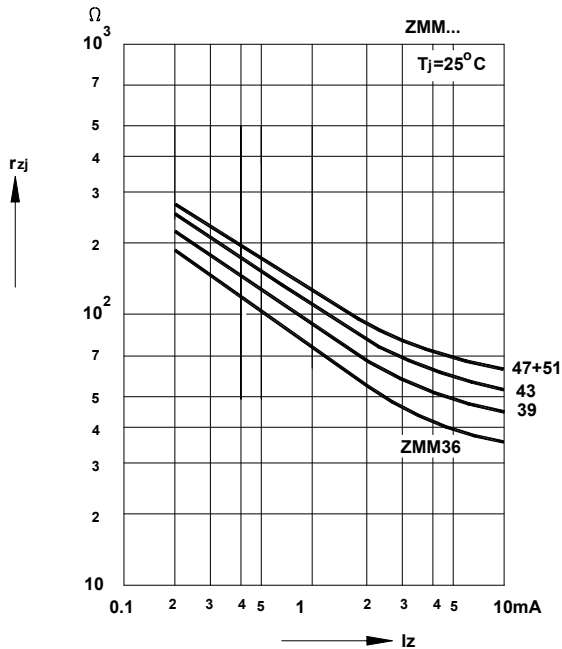
**Dynamic resistance  
versus Zener current**



# ZMM1 thru ZMM200

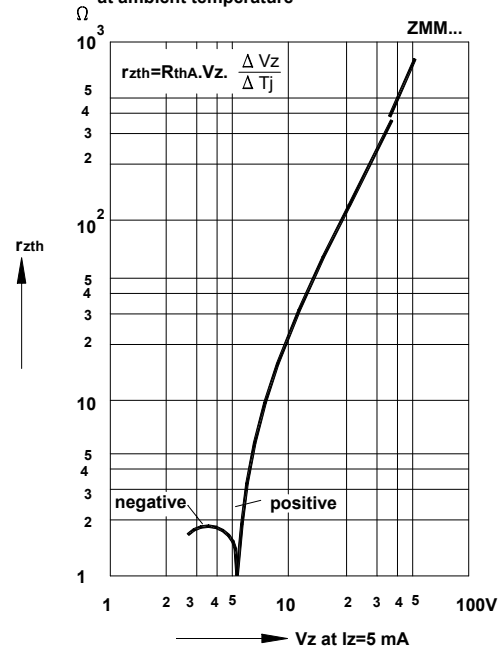
## SURFACE MOUNT ZENER DIODES

Dynamic resistance  
versus Zener current

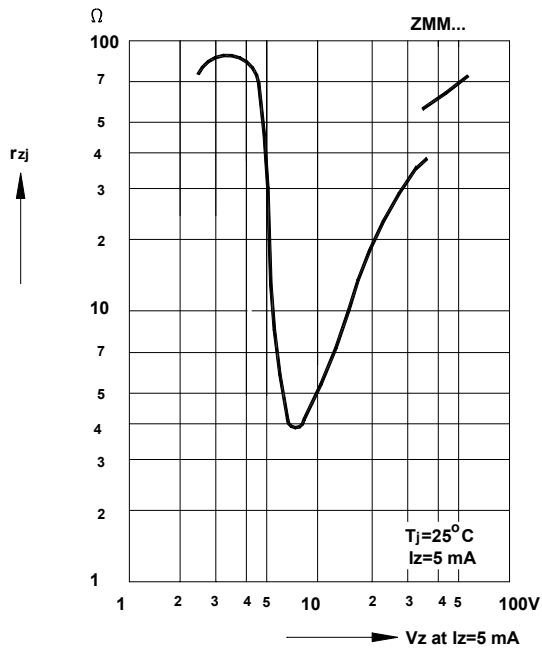


Thermal differential resistance  
versus Zener voltage

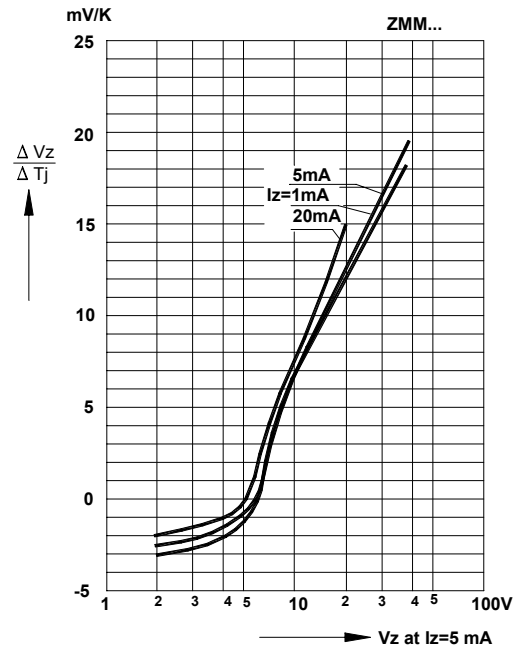
Valid provided that electrodes are kept  
at ambient temperature



Dynamic resistance  
versus Zener voltage



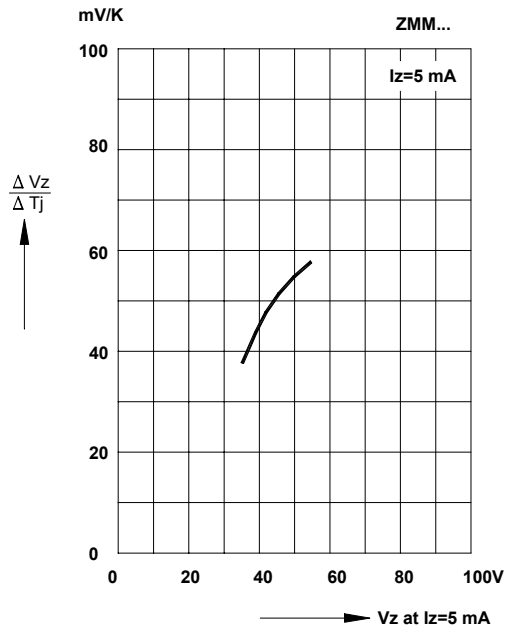
Temperature dependence of Zener voltage  
versus Zener voltage



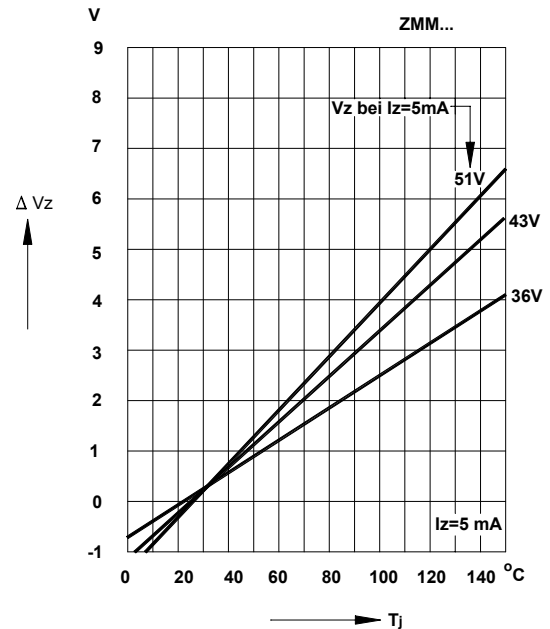
# ZMM1 thru ZMM200

## SURFACE MOUNT ZENER DIODES

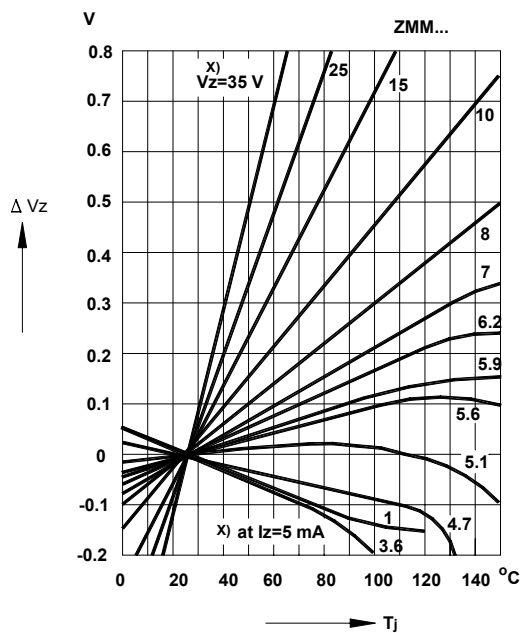
Temperature dependence of Zener voltage versus Zener voltage



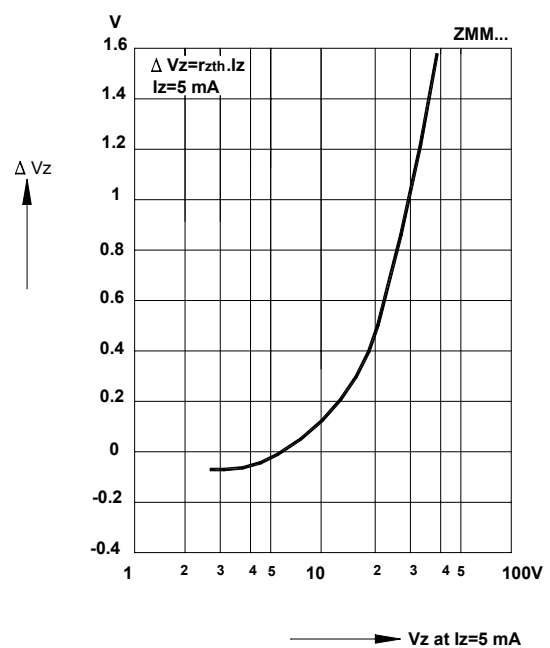
Change of Zener voltage versus junction temperature



Change of Zener voltage versus junction temperature



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



# ZMM1 thru ZMM200

## SURFACE MOUNT ZENER DIODES

