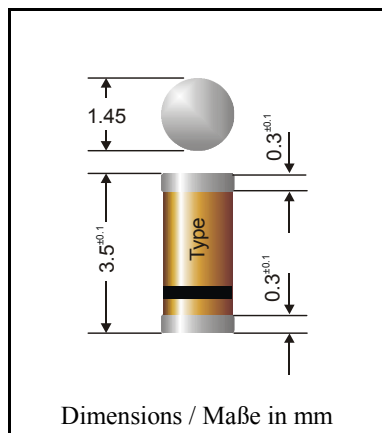


**Surface mount**  
**Silicon Planar Zener Diodes**
**Silizium-Planar-Zener-Dioden**  
**für die Oberflächenmontage**


|                                        |                   |
|----------------------------------------|-------------------|
| Maximum power dissipation              | 500 mW            |
| Maximale Verlustleistung               |                   |
| Tolerance of Zener voltage             | $\approx \pm 2\%$ |
| Toleranz der Zener Spannung            |                   |
| Glass case MiniMELF                    | SOD-80            |
| Glasgehäuse MiniMELF                   | DO-213AA          |
| Weight approx. – Gewicht ca.           | 0.05 g            |
| Standard packaging taped and reeled    | see page 18       |
| Standard Lieferform gegurtet auf Rolle | siehe Seite 18    |

Standard Zener voltage tolerance is graded to the international E 24 standard (about  $\pm 5\%$ ).  
 Devices with a tolerance of  $\pm 2\%$  like ZMM 3.9-2%...ZMM 100-2% are specially selected.  
 Other voltage tolerances and Zener voltages on request.

Die Standard-Toleranz der Z-Spannung ist gestuft nach der internationalen Reihe E 24, (entspricht etwa  $\pm 5\%$ ). Die 2%-Reihe ZMM 3.9-2%...ZMM 100-2% ist eine Sonderselektion.  
 Andere Toleranzen oder Zener-Spannungen auf Anfrage.

**Maximum ratings and Characteristics**
**Grenz- und Kennwerte**

|                                                         |                          |                  |                            |
|---------------------------------------------------------|--------------------------|------------------|----------------------------|
| Power dissipation                                       | $T_A = 25^\circ\text{C}$ | $P_{\text{tot}}$ | 500 mW <sup>1)</sup>       |
| Verlustleistung                                         |                          |                  |                            |
| Operating junction temperature – Sperrschichttemperatur |                          | $T_j$            | $-50...+175^\circ\text{C}$ |
| Storage temperature – Lagerungstemperatur               |                          | $T_s$            | $-50...+175^\circ\text{C}$ |
| Thermal resistance junction to ambient air              |                          | $R_{\text{thA}}$ | $< 300 \text{ K/W}^1)$     |
| Wärmewiderstand Sperrschicht – umgebende Luft           |                          |                  |                            |

Zener voltages see table on next page – Zener-Spannungen siehe Tabelle auf der nächsten Seite

<sup>1)</sup> Mounted on P.C. board with 25 mm<sup>2</sup> copper pads at each terminal  
 Montage auf Leiterplatte mit 25 mm<sup>2</sup> Kupferbelag (Löt-pad) an jedem Anschluß

<sup>2)</sup> Tested with pulses  $t_p = 20 \text{ ms}$  – Gemessen mit Impulsen  $t_p = 20 \text{ ms}$

**Maximum ratings**
**Grenzwerte**

| Type<br>Typ | Zener voltage <sup>1)</sup><br>Zener-Spanng. <sup>1)</sup><br>I <sub>Z</sub> = 5 mA<br>V <sub>zmin</sub> [V] V <sub>zmax</sub> |       | Dynamic resistance<br>Inhär. diff. Widerstand<br>r <sub>zj</sub> [Ω] at f = 1 kHz<br>I <sub>Z</sub> = 5 mA I <sub>Z</sub> = 1 mA |        | Temp. Coeffiz.<br>of Z-voltage<br>... der Z-spanng.<br>α <sub>VZ</sub> [10 <sup>-4</sup> / °C] | Reverse volt.<br>Sperrspanng.<br>I <sub>R</sub> = 100 nA<br>V <sub>R</sub> [V] | Z-current <sup>2)</sup><br>Z-Strom <sup>2)</sup><br>T <sub>A</sub> = 25 °C<br>I <sub>Zmax</sub> [mA] |
|-------------|--------------------------------------------------------------------------------------------------------------------------------|-------|----------------------------------------------------------------------------------------------------------------------------------|--------|------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| ZMM 3.9-2%  | 3,81                                                                                                                           | 3,99  | < 85                                                                                                                             | < 600  | -8...-5                                                                                        | 1 (2μA)                                                                        | 125                                                                                                  |
| ZMM 4.3-2%  | 4,20                                                                                                                           | 4,40  | < 75                                                                                                                             | < 600  | -6...-3                                                                                        | 1 (1μA)                                                                        | 114                                                                                                  |
| ZMM 4.7-2%  | 4,60                                                                                                                           | 4,80  | < 60                                                                                                                             | < 600  | -5...+2                                                                                        | 1 (0.5μA)                                                                      | 104                                                                                                  |
| ZMM 5.1-2%  | 4,99                                                                                                                           | 5,21  | < 35                                                                                                                             | < 550  | -2...+2                                                                                        | 1                                                                              | 96                                                                                                   |
| ZMM 5.6-2%  | 5,48                                                                                                                           | 5,72  | < 25                                                                                                                             | < 450  | -5...+5                                                                                        | 1                                                                              | 87                                                                                                   |
| ZMM 6.2-2%  | 6,07                                                                                                                           | 6,33  | < 10                                                                                                                             | < 200  | +3...+6                                                                                        | 2                                                                              | 79                                                                                                   |
| ZMM 6.8-2%  | 6,65                                                                                                                           | 6,95  | < 8                                                                                                                              | < 150  | +3...+7                                                                                        | 3                                                                              | 72                                                                                                   |
| ZMM 7.5-2%  | 7,34                                                                                                                           | 7,66  | < 7                                                                                                                              | < 50   | +3...+7                                                                                        | 5                                                                              | 65                                                                                                   |
| ZMM 8.2-2%  | 8,03                                                                                                                           | 8,37  | < 7                                                                                                                              | < 50   | +3...+8                                                                                        | 6                                                                              | 60                                                                                                   |
| ZMM 9.1-2%  | 8,91                                                                                                                           | 9,29  | < 10                                                                                                                             | < 50   | +3...+9                                                                                        | 7                                                                              | 54                                                                                                   |
| ZMM 10-2%   | 9,79                                                                                                                           | 10,21 | < 15                                                                                                                             | < 70   | +3...+10                                                                                       | 7                                                                              | 49                                                                                                   |
| ZMM 11-2%   | 10,79                                                                                                                          | 11,21 | < 20                                                                                                                             | < 70   | +3...+11                                                                                       | 8                                                                              | 45                                                                                                   |
| ZMM 12-2%   | 11,79                                                                                                                          | 12,21 | < 20                                                                                                                             | < 90   | +3...+11                                                                                       | 9                                                                              | 41                                                                                                   |
| ZMM 13-2%   | 12,68                                                                                                                          | 13,32 | < 26                                                                                                                             | < 110  | +3...+11                                                                                       | 10                                                                             | 38                                                                                                   |
| ZMM 15-2%   | 14,68                                                                                                                          | 15,32 | < 30                                                                                                                             | < 110  | +3...+11                                                                                       | 11                                                                             | 33                                                                                                   |
| ZMM 16-2%   | 15,68                                                                                                                          | 16,32 | < 40                                                                                                                             | < 170  | +3...+11                                                                                       | 12                                                                             | 31                                                                                                   |
| ZMM 18-2%   | 17,58                                                                                                                          | 18,42 | < 50                                                                                                                             | < 170  | +3...+11                                                                                       | 13                                                                             | 27                                                                                                   |
| ZMM 20-2%   | 19,58                                                                                                                          | 20,42 | < 55                                                                                                                             | < 220  | +3...+11                                                                                       | 15                                                                             | 24                                                                                                   |
| ZMM 22-2%   | 21,58                                                                                                                          | 22,42 | < 55                                                                                                                             | < 220  | +4...+12                                                                                       | 16                                                                             | 22                                                                                                   |
| ZMM 24-2%   | 23,48                                                                                                                          | 24,52 | < 80                                                                                                                             | < 220  | +4...+12                                                                                       | 18                                                                             | 20                                                                                                   |
| ZMM 27-2%   | 26,48                                                                                                                          | 27,52 | < 80                                                                                                                             | < 220  | +4...+12                                                                                       | 20                                                                             | 18                                                                                                   |
| ZMM 30-2%   | 29,38                                                                                                                          | 30,62 | < 80                                                                                                                             | < 220  | +4...+12                                                                                       | 22                                                                             | 16                                                                                                   |
| ZMM 33-2%   | 33,2                                                                                                                           | 33,8  | < 80                                                                                                                             | < 220  | +4...+12                                                                                       | 24                                                                             | 15                                                                                                   |
| ZMM 36-2%   | 35,2                                                                                                                           | 36,8  | < 80                                                                                                                             | < 220  | +4...+12                                                                                       | 27                                                                             | 14                                                                                                   |
| ZMM 39-2%   | 38,1                                                                                                                           | 39,9  | < 90                                                                                                                             | < 500  | +4...+12                                                                                       | 30                                                                             | 13                                                                                                   |
| ZMM 43-2%   | 42,0                                                                                                                           | 44,0  | < 90                                                                                                                             | < 500  | +4...+12                                                                                       | 33                                                                             | 11                                                                                                   |
| ZMM 47-2%   | 46,0                                                                                                                           | 48,0  | <110                                                                                                                             | < 600  | +4...+12                                                                                       | 36                                                                             | 10                                                                                                   |
| ZMM 51-2%   | 49,9                                                                                                                           | 52,1  | < 125                                                                                                                            | < 700  | +4...+12                                                                                       | 39                                                                             | 10                                                                                                   |
| ZMM 56-2%   | 54,8                                                                                                                           | 57,2  | < 135                                                                                                                            | < 700  | +4...+12                                                                                       | 43                                                                             | 9                                                                                                    |
| ZMM 62-2%   | 60,7                                                                                                                           | 63,3  | < 150                                                                                                                            | < 1000 | +4...+12                                                                                       | 47                                                                             | 8                                                                                                    |
| ZMM 68-2%   | 66,5                                                                                                                           | 69,5  | < 200                                                                                                                            | < 1000 | +4...+12                                                                                       | 51                                                                             | 7                                                                                                    |
| ZMM 75-2%   | 73,4                                                                                                                           | 76,6  | < 250                                                                                                                            | < 1000 | +4...+12                                                                                       | 56                                                                             | 6                                                                                                    |
| ZMM 82-2%   | 80,3                                                                                                                           | 83,7  | < 300                                                                                                                            | < 1500 | +5...+12                                                                                       | 62                                                                             | 6                                                                                                    |
| ZMM 91-2%   | 89,1                                                                                                                           | 92,9  | < 450                                                                                                                            | < 2000 | +5...+12                                                                                       | 68                                                                             | 5                                                                                                    |
| ZMM 100-2%  | 97,9                                                                                                                           | 102,1 | < 450                                                                                                                            | < 5000 | +5...+12                                                                                       | 75                                                                             | 5                                                                                                    |

<sup>1)</sup> Notes see previous page – Fußnoten siehe vorhergehende Seite

