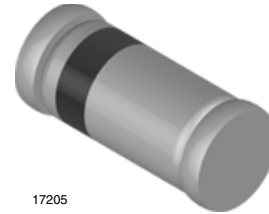


## Small Signal Zener Diodes

### Features

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- TZMC -  $V_Z$ -tolerance  $\pm 5\%$
- TZMB -  $V_Z$ -tolerance  $\pm 2\%$
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC
- Halogen-free according to IEC 61249-2-21 definition



17205

### Applications

- Voltage stabilization

### Mechanical Data

**Case:** MiniMELF SOD-80

**Weight:** approx. 31 mg

**Cathode band color:** black

**Packaging codes/options:**

08/2.5K per 7" reel (8 mm tape), 12.5K/box

18/10K per 13" reel (8 mm tape), 10K/box

### Absolute Maximum Ratings

$T_{amb} = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Power dissipation	$R_{thJA} \leq 300\text{ K/W}$	$P_{tot}$	500	mW
Z-current		$I_Z$	$P_{tot}/V_Z$	mA

### Thermal Characteristics

$T_{amb} = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air	On PC board 50 mm x 50 mm x 1.6 mm	$R_{thJA}$	500	K/W
Junction temperature		$T_j$	175	$^\circ\text{C}$
Storage temperature range		$T_{stg}$	- 65 to + 175	$^\circ\text{C}$

### Electrical Characteristics

$T_{amb} = 25\text{ }^\circ\text{C}$ , unless otherwise specified

Parameter	Test condition	Symbol	Min.	Typ.	Max.	Unit
Forward voltage	$I_F = 200\text{ mA}$	$V_F$			1.5	V

### Electrical Characteristics

Part number	Zener voltage range		Dynamic resistance		Test current		Reverse leakage current			Temperature coefficient of zener voltage	
	$V_Z$ at $I_{ZT}$		$r_{zT}$ at $I_{ZT}$	$r_{zK}$ at $I_{ZK}$	$I_{ZT}$	$I_{ZK}$	$I_R$	$I_R$ <sup>1)</sup>	at $V_R$	TK <sub>VZ</sub>	
	V	V	$\Omega$	$\Omega$	mA	mA	$\mu$ A	$\mu$ A	V	%/K	%/K
	min.	max.	typ.	typ.						min.	max.
TZMC2V4-M	2.28	2.56	< 85	< 600	5	1	< 50	< 100	1	- 0.09	- 0.06
TZMC2V7-M	2.5	2.9	< 85	< 600	5	1	< 10	< 50	1	- 0.09	- 0.06
TZMC3V0-M	2.8	3.2	< 90	< 600	5	1	< 4	< 40	1	- 0.08	- 0.05
TZMC3V3-M	3.1	3.5	< 90	< 600	5	1	< 2	< 40	1	- 0.08	- 0.05
TZMC3V6-M	3.4	3.8	< 90	< 600	5	1	< 2	< 40	1	- 0.08	- 0.05
TZMC3V9-M	3.7	4.1	< 90	< 600	5	1	< 2	< 40	1	- 0.08	- 0.05
TZMC4V3-M	4	4.6	< 90	< 600	5	1	< 1	< 20	1	- 0.06	- 0.03
TZMC4V7-M	4.4	5	< 80	< 600	5	1	< 0.5	< 10	1	- 0.05	0.02
TZMC5V1-M	4.8	5.4	< 60	< 550	5	1	< 0.1	< 2	1	- 0.02	0.02
TZMC5V6-M	5.2	6	< 40	< 450	5	1	< 0.1	< 2	1	- 0.05	0.05
TZMC6V2-M	5.8	6.6	< 10	< 200	5	1	< 0.1	< 2	2	0.03	0.06
TZMC6V8-M	6.4	7.2	< 8	< 150	5	1	< 0.1	< 2	3	0.03	0.07
TZMC7V5-M	7	7.9	< 7	< 50	5	1	< 0.1	< 2	5	0.03	0.07
TZMC8V2-M	7.7	8.7	< 7	< 50	5	1	< 0.1	< 2	6.2	0.03	0.08
TZMC9V1-M	8.5	9.6	< 10	< 50	5	1	< 0.1	< 2	6.8	0.03	0.09
TZMC10-M	9.4	10.6	< 15	< 70	5	1	< 0.1	< 2	7.5	0.03	0.1
TZMC11-M	10.4	11.6	< 20	< 70	5	1	< 0.1	< 2	8.2	0.03	0.11
TZMC12-M	11.4	12.7	< 20	< 90	5	1	< 0.1	< 2	9.1	0.03	0.11
TZMC13-M	12.4	14.1	< 26	< 110	5	1	< 0.1	< 2	10	0.03	0.11
TZMC15-M	13.8	15.6	< 30	< 110	5	1	< 0.1	< 2	11	0.03	0.11
TZMC16-M	15.3	17.1	< 40	< 170	5	1	< 0.1	< 2	12	0.03	0.11
TZMC18-M	16.8	19.1	< 50	< 170	5	1	< 0.1	< 2	13	0.03	0.11
TZMC20-M	18.8	21.2	< 55	< 220	5	1	< 0.1	< 2	15	0.03	0.11
TZMC22-M	20.8	23.3	< 55	< 220	5	1	< 0.1	< 2	16	0.04	0.12
TZMC24-M	22.8	25.6	< 80	< 220	5	1	< 0.1	< 2	18	0.04	0.12
TZMC27-M	25.1	28.9	< 80	< 220	5	1	< 0.1	< 2	20	0.04	0.12
TZMC30-M	28	32	< 80	< 220	5	1	< 0.1	< 2	22	0.04	0.12
TZMC33-M	31	35	< 80	< 220	5	1	< 0.1	< 2	24	0.04	0.12
TZMC36-M	34	38	< 80	< 220	5	1	< 0.1	< 2	27	0.04	0.12
TZMC39-M	37	41	< 90	< 500	2.5	0.5	< 0.1	< 5	30	0.04	0.12
TZMC43-M	40	46	< 90	< 600	2.5	0.5	< 0.1	< 5	33	0.04	0.12
TZMC47-M	44	50	< 110	< 700	2.5	0.5	< 0.1	< 5	36	0.04	0.12
TZMC51-M	48	54	< 125	< 700	2.5	0.5	< 0.1	< 10	39	0.04	0.12
TZMC56-M	52	60	< 135	< 1000	2.5	0.5	< 0.1	< 10	43	0.04	0.12
TZMC62-M	58	66	< 150	< 1000	2.5	0.5	< 0.1	< 10	47	0.04	0.12
TZMC68-M	64	72	< 200	< 1000	2.5	0.5	< 0.1	< 10	51	0.04	0.12
TZMC75-M	70	79	< 250	< 1500	2.5	0.5	< 0.1	< 10	56	0.04	0.12

Note:

Additional measurement of voltage group TZMC9V1-M to TZMC75-M,  $I_R$  at 95 %  $V_{Zmin} \leq 35$  nA at  $T_j = 25$  °C

<sup>1)</sup> at  $T_j = 150$  °C



## Electrical Characteristics

Part number	Zener voltage range		Dynamic resistance		Test current		Reverse leakage current			Temperature coefficient of zener voltage	
	V <sub>Z</sub> at I <sub>ZT</sub>		r <sub>zjT</sub> at I <sub>ZT</sub>	r <sub>zjK</sub> at I <sub>ZK</sub>	I <sub>ZT</sub>	I <sub>ZK</sub>	I <sub>R</sub>	I <sub>R</sub> <sup>1)</sup>	at V <sub>R</sub>	TK <sub>VZ</sub>	
	V	V	Ω	Ω	mA	mA	μA	μA	V	%/K	%/K
	min.	max.	typ.	typ.						min.	max.
TZMB2V4-M	2.35	2.45	< 85	< 600	5	1	< 50	< 100	1	- 0.09	- 0.06
TZMB2V7-M	2.64	2.76	< 85	< 600	5	1	< 10	< 50	1	- 0.09	- 0.06
TZMB3V0-M	2.94	3.06	< 90	< 600	5	1	< 4	< 40	1	- 0.08	- 0.05
TZMB3V3-M	3.24	3.36	< 90	< 600	5	1	< 2	< 40	1	- 0.08	- 0.05
TZMB3V6-M	3.52	3.68	< 90	< 600	5	1	< 2	< 40	1	- 0.08	- 0.05
TZMB3V9-M	3.82	3.98	< 90	< 600	5	1	< 2	< 40	1	- 0.08	- 0.05
TZMB4V3-M	4.22	4.38	< 90	< 600	5	1	< 1	< 20	1	- 0.06	-0.03
TZMB4V7-M	4.6	4.8	< 80	< 600	5	1	< 0.5	< 10	1	- 0.05	0.02
TZMB5V1-M	5	5.2	< 60	< 550	5	1	< 0.1	< 2	1	- 0.02	0.02
TZMB5V6-M	5.48	5.72	< 40	< 450	5	1	< 0.1	< 2	1	- 0.05	0.05
TZMB6V2-M	6.08	6.32	< 10	< 200	5	1	< 0.1	< 2	2	0.03	0.06
TZMB6V8-M	6.66	6.94	< 8	< 150	5	1	< 0.1	< 2	3	0.03	0.07
TZMB7V5-M	7.35	7.65	< 7	< 50	5	1	< 0.1	< 2	5	0.03	0.07
TZMB8V2-M	8.04	8.36	< 7	< 50	5	1	< 0.1	< 2	6.2	0.03	0.08
TZMB9V1-M	8.92	9.28	< 10	< 50	5	1	< 0.1	< 2	6.8	0.03	0.09
TZMB10-M	9.8	10.2	< 15	< 70	5	1	< 0.1	< 2	7.5	0.03	0.1
TZMB11-M	10.78	11.22	< 20	< 70	5	1	< 0.1	< 2	8.2	0.03	0.11
TZMB12-M	11.76	12.24	< 20	< 90	5	1	< 0.1	< 2	9.1	0.03	0.11
TZMB13-M	12.74	13.26	< 26	< 110	5	1	< 0.1	< 2	10	0.03	0.11
TZMB15-M	14.7	15.3	< 30	< 110	5	1	< 0.1	< 2	11	0.03	0.11
TZMB16-M	15.7	16.3	< 40	< 170	5	1	< 0.1	< 2	12	0.03	0.11
TZMB18-M	17.64	18.36	< 50	< 170	5	1	< 0.1	< 2	13	0.03	0.11
TZMB20-M	19.6	20.4	< 55	< 220	5	1	< 0.1	< 2	15	0.03	0.11
TZMB22-M	21.55	22.45	< 55	< 220	5	1	< 0.1	< 2	16	0.04	0.12
TZMB24-M	23.5	24.5	< 80	< 220	5	1	< 0.1	< 2	18	0.04	0.12
TZMB27-M	26.4	27.6	< 80	< 220	5	1	< 0.1	< 2	20	0.04	0.12
TZMB30-M	29.4	30.6	< 80	< 220	5	1	< 0.1	< 2	22	0.04	0.12
TZMB33-M	32.4	33.6	< 80	< 220	5	1	< 0.1	< 2	24	0.04	0.12
TZMB36-M	35.3	36.7	< 80	< 220	5	1	< 0.1	< 2	27	0.04	0.12
TZMB39-M	38.2	39.8	< 90	< 500	2.5	1	< 0.1	< 5	30	0.04	0.12
TZMB43-M	42.1	43.9	< 90	< 600	2.5	0.5	< 0.1	< 5	33	0.04	0.12
TZMB47-M	46.1	47.9	< 110	< 700	2.5	0.5	< 0.1	< 5	36	0.04	0.12
TZMB51-M	50	52	< 125	< 700	2.5	0.5	< 0.1	< 10	39	0.04	0.12
TZMB56-M	54.9	57.1	< 135	< 1000	2.5	0.5	< 0.1	< 10	43	0.04	0.12
TZMB62-M	60.8	63.2	< 150	< 1000	2.5	0.5	< 0.1	< 10	47	0.04	0.12
TZMB68-M	66.6	69.4	< 200	< 1000	2.5	0.5	< 0.1	< 10	51	0.04	0.12
TZMB75-M	73.5	76.5	< 250	< 1500	2.5	0.5	< 0.1	< 10	56	0.04	0.12

Note:

Additional measurement of voltage group TZMB9V1-M to TZMB75-M, I<sub>R</sub> at 95 % V<sub>Zmin</sub> ≤ 35 nA at T<sub>j</sub> = 25 °C

<sup>1)</sup> at T<sub>j</sub> = 150 °C

### Typical Characteristics

$T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified

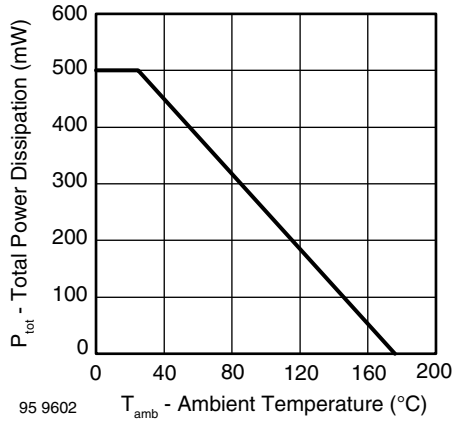


Figure 1. Total Power Dissipation vs. Ambient Temperature

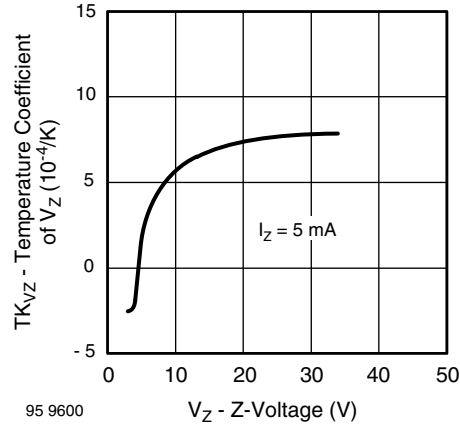


Figure 4. Temperature Coefficient of  $V_Z$  vs. Z-Voltage

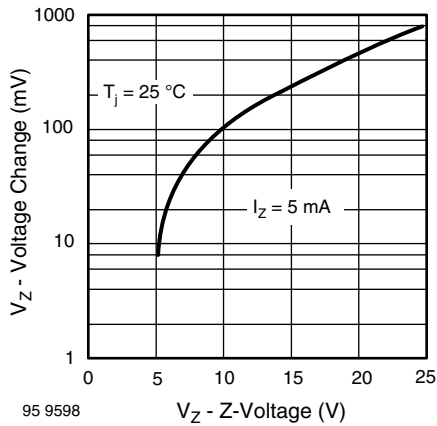


Figure 2. Typical Change of Working Voltage under Operating Conditions at  $T_{amb} = 25\text{ }^{\circ}\text{C}$

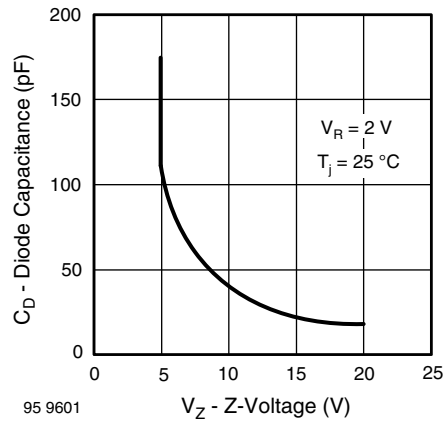


Figure 5. Diode Capacitance vs. Z-Voltage

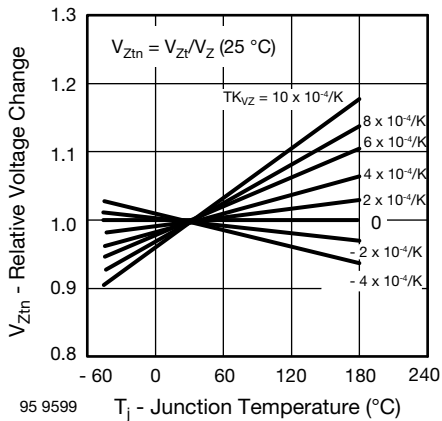


Figure 3. Typical Change of Working Voltage vs. Junction Temperature

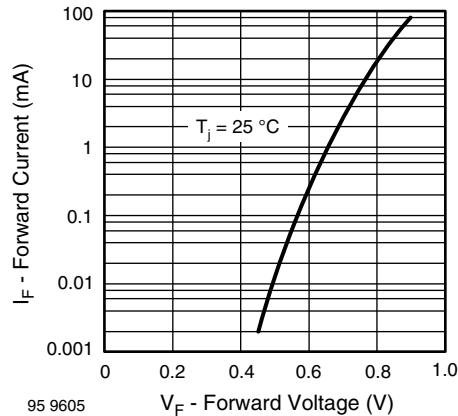


Figure 6. Forward Current vs. Forward Voltage

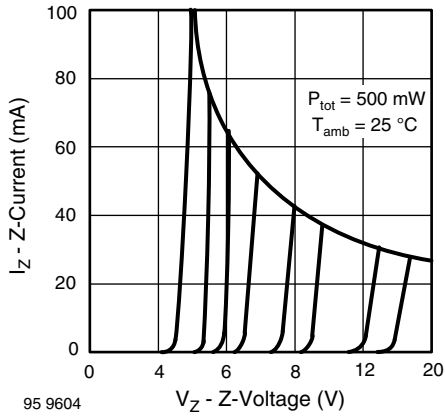


Figure 7. Z-Current vs. Z-Voltage

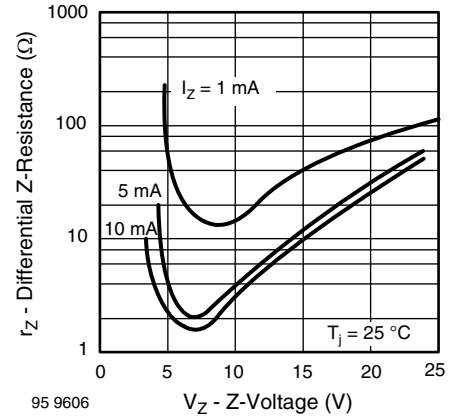


Figure 9. Differential Z-Resistance vs. Z-Voltage

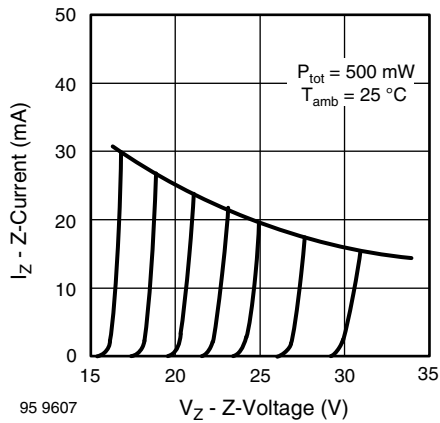


Figure 8. Z-Current vs. Z-Voltage

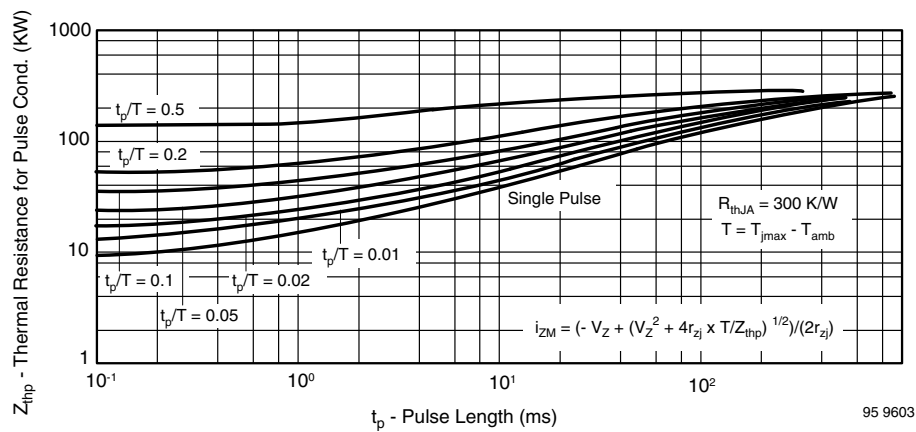
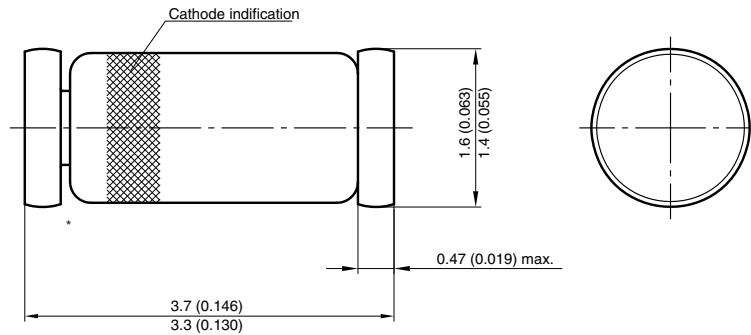


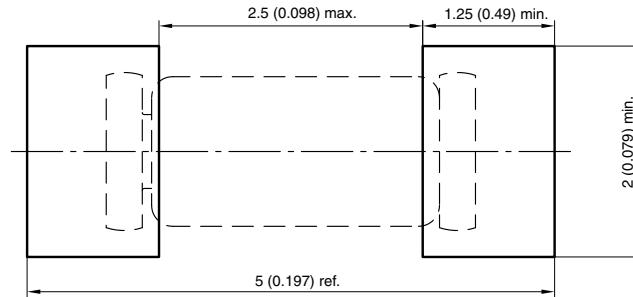
Figure 10. Thermal Response

### Package Dimensions in millimeters (inches): MiniMELF SOD-80



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

Foot print recommendation:



Document no.: 6.560-5005.01-4  
Rev. 8 - Date: 07.June.2006  
96 12070



## Disclaimer

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