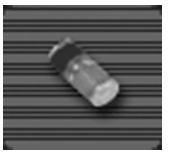
ZMM1 thru ZMM75

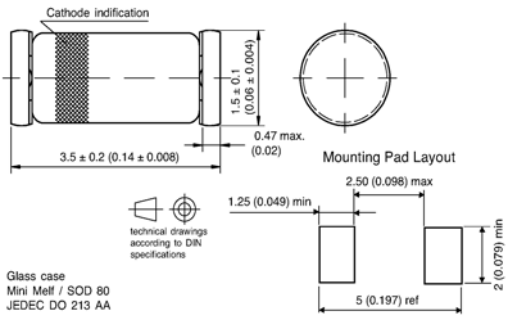
Zener Diodes

Zener Voltage Range: 1.0, 2.4 to 75 Volts Power Dissipation: 500mW

Features

- ◆ Silicon Planar Zener Diodes
- ◆ In MiniMELF case especially for automatic insertion
- ◆ The Zener voltages are graded according to the international E 24 standard. Offered with either 5% or 2% tolerance. Smaller voltage tolerances and other Zener voltages are available upon request.
- ◆ These diodes are also available in DO-35 case with the type designation ZPD1 ... ZPD51





Mechanical Data

- ◆ Case: MiniMELF Glass Case (SOD-80)
- ◆ Weight: approx. 0.05g

Maximum Ratings and Thermal Characteristics

(T_A=25°C unless otherwise noted)

Parameter	Symbol	Value	Unit
Zener current (see Table "Characteristics")			
Power dissipation at T_{amb}=25°C	P_{tot}	500 (1)	mW
Thermal resistance junction to ambient air	$R_{\theta JA}$	300 (1)	°C/W
Junction temperature	T_j	175	°C
Storage temperature range	T_S	-55 to +175	°C

Notes: 1. Valid provided that electrodes are kept at ambient temperature.

Electrical Characteristics

(T_A=25°C unless otherwise noted)

Type number add suffix B for ±2% tol.	Dynamic resistance		Temp. coefficient of zener voltage at I_Z=5mA αvz (10^{-4} / °C)		Maximum reverse leakage current		Admissible zener current (2)	
	at I_Z=5mA f=1kHz r_{zj} (Ω)	at I_Z=1mA f=1kHz r_{zj} (Ω)	Min.	Max.	I_R (uA)	at V_R (Volts)	at T_{amb}=45°C I_Z (mA)	at T_{amb}=25°C I_Z (mA)
ZMM1 (3)	6.5 (< 8)	< 50	-26	-23	-	-	280	340
ZMM2.4	<100	<600	-10	-5	50	0.8	152	175
ZMM2.7	75 (< 83)	< 500	-9	-4	20	0.8	135	160
ZMM3	80 (< 95)	< 500	-9	-3	20	0.8	117	140
ZMM3.3	80 (< 95)	< 500	-8	-3	6	0.8	109	130
ZMM3.6	80 (< 95)	< 500	-8	-3	6	0.8	101	120
ZMM3.9	80 (< 95)	< 500	-7	-3	1.6	0.8	92	110
ZMM4.3	80 (< 95)	< 500	-6	-1	1.0	0.8	85	100
ZMM4.7	70 (< 78)	< 500	-5	+2	0.1	0.8	76	90
ZMM5.1	30 (< 60)	< 480	-3	+4	0.1	0.8	67	80
ZMM5.6	10 (< 40)	< 400	-2	+6	0.1	1	59	70
ZMM6.2	4.8 (< 10)	< 200	-1	+7	0.1	2	54	64
ZMM6.8	4.5 (< 8)	< 150	+2	+7	0.1	3	49	58
ZMM7.5	4 (< 7)	< 50	+3	+7	0.1	5	44	53
ZMM8.2	4.5 (< 7)	< 50	+4	+7	0.1	6	40	47
ZMM9.1	4.8 (< 10)	< 50	+5	+8	0.1	7	36	43
ZMM10	5.2 (< 15)	< 70	+5	+8	0.1	7.5	33	40
ZMM11	6 (< 20)	< 70	+5	+9	0.1	8.5	30	36
ZMM12	7 (< 20)	< 90	+6	+9	0.1	9	28	32
ZMM13	9 (< 25)	< 110	+7	+9	0.1	10	25	29
ZMM15	11 (< 30)	< 110	+7	+9	0.1	11	23	27
ZMM16	13 (< 40)	< 170	+8	+9.5	0.1	12	20	24
ZMM18	18 (< 50)	< 170	+8	+9.5	0.1	14	18	21
ZMM20	20 (< 50)	< 220	+8	+10	0.1	15	17	20
ZMM22	25 (< 55)	< 220	+8	+10	0.1	17	16	18
ZMM24	28 (< 80)	< 220	+8	+10	0.1	18	13	16
ZMM27	30 (< 80)	< 250	+8	+10	0.1	20	12	14
ZMM30	35 (< 80)	< 250	+8	+10	0.1	22.5	10	13
ZMM33	40 (< 80)	< 250	+8	+10	0.1	25	9	12
ZMM36	40 (< 90)	< 250	+8	+10	0.1	27	9	11
ZMM39	50 (< 90)	< 300	+10	+12	0.1	29	8	10
ZMM43	60 (< 100)	< 700	+10	+12	0.1	32	7	9.2
ZMM47	70 (< 100)	< 750	+10	+12	0.1	35	6	8.5
ZMM51	70 (< 100)	< 750	+10	+12	0.1	38	6	7.8
ZMM56	< 135 (4)	< 1000 (5)	typ. +10 (4)	-	0.1	42	5.2	7.1
ZMM62	< 150 (4)	< 1000 (5)	typ. +10 (4)	-	0.1	47	4.8	6.4
ZMM68	< 200 (4)	< 1000 (5)	typ. +10 (4)	-	0.1	51	4.1	5.8
ZMM75	< 250 (4)	< 1500 (5)	typ. +10 (4)	-	0.1	55	3.9	5.3

Notes: 1. Tested with pulses t_p=5ms

2. Valid provided that electrodes are kept at ambient temperature
3. The ZMM1 is a silicon diode operated in forward direction Hence, the index of all parameters should be "F" instead of "Z" Connect the cathode electrode to the negative pole
4. at I_Z=2.5mA
5. at I_Z=0.5mA

Electrical Characteristics

(T_A=25°C unless otherwise noted)

Type number ±5% Tol.	Zener voltage range (1) at I_z V_z (Volts) Min.	Max.	Test current I_z (mA)
ZMM1 (2)	0.70	0.80	5.0
ZMM2.4	2.20	2.60	5.0
ZMM2.7	2.50	2.90	5.0
ZMM3	2.80	3.20	5.0
ZMM3.3	3.10	3.50	5.0
ZMM3.6	3.40	3.80	5.0
ZMM3.9	3.70	4.10	5.0
ZMM4.3	4.00	4.60	5.0
ZMM4.7	4.40	5.00	5.0
ZMM5.1	4.80	5.40	5.0
ZMM5.6	5.20	6.00	5.0
ZMM6.2	5.80	6.60	5.0
ZMM6.8	6.40	7.20	5.0
ZMM7.5	7.00	7.90	5.0
ZMM8.2	7.70	8.70	5.0
ZMM9.1	8.50	9.60	5.0
ZMM10	9.40	10.6	5.0
ZMM11	10.4	11.6	5.0
ZMM12	11.4	12.7	5.0
ZMM13	12.4	14.1	5.0
ZMM15	13.8	15.6	5.0
ZMM16	15.3	17.1	5.0
ZMM18	16.8	19.1	5.0
ZMM20	18.8	21.2	5.0
ZMM22	20.8	23.3	5.0
ZMM24	22.8	25.6	5.0
ZMM27	25.1	28.9	5.0
ZMM30	28.0	32.0	5.0
ZMM33	31.0	35.0	5.0
ZMM36	34.0	38.0	5.0
ZMM39	37.0	41.0	5.0
ZMM43	40.0	46.0	5.0
ZMM47	44.0	50.0	5.0
ZMM51	48.0	54.0	5.0
ZMM56	52.0	60.0	2.5
ZMM62	58.0	66.0	2.5
ZMM68	64.0	72.0	2.5
ZMM75	70.0	79.0	2.5

Type number add suffix B ±2% Tol.	Zener voltage range (1) at I_z V_z (Volts) Min.	Max.	Test current I_z (mA)
ZMM1 (3)	-	-	-
ZMM2.4	-	-	-
ZMM2.7	2.65	2.75	5.0
ZMM3	2.94	3.06	5.0
ZMM3.3	3.23	3.37	5.0
ZMM3.6	3.53	3.67	5.0
ZMM3.9	3.82	3.98	5.0
ZMM4.3	4.21	4.39	5.0
ZMM4.7	4.61	4.79	5.0
ZMM5.1	5.00	5.20	5.0
ZMM5.6	5.49	5.71	5.0
ZMM6.2	6.08	6.32	5.0
ZMM6.8	6.66	6.94	5.0
ZMM7.5	7.35	7.65	5.0
ZMM8.2	8.04	8.36	5.0
ZMM9.1	8.92	9.28	5.0
ZMM10	9.80	10.2	5.0
ZMM11	10.8	11.2	5.0
ZMM12	11.8	12.2	5.0
ZMM13	12.7	13.3	5.0
ZMM15	14.7	15.3	5.0
ZMM16	15.7	16.3	5.0
ZMM18	17.6	18.4	5.0
ZMM20	19.6	20.4	5.0
ZMM22	21.6	22.4	5.0
ZMM24	23.5	24.5	5.0
ZMM27	26.5	27.5	5.0
ZMM30	29.4	30.6	5.0
ZMM33	32.3	33.7	5.0
ZMM36	35.3	36.7	5.0
ZMM39	38.2	39.8	5.0
ZMM43	42.1	43.9	5.0
ZMM47	46.1	47.9	5.0
ZMM51	50.0	52.0	5.0
ZMM56	54.9	57.1	2.5
ZMM62	60.8	63.2	2.5
ZMM68	66.6	69.4	2.5
ZMM75	73.5	76.5	2.5

Notes: 1. Measured with pulses t_p=5 ms

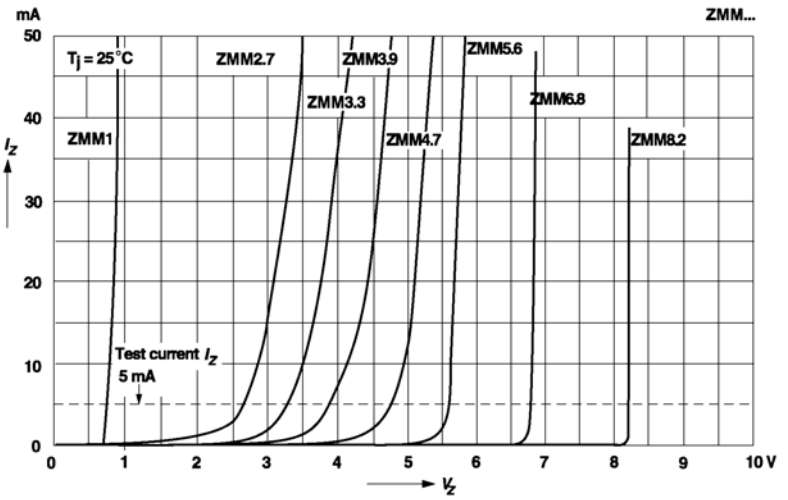
2. The ZMM1 is a silicon diode operated in forward direction. Hence, the index of all parameters should be "F" instead of "Z". Connect the the cathode electrode to the negative pole

RATINGS AND CHARACTERISTIC CURVES

(T_A = 25°C unless otherwise noted)

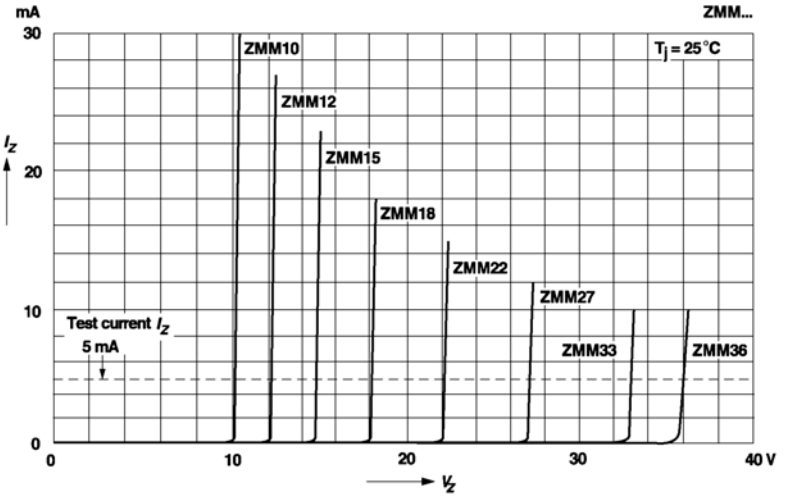
Breakdown characteristics

T_j = constant (pulsed)



Breakdown characteristics

T_j = constant (pulsed)

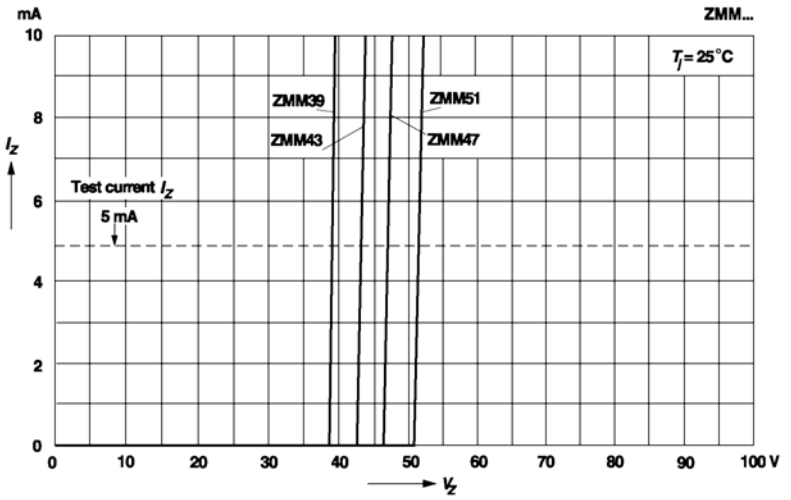


RATINGS AND CHARACTERISTIC CURVES

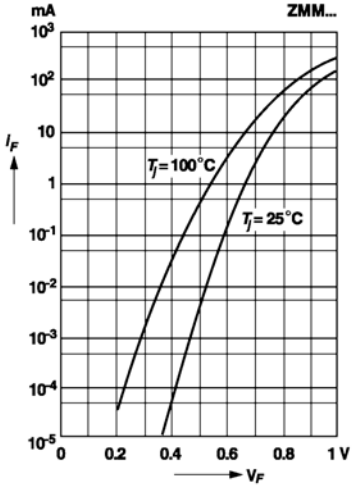
(T_A = 25°C unless otherwise noted)

Breakdown characteristics

T_j = constant (pulsed)

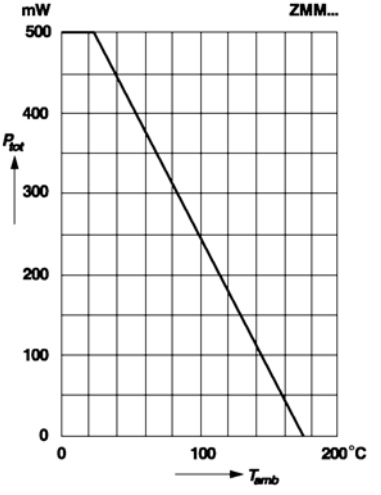


Forward characteristics



Admissible power dissipation versus ambient temperature

Valid provided that electrodes are kept at ambient temperature

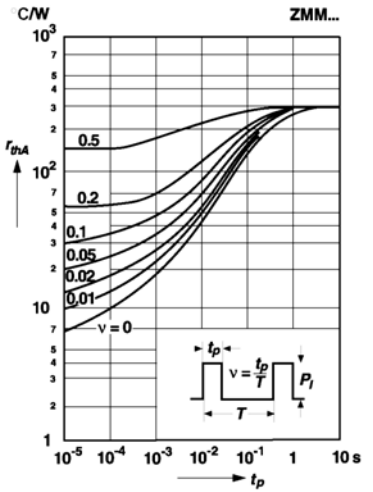


RATINGS AND CHARACTERISTIC CURVES

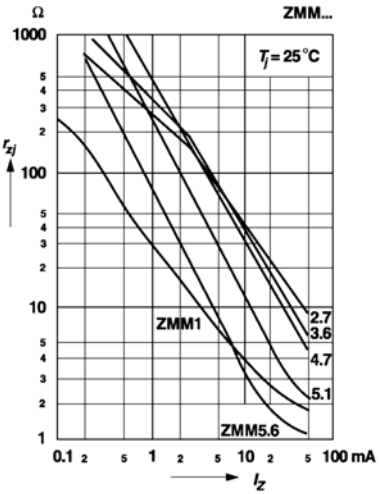
(T_A = 25°C unless otherwise noted)

Pulse thermal resistance versus pulse duration

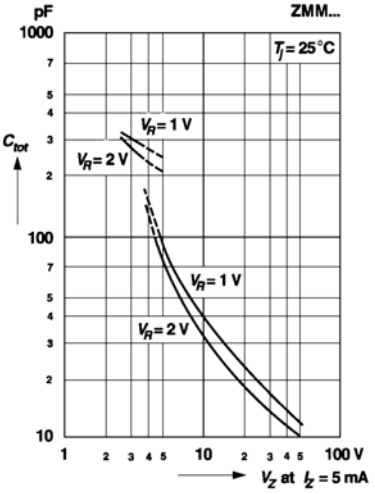
Valid provided that the electrodes are kept at ambient temperature



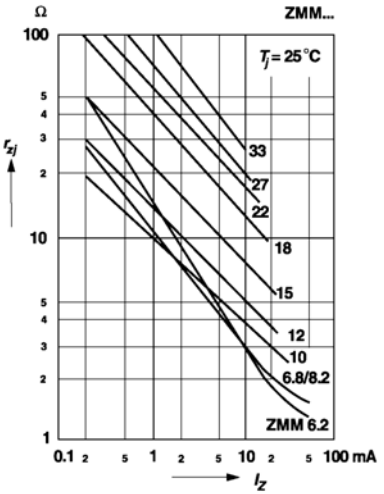
Dynamic resistance versus Zener current



Capacitance versus Zener voltage



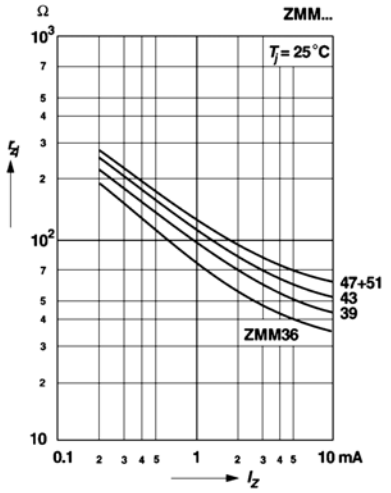
Dynamic resistance versus Zener current



RATINGS AND CHARACTERISTIC CURVES

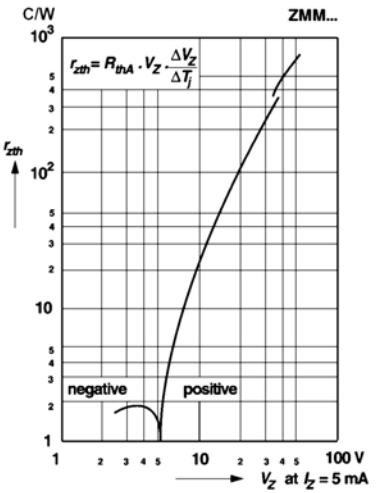
(T_A=25°C unless otherwise noted)

Dynamic resistance versus Zener current

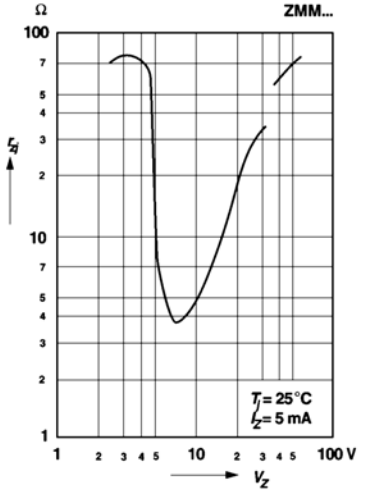


Thermal differential resistance versus Zener voltage

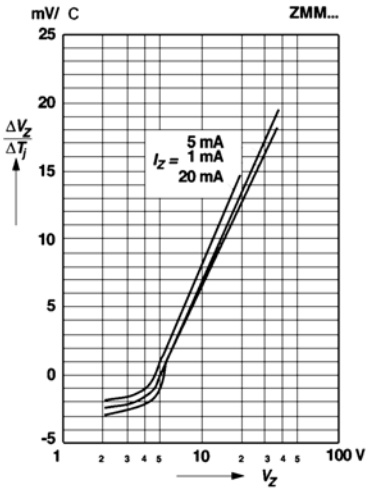
Valid provided that electrodes are kept at ambient temperature



Dynamic resistance versus Zener voltage



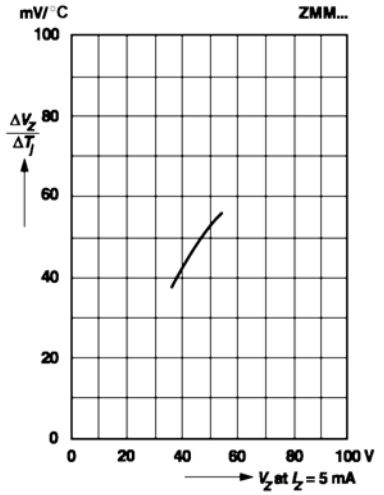
Temperature dependence of Zener voltage versus Zener voltage



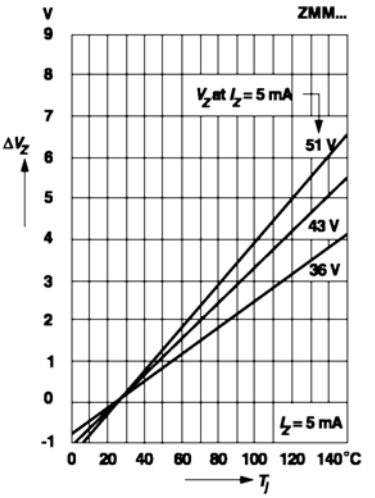
RATINGS AND CHARACTERISTIC CURVES

(T_A = 25°C unless otherwise noted)

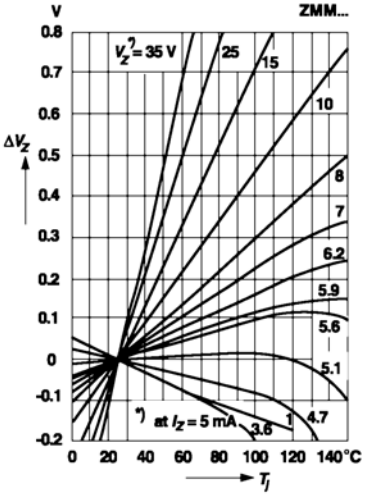
Temperature dependence of Zener voltage versus Zener voltage



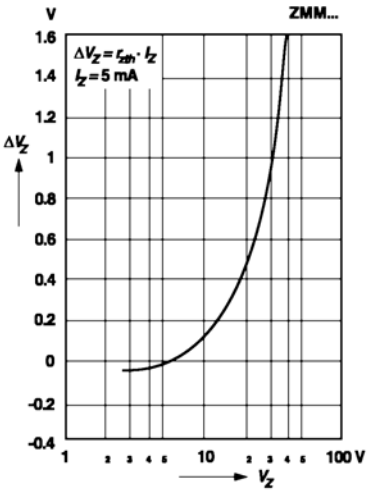
Change of Zener voltage versus junction temperature



Change of Zener voltage versus junction temperature



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



RATINGS AND CHARACTERISTIC CURVES

(T_A = 25°C unless otherwise noted)

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

