

ZMM55 SERIES

MINI MELF Glass-Encapsulate Diodes

Zener Diodes

Features

- P_d 500mW
- V_z 2.4V-75V

Applications

- Stabilizing Voltage

MINI MELF(SOD-80/ LL- 34)



Limiting Values (Absolute Maximum Rating)

Item	Symbol	Unit	Conditions	Max
Power dissipation	P_d	mW	$L=4\text{mm}, T_L=25^\circ\text{C}$	500
Zener current	I_z	mA	P_{tot} / V_z	See Table
Maximum junction temperature	T_j	$^\circ\text{C}$		175
Storage temperature range	T_{stg}	$^\circ\text{C}$		-65 to +175

Electrical Characteristics ($T_a=25^\circ\text{C}$ Unless otherwise specified)

Item	Symbol	Unit	Conditions	Max
Thermal resistance	$R_{\theta JA}$	$^\circ\text{C}/\text{W}$	junction to ambient air, $L=4\text{mm}, T_L=\text{constant}$	300
Forward voltage	V_F	V	$I_F=200\text{mA}$	1

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

ZMM55C..

Part Number	Zener voltage range		Dynamic resistance		Test current	Temperature Coefficient		Test current	Reverse leakage current		
	V_Z at I_{ZT}		R_{ZJT} at I_{ZT}	R_{ZJK} at I_{ZT}	I_{ZT}	TK _{VZ}		I_{ZK}	I_R	$I_R^{(1)}$	at V_R
	V		Ω		mA	%/K		mA	μA		V
	Min.	Max.				Min.	Max.				
ZMM55C2V4	2.28	2.56	< 85	< 600	5	- 0.09	- 0.06	1	< 50	< 100	1
ZMM55C2V7	2.5	2.9	< 85	< 600	5	- 0.09	- 0.06	1	< 10	< 50	1
ZMM55C3V0	2.8	3.2	< 85	< 600	5	- 0.08	- 0.05	1	< 4	< 40	1
ZMM55C3V3	3.1	3.5	< 85	< 600	5	- 0.08	- 0.05	1	< 2	< 40	1
ZMM55C3V6	3.4	3.8	< 85	< 600	5	- 0.08	- 0.05	1	< 2	< 40	1
ZMM55C3V9	3.7	4.1	< 85	< 600	5	- 0.08	- 0.05	1	< 2	< 40	1
ZMM55C4V3	4	4.6	< 75	< 600	5	- 0.06	- 0.03	1	< 1	< 20	1
ZMM55C4V7	4.4	5	< 60	< 600	5	- 0.05	0.02	1	< 0.5	< 10	1
ZMM55C5V1	4.8	5.4	< 35	< 550	5	- 0.02	0.02	1	< 0.1	< 2	1
ZMM55C5V6	5.2	6	< 25	< 450	5	- 0.05	0.05	1	< 0.1	< 2	1
ZMM55C6V2	5.8	6.6	< 10	< 200	5	0.03	0.06	1	< 0.1	< 2	2
ZMM55C6V8	6.4	7.2	< 8	< 150	5	0.03	0.07	1	< 0.1	< 2	3
ZMM55C7V5	7	7.9	< 7	< 50	5	0.03	0.07	1	< 0.1	< 2	5
ZMM55C8V2	7.7	8.7	< 7	< 50	5	0.03	0.08	1	< 0.1	< 2	6.2
ZMM55C9V1	8.5	9.6	< 10	< 50	5	0.03	0.09	1	< 0.1	< 2	6.8
ZMM55C10	9.4	10.6	< 15	< 70	5	0.03	0.1	1	< 0.1	< 2	7.5
ZMM55C11	10.4	11.6	< 20	< 70	5	0.03	0.11	1	< 0.1	< 2	8.2
ZMM55C12	11.4	12.7	< 20	< 90	5	0.03	0.11	1	< 0.1	< 2	9.1
ZMM55C13	12.4	14.1	< 26	< 110	5	0.03	0.11	1	< 0.1	< 2	10
ZMM55C15	13.8	15.6	< 30	< 110	5	0.03	0.11	1	< 0.1	< 2	11
ZMM55C16	15.3	17.1	< 40	< 170	5	0.03	0.11	1	< 0.1	< 2	12
ZMM55C18	16.8	19.1	< 50	< 170	5	0.03	0.11	1	< 0.1	< 2	13
ZMM55C20	18.8	21.2	< 55	< 220	5	0.03	0.11	1	< 0.1	< 2	15
ZMM55C22	20.8	23.3	< 55	< 220	5	0.04	0.12	1	< 0.1	< 2	16
ZMM55C24	22.8	25.6	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	18
ZMM55C27	25.1	28.9	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	20
ZMM55C30	28	32	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	22
ZMM55C33	31	35	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	24
ZMM55C36	34	38	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	27
ZMM55C39	37	41	< 90	< 500	2.5	0.04	0.12	0.5	< 0.1	< 5	30
ZMM55C43	40	46	< 90	< 600	2.5	0.04	0.12	0.5	< 0.1	< 5	33
ZMM55C47	44	50	< 110	< 700	2.5	0.04	0.12	0.5	< 0.1	< 5	36
ZMM55C51	48	54	< 125	< 700	2.5	0.04	0.12	0.5	< 0.1	< 10	39
ZMM55C56	52	60	< 135	< 1000	2.5	0.04	0.12	0.5	< 0.1	< 10	43
ZMM55C62	58	66	< 150	< 1000	2.5	0.04	0.12	0.5	< 0.1	< 10	47
ZMM55C68	64	72	< 200	< 1000	2.5	0.04	0.12	0.5	< 0.1	< 10	51
ZMM55C75	70	79	< 250	< 1500	2.5	0.04	0.12	0.5	< 0.1	< 10	56

Notes:

Additional measurement of voltage group ZMM55C9V1 to ZMM55C75, I_R at 95% $V_{Zmin} \leq 35\text{nA}$ at $T_j=25^\circ\text{C}$

¹⁾ $T_j=150^\circ\text{C}$

Electrical Characteristics ($T_A=25^\circ\text{C}$ unless otherwise noted)

ZMM55B..

Part Number	Zener voltage range		Dynamic resistance		Test current	Temperature Coefficient		Test current	Reverse leakage current		
	V_Z at I_{ZT}		R_{ZJT} at I_{ZT}	R_{ZJK} at I_{ZT}	I_{ZT}	TK_{VZ}		I_{ZK}	I_R	$I_R^{(1)}$	at V_R
	V		Ω		mA	%K		mA	μA		V
	Min.	Max.				Min.	Max.				
ZMM55B2V4	2.35	2.45	< 85	< 600	5	- 0.09	- 0.06	1	< 50	< 100	1
ZMM55B2V7	2.64	2.76	< 85	< 600	5	- 0.09	- 0.06	1	< 10	< 50	1
ZMM55B3V0	2.94	3.06	< 90	< 600	5	- 0.08	- 0.05	1	< 4	< 40	1
ZMM55B3V3	3.24	3.36	< 90	< 600	5	- 0.08	- 0.05	1	< 2	< 40	1
ZMM55B3V6	3.52	3.68	< 90	< 600	5	- 0.08	- 0.05	1	< 2	< 40	1
ZMM55B3V9	3.82	3.98	< 90	< 600	5	- 0.08	- 0.05	1	< 2	< 40	1
ZMM55B4V3	4.22	4.38	< 90	< 600	5	- 0.06	- 0.03	1	< 1	< 20	1
ZMM55B4V7	4.6	4.8	< 80	< 600	5	- 0.05	0.02	1	< 0.5	< 10	1
ZMM55B5V1	5	5.2	< 60	< 550	5	- 0.02	0.02	1	< 0.1	< 2	1
ZMM55B5V6	5.48	5.72	< 40	< 450	5	- 0.05	0.05	1	< 0.1	< 2	1
ZMM55B6V2	6.08	6.32	< 10	< 200	5	0.03	0.06	1	< 0.1	< 2	2
ZMM55B6V8	6.66	6.94	< 8	< 150	5	0.03	0.07	1	< 0.1	< 2	3
ZMM55B7V5	7.35	7.65	< 7	< 50	5	0.03	0.07	1	< 0.1	< 2	5
ZMM55B8V2	8.04	8.36	< 7	< 50	5	0.03	0.08	1	< 0.1	< 2	6.2
ZMM55B9V1	8.92	9.28	< 10	< 50	5	0.03	0.09	1	< 0.1	< 2	6.8
ZMM55B10	9.8	10.2	< 15	< 70	5	0.03	0.1	1	< 0.1	< 2	7.5
ZMM55B11	10.78	11.22	< 20	< 70	5	0.03	0.11	1	< 0.1	< 2	8.2
ZMM55B12	11.76	12.24	< 20	< 90	5	0.03	0.11	1	< 0.1	< 2	9.1
ZMM55B13	12.74	13.26	< 26	< 110	5	0.03	0.11	1	< 0.1	< 2	10
ZMM55B15	14.7	15.3	< 30	< 110	5	0.03	0.11	1	< 0.1	< 2	11
ZMM55B16	15.7	16.3	< 40	< 170	5	0.03	0.11	1	< 0.1	< 2	12
ZMM55B18	17.64	18.36	< 50	< 170	5	0.03	0.11	1	< 0.1	< 2	13
ZMM55B20	19.6	20.4	< 55	< 220	5	0.03	0.11	1	< 0.1	< 2	15
ZMM55B22	21.55	22.45	< 55	< 220	5	0.04	0.12	1	< 0.1	< 2	16
ZMM55B24	23.5	24.5	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	18
ZMM55B27	26.4	27.6	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	20
ZMM55B30	29.4	30.6	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	22
ZMM55B33	32.4	33.6	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	24
ZMM55B36	35.3	36.7	< 80	< 220	5	0.04	0.12	1	< 0.1	< 2	27
ZMM55B39	38.2	39.8	< 90	< 500	2.5	0.04	0.12	0.5	< 0.1	< 5	30
ZMM55B43	42.1	43.9	< 90	< 600	2.5	0.04	0.12	0.5	< 0.1	< 5	33
ZMM55B47	46.1	47.9	< 110	< 700	2.5	0.04	0.12	0.5	< 0.1	< 5	36
ZMM55B51	50	52	< 125	< 700	2.5	0.04	0.12	0.5	< 0.1	< 10	39
ZMM55B56	54.9	57.1	< 135	< 1000	2.5	0.04	0.12	0.5	< 0.1	< 10	43
ZMM55B62	60.8	63.2	< 150	< 1000	2.5	0.04	0.12	0.5	< 0.1	< 10	47
ZMM55B68	66.6	69.4	< 200	< 1000	2.5	0.04	0.12	0.5	< 0.1	< 10	51
ZMM55B75	73.5	76.5	< 250	< 1500	2.5	0.04	0.12	0.5	< 0.1	< 10	56

Notes:

Additional measurement of voltage group ZMM55B9V1 to ZMM55B75, I_R at 95% $V_{Zmin} \leq 35\text{nA}$ at $T_j=25^\circ\text{C}$

¹⁾ $T_j=150^\circ\text{C}$

Typical Characteristics

FIG1: Total Power Dissipation vs. Ambient Temperature

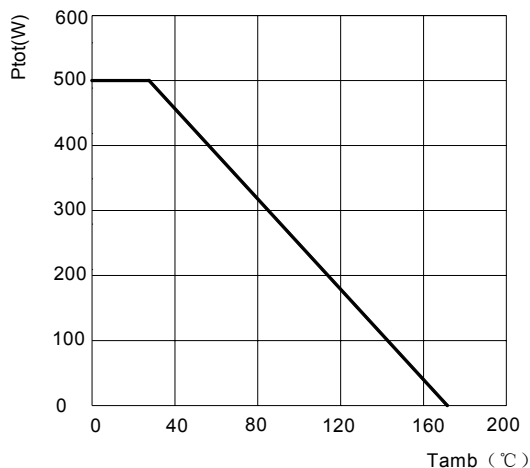


FIG2: Typical Change of Working Voltage under Operating Conditions at Tamb=25°C

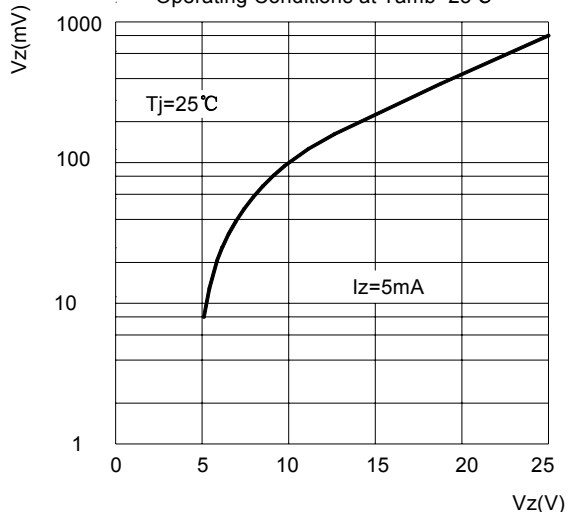


FIG3: Typical Change of Working Voltage vs. Junction Temperature

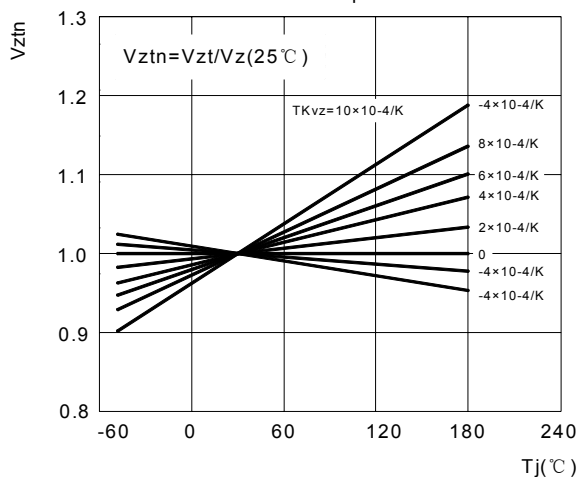


FIG4: Temperature Coefficient of Vz vs. Z-voltage

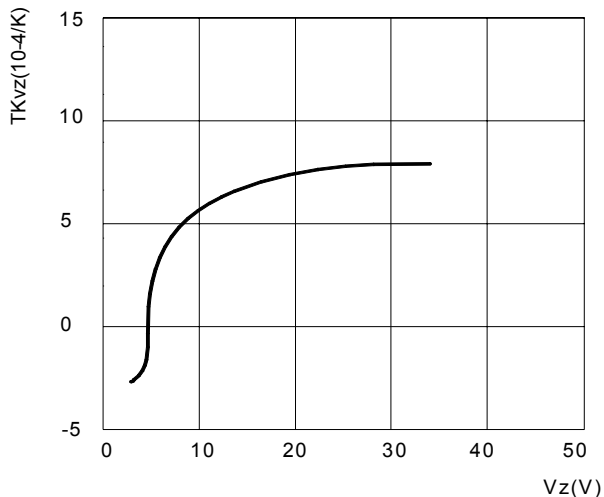


FIG5: Forward Current vs. Forward Voltage

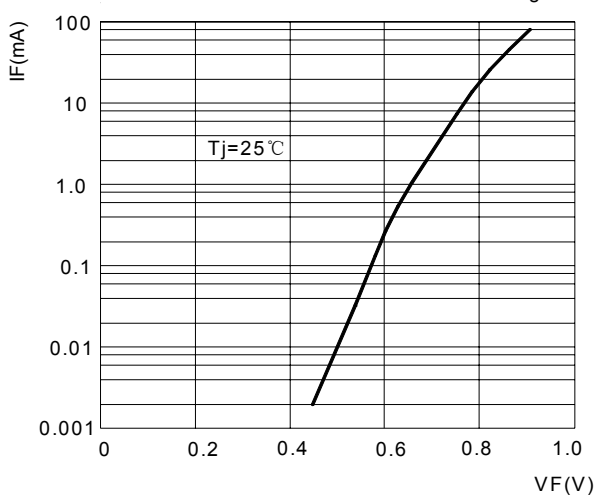
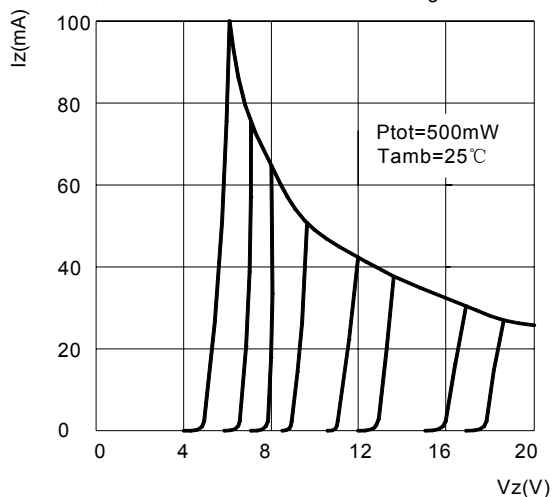


FIG6: Z-Current vs. Z-Voltage



Typical Characteristics

FIG7: Z-Current vs. Z-Voltage

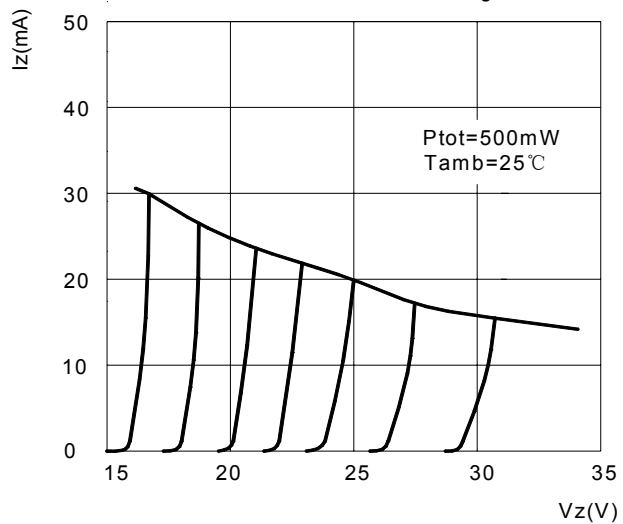
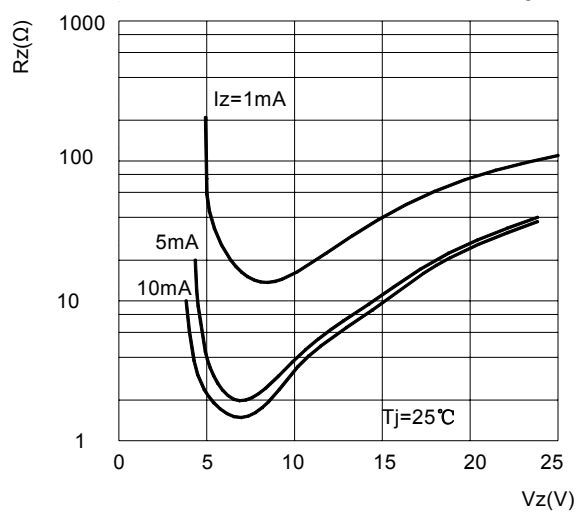
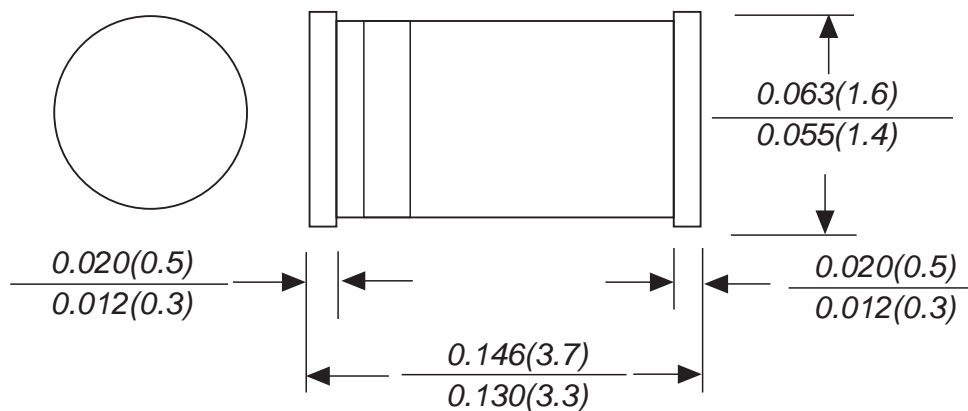


FIG8: Differential Z-Resistance vs. Z-Voltage

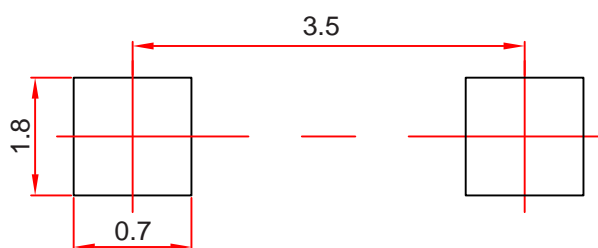


MINI MELF Package Outline Dimensions



Dimensions in millimeters

MINI MELF Suggested Pad Layout



Note:

1. Controlling dimension: in millimeters.
2. General tolerance: ± 0.05 mm.
3. The pad layout is for reference purposes only.

NOTICE

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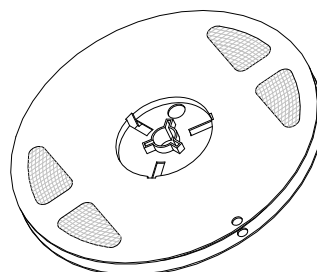
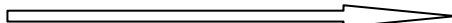
Packaging Specifications for Surface Mounted Glass Diodes

1. The method of packaging and dimension are shown as below figure. (Dimension in mm)

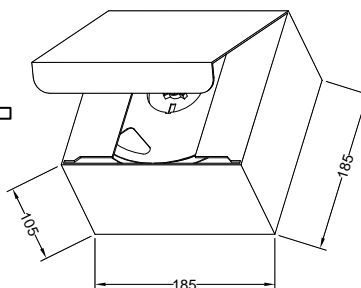
LS-31 (MicroMELF)
LS-34 (QuadroMELF)
LL-34 (MiniMELF)
DO-213AA(MiniMELF)



2,500 pcs per reel



20,000 pcs per box
8 reels per box



100,000 pcs per carton
5 boxes per carton

