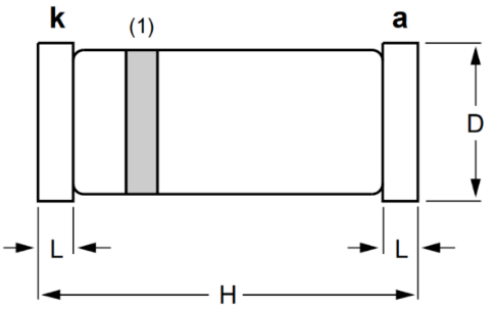
Silicon SMD Voltage Regulator Zener Diodes

Primary characteristics		
Parameter	**Value**	**Unit**
V_Z range nom.	0.75 to 200	V
Power rating	500	mW

Features

- Common cylindrical glass **MiniMELF (SOD-80C, DO-213AA, LL-34)** case for easy automatic insertion.
- Pb-Free and **RoHS** Compliant
- Smaller voltage tolerances and higher Zener voltages are available upon request

Case dimensions



[1]The marking band indicates the cathode

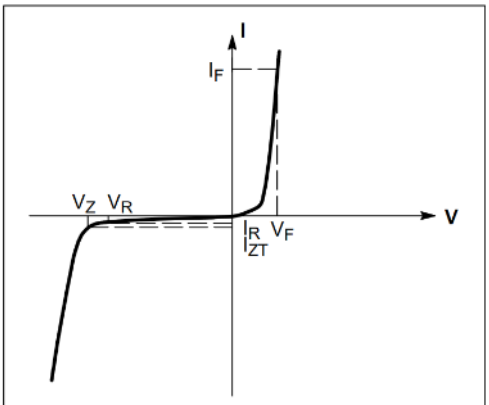
LL-34 (MiniMELF)			
Unit	**D**	**H**	**L**
mm	1.45 ± 0.05	3.45 ± 0.15	0.29 ± 0.04

Part numbering system	
ZMM	**8B2**
↓	↓
Series code	Reverse Zener Voltage = 8,2V B: series code (see: Characteristics table)

Absolute maximum ratings (T_a = 25°C)			
Parameter	**Symbol**	**Value**	**Unit**
Power Dissipation	P_{tot}	500[1)]	mW
Junction Temperature	T_j	175	°C
Storage Temperature Range	T_s	-55 to +175	°C
[1)] Valid provided that electrodes are kept at ambient temperature			

Characteristics (T_a = 25°C)			
Parameter	**Symbol**	**Max.**	**Unit**
Thermal Resistance: Junction to Ambient Air	R_{thA}	0.3[1)]	K/mW
[1)] Valid provided that electrodes are kept at ambient temperature			

Parameters list	
Symbol	**Parameter**
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
I_R	Reverse Leakage Current @ V_R
V_R	Reverse Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F



Zener Voltage Regulator

Characteristics table (T_a = 25°C)

Type	Zener Voltage Range[1)]			Dynamic Resistance			Reverse Leakage Current			Temp coefficient of Zener Voltage
	V_Z nom. V	I_{ZT} mA	V_{ZT} [2)] V	r_{ZJT} Ω	r_{ZJK} Ω	I_{ZK} mA	T_a = 25°C µA	T_a = 125°C µA	I_R at V_R V	TKvz %/K
ZMM1B[3)]	0.75	5.0	0.73 ~ 0.77	<8	<50	1.0	-	-	-	-0.26 ~ -0.23
ZMM2B0	2.0	5.0	1.96 ~ 2.04	<85	<600	1.0	<100	<200	1.0	-0.09 ~ -0.06
ZMM2B2	2.2	5.0	2.15 ~ 2.25	<85	<600	1.0	<75	<160	1.0	-0.09 ~ -0.06
ZMM2B4	2.4	5.0	2.35 ~ 2.45	<85	<600	1.0	<50	<100	1.0	-0.09 ~ -0.06
ZMM2B7	2.7	5.0	2.64 ~ 2.75	<85	<600	1.0	<10	<50	1.0	-0.09 ~ -0.06
ZMM3B0	3.0	5.0	2.94 ~ 3.06	<85	<600	1.0	<4	<40	1.0	-0.08 ~ -0.05
ZMM3B3	3.3	5.0	3.23 ~ 3.36	<85	<600	1.0	<2	<40	1.0	-0.08 ~ -0.05
ZMM3B6	3.6	5.0	3.52 ~ 3.67	<85	<600	1.0	<2	<40	1.0	-0.08 ~ -0.05
ZMM3B9	3.9	5.0	3.82 ~ 3.98	<85	<600	1.0	<2	<40	1.0	-0.08 ~ -0.05
ZMM4B3	4.3	5.0	4.21 ~ 4.39	<75	<600	1.0	<1	<20	1.0	-0.06 ~ -0.03
ZMM4B7	4.7	5.0	4.6 ~ 4.8	<60	<600	1.0	<0.5	<10	1.0	-0.05 ~ 0.02
ZMM5B1	5.1	5.0	4.99 ~ 5.2	<35	<550	1.0	<0.1	<2	1.0	-0.02 ~ 0.02
ZMM5B6	5.6	5.0	5.49 ~ 5.71	<25	<450	1.0	<0.1	<2	1.0	-0.05 ~ 0.05
ZMM6B2	6.2	5.0	6.07 ~ 6.32	<10	<200	1.0	<0.1	<2	2.0	0.03 ~ 0.06
ZMM6B8	6.8	5.0	6.66 ~ 6.94	<8	<150	1.0	<0.1	<2	3.0	0.03 ~ 0.07
ZMM7B5	7.5	5.0	7.35 ~ 7.65	<7	<50	1.0	<0.1	<2	5.0	0.03 ~ 0.07
ZMM8B2	8.2	5.0	8.04 ~ 8.36	<7	<50	1.0	<0.1	<2	6.2	0.03 ~ 0.08
ZMM9B1	9.1	5.0	8.92 ~ 9.28	<10	<50	1.0	<0.1	<2	6.8	0.03 ~ 0.09
ZMM10B	10	5.0	9.8 ~ 10.2	<15	<70	1.0	<0.1	<2	7.5	0.03 ~ 0.10
ZMM11B	11	5.0	10.8 ~ 11.2	<20	<70	1.0	<0.1	<2	8.2	0.03 ~ 0.11
ZMM12B	12	5.0	11.8 ~ 12.2	<20	<90	1.0	<0.1	<2	9.1	0.03 ~ 0.11
ZMM13B	13	5.0	12.7 ~ 13.3	<26	<110	1.0	<0.1	<2	10	0.03 ~ 0.11
ZMM15B	15	5.0	14.7 ~ 15.3	<30	<110	1.0	<0.1	<2	11	0.03 ~ 0.11
ZMM16B	16	5.0	15.7 ~ 16.3	<40	<170	1.0	<0.1	<2	12	0.03 ~ 0.11
ZMM18B	18	5.0	17.6 ~ 18.4	<50	<170	1.0	<0.1	<2	13	0.03 ~ 0.11
ZMM20B	20	5.0	19.6 ~ 20.4	<55	<220	1.0	<0.1	<2	15	0.03 ~ 0.11
ZMM22B	22	5.0	21.6 ~ 22.5	<55	<220	1.0	<0.1	<2	16	0.04 ~ 0.12
ZMM24B	24	5.0	23.5 ~ 24.5	<80	<220	1.0	<0.1	<2	18	0.04 ~ 0.12
ZMM27B	27	5.0	26.4 ~ 27.6	<80	<220	1.0	<0.1	<2	20	0.04 ~ 0.12
ZMM30B	30	5.0	29.4 ~ 30.6	<80	<220	1.0	<0.1	<2	22	0.04 ~ 0.12
ZMM33B	33	5.0	32.3 ~ 33.7	<80	<220	1.0	<0.1	<2	24	0.04 ~ 0.12
ZMM36B	36	5.0	35.2 ~ 36.8	<80	<220	1.0	<0.1	<2	27	0.04 ~ 0.12

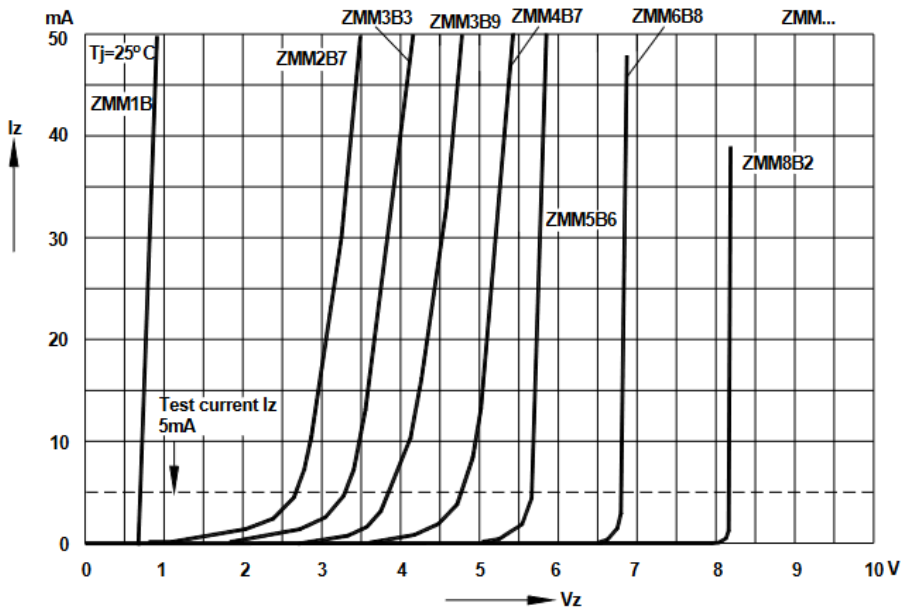
Characteristics table (T_a = 25°C)

Type	Zener Voltage Range[1]			Dynamic Resistance			Reverse Leakage Current			Temp coefficient of Zener Voltage
	V_Z nom. V	I_{ZT} mA	V_{ZT}[2] V	r_{ZJT} Ω	r_{ZJK} Ω	I_{ZK} mA	T_a = 25°C µA	T_a = 125°C µA	I_R at V_R V	TKvz %/K
ZMM39B	39	2.5	38.2 ~ 39.8	<90	<500	0.5	<0.1	<5	30	0.04 ~ 0.12
ZMM43B	43	2.5	42.1 ~ 43.9	<90	<500	0.5	<0.1	<5	33	0.04 ~ 0.12
ZMM47B	47	2.5	46 ~ 48	<110	<600	0.5	<0.1	<5	36	0.04 ~ 0.12
ZMM51B	51	2.5	49.9 ~ 52.1	<125	<700	0.5	<0.1	<10	39	0.04 ~ 0.12
ZMM56B	56	2.5	54.8 ~ 57.2	<135	<700	0.5	<0.1	<10	43	0.04 ~ 0.12
ZMM62B	62	2.5	60.7 ~ 63.3	<150	<1000	0.5	<0.1	<10	47	0.04 ~ 0.12
ZMM68B	68	2.5	66.6 ~ 69.4	<200	<1000	0.50	<0.1	<10	51	0.04 ~ 0.12
ZMM75B	75	2.5	73.5 ~ 76.5	<250	<1000	0.50	<0.1	<10	56	0.04 ~ 0.12
ZMM82B	82	2.5	80.3 ~ 83.7	<300	<1500	0.25	<0.1	<10	62	0.05 ~ 0.12
ZMM91B	91	1.0	89.1 ~ 92.9	<450	<2000	0.1	<0.1	<10	68	0.05 ~ 0.12
ZMM100B	100	1.0	98 ~ 102	<450	<5000	0.1	<0.1	<10	75	0.05 ~ 0.12
ZMM110B	110	1.0	107.8 ~ 112.2	<600	<5000	0.1	<0.1	<10	82	0.05 ~ 0.12
ZMM120B	120	1.0	117.6 ~ 122.4	<800	<5500	0.1	<0.1	<10	91	0.05 ~ 0.12
ZMM130B	130	1.0	127.4 ~ 132.6	<950	<6000	0.1	<0.1	<10	100	0.05 ~ 0.12
ZMM150B	150	1.0	147 ~ 153	<1250	<6500	0.1	<0.1	<10	110	0.05 ~ 0.12
ZMM160B	160	1.0	156.8 ~ 163.2	<1400	<7000	0.1	<0.1	<10	120	0.05 ~ 0.12
ZMM180B	180	1.0	176.4 ~ 183.6	<1700	<8500	0.1	<0.1	<10	130	0.05 ~ 0.12
ZMM200B	200	1.0	196 ~ 204	<2000	<10000	0.1	<0.1	<10	150	0.05 ~ 0.12

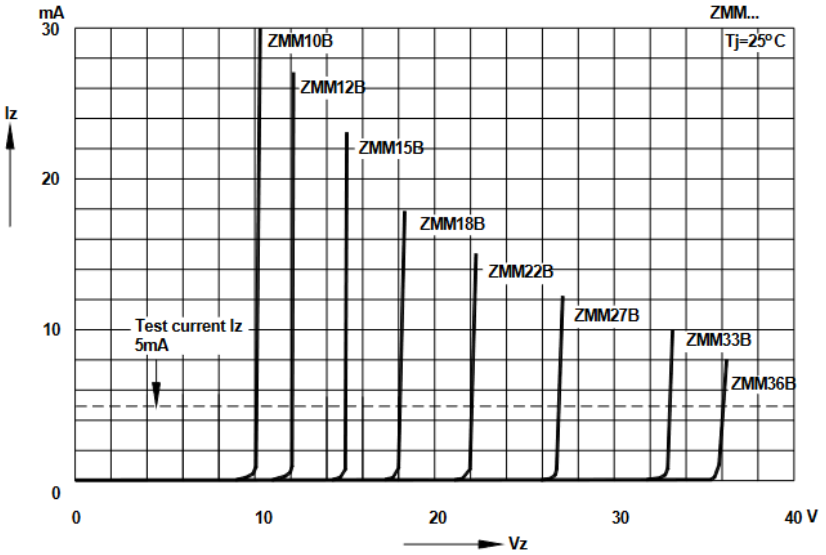
[1] Tested with pulses t_p = 20 ms
[2] Valid provided that electrodes are kept at ambient temperature
[3] The ZMM1B is a silicon diode with operation in forward direction. Hence, the index of all parameters should be "F" instead of "Z". Connect the cathode electrode to the negative pole.

Breakdown characteristics

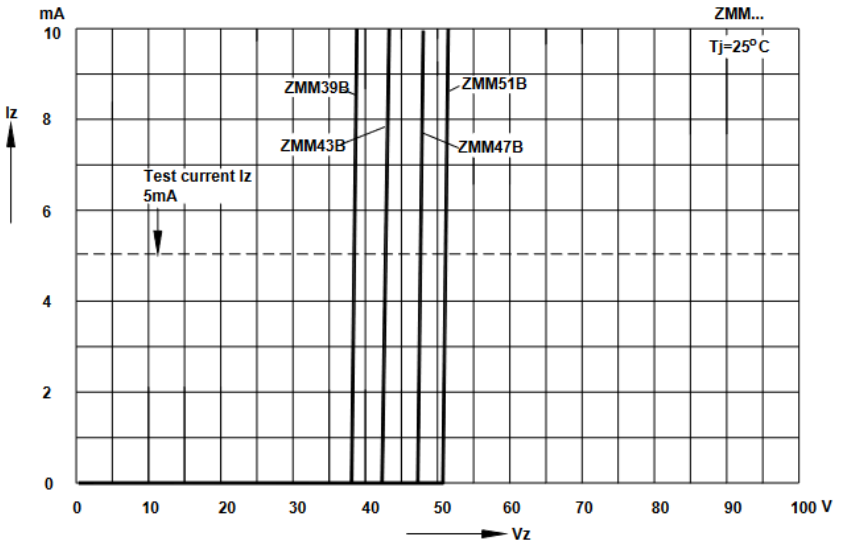
T_j = constant (pulsed)



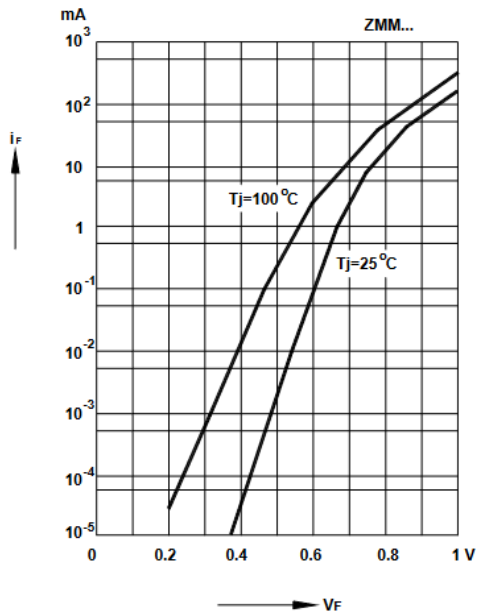
Breakdown characteristics
T_j = constant (pulsed)



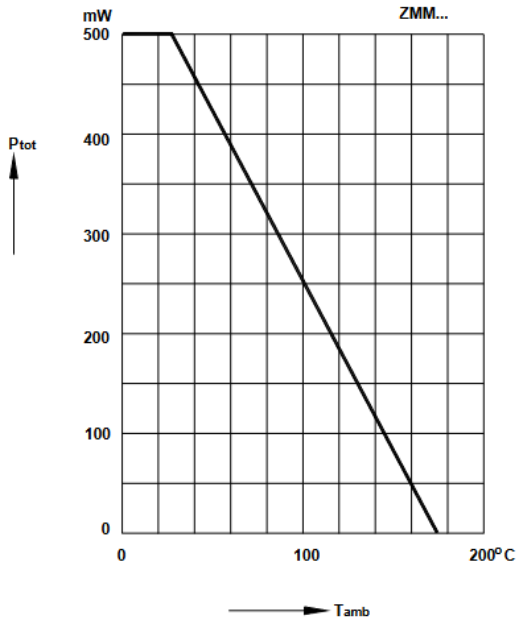
Breakdown characteristics
T_j = constant (pulsed)



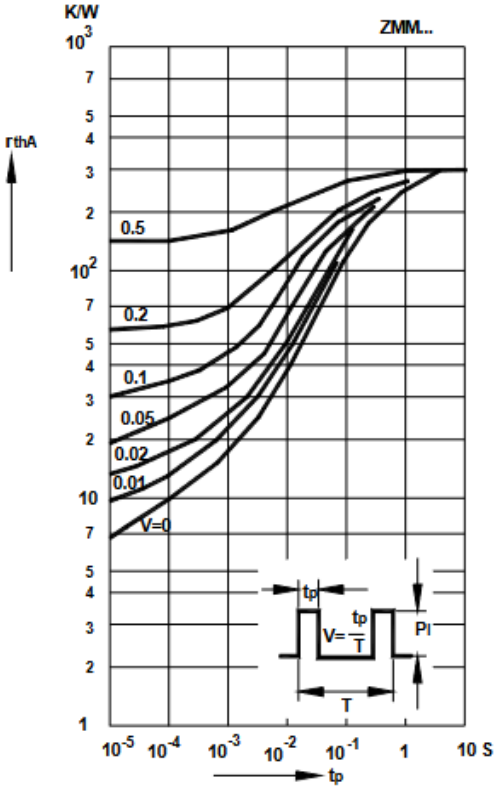
Forward characteristics



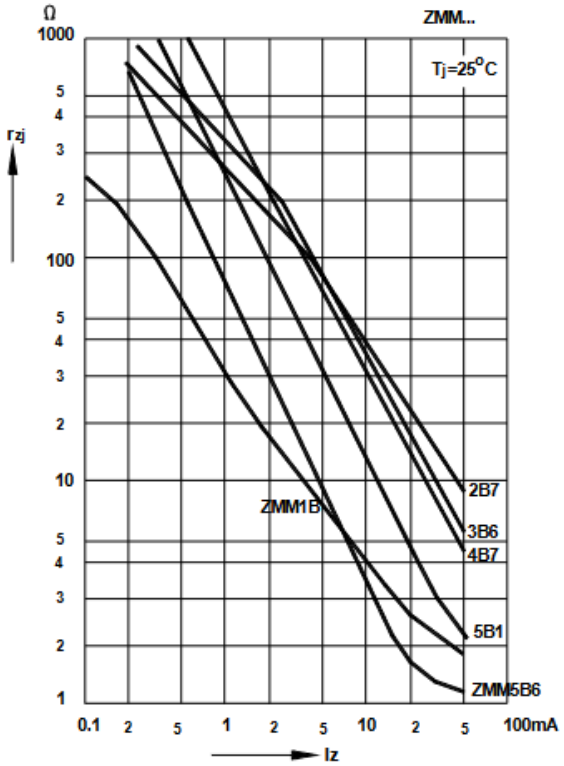
Admissible power dissipation versus ambient temperature
Valid provided that electrodes are kept at ambient temperature.



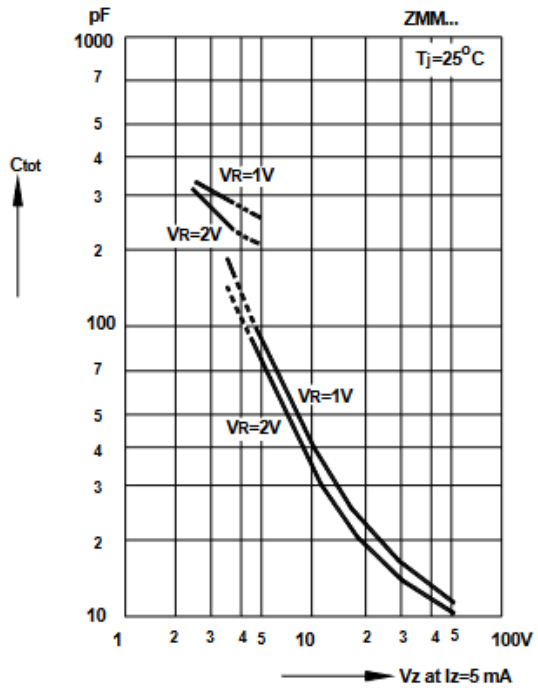
Pulse thermal resistance versus pulse duration
Valid provided that the electrodes are kept at ambient temperature.



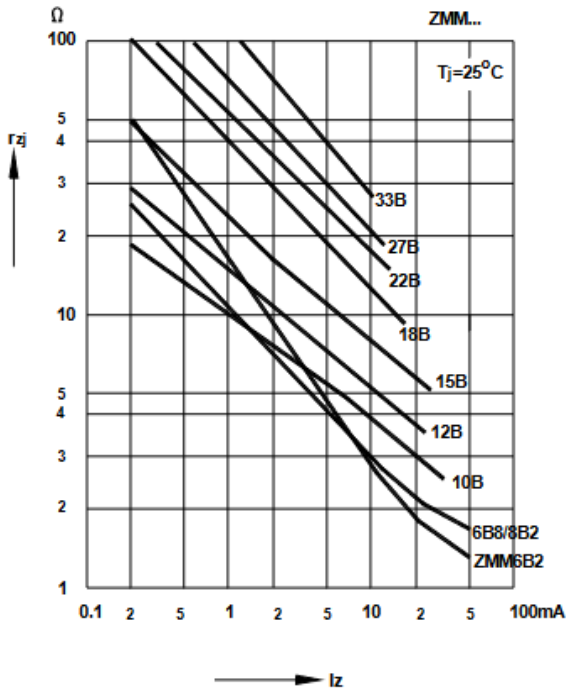
Dynamic resistance vs Zener current



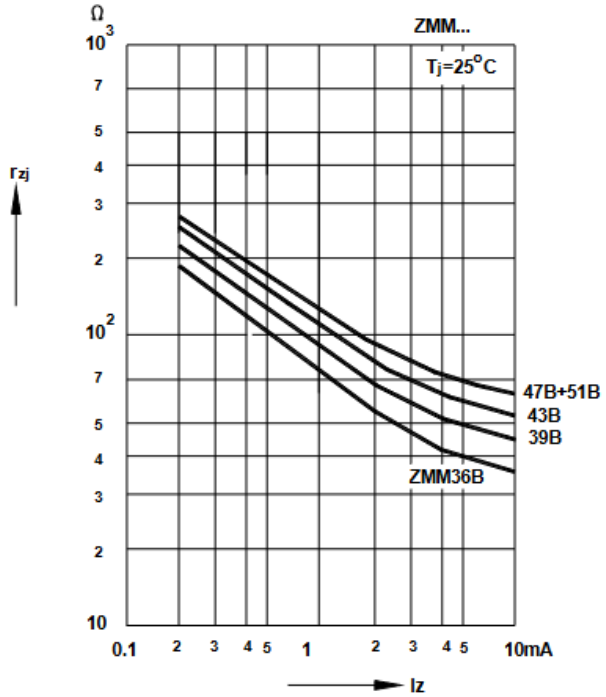
Capacitance vs Zener voltage



Dynamic resistance vs Zener current

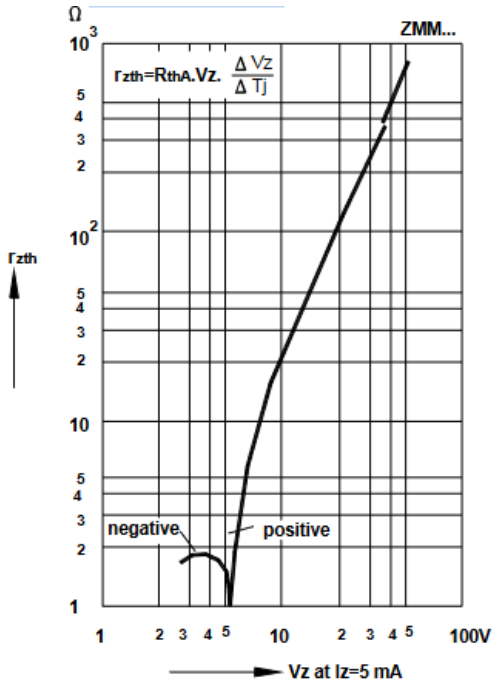


Dynamic resistance vs Zener current

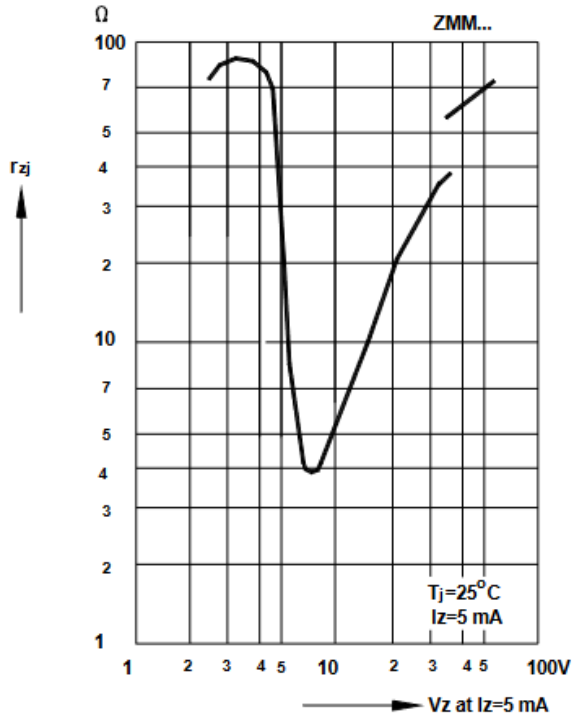


Thermal differential resistance vs Zener voltage

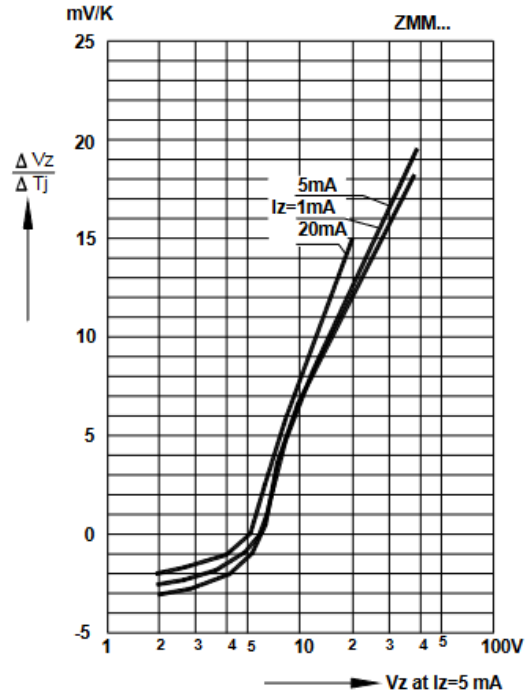
Valid provided that electrodes are kept at ambient temperature



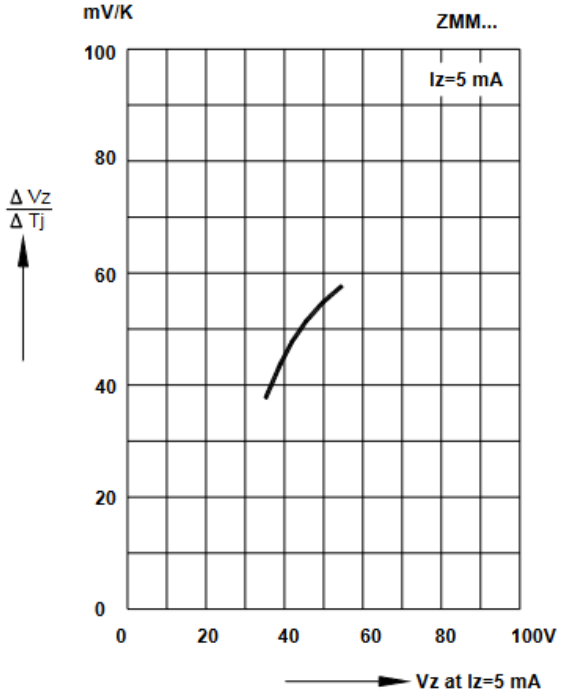
Dynamic resistance vs Zener voltage



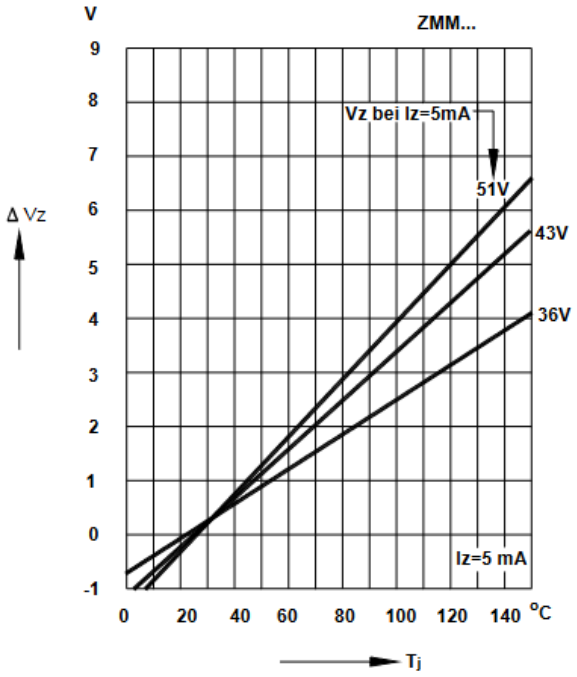
Temperature dependence of Zener voltage vs Zener voltage

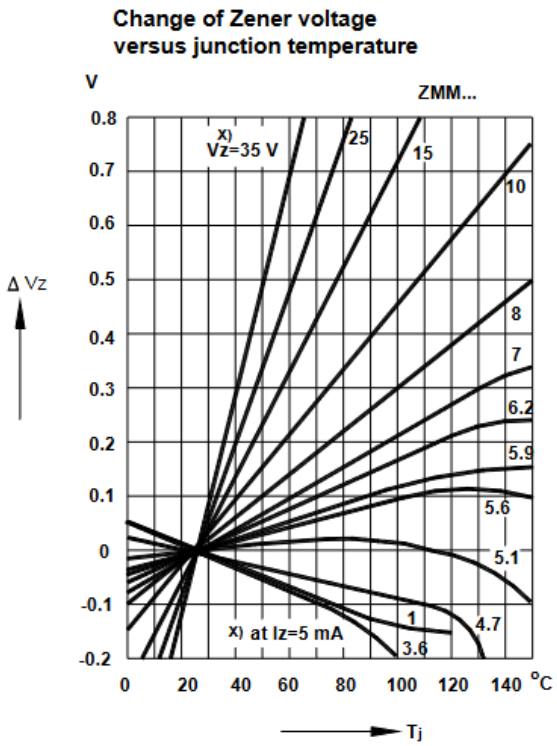
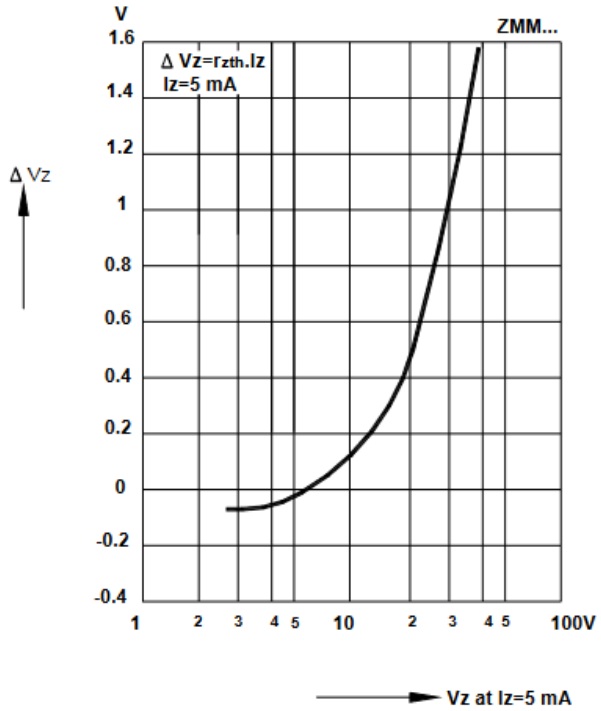


Temperature dependence of Zener voltage vs Zener voltage

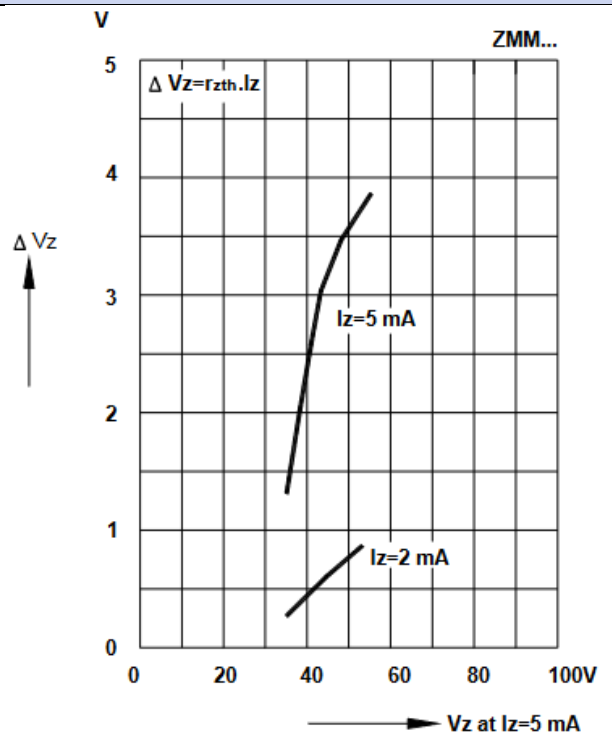


Change of Zener voltage vs junction temperature

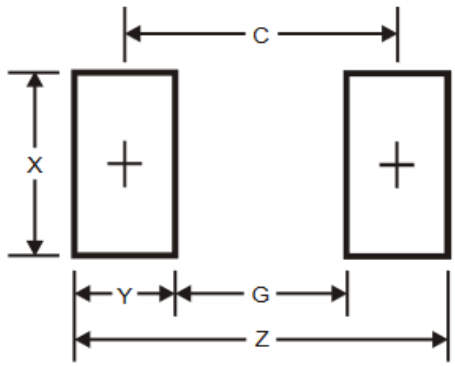


Change of Zener voltage vs junction temperature	Change of Zener voltge from turn-on up to the point of thermal equilibrium vs Zener voltage
	

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



Suggested soldering pad layout



LL-34 (MiniMELF)

Pad dimensions

Unit	Z	G	X	Y	C
mm	4.70	2.10	1.70	1.30	3.50

Ordering information

Part Number	Package	Shipping Quantity	Dimensions
ZMM1B ~ ZMM200B	MiniMELF (SOD-80C, DO-213AA, LL-34)	**2500 pcs / reel**	---

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