

## ZMM1...ZMM75

## Silicon Epitaxial Planar Zener Diodes

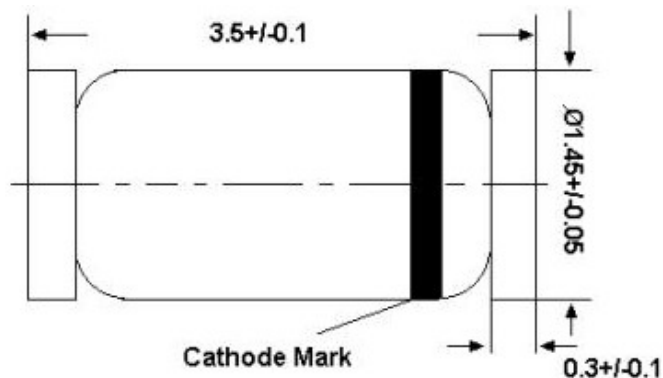
## FEATURES

In MiniMELF case especially for automatic insertion.

The Zener voltages are graded according to the international E24 standard. Smaller voltage tolerances and higher Zener voltages are upon request.

These diodes are also available in DO-35 case with the type designation BZX55C.

LL-34



Glass Case MiniMELF Dimensions in mm

## MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Absolute Maximum Ratings  $T_a=25^\circ\text{C}$

PARAMETER	SYMBOL	VALUE	UNIT
Power Dissipation	$P_{tot}$	500 <sup>1)</sup>	mW
Junction Temperature	$T_j$	175	$^\circ\text{C}$
Storage Temperature Range	$T_{stg}$	-55 to +175	$^\circ\text{C}$

<sup>1)</sup> Valid provided that electrodes are kept at ambient temperature.

Characteristics at  $T_a=25^\circ\text{C}$

PARAMETER	SYMBOL	MAX.	UNIT
Thermal Resistance Junction to Ambient Air	$R_{thA}$	0.3 <sup>1)</sup>	K/mW
Forward Voltage at $I_F = 100\text{ mA}$	$V_F$	1	V

<sup>1)</sup> Valid provided that electrodes are kept at ambient temperature

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TYPE	Zener Voltage Range <sup>1)</sup>			Dynamic Resistance			Reverse Leakage Current			Temp. Coefficient of Zener Voltage
	V <sub>znom</sub>	V <sub>ZT</sub>	at I <sub>ZT</sub>	Z <sub>ZT</sub>	Z <sub>Zk</sub>	at I <sub>Zk</sub>	T <sub>a</sub> = 25°C	T <sub>a</sub> = 125°C	at V <sub>R</sub>	
	(V)	(V)	(mA)	Max. (Ω)	Max. (Ω)	(mA)	Max. (μA)	Max. (μA)	(V)	TK <sub>vz</sub> (%/K)
ZMM1 <sup>2)</sup>	0.75	0.7...0.8	5	8	50	1	-	-	-	-0.26...-0.23
ZMM2V0	2	1.8...2.15	5	85	600	1	100	200	1	-0.09...-0.06
ZMM2V2	2.2	2.08...2.33	5	85	600	1	75	160	1	-0.09...-0.06
ZMM2V4	2.4	2.28...2.56	5	85	600	1	50	100	1	-0.09...-0.06
ZMM2V7	2.7	2.5...2.9	5	85	600	1	10	50	1	-0.09...-0.06
ZMM3V0	3	2.8...3.2	5	85	600	1	4	40	1	-0.08...-0.05
ZMM3V3	3.3	3.1...3.5	5	85	600	1	2	40	1	-0.08...-0.05
ZMM3V6	3.6	3.4...3.8	5	85	600	1	2	40	1	-0.08...-0.05
ZMM3V9	3.9	3.7...4.1	5	85	600	1	2	40	1	-0.08...-0.05
ZMM4V3	4.3	4...4.6	5	75	600	1	1	20	1	-0.06...-0.03
ZMM4V7	4.7	4.4...5	5	60	600	1	0.5	10	1	-0.05...+0.02
ZMM5V1	5.1	4.8...5.4	5	35	550	1	0.1	2	1	-0.02...+0.02
ZMM5V6	5.6	5.2...6	5	25	450	1	0.1	2	1	-0.05...+0.05
ZMM6V2	6.2	5.8...6.6	5	10	200	1	0.1	2	2	0.03...0.06
ZMM6V8	6.8	6.4...7.2	5	8	150	1	0.1	2	3	0.03...0.07
ZMM7V5	7.5	7...7.9	5	7	50	1	0.1	2	5	0.03...0.07
ZMM8V2	8.2	7.7...8.7	5	7	50	1	0.1	2	6.2	0.03...0.08
ZMM9V1	9.1	8.5...9.6	5	10	50	1	0.1	2	6.8	0.03...0.09
ZMM10	10	9.4...10.6	5	15	70	1	0.1	2	7.5	0.03...0.1
ZMM11	11	10.4...11.6	5	20	70	1	0.1	2	8.2	0.03...0.11
ZMM12	12	11.4...12.7	5	20	90	1	0.1	2	9.1	0.03...0.11
ZMM13	13	12.4...14.1	5	26	110	1	0.1	2	10	0.03...0.11
ZMM15	15	13.8...15.6	5	30	110	1	0.1	2	11	0.03...0.11
ZMM16	16	15.3...17.1	5	40	170	1	0.1	2	12	0.03...0.11
ZMM18	18	16.8...19.1	5	50	170	1	0.1	2	13	0.03...0.11
ZMM20	20	18.8...21.2	5	55	220	1	0.1	2	15	0.03...0.11
ZMM22	22	20.8...23.3	5	55	220	1	0.1	2	16	0.04...0.12
ZMM24	24	22.8...25.6	5	80	220	1	0.1	2	18	0.04...0.12
ZMM27	27	25.1...28.9	5	80	220	1	0.1	2	20	0.04...0.12
ZMM30	30	28...32	5	80	220	1	0.1	2	22	0.04...0.12
ZMM33	33	31...35	5	80	220	1	0.1	2	24	0.04...0.12
ZMM36	36	34...38	5	80	220	1	0.1	2	27	0.04...0.12
ZMM39	39	37...41	2.5	90	500	0.5	0.1	5	30	0.04...0.12
ZMM43	43	40...46	2.5	90	500	0.5	0.1	5	33	0.04...0.12

## Silicon Epitaxial Planar Zener Diodes ZMM1...ZMM75

Characteristics at  $T_a=25^\circ\text{C}$ 

TYPE	Zener Voltage Range <sup>1)</sup>			Dynamic Resistance			Reverse Leakage Current			Temp. Coefficient of Zener Voltage
	$V_{znom}$	$V_{zT}$	at $I_{zT}$	$Z_{zT}$	$Z_{zk}$	at $I_{zk}$	$T_a = 25^\circ\text{C}$	$T_a = 125^\circ\text{C}$	$I_R$ at $V_R$	
	(V)	(V)	(mA)	Max. ( $\Omega$ )	Max. ( $\Omega$ )	(mA)	Max. ( $\mu\text{A}$ )	Max. ( $\mu\text{A}$ )	(V)	TKvz (%/K)
ZMM47	47	44...50	2.5	110	600	0.5	0.1	5	36	0.04...0.12
ZMM51	51	48...54	2.5	125	700	0.5	0.1	10	39	0.04...0.12
ZMM56	56	52...60	2.5	135	700	0.5	0.1	10	43	0.04...0.12
ZMM62	62	58...66	2.5	150	1000	0.5	0.1	10	47	0.04...0.12
ZMM68	68	64...72	2.5	200	1000	0.5	0.1	10	51	0.04...0.12
ZMM75	75	70...79	2.5	250	1000	0.5	0.1	10	56	0.04...0.12

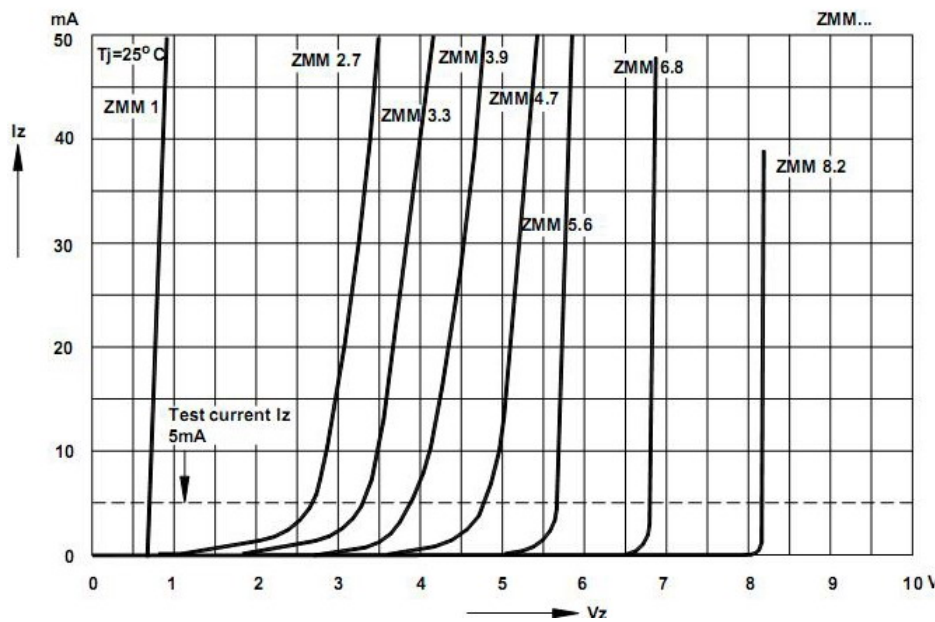
1) Tested with pulses  $t_p = 20$  ms.

2) The ZMM1 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.

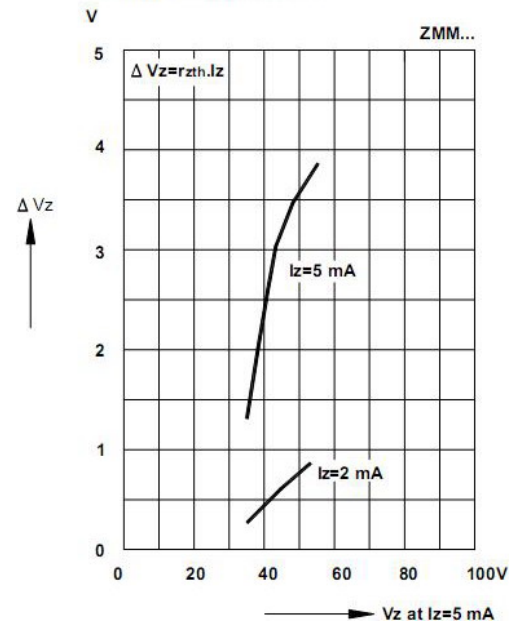
RATINGS AND CHARACTERISTIC CURVES ZMM1...ZMM75

Breakdown characteristics

$T_j = \text{constant (pulsed)}$

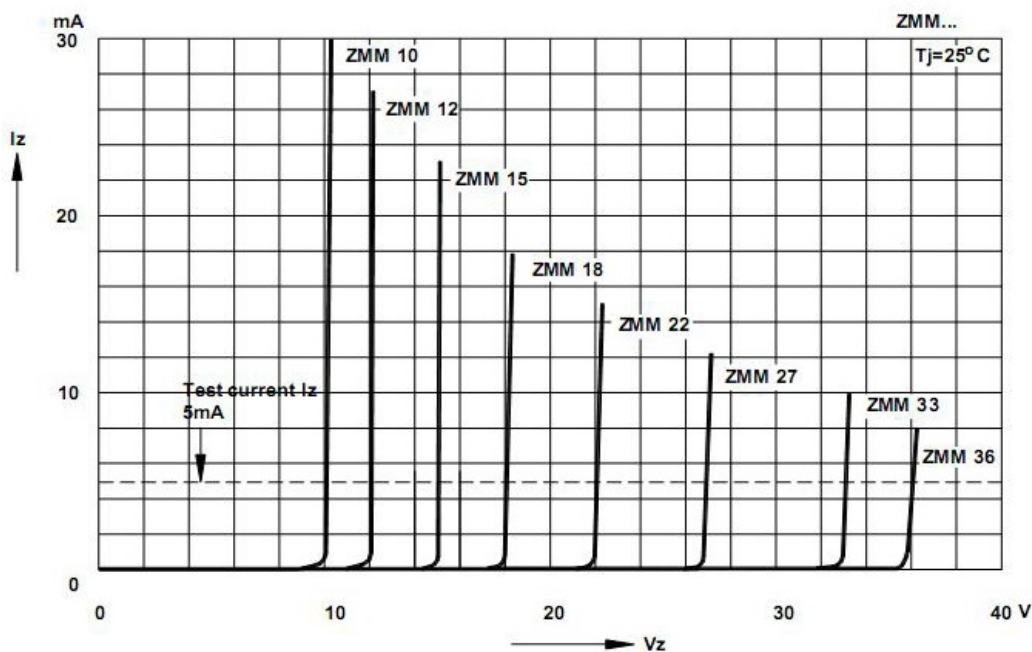


Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage



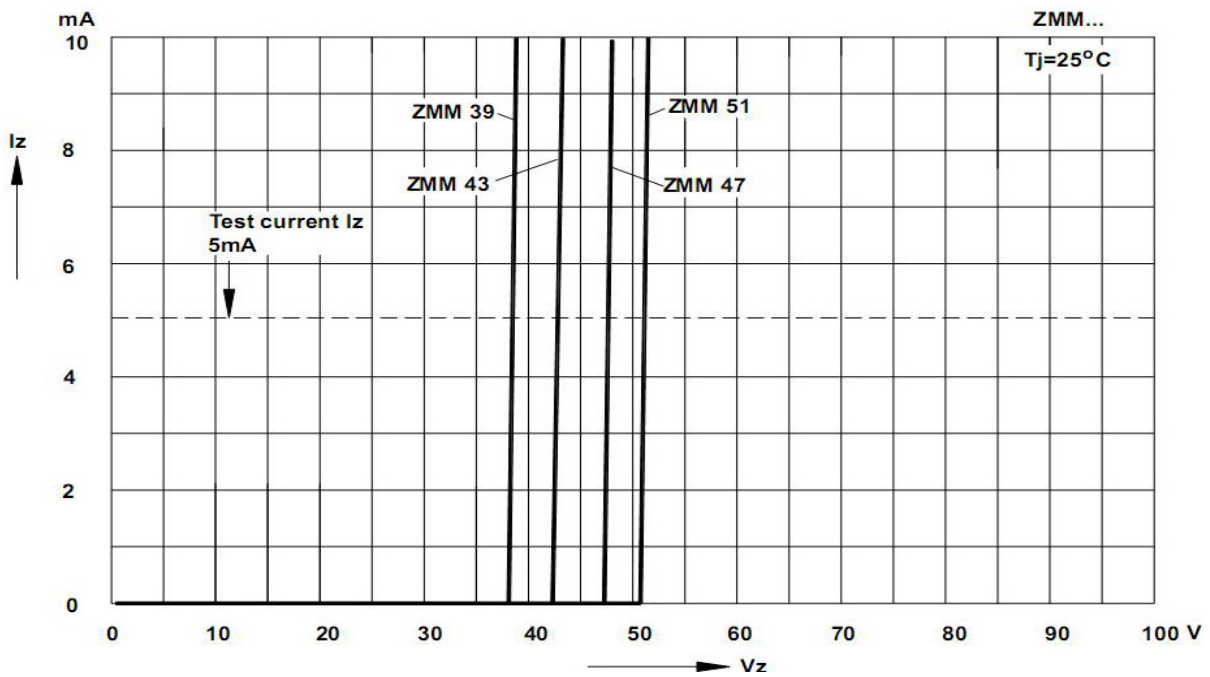
Breakdown characteristics

$T_j = \text{constant (pulsed)}$

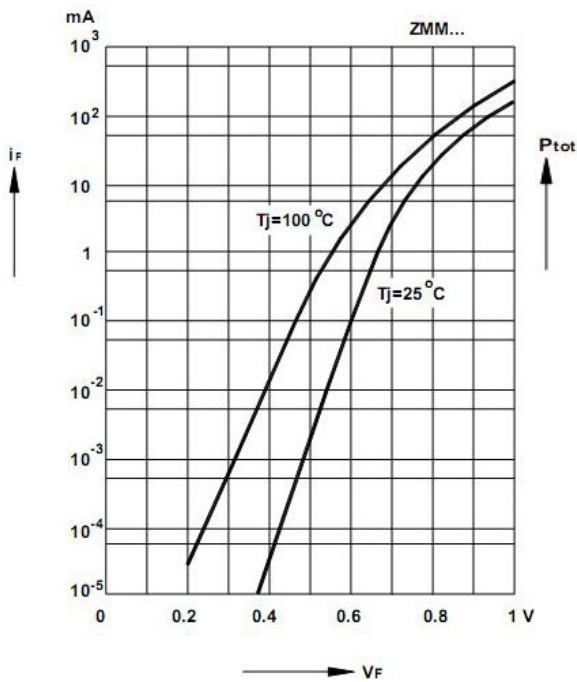


RATINGS AND CHARACTERISTIC CURVES ZMM1...ZMM75

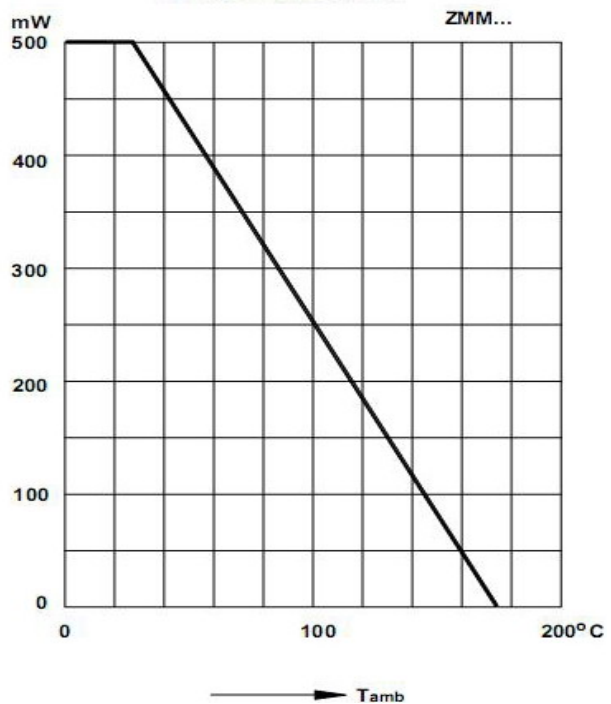
Breakdown characteristics  
 $T_j = \text{constant (pulsed)}$



Forward characteristics

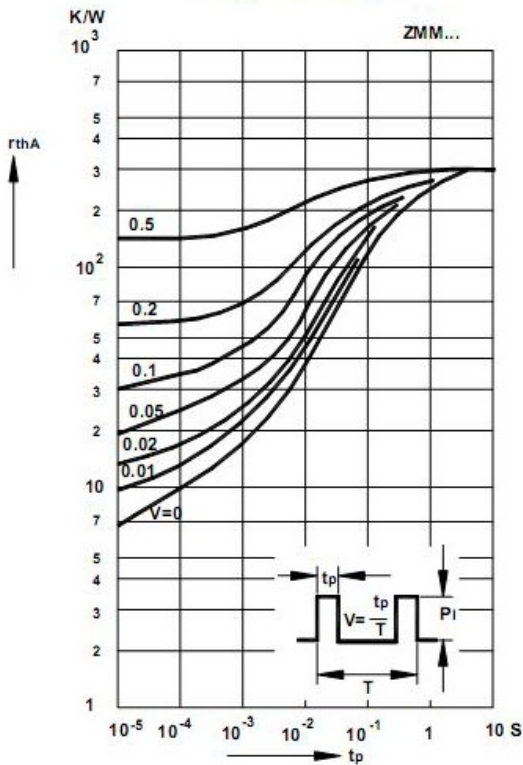


Admissible power dissipation  
 versus ambient temperature  
 Valid provided that electrodes are kept  
 at ambient temperature.

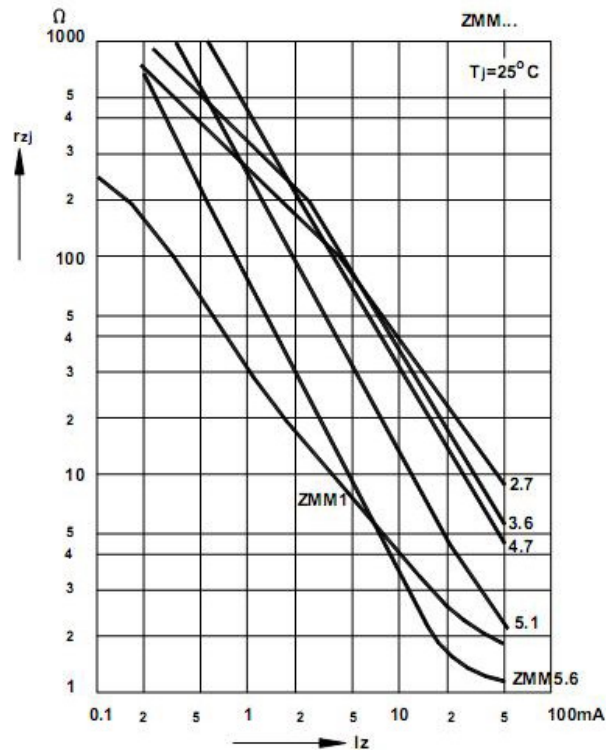


## RATINGS AND CHARACTERISTIC CURVES ZMM1...ZMM75

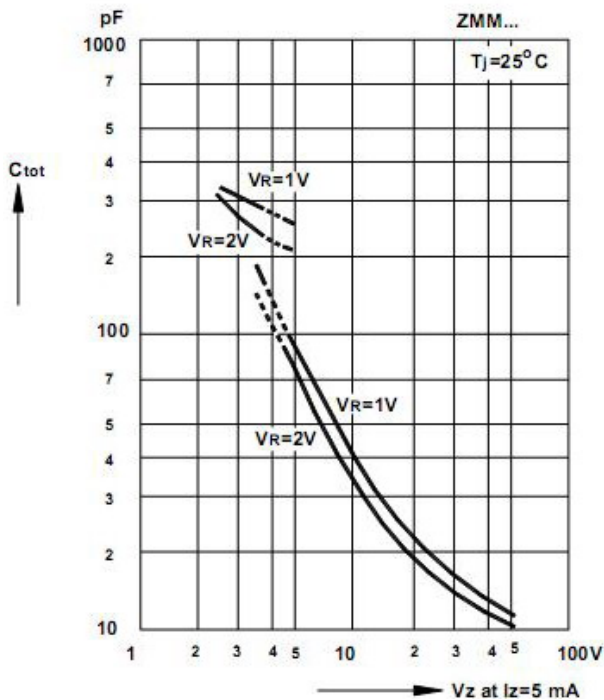
**Pulse thermal resistance versus pulse duration**  
Valid provided that the electrodes are kept at ambient temperature.



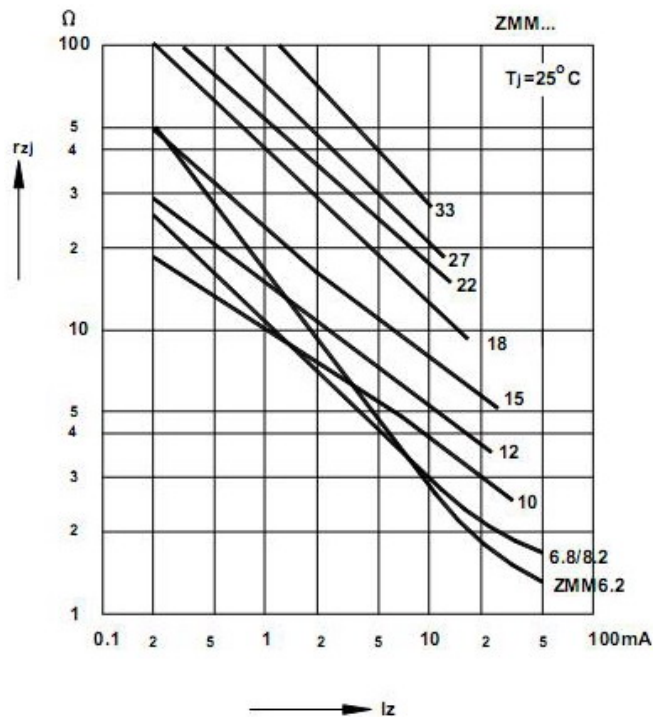
**Dynamic resistance versus Zener current**



**Capacitance versus Zener voltage**

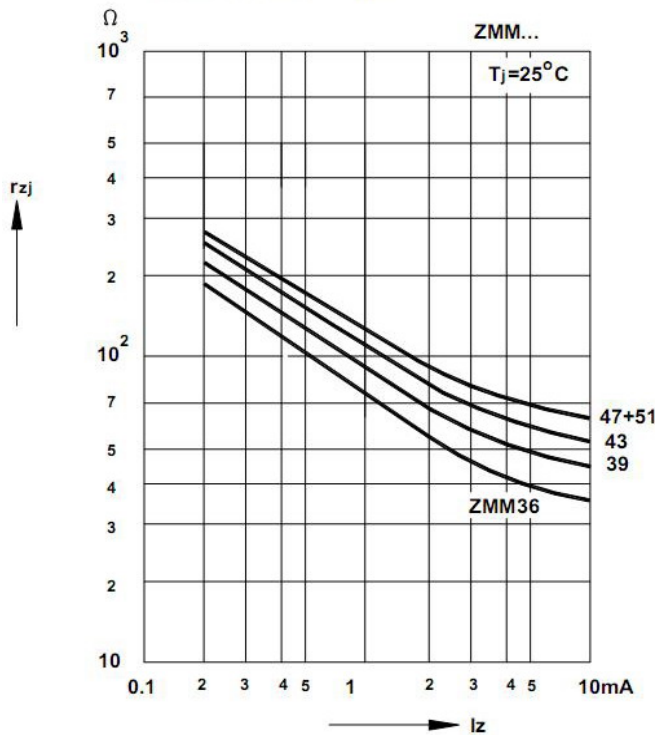


**Dynamic resistance versus Zener current**



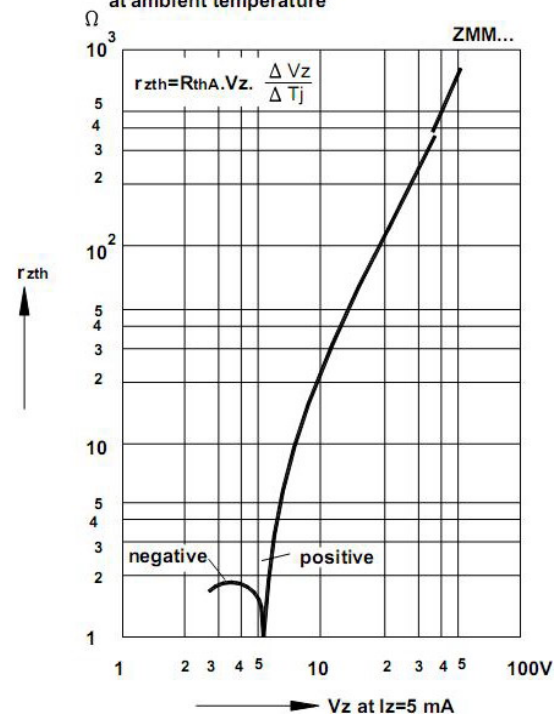
RATINGS AND CHARACTERISTIC CURVES ZMM1...ZMM75

Dynamic resistance versus Zener current

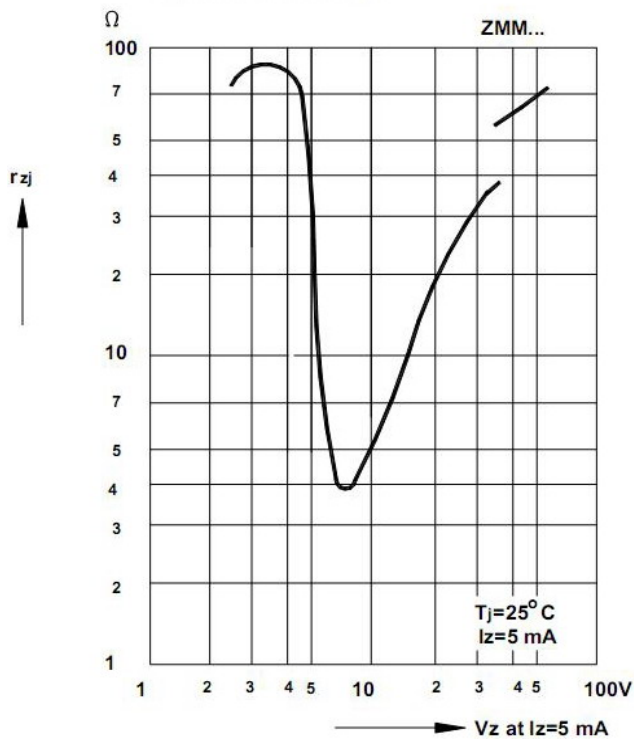


Thermal differential resistance versus Zener voltage

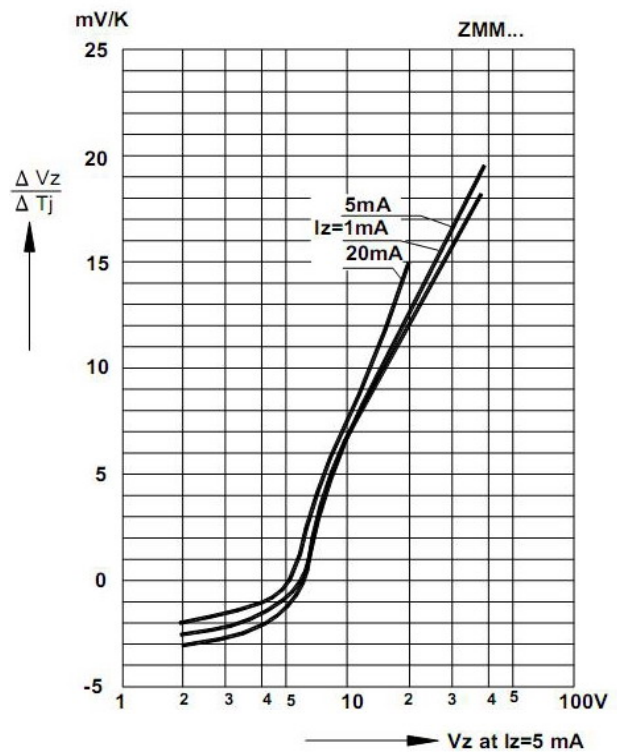
Valid provided that electrodes are kept at ambient temperature



Dynamic resistance versus Zener voltage

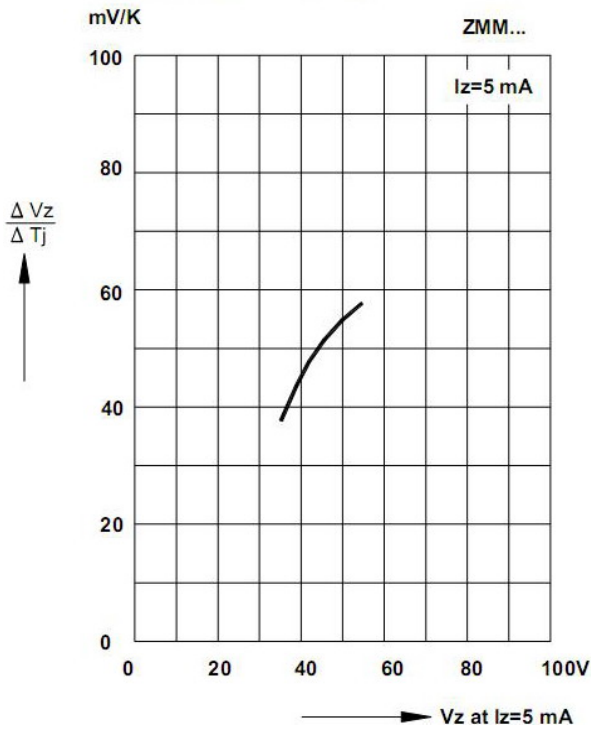


Temperature dependence of Zener voltage versus Zener voltage

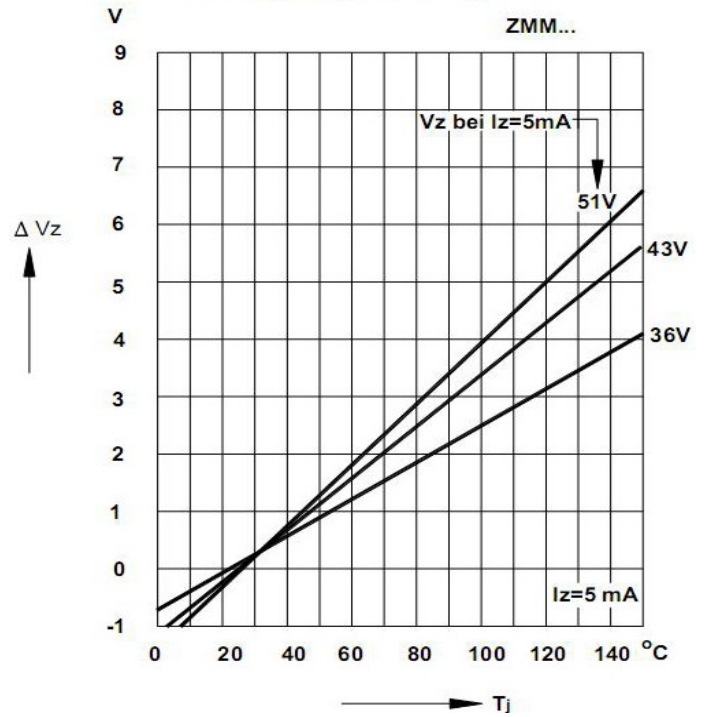


RATINGS AND CHARACTERISTIC CURVES ZMM1...ZMM75

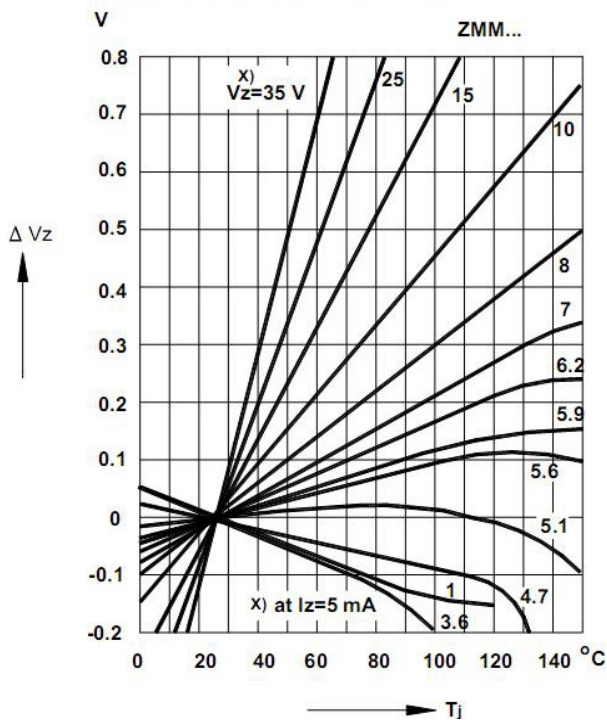
Temperature dependence of Zener voltage versus Zener voltage



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

