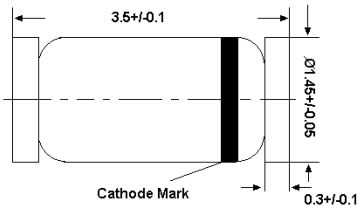
Silicon Epitaxial Planar Zener Diodes

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.

LL34



Glass case MiniMELF
Dimensions in mm

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_{stg}	- 55 to + 175	°C
[1] Valid provided that electrodes are kept at ambient temperature			

Characteristics at T_a = 25 °C

Parameter	Symbol	Max.	Unit
Thermal Resistance Junction to Ambient Air	R_{thA}	0.3 [1]	K/mW
Forward Voltage at I_F = 100 mA	V_F	1	V
[1] Valid provided that electrodes are kept at ambient temperature			

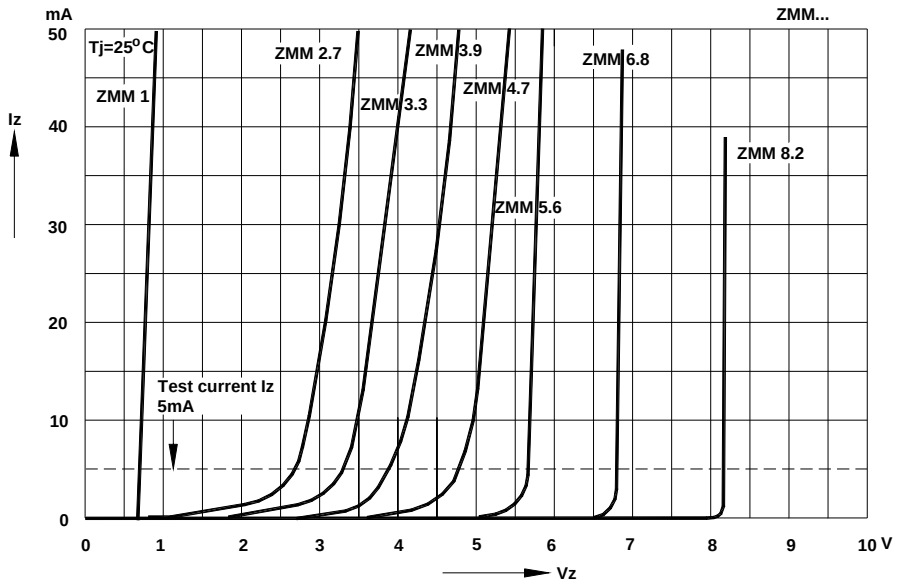
Characteristics at T_a = 25 °C

Type	Zener Voltage Range [1]			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 °C	T_a = 125 °C	at V_R	
	(V)	(V)	(mA)	Max. (Ω)	Max. (Ω)	(mA)	Max. (μA)	Max. (μA)	(V)	TKvz (%/K)
ZMM1V0	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
ZMM10V	10	9.4...10.6	5	15	70	1	0.1	2	7.5	0.03...0.1
ZMM11V	11	10.4...11.6	5	20	70	1	0.1	2	8.2	0.03...0.11
ZMM12V	12	11.4...12.7	5	20	90	1	0.1	2	9.1	0.03...0.11
ZMM13V	13	12.4...14.1	5	26	110	1	0.1	2	10	0.03...0.11
ZMM15V	15	13.8...15.6	5	30	110	1	0.1	2	11	0.03...0.11
ZMM16V	16	15.3...17.1	5	40	170	1	0.1	2	12	0.03...0.11
ZMM18V	18	16.8...19.1	5	50	170	1	0.1	2	13	0.03...0.11
ZMM20V	20	18.8...21.2	5	55	220	1	0.1	2	15	0.03...0.11
ZMM22V	22	20.8...23.3	5	55	220	1	0.1	2	16	0.04...0.12
ZMM24V	24	22.8...25.6	5	80	220	1	0.1	2	18	0.04...0.12
ZMM27V	27	25.1...28.9	5	80	220	1	0.1	2	20	0.04...0.12
ZMM30V	30	28...32	5	80	220	1	0.1	2	22	0.04...0.12
ZMM33V	33	31...35	5	80	220	1	0.1	2	24	0.04...0.12
ZMM36V	36	34...38	5	80	220	1	0.1	2	27	0.04...0.12
ZMM39V	39	37...41	2.5	90	500	0.5	0.1	5	30	0.04...0.12
ZMM43V	43	40...46	2.5	90	500	0.5	0.1	5	33	0.04...0.12
ZMM47V	47	44...50	2.5	110	600	0.5	0.1	5	36	0.04...0.12
ZMM51V	51	48...54	2.5	125	700	0.5	0.1	10	39	0.04...0.12
ZMM56V	56	52...60	2.5	135	700	0.5	0.1	10	43	0.04...0.12
ZMM62V	62	58...66	2.5	150	1000	0.5	0.1	10	47	0.04...0.12
ZMM68V	68	64...72	2.5	200	1000	0.5	0.1	10	51	0.04...0.12
ZMM75V	75	70...79	2.5	250	1000	0.5	0.1	10	56	0.04...0.12

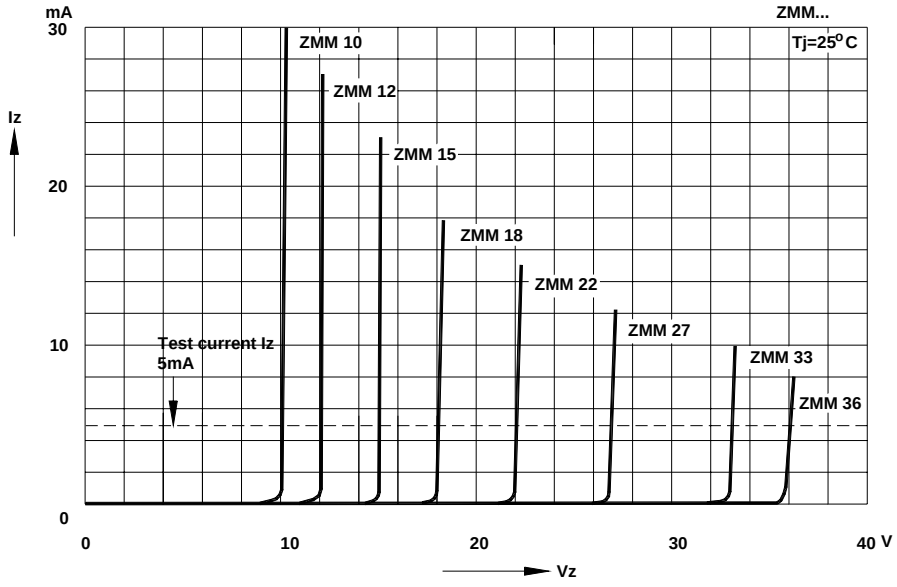
[1] Tested with pulses t_p = 20 ms.

[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.

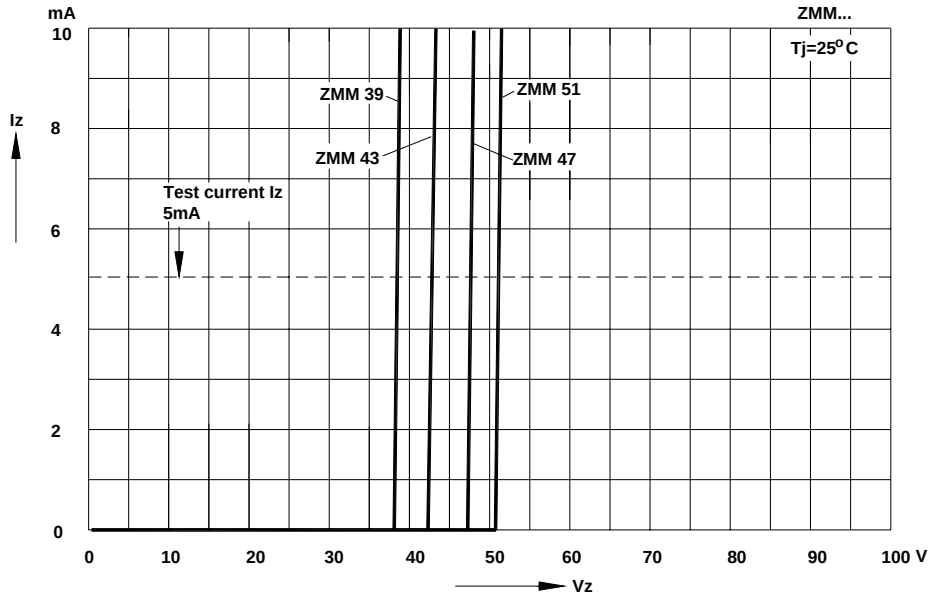
Breakdown characteristics
T_j = constant (pulsed)



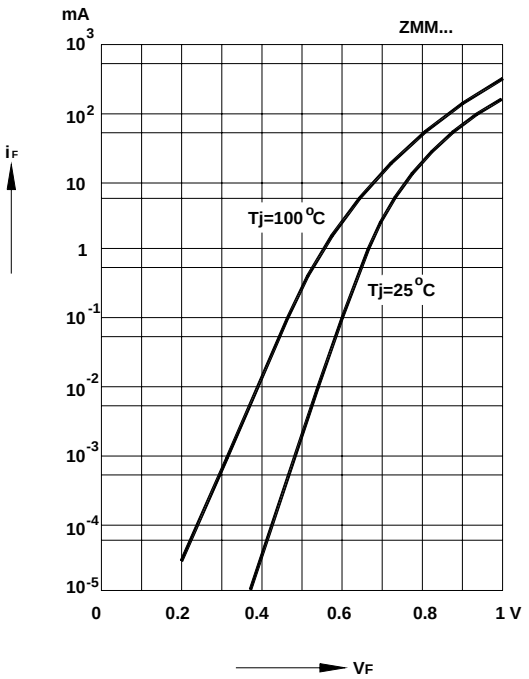
Breakdown characteristics
T_j = constant (pulsed)



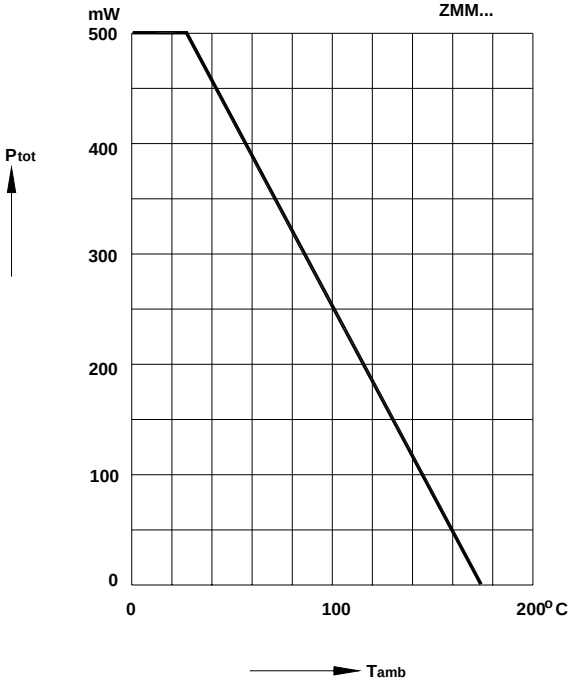
Breakdown characteristics
T_j = constant (pulsed)



Forward characteristics

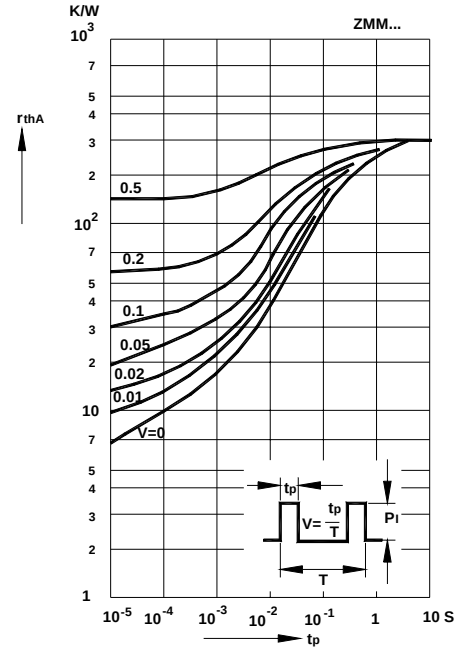


Admissible power dissipation versus ambient temperature
Valid provided that electrodes are kept at ambient temperature.

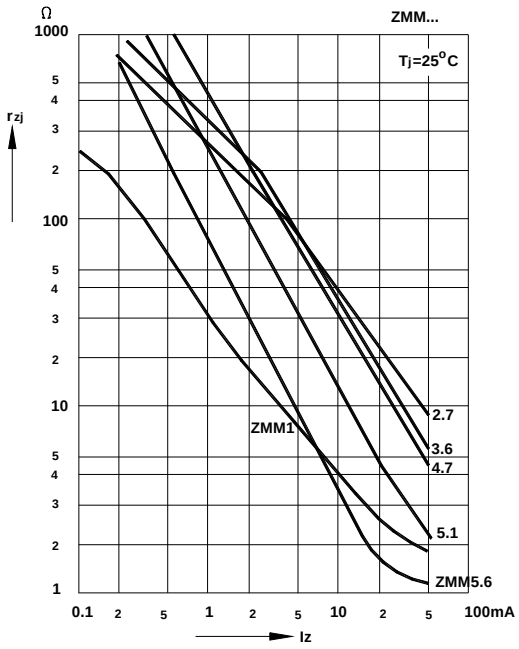


Pulse thermal resistance versus pulse duration

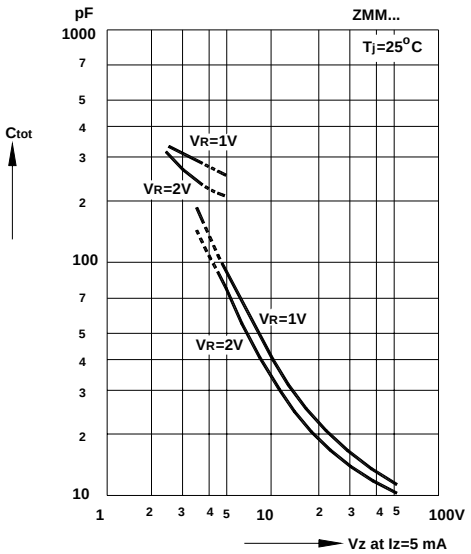
Valid provided that the electrodes are kept at ambient temperature.



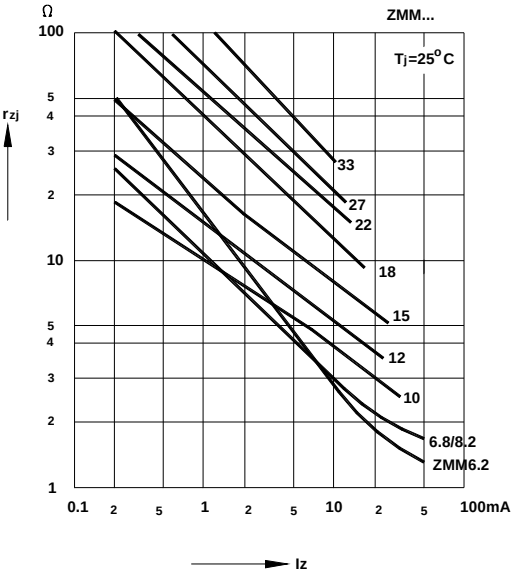
Dynamic resistance versus Zener current



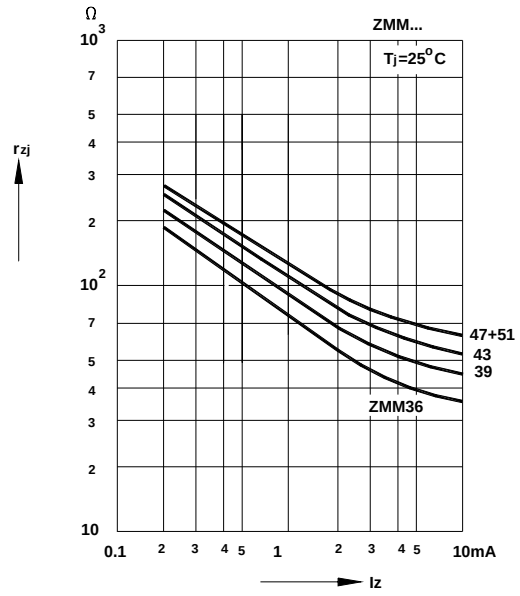
Capacitance versus Zener voltage



Dynamic resistance versus Zener current

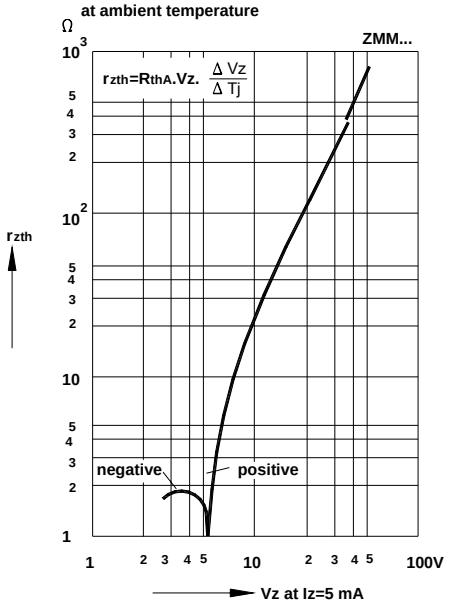


Dynamic resistance versus Zener current

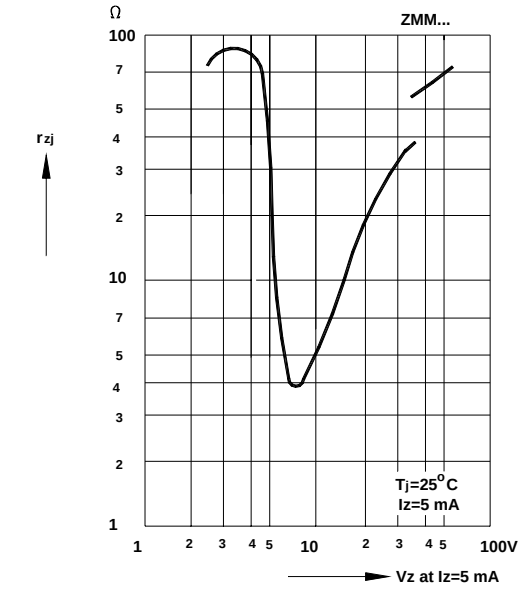


Thermal differential resistance versus Zener voltage

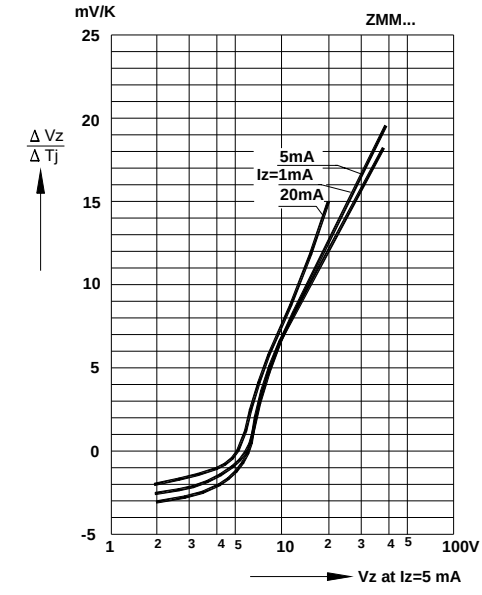
Valid provided that electrodes are kept at ambient temperature



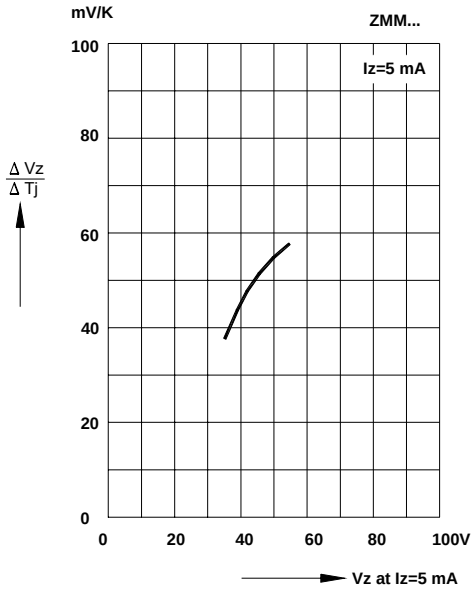
Dynamic resistance versus Zener voltage



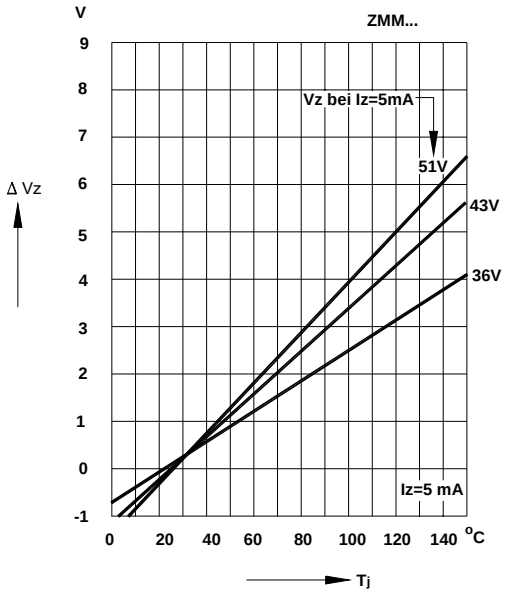
Temperature dependence of Zener voltage versus Zener voltage



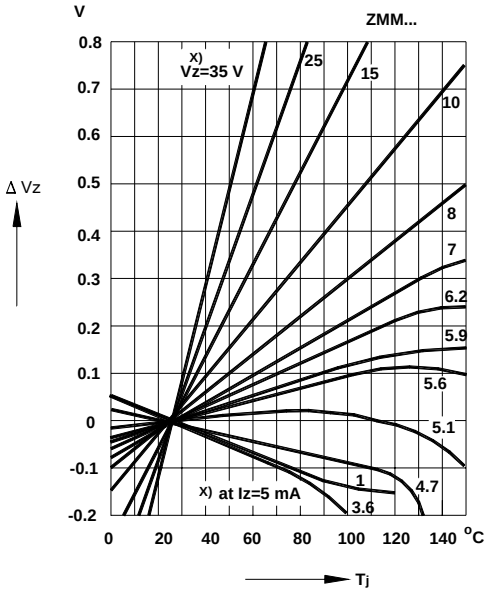
Temperature dependence of Zener voltage versus Zener voltage



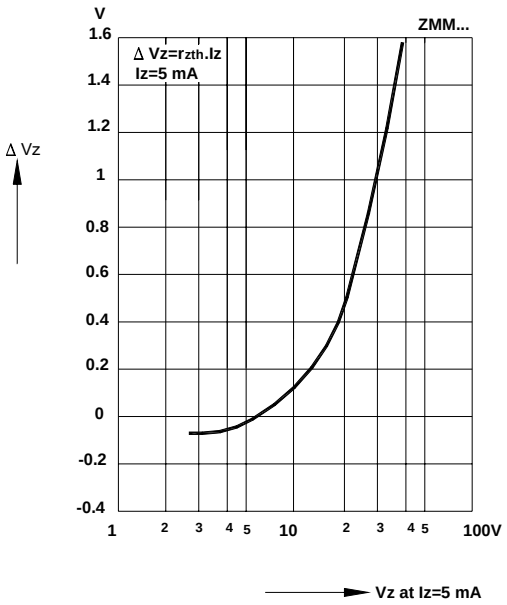
Change of Zener voltage versus junction temperature

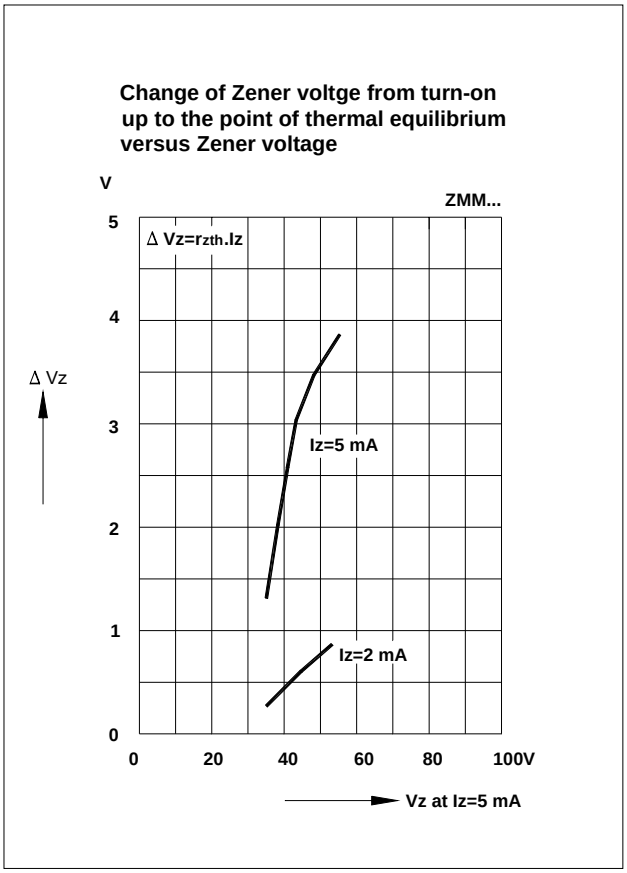


Change of Zener voltage versus junction temperature



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




Change of Zener voltge from turn-on
up to the point of thermal equilibrium
versus Zener voltage
V
ZMM...
5
4
3
2
1
0
Δ Vz=rzth.Iz
Δ Vz
Iz=5 mA
Iz=2 mA
0
20
40
60
80
100V
Vz at Iz=5 mA