

Small Signal Zener Diodes



DESIGN SUPPORT TOOLS

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FEATURES

- Silicon planar power Zener diodes
- The Zener voltages are graded according to the international E24 standard
- AEC-Q101 qualified available (part number on request)
- ESD capability according to AEC-Q101:
Human body model > 8 kV
Machine model > 800 V
- Base P/N-G3 - green, commercial grade
- Material categorization:
for definitions of compliance please see www.vishay.com/doc?99912



PRIMARY CHARACTERISTICS

PARAMETER	VALUE	UNIT
V _Z range nom.	2.4 to 75	V
Test current I _{ZT}	2.5; 5	mA
V _Z specification	Pulse current	
Circuit configuration	Single	

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZT52-G-series	BZT52C2V4-G3-08 to BZT52C75-G3-08	3000 (8 mm tape on 7" reel)	15 000/box
	BZT52B2V4-G3-08 to BZT52B75-G3-08		
	BZT52C2V4-G3-18 to BZT52C75-G3-18	10 000 (8 mm tape on 13" reel)	10 000/box
	BZT52B2V4-G3-18 to BZT52B75-G3-18		

PACKAGE

PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
SOD-123	9.4 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS (T_{amb} = 25 °C, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	Diode on ceramic substrate 0.7 mm; 5 mm ² pad areas	P _{tot}	500	mW
	Diode on ceramic substrate 0.7 mm; 2.5 mm ² pad areas	P _{tot}	410	mW
Zener current	See Table "Electrical Characteristics"			
Thermal resistance junction to ambient air	Valid provided that electrodes are kept at ambient temperature	R _{thJA}	300	K/W
Junction temperature		T _j	150	°C
Storage temperature range		T _{stg}	-65 to +150	°C
Operating temperature range		T _{op}	-55 to +150	°C

**ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE ⁽¹⁾			TEST CURRENT		REVERSE VOLTAGE		DYNAMIC RESISTANCE		TEMP. COEFFICIENT	ADMISSIBLE ZENER CURRENT ⁽⁴⁾	
		V_Z at I_{ZT1}			I_{ZT1}	I_{ZT2}	V_R at I_R		Z_Z at I_{ZT1}	Z_{ZK} at I_{ZT2}	α_{VZ}	I_Z at $T_{amb} = 45\text{ }^{\circ}\text{C}$	I_Z at $T_{amb} = 25\text{ }^{\circ}\text{C}$
		V			mA		V	nA	Ω		$10^{-4}/^{\circ}\text{C}$	mA	
		MIN.	NOM.	MAX.									
BZT52C2V4-G	Y1	2.2	2.4	2.6	5	1	-	100	85	600	-9 to -4	-	-
BZT52C2V7-G	Y2	2.5	2.7	2.9	5	1	-	100	75 (< 83)	< 500	-9 to -4	113	134
BZT52C3V0-G	Y3	2.8	3.0	3.2	5	1	-	100	80 (< 95)	< 500	-9 to -3	98	118
BZT52C3V3-G	Y4	3.1	3.3	3.5	5	1	-	100	80 (< 95)	< 500	-8 to -3	92	109
BZT52C3V6-G	Y5	3.4	3.6	3.8	5	1	-	100	80 (< 95)	< 500	-8 to -3	85	100
BZT52C3V9-G	Y6	3.7	3.9	4.1	5	1	-	100	80 (< 95)	< 500	-7 to -3	77	92
BZT52C4V3-G	Y7	4	4.3	4.6	5	1	-	100	80 (< 95)	< 500	-6 to -1	71	84
BZT52C4V7-G	Y8	4.4	4.7	5	5	1	-	100	70 (< 78)	< 500	-5 to +2	64	76
BZT52C5V1-G	Y9	4.8	5.1	5.4	5	1	> 0.8	100	30 (< 60)	< 480	-3 to +4	56	67
BZT52C5V6-G	YA	5.2	5.6	6	5	1	> 1	100	10 (< 40)	< 400	-2 to +6	50	59
BZT52C6V2-G	YB	5.8	6.2	6.6	5	1	> 2	100	4.8 (< 10)	< 200	-1 to +7	45	54
BZT52C6V8-G	YC	6.4	6.8	7.2	5	1	> 3	100	4.5 (< 8)	< 150	+2 to +7	41	49
BZT52C7V5-G	YD	7	7.5	7.9	5	1	> 5	100	4 (< 7)	< 50	+3 to +7	37	44
BZT52C8V2-G	YE	7.7	8.2	8.7	5	1	> 6	100	4.5 (< 7)	< 50	+4 to +7	34	40
BZT52C9V1-G	YF	8.5	9.1	9.6	5	1	> 7	100	4.8 (< 10)	< 50	+5 to +8	30	36
BZT52C10-G	YG	9.4	10	10.6	5	1	> 7.5	100	5.2 (< 15)	< 70	+5 to +8	28	33
BZT52C11-G	YH	10.4	11	11.6	5	1	> 8.5	100	6 (< 20)	< 70	+5 to +9	25	30
BZT52C12-G	YI	11.4	12	12.7	5	1	> 9	100	7 (< 20)	< 90	+6 to +9	23	28
BZT52C13-G	YK	12.4	13	14.1	5	1	> 10	100	9 (< 25)	< 110	+7 to +9	21	25
BZT52C15-G	YL	13.8	15	15.6	5	1	> 11	100	11 (< 30)	< 110	+7 to +9	19	23
BZT52C16-G	YM	15.3	16	17.1	5	1	> 12	100	13 (< 40)	< 170	+8 to +9.5	17	20
BZT52C18-G	YN	16.8	18	19.1	5	1	> 14	100	18 (< 50)	< 170	+8 to +9.5	15	18
BZT52C20-G	YO	18.8	20	21.2	5	1	> 15	100	20 (< 50)	< 220	+8 to +10	14	17
BZT52C22-G	YP	20.8	22	23.3	5	1	> 17	100	25 (< 55)	< 220	+8 to +10	13	16
BZT52C24-G	YR	22.8	24	25.6	5	1	> 18	100	28 (< 80)	< 220	+8 to +10	11	13
BZT52C27-G	YS	25.1	27	28.9	5	1	> 20	100	30 (< 80)	< 250	+8 to +10	10	12
BZT52C30-G	YT	28	30	32	5	1	> 22.5	100	35 (< 80)	< 250	+8 to +10	9	10
BZT52C33-G	YU	31	33	35	5	1	> 25	100	40 (< 80)	< 250	+8 to +10	8	9
BZT52C36-G	YW	34	36	38	5	1	> 27	100	40 (< 90)	< 250	+8 to +10	8	9
BZT52C39-G	YX	37	39	41	5	1	> 29	100	50 (< 90)	< 300	+10 to +12	7	8
BZT52C43-G	YY	40	43	46	5	1	> 32	100	60 (< 100)	< 700	+10 to +12	6	7
BZT52C47-G	YZ	44	47	50	5	1	> 35	100	70 (< 100)	< 750	+10 to +12	5	6
BZT52C51-G	Z1	48	51	54	5	1	> 38	100	70 (< 100)	< 750	+10 to +12	5	6
BZT52C56-G	Z2	52	56	60	2.5	1	-	100	< 135 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-
BZT52C62-G	Z3	58	62	66	2.5	1	-	100	< 150 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-
BZT52C68-G	Z4	64	68	72	2.5	1	-	100	< 200 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-
BZT52C75-G	Z5	70	75	79	2.5	1	-	100	< 250 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-

Notes

- $I_{ZT1} = 5\text{ mA}$, $I_{ZT2} = 1\text{ mA}$
- (1) Measured with pulses $t_p = 5\text{ ms}$
- (2) $I_{ZT1} = 2.5\text{ mA}$
- (3) $I_{ZT2} = 0.5\text{ mA}$
- (4) Valid provided that electrodes are kept at ambient temperature

**ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE ⁽¹⁾			TEST CURRENT		REVERSE VOLTAGE		DYNAMIC RESISTANCE		TEMP. COEFFICIENT	ADMISSIBLE ZENER CURRENT ⁽⁴⁾	
		V_Z at I_{ZT1}			I_{ZT1}	I_{ZT2}	V_R at I_R		Z_Z at I_{ZT1}	Z_{ZK} at I_{ZT2}	α_{VZ}	I_Z at $T_{amb} = 45\text{ }^{\circ}\text{C}$	I_Z at $T_{amb} = 25\text{ }^{\circ}\text{C}$
		V			mA		V	nA	Ω		$10^{-4}/^{\circ}\text{C}$	mA	
		MIN.	NOM.	MAX.									
BZT52B2V4-G	V1	2.35	2.4	2.45	5	1	-	100	85	600	-9 to -4	-	-
BZT52B2V7-G	V2	2.65	2.7	2.75	5	1	-	100	75 (< 83)	< 500	-9 to -4	113	134
BZT52B3V0-G	V3	2.94	3.0	3.06	5	1	-	100	80 (< 95)	< 500	-9 to -3	98	118
BZT52B3V3-G	V4	3.23	3.3	3.37	5	1	-	100	80 (< 95)	< 500	-8 to -3	92	109
BZT52B3V6-G	V5	3.53	3.6	3.67	5	1	-	100	80 (< 95)	< 500	-8 to -3	85	100
BZT52B3V9-G	V6	3.82	3.9	3.98	5	1	-	100	80 (< 95)	< 500	-7 to -3	77	92
BZT52B4V3-G	V7	4.21	4.3	4.39	5	1	-	100	80 (< 95)	< 500	-6 to -1	71	84
BZT52B4V7-G	V8	4.61	4.7	4.79	5	1	-	100	70 (< 78)	< 500	-5 to +2	64	76
BZT52B5V1-G	V9	5	5.1	5.2	5	1	> 0.8	100	30 (< 60)	< 480	-3 to +4	56	67
BZT52B5V6-G	VA	5.49	5.6	5.71	5	1	> 1	100	10 (< 40)	< 400	-2 to +6	50	59
BZT52B6V2-G	VB	6.08	6.2	6.32	5	1	> 2	100	4.8 (< 10)	< 200	-1 to +7	45	54
BZT52B6V8-G	VC	6.66	6.8	6.94	5	1	> 3	100	4.5 (< 8)	< 150	+2 to +7	41	49
BZT52B7V5-G	VD	7.35	7.5	7.65	5	1	> 5	100	4 (< 7)	< 50	+3 to +7	37	44
BZT52B8V2-G	VE	8.04	8.2	8.36	5	1	> 6	100	4.5 (< 7)	< 50	+4 to +7	34	40
BZT52B9V1-G	VF	8.92	9.1	9.28	5	1	> 7	100	4.8 (< 10)	< 50	+5 to +8	30	36
BZT52B10-G	VG	9.8	10	10.2	5	1	> 7.5	100	5.2 (< 15)	< 70	+5 to +8	28	33
BZT52B11-G	VH	10.8	11	11.2	5	1	> 8.5	100	6 (< 20)	< 70	+5 to +9	25	30
BZT52B12-G	VI	11.8	12	12.2	5	1	> 9	100	7 (< 20)	< 90	+6 to +9	23	28
BZT52B13-G	VK	12.7	13	13.3	5	1	> 10	100	9 (< 25)	< 110	+7 to +9	21	25
BZT52B15-G	VL	14.7	15	15.3	5	1	> 11	100	11 (< 30)	< 110	+7 to +9	19	23
BZT52B16-G	VM	15.7	16	16.3	5	1	> 12	100	13 (< 40)	< 170	+8 to +9.5	17	20
BZT52B18-G	VN	17.6	18	18.4	5	1	> 14	100	18 (< 50)	< 170	+8 to +9.5	15	18
BZT52B20-G	VO	19.6	20	20.4	5	1	> 15	100	20 (< 50)	< 220	+8 to +10	14	17
BZT52B22-G	VP	21.6	22	22.4	5	1	> 17	100	25 (< 55)	< 220	+8 to +10	13	16
BZT52B24-G	VR	23.5	24	24.5	5	1	> 18	100	28 (< 80)	< 220	+8 to +10	11	13
BZT52B27-G	VS	26.5	27	27.5	5	1	> 20	100	30 (< 80)	< 250	+8 to +10	10	12
BZT52B30-G	VT	29.4	30	30.6	5	1	> 22.5	100	35 (< 80)	< 250	+8 to +10	9	10
BZT52B33-G	VU	32.3	33	33.7	5	1	> 25	100	40 (< 80)	< 250	+8 to +10	8	9
BZT52B36-G	VW	35.3	36	36.7	5	1	> 27	100	40 (< 90)	< 250	+8 to +10	8	9
BZT52B39-G	VX	38.2	39	39.8	5	1	> 29	100	50 (< 90)	< 300	+10 to +12	7	8
BZT52B43-G	VY	42.1	43	43.9	5	1	> 32	100	60 (< 100)	< 700	+10 to +12	6	7
BZT52B47-G	VZ	46.1	47	47.9	5	1	> 35	100	70 (< 100)	< 750	+10 to +12	5	6
BZT52B51-G	U1	50	51	52	5	1	> 38	100	70 (< 100)	< 750	+10 to +12	5	6
BZT52B56-G	U2	54.9	56	57.1	2.5	1	-	100	< 135 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-
BZT52B62-G	U3	60.8	62	63.2	2.5	1	-	100	< 150 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-
BZT52B68-G	U4	66.6	68	69.4	2.5	1	-	100	< 200 ⁽²⁾	< 1000 ⁽³⁾	typ. +10 ⁽²⁾	-	-
BZT52B75-G	U5	73.5	75	76.5	2.5	1	-	100	< 250 ⁽²⁾	< 1500 ⁽³⁾	typ. +10 ⁽²⁾	-	-

Notes

- $I_{ZT1} = 5\text{ mA}$, $I_{ZT2} = 1\text{ mA}$
- (1) Measured with pulses $t_p = 5\text{ ms}$
- (2) $I_{ZT1} = 2.5\text{ mA}$
- (3) $I_{ZT2} = 0.5\text{ mA}$
- (4) Valid provided that electrodes are kept at ambient temperature

TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

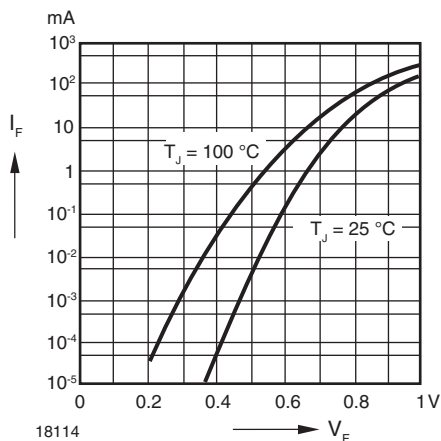


Fig. 1 - Forward Characteristics

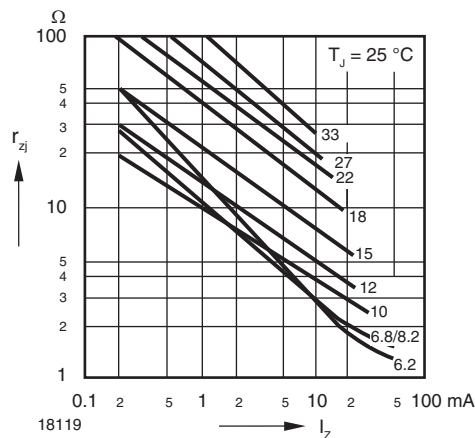


Fig. 4 - Dynamic Resistance vs. Zener Current

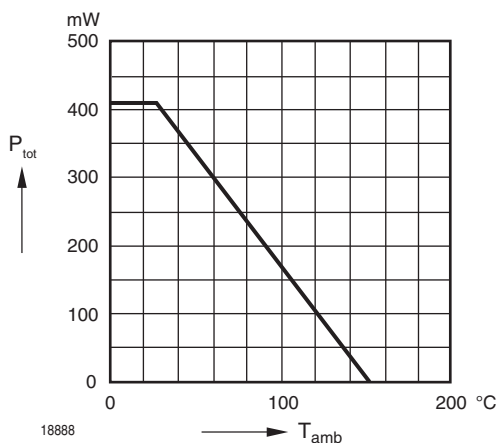


Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

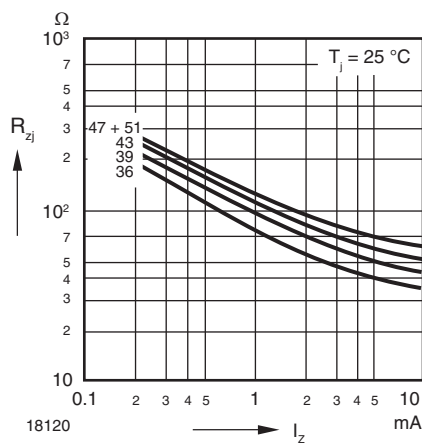


Fig. 5 - Dynamic Resistance vs. Zener Current

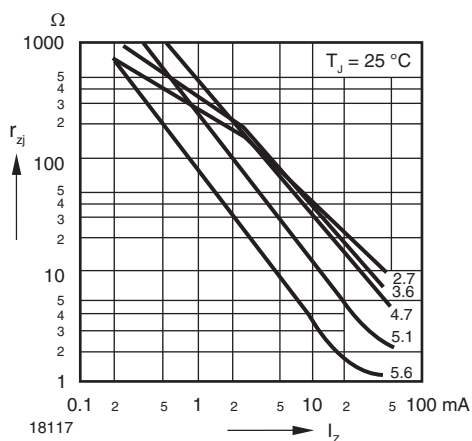


Fig. 3 - Dynamic Resistance vs. Zener Current

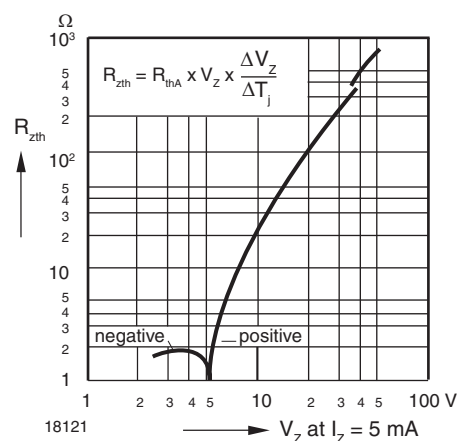


Fig. 6 - Thermal Differential Resistance vs. Zener Voltage

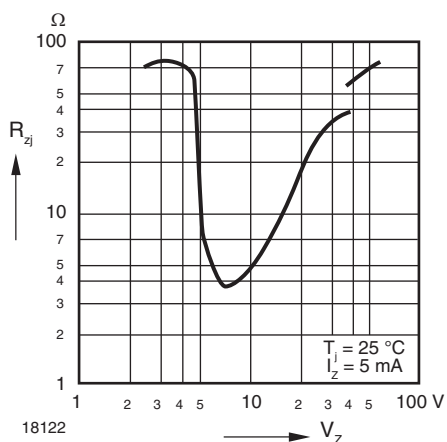


Fig. 7 - Dynamic Resistance vs. Zener Voltage

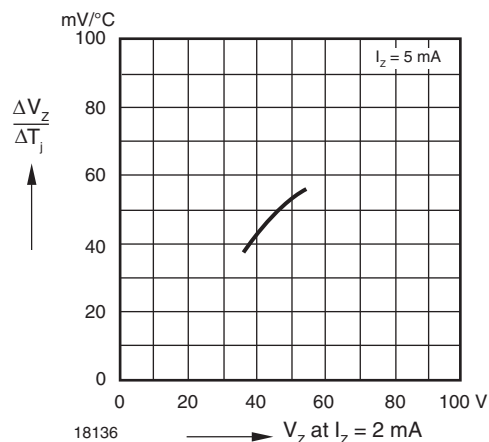


Fig. 10 - Temperature Dependence of Zener Voltage vs. Zener Voltage

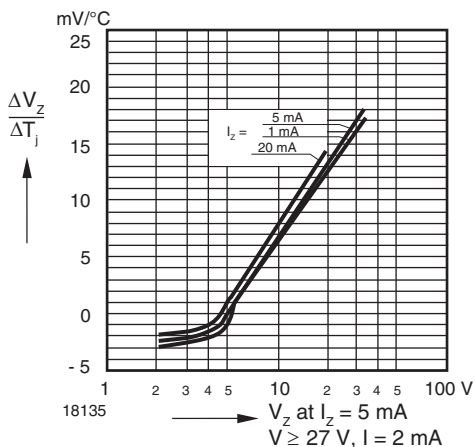


Fig. 8 - Temperature Dependence of Zener Voltage vs. Zener Voltage

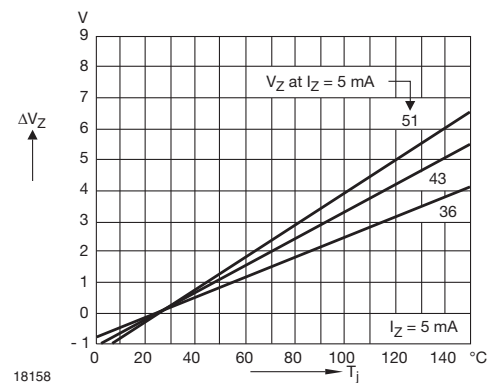


Fig. 11 - Change of Zener Voltage vs. Junction Temperature

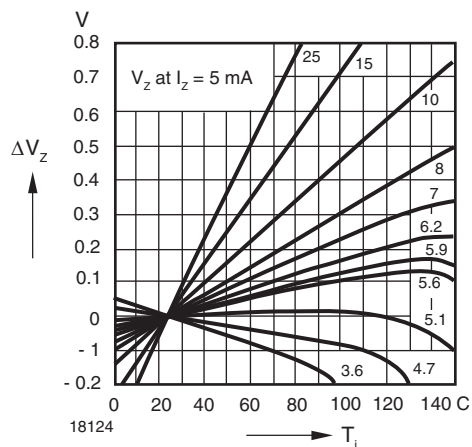


Fig. 9 - Change of Zener Voltage vs. Junction Temperature

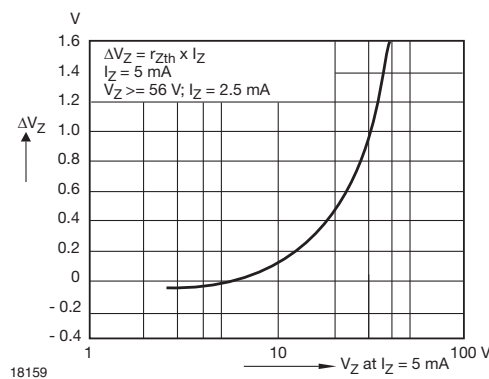


Fig. 12 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

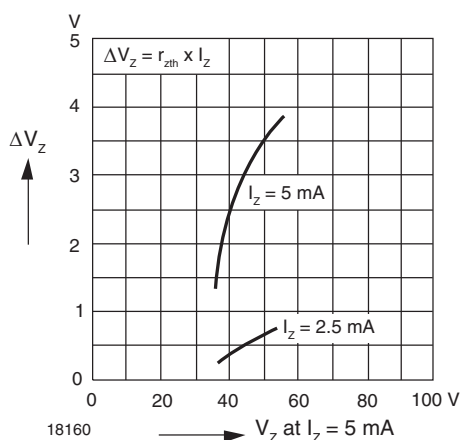


Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

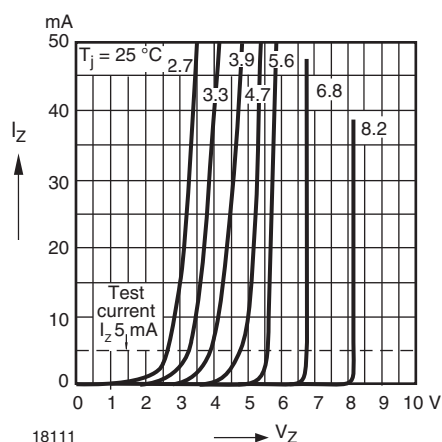


Fig. 14 - Breakdown Characteristics

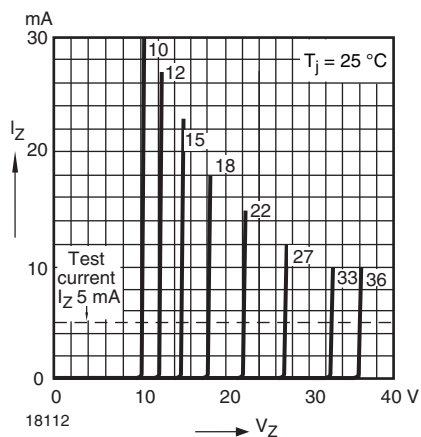


Fig. 15 - Breakdown Characteristics

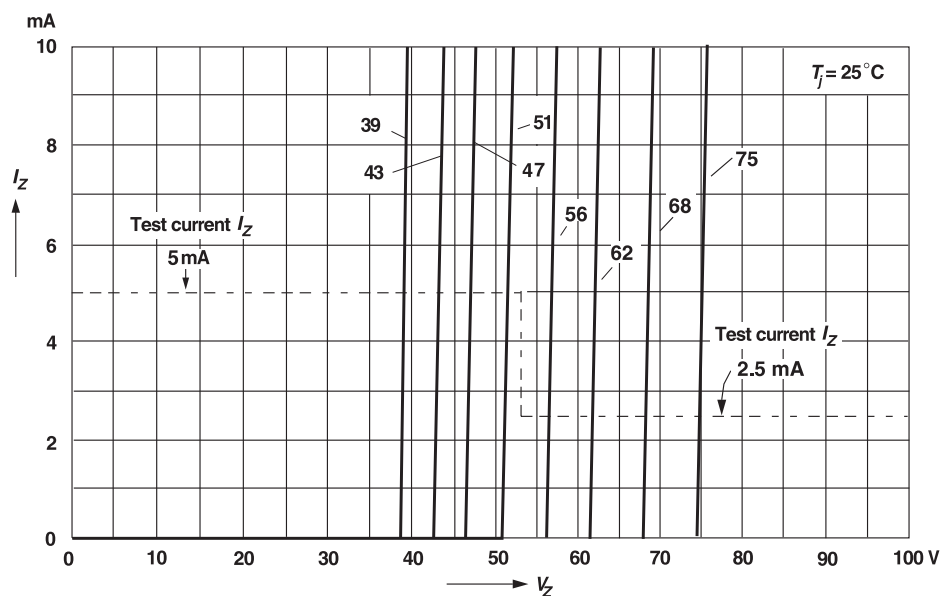
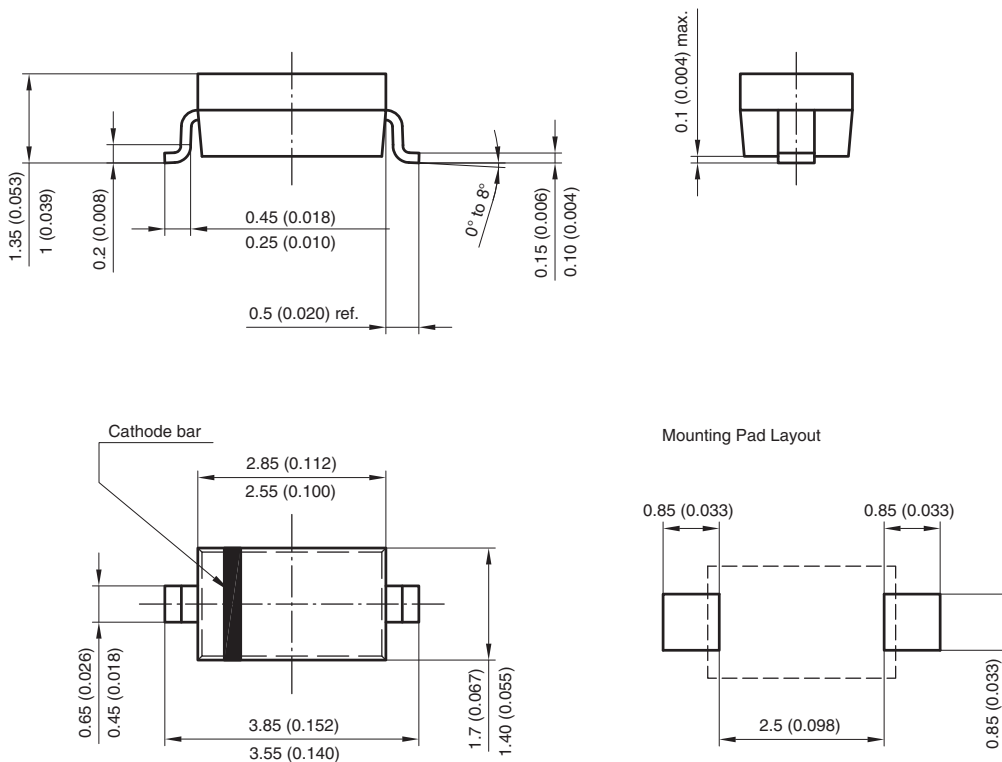


Fig. 16 - Breakdown Characteristics



PACKAGE DIMENSIONS in millimeters (inches): **SOD-123**



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