Small Signal Zener Diodes

FEATURES

- Silicon planar Zener diodes
- The Zener voltages are graded according to the international E24 standard
- AEC-Q101 qualified
- ESD capability according to AEC-Q101:
  Human body model > 8 kV
  Machine model > 800 V
- Base P/N-E3 - RoHS-compliant, commercial grade
- Base P/N-HE3 - RoHS-compliant, AEC-Q101 qualified
- Material categorization: For definitions of compliance please see www.vishay.com/doc?99912

Pb-free

e3

RoHS COMPLIANT

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	
Int. construction	Single	

ORDERING INFORMATION			
DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZT52-series	BZT52C2V4-E3-08 to BZT52C75-E3-08	3000 (8 mm tape on 7" reel)	15 000/box
	BZT52B2V4-E3-08 to BZT52B75-E3-08		
	BZT52C2V4-HE3-08 to BZT52C75-HE3-08		
	BZT52B2V4-HE3-08 to BZT52B75-HE3-08		
	BZT52C2V4-E3-18 to BZT52C75-E3-18	10 000 (8 mm tape on 13" reel)	10 000/box
	BZT52B2V4-E3-18 to BZT52B75-E3-18		
	BZT52C2V4-HE3-18 to BZT52C75-HE3-18		
	BZT52B2V4-HE3-18 to BZT52B75-HE3-18		

PACKAGE				
PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
SOD-123	10.3 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

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE (1)			TEST CURRENT		REVERSE VOLTAGE		DYNAMIC RESISTANCE		TEMP. COEFFICIENT	ADMISSABLE 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 °C	I_Z at T_{amb} = 25 °C
		V			mA		V	nA	Ω		10^{-4}/°C	mA	
		MIN.	NOM.	MAX.									
BZT52C2V4	W1	2.2	2.4	2.6	5	1	-	-	85	600	- 9 to - 4	-	-
BZT52C2V7	W2	2.5	2.7	2.9	5	1	-	-	75 (< 83)	< 500	- 9 to - 4	113	134
BZT52C3V0	W3	2.8	3.0	3.2	5	1	-	-	80 (< 95)	< 500	- 9 to - 3	98	118
BZT52C3V3	W4	3.1	3.3	3.5	5	1	-	-	80 (< 95)	< 500	- 8 to - 3	92	109
BZT52C3V6	W5	3.4	3.6	3.8	5	1	-	-	80 (< 95)	< 500	- 8 to - 3	85	100
BZT52C3V9	W6	3.7	3.9	4.1	5	1	-	-	80 (< 95)	< 500	- 7 to - 3	77	92
BZT52C4V3	W7	4	4.3	4.6	5	1	-	-	80 (< 95)	< 500	- 6 to - 1	71	84
BZT52C4V7	W8	4.4	4.7	5	5	1	-	-	70 (< 78)	< 500	- 5 to + 2	64	76
BZT52C5V1	W9	4.8	5.1	5.4	5	1	> 0.8	100	30 (< 60)	< 480	- 3 to + 4	56	67
BZT52C5V6	WA	5.2	5.6	6	5	1	> 1	100	10 (< 40)	< 400	- 2 to + 6	50	59
BZT52C6V2	WB	5.8	6.2	6.6	5	1	> 2	100	4.8 (< 10)	< 200	- 1 to + 7	45	54
BZT52C6V8	WC	6.4	6.8	7.2	5	1	> 3	100	4.5 (< 8)	< 150	+ 2 to + 7	41	49
BZT52C7V5	WD	7	7.5	7.9	5	1	> 5	100	4 (< 7)	< 50	+ 3 to + 7	37	44
BZT52C8V2	WE	7.7	8.2	8.7	5	1	> 6	100	4.5 (< 7)	< 50	+ 4 to + 7	34	40
BZT52C9V1	WF	8.5	9.1	9.6	5	1	> 7	100	4.8 (< 10)	< 50	+ 5 to + 8	30	36
BZT52C10	WG	9.4	10	10.6	5	1	> 7.5	100	5.2 (< 15)	< 70	+ 5 to + 8	28	33
BZT52C11	WH	10.4	11	11.6	5	1	> 8.5	100	6 (< 20)	< 70	+ 5 to + 9	25	30
BZT52C12	WI	11.4	12	12.7	5	1	> 9	100	7 (< 20)	< 90	+ 6 to + 9	23	28
BZT52C13	WK	12.4	13	14.1	5	1	> 10	100	9 (< 25)	< 110	+ 7 to + 9	21	25
BZT52C15	WL	13.8	15	15.6	5	1	> 11	100	11 (< 30)	< 110	+ 7 to + 9	19	23
BZT52C16	WM	15.3	16	17.1	5	1	> 12	100	13 (< 40)	< 170	+ 8 to + 9.5	17	20
BZT52C18	WN	16.8	18	19.1	5	1	> 14	100	18 (< 50)	< 170	+ 8 to + 9.5	15	18
BZT52C20	WO	18.8	20	21.2	5	1	> 15	100	20 (< 50)	< 220	+ 8 to + 10	14	17
BZT52C22	WP	20.8	22	23.3	5	1	> 17	100	25 (< 55)	< 220	+ 8 to + 10	13	16
BZT52C24	WR	22.8	24	25.6	5	1	> 18	100	28 (< 80)	< 220	+ 8 to + 10	11	13
BZT52C27	WS	25.1	27	28.9	5	1	> 20	100	30 (< 80)	< 250	+ 8 to + 10	10	12
BZT52C30	WT	28	30	32	5	1	> 22.5	100	35 (< 80)	< 250	+ 8 to + 10	9	10
BZT52C33	WU	31	33	35	5	1	> 25	100	40 (< 80)	< 250	+ 8 to + 10	8	9
BZT52C36	WW	34	36	38	5	1	> 27	100	40 (< 90)	< 250	+ 8 to + 10	8	9
BZT52C39	WX	37	39	41	5	1	> 29	100	50 (< 90)	< 300	+ 10 to + 12	7	8
BZT52C43	WY	40	43	46	5	1	> 32	100	60 (< 100)	< 700	+ 10 to + 12	6	7
BZT52C47	WZ	44	47	50	5	1	> 35	100	70 (< 100)	< 750	+ 10 to + 12	5	6
BZT52C51	X1	48	51	54	5	1	> 38	100	70 (< 100)	< 750	+ 10 to + 12	5	6
BZT52C56	X2	52	56	60	2.5	0.5	-	-	< 135 (2)	< 1000 (3)	typ. +10 (2)	-	-
BZT52C62	X3	58	62	66	2.5	0.5	-	-	< 150 (2)	< 1000 (3)	typ. +10 (2)	-	-
BZT52C68	X4	64	68	72	2.5	0.5	-	-	< 200 (2)	< 1000 (3)	typ. +10 (2)	-	-
BZT52C75	X5	70	75	79	2.5	0.5	-	-	< 250 (2)	< 1500 (3)	typ. +10 (2)	-	-

Notes

- I_{ZT1} = 5 mA, I_{ZT2} = 1 mA

(1) Measured with pulses t_p = 5 ms

(2) I_{ZT1} = 2.5 mA

(3) I_{ZT2} = 0.5 mA

(4) Valid provided that electrodes are kept at ambient temperature

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ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE (1)			TEST CURRENT		REVERSE VOLTAGE		DYNAMIC RESISTANCE		TEMP. COEFFICIENT	ADMISSABLE 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 °C	I_Z at T_{amb} = 25 °C
		V			mA		V	nA	Ω		10^{-4}/°C	mA	
		MIN.	NOM.	MAX.									
BZT52B2V4	W1	2.35	2.4	2.45	5	1	-	-	85	600	- 9 to - 4	-	-
BZT52B2V7	W2	2.65	2.7	2.75	5	1	-	-	75 (< 83)	< 500	- 9 to - 4	113	134
BZT52B3V0	W3	2.94	3.0	3.06	5	1	-	-	80 (< 95)	< 500	- 9 to - 3	98	118
BZT52B3V3	W4	3.23	3.3	3.37	5	1	-	-	80 (< 95)	< 500	- 8 to - 3	92	109
BZT52B3V6	W5	3.53	3.6	3.67	5	1	-	-	80 (< 95)	< 500	- 8 to - 3	85	100
BZT52B3V9	W6	3.82	3.9	3.98	5	1	-	-	80 (< 95)	< 500	- 7 to - 3	77	92
BZT52B4V3	W7	4.21	4.3	4.39	5	1	-	-	80 (< 95)	< 500	- 6 to - 1	71	84
BZT52B4V7	W8	4.61	4.7	4.79	5	1	-	-	70 (< 78)	< 500	- 5 to + 2	64	76
BZT52B5V1	W9	5	5.1	5.2	5	1	> 0.8	100	30 (< 60)	< 480	- 3 to + 4	56	67
BZT52B5V6	WA	5.49	5.6	5.71	5	1	> 1	100	10 (< 40)	< 400	- 2 to + 6	50	59
BZT52B6V2	WB	6.08	6.2	6.32	5	1	> 2	100	4.8 (< 10)	< 200	- 1 to + 7	45	54
BZT52B6V8	WC	6.66	6.8	6.94	5	1	> 3	100	4.5 (< 8)	< 150	+ 2 to + 7	41	49
BZT52B7V5	WD	7.35	7.5	7.65	5	1	> 5	100	4 (< 7)	< 50	+ 3 to + 7	37	44
BZT52B8V2	WE	8.04	8.2	8.36	5	1	> 6	100	4.5 (< 7)	< 50	+ 4 to + 7	34	40
BZT52B9V1	WF	8.92	9.1	9.28	5	1	> 7	100	4.8 (< 10)	< 50	+ 5 to + 8	30	36
BZT52B10	WG	9.8	10	10.2	5	1	> 7.5	100	5.2 (< 15)	< 70	+ 5 to + 8	28	33
BZT52B11	WH	10.8	11	11.2	5	1	> 8.5	100	6 (< 20)	< 70	+ 5 to + 9	25	30
BZT52B12	WI	11.8	12	12.2	5	1	> 9	100	7 (< 20)	< 90	+ 6 to + 9	23	28
BZT52B13	WK	12.7	13	13.3	5	1	> 10	100	9 (< 25)	< 110	+ 7 to + 9	21	25
BZT52B15	WL	14.7	15	15.3	5	1	> 11	100	11 (< 30)	< 110	+ 7 to + 9	19	23
BZT52B16	WM	15.7	16	16.3	5	1	> 12	100	13 (< 40)	< 170	+ 8 to + 9.5	17	20
BZT52B18	WN	17.6	18	18.4	5	1	> 14	100	18 (< 50)	< 170	+ 8 to + 9.5	15	18
BZT52B20	WO	19.6	20	20.4	5	1	> 15	100	20 (< 50)	< 220	+ 8 to + 10	14	17
BZT52B22	WP	21.6	22	22.4	5	1	> 17	100	25 (< 55)	< 220	+ 8 to + 10	13	16
BZT52B24	WR	23.5	24	24.5	5	1	> 18	100	28 (< 80)	< 220	+ 8 to + 10	11	13
BZT52B27	WS	26.5	27	27.5	5	1	> 20	100	30 (< 80)	< 250	+ 8 to + 10	10	12
BZT52B30	WT	29.4	30	30.6	5	1	> 22.5	100	35 (< 80)	< 250	+ 8 to + 10	9	10
BZT52B33	WU	32.3	33	33.7	5	1	> 25	100	40 (< 80)	< 250	+ 8 to + 10	8	9
BZT52B36	WW	35.3	36	36.7	5	1	> 27	100	40 (< 90)	< 250	+ 8 to + 10	8	9
BZT52B39	WX	38.2	39	39.8	5	1	> 29	100	50 (< 90)	< 300	+ 10 to + 12	7	8
BZT52B43	WY	42.1	43	43.9	5	1	> 32	100	60 (< 100)	< 700	+ 10 to + 12	6	7
BZT52B47	WZ	46.1	47	47.9	5	1	> 35	100	70 (< 100)	< 750	+ 10 to + 12	5	6
BZT52B51	X1	50	51	52	5	1	> 38	100	70 (< 100)	< 750	+ 10 to + 12	5	6
BZT52B56	X2	54.9	56	57.1	2.5	0.5	-	-	< 135 (2)	< 1000 (3)	typ. + 10 (2)	-	-
BZT52B62	X3	60.8	62	63.2	2.5	0.5	-	-	< 150 (2)	< 1000 (3)	typ. + 10 (2)	-	-
BZT52B68	X4	66.6	68	69.4	2.5	0.5	-	-	< 200 (2)	< 1000 (3)	typ. + 10 (2)	-	-
BZT52B75	X5	73.5	75	76.5	2.5	0.5	-	-	< 250 (2)	< 1500 (3)	typ. + 10 (2)	-	-

Notes

- I_{ZT1} = 5 mA, I_{ZT2} = 1 mA

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

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TYPICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

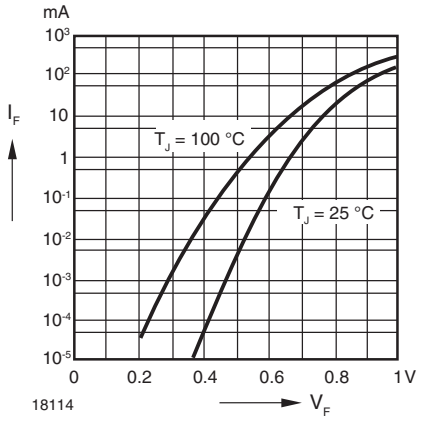

Fig. 1 - Forward characteristics

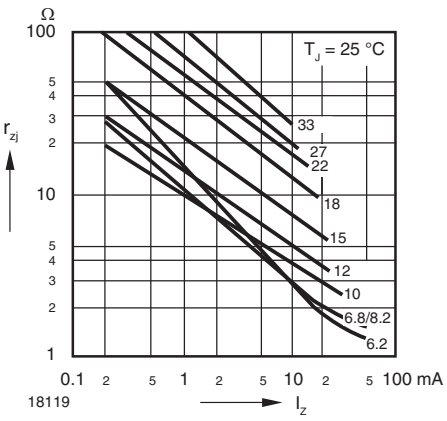

Fig. 4 - Dynamic Resistance vs. Zener Current

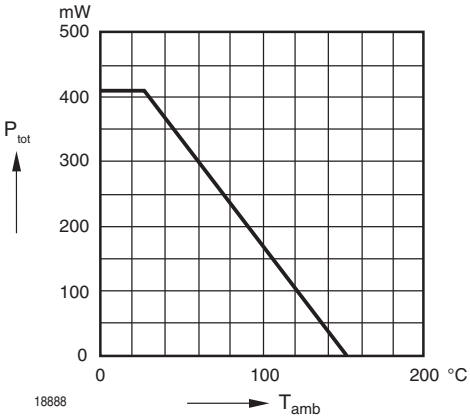

Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

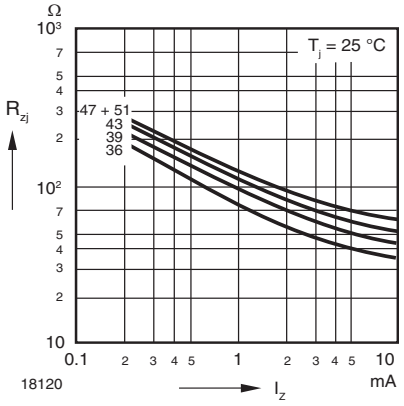

Fig. 5 - Dynamic Resistance vs. Zener Current

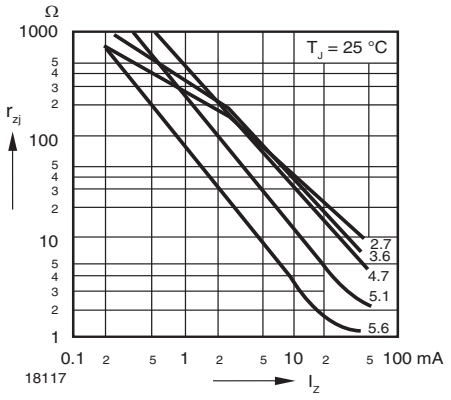

Fig. 3 - Dynamic Resistance vs. Zener Current

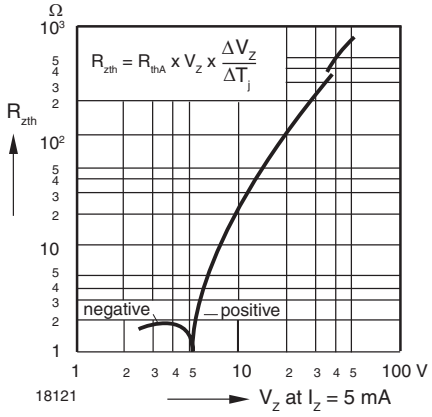

Fig. 6 - Thermal Differential Resistance vs. Zener Voltage

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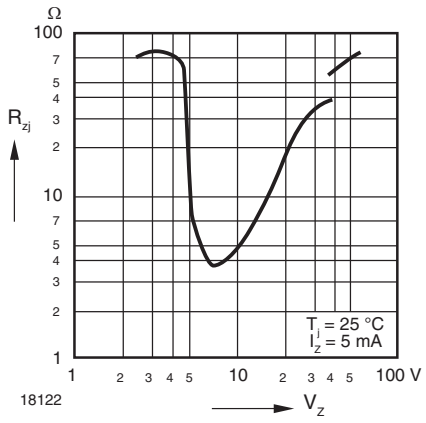

Fig. 7 - Dynamic Resistance vs. Zener Voltage

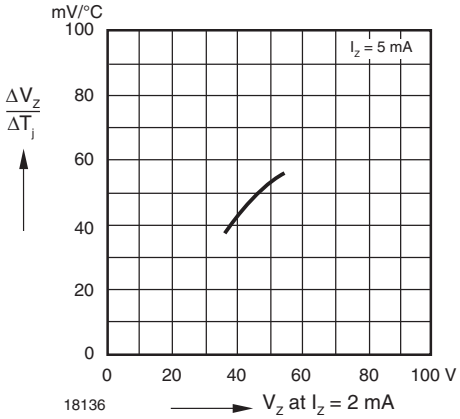

Fig. 10 - Temperature Dependence of Zener Voltage vs. Zener Voltage

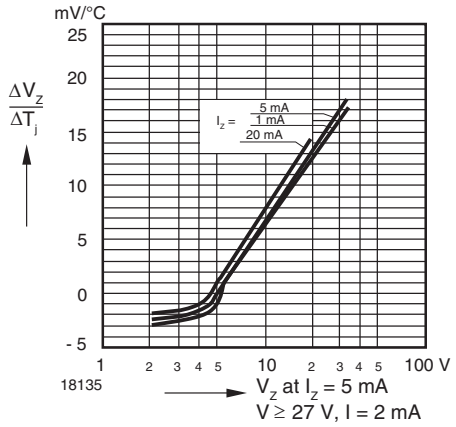

Fig. 8 - Temperature Dependence of Zener Voltage vs. Zener Voltage

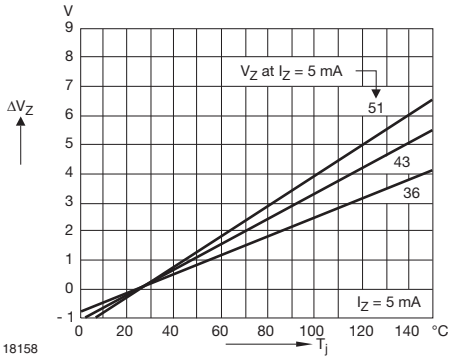

Fig. 11 - Change of Zener Voltage vs. Junction Temperature

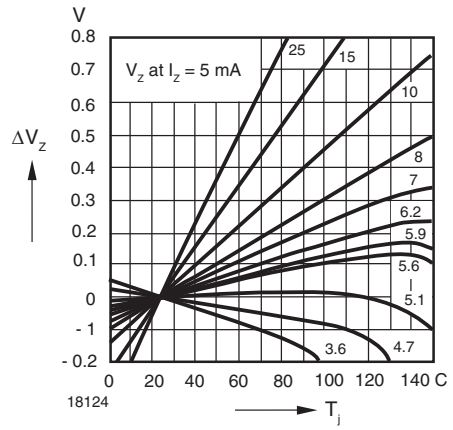

Fig. 9 - Change of Zener Voltage vs. Junction Temperature

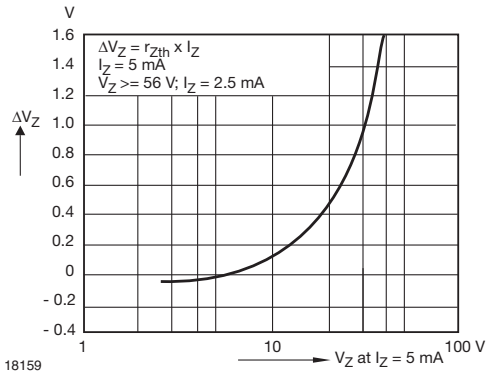

Fig. 12 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

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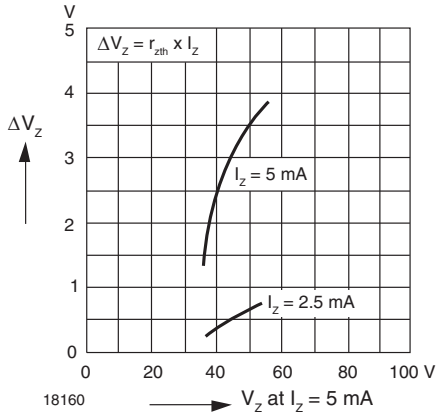

Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

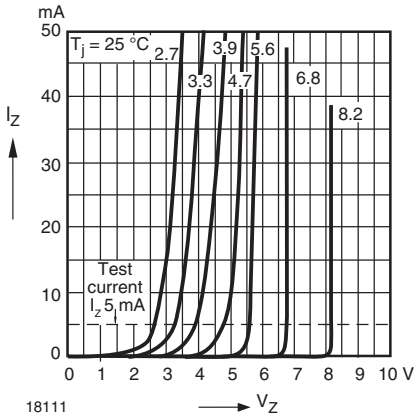

Fig. 14 - Breakdown Characteristics

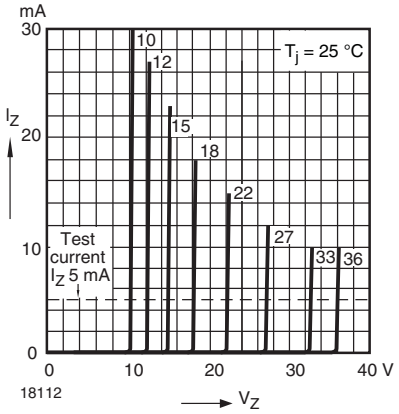

Fig. 15 - Breakdown Characteristics

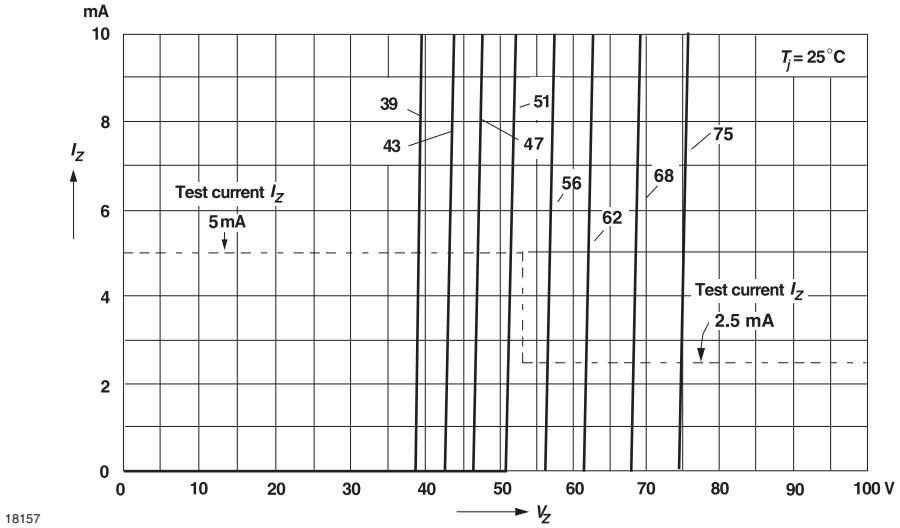

Fig. 16 - Breakdown Characteristics

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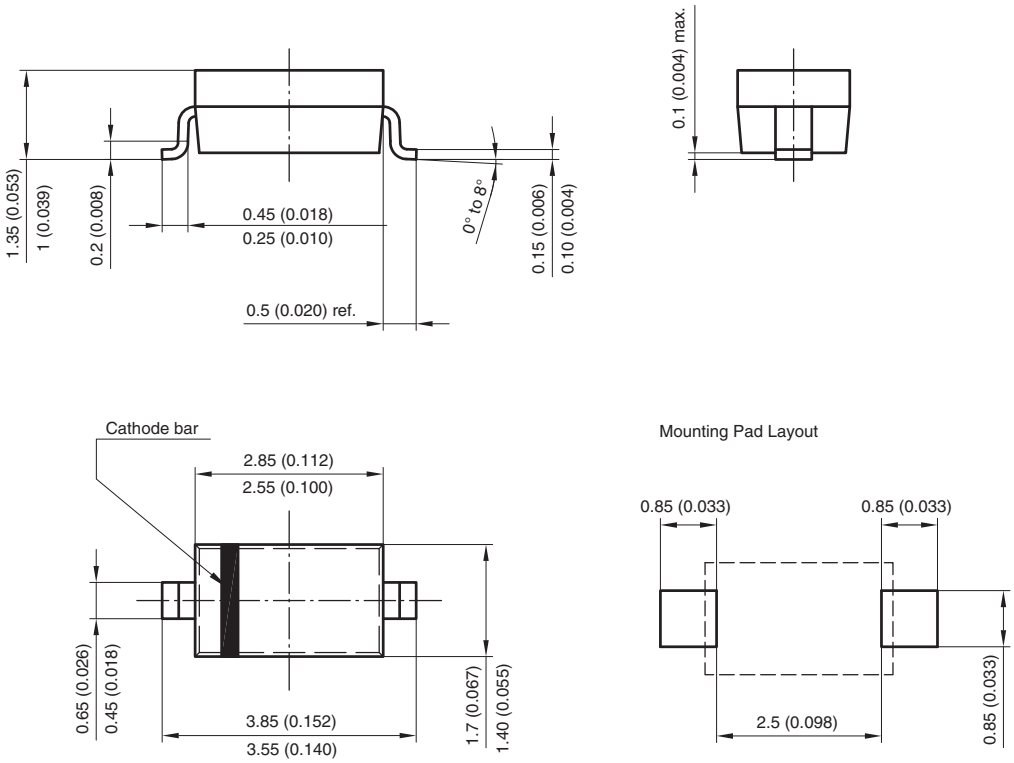
PACKAGE DIMENSIONS in millimeters (inches): **SOD-123**



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