

Small Signal Zener Diodes



DESIGN SUPPORT TOOLS

[click logo to get started](#)


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

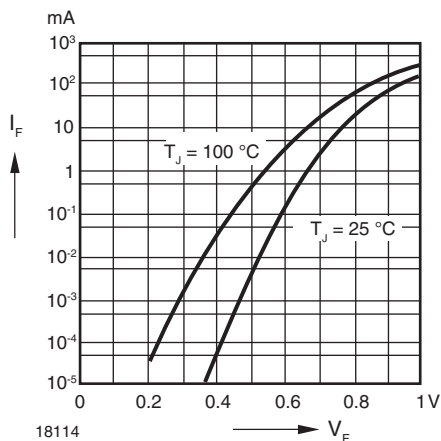
TYPICAL CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Forward Characteristics

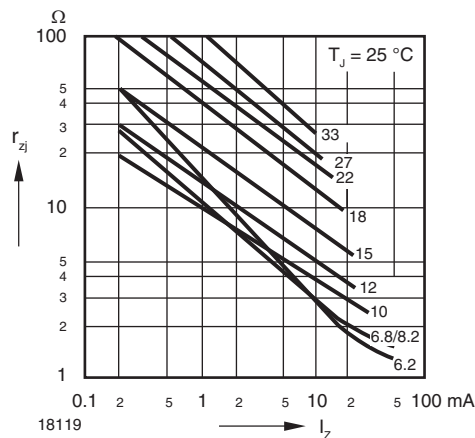


Fig. 4 - Dynamic Resistance vs. Zener Current

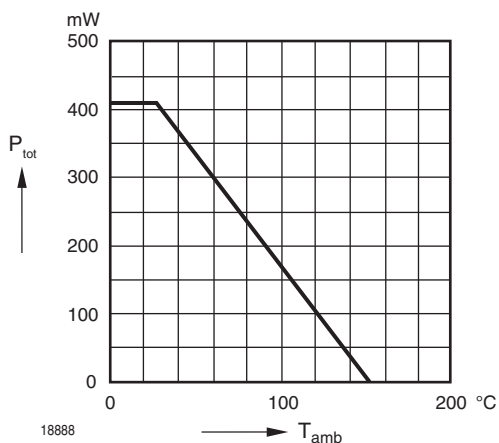


Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

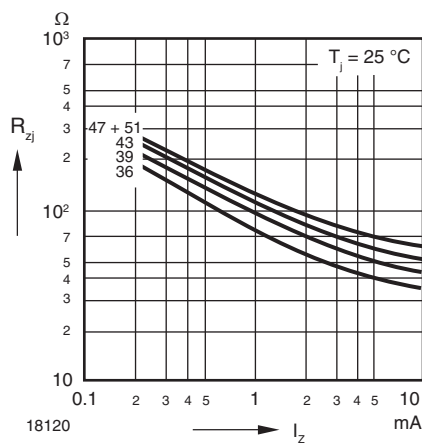


Fig. 5 - Dynamic Resistance vs. Zener Current

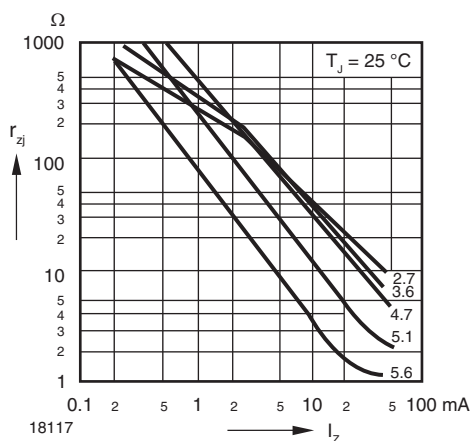


Fig. 3 - Dynamic Resistance vs. Zener Current

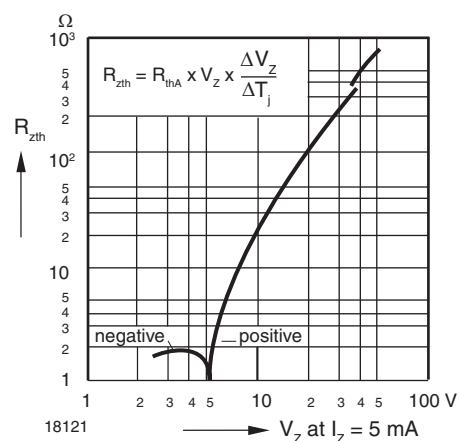


Fig. 6 - Thermal Differential Resistance vs. Zener Voltage

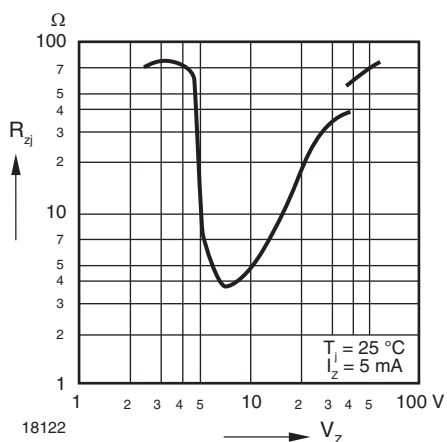


Fig. 7 - Dynamic Resistance vs. Zener Voltage

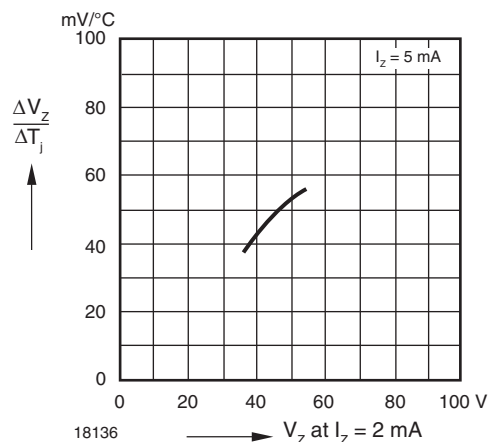


Fig. 10 - Temperature Dependence of Zener Voltage vs. Zener Voltage

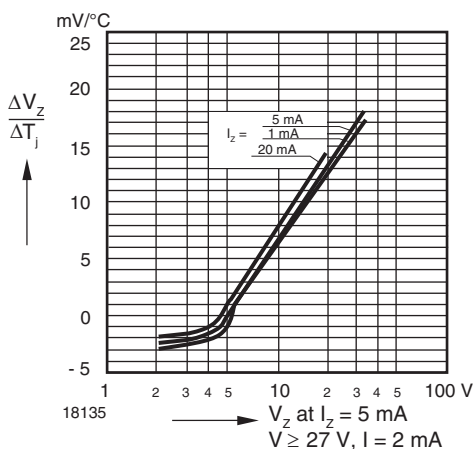


Fig. 8 - Temperature Dependence of Zener Voltage vs. Zener Voltage

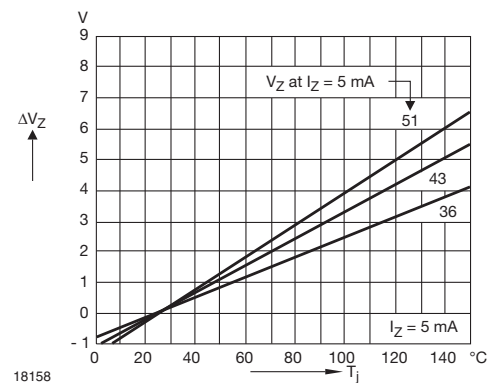


Fig. 11 - Change of Zener Voltage vs. Junction Temperature

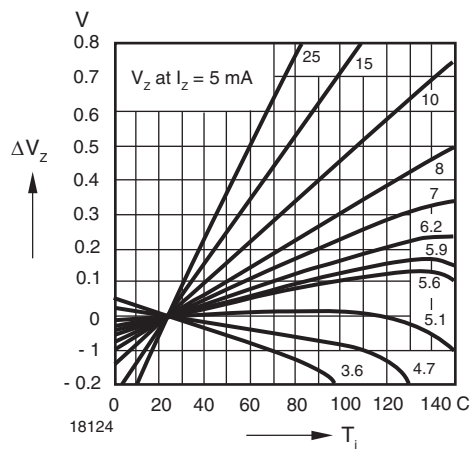


Fig. 9 - Change of Zener Voltage vs. Junction Temperature

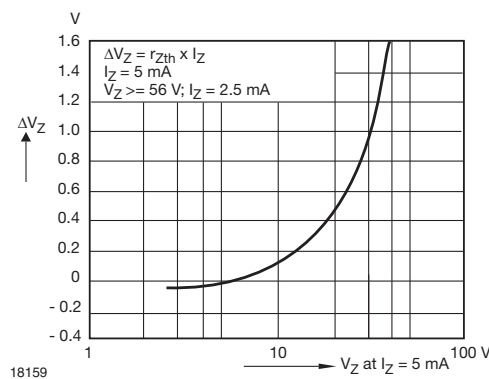


Fig. 12 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

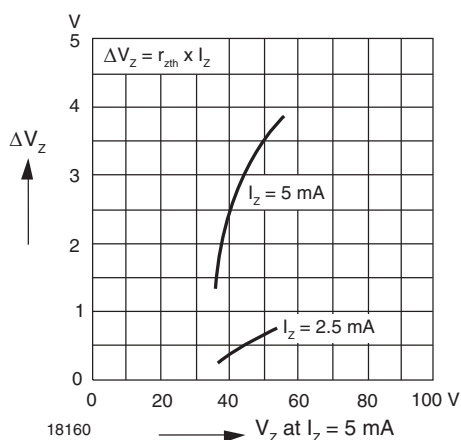


Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

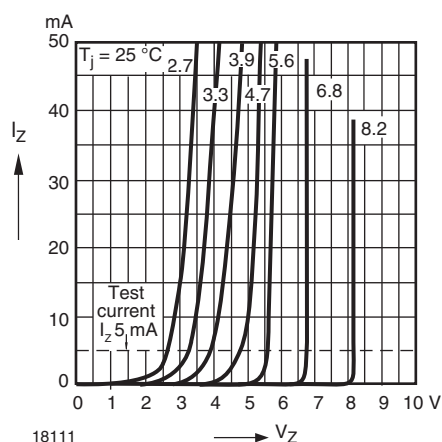


Fig. 14 - Breakdown Characteristics

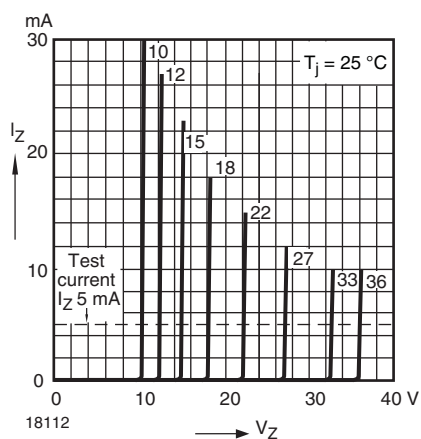


Fig. 15 - Breakdown Characteristics

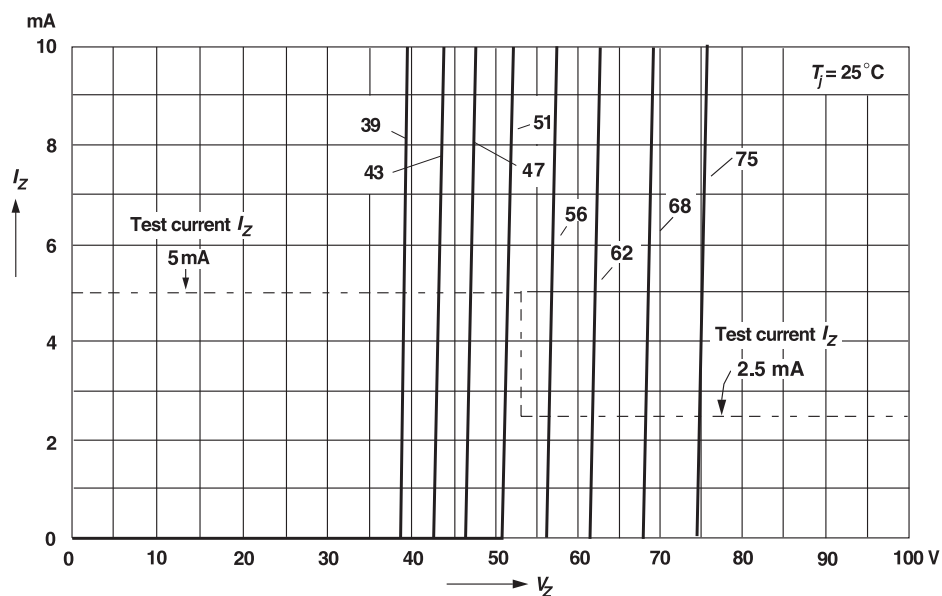
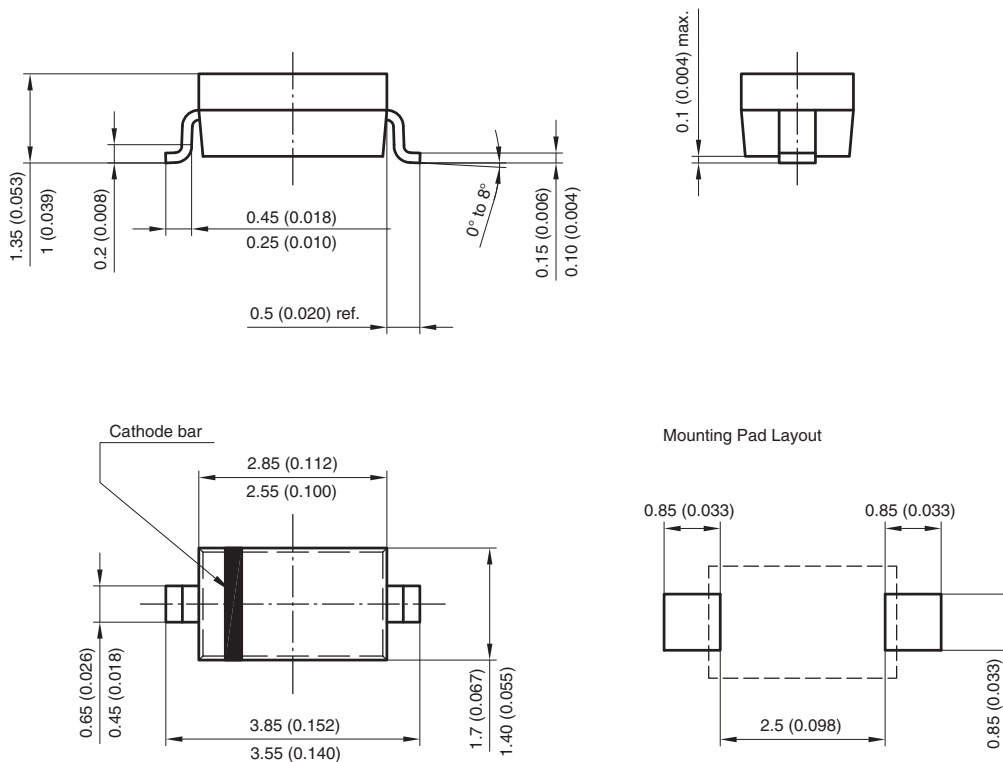


Fig. 16 - Breakdown Characteristics



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



Rev. 4 - Date: 24. Sep. 2009
Document no.: S8-V-3910.01-001 (4)
17432



Disclaimer

ALL PRODUCT, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE TO IMPROVE RELIABILITY, FUNCTION OR DESIGN OR OTHERWISE.

Vishay Intertechnology, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "Vishay"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained in any datasheet or in any other disclosure relating to any product.

Vishay makes no warranty, representation or guarantee regarding the suitability of the products for any particular purpose or the continuing production of any product. To the maximum extent permitted by applicable law, Vishay disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.

Statements regarding the suitability of products for certain types of applications are based on Vishay's knowledge of typical requirements that are often placed on Vishay products in generic applications. Such statements are not binding statements about the suitability of products for a particular application. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. Parameters provided in datasheets and / or specifications may vary in different applications and performance may vary over time. All operating parameters, including typical parameters, must be validated for each customer application by the customer's technical experts. Product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein.

Hyperlinks included in this datasheet may direct users to third-party websites. These links are provided as a convenience and for informational purposes only. Inclusion of these hyperlinks does not constitute an endorsement or an approval by Vishay of any of the products, services or opinions of the corporation, organization or individual associated with the third-party website. Vishay disclaims any and all liability and bears no responsibility for the accuracy, legality or content of the third-party website or for that of subsequent links.

Except as expressly indicated in writing, Vishay products are not designed for use in medical, life-saving, or life-sustaining applications or for any other application in which the failure of the Vishay product could result in personal injury or death. Customers using or selling Vishay products not expressly indicated for use in such applications do so at their own risk. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document or by any conduct of Vishay. Product names and markings noted herein may be trademarks of their respective owners.