

Small Signal Zener Diodes



FEATURES

- Very sharp reverse characteristic
- Low reverse current level
- Very high stability
- Low noise
- AEC-Q101 qualified
- Material categorization:
For definitions of compliance please see www.vishay.com/doc?99912



RoHS
COMPLIANT
HALOGEN
FREE

APPLICATIONS

- Voltage stabilization

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
BZX55-series	BZX55-series-TR	10 000 per 13" reel	30 000/box
BZX55-series	BZX55-series-TAP	10 000 per ammpack (52 mm tape)	30 000/box

PACKAGE

PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
DO-35	125 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	I = 4 mm, T _L = 25 °C	P _{tot}	500	mW
Zener current		I _Z	P _{tot} /V _Z	mA
Junction to ambient air	I = 4 mm, T _L = constant	R _{thJA}	300	K/W
Junction temperature		T _j	175	°C
Storage temperature range		T _{stg}	- 65 to + 175	°C
Forward voltage (max.)	I _F = 200 mA	V _F	1.5	V



ELECTRICAL CHARACTERISTICS (T _{amb} = 25 °C, unless otherwise specified)												
PART NUMBER	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LEAKAGE CURRENT			DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT	
	V _Z at I _{ZT1}			I _{ZT1}	I _{ZT2}	I _R at V _R			Z _Z at I _{ZT1}	Z _{ZK} at I _{ZT2}	TK _{VZ}	
						T _{amb} = 25 °C	T _{amb} = 150 °C		f = 1 kHz			
	V			mA		µA		V	Ω		% / K	
	MIN.	NOM.	MAX.						MAX.	MAX.	MIN.	MAX.
BZX55C2V4	2.28	2.4	2.56	5	1	< 50	< 100	1	< 85	< 600	- 0.09	- 0.06
BZX55C2V7	2.5	2.7	2.9	5	1	< 10	< 50	1	< 85	< 600	- 0.09	- 0.06
BZX55C3V0	2.8	3.0	3.2	5	1	< 4	< 40	1	< 85	< 600	- 0.08	- 0.05
BZX55C3V3	3.1	3.3	3.5	5	1	< 2	< 40	1	< 85	< 600	- 0.08	- 0.05
BZX55C3V6	3.4	3.6	3.8	5	1	< 2	< 40	1	< 85	< 600	- 0.08	- 0.05
BZX55C3V9	3.7	3.9	4.1	5	1	< 2	< 40	1	< 85	< 600	- 0.08	- 0.05
BZX55C4V3	4	4.3	4.6	5	1	< 1	< 20	1	< 75	< 600	- 0.06	- 0.03
BZX55C4V7	4.4	4.7	5	5	1	< 0.5	< 10	1	< 60	< 600	- 0.05	0.02
BZX55C5V1	4.8	5.1	5.4	5	1	< 0.1	< 2	1	< 35	< 550	- 0.02	0.02
BZX55C5V6	5.2	5.6	6	5	1	< 0.1	< 2	1	< 25	< 450	- 0.05	0.05
BZX55C6V2	5.8	6.2	6.6	5	1	< 0.1	< 2	2	< 10	< 200	0.03	0.06
BZX55C6V8	6.4	6.8	7.2	5	1	< 0.1	< 2	3	< 8	< 150	0.03	0.07
BZX55C7V5	7	7.5	7.9	5	1	< 0.1	< 2	5	< 7	< 50	0.03	0.07
BZX55C8V2	7.7	8.2	8.7	5	1	< 0.1	< 2	6.2	< 7	< 50	0.03	0.08
BZX55C9V1	8.5	9.1	9.6	5	1	< 0.1	< 2	6.8	< 10	< 50	0.03	0.09
BZX55C10	9.4	10	10.6	5	1	< 0.1	< 2	7.5	< 15	< 70	0.03	0.1
BZX55C11	10.4	11	11.6	5	1	< 0.1	< 2	8.2	< 20	< 70	0.03	0.11
BZX55C12	11.4	12	12.7	5	1	< 0.1	< 2	9.1	< 20	< 90	0.03	0.11
BZX55C13	12.4	13	14.1	5	1	< 0.1	< 2	10	< 26	< 110	0.03	0.11
BZX55C15	13.8	15	15.6	5	1	< 0.1	< 2	11	< 30	< 110	0.03	0.11
BZX55C16	15.3	16	17.1	5	1	< 0.1	< 2	12	< 40	< 170	0.03	0.11
BZX55C18	16.8	18	19.1	5	1	< 0.1	< 2	13	< 50	< 170	0.03	0.11
BZX55C20	18.8	20	21.2	5	1	< 0.1	< 2	15	< 55	< 220	0.03	0.11
BZX55C22	20.8	22	23.3	5	1	< 0.1	< 2	16	< 55	< 220	0.04	0.12
BZX55C24	22.8	24	25.6	5	1	< 0.1	< 2	18	< 80	< 220	0.04	0.12
BZX55C27	25.1	27	28.9	5	1	< 0.1	< 2	20	< 80	< 220	0.04	0.12
BZX55C30	28	30	32	5	1	< 0.1	< 2	22	< 80	< 220	0.04	0.12
BZX55C33	31	33	35	5	1	< 0.1	< 2	24	< 80	< 220	0.04	0.12
BZX55C36	34	36	38	5	1	< 0.1	< 2	27	< 80	< 220	0.04	0.12
BZX55C39	37	39	41	2.5	0.5	< 0.1	< 5	30	< 90	< 500	0.04	0.12
BZX55C43	40	43	46	2.5	0.5	< 0.1	< 5	33	< 90	< 600	0.04	0.12
BZX55C47	44	47	50	2.5	0.5	< 0.1	< 5	36	< 110	< 700	0.04	0.12
BZX55C51	48	51	54	2.5	0.5	< 0.1	< 10	39	< 125	< 700	0.04	0.12
BZX55C56	52	56	60	2.5	0.5	< 0.1	< 10	43	< 135	< 1000	0.04	0.12
BZX55C62	58	62	66	2.5	0.5	< 0.1	< 10	47	< 150	< 1000	0.04	0.12
BZX55C68	64	68	72	2.5	0.5	< 0.1	< 10	51	< 200	< 1000	0.04	0.12
BZX55C75	70	75	79	2.5	0.5	< 0.1	< 10	56	< 250	< 1500	0.04	0.12

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

PART NUMBER	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LEAKAGE CURRENT			DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT	
	V_Z at I_{ZT1}			I_{ZT1}	I_{ZT2}	I_R at V_R			Z_Z at I_{ZT1}	Z_{ZK} at I_{ZT2}	TK_{VZ}	
	V			mA		μA		V	Ω		$\%/K$	
	MIN.	NOM.	MAX.						MAX.	MAX.	MIN.	MAX.
BZX55B2V4	2.35	2.4	2.45	5	1	< 50	< 100	1	< 85	< 600	- 0.09	- 0.06
BZX55B2V7	2.64	2.7	2.76	5	1	< 10	< 50	1	< 85	< 600	- 0.09	- 0.06
BZX55B3V0	2.94	3.0	3.06	5	1	< 4	< 40	1	< 90	< 600	- 0.08	- 0.05
BZX55B3V3	3.24	3.3	3.36	5	1	< 2	< 40	1	< 90	< 600	- 0.08	- 0.05
BZX55B3V6	3.52	3.6	3.68	5	1	< 2	< 40	1	< 90	< 600	- 0.08	- 0.05
BZX55B3V9	3.82	3.9	3.98	5	1	< 2	< 40	1	< 90	< 600	- 0.08	- 0.05
BZX55B4V3	4.22	4.3	4.38	5	1	< 1	< 20	1	< 90	< 600	- 0.06	- 0.03
BZX55B4V7	4.6	4.7	4.8	5	1	< 0.5	< 10	1	< 80	< 600	- 0.05	0.02
BZX55B5V1	5	5.1	5.2	5	1	< 0.1	< 2	1	< 60	< 550	- 0.02	0.02
BZX55B5V6	5.48	5.6	5.72	5	1	< 0.1	< 2	1	< 40	< 450	- 0.05	0.05
BZX55B6V2	6.08	6.2	6.32	5	1	< 0.1	< 2	2	< 10	< 200	0.03	0.06
BZX55B6V8	6.66	6.8	6.94	5	1	< 0.1	< 2	3	< 8	< 150	0.03	0.07
BZX55B7V5	7.35	7.5	7.65	5	1	< 0.1	< 2	5	< 7	< 50	0.03	0.07
BZX55B8V2	8.04	8.2	8.36	5	1	< 0.1	< 2	6.2	< 7	< 50	0.03	0.08
BZX55B9V1	8.92	9.1	9.28	5	1	< 0.1	< 2	6.8	< 10	< 50	0.03	0.09
BZX55B10	9.8	10	10.2	5	1	< 0.1	< 2	7.5	< 15	< 70	0.03	0.1
BZX55B11	10.78	11	11.22	5	1	< 0.1	< 2	8.2	< 20	< 70	0.03	0.11
BZX55B12	11.76	12	12.24	5	1	< 0.1	< 2	9.1	< 20	< 90	0.03	0.11
BZX55B13	12.74	13	13.26	5	1	< 0.1	< 2	10	< 26	< 110	0.03	0.11
BZX55B15	14.7	15	15.3	5	1	< 0.1	< 2	11	< 30	< 110	0.03	0.11
BZX55B16	15.7	16	16.3	5	1	< 0.1	< 2	12	< 40	< 170	0.03	0.11
BZX55B18	17.64	18	18.36	5	1	< 0.1	< 2	13	< 50	< 170	0.03	0.11
BZX55B20	19.6	20	20.4	5	1	< 0.1	< 2	15	< 55	< 220	0.03	0.11
BZX55B22	21.55	22	22.45	5	1	< 0.1	< 2	16	< 55	< 220	0.04	0.12
BZX55B24	23.5	24	24.5	5	1	< 0.1	< 2	18	< 80	< 220	0.04	0.12
BZX55B27	26.4	27	27.6	5	1	< 0.1	< 2	20	< 80	< 220	0.04	0.12
BZX55B30	29.4	30	30.6	5	1	< 0.1	< 2	22	< 80	< 220	0.04	0.12
BZX55B33	32.4	33	33.6	5	1	< 0.1	< 2	24	< 80	< 220	0.04	0.12
BZX55B36	35.3	36	36.7	5	1	< 0.1	< 2	27	< 80	< 220	0.04	0.12
BZX55B39	38.2	39	39.8	2.5	0.5	< 0.1	< 5	30	< 90	< 500	0.04	0.12
BZX55B43	42.1	43	43.9	2.5	0.5	< 0.1	< 5	33	< 90	< 600	0.04	0.12
BZX55B47	46.1	47	47.9	2.5	0.5	< 0.1	< 5	36	< 110	< 700	0.04	0.12
BZX55B51	50	51	52	2.5	0.5	< 0.1	< 10	39	< 125	< 700	0.04	0.12
BZX55B56	54.9	56	57.1	2.5	0.5	< 0.1	< 10	43	< 135	< 1000	0.04	0.12
BZX55B62	60.8	62	63.2	2.5	0.5	< 0.1	< 10	47	< 150	< 1000	0.04	0.12
BZX55B68	66.6	68	69.4	2.5	0.5	< 0.1	< 10	51	< 200	< 1000	0.04	0.12
BZX55B75	73	75	76.5	2.5	0.5	< 0.1	< 10	56	< 250	< 1500	0.04	0.12

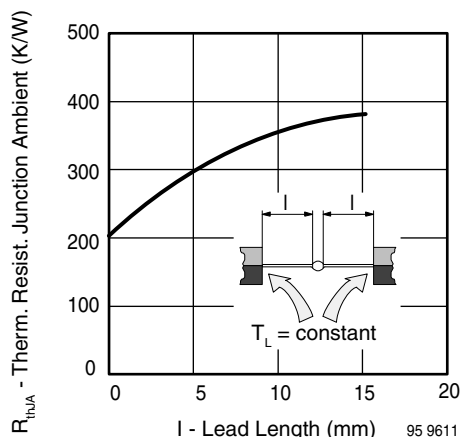
BASIC CHARACTERISTICS ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)


Fig. 1 - Thermal Resistance vs. Lead Length

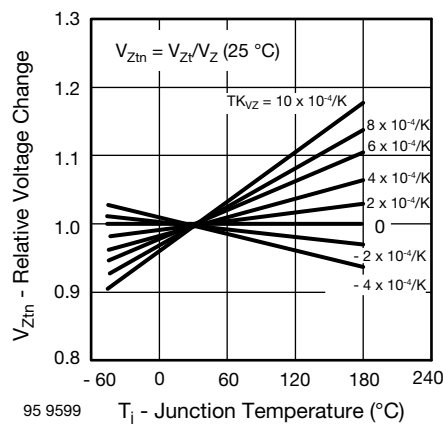


Fig. 4 - Typical Change of Working Voltage vs. Junction Temperature



Fig. 2 - Total Power Dissipation vs. Ambient Temperature

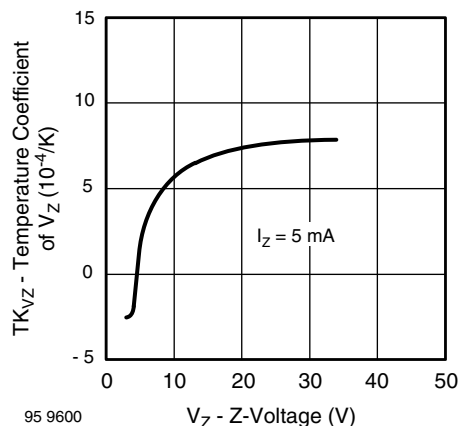

Fig. 5 - Temperature Coefficient of V_Z vs. Z-Voltage

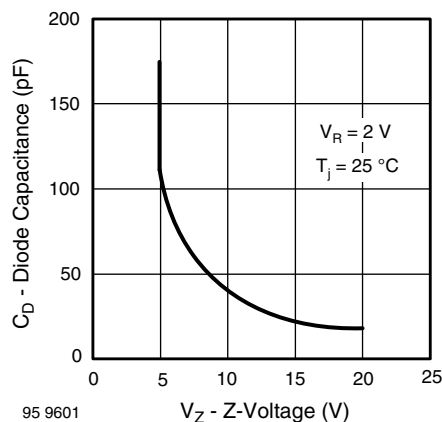
Fig. 3 - Typical Change of Working Voltage under Operating Conditions at $T_{amb} = 25\text{ }^{\circ}\text{C}$


Fig. 6 - Diode Capacitance vs. Z-Voltage



Fig. 7 - Forward Current vs. Forward Voltage

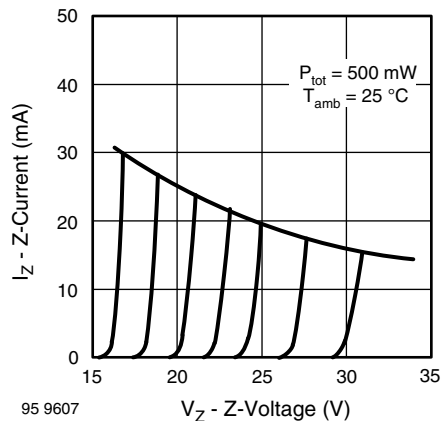


Fig. 9 - Z-Current vs. Z-Voltage



Fig. 8 - Z-Current vs. Z-Voltage



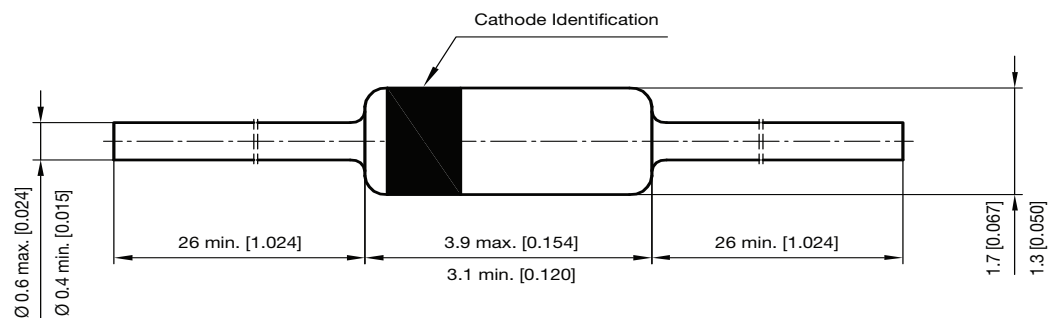
Fig. 10 - Differential Z-Resistance vs. Z-Voltage



Fig. 11 - Thermal Response



PACKAGE DIMENSIONS in millimeters (inches): **DO-35**



Rev. 6 - Date: 19. December 2011
Document no.: SB-V-3906.04-031(4)
94 9366



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.

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.

Material Category Policy

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as RoHS-Compliant fulfill the definitions and restrictions defined under Directive 2011/65/EU of The European Parliament and of the Council of June 8, 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment (EEE) - recast, unless otherwise specified as non-compliant.

Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.

Vishay Intertechnology, Inc. hereby certifies that all its products that are identified as Halogen-Free follow Halogen-Free requirements as per JEDEC JS709A standards. Please note that some Vishay documentation may still make reference to the IEC 61249-2-21 definition. We confirm that all the products identified as being compliant to IEC 61249-2-21 conform to JEDEC JS709A standards.