

## Small Signal Zener Diodes


**DESIGN SUPPORT TOOLS**
[click logo to get started](#)


PRIMARY CHARACTERISTICS		
PARAMETER	VALUE	UNIT
V <sub>Z</sub> range nom.	2.4 to 75	V
Test current I <sub>ZT</sub>	2; 5	mA
V <sub>Z</sub> specification	Pulse current	
Circuit configuration	Single	

**FEATURES**

- Silicon planar Zener diodes
- The Zener voltages are graded according to the international E24 standard
- Standard Zener voltage tolerance is  $\pm 5\%$ ; replace "C" with "B" for  $\pm 2\%$  tolerance
- AEC-Q101 qualified available
- 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](http://www.vishay.com/doc?99912)

 AUTOMOTIVE  
GRADE  
Available

**RoHS**  
COMPLIANT

ORDERING INFORMATION			
DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZX384-series	BZX384C2V4-E3-08 to BZX384C75-E3-08	3000 (8 mm tape on 7" reel)	15 000/box
	BZX384B2V4-E3-08 to BZX384B75-E3-08		
	BZX384C2V4-HE3-08 to BZX384C75-HE3-08		
	BZX384B2V4-HE3-08 to BZX384B75-HE3-08		
	BZX384C2V4-E3-18 to BZX384C75-E3-18	10 000 (8 mm tape on 13" reel)	10 000/box
	BZX384B2V4-E3-18 to BZX384B75-E3-18		
	BZX384C2V4-HE3-18 to BZX384C75-HE3-18		
	BZX384B2V4-HE3-18 to BZX384B75-HE3-18		

PACKAGE				
PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
SOD-323	4.3 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS (T <sub>amb</sub> = 25 °C, unless otherwise specified)					
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT	
Power dissipation	Device on fiberglass substrate	P <sub>tot</sub>	200	mW	
Thermal resistance junction to ambient air	Valid that electrodes are kept at ambient temperature	R <sub>thJA</sub>	650	K/W	
Junction temperature		T <sub>j</sub>	150	°C	
Storage temperature range		T <sub>stg</sub>	-65 to +150	°C	
Operating temperature range		T <sub>op</sub>	-55 to +150	°C	



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)												
PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LAEKAGE CURRENT		DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT OF ZENER VOLTAGE	
		$V_Z$ at $I_{ZT1}$			$I_{ZT1}$	$I_{ZT2}$	$I_R$ at $V_R$		$Z_Z$ at $I_{ZT1}$	$Z_{ZK}$ at $I_{ZT2}$	$\alpha_{VZ}$ at $I_{ZT1}$	
		V			mA		$\mu\text{A}$	V	$\Omega$		$10^{-4}/^{\circ}\text{C}$	
		MIN.	NOM.	MAX.			MAX.		TYP.	TYP.	MIN.	MAX.
BZX384C2V4	W1	2.2	2.4	2.6	5	1	50	1	70 ( $\leq 100$ )	275	-9	-4
BZX384C2V7	W2	2.5	2.7	2.9	5	1	20	1	75 ( $\leq 100$ )	300 ( $\leq 600$ )	-9	-4
BZX384C3V0	W3	2.8	3.0	3.2	5	1	10	1	80 ( $\leq 95$ )	325 ( $\leq 600$ )	-9	-3
BZX384C3V3	W4	3.1	3.3	3.5	5	1	5	1	85 ( $\leq 95$ )	350 ( $\leq 600$ )	-8	-3
BZX384C3V6	W5	3.4	3.6	3.8	5	1	5	1	85 ( $\leq 90$ )	375 ( $\leq 600$ )	-8	-3
BZX384C3V9	W6	3.7	3.9	4.1	5	1	3	1	85 ( $\leq 90$ )	400 ( $\leq 600$ )	-7	-3
BZX384C4V3	W7	4	4.3	4.6	5	1	3	1	80 ( $\leq 90$ )	410 ( $\leq 600$ )	-6	-1
BZX384C4V7	W8	4.4	4.7	5	5	1	3	2	50 ( $\leq 80$ )	425 ( $\leq 500$ )	-5	2
BZX384C5V1	W9	4.8	5.1	5.4	5	1	2	2	40 ( $\leq 60$ )	400 ( $\leq 480$ )	-3	4
BZX384C5V6	WA	5.2	5.6	6	5	1	1	2	15 ( $\leq 40$ )	80 ( $\leq 400$ )	-2	6
BZX384C6V2	WB	5.8	6.2	6.6	5	1	3	4	6 ( $\leq 10$ )	40 ( $\leq 150$ )	-1	7
BZX384C6V8	WC	6.4	6.8	7.2	5	1	2	4	6 ( $\leq 15$ )	30 ( $\leq 80$ )	2	7
BZX384C7V5	WD	7	7.5	7.9	5	1	1	5	6 ( $\leq 15$ )	30 ( $\leq 80$ )	3	7
BZX384C8V2	WE	7.7	8.2	8.7	5	1	0.7	5	6 ( $\leq 15$ )	40 ( $\leq 80$ )	4	7
BZX384C9V1	WF	8.5	9.1	9.6	5	1	0.5	6	6 ( $\leq 15$ )	40 ( $\leq 100$ )	5	8
BZX384C10	WG	9.4	10	10.6	5	1	0.2	7	8 ( $\leq 20$ )	50 ( $\leq 150$ )	5	8
BZX384C11	WH	10.4	11	11.6	5	1	0.1	8	10 ( $\leq 20$ )	50 ( $\leq 150$ )	5	9
BZX384C12	WI	11.4	12	12.7	5	1	0.1	8	10 ( $\leq 25$ )	50 ( $\leq 150$ )	6	9
BZX384C13	WK	12.4	13	14.1	5	1	0.1	8	10 ( $\leq 30$ )	50 ( $\leq 170$ )	7	9
BZX384C15	WL	13.8	15	15.6	5	1	0.05	$0.7 V_{Znom.}$	10 ( $\leq 30$ )	50 ( $\leq 200$ )	7	9
BZX384C16	WM	15.3	16	17.1	5	1	0.05	$0.7 V_{Znom.}$	10 ( $\leq 40$ )	50 ( $\leq 200$ )	8	9.5
BZX384C18	WN	16.8	18	19.1	5	1	0.05	$0.7 V_{Znom.}$	10 ( $\leq 45$ )	50 ( $\leq 225$ )	8	9.5
BZX384C20	WO	18.8	20	21.2	5	1	0.05	$0.7 V_{Znom.}$	15 ( $\leq 55$ )	60 ( $\leq 225$ )	8	10
BZX384C22	WP	20.8	22	23.3	5	1	0.05	$0.7 V_{Znom.}$	20 ( $\leq 55$ )	60 ( $\leq 250$ )	8	10
BZX384C24	WR	22.8	24	25.6	5	1	0.05	$0.7 V_{Znom.}$	25 ( $\leq 70$ )	60 ( $\leq 250$ )	8	10
BZX384C27	WS	25.1	27	28.9	2	0.5	0.05	$0.7 V_{Znom.}$	25 ( $\leq 80$ )	65 ( $\leq 300$ )	8	10
BZX384C30	WT	28	30	32	2	0.5	0.05	$0.7 V_{Znom.}$	30 ( $\leq 80$ )	70 ( $\leq 300$ )	8	10
BZX384C33	WU	31	33	35	2	0.5	0.05	$0.7 V_{Znom.}$	35 ( $\leq 80$ )	75 ( $\leq 325$ )	8	10
BZX384C36	WW	34	36	38	2	0.5	0.05	$0.7 V_{Znom.}$	35 ( $\leq 90$ )	80 ( $\leq 350$ )	8	10
BZX384C39	WX	37	39	41	2	0.5	0.05	$0.7 V_{Znom.}$	40 ( $\leq 130$ )	80 ( $\leq 350$ )	10	12
BZX384C43	WY	40	43	46	2	0.5	0.05	$0.7 V_{Znom.}$	45 ( $\leq 150$ )	85 ( $\leq 375$ )	10	12
BZX384C47	WZ	44	47	50	2	0.5	0.05	$0.7 V_{Znom.}$	50 ( $\leq 170$ )	85 ( $\leq 375$ )	10	12
BZX384C51	X1	48	51	54	2	0.5	0.05	$0.7 V_{Znom.}$	60 ( $\leq 180$ )	85 ( $\leq 400$ )	8	10
BZX384C56	X2	52	56	60	2	0.5	0.05	$0.7 V_{Znom.}$	70 ( $\leq 200$ )	100 ( $\leq 425$ )	10	12
BZX384C62	X3	58	62	66	2	0.5	0.05	$0.7 V_{Znom.}$	80 ( $\leq 215$ )	100 ( $\leq 450$ )	10	12
BZX384C68	X4	64	68	72	2	0.5	0.05	$0.7 V_{Znom.}$	90 ( $\leq 240$ )	150 ( $\leq 475$ )	10	12
BZX384C75	X5	70	75	79	2	0.5	0.05	$0.7 V_{Znom.}$	95 ( $\leq 255$ )	170 ( $\leq 500$ )	10	12



<b>ELECTRICAL CHARACTERISTICS</b> ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ , unless otherwise specified)												
PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LEAKAGE CURRENT		DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT OF ZENER VOLTAGE	
		$V_Z$ at $I_{ZT1}$			$I_{ZT1}$	$I_{ZT2}$	$I_R$ at $V_R$		$Z_Z$ at $I_{ZT1}$	$Z_{ZK}$ at $I_{ZT2}$	$\alpha_{VZ}$ at $I_{ZT1}$	
		V			mA		$\mu\text{A}$	V	$\Omega$		$10^{-4}/^{\circ}\text{C}$	
		MIN.	NOM.	MAX.			MAX.		TYP.	TYP.	MIN.	MAX.
BZX384B2V4	W1	2.35	2.4	2.45	5	1	50	1	70 ( $\leq 100$ )	275	-9	-4
BZX384B2V7	W2	2.65	2.7	2.75	5	1	20	1	75 ( $\leq 100$ )	300 ( $\leq 600$ )	-9	-3
BZX384B3V0	W3	2.94	3.0	3.06	5	1	10	1	80 ( $\leq 95$ )	325 ( $\leq 600$ )	-8	-3
BZX384B3V3	W4	3.23	3.3	3.37	5	1	5	1	85 ( $\leq 95$ )	350 ( $\leq 600$ )	-8	-3
BZX384B3V6	W5	3.53	3.6	3.67	5	1	5	1	85 ( $\leq 90$ )	375 ( $\leq 600$ )	-7	-3
BZX384B3V9	W6	3.82	3.9	3.98	5	1	3	1	85 ( $\leq 90$ )	400 ( $\leq 600$ )	-6	-1
BZX384B4V3	W7	4.21	4.3	4.39	5	1	3	1	80 ( $\leq 90$ )	410 ( $\leq 600$ )	-5	2
BZX384B4V7	W8	4.61	4.7	4.79	5	1	3	2	50 ( $\leq 80$ )	425 ( $\leq 500$ )	-3	4
BZX384B5V1	W9	5	5.1	5.2	5	1	2	2	40 ( $\leq 60$ )	400 ( $\leq 480$ )	-2	6
BZX384B5V6	WA	5.49	5.6	5.71	5	1	1	2	15 ( $\leq 40$ )	80 ( $\leq 400$ )	-1	7
BZX384B6V2	WB	6.08	6.2	6.32	5	1	3	4	6 ( $\leq 10$ )	40 ( $\leq 150$ )	2	7
BZX384B6V8	WC	6.66	6.8	6.94	5	1	2	4	6 ( $\leq 15$ )	30 ( $\leq 80$ )	3	7
BZX384B7V5	WD	7.35	7.5	7.65	5	1	1	5	6 ( $\leq 15$ )	30 ( $\leq 80$ )	4	7
BZX384B8V2	WE	8.04	8.2	8.36	5	1	0.7	5	6 ( $\leq 15$ )	40 ( $\leq 80$ )	5	8
BZX384B9V1	WF	8.92	9.1	9.28	5	1	0.5	6	6 ( $\leq 15$ )	40 ( $\leq 100$ )	5	8
BZX384B10	WG	9.8	10	10.2	5	1	0.2	7	8 ( $\leq 20$ )	50 ( $\leq 150$ )	5	9
BZX384B11	WH	10.8	11	11.2	5	1	0.1	8	10 ( $\leq 20$ )	50 ( $\leq 150$ )	6	9
BZX384B12	WI	11.8	12	12.2	5	1	0.1	8	10 ( $\leq 25$ )	50 ( $\leq 150$ )	7	9
BZX384B13	WK	12.7	13	13.3	5	1	0.1	8	10 ( $\leq 30$ )	50 ( $\leq 170$ )	7	9
BZX384B15	WL	14.7	15	15.3	5	1	0.05	0.7 $V_{Znom.}$	10 ( $\leq 30$ )	50 ( $\leq 200$ )	8	9.5
BZX384B16	WM	15.7	16	16.3	5	1	0.05	0.7 $V_{Znom.}$	10 ( $\leq 40$ )	50 ( $\leq 200$ )	8	9.5
BZX384B18	WN	17.6	18	18.4	5	1	0.05	0.7 $V_{Znom.}$	10 ( $\leq 45$ )	50 ( $\leq 225$ )	8	10
BZX384B20	WO	19.6	20	20.4	5	1	0.05	0.7 $V_{Znom.}$	15 ( $\leq 55$ )	60 ( $\leq 225$ )	8	10
BZX384B22	WP	21.6	22	22.4	5	1	0.05	0.7 $V_{Znom.}$	20 ( $\leq 55$ )	60 ( $\leq 250$ )	8	10
BZX384B24	WR	23.5	24	24.5	5	1	0.05	0.7 $V_{Znom.}$	25 ( $\leq 70$ )	60 ( $\leq 250$ )	8	10
BZX384B27	WS	26.5	27	27.5	2	0.5	0.05	0.7 $V_{Znom.}$	25 ( $\leq 80$ )	65 ( $\leq 300$ )	8	10
BZX384B30	WT	29.4	30	30.6	2	0.5	0.05	0.7 $V_{Znom.}$	30 ( $\leq 80$ )	70 ( $\leq 300$ )	8	10
BZX384B33	WU	32.3	33	33.7	2	0.5	0.05	0.7 $V_{Znom.}$	35 ( $\leq 80$ )	75 ( $\leq 325$ )	8	10
BZX384B36	WW	35.3	36	36.7	2	0.5	0.05	0.7 $V_{Znom.}$	35 ( $\leq 90$ )	80 ( $\leq 350$ )	10	12
BZX384B39	WX	38.2	39	39.8	2	0.5	0.05	0.7 $V_{Znom.}$	40 ( $\leq 130$ )	80 ( $\leq 350$ )	10	12
BZX384B43	WY	42.1	43	43.9	2	0.5	0.05	0.7 $V_{Znom.}$	45 ( $\leq 150$ )	85 ( $\leq 375$ )	10	12
BZX384B47	WZ	46.1	47	47.9	2	0.5	0.05	0.7 $V_{Znom.}$	50 ( $\leq 170$ )	85 ( $\leq 375$ )	10	12
BZX384B51	X1	50	51	52	2	0.5	0.05	0.7 $V_{Znom.}$	60 ( $\leq 180$ )	85 ( $\leq 400$ )	10	12
BZX384B56	X2	54.9	56	57.1	2	0.5	0.05	0.7 $V_{Znom.}$	70 ( $\leq 200$ )	100 ( $\leq 425$ )	10	12
BZX384B62	X3	60.8	62	63.2	2	0.5	0.05	0.7 $V_{Znom.}$	80 ( $\leq 215$ )	100 ( $\leq 450$ )	10	12
BZX384B68	X4	66.6	68	69.4	2	0.5	0.05	0.7 $V_{Znom.}$	90 ( $\leq 240$ )	150 ( $\leq 475$ )	10	12
BZX384B75	X5	73.5	75	76.5	2	0.5	0.05	0.7 $V_{Znom.}$	95 ( $\leq 255$ )	170 ( $\leq 500$ )	10	12

**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

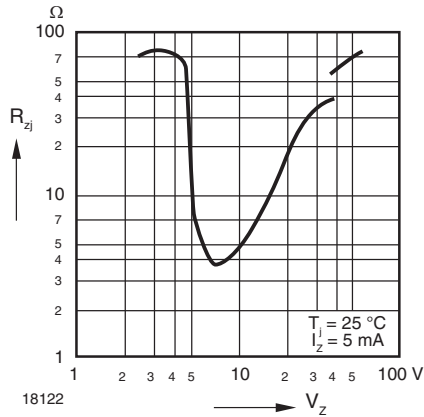


Fig. 7 - Dynamic Resistance vs. Zener Voltage



Fig. 10 - Change of Zener Voltage vs. Junction Temperature



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



Fig. 11 - Temperature Dependence of Zener Voltage vs. Zener Voltage



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

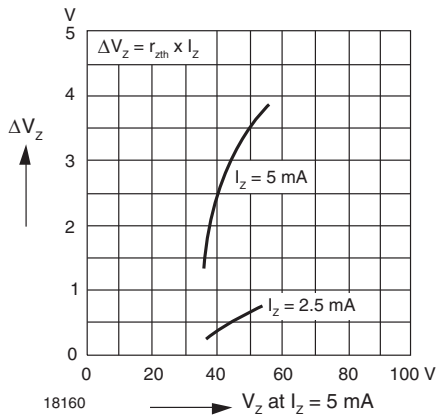


Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

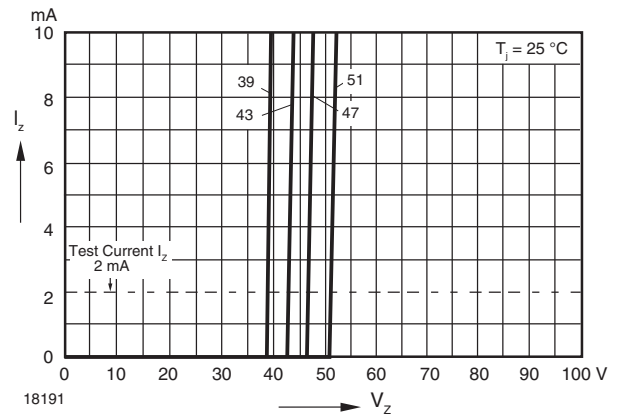


Fig. 16 - Breakdown Characteristics

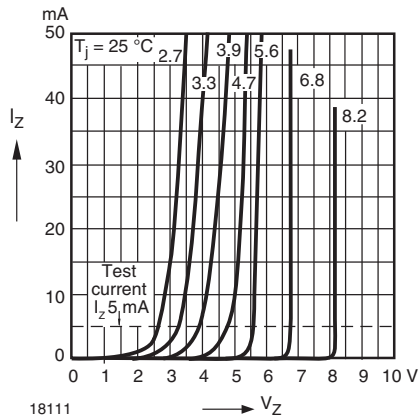


Fig. 14 - Breakdown Characteristics

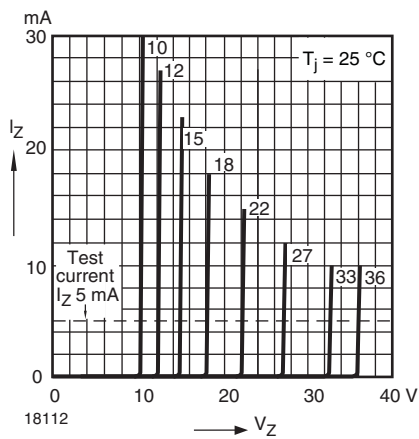


Fig. 15 - Breakdown Characteristics



PACKAGE DIMENSIONS in millimeters (inches): SOD-323



Footprint recommendation:



Document no.: S8-V-3910.02-001 (4)  
 Created - Date: 24.August.2004  
 Rev. 6 - Date: 23.Sept.2016  
 17443



## **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.