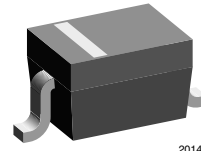


## Small Signal Zener Diodes

### Features

- Silicon Planar Power Zener Diodes
- The Zener voltages are graded according to the international E 24 standard
- Standard Zener voltage tolerance is  $\pm 5\%$ ; Replace "C" with "B" for  $\pm 2\%$  tolerance
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



20145

### Mechanical Data

**Case:** SOD323 Plastic case

**Weight:** approx. 5.0 mg

**Packaging Codes/Options:**

GS18/10 k per 13" reel (8 mm tape), 10 k/box

GS08/3 k per 7" reel (8 mm tape), 15 k/box

### Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Power dissipation		$P_{tot}$	200 <sup>1)</sup>	mW

<sup>1)</sup> Device on fiberglass substrate

### Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		$R_{thJA}$	650 <sup>1)</sup>	K/W
Junction temperature		$T_j$	150	$^{\circ}\text{C}$
Storage temperature range		$T_{stg}$	- 65 to + 150	$^{\circ}\text{C}$

<sup>1)</sup> Valid that electrodes are kept at ambient temperature

### Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temperature Coefficient of Zener Voltage		Test Current	Reverse Leakage Current			
		$V_Z$ at $I_{ZT1}$		$r_{zj}$ at $I_{ZT1}$	$r_{zj}$ at $I_{ZT2}$		$I_{ZT1}$	$\alpha_{VZ}$ at $I_{ZT1}$		at $I_{ZT2}$	$I_R$ at $V_R$		
		V		$\Omega$	$\Omega$		mA	$10^{-4}/^{\circ}\text{C}$		mA	$\mu\text{A}$	V	
		min	max	typ	typ		min	max					
BZX384C2V4-V	W1	2.2	2.6	70 ( $\leq 100$ )	275	5	-9	-4	1	50	1		
BZX384C2V7-V	W2	2.5	2.9	75 ( $\leq 100$ )	300 ( $\leq 600$ )	5	-9	-4	1	20	1		
BZX384C3V0-V	W3	2.8	3.2	80 ( $\leq 95$ )	325 ( $\leq 600$ )	5	-9	-3	1	10	1		
BZX384C3V3-V	W4	3.1	3.5	85 ( $\leq 95$ )	350 ( $\leq 600$ )	5	-8	-3	1	5	1		
BZX384C3V6-V	W5	3.4	3.8	85 ( $\leq 90$ )	375 ( $\leq 600$ )	5	-8	-3	1	5	1		
BZX384C3V9-V	W6	3.7	4.1	85 ( $\leq 90$ )	400 ( $\leq 600$ )	5	-7	-3	1	3	1		
BZX384C4V3-V	W7	4	4.6	80 ( $\leq 90$ )	410 ( $\leq 600$ )	5	-6	-1	1	3	1		
BZX384C4V7-V	W8	4.4	5	50 ( $\leq 80$ )	425 ( $\leq 500$ )	5	-5	2	1	3	2		
BZX384C5V1-V	W9	4.8	5.4	40 ( $\leq 60$ )	400 ( $\leq 480$ )	5	-3	4	1	2	2		
BZX384C5V6-V	WA	5.2	6	15 ( $\leq 40$ )	80 ( $\leq 400$ )	5	-2	6	1	1	2		
BZX384C6V2-V	WB	5.8	6.6	6.0 ( $\leq 10$ )	40 ( $\leq 150$ )	5	-1	7	1	3	4		
BZX384C6V8-V	WC	6.4	7.2	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	2	7	1	2	4		
BZX384C7V5-V	WD	7	7.9	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	3	7	1	1	5		
BZX384C8V2-V	WE	7.7	8.7	6.0 ( $\leq 15$ )	40 ( $\leq 80$ )	5	4	7	1	0.7	5		
BZX384C9V1-V	WF	8.5	9.6	6.0 ( $\leq 15$ )	40 ( $\leq 100$ )	5	5	8	1	0.5	6		
BZX384C10-V	WG	9.4	10.6	8.0 ( $\leq 20$ )	50 ( $\leq 150$ )	5	5	8	1	0.2	7		
BZX384C11-V	WH	10.4	11.6	10 ( $\leq 20$ )	50 ( $\leq 150$ )	5	5	9	1	0.1	8		
BZX384C12-V	WI	11.4	12.7	10 ( $\leq 25$ )	50 ( $\leq 150$ )	5	6	9	1	0.1	8		
BZX384C13-V	WK	12.4	14.1	10 ( $\leq 30$ )	50 ( $\leq 170$ )	5	7	9	1	0.1	8		
BZX384C15-V	WL	13.8	15.6	10 ( $\leq 30$ )	50 ( $\leq 200$ )	5	7	9	1	0.05	0.7 $V_{Znom}$		
BZX384C16-V	WM	15.3	17.1	10 ( $\leq 40$ )	50 ( $\leq 200$ )	5	8	9.5	1	0.05	0.7 $V_{Znom}$		
BZX384C18-V	WN	16.8	19.1	10 ( $\leq 45$ )	50 ( $\leq 225$ )	5	8	9.5	1	0.05	0.7 $V_{Znom}$		
BZX384C20-V	WO	18.8	21.2	15 ( $\leq 55$ )	60 ( $\leq 225$ )	5	8	10	1	0.05	0.7 $V_{Znom}$		
BZX384C22-V	WP	20.8	23.3	20 ( $\leq 55$ )	60 ( $\leq 250$ )	5	8	10	1	0.05	0.7 $V_{Znom}$		
BZX384C24-V	WR	22.8	25.6	25 ( $\leq 70$ )	60 ( $\leq 250$ )	5	8	10	1	0.05	0.7 $V_{Znom}$		
BZX384C27-V	WS	25.1	28.9	25 ( $\leq 80$ )	65 ( $\leq 300$ )	2	8	10	0.5	0.05	0.7 $V_{Znom}$		
BZX384C30-V	WT	28	32	30 ( $\leq 80$ )	70 ( $\leq 300$ )	2	8	10	0.5	0.05	0.7 $V_{Znom}$		
BZX384C33-V	WU	31	35	35 ( $\leq 80$ )	75 ( $\leq 325$ )	2	8	10	0.5	0.05	0.7 $V_{Znom}$		
BZX384C36-V	WW	34	38	35 ( $\leq 90$ )	80 ( $\leq 350$ )	2	8	10	0.5	0.05	0.7 $V_{Znom}$		
BZX384C39-V	WX	37	41	40 ( $\leq 130$ )	80 ( $\leq 350$ )	2	10	12	0.5	0.05	0.7 $V_{Znom}$		
BZX384C43-V	WY	40	46	45 ( $\leq 150$ )	85 ( $\leq 375$ )	2	10	12	0.5	0.05	0.7 $V_{Znom}$		
BZX384C47-V	WZ	44	50	50 ( $\leq 170$ )	85 ( $\leq 375$ )	2	10	12	0.5	0.05	0.7 $V_{Znom}$		
BZX384C51-V	X1	48	54	60 ( $\leq 180$ )	85 ( $\leq 400$ )	2	10	12	0.5	0.05	0.7 $V_{Znom}$		
BZX384C56-V	X2	52	60	70 ( $\leq 200$ )	100 ( $\leq 425$ )	2	9	11	0.5	0.05	0.7 $V_{Znom}$		
BZX384C62-V	X3	58	66	80 ( $\leq 215$ )	100 ( $\leq 450$ )	2	9	12	0.5	0.05	0.7 $V_{Znom}$		
BZX384C68-V	X4	64	72	90 ( $\leq 240$ )	150 ( $\leq 475$ )	2	10	12	0.5	0.05	0.7 $V_{Znom}$		
BZX384C75-V	X5	70	79	95 ( $\leq 255$ )	170 ( $\leq 500$ )	2	10	12	0.5	0.05	0.7 $V_{Znom}$		

(1) Measured with pulses  $t_p = 5$  ms



## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temperature Coefficient of Zener Voltage		Test Current	Reverse Leakage Current			
		$V_Z$ at $I_{ZT1}$		$r_{zj}$ at $I_{ZT1}$	$r_{zj}$ at $I_{ZT2}$		$I_{ZT1}$	$\alpha_{VZ}$ at $I_{ZT1}$		$I_{ZT2}$	$I_R$ at $V_R$		
		V		$\Omega$	$\Omega$		mA	$10^{-4}/^{\circ}\text{C}$		mA	$\mu\text{A}$	V	
		min	max	typ	typ		min	max					
BZX384B2V4-V	W1	2.35	2.45	70 ( $\leq 100$ )	275	5	-9	-4	1	50	1		
BZX384B2V7-V	W2	2.65	2.75	75 ( $\leq 100$ )	300 ( $\leq 600$ )	5	-9	-4	1	20	1		
BZX384B3V0-V	W3	2.94	3.06	80 ( $\leq 95$ )	325 ( $\leq 600$ )	5	-9	-3	1	10	1		
BZX384B3V3-V	W4	3.23	3.37	85 ( $\leq 95$ )	350 ( $\leq 600$ )	5	-8	-3	1	5	1		
BZX384B3V6-V	W5	3.53	3.67	85 ( $\leq 90$ )	375 ( $\leq 600$ )	5	-8	-3	1	5	1		
BZX384B3V9-V	W6	3.82	3.98	85 ( $\leq 90$ )	400 ( $\leq 600$ )	5	-7	-3	1	3	1		
BZX384B4V3-V	W7	4.21	4.39	80 ( $\leq 90$ )	410 ( $\leq 600$ )	5	-6	-1	1	3	1		
BZX384B4V7-V	W8	4.61	4.79	50 ( $\leq 80$ )	425 ( $\leq 500$ )	5	-5	2	1	3	2		
BZX384B5V1-V	W9	5.00	5.20	40 ( $\leq 60$ )	400 ( $\leq 480$ )	5	-3	4	1	2	2		
BZX384B5V6-V	WA	5.49	5.71	15 ( $\leq 40$ )	80 ( $\leq 400$ )	5	-2	6	1	1	2		
BZX384B6V2-V	WB	6.08	6.32	6.0 ( $\leq 10$ )	40 ( $\leq 150$ )	5	-1	7	1	3	4		
BZX384B6V8-V	WC	6.66	6.94	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	2	7	1	2	4		
BZX384B7V5-V	WD	7.35	7.65	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	3	7	1	1	5		
BZX384B8V2-V	WE	8.04	8.36	6.0 ( $\leq 15$ )	40 ( $\leq 80$ )	5	4	7	1	0.7	5		
BZX384B9V1-V	WF	8.92	9.28	6.0 ( $\leq 15$ )	40 ( $\leq 100$ )	5	5	8	1	0.5	6		
BZX384B10-V	WG	9.80	10.2	8.0 ( $\leq 20$ )	50 ( $\leq 150$ )	5	5	8	1	0.2	7		
BZX384B11-V	WH	10.8	11.2	10 ( $\leq 20$ )	50 ( $\leq 150$ )	5	5	9	1	0.1	8		
BZX384B12-V	WI	11.8	12.2	10 ( $\leq 25$ )	50 ( $\leq 150$ )	5	6	9	1	0.1	8		
BZX384B13-V	WK	12.7	13.3	10 ( $\leq 30$ )	50 ( $\leq 170$ )	5	7	9	1	0.1	8		
BZX384B15-V	WL	14.7	15.3	10 ( $\leq 30$ )	50 ( $\leq 200$ )	5	7	9	1	0.05	0.7 $V_{Znom.}$		
BZX384B16-V	WM	15.7	16.3	10 ( $\leq 40$ )	50 ( $\leq 200$ )	5	8	9.5	1	0.05	0.7 $V_{Znom.}$		
BZX384B18-V	WN	17.6	18.4	10 ( $\leq 45$ )	50 ( $\leq 225$ )	5	8	9.5	1	0.05	0.7 $V_{Znom.}$		
BZX384B20-V	WO	19.6	20.4	15 ( $\leq 55$ )	60 ( $\leq 225$ )	5	8	10	1	0.05	0.7 $V_{Znom.}$		
BZX384B22-V	WP	21.6	22.4	20 ( $\leq 55$ )	60 ( $\leq 250$ )	5	8	10	1	0.05	0.7 $V_{Znom.}$		
BZX384B24-V	WR	23.5	24.5	25 ( $\leq 70$ )	60 ( $\leq 250$ )	5	8	10	1	0.05	0.7 $V_{Znom.}$		
BZX384B27-V	WS	26.5	27.5	25 ( $\leq 80$ )	65 ( $\leq 300$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B30-V	WT	29.4	30.6	30 ( $\leq 80$ )	70 ( $\leq 300$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B33-V	WU	32.3	33.7	35 ( $\leq 80$ )	75 ( $\leq 325$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B36-V	WW	35.3	36.7	35 ( $\leq 90$ )	80 ( $\leq 350$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B39-V	WX	38.2	39.8	40 ( $\leq 130$ )	80 ( $\leq 350$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B43-V	WY	42.1	43.9	45 ( $\leq 150$ )	85 ( $\leq 375$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B47-V	WZ	46.1	47.9	50 ( $\leq 170$ )	85 ( $\leq 375$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B51-V	X1	50.0	52.0	60 ( $\leq 180$ )	85 ( $\leq 400$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B56-V	X2	54.9	57.1	70 ( $\leq 200$ )	100 ( $\leq 425$ )	2	9	11	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B62-V	X3	60.8	63.2	80 ( $\leq 215$ )	100 ( $\leq 450$ )	2	9	12	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B68-V	X4	66.6	69.4	90 ( $\leq 240$ )	150 ( $\leq 475$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$		
BZX384B75-V	X5	73.5	76.5	95 ( $\leq 255$ )	170 ( $\leq 500$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$		

## Typical Characteristics

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

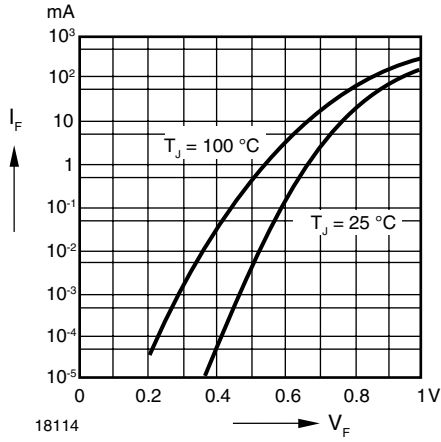


Figure 1. Forward characteristics

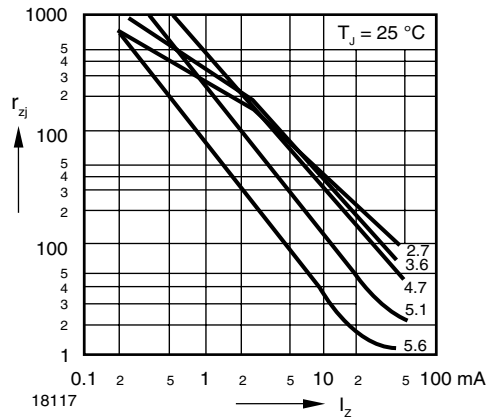


Figure 4. Dynamic Resistance vs. Zener Current

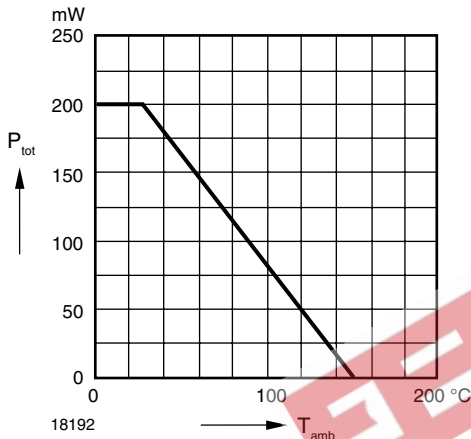


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

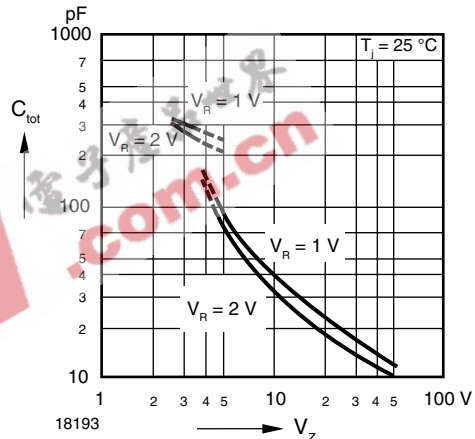


Figure 5. Capacitance vs. Zener Voltage

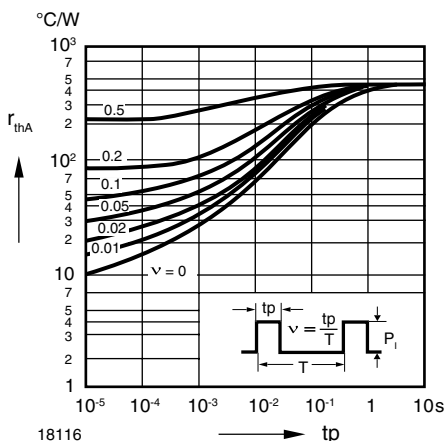


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

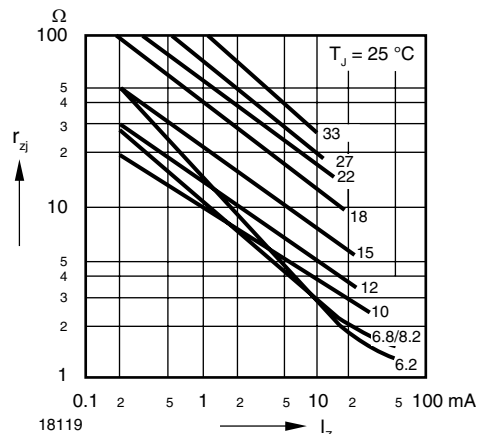


Figure 6. Dynamic Resistance vs. Zener Current

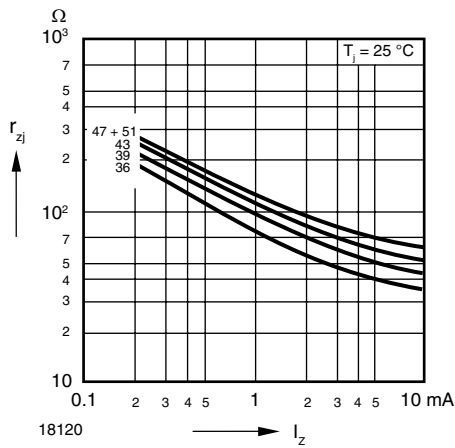


Figure 7. Dynamic Resistance vs. Zener Current

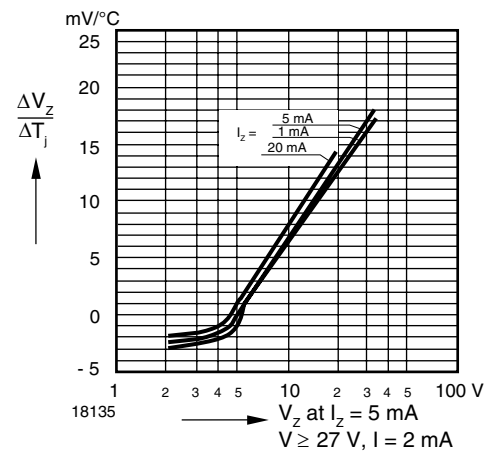


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

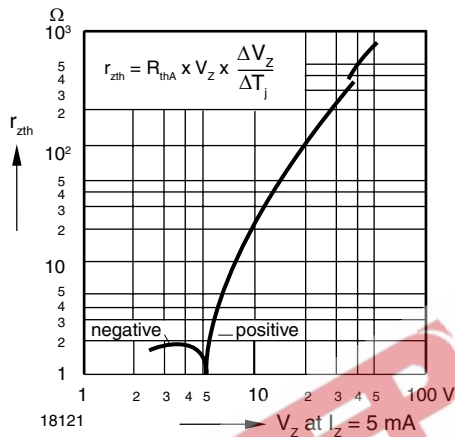


Figure 8. Thermal Differential Resistance vs. Zener Voltage

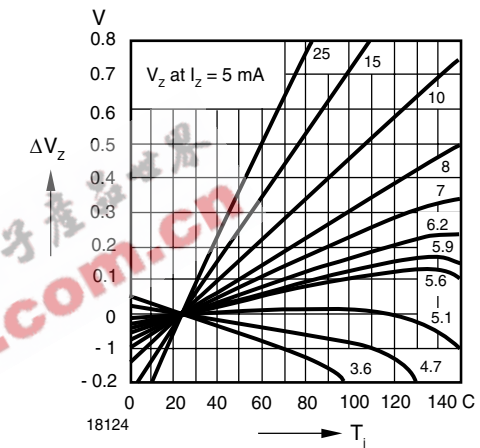


Figure 11. Change of Zener Voltage vs. Junction Temperature

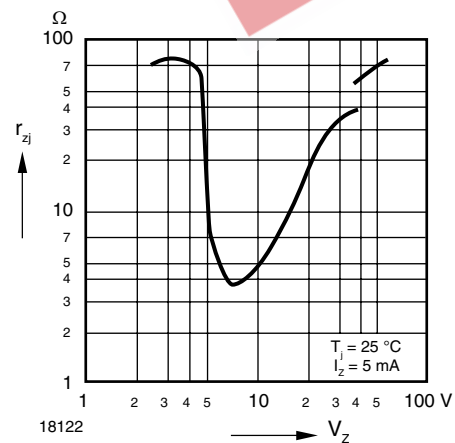


Figure 9. Dynamic Resistance vs. Zener Voltage

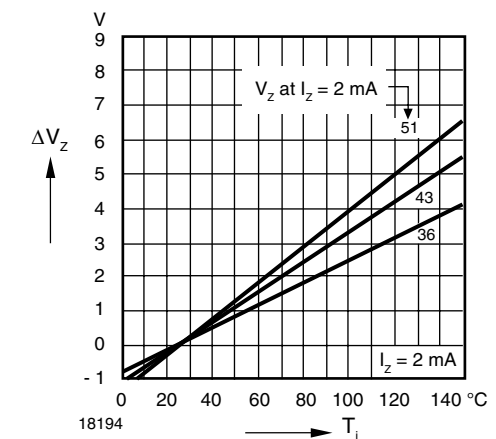


Figure 12. Change of Zener Voltage vs. Junction Temperature

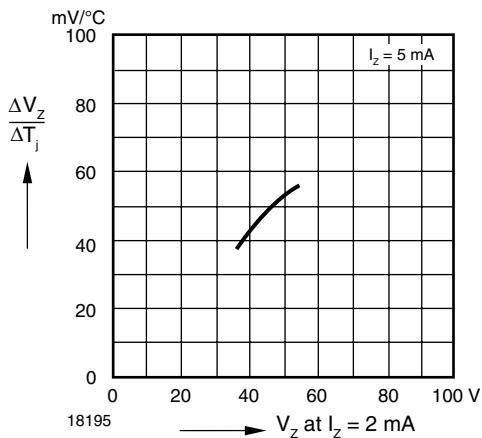


Figure 13. Temperature Dependence of Zener Voltage vs. Zener Voltage

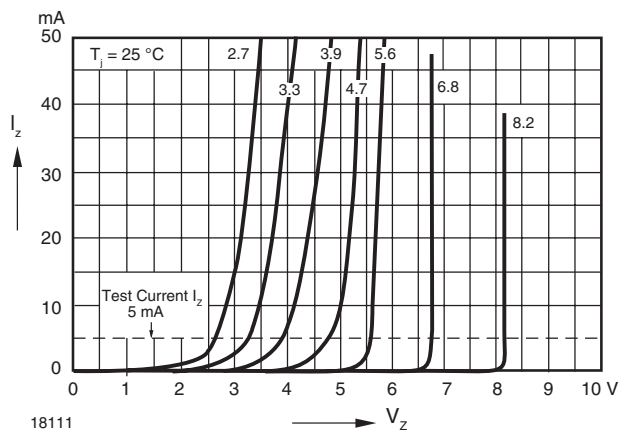


Figure 16. Breakdown Characteristics

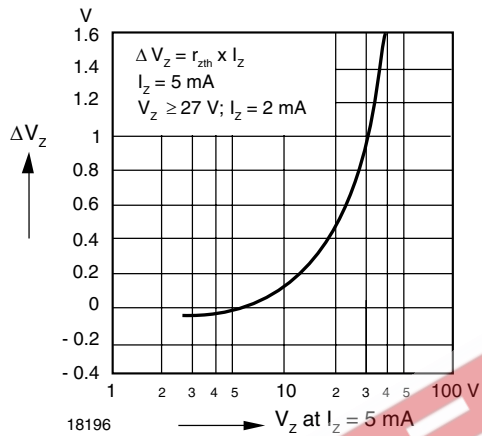


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

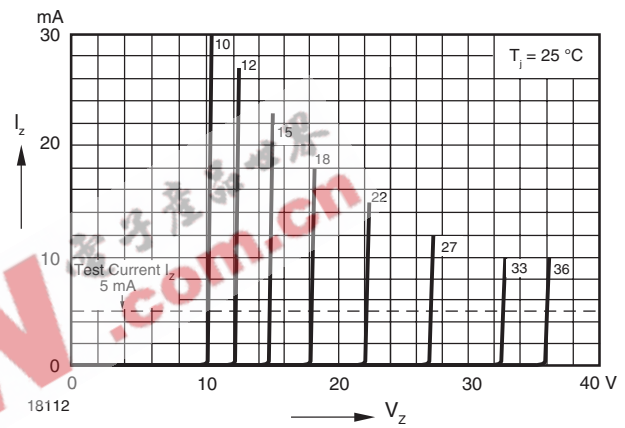


Figure 17. Breakdown Characteristics

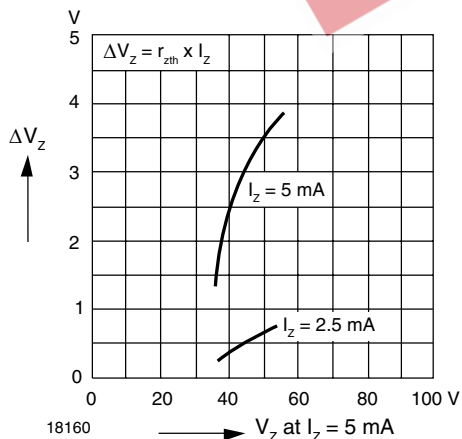


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

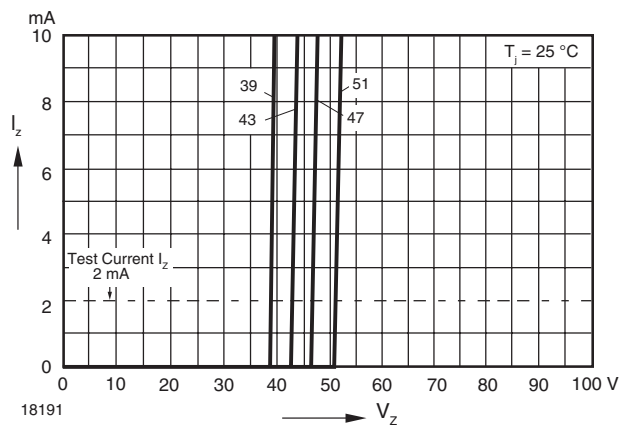
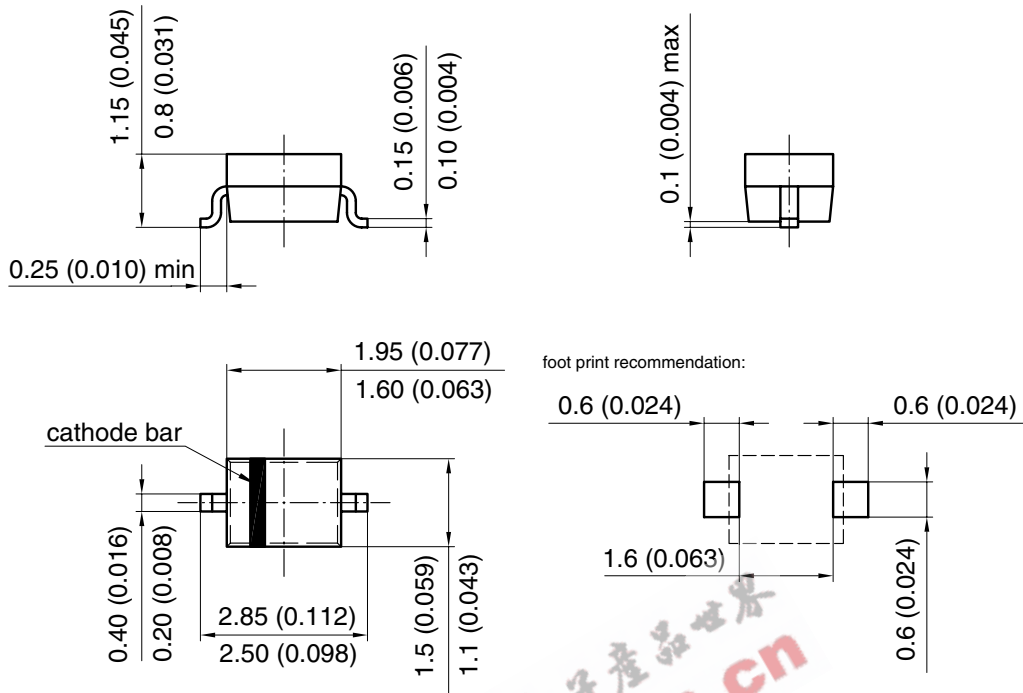


Figure 18. Breakdown Characteristics

## Package Dimensions in mm (Inches): SOD323



Document no.: S8-V-3910.02-001 (4)

Rev. 03 - Date: 08.November 2004

17443

EPW.com.cn

### Ozone Depleting Substances Policy Statement

It is the policy of Vishay Semiconductor GmbH to

1. Meet all present and future national and international statutory requirements.
2. Regularly and continuously improve the performance of our products, processes, distribution and operating systems with respect to their impact on the health and safety of our employees and the public, as well as their impact on the environment.

It is particular concern to control or eliminate releases of those substances into the atmosphere which are known as ozone depleting substances (ODSs).

The Montreal Protocol (1987) and its London Amendments (1990) intend to severely restrict the use of ODSs and forbid their use within the next ten years. Various national and international initiatives are pressing for an earlier ban on these substances.

Vishay Semiconductor GmbH has been able to use its policy of continuous improvements to eliminate the use of ODSs listed in the following documents.

1. Annex A, B and list of transitional substances of the Montreal Protocol and the London Amendments respectively
2. Class I and II ozone depleting substances in the Clean Air Act Amendments of 1990 by the Environmental Protection Agency (EPA) in the USA
3. Council Decision 88/540/EEC and 91/690/EEC Annex A, B and C (transitional substances) respectively.

Vishay Semiconductor GmbH can certify that our semiconductors are not manufactured with ozone depleting substances and do not contain such substances.

We reserve the right to make changes to improve technical design and may do so without further notice.

Parameters can vary in different applications. All operating parameters must be validated for each customer application by the customer. Should the buyer use Vishay Semiconductors products for any unintended or unauthorized application, the buyer shall indemnify Vishay Semiconductors against all claims, costs, damages, and expenses, arising out of, directly or indirectly, any claim of personal damage, injury or death associated with such unintended or unauthorized use.

Vishay Semiconductor GmbH, P.O.B. 3535, D-74025 Heilbronn, Germany





### Disclaimer

All product specifications and data are subject to change without notice.

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 herein or in any other disclosure relating to any product.

Vishay disclaims any and all liability arising out of the use or application of any product described herein or of any information provided herein to the maximum extent permitted by law. The product specifications do not expand or otherwise modify Vishay's terms and conditions of purchase, including but not limited to the warranty expressed therein, which apply to these products.

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.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications unless otherwise expressly indicated. Customers using or selling Vishay products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify Vishay for any damages arising or resulting from such use or sale. Please contact authorized Vishay personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.