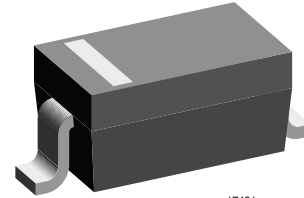


## Zener Diodes

### 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. Other voltage tolerances and other Zener voltages are available upon request.



17431

### Mechanical Data

**Case:** SOD-323 Plastic Package

**Weight:** Approx. 4 mg

#### Packaging Codes/Options:

D5 / 10k per 13 " reel (8 mm tape), 30k/box

D6 / 3k per 7 " reel (8 mm tape), 30k/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		$R_{\theta JA}$	650 <sup>1)</sup>	$^{\circ}\text{C}/\text{W}$
Junction temperature		$T_j$	150	$^{\circ}\text{C}$
Storage temperature range		$T_S$	- 65 to + 150	$^{\circ}\text{C}$

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

# BZX384 Series



Vishay Semiconductors

## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range <sup>(1)</sup>		Dynamic Resistance	Temperature Coefficient of Zener Voltage		Test Current	Dynamic Resistance	Test Current	Reverse Leakage Current	
		$V_Z @ I_{ZT}$			$r_{zj} @ I_{ZT1}$	$\alpha_{VZ} @ I_{ZT1}$				$I_{ZT1}$	$r_{zj} @ I_{ZT2}$
		V		$\Omega$	$10^{-4}/^{\circ}\text{C}$		mA	$\Omega$	mA	$\mu\text{A}$	V
		min	max		min	max					
BZX384C2V4	W1	2.2	2.6	70 ( $\leq 100$ )	-9	-4	5	275	1	50	1
BZX384C2V7	W2	2.5	2.9	75 ( $\leq 100$ )	-9	-4	5	300 ( $\leq 600$ )	1	20	1
BZX384C3	W3	2.8	3.2	80 ( $\leq 95$ )	-9	-3	5	325 ( $\leq 600$ )	1	10	1
BZX384C3V3	W4	3.1	3.5	85 ( $\leq 95$ )	-8	-3	5	350 ( $\leq 600$ )	1	5	1
BZX384C3V6	W5	3.4	3.8	85 ( $\leq 90$ )	-8	-3	5	375 ( $\leq 600$ )	1	5	1
BZX384C3V9	W6	3.7	4.1	85 ( $\leq 90$ )	-7	-3	5	400 ( $\leq 600$ )	1	3	1
BZX384C4V3	W7	4	4.6	80 ( $\leq 90$ )	-6	-1	5	410 ( $\leq 600$ )	1	3	1
BZX384C4V7	W8	4.4	5	50 ( $\leq 80$ )	-5	2	5	425 ( $\leq 500$ )	1	3	2
BZX384C5V1	W9	4.8	5.4	40 ( $\leq 60$ )	-3	4	5	400 ( $\leq 480$ )	1	2	2
BZX384C5V6	WA	5.2	6	15 ( $\leq 40$ )	-2	6	5	80 ( $\leq 400$ )	1	1	2
BZX384C6V2	WB	5.8	6.6	6.0 ( $\leq 10$ )	-1	7	5	40 ( $\leq 150$ )	1	3	4
BZX384C6V8	WC	6.4	7.2	6.0 ( $\leq 15$ )	2	7	5	30 ( $\leq 80$ )	1	2	4
BZX384C7V5	WD	7	7.9	6.0 ( $\leq 15$ )	3	7	5	30 ( $\leq 80$ )	1	1	5
BZX384C8V2	WE	7.7	8.7	6.0 ( $\leq 15$ )	4	7	5	40 ( $\leq 80$ )	1	0.7	5
BZX384C9V1	WF	8.5	9.6	6.0 ( $\leq 15$ )	5	8	5	40 ( $\leq 100$ )	1	0.5	6
BZX384C10	WG	9.4	10.6	8.0 ( $\leq 20$ )	5	8	5	50 ( $\leq 150$ )	1	0.2	7
BZX384C11	WH	10.4	11.6	10 ( $\leq 20$ )	5	9	5	50 ( $\leq 150$ )	1	0.1	8
BZX384C12	WI	11.4	12.7	10 ( $\leq 25$ )	6	9	5	50 ( $\leq 150$ )	1	0.1	8
BZX384C13	WK	12.4	14.1	10 ( $\leq 30$ )	7	9	5	50 ( $\leq 170$ )	1	0.1	8
BZX384C15	WL	13.8	15.6	10 ( $\leq 30$ )	7	9	5	50 ( $\leq 200$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384C16	WM	15.3	17.1	10 ( $\leq 40$ )	8	9.5	5	50 ( $\leq 200$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384C18	WN	16.8	19.1	10 ( $\leq 45$ )	8	9.5	5	50 ( $\leq 225$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384C20	WO	18.8	21.2	15 ( $\leq 55$ )	8	10	5	60 ( $\leq 225$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384C22	WP	20.8	23.3	20 ( $\leq 55$ )	8	10	5	60 ( $\leq 250$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384C24	WR	22.8	25.6	25 ( $\leq 70$ )	8	10	5	60 ( $\leq 250$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384C27	WS	25.1	28.9	25 ( $\leq 80$ )	8	10	2	65 ( $\leq 300$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C30	WT	28	32	30 ( $\leq 80$ )	8	10	2	70 ( $\leq 300$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C33	WU	31	35	35 ( $\leq 80$ )	8	10	2	75 ( $\leq 325$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C36	WW	34	38	35 ( $\leq 90$ )	8	10	2	80 ( $\leq 350$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C39	WX	37	41	40 ( $\leq 130$ )	10	12	2	80 ( $\leq 350$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C43	WY	40	46	45 ( $\leq 150$ )	10	12	2	85 ( $\leq 375$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C47	WZ	44	50	50 ( $\leq 170$ )	10	12	2	85 ( $\leq 375$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C51	X1	48	54	60 ( $\leq 180$ )	10	12	2	85 ( $\leq 400$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C56	X2	52	60	70 ( $\leq 200$ )	9	11	2	100 ( $\leq 425$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C62	X3	58	66	80 ( $\leq 215$ )	9	12	2	100 ( $\leq 450$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C68	X4	64	72	90 ( $\leq 240$ )	10	12	2	150 ( $\leq 475$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384C75	X5	70	79	95 ( $\leq 255$ )	10	12	2	170 ( $\leq 500$ )	0.5	0.05	0.7V <sub>Znom.</sub>

<sup>(1)</sup> Measured with pulses  $t_p = 5 \text{ ms}$



## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range <sup>(1)</sup>		Dynamic Resistance	Temperature Coefficient of Zener Voltage		Test Current	Dynamic Resistance	Test Current	Reverse Leakage Current	
		$V_Z @ I_{ZT}$		$r_{zj} @ I_{ZT1}$	$\alpha_{VZ} @ I_{ZT1}$		$I_{ZT1}$	$r_{zj} @ I_{ZT2}$	@ $I_{ZT2}$	$I_R$	$V_R$
		V		$\Omega$	$10^{-4}/^{\circ}C$		mA	$\Omega$	mA	$\mu A$	V
		min	max	min		max					
BZX384B2V4	W1	2.35	2.45	70 ( $\leq 100$ )	-9	-4	5	275	1	50	1
BZX384B2V7	W2	2.65	2.75	75 ( $\leq 100$ )	-9	-4	5	300 ( $\leq 600$ )	1	20	1
BZX384B3	W3	2.94	3.06	80 ( $\leq 95$ )	-9	-3	5	325 ( $\leq 600$ )	1	10	1
BZX384B3V3	W4	3.23	3.37	85 ( $\leq 95$ )	-8	-3	5	350 ( $\leq 600$ )	1	5	1
BZX384B3V6	W5	3.53	3.67	85 ( $\leq 90$ )	-8	-3	5	375 ( $\leq 600$ )	1	5	1
BZX384B3V9	W6	3.82	3.98	85 ( $\leq 90$ )	-7	-3	5	400 ( $\leq 600$ )	1	3	1
BZX384B4V3	W7	4.21	4.39	80 ( $\leq 90$ )	-6	-1	5	410 ( $\leq 600$ )	1	3	1
BZX384B4V7	W8	4.61	4.79	50 ( $\leq 80$ )	-5	2	5	425 ( $\leq 500$ )	1	3	2
BZX384B5V1	W9	5.00	5.20	40 ( $\leq 60$ )	-3	4	5	400 ( $\leq 480$ )	1	2	2
BZX384B5V6	WA	5.49	5.71	15 ( $\leq 40$ )	-2	6	5	80 ( $\leq 400$ )	1	1	2
BZX384B6V2	WB	6.08	6.32	6.0 ( $\leq 10$ )	-1	7	5	40 ( $\leq 150$ )	1	3	4
BZX384B6V8	WC	6.66	6.94	6.0 ( $\leq 15$ )	2	7	5	30 ( $\leq 80$ )	1	2	4
BZX384B7V5	WD	7.35	7.65	6.0 ( $\leq 15$ )	3	7	5	30 ( $\leq 80$ )	1	1	5
BZX384B8V2	WE	8.04	8.36	6.0 ( $\leq 15$ )	4	7	5	40 ( $\leq 80$ )	1	0.7	5
BZX384B9V1	WF	8.92	9.28	6.0 ( $\leq 15$ )	5	8	5	40 ( $\leq 100$ )	1	0.5	6
BZX384B10	WG	9.80	10.2	8.0 ( $\leq 20$ )	5	8	5	50 ( $\leq 150$ )	1	0.2	7
BZX384B11	WH	10.8	11.2	10 ( $\leq 20$ )	5	9	5	50 ( $\leq 150$ )	1	0.1	8
BZX384B12	WI	11.8	12.2	10 ( $\leq 25$ )	6	9	5	50 ( $\leq 150$ )	1	0.1	8
BZX384B13	WK	12.7	13.3	10 ( $\leq 30$ )	7	9	5	50 ( $\leq 170$ )	1	0.1	8
BZX384B15	WL	14.7	15.3	10 ( $\leq 30$ )	7	9	5	50 ( $\leq 200$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384B16	WM	15.7	16.3	10 ( $\leq 40$ )	8	9.5	5	50 ( $\leq 200$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384B18	WN	17.6	18.4	10 ( $\leq 45$ )	8	9.5	5	50 ( $\leq 225$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384B20	WO	19.6	20.4	15 ( $\leq 55$ )	8	10	5	60 ( $\leq 225$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384B22	WP	21.6	22.4	20 ( $\leq 55$ )	8	10	5	60 ( $\leq 250$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384B24	WR	23.5	24.5	25 ( $\leq 70$ )	8	10	5	60 ( $\leq 250$ )	1	0.05	0.7V <sub>Znom.</sub>
BZX384B27	WS	26.5	27.5	25 ( $\leq 80$ )	8	10	2	65 ( $\leq 300$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B30	WT	29.4	30.6	30 ( $\leq 80$ )	8	10	2	70 ( $\leq 300$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B33	WU	32.3	33.7	35 ( $\leq 80$ )	8	10	2	75 ( $\leq 325$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B36	WW	35.3	36.7	35 ( $\leq 90$ )	8	10	2	80 ( $\leq 350$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B39	WX	38.2	39.8	40 ( $\leq 130$ )	10	12	2	80 ( $\leq 350$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B43	WY	42.1	43.9	45 ( $\leq 150$ )	10	12	2	85 ( $\leq 375$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B47	WZ	46.1	47.9	50 ( $\leq 170$ )	10	12	2	85 ( $\leq 375$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B51	X1	50.0	52.0	60 ( $\leq 180$ )	10	12	2	85 ( $\leq 400$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B56	X2	54.9	57.1	70 ( $\leq 200$ )	9	11	2	100 ( $\leq 425$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B62	X3	60.8	63.2	80 ( $\leq 215$ )	9	12	2	100 ( $\leq 450$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B68	X4	66.6	69.4	90 ( $\leq 240$ )	10	12	2	150 ( $\leq 475$ )	0.5	0.05	0.7V <sub>Znom.</sub>
BZX384B75	X5	73.5	76.5	95 ( $\leq 255$ )	10	12	2	170 ( $\leq 500$ )	0.5	0.05	0.7V <sub>Znom.</sub>

## Typical Characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$ unless otherwise specified)

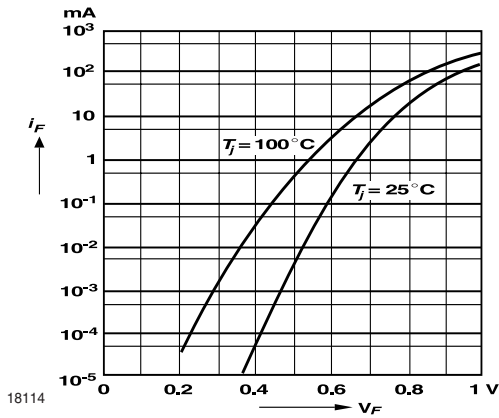


Figure 1. Forward characteristics

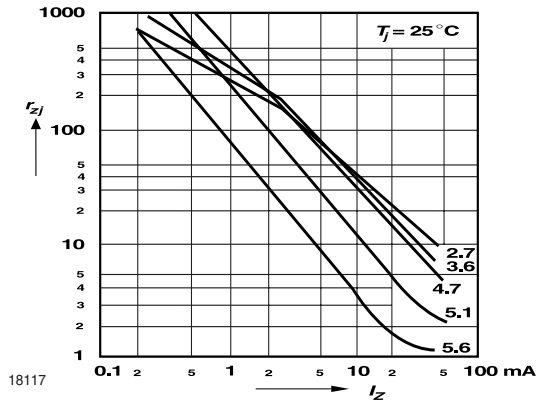


Figure 4. Dynamic Resistance vs. Zener Current

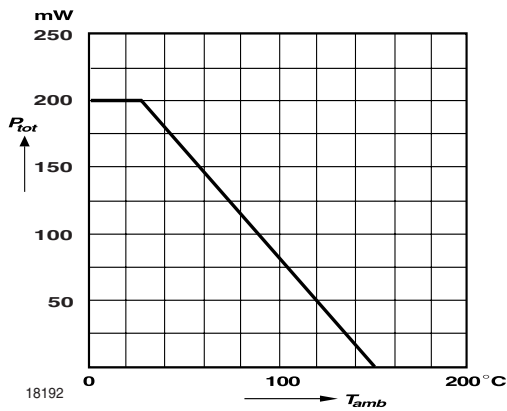


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

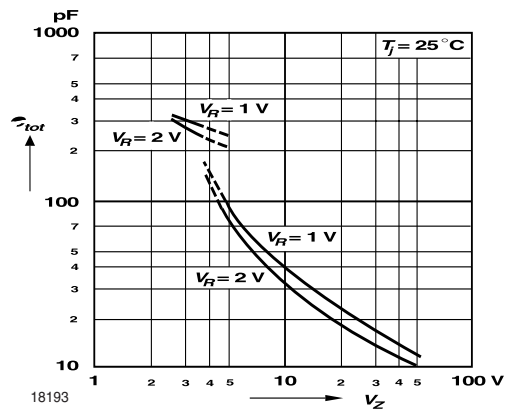


Figure 5. Capacitance vs. Zener Voltage

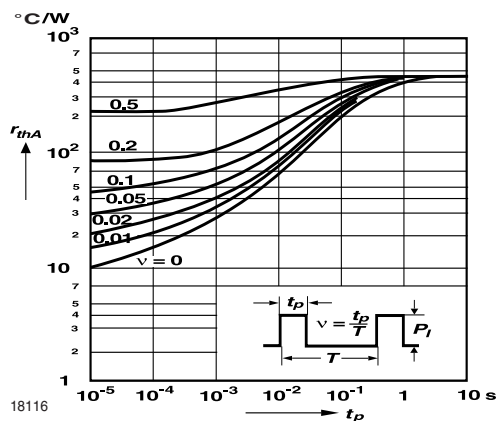


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

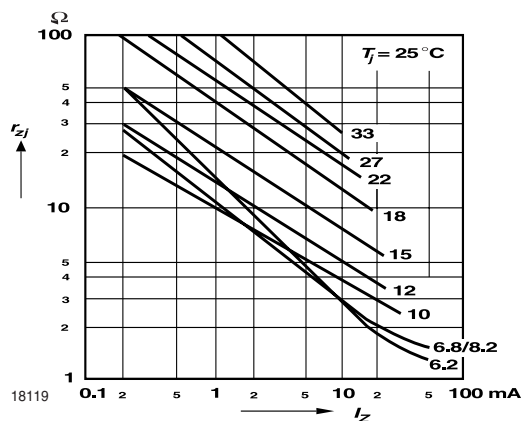


Figure 6. Dynamic Resistance vs. Zener Current

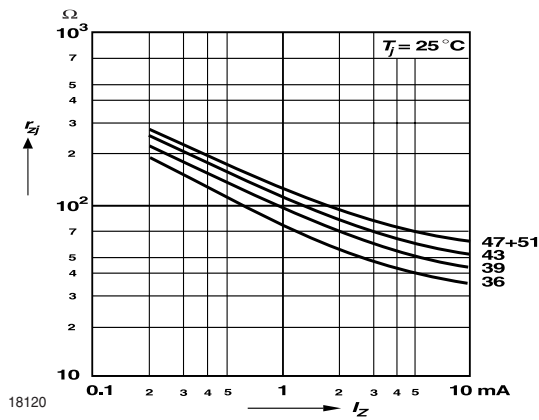


Figure 7. Dynamic Resistance vs. Zener Current

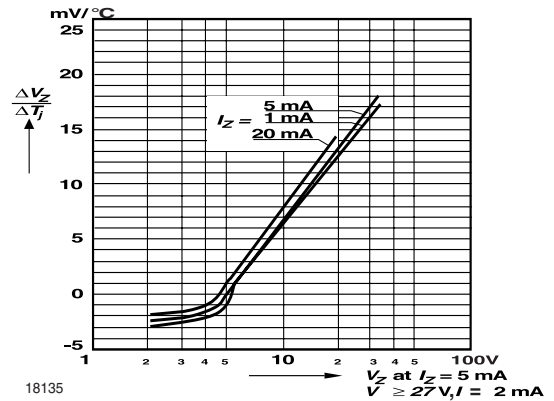


Figure 10. Temperature dependence of Zener voltage versus Zener voltage

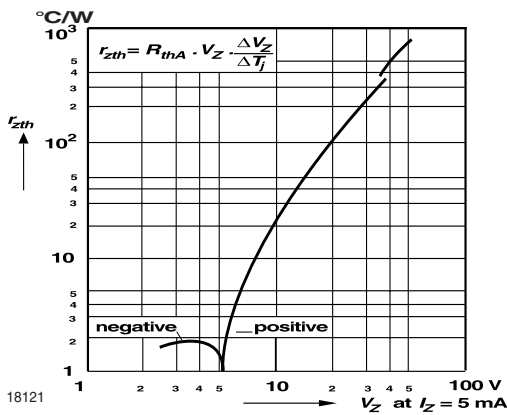


Figure 8. Thermal differential resistance versus Zener voltage

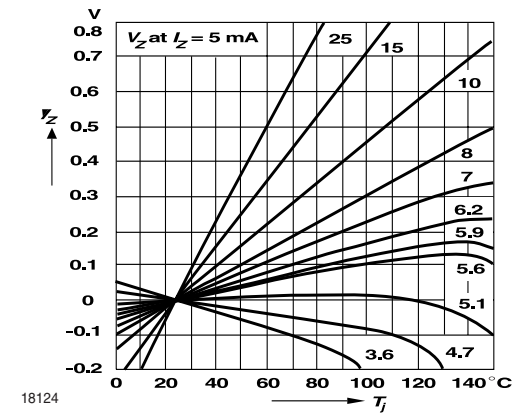


Figure 11. Change of Zener voltage versus junction temperature

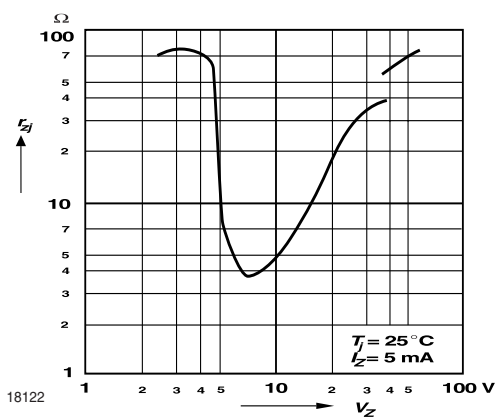


Figure 9. Dynamic resistance versus Zener voltage

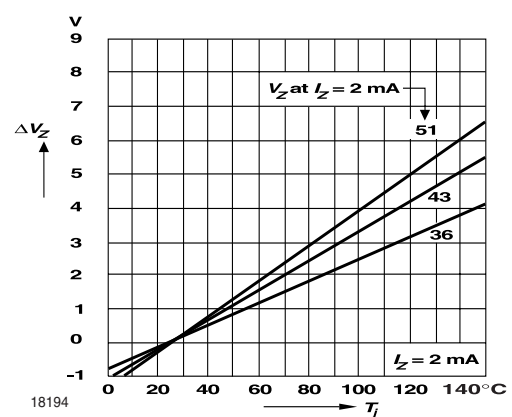


Figure 12. Change of Zener voltage versus junction temperature

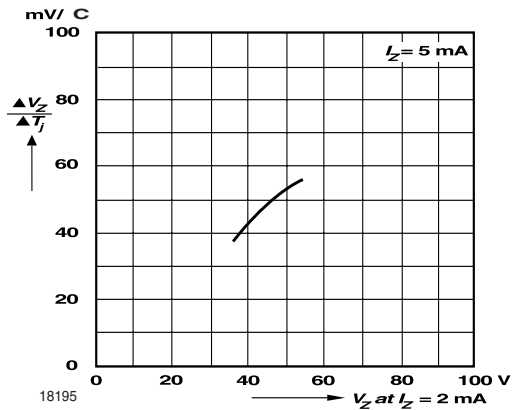


Figure 13. Temperature dependence of Zener voltage versus Zener voltage

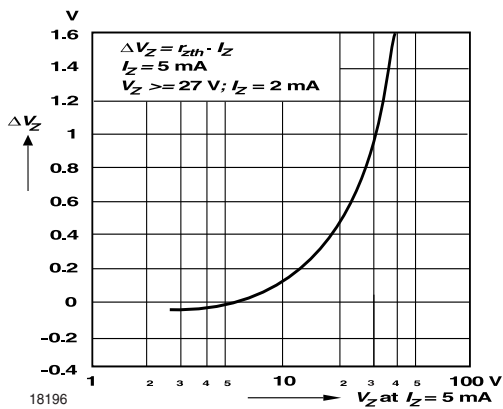


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage

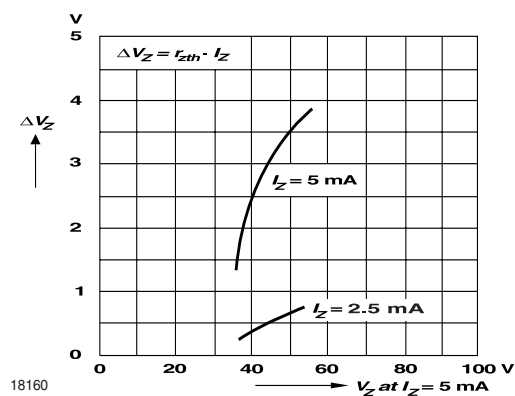


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage

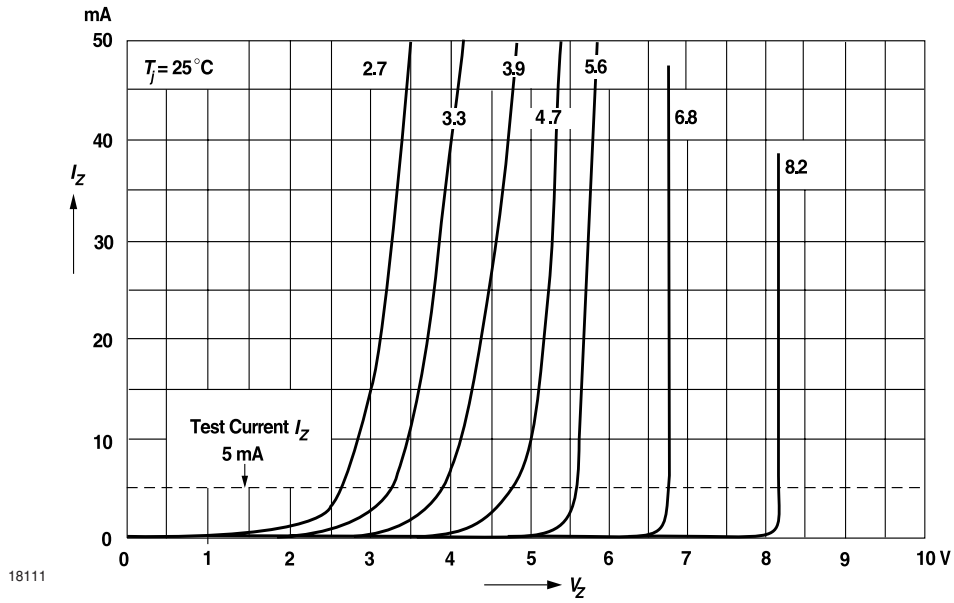


Figure 16. Breakdown Characteristics

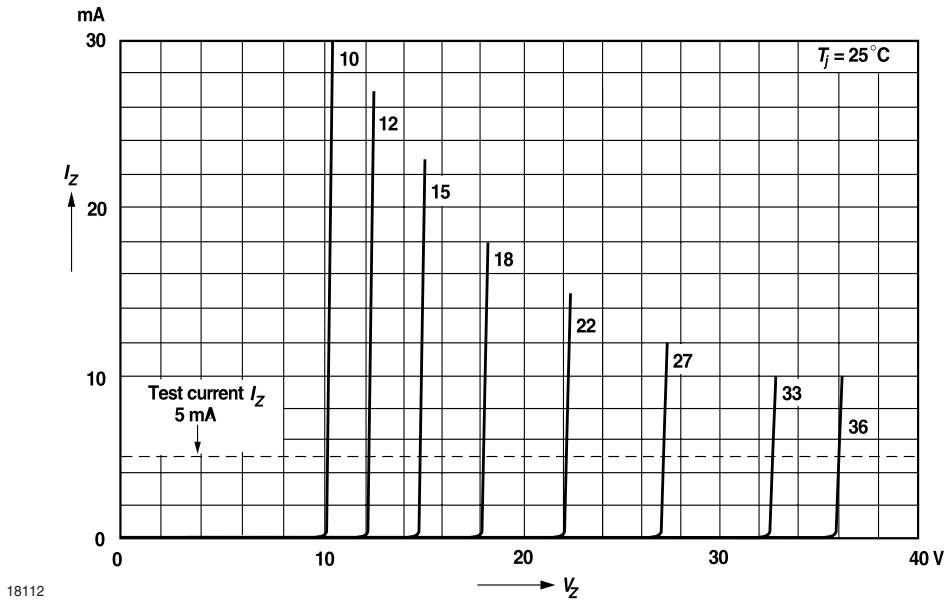


Figure 17. Breakdown Characteristics

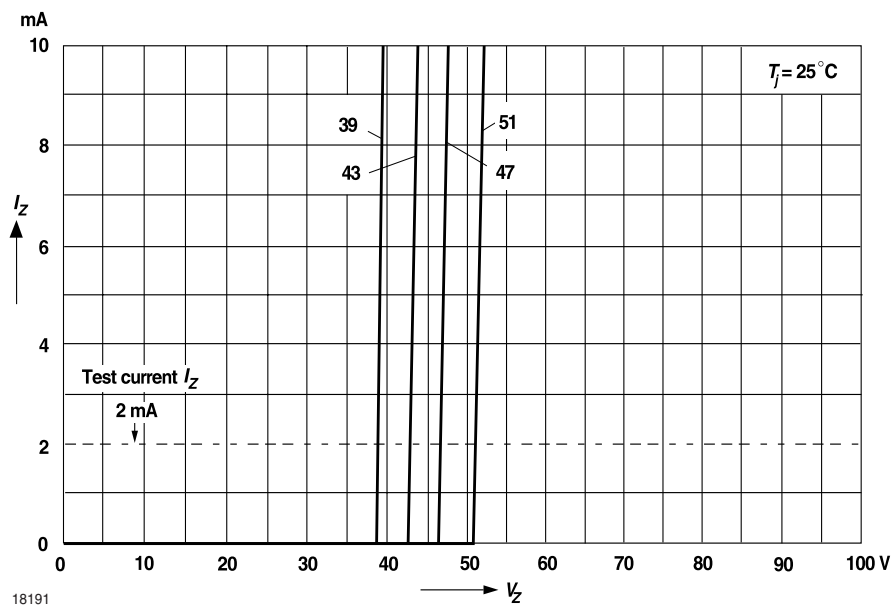
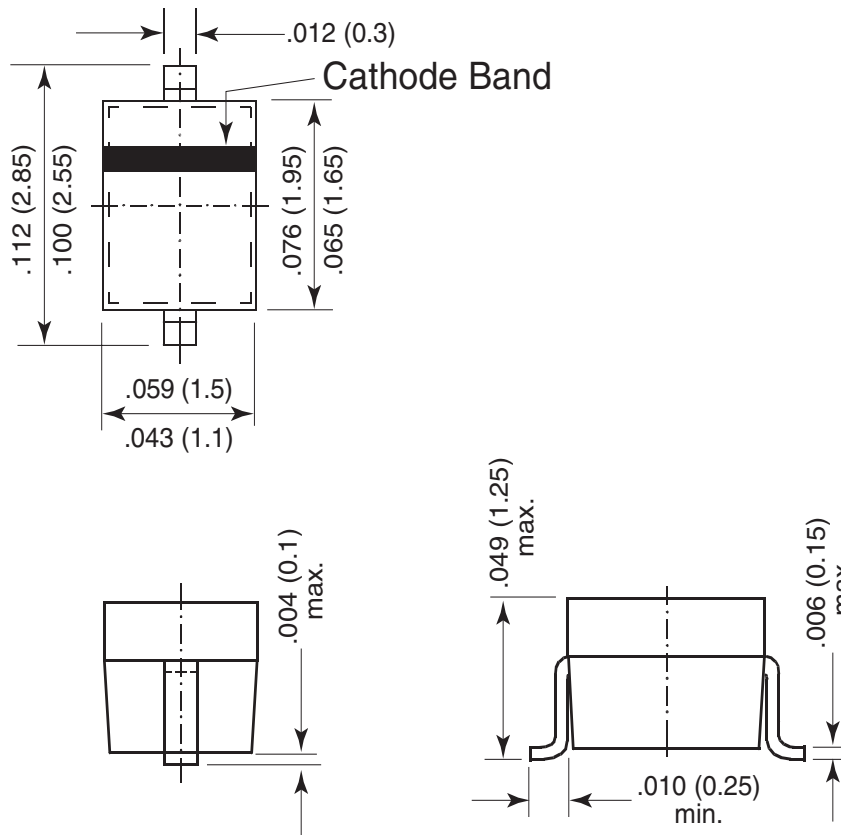


Figure 18. Breakdown Characteristics

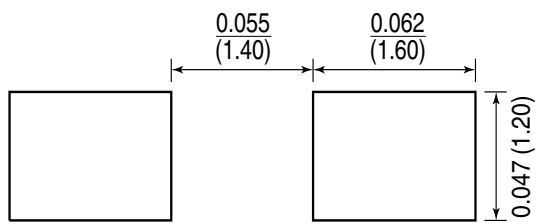


## Package Dimensions in Inches (mm)



17443

## Mounting Pad Layout



17444

### 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.

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