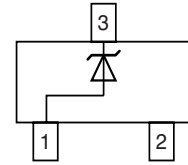
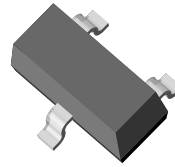


## Zener Diodes

### Features

- These diodes are also available in other case styles and other configurations including: the SOD-123 case with type designation BZT52 series, the dual zener diode common anode configuration in the SOT-23 case with type designation AZ23 series and the dual zener diode common cathode configuration in the SOT-23 case with type designation DZ23 series.
- 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.
- Silicon Planar Power Zener Diodes



18078

### Mechanical Data

**Case:** SOT-23 Plastic Package

**Weight:** Approx. 8 mg

**Packaging Codes/Options:**

E8 / 10k per 13 " reel (8 mm tape), 30k/box

E9 / 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		$P_{tot}$	300 <sup>1)</sup>	mW

<sup>1)</sup> Device on fiberglass substrate, see layout.

### Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		$R_{\theta JA}$	420 <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> Device on fiberglass substrate, see layout.



## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temp. Coefficient of Zener Voltage		Test Current	Reverse Leakage Current	
		$V_Z @ I_{ZT1}$		$r_{zj} @ I_{ZT1}$	$r_{zj} @ I_{ZT2}$		$I_{ZT1}$	$\alpha_{VZ} @ I_{ZT1}$		$I_{ZT2}$	$I_R$
		V		$\Omega$		mA	$10^{-4}/^{\circ}C$		mA	$\mu A$	V
		min	max				min	max			
BZX84C1V8	TBD	1.7	2	<100	< 600	5	-9.0	-4.0	1	<120	0.5
BZX84C2V0	TBD	1.9	2.2	<100	< 600	5	-9.0	-4.0	1	<120	0.5
BZX84C2V2	TBD	2.1	2.4	<100	< 600	5	-9.0	-4.0	1	<120	0.7
BZX84C2V4	Z11	2.2	2.6	70 ( $\leq 100$ )	275	5	-9.0	-4.0	1	50	1
BZX84C2V7	Z12	2.5	2.9	75 ( $\leq 100$ )	300 ( $\leq 600$ )	5	-9.0	-4.0	1	20	1
BZX84C3	Z13	2.8	3.2	80 ( $\leq 95$ )	325 ( $\leq 600$ )	5	-9.0	-3.0	1	10	1
BZX84C3V3	Z14	3.1	3.5	85 ( $\leq 95$ )	350 ( $\leq 600$ )	5	-8.0	-3.0	1	5	1
BZX84C3V6	Z15	3.4	3.8	85 ( $\leq 90$ )	375 ( $\leq 600$ )	5	-8.0	-3.0	1	5	1
BZX84C3V9	Z16	3.7	4.1	85 ( $\leq 90$ )	400 ( $\leq 600$ )	5	-7.0	-3.0	1	3	1
BZX84C4V3	Z17	4	4.6	80 ( $\leq 90$ )	410 ( $\leq 600$ )	5	-6.0	-1.0	1	3	1
BZX84C4V7	Z1	4.4	5	50 ( $\leq 80$ )	425 ( $\leq 500$ )	5	-5.0	+2.0	1	3	2
BZX84C5V1	Z2	4.8	5.4	40 ( $\leq 60$ )	400 ( $\leq 480$ )	5	-3.0	+4.0	1	2	2
BZX84C5V6	Z3	5.2	6	15 ( $\leq 40$ )	80 ( $\leq 400$ )	5	-2.0	+6.0	1	1	2
BZX84C6V2	Z4	5.8	6.6	6.0 ( $\leq 10$ )	40 ( $\leq 150$ )	5	-1.0	+7.0	1	3	4
BZX84C6V8	Z5	6.4	7.2	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	+2.0	+7.0	1	2	4
BZX84C7V5	Z6	7	7.9	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	+3.0	+7.0	1	1	5
BZX84C8V2	Z7	7.7	8.7	6.0 ( $\leq 15$ )	40 ( $\leq 80$ )	5	+4.0	+7.0	1	0.7	5
BZX84C9V1	Z8	8.5	9.6	6.0 ( $\leq 15$ )	40 ( $\leq 100$ )	5	+5.0	+8.0	1	0.5	6
BZX84C10	Z9	9.4	10.6	8.0 ( $\leq 20$ )	50 ( $\leq 150$ )	5	+5.0	+8.0	1	0.2	7
BZX84C11	Y1	10.4	11.6	10 ( $\leq 20$ )	50 ( $\leq 150$ )	5	+5.0	+9.0	1	0.1	8
BZX84C12	Y2	11.4	12.7	10 ( $\leq 25$ )	50 ( $\leq 150$ )	5	+6.0	+9.0	1	0.1	8
BZX84C13	Y3	12.4	14.1	10 ( $\leq 30$ )	50 ( $\leq 170$ )	5	+7.0	+9.0	1	0.1	8
BZX84C15	Y4	13.8	15.6	10 ( $\leq 30$ )	50 ( $\leq 200$ )	5	+7.0	+9.0	1	0.05	0.7 $V_{Znom}$ .
BZX84C16	Y5	15.3	17.1	10 ( $\leq 40$ )	50 ( $\leq 200$ )	5	+8.0	+9.5	1	0.05	0.7 $V_{Znom}$ .
BZX84C18	Y6	16.8	19.1	10 ( $\leq 45$ )	50 ( $\leq 225$ )	5	+8.0	+9.5	1	0.05	0.7 $V_{Znom}$ .
BZX84C20	Y7	18.8	21.2	15 ( $\leq 55$ )	60 ( $\leq 225$ )	5	+8.0	+10	1	0.05	0.7 $V_{Znom}$ .
BZX84C22	Y8	20.8	23.3	20 ( $\leq 55$ )	60 ( $\leq 250$ )	5	+8.0	+10	1	0.05	0.7 $V_{Znom}$ .
BZX84C24	Y9	22.8	25.6	25 ( $\leq 70$ )	60 ( $\leq 250$ )	5	+8.0	+10	1	0.05	0.7 $V_{Znom}$ .
BZX84C27	Y10	25.1	28.9	25 ( $\leq 80$ )	65 ( $\leq 300$ )	2	+8.0	+10	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C30	Y11	28	32	30 ( $\leq 80$ )	70 ( $\leq 300$ )	2	+8.0	+10	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C33	Y12	31	35	35 ( $\leq 80$ )	75 ( $\leq 325$ )	2	+8.0	+10	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C36	Y13	34	38	35 ( $\leq 90$ )	80 ( $\leq 350$ )	2	+8.0	+10	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C39	Y14	37	41	40 ( $\leq 130$ )	80 ( $\leq 350$ )	2	+10	+12	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C43	Y15	40	46	45 ( $\leq 150$ )	85 ( $\leq 375$ )	2	+10	+12	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C47	Y16	44	50	50 ( $\leq 170$ )	85 ( $\leq 375$ )	2	+10	+12	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C51	Y17	48	54	60 ( $\leq 180$ )	85 ( $\leq 400$ )	2	+10	+12	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C56	Y18	52	60	70 ( $\leq 200$ )	100 ( $\leq 425$ )	2	+9.0	+11	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C62	Y19	58	66	80 ( $\leq 215$ )	100 ( $\leq 450$ )	2	+9.0	+12	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C68	Y20	64	72	90 ( $\leq 240$ )	150 ( $\leq 475$ )	2	+10	+12	0.5	0.05	0.7 $V_{Znom}$ .
BZX84C75	Y21	70	79	95 ( $\leq 255$ )	170 ( $\leq 500$ )	2	+10	+12	0.5	0.05	0.7 $V_{Znom}$ .



## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temp. Coefficient of Zener Voltage		Test Current	Reverse Leakage Current	
		$V_Z @ I_{ZT1}$		$r_{zj} @ I_{ZT1}$	$r_{zj} @ I_{ZT2}$		$I_{ZT1}$	$\alpha_{VZ} @ I_{ZT1}$		$I_{ZT2}$	$I_R$
		V		$\Omega$		mA	$10^{-4}/^{\circ}C$		mA	$\mu A$	V
		min	max				min	max			
BZX84B1V8	TBD	1.8	1.9	<100	< 600	5	-9	4	1	<120	0.5
BZX84B2V0	TBD	2.01	2.09	<100	< 600	5	-9	4	1	<120	0.5
BZX84B2V2	TBD	2.21	2.3	<100	< 600	5	-9	4	1	<120	0.7
BZX84B2V4	Z50	2.35	2.45	70 ( $\leq 100$ )	275	5	-9	-4	1	50	1
BZX84B2V7	Z51	2.65	2.75	75 ( $\leq 100$ )	300 ( $\leq 600$ )	5	-9	-4	1	20	1
BZX84B3	Z52	2.94	3.06	80 ( $\leq 95$ )	325 ( $\leq 600$ )	5	-9	-3	1	10	1
BZX84B3V3	Z53	3.23	3.37	85 ( $\leq 95$ )	350 ( $\leq 600$ )	5	-8	-3	1	5	1
BZX84B3V6	Z54	3.53	3.67	85 ( $\leq 90$ )	375 ( $\leq 600$ )	5	-8	-3	1	5	1
BZX84B3V9	Z55	3.82	3.98	85 ( $\leq 90$ )	400 ( $\leq 600$ )	5	-7	-3	1	3	1
BZX84B4V3	Z56	4.21	4.39	80 ( $\leq 90$ )	410 ( $\leq 600$ )	5	-6	-1	1	3	1
BZX84B4V7	Z57	4.61	4.79	50 ( $\leq 80$ )	425 ( $\leq 500$ )	5	-5	2	1	3	2
BZX84B5V1	Z58	5	5.2	40 ( $\leq 60$ )	400 ( $\leq 480$ )	5	-3	4	1	2	2
BZX84B5V6	Z59	5.49	5.71	15 ( $\leq 40$ )	80 ( $\leq 400$ )	5	-2	6	1	1	2
BZX84B6V2	Z60	6.08	6.32	6.0 ( $\leq 10$ )	40 ( $\leq 150$ )	5	-1	7	1	3	4
BZX84B6V8	Z61	6.66	6.94	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	2	7	1	2	4
BZX84B7V5	Z62	7.35	7.65	6.0 ( $\leq 15$ )	30 ( $\leq 80$ )	5	3	7	1	1	5
BZX84B8V2	Z63	8.04	8.36	6.0 ( $\leq 15$ )	40 ( $\leq 80$ )	5	4	7	1	0.7	5
BZX84B9V1	Z64	8.92	9.28	6.0 ( $\leq 15$ )	40 ( $\leq 100$ )	5	5	8	1	0.5	6
BZX84B10	Z65	9.8	10.2	8.0 ( $\leq 20$ )	50 ( $\leq 150$ )	5	5	8	1	0.2	7
BZX84B11	Z66	10.8	11.2	10 ( $\leq 20$ )	50 ( $\leq 150$ )	5	5	9	1	0.1	8
BZX84B12	Z67	11.8	12.2	10 ( $\leq 25$ )	50 ( $\leq 150$ )	5	6	9	1	0.1	8
BZX84B13	Z68	12.7	13.3	10 ( $\leq 30$ )	50 ( $\leq 170$ )	5	7	9	1	0.1	8
BZX84B15	Z69	14.7	15.3	10 ( $\leq 30$ )	50 ( $\leq 200$ )	5	7	9	1	0.05	0.7 $V_{Znom.}$
BZX84B16	Z70	15.7	16.3	10 ( $\leq 40$ )	50 ( $\leq 200$ )	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX84B18	Z71	17.6	18.4	10 ( $\leq 45$ )	50 ( $\leq 225$ )	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX84B20	Z72	19.6	20.4	15 ( $\leq 55$ )	60 ( $\leq 225$ )	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX84B22	Z73	21.6	22.4	20 ( $\leq 55$ )	60 ( $\leq 250$ )	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX84B24	Z74	23.5	24.5	25 ( $\leq 70$ )	60 ( $\leq 250$ )	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX84B27	Z75	26.5	27.5	25 ( $\leq 80$ )	65 ( $\leq 300$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B30	Z76	29.4	30.6	30 ( $\leq 80$ )	70 ( $\leq 300$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B33	Z77	32.3	33.7	35 ( $\leq 80$ )	75 ( $\leq 325$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B36	Z78	35.3	36.7	35 ( $\leq 90$ )	80 ( $\leq 350$ )	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B39	Z79	38.2	39.8	40 ( $\leq 130$ )	80 ( $\leq 350$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B43	Z80	42.1	43.9	45 ( $\leq 150$ )	85 ( $\leq 375$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B47	Z81	46.1	47.9	50 ( $\leq 170$ )	85 ( $\leq 375$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B51	Z82	50	52	60 ( $\leq 180$ )	85 ( $\leq 400$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B56	Z83	54.9	57.1	70 ( $\leq 200$ )	100 ( $\leq 425$ )	2	9	11	0.5	0.05	0.7 $V_{Znom.}$
BZX84B62	Z84	60.8	63.2	80 ( $\leq 215$ )	100 ( $\leq 450$ )	2	9	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B68	Z85	66.6	69.4	90 ( $\leq 240$ )	150 ( $\leq 475$ )	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B75	Z86	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)

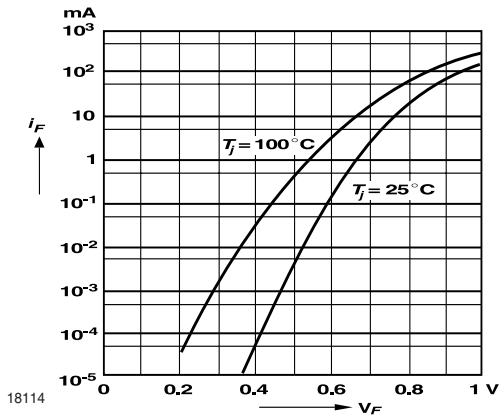


Figure 1. Forward characteristics

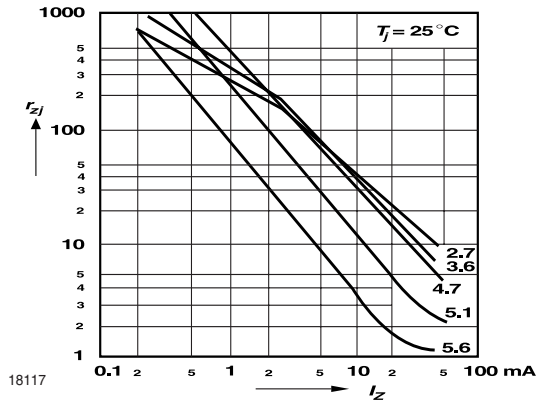


Figure 4. Dynamic Resistance vs. Zener Current

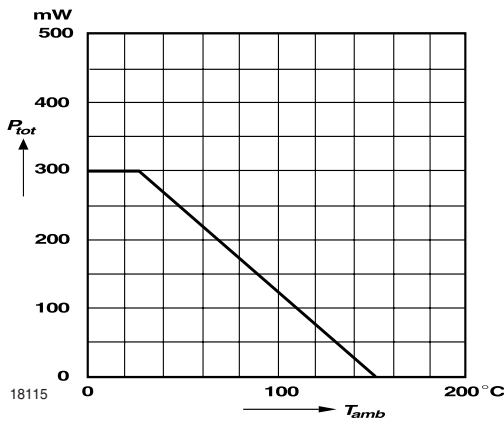


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

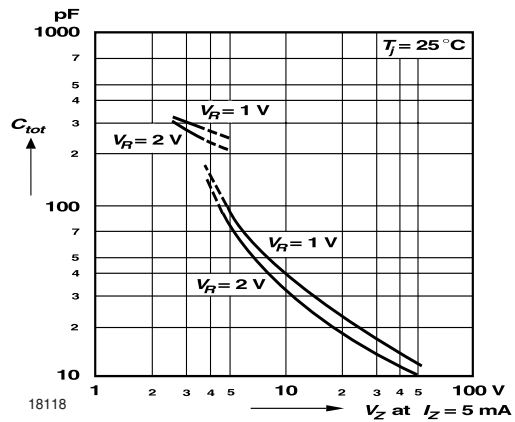


Figure 5. Capacitance vs. Zener Voltage

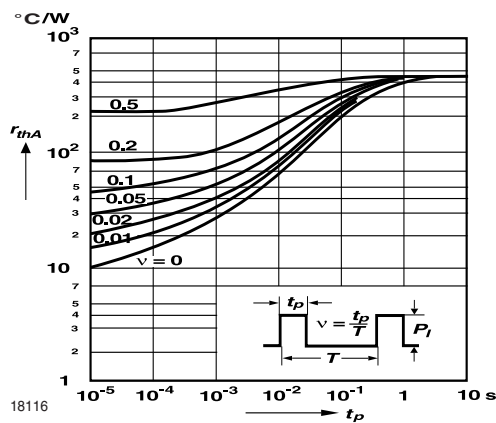


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

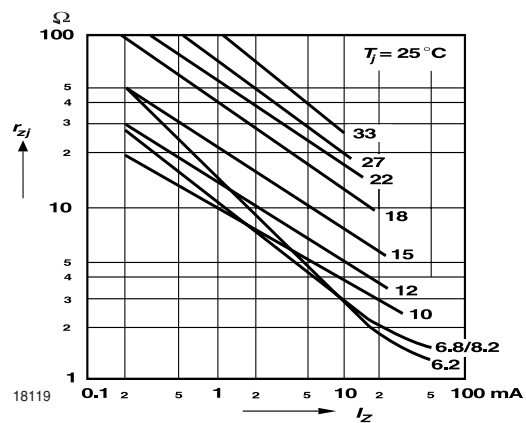


Figure 6. Dynamic Resistance vs. Zener Current

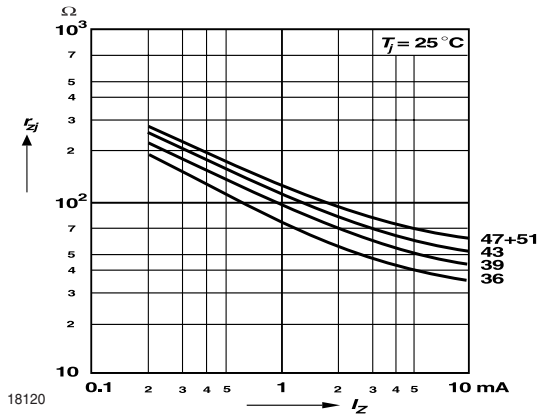


Figure 7. Dynamic Resistance vs. Zener Current

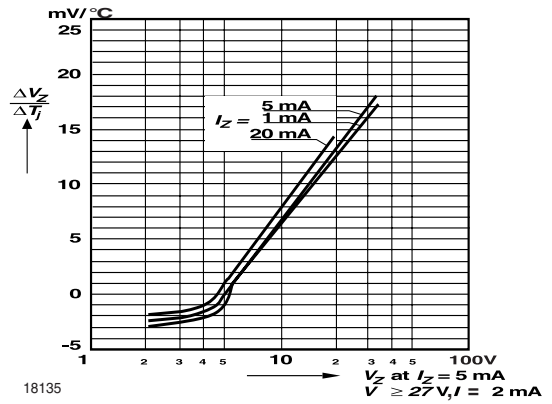


Figure 10. Temperature dependence of Zener voltage versus Zener voltage

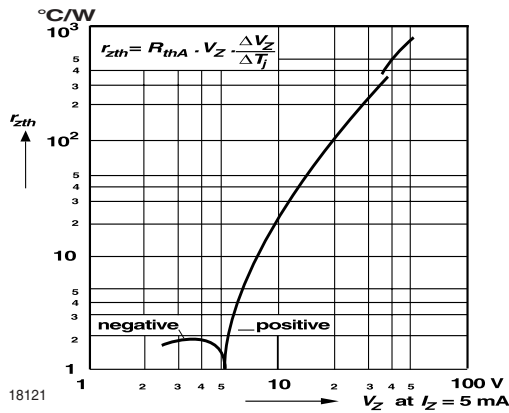


Figure 8. Thermal differential resistance versus Zener voltage

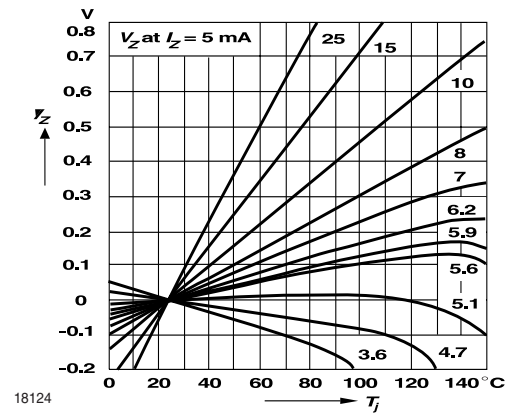


Figure 11. Change of Zener voltage versus junction temperature

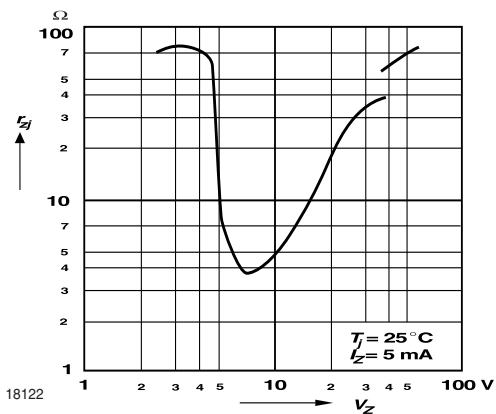


Figure 9. Dynamic resistance versus Zener voltage

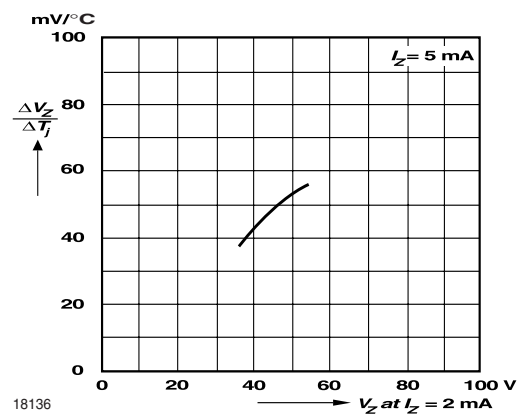


Figure 12. Temperature dependence of Zener voltage versus Zener voltage

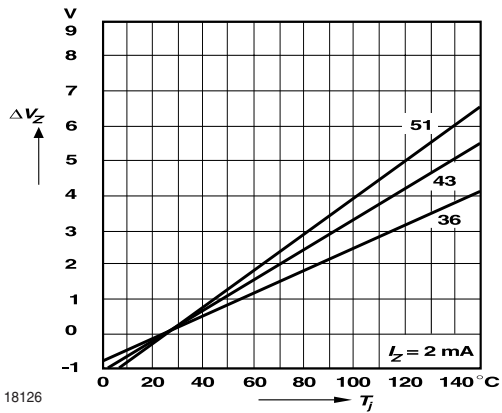


Figure 13. Change of Zener voltage versus junction temperature

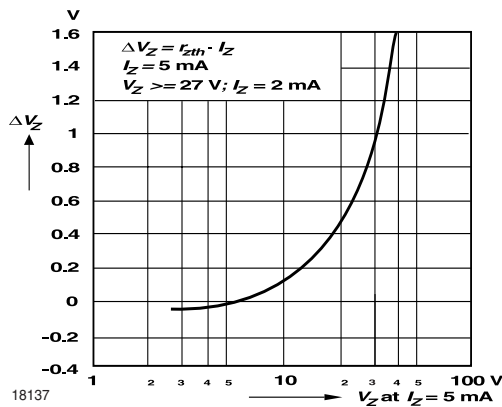


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage

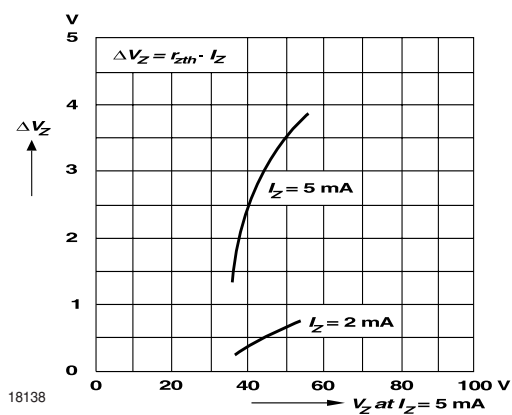


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage

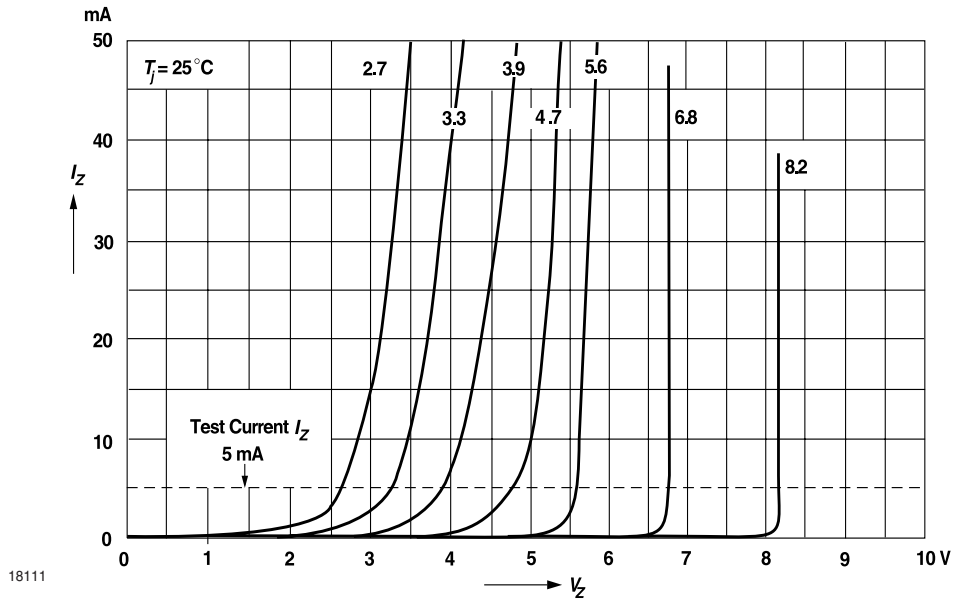


Figure 16. Breakdown Characteristics

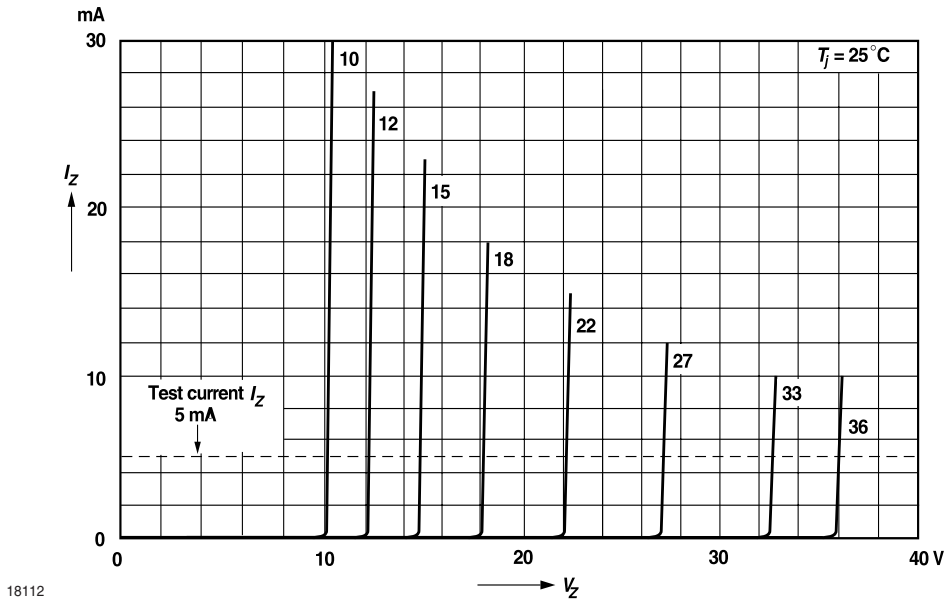
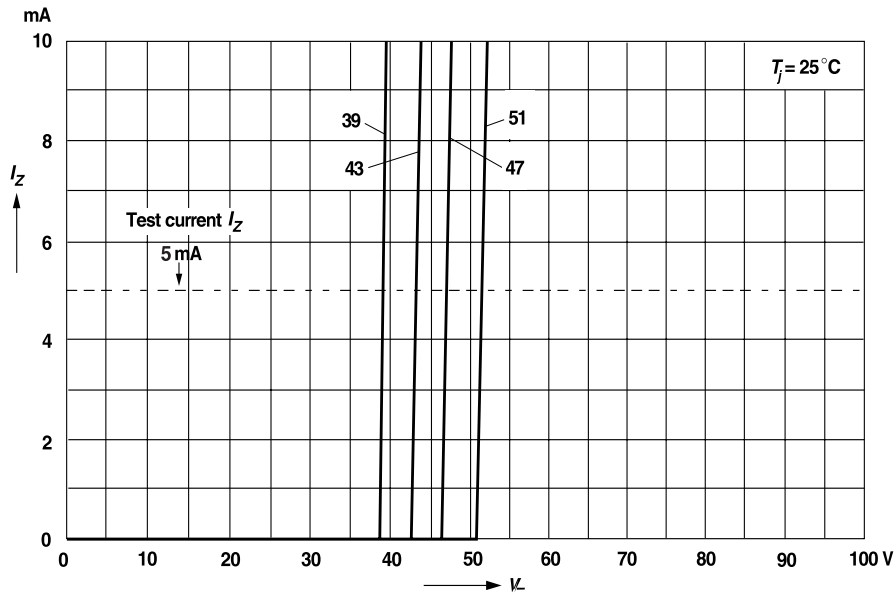


Figure 17. Breakdown Characteristics



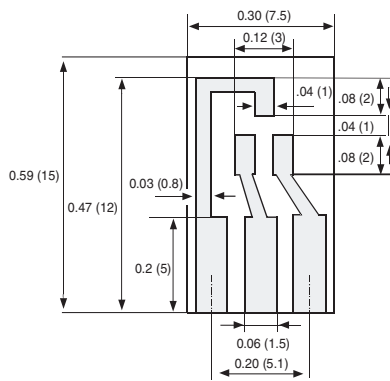
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Figure 18. Breakdown Characteristics

## Layout for $R_{\theta JA}$ test

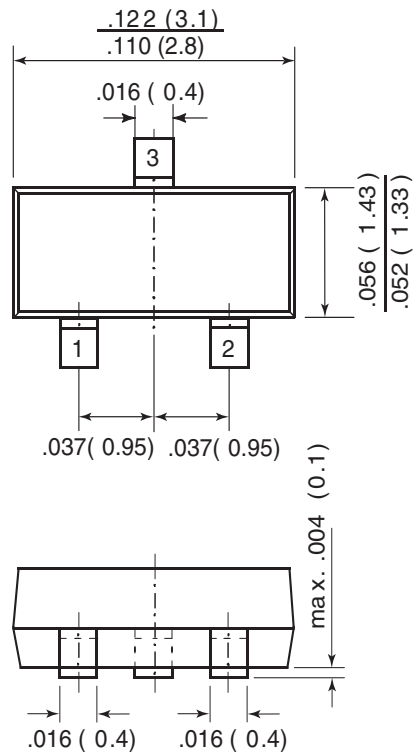
Thickness: Fiberglass 0.059 in. (1.5 mm)

Copper leads 0.012 in. (0.3 mm)

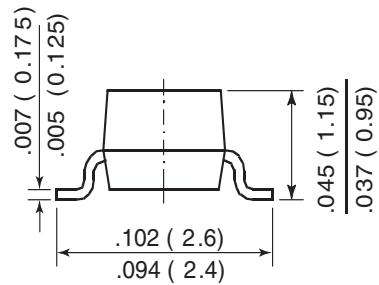


17451 Dimensions in inches (millimeters)

## Package Dimensions in Inches (mm)

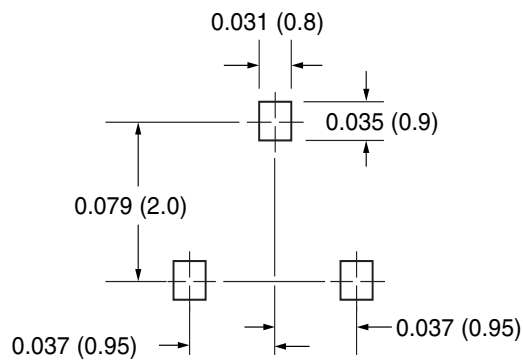


Top View



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## Mounting Pad Layout



17417

### 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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Telephone: 49 (0)7131 67 2831, Fax number: 49 (0)7131 67 2423