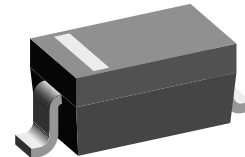


## Small Signal Zener Diodes

### Features

- Silicon Planar Power Zener Diodes
- These diodes are also available in other case styles and other configurations including: the SOT-23 case with type designation BZX84 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.
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC



17431

### Mechanical Data

**Case:** SOD-123 Plastic case

**Weight:** approx. 9.3 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
Zener current see table "Characteristics "				
Power dissipation		$P_{tot}$	500 <sup>2)</sup>	mW
Power dissipation		$P_{tot}$	410 <sup>1)</sup>	mW

1) Diode on ceramic substrate 0.7 mm; 2.5 mm<sup>2</sup> pad areas

2) Diode on ceramic substrate 0.7 mm; 5 mm<sup>2</sup> pad areas

### Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		$R_{thJA}$	300 <sup>1)</sup>	$^{\circ}\text{C}/\text{W}$
Junction temperature		$T_J$	150	$^{\circ}\text{C}$
Storage temperature range		$T_S$	- 65 to + 150	$^{\circ}\text{C}$

1) Valid provided that electrodes are kept at ambient temperature



## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range <sup>1)</sup>		Dynamic Resistance		Test Current	Temp. Coefficient @ I <sub>ZT1</sub>	Reverse Voltage V <sub>R</sub> @ I <sub>R</sub> = 100 nA,	Admissible Zener Current <sup>4)</sup>	
		V <sub>Z</sub> @ I <sub>ZT1</sub>		r <sub>zj</sub> @ I <sub>ZT1</sub>	r <sub>zj</sub> @ I <sub>ZT2</sub>				I <sub>Z</sub> @ T <sub>amb</sub> = 45 °C,	I <sub>Z</sub> @ T <sub>amb</sub> = 25 °C,
		V		Ω		mA	α <sub>VZ</sub> (10 <sup>-4</sup> /°C)	V	mA	
		min	max							
BZT52C2V4-V	W1	2.2	2.6	85	600	5	- 9 to - 4	-	-	-
BZT52C2V7-V	W2	2.5	2.9	75 (< 83)	< 500	5	- 9 to - 4	-	113	134
BZT52C3V0-V	W3	2.8	3.2	80 (< 95)	< 500	5	- 9 to - 3	-	98	118
BZT52C3V3-V	W4	3.1	3.5	80 (< 95)	< 500	5	- 8 to - 3	-	92	109
BZT52C3V6-V	W5	3.4	3.8	80 (< 95)	< 500	5	- 8 to - 3	-	85	100
BZT52C3V9-V	W6	3.7	4.1	80 (< 95)	< 500	5	- 7 to - 3	-	77	92
BZT52C4V3-V	W7	4	4.6	80 (< 95)	< 500	5	- 6 to - 1	-	71	84
BZT52C4V7-V	W8	4.4	5	70 (< 78)	< 500	5	- 5 to +2	-	64	76
BZT52C5V1-V	W9	4.8	5.4	30 (< 60)	< 480	5	- 3 to +4	> 0.8	56	67
BZT52C5V6-V	WA	5.2	6	10 (< 40)	< 400	5	- 2 to +6	> 1	50	59
BZT52C6V2-V	WB	5.8	6.6	4.8 (< 10)	< 200	5	- 1 to +7	> 2	45	54
BZT52C6V8-V	WC	6.4	7.2	4.5 (< 8)	< 150	5	+2 to +7	> 3	41	49
BZT52C7V5-V	WD	7	7.9	4 (< 7)	< 50	5	+3 to +7	> 5	37	44
BZT52C8V2-V	WE	7.7	8.7	4.5 (< 7)	< 50	5	+4 to +7	> 6	34	40
BZT52C9V1-V	WF	8.5	9.6	4.8 (< 10)	< 50	5	+5 to +8	> 7	30	36
BZT52C10-V	WG	9.4	10.6	5.2 (< 15)	< 70	5	+5 to +8	> 7.5	28	33
BZT52C11-V	WH	10.4	11.6	6 (< 20)	< 70	5	+5 to +9	> 8.5	25	30
BZT52C12-V	WI	11.4	12.7	7 (< 20)	< 90	5	+6 to +9	> 9	23	28
BZT52C13-V	WK	12.4	14.1	9 (< 25)	< 110	5	+7 to +9	> 10	21	25
BZT52C15-V	WL	13.8	15.6	11 (< 30)	< 110	5	+7 to +9	> 11	19	23
BZT52C16-V	WM	15.3	17.1	13 (< 40)	< 170	5	+8 to +9.5	> 12	17	20
BZT52C18-V	WN	16.8	19.1	18 (< 50)	< 170	5	+8 to +9.5	> 14	15	18
BZT52C20-V	WO	18.8	21.2	20 (< 50)	< 220	5	+8 to +10	> 15	14	17
BZT52C22-V	WP	20.8	23.3	25 (< 55)	< 220	5	+8 to +10	> 17	13	16
BZT52C24-V	WR	22.8	25.6	28 (< 80)	< 220	5	+8 to +10	> 18	11	13
BZT52C27-V	WS	25.1	28.9	30 (< 80)	< 250	5	+8 to +10	> 20	10	12
BZT52C30-V	WT	28	32	35 (< 80)	< 250	5	+8 to +10	> 22.5	9	10
BZT52C33-V	WU	31	35	40 (< 80)	< 250	5	+8 to +10	> 25	8	9
BZT52C36-V	WW	34	38	40 (< 90)	< 250	5	+8 to +10	> 27	8	9
BZT52C39-V	WX	37	41	50 (< 90)	< 300	5	+10 to +12	> 29	7	8
BZT52C43-V	WY	40	46	60 (< 100)	< 700	5	+10 to +12	> 32	6	7
BZT52C47-V	WZ	44	50	70 (< 100)	< 750	5	+10 to +12	> 35	5	6
BZT52C51-V	X1	48	54	70 (< 100)	< 750	5	+10 to +12	> 38	5	6
BZT52C56-V	X2	52	60	< 135 <sup>(2)</sup>	< 1000 <sup>(3)</sup>	2.5	typ. +10 <sup>(2)</sup>	-	-	-
BZT52C62-V	X3	58	66	< 150 <sup>(2)</sup>	< 1000 <sup>(3)</sup>	2.5	typ. +10 <sup>(2)</sup>	-	-	-
BZT52C68-V	X4	64	72	< 200 <sup>(2)</sup>	< 1000 <sup>(3)</sup>	2.5	typ. +10 <sup>(2)</sup>	-	-	-
BZT52C75-V	X5	70	79	< 250 <sup>(2)</sup>	< 1500 <sup>(3)</sup>	2.5	typ. +10 <sup>(2)</sup>	-	-	-

I<sub>ZT1</sub> = 5 mA, I<sub>ZT2</sub> = 1 mA

<sup>(1)</sup> Measured with pulses T<sub>p</sub> = 5 ms

<sup>(2)</sup> = I<sub>ZT1</sub> = 2.5 mA

<sup>(3)</sup> = I<sub>ZT2</sub> = 0.5 mA

<sup>(4)</sup> Valid provided that electrodes are kept at ambient temperature.



## Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range <sup>1)</sup>		Dynamic Resistance		Test Current	Temp. Coefficient @ I <sub>ZT1</sub>	Reverse Voltage V <sub>R</sub> @ I <sub>R</sub> = 100 nA,	Admissible Zener Current <sup>4)</sup>		
		V <sub>Z</sub> @ I <sub>ZT1</sub>		r <sub>zj</sub> @ I <sub>ZT1</sub>	r <sub>zj</sub> @ I <sub>ZT2</sub>				I <sub>ZT1</sub>	I <sub>Z</sub> @ T <sub>amb</sub> = 45 °C,	I <sub>Z</sub> @ T <sub>amb</sub> = 25 °C,
		V		Ω					mA	mA	
		min	max				α <sub>VZ</sub> (10 <sup>-4</sup> /°C)	V			
BZT52B2V4-V	W1	2.35	2.45	85	600	5	- 9 to - 4	-	-	-	
BZT52B2V7-V	W2	2.65	2.75	75 (< 83)	< 500	5	- 9 to - 4	-	113	134	
BZT52B3V0-V	W3	2.94	3.06	80 (< 95)	< 500	5	- 9 to - 3	-	98	118	
BZT52B3V3-V	W4	3.23	3.37	80 (< 95)	< 500	5	- 8 to - 3	-	92	109	
BZT52B3V6-V	W5	3.53	3.67	80 (< 95)	< 500	5	- 8 to - 3	-	85	100	
BZT52B3V9-V	W6	3.82	3.98	80 (< 95)	< 500	5	- 7 to - 3	-	77	92	
BZT52B4V3-V	W7	4.21	4.39	80 (< 95)	< 500	5	- 6 to - 1	-	71	84	
BZT52B4V7-V	W8	4.61	4.79	70 (< 78)	< 500	5	- 5 to + 2	-	64	76	
BZT52B5V1-V	W9	5	5.2	30 (< 60)	< 480	5	- 3 to + 4	> 0.8	56	67	
BZT52B5V6-V	WA	5.49	5.71	10 (< 40)	< 400	5	- 2 to + 6	> 1	50	59	
BZT52B6V2-V	WB	6.08	6.32	4.8 (< 10)	< 200	5	- 1 to + 7	> 2	45	54	
BZT52B6V8-V	WC	6.66	6.94	4.5 (< 8)	< 150	5	+ 2 to + 7	> 3	41	49	
BZT52B7V5-V	WD	7.35	7.65	4 (< 7)	< 50	5	+ 3 to + 7	> 5	37	44	
BZT52B8V2-V	WE	8.04	8.36	4.5 (< 7)	< 50	5	+ 4 to + 7	> 6	34	40	
BZT52B9V1-V	WF	8.92	9.28	4.8 (< 10)	< 50	5	+ 5 to + 8	> 7	30	36	
BZT52B10-V	WG	9.8	10.2	5.2 (< 15)	< 70	5	+ 5 to + 8	> 7.5	28	33	
BZT52B11-V	WH	10.8	11.2	6 (< 20)	< 70	5	+ 5 to + 9	> 8.5	25	30	
BZT52B12-V	WI	11.8	12.2	7 (< 20)	< 90	5	+ 6 to + 9	> 9	23	28	
BZT52B13-V	WK	12.7	13.3	9 (< 25)	< 110	5	+ 7 to + 9	> 10	21	25	
BZT52B15-V	WL	14.7	15.3	11 (< 30)	< 110	5	+ 7 to + 9	> 11	19	23	
BZT52B16-V	WM	15.7	16.3	13 (< 40)	< 170	5	+ 8 to + 9.5	> 12	17	20	
BZT52B18-V	WN	17.6	18.4	18 (< 50)	< 170	5	+ 8 to + 9.5	> 14	15	18	
BZT52B20-V	WO	19.6	20.4	20 (< 50)	< 220	5	+ 8 to + 10	> 15	14	17	
BZT52B22-V	WP	21.6	22.4	25 (< 55)	< 220	5	+ 8 to + 10	> 17	13	16	
BZT52B24-V	WR	23.5	24.5	28 (< 80)	< 220	5	+ 8 to + 10	> 18	11	13	
BZT52B27-V	WS	26.5	27.5	30 (< 80)	< 250	5	+ 8 to + 10	> 20	10	12	
BZT52B30-V	WT	29.4	30.6	35 (< 80)	< 250	5	+ 8 to + 10	> 22.5	9	10	
BZT52B33-V	WU	32.3	33.7	40 (< 80)	< 250	5	+ 8 to + 10	> 25	8	9	
BZT52B36-V	WW	35.3	36.7	40 (< 90)	< 250	5	+ 8 to + 10	> 27	8	9	
BZT52B39-V	WX	38.2	39.8	50 (< 90)	< 300	5	+ 10 to + 12	> 29	7	8	
BZT52B43-V	WY	42.1	43.9	60 (< 100)	< 700	5	+ 10 to + 12	> 32	6	7	
BZT52B47-V	WZ	46.1	47.9	70 (< 100)	< 750	5	+ 10 to + 12	> 35	5	6	
BZT52B51-V	X1	50	52	70 (< 100)	< 750	5	+ 10 to + 12	> 38	5	6	
BZT52B56-V	X2	54.9	57.1	< 135 <sup>(2)</sup>	< 1000 <sup>(3)</sup>	2.5	typ. + 10 <sup>(2)</sup>	-	-	-	
BZT52B62-V	X3	60.8	63.2	< 150 <sup>(2)</sup>	< 1000 <sup>(3)</sup>	2.5	typ. + 10 <sup>(2)</sup>	-	-	-	
BZT52B68-V	X4	66.6	69.4	< 200 <sup>(2)</sup>	< 1000 <sup>(3)</sup>	2.5	typ. + 10 <sup>(2)</sup>	-	-	-	
BZT52B75-V	X5	73.5	76.5	< 250 <sup>(2)</sup>	< 1500 <sup>(3)</sup>	2.5	typ. + 10 <sup>(2)</sup>	-	-	-	

I<sub>ZT1</sub> = 5 mA, I<sub>ZT2</sub> = 1 mA

<sup>1)</sup> Measured with pulses T<sub>p</sub> = 5 ms

<sup>2)</sup> = I<sub>ZT1</sub> = 2.5 mA

<sup>3)</sup> = I<sub>ZT2</sub> = 0.5 mA

<sup>4)</sup> Valid provided that electrodes are kept at ambient temperature.

## Typical Characteristics (Tamb = 25 °C unless otherwise specified)

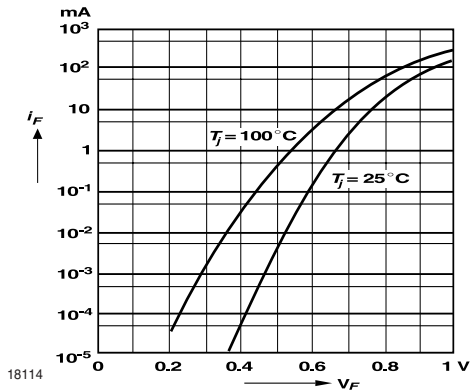


Figure 1. Forward characteristics

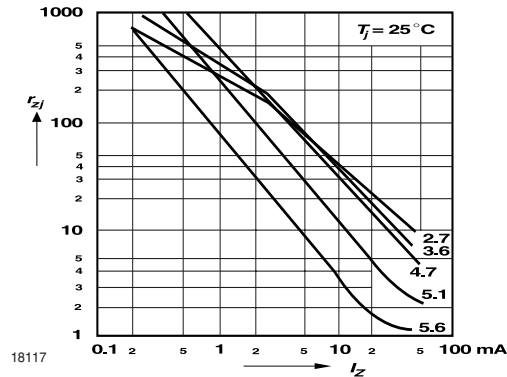


Figure 4. Dynamic Resistance vs. Zener Current

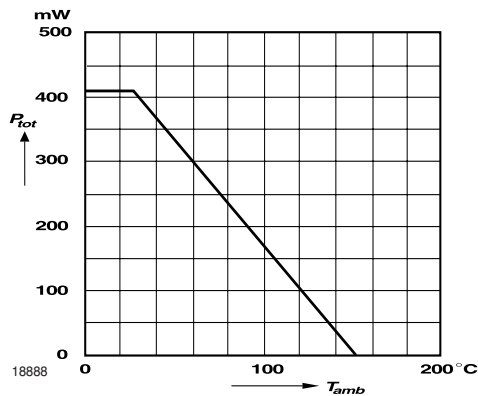


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

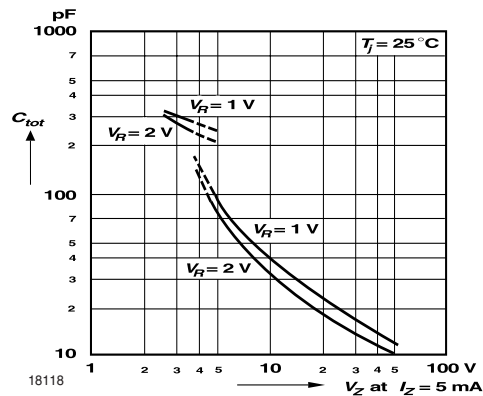


Figure 5. Capacitance vs. Zener Voltage

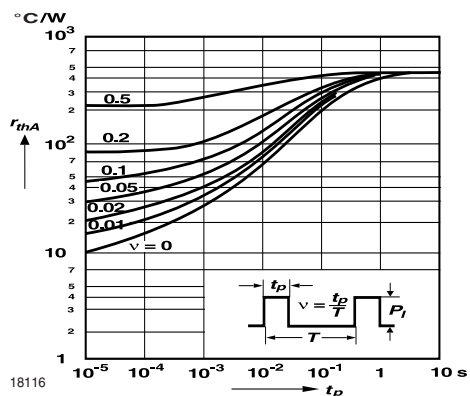


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

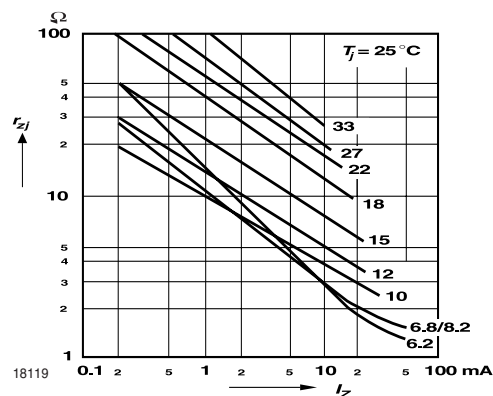


Figure 6. Dynamic Resistance vs. Zener Current

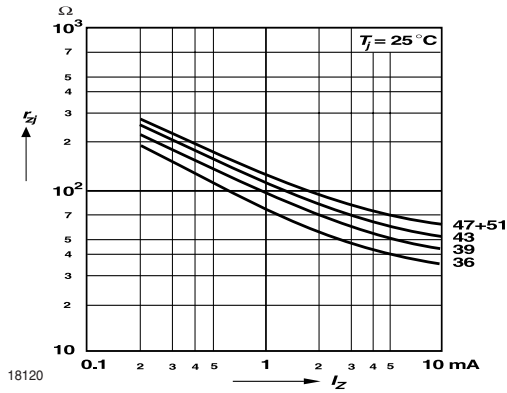


Figure 7. Dynamic Resistance vs. Zener Current

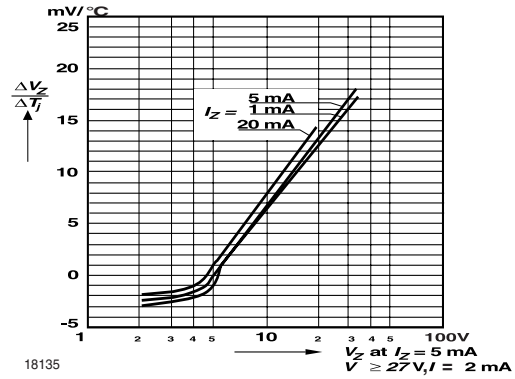


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

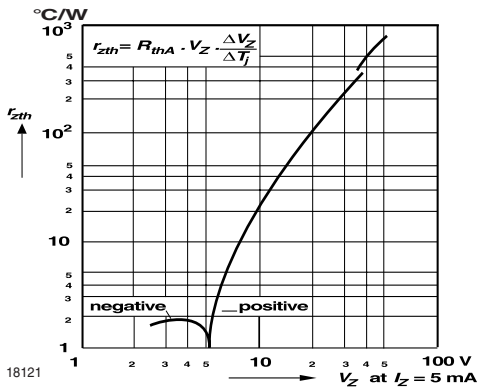


Figure 8. Thermal Differential Resistance vs. Zener Voltage

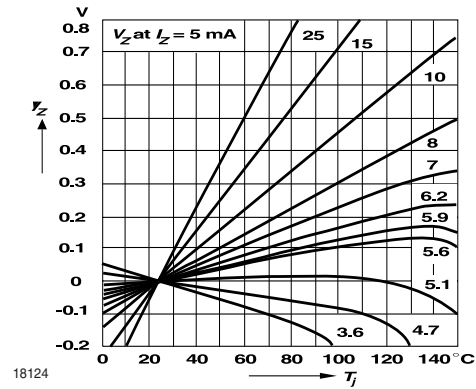


Figure 11. Change of Zener Voltage vs. Junction Temperature

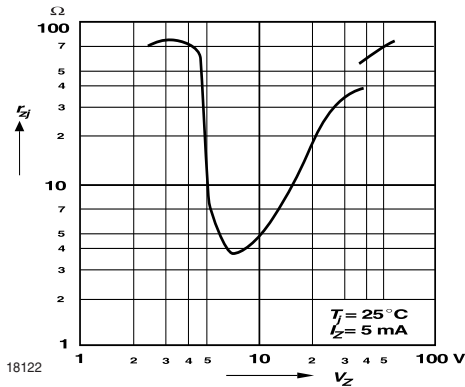


Figure 9. Dynamic Resistance vs. Zener Voltage

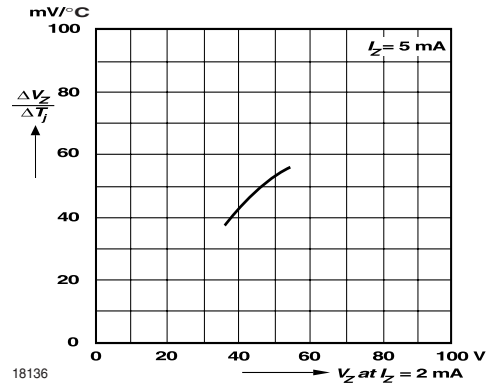


Figure 12. Temperature Dependence of Zener Voltage vs. Zener Voltage

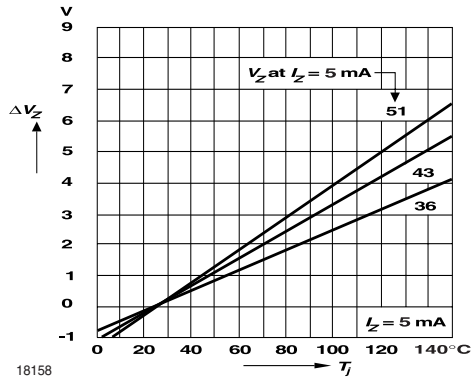


Figure 13. Change of Zener Voltage vs. Junction Temperature

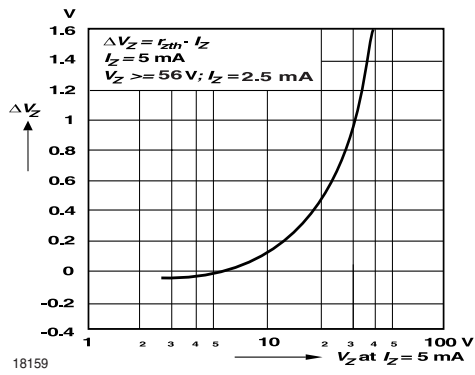


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

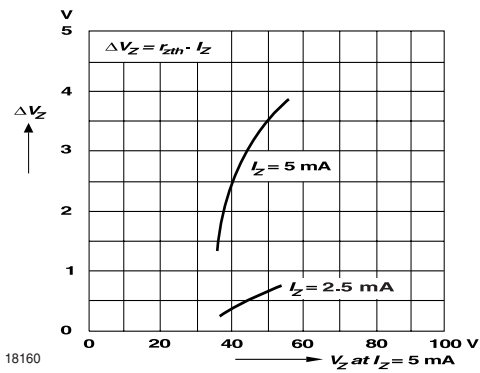


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

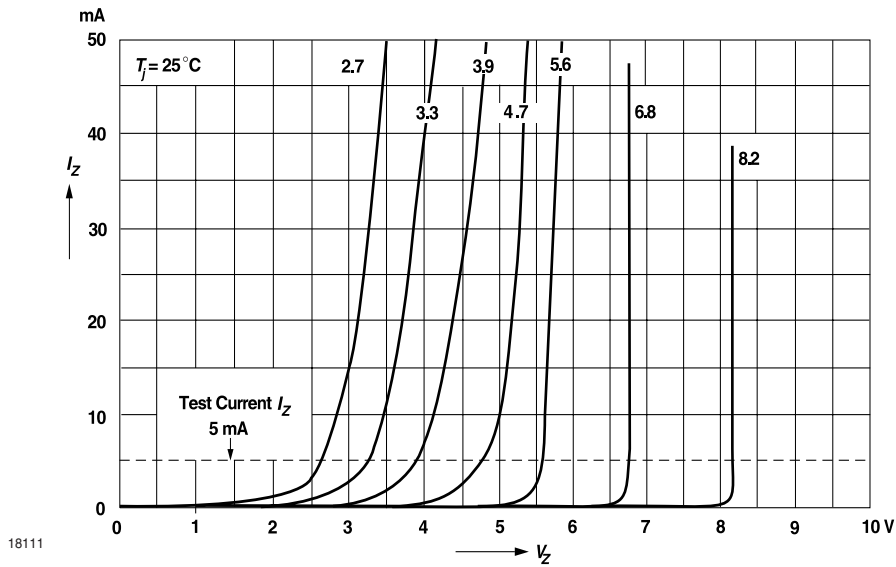


Figure 16. Breakdown Characteristics

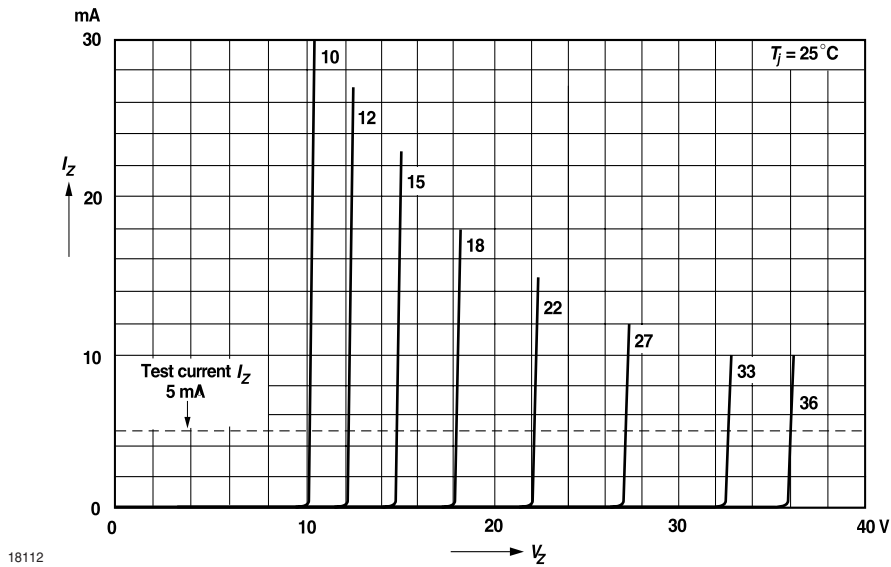
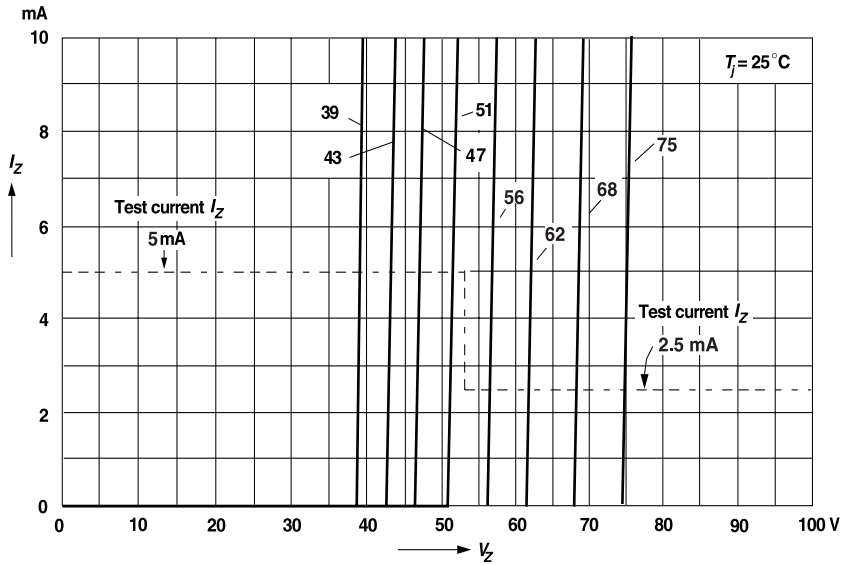


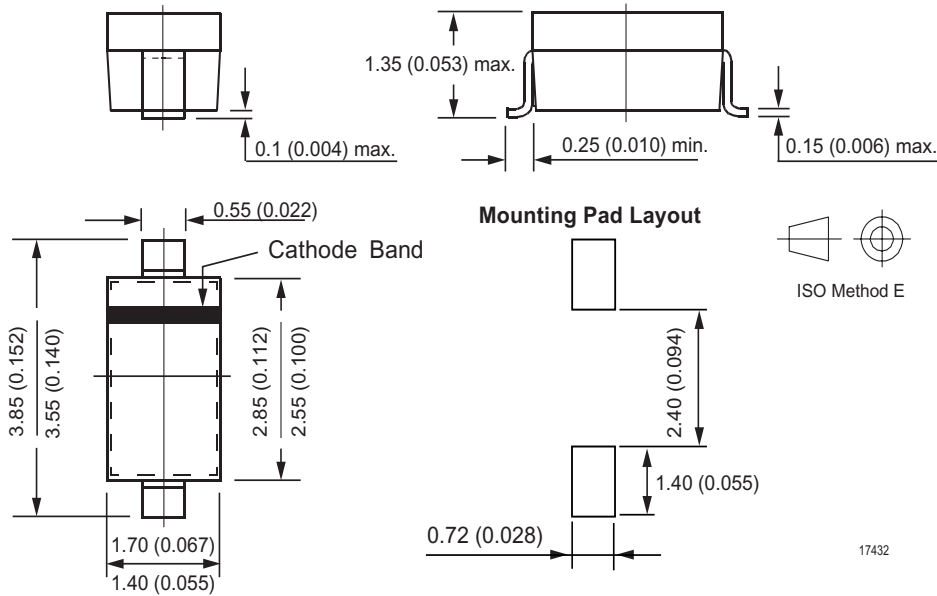
Figure 17. Breakdown Characteristics



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Figure 18. Breakdown Characteristics

## Package Dimensions in mm (Inches)



17432





## 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