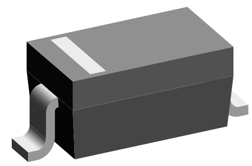
Small Signal Zener Diodes

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 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Zener current see table " Characteristics "				
Power dissipation		P_{tot}	500[2)]	mW
Power dissipation		P_{tot}	410[1)]	mW

[1)] Diode on ceramic substrate 0.7 mm; 2.5 mm^2 pad areas

[2)] Diode on ceramic substrate 0.7 mm; 5 mm^2 pad areas

Thermal Characteristics

T_{amb} = 25 °C, unless otherwise specified

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		R_{thJA}	300[1)]	°C/W
Junction temperature		T_J	150	°C
Storage temperature range		T_S	- 65 to + 150	°C

[1)] Valid provided that electrodes are kept at ambient temperature

Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range[1)]		Dynamic Resistance		Test Current	Temp. Coefficient	Reverse Voltage	Admissible Zener Current[4)]	
		V_Z @ I_{ZT1}		r_{zj} @ I_{ZT1}	r_{zj} @ I_{ZT2}	I_{ZT1}	@ I_{ZT1}	V_R @ I_R = 100 nA,	I_Z @ T_{amb} = 45 °C,	I_Z @ T_{amb} = 25 °C,
		V		Ω		mA	α_{VZ} (10^{-4}/°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[(2)]	< 1000[(3)]	2.5	typ. +10[(2)]	-	-	-
BZT52C62-V	X3	58	66	< 150[(2)]	< 1000[(3)]	2.5	typ. +10[(2)]	-	-	-
BZT52C68-V	X4	64	72	< 200[(2)]	< 1000[(3)]	2.5	typ. +10[(2)]	-	-	-
BZT52C75-V	X5	70	79	< 250[(2)]	< 1500[(3)]	2.5	typ. +10[(2)]	-	-	-

I_{ZT1} = 5 mA, I_{ZT2} = 1 mA

(1) Measured with pulses T_p = 5 ms

(2) = I_{ZT1} = 2.5 mA

(3) = I_{ZT2} = 0.5 mA

(4) Valid provided that electrodes are kept at ambient temperature.

Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range[1)]		Dynamic Resistance		Test Current	Temp. Coefficient	Reverse Voltage	Admissible Zener Current[4)]	
		V_Z @ I_{ZT1}		r_{zj} @ I_{ZT1}	r_{zj} @ I_{ZT2}	I_{ZT1}	@ I_{ZT1}	V_R @ I_R = 100 nA,	I_Z @ T_{amb} = 45 °C,	I_Z @ T_{amb} = 25 °C,
		V		Ω		mA	α_{VZ} (10^{-4}/°C)	V	mA	
		min	max							
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[(2)]	< 1000[(3)]	2.5	typ. + 10[(2)]	-	-	-
BZT52B62-V	X3	60.8	63.2	< 150[(2)]	< 1000[(3)]	2.5	typ. + 10[(2)]	-	-	-
BZT52B68-V	X4	66.6	69.4	< 200[(2)]	< 1000[(3)]	2.5	typ. + 10[(2)]	-	-	-
BZT52B75-V	X5	73.5	76.5	< 250[(2)]	< 1500[(3)]	2.5	typ. + 10[(2)]	-	-	-

I_{ZT1} = 5 mA, I_{ZT2} = 1 mA

1) Measured with pulses T_p = 5 ms

2) = I_{ZT1} = 2.5 mA

3) = I_{ZT2} = 0.5 mA

4) Valid provided that electrodes are kept at ambient temperature.

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

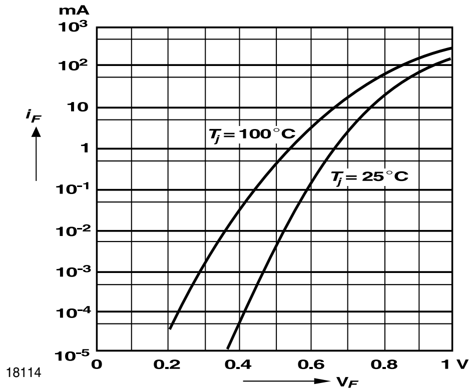


Figure 1. Forward characteristics

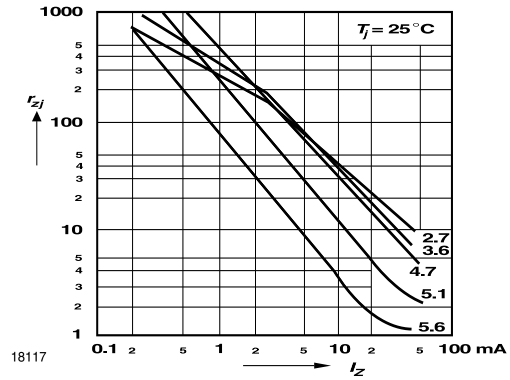


Figure 4. Dynamic Resistance vs. Zener Current

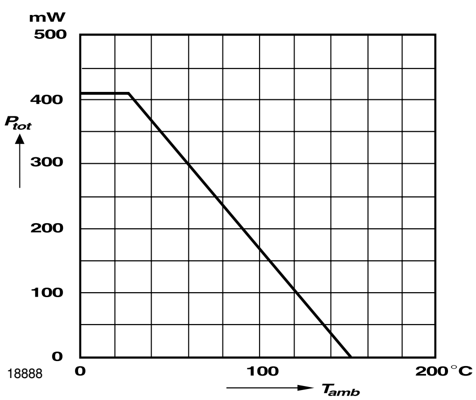


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

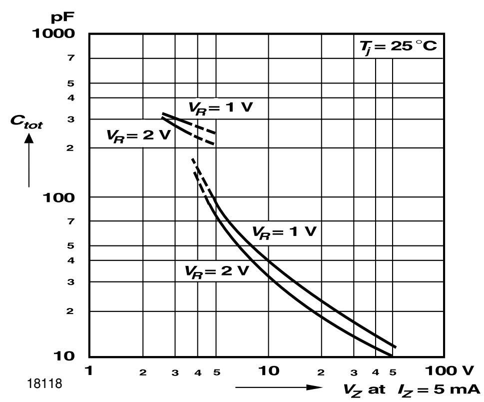


Figure 5. Capacitance vs. Zener Voltage

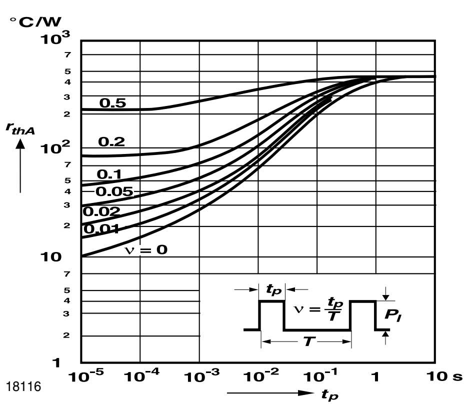


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

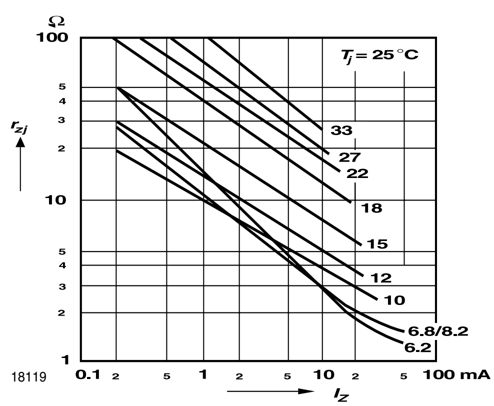


Figure 6. Dynamic Resistance vs. Zener Current

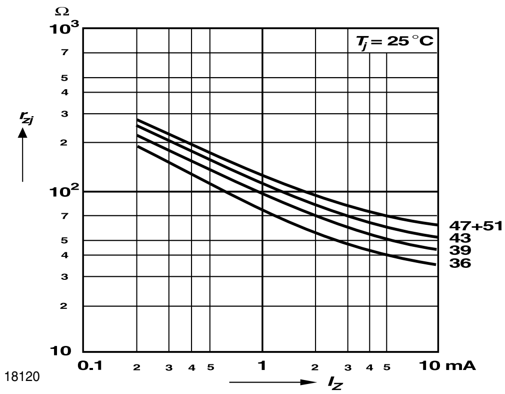


Figure 7. Dynamic Resistance vs. Zener Current

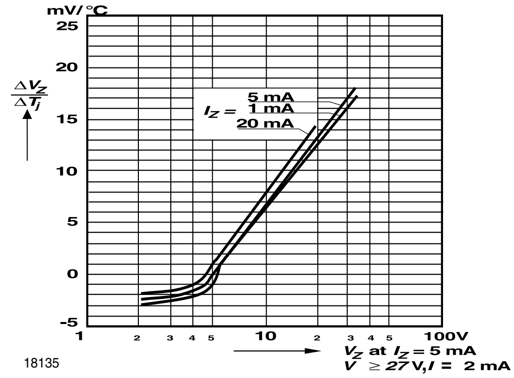


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

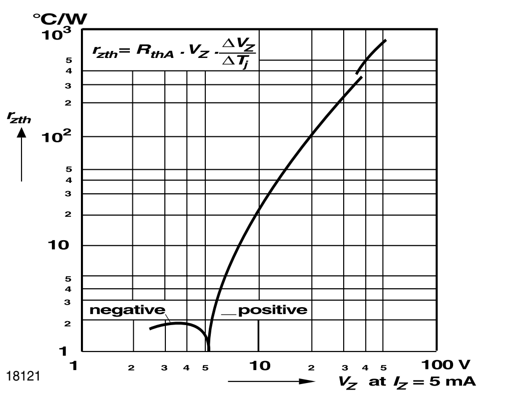


Figure 8. Thermal Differential Resistance vs. Zener Voltage

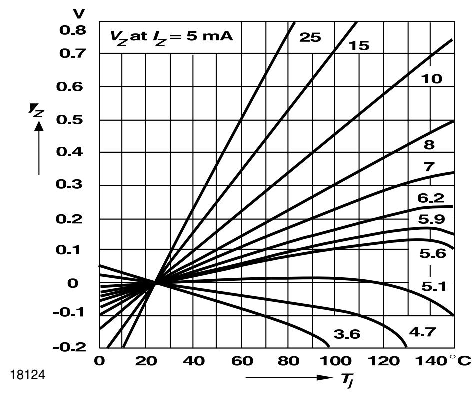


Figure 11. Change of Zener Voltage vs. Junction Temperature

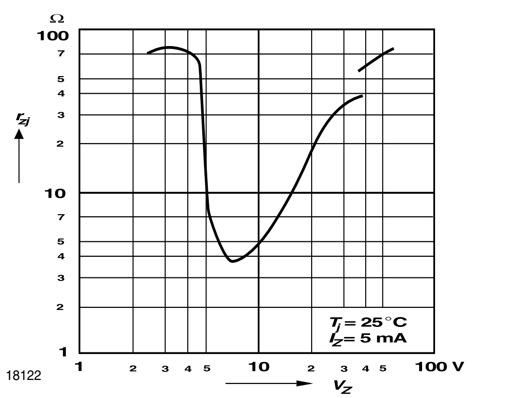


Figure 9. Dynamic Resistance vs. Zener Voltage

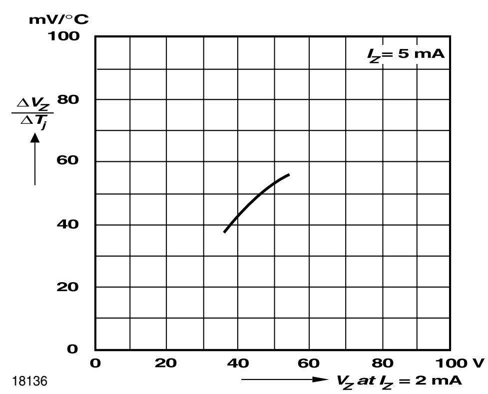


Figure 12. Temperature Dependence of Zener Voltage vs. Zener Voltage

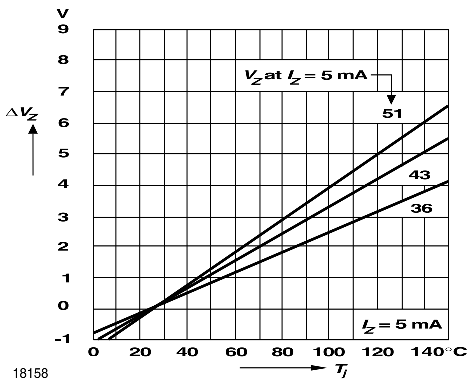


Figure 13. Change of Zener Voltage vs. Junction Temperature

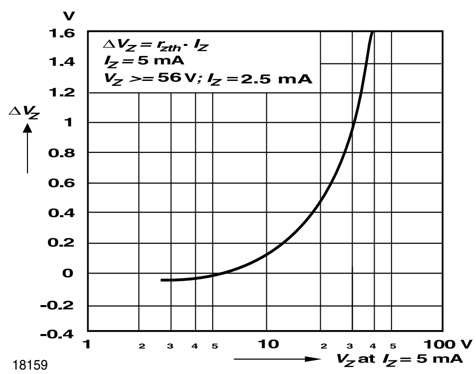


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

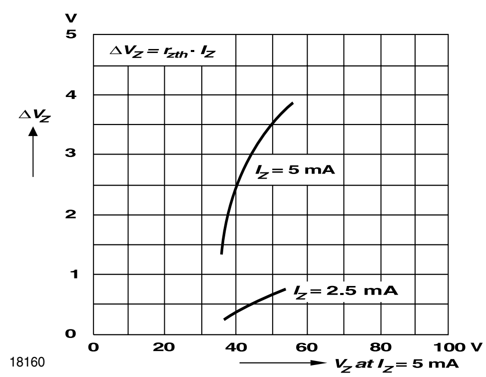


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

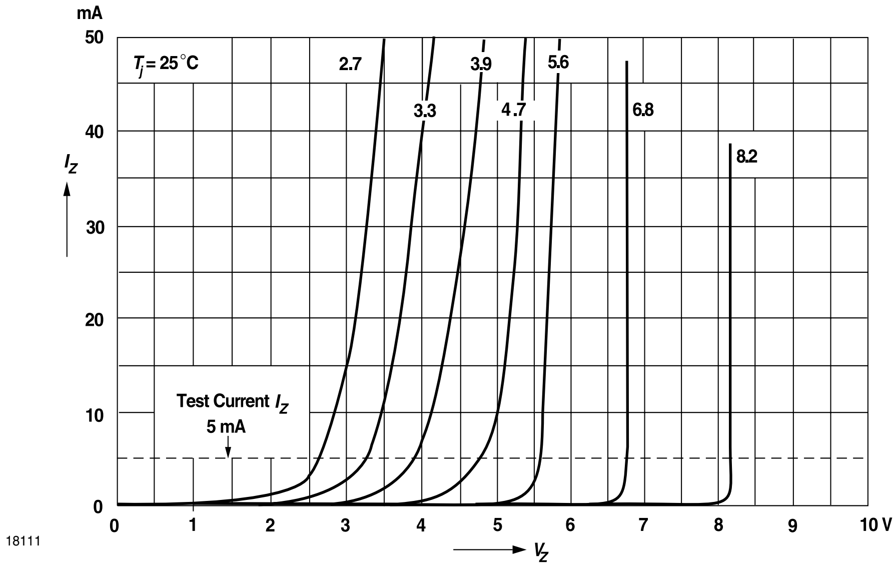


Figure 16. Breakdown Characteristics

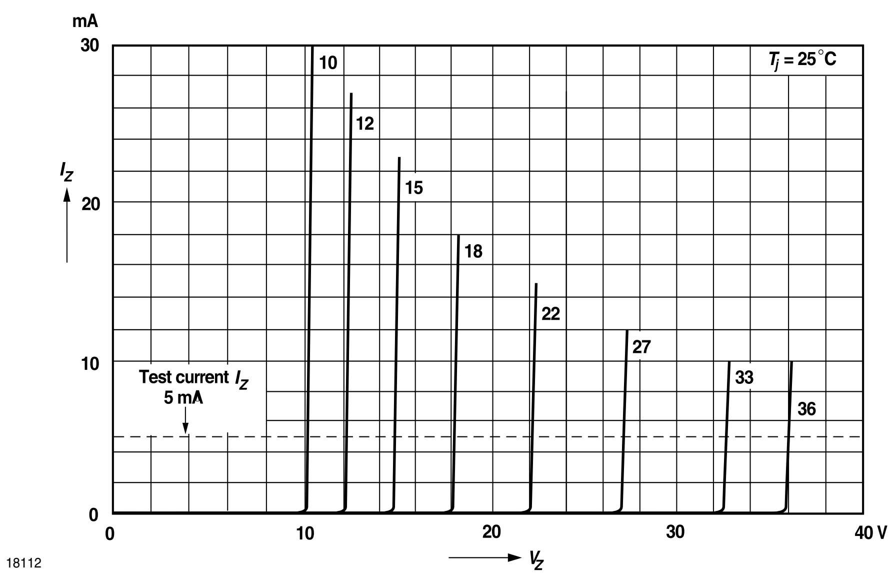


Figure 17. Breakdown Characteristics

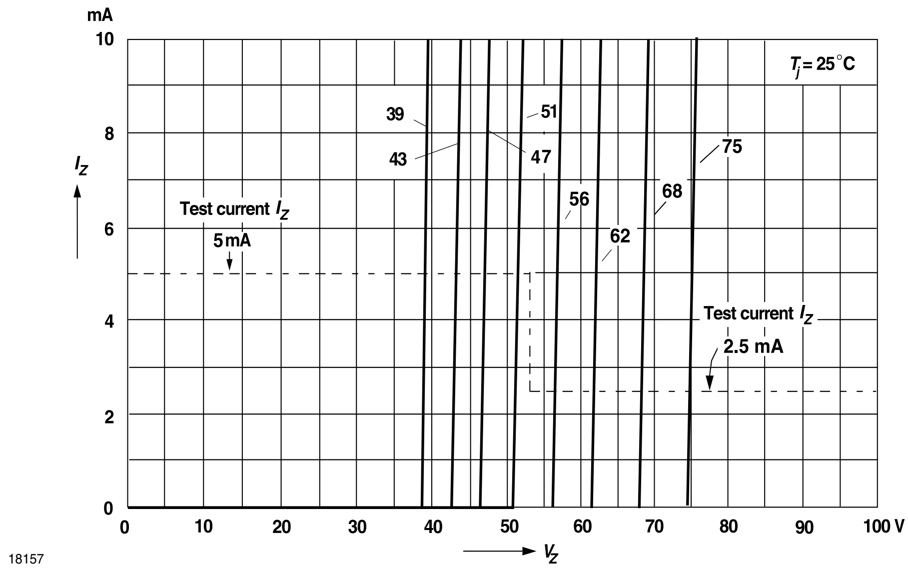
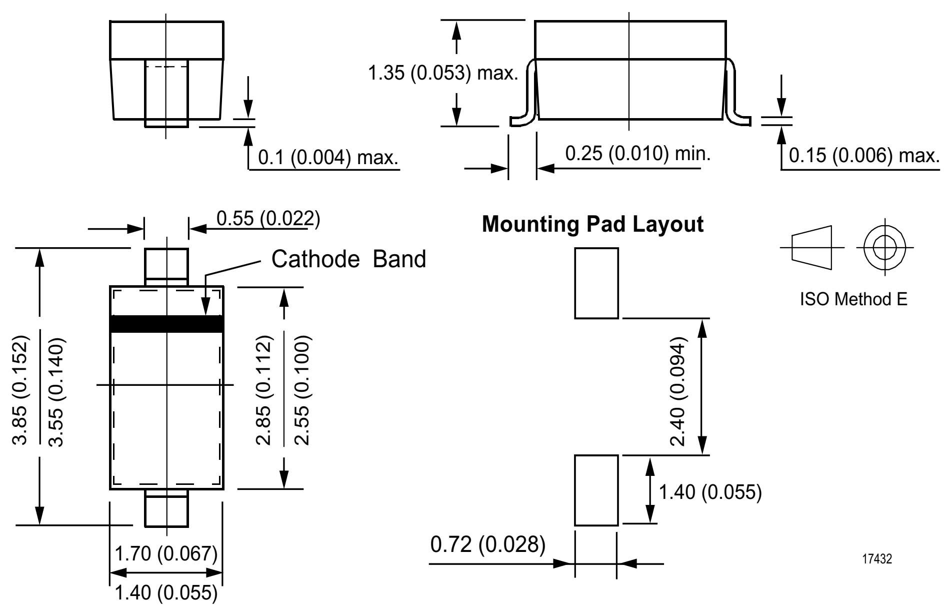


Figure 18. Breakdown Characteristics

Package Dimensions in mm (Inches)



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.

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

Notice

Specifications of the products displayed herein are subject to change without notice. Vishay Intertechnology, Inc., or anyone on its behalf, assumes no responsibility or liability for any errors or inaccuracies.

Information contained herein is intended to provide a product description only. No license, express or implied, by estoppel or otherwise, to any intellectual property rights is granted by this document. Except as provided in Vishay's terms and conditions of sale for such products, Vishay assumes no liability whatsoever, and disclaims any express or implied warranty, relating to sale and/or use of Vishay products including liability or warranties relating to fitness for a particular purpose, merchantability, or infringement of any patent, copyright, or other intellectual property right.

The products shown herein are not designed for use in medical, life-saving, or life-sustaining applications. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Vishay for any damages resulting from such improper use or sale.