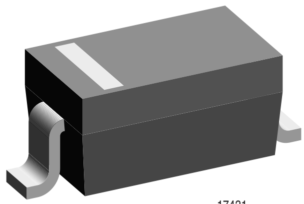
Zener Diodes

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. Standard Zener voltage tolerance is ± 5 %. Replace suffix "C" with "B" for ± 2 % tolerance. Other tolerances and other Zener voltages are available upon request.

Mechanical Data

Case: SOD-123 Plastic Case
Weight: approx. 10 mg
Packaging Codes/Options:
D3 / 10 K per 13 " reel (8 mm tape)
D4 / 3 K per 7 " reel (8 mm tape)

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}	410[1)]	mW

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

Maximum Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		$R_{\theta JA}$	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	W1	2.2	2.6	85	600	5	- 9 to - 4	-	-	-
BZT52C2V7	W2	2.5	2.9	75 (< 83)	< 500	5	- 9 to - 4	-	113	134
BZT52C3	W3	2.8	3.2	80 (< 95)	< 500	5	- 9 to - 3	-	98	118
BZT52C3V3	W4	3.1	3.5	80 (< 95)	< 500	5	- 8 to - 3	-	92	109
BZT52C3V6	W5	3.4	3.8	80 (< 95)	< 500	5	- 8 to - 3	-	85	100
BZT52C3V9	W6	3.7	4.1	80 (< 95)	< 500	5	- 7 to - 3	-	77	92
BZT52C4V3	W7	4	4.6	80 (< 95)	< 500	5	- 6 to - 1	-	71	84
BZT52C4V7	W8	4.4	5	70 (< 78)	< 500	5	- 5 to +2	-	64	76
BZT52C5V1	W9	4.8	5.4	30 (< 60)	< 480	5	- 3 to +4	> 0.8	56	67
BZT52C5V6	WA	5.2	6	10 (< 40)	< 400	5	- 2 to +6	> 1	50	59
BZT52C6V2	WB	5.8	6.6	4.8 (< 10)	< 200	5	- 1 to +7	> 2	45	54
BZT52C6V8	WC	6.4	7.2	4.5 (< 8)	< 150	5	+2 to +7	> 3	41	49
BZT52C7V5	WD	7	7.9	4 (< 7)	< 50	5	+3 to +7	> 5	37	44
BZT52C8V2	WE	7.7	8.7	4.5 (< 7)	< 50	5	+4 to +7	> 6	34	40
BZT52C9V1	WF	8.5	9.6	4.8 (< 10)	< 50	5	+5 to +8	> 7	30	36
BZT52C10	WG	9.4	10.6	5.2 (< 15)	< 70	5	+5 to +8	> 7.5	28	33
BZT52C11	WH	10.4	11.6	6 (< 20)	< 70	5	+5 to +9	> 8.5	25	30
BZT52C12	WI	11.4	12.7	7 (< 20)	< 90	5	+6 to +9	> 9	23	28
BZT52C13	WK	12.4	14.1	9 (< 25)	< 110	5	+7 to +9	> 10	21	25
BZT52C15	WL	13.8	15.6	11 (< 30)	< 110	5	+7 to +9	> 11	19	23
BZT52C16	WM	15.3	17.1	13 (< 40)	< 170	5	+8 to +9.5	> 12	17	20
BZT52C18	WN	16.8	19.1	18 (< 50)	< 170	5	+8 to +9.5	> 14	15	18
BZT52C20	WO	18.8	21.2	20 (< 50)	< 220	5	+8 to +10	> 15	14	17
BZT52C22	WP	20.8	23.3	25 (< 55)	< 220	5	+8 to +10	> 17	13	16
BZT52C24	WR	22.8	25.6	28 (< 80)	< 220	5	+8 to +10	> 18	11	13
BZT52C27	WS	25.1	28.9	30 (< 80)	< 250	5	+8 to +10	> 20	10	12
BZT52C30	WT	28	32	35 (< 80)	< 250	5	+8 to +10	> 22.5	9	10
BZT52C33	WU	31	35	40 (< 80)	< 250	5	+8 to +10	> 25	8	9
BZT52C36	WW	34	38	40 (< 90)	< 250	5	+8 to +10	> 27	8	9
BZT52C39	WX	37	41	50 (< 90)	< 300	5	+10 to +12	> 29	7	8
BZT52C43	WY	40	46	60 (< 100)	< 700	5	+10 to +12	> 32	6	7
BZT52C47	WZ	44	50	70 (< 100)	< 750	5	+10 to +12	> 35	5	6
BZT52C51	X1	48	54	70 (< 100)	< 750	5	+10 to +12	> 38	5	6
BZT52C56	X2	52	60	< 135[(2)]	< 1000[(3)]	2.5	typ. +10[(2)]	-	-	-
BZT52C62	X3	58	66	< 150[(2)]	< 1000[(3)]	2.5	typ. +10[(2)]	-	-	-
BZT52C68	X4	64	72	< 200[(2)]	< 1000[(3)]	2.5	typ. +10[(2)]	-	-	-
BZT52C75	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	W1	2.35	2.45	85	600	5	- 9 to - 4	-	-	-
BZT52B2V7	W2	2.65	2.75	75 (< 83)	< 500	5	- 9 to - 4	-	113	134
BZT52B3	W3	2.94	3.06	80 (< 95)	< 500	5	- 9 to - 3	-	98	118
BZT52B3V3	W4	3.23	3.37	80 (< 95)	< 500	5	- 8 to - 3	-	92	109W5
BZT52B3V6	W5	3.53	3.67	80 (< 95)	< 500	5	- 8 to - 3	-	85	100
BZT52B3V9	W6	3.82	3.98	80 (< 95)	< 500	5	- 7 to - 3	-	77	92
BZT52B4V3	W7	4.21	4.39	80 (< 95)	< 500	5	- 6 to - 1	-	71	84
BZT52B4V7	W8	4.61	4.79	70 (< 78)	< 500	5	- 5 to + 2	-	64	76
BZT52B5V1	W9	5	5.2	30 (< 60)	< 480	5	- 3 to + 4	> 0.8	56	67
BZT52B5V6	WA	5.49	5.71	10 (< 40)	< 400	5	- 2 to + 6	> 1	50	59
BZT52B6V2	WB	6.08	6.32	4.8 (< 10)	< 200	5	- 1 to + 7	> 2	45	54
BZT52B6V8	WC	6.66	6.94	4.5 (< 8)	< 150	5	+ 2 to + 7	> 3	41	49
BZT52B7V5	WD	7.35	7.65	4 (< 7)	< 50	5	+ 3 to + 7	> 5	37	44
BZT52B8V2	WE	8.04	8.36	4.5 (< 7)	< 50	5	+ 4 to + 7	> 6	34	40
BZT52B9V1	WF	8.92	9.28	4.8 (< 10)	< 50	5	+ 5 to + 8	> 7	30	36
BZT52B10	WG	9.8	10.2	5.2 (< 15)	< 70	5	+ 5 to + 8	> 7.5	28	33
BZT52B11	WH	10.8	11.2	6 (< 20)	< 70	5	+ 5 to + 9	> 8.5	25	30
BZT52B12	WI	11.8	12.2	7 (< 20)	< 90	5	+ 6 to + 9	> 9	23	28
BZT52B13	WK	12.7	13.3	9 (< 25)	< 110	5	+ 7 to + 9	> 10	21	25
BZT52B15	WL	14.7	15.3	11 (< 30)	< 110	5	+ 7 to + 9	> 11	19	23
BZT52B16	WM	15.7	16.3	13 (< 40)	< 170	5	+ 8 to + 9.5	> 12	17	20
BZT52B18	WN	17.6	18.4	18 (< 50)	< 170	5	+ 8 to + 9.5	> 14	15	18
BZT52B20	WO	19.6	20.4	20 (< 50)	< 220	5	+ 8 to + 10	> 15	14	17
BZT52B22	WP	21.6	22.4	25 (< 55)	< 220	5	+ 8 to + 10	> 17	13	16
BZT52B24	WR	23.5	24.5	28 (< 80)	< 220	5	+ 8 to + 10	> 18	11	13
BZT52B27	WS	26.5	27.5	30 (< 80)	< 250	5	+ 8 to + 10	> 20	10	12
BZT52B30	WT	29.4	30.6	35 (< 80)	< 250	5	+ 8 to + 10	> 22.5	9	10
BZT52B33	WU	32.3	33.7	40 (< 80)	< 250	5	+ 8 to + 10	> 25	8	9
BZT52B36	WW	35.3	36.7	40 (< 90)	< 250	5	+ 8 to + 10	> 27	8	9
BZT52B39	WX	38.2	39.8	50 (< 90)	< 300	5	+ 10 to + 12	> 29	7	8
BZT52B43	WY	42.1	43.9	60 (< 100)	< 700	5	+ 10 to + 12	> 32	6	7
BZT52B47	WZ	46.1	47.9	70 (< 100)	< 750	5	+ 10 to + 12	> 35	5	6
BZT52B51	X1	50	52	70 (< 100)	< 750	5	+ 10 to + 12	> 38	5	6
BZT52B56	X2	54.9	57.1	< 135[(2)]	< 1000[(3)]	2.5	typ. + 10[(2)]	-	-	-
BZT52B62	X3	60.8	63.2	< 150[(2)]	< 1000[(3)]	2.5	typ. + 10[(2)]	-	-	-
BZT52B68	X4	66.6	69.4	< 200[(2)]	< 1000[(3)]	2.5	typ. + 10[(2)]	-	-	-
BZT52B75	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 (T_{amb} = 25 °C unless otherwise specified)

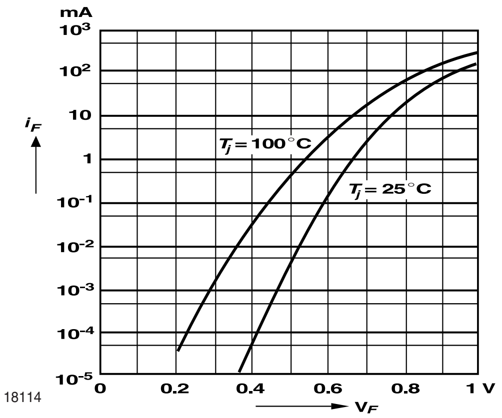


Figure 1. Forward characteristics

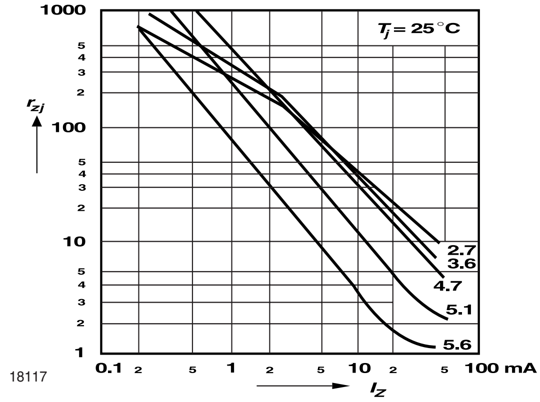


Figure 4. Dynamic Resistance vs. Zener Current

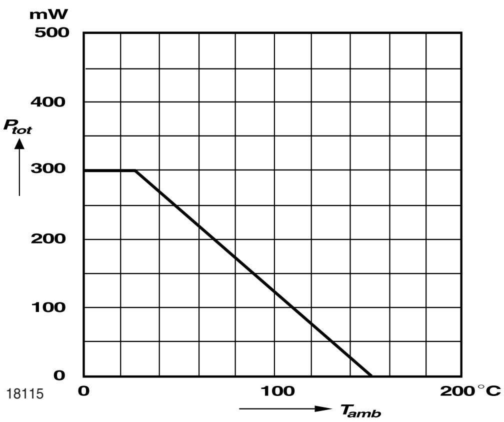


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

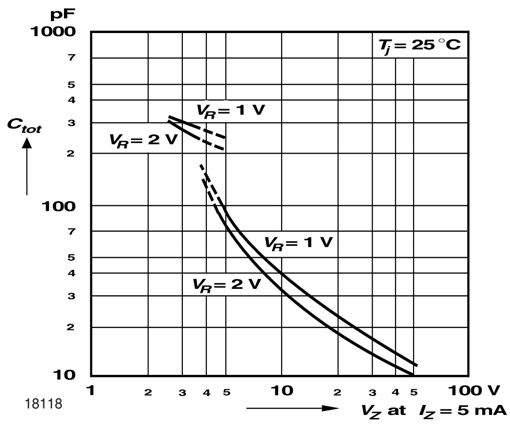


Figure 5. Capacitance vs. Zener Voltage

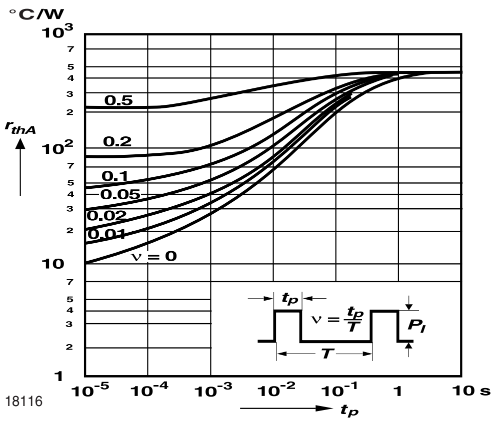


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

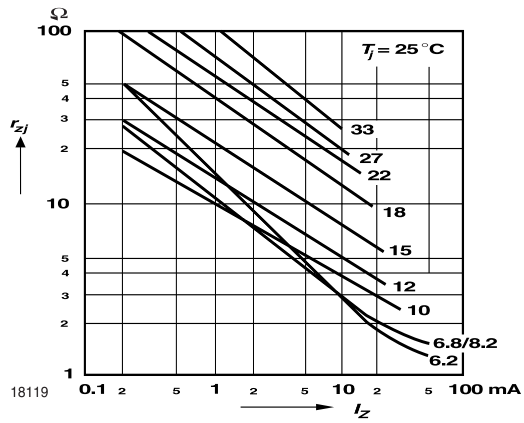


Figure 6. Dynamic Resistance vs. Zener Current

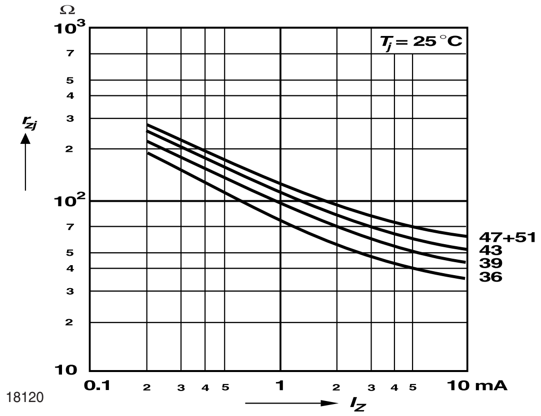


Figure 7. Dynamic Resistance vs. Zener Current

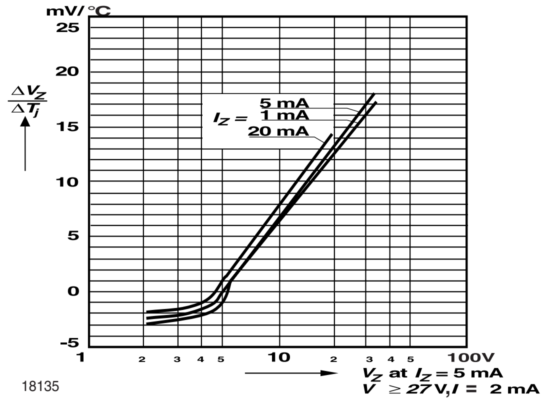


Figure 10. Temperature dependence of Zener voltage versus Zener voltage

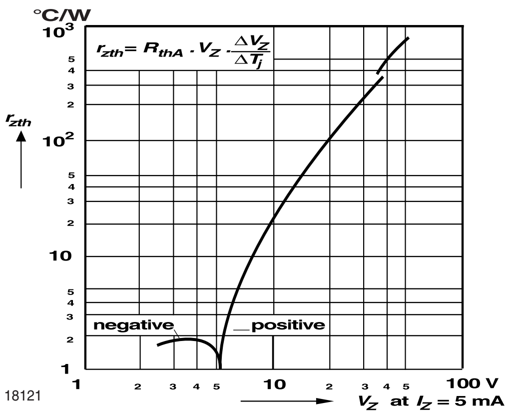


Figure 8. Thermal differential resistance versus Zener voltage

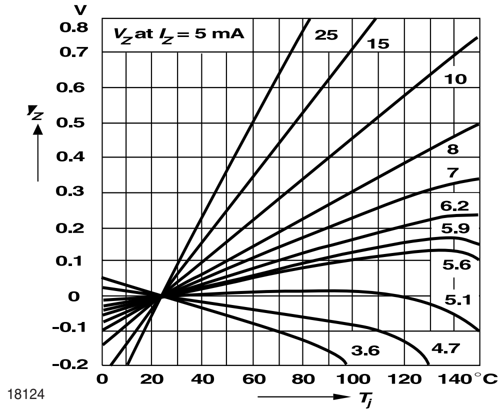


Figure 11. Change of Zener voltage versus junction temperature

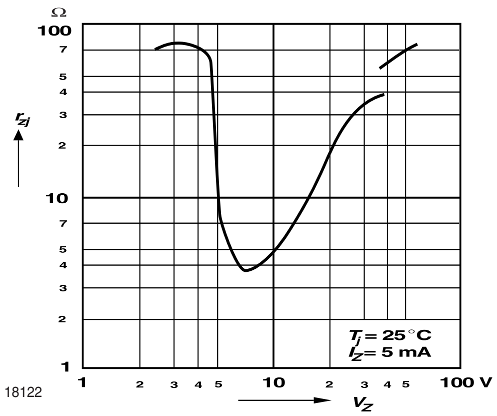


Figure 9. Dynamic resistance versus Zener voltage

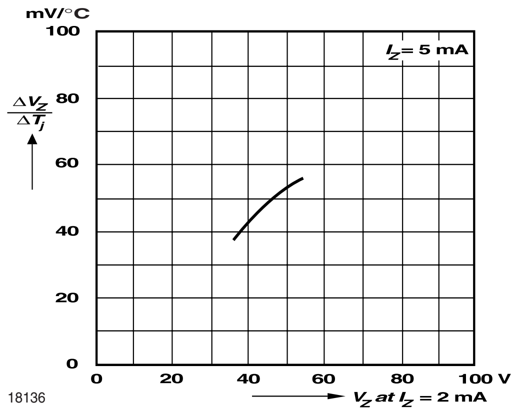


Figure 12. Temperature dependence of Zener voltage versus Zener voltage

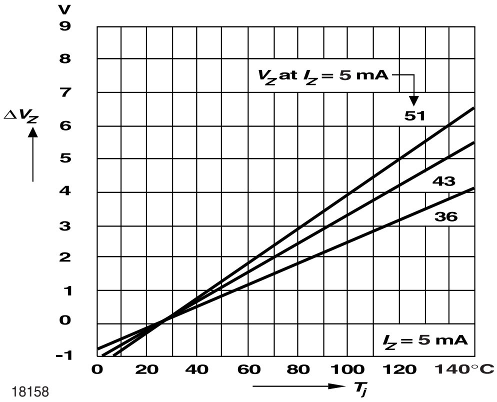


Figure 13. Change of Zener voltage versus junction temperature

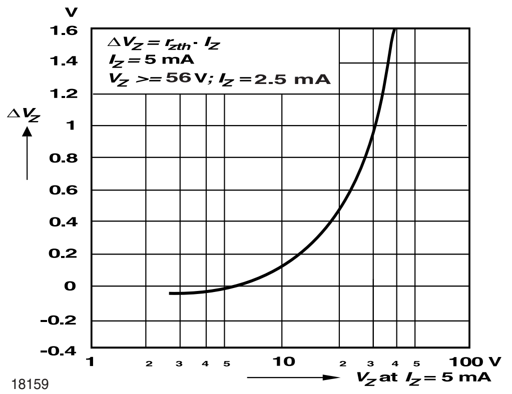


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage

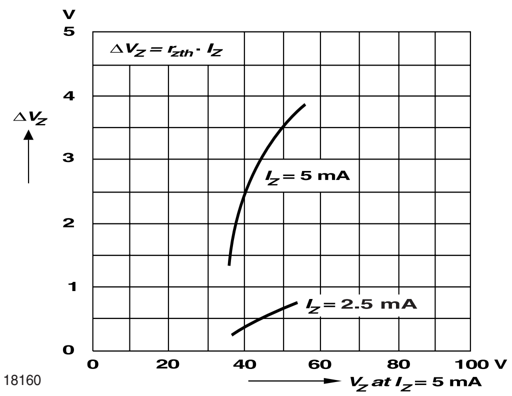


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium versus Zener voltage

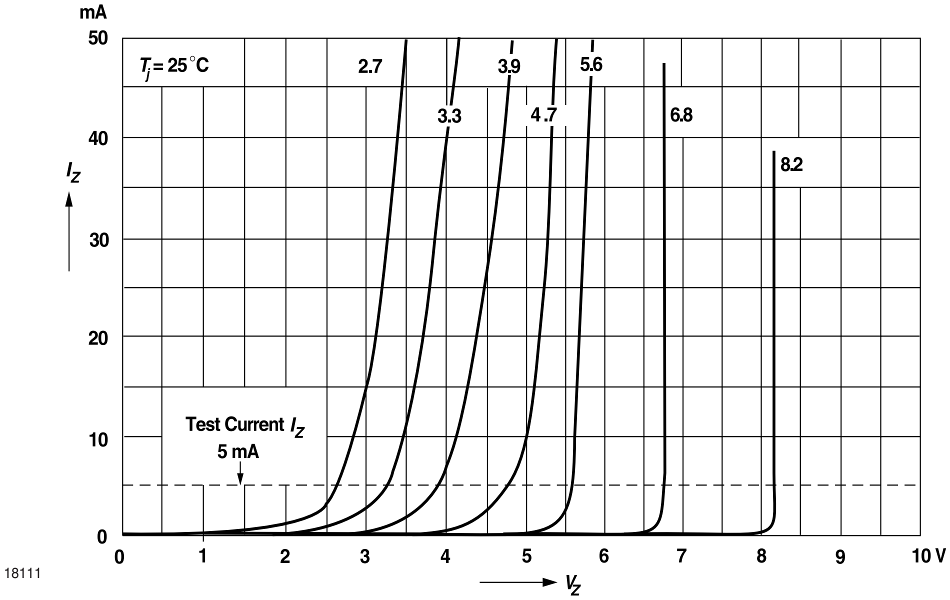


Figure 16. Breakdown Characteristics

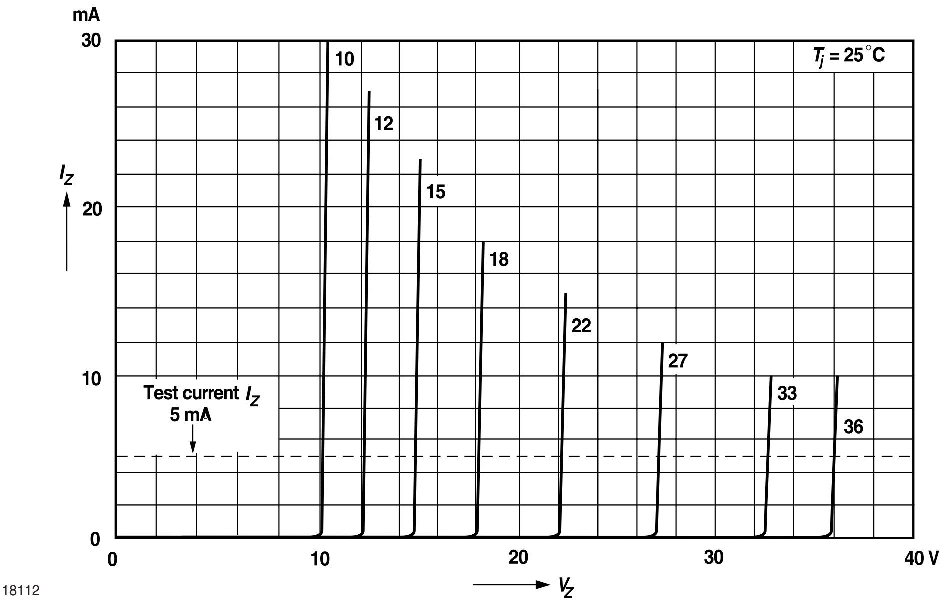


Figure 17. Breakdown Characteristics

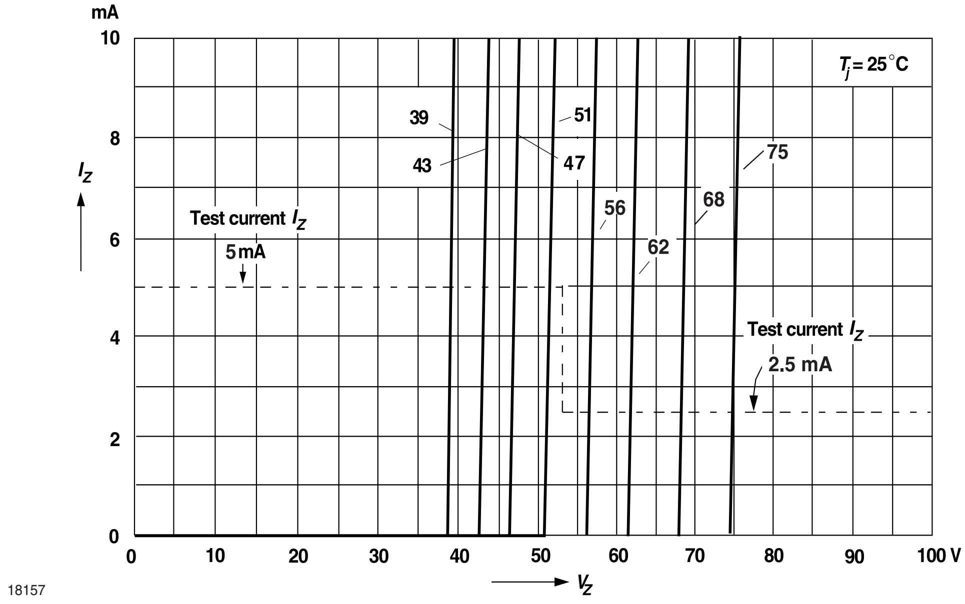
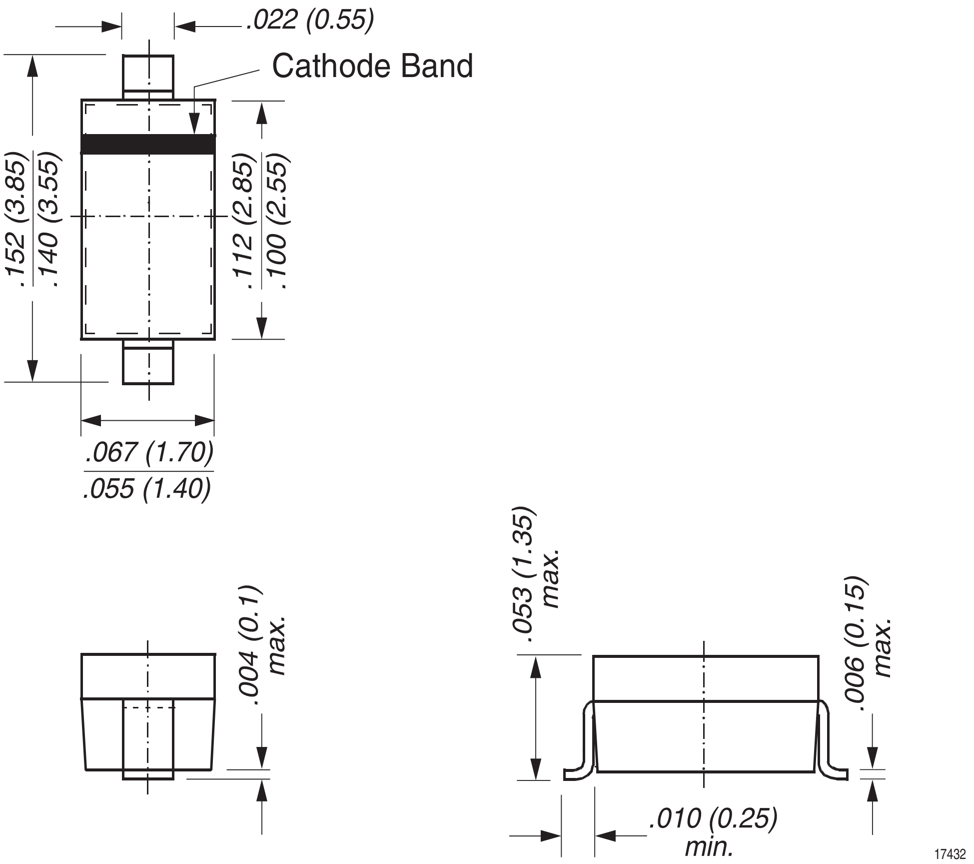
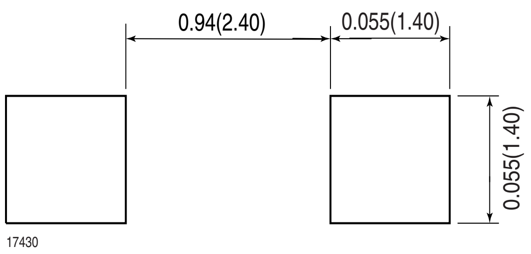


Figure 18. Breakdown Characteristics

Package Dimensions in Inches (mm)



Mounting Pad Layout



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 operatingsystems 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.

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