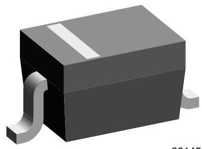
Small Signal Zener Diodes

Features
- Silicon Planar Power Zener Diodes
- The Zener voltages are graded according to the international E 24 standard
- Standard Zener voltage tolerance is ± 5 %; Replace "C" with "B" for ± 2 % tolerance
- Lead (Pb)-free component
- Component in accordance to RoHS 2002/95/EC and WEEE 2002/96/EC


20145

Mechanical Data
Case: SOD323 Plastic case
Weight: approx. 5.0 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
Power dissipation		P_{tot}	200[1)]	mW

1) Device on fiberglass substrate

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		R_{thJA}	650[1)]	K/W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	- 65 to + 150	°C

1) Valid that electrodes are kept at ambient temperature

Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temperature Coefficient of Zener Voltage		Test Current	Reverse Leakage Current	
		V_Z at I_{ZT1}		r_{zj} at I_{ZT1}	r_{zj} at I_{ZT2}	I_{ZT1}	α_{VZ} at I_{ZT1}		at I_{ZT2}	I_R at V_R	
		V		Ω	Ω	mA	10^{-4}/°C		mA	µA	V
		min	max	typ	typ		min	max			
BZX384C2V4-V	W1	2.2	2.6	70 (≤ 100)	275	5	- 9	- 4	1	50	1
BZX384C2V7-V	W2	2.5	2.9	75 (≤ 100)	300 (≤ 600)	5	- 9	- 4	1	20	1
BZX384C3V0-V	W3	2.8	3.2	80 (≤ 95)	325 (≤ 600)	5	- 9	- 3	1	10	1
BZX384C3V3-V	W4	3.1	3.5	85 (≤ 95)	350 (≤ 600)	5	- 8	- 3	1	5	1
BZX384C3V6-V	W5	3.4	3.8	85 (≤ 90)	375 (≤ 600)	5	- 8	- 3	1	5	1
BZX384C3V9-V	W6	3.7	4.1	85 (≤ 90)	400 (≤ 600)	5	- 7	- 3	1	3	1
BZX384C4V3-V	W7	4	4.6	80 (≤ 90)	410 (≤ 600)	5	- 6	- 1	1	3	1
BZX384C4V7-V	W8	4.4	5	50 (≤ 80)	425 (≤ 500)	5	- 5	2	1	3	2
BZX384C5V1-V	W9	4.8	5.4	40 (≤ 60)	400 (≤ 480)	5	- 3	4	1	2	2
BZX384C5V6-V	WA	5.2	6	15 (≤ 40)	80 (≤ 400)	5	- 2	6	1	1	2
BZX384C6V2-V	WB	5.8	6.6	6.0 (≤ 10)	40 (≤ 150)	5	- 1	7	1	3	4
BZX384C6V8-V	WC	6.4	7.2	6.0 (≤ 15)	30 (≤ 80)	5	2	7	1	2	4
BZX384C7V5-V	WD	7	7.9	6.0 (≤ 15)	30 (≤ 80)	5	3	7	1	1	5
BZX384C8V2-V	WE	7.7	8.7	6.0 (≤ 15)	40 (≤ 80)	5	4	7	1	0.7	5
BZX384C9V1-V	WF	8.5	9.6	6.0 (≤ 15)	40 (≤ 100)	5	5	8	1	0.5	6
BZX384C10-V	WG	9.4	10.6	8.0 (≤ 20)	50 (≤ 150)	5	5	8	1	0.2	7
BZX384C11-V	WH	10.4	11.6	10 (≤ 20)	50 (≤ 150)	5	5	9	1	0.1	8
BZX384C12-V	WI	11.4	12.7	10 (≤ 25)	50 (≤ 150)	5	6	9	1	0.1	8
BZX384C13-V	WK	12.4	14.1	10 (≤ 30)	50 (≤ 170)	5	7	9	1	0.1	8
BZX384C15-V	WL	13.8	15.6	10 (≤ 30)	50 (≤ 200)	5	7	9	1	0.05	0.7 $V_{Znom.}$
BZX384C16-V	WM	15.3	17.1	10 (≤ 40)	50 (≤ 200)	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX384C18-V	WN	16.8	19.1	10 (≤ 45)	50 (≤ 225)	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX384C20-V	WO	18.8	21.2	15 (≤ 55)	60 (≤ 225)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX384C22-V	WP	20.8	23.3	20 (≤ 55)	60 (≤ 250)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX384C24-V	WR	22.8	25.6	25 (≤ 70)	60 (≤ 250)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX384C27-V	WS	25.1	28.9	25 (≤ 80)	65 (≤ 300)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384C30-V	WT	28	32	30 (≤ 80)	70 (≤ 300)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384C33-V	WU	31	35	35 (≤ 80)	75 (≤ 325)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384C36-V	WW	34	38	35 (≤ 90)	80 (≤ 350)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384C39-V	WX	37	41	40 (≤ 130)	80 (≤ 350)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384C43-V	WY	40	46	45 (≤ 150)	85 (≤ 375)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384C47-V	WZ	44	50	50 (≤ 170)	85 (≤ 375)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384C51-V	X1	48	54	60 (≤ 180)	85 (≤ 400)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384C56-V	X2	52	60	70 (≤ 200)	100 (≤ 425)	2	9	11	0.5	0.05	0.7 $V_{Znom.}$
BZX384C62-V	X3	58	66	80 (≤ 215)	100 (≤ 450)	2	9	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384C68-V	X4	64	72	90 (≤ 240)	150 (≤ 475)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384C75-V	X5	70	79	95 (≤ 255)	170 (≤ 500)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$

(1) Measured with pulses t_p = 5 ms

Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temperature Coefficient of Zener Voltage		Test Current	Reverse Leakage Current	
		V_Z at I_{ZT1}		r_{zj} at I_{ZT1}	r_{zj} at I_{ZT2}	I_{ZT1}	α_{VZ} at I_{ZT1}		atI_{ZT2}	I_R at V_R	
		V		Ω	Ω	mA	10^{-4}/°C		mA	µA	V
		min	max	typ	typ		min	max			
BZX384B2V4-V	W1	2.35	2.45	70 (≤ 100)	275	5	- 9	- 4	1	50	1
BZX384B2V7-V	W2	2.65	2.75	75 (≤ 100)	300 (≤ 600)	5	- 9	- 4	1	20	1
BZX384B3V0-V	W3	2.94	3.06	80 (≤ 95)	325 (≤ 600)	5	- 9	- 3	1	10	1
BZX384B3V3-V	W4	3.23	3.37	85 (≤ 95)	350 (≤ 600)	5	- 8	- 3	1	5	1
BZX384B3V6-V	W5	3.53	3.67	85 (≤ 90)	375 (≤ 600)	5	- 8	- 3	1	5	1
BZX384B3V9-V	W6	3.82	3.98	85 (≤ 90)	400 (≤ 600)	5	- 7	- 3	1	3	1
BZX384B4V3-V	W7	4.21	4.39	80 (≤ 90)	410 (≤ 600)	5	- 6	- 1	1	3	1
BZX384B4V7-V	W8	4.61	4.79	50 (≤ 80)	425 (≤ 500)	5	- 5	2	1	3	2
BZX384B5V1-V	W9	5.00	5.20	40 (≤ 60)	400 (≤ 480)	5	- 3	4	1	2	2
BZX384B5V6-V	WA	5.49	5.71	15 (≤ 40)	80 (≤ 400)	5	- 2	6	1	1	2
BZX384B6V2-V	WB	6.08	6.32	6.0 (≤ 10)	40 (≤ 150)	5	- 1	7	1	3	4
BZX384B6V8-V	WC	6.66	6.94	6.0 (≤ 15)	30 (≤ 80)	5	2	7	1	2	4
BZX384B7V5-V	WD	7.35	7.65	6.0 (≤ 15)	30 (≤ 80)	5	3	7	1	1	5
BZX384B8V2-V	WE	8.04	8.36	6.0 (≤ 15)	40 (≤ 80)	5	4	7	1	0.7	5
BZX384B9V1-V	WF	8.92	9.28	6.0 (≤ 15)	40 (≤ 100)	5	5	8	1	0.5	6
BZX384B10-V	WG	9.80	10.2	8.0 (≤ 20)	50 (≤ 150)	5	5	8	1	0.2	7
BZX384B11-V	WH	10.8	11.2	10 (≤ 20)	50 (≤ 150)	5	5	9	1	0.1	8
BZX384B12-V	WI	11.8	12.2	10 (≤ 25)	50 (≤ 150)	5	6	9	1	0.1	8
BZX384B13-V	WK	12.7	13.3	10 (≤ 30)	50 (≤ 170)	5	7	9	1	0.1	8
BZX384B15-V	WL	14.7	15.3	10 (≤ 30)	50 (≤ 200)	5	7	9	1	0.05	0.7 $V_{Znom.}$
BZX384B16-V	WM	15.7	16.3	10 (≤ 40)	50 (≤ 200)	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX384B18-V	WN	17.6	18.4	10 (≤ 45)	50 (≤ 225)	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX384B20-V	WO	19.6	20.4	15 (≤ 55)	60 (≤ 225)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX384B22-V	WP	21.6	22.4	20 (≤ 55)	60 (≤ 250)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX384B24-V	WR	23.5	24.5	25 (≤ 70)	60 (≤ 250)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX384B27-V	WS	26.5	27.5	25 (≤ 80)	65 (≤ 300)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384B30-V	WT	29.4	30.6	30 (≤ 80)	70 (≤ 300)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384B33-V	WU	32.3	33.7	35 (≤ 80)	75 (≤ 325)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384B36-V	WW	35.3	36.7	35 (≤ 90)	80 (≤ 350)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX384B39-V	WX	38.2	39.8	40 (≤ 130)	80 (≤ 350)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384B43-V	WY	42.1	43.9	45 (≤ 150)	85 (≤ 375)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384B47-V	WZ	46.1	47.9	50 (≤ 170)	85 (≤ 375)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384B51-V	X1	50.0	52.0	60 (≤ 180)	85 (≤ 400)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384B56-V	X2	54.9	57.1	70 (≤ 200)	100 (≤ 425)	2	9	11	0.5	0.05	0.7 $V_{Znom.}$
BZX384B62-V	X3	60.8	63.2	80 (≤ 215)	100 (≤ 450)	2	9	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384B68-V	X4	66.6	69.4	90 (≤ 240)	150 (≤ 475)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX384B75-V	X5	73.5	76.5	95 (≤ 255)	170 (≤ 500)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$

Typical Characteristics

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

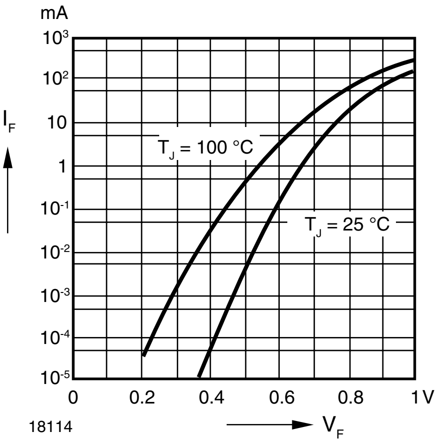


Figure 1. Forward characteristics

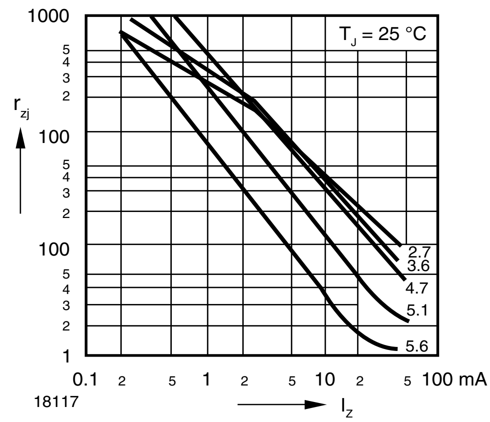


Figure 4. Dynamic Resistance vs. Zener Current

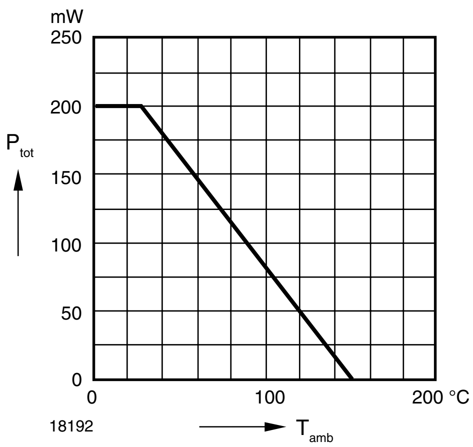


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

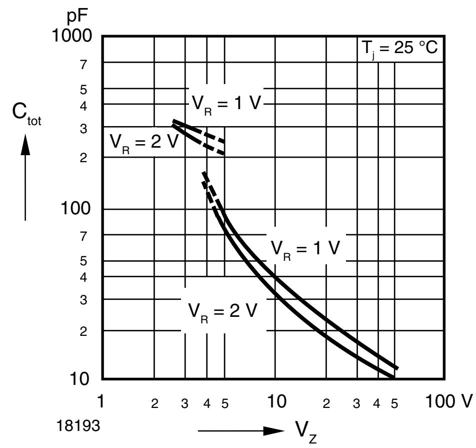


Figure 5. Capacitance vs. Zener Voltage

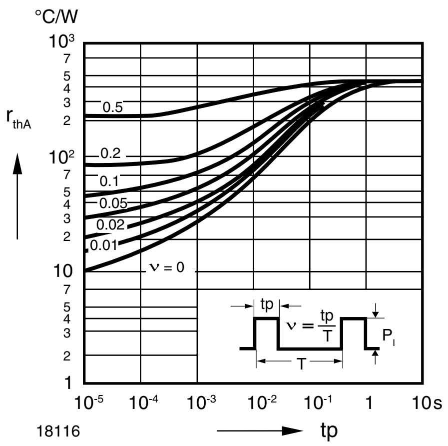


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

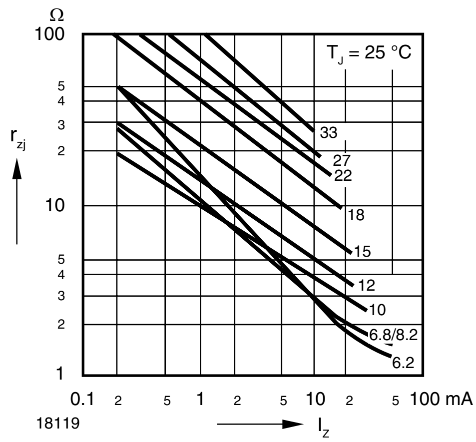


Figure 6. Dynamic Resistance vs. Zener Current

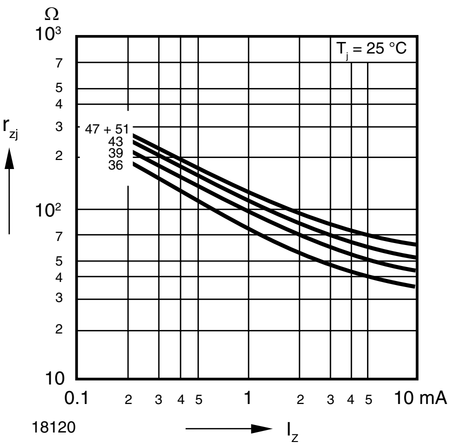


Figure 7. Dynamic Resistance vs. Zener Current

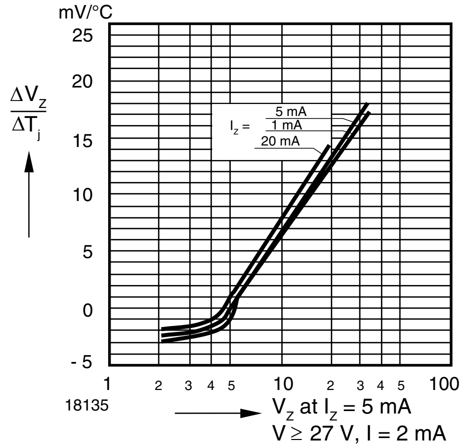


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

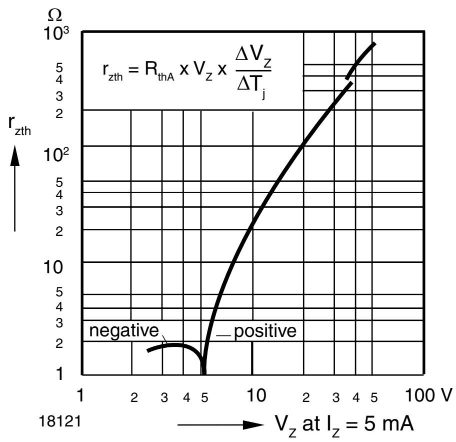


Figure 8. Thermal Differential Resistance vs. Zener Voltage

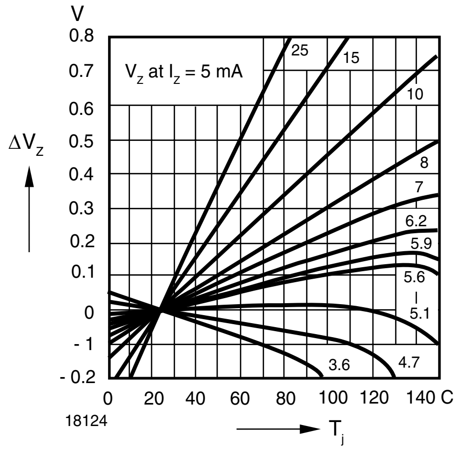


Figure 11. Change of Zener Voltage vs. Junction Temperature

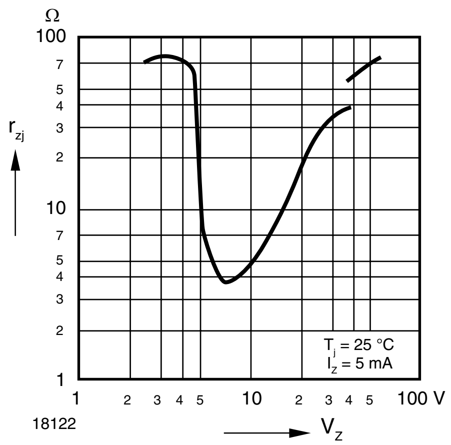


Figure 9. Dynamic Resistance vs. Zener Voltage

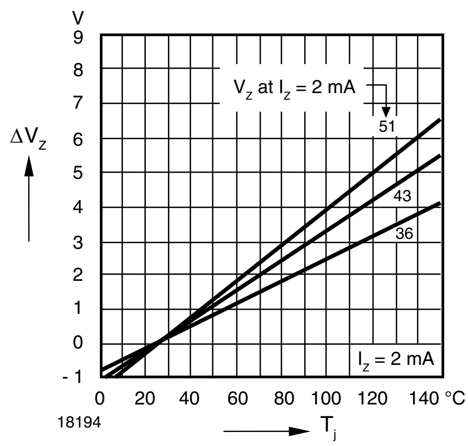


Figure 12. Change of Zener Voltage vs. Junction Temperature

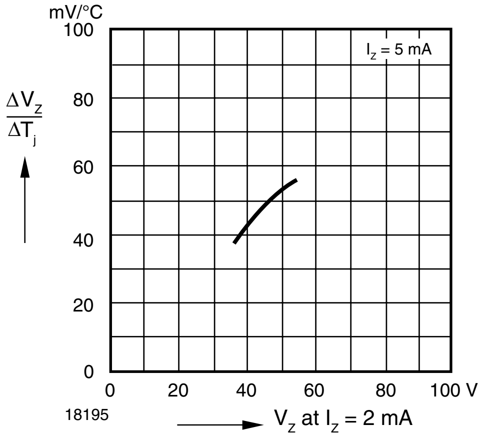


Figure 13. Temperature Dependence of Zener Voltage vs. Zener Voltage

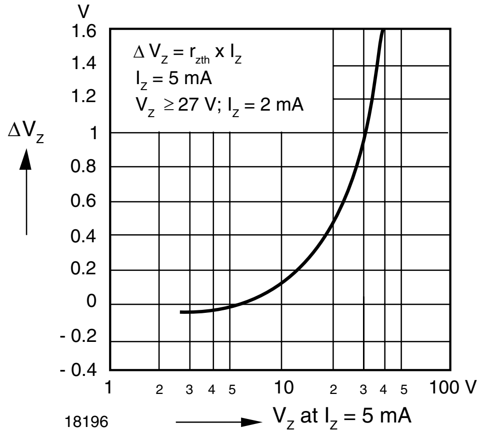


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

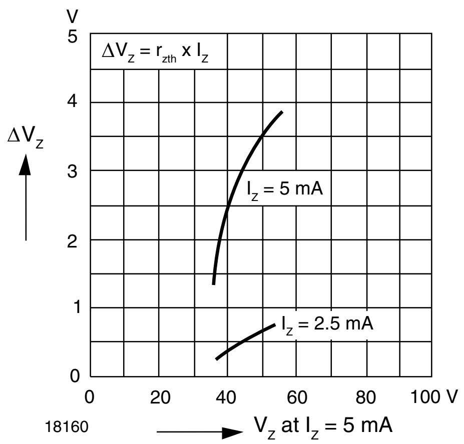


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

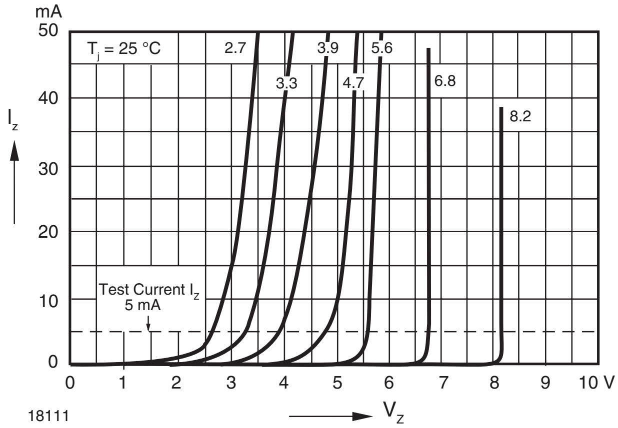


Figure 16. Breakdown Characteristics

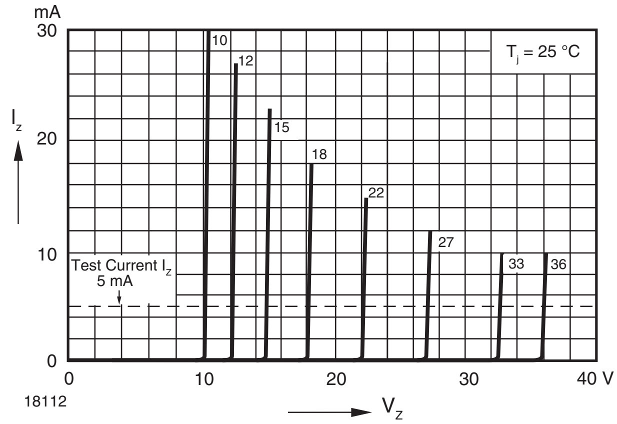


Figure 17. Breakdown Characteristics

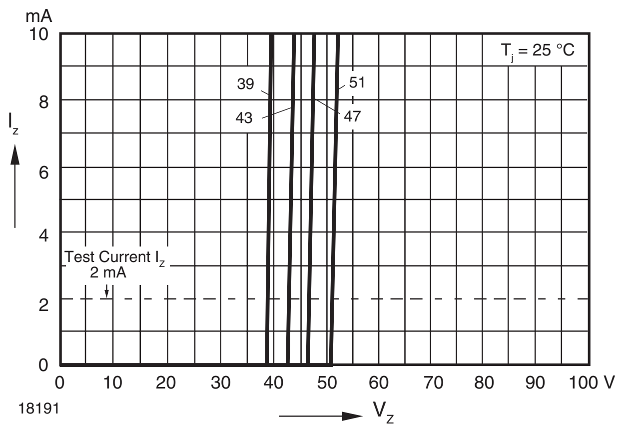
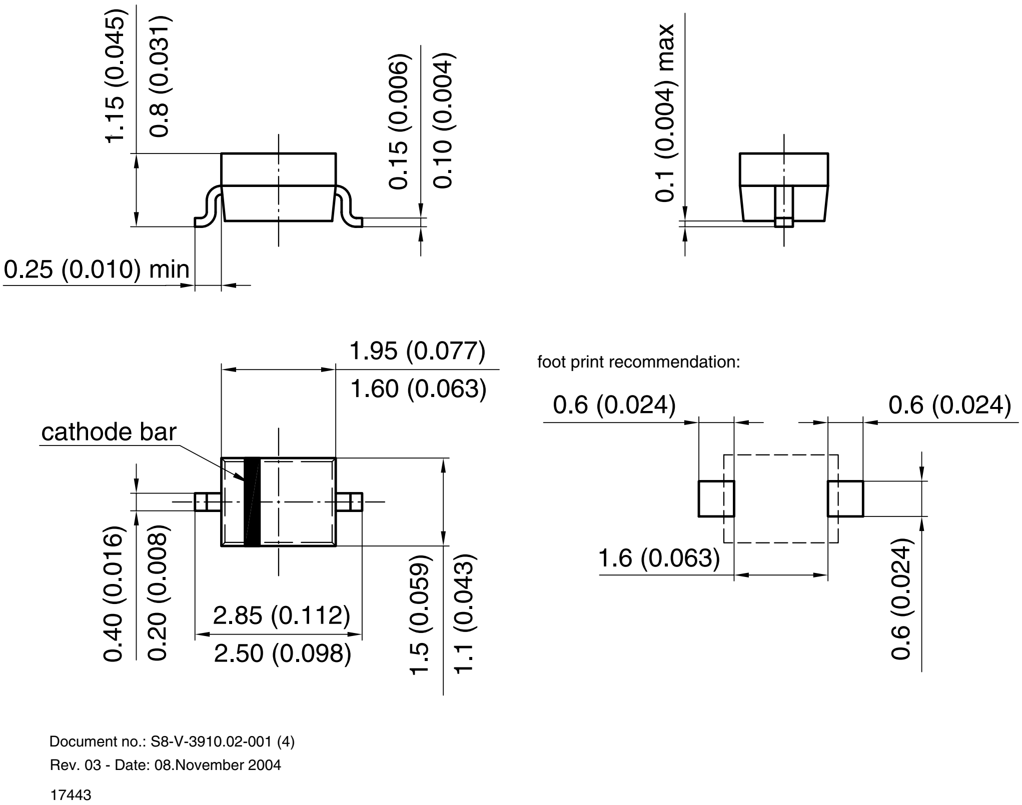


Figure 18. Breakdown Characteristics

Package Dimensions in mm (Inches): SOD323



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

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