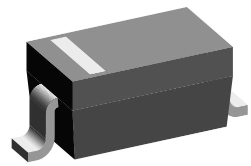
Small Signal Zener Diodes

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.



Mechanical Data

Case: SOD-323 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)]	°C/W
Junction temperature		T_j	150	°C
Storage temperature range		T_S	- 65 to + 150	°C

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

VISHAY

Electrical Characteristics

Partnumber	Marking Code	Zener Voltage Range		Dynamic Resistance		Test Current	Temperature Coefficient of Zener Voltage		Test Current	Reverse Leakage Current	
		V_Z @ I_{ZT}		r_{zj} @ I_{ZT1}	r_{zj} @ I_{ZT2}	I_{ZT1}	α_{VZ} @ I_{ZT1}		@I_{ZT2}	I_R	V_R
		V		Ω	Ω	mA	10^{-4}/°C		mA	µA	V
		min	max	typ	typ		min	max			
BZX384C2V4	W1	2.2	2.6	70 (≤100)	275	5	-9	-4	1	50	1
BZX384C2V7	W2	2.5	2.9	75 (≤100)	300 (≤600)	5	-9	-4	1	20	1
BZX384C3	W3	2.8	3.2	80 (≤95)	325 (≤600)	5	-9	-3	1	10	1
BZX384C3V3	W4	3.1	3.5	85 (≤95)	350 (≤600)	5	-8	-3	1	5	1
BZX384C3V6	W5	3.4	3.8	85 (≤90)	375 (≤600)	5	-8	-3	1	5	1
BZX384C3V9	W6	3.7	4.1	85 (≤90)	400 (≤600)	5	-7	-3	1	3	1
BZX384C4V3	W7	4	4.6	80 (≤90)	410 (≤600)	5	-6	-1	1	3	1
BZX384C4V7	W8	4.4	5	50 (≤80)	425 (≤500)	5	-5	2	1	3	2
BZX384C5V1	W9	4.8	5.4	40 (≤60)	400 (≤480)	5	-3	4	1	2	2
BZX384C5V6	WA	5.2	6	15 (≤40)	80 (≤400)	5	-2	6	1	1	2
BZX384C6V2	WB	5.8	6.6	6.0 (≤10)	40 (≤150)	5	-1	7	1	3	4
BZX384C6V8	WC	6.4	7.2	6.0 (≤15)	30 (≤80)	5	2	7	1	2	4
BZX384C7V5	WD	7	7.9	6.0 (≤15)	30 (≤80)	5	3	7	1	1	5
BZX384C8V2	WE	7.7	8.7	6.0 (≤15)	40 (≤80)	5	4	7	1	0.7	5
BZX384C9V1	WF	8.5	9.6	6.0 (≤15)	40 (≤100)	5	5	8	1	0.5	6
BZX384C10	WG	9.4	10.6	8.0 (≤20)	50 (≤150)	5	5	8	1	0.2	7
BZX384C11	WH	10.4	11.6	10 (≤20)	50 (≤150)	5	5	9	1	0.1	8
BZX384C12	WI	11.4	12.7	10 (≤25)	50 (≤150)	5	6	9	1	0.1	8
BZX384C13	WK	12.4	14.1	10 (≤30)	50 (≤170)	5	7	9	1	0.1	8
BZX384C15	WL	13.8	15.6	10 (≤30)	50 (≤200)	5	7	9	1	0.05	$0.7V_{Znom.}$
BZX384C16	WM	15.3	17.1	10 (≤40)	50 (≤200)	5	8	9.5	1	0.05	$0.7V_{Znom.}$
BZX384C18	WN	16.8	19.1	10 (≤45)	50 (≤225)	5	8	9.5	1	0.05	$0.7V_{Znom.}$
BZX384C20	WO	18.8	21.2	15 (≤55)	60 (≤225)	5	8	10	1	0.05	$0.7V_{Znom.}$
BZX384C22	WP	20.8	23.3	20 (≤55)	60 (≤250)	5	8	10	1	0.05	$0.7V_{Znom.}$
BZX384C24	WR	22.8	25.6	25 (≤70)	60 (≤250)	5	8	10	1	0.05	$0.7V_{Znom.}$
BZX384C27	WS	25.1	28.9	25 (≤80)	65 (≤300)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384C30	WT	28	32	30 (≤80)	70 (≤300)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384C33	WU	31	35	35 (≤80)	75 (≤325)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384C36	WW	34	38	35 (≤90)	80 (≤350)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384C39	WX	37	41	40 (≤130)	80 (≤350)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384C43	WY	40	46	45 (≤150)	85 (≤375)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384C47	WZ	44	50	50 (≤170)	85 (≤375)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384C51	X1	48	54	60 (≤180)	85 (≤400)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384C56	X2	52	60	70 (≤200)	100 (≤425)	2	9	11	0.5	0.05	$0.7V_{Znom.}$
BZX384C62	X3	58	66	80 (≤215)	100 (≤450)	2	9	12	0.5	0.05	$0.7V_{Znom.}$
BZX384C68	X4	64	72	90 (≤240)	150 (≤475)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384C75	X5	70	79	95 (≤255)	170 (≤500)	2	10	12	0.5	0.05	$0.7V_{Znom.}$

(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 @ I_{ZT}		r_{zj} @ I_{ZT1}	r_{zj} @ I_{ZT2}	I_{ZT1}	α_{VZ} @ I_{ZT1}		@I_{ZT2}	I_R	V_R
		V		Ω	Ω	mA	10^{-4}/°C		mA	µA	V
		min	max	typ	typ		min	max			
BZX384B2V4	W1	2.35	2.45	70 (≤100)	275	5	-9	-4	1	50	1
BZX384B2V7	W2	2.65	2.75	75 (≤100)	300 (≤600)	5	-9	-4	1	20	1
BZX384B3	W3	2.94	3.06	80 (≤95)	325 (≤600)	5	-9	-3	1	10	1
BZX384B3V3	W4	3.23	3.37	85 (≤95)	350 (≤600)	5	-8	-3	1	5	1
BZX384B3V6	W5	3.53	3.67	85 (≤90)	375 (≤600)	5	-8	-3	1	5	1
BZX384B3V9	W6	3.82	3.98	85 (≤90)	400 (≤600)	5	-7	-3	1	3	1
BZX384B4V3	W7	4.21	4.39	80 (≤90)	410 (≤600)	5	-6	-1	1	3	1
BZX384B4V7	W8	4.61	4.79	50 (≤80)	425 (≤500)	5	-5	2	1	3	2
BZX384B5V1	W9	5.00	5.20	40 (≤60)	400 (≤480)	5	-3	4	1	2	2
BZX384B5V6	WA	5.49	5.71	15 (≤40)	80 (≤400)	5	-2	6	1	1	2
BZX384B6V2	WB	6.08	6.32	6.0 (≤10)	40 (≤150)	5	-1	7	1	3	4
BZX384B6V8	WC	6.66	6.94	6.0 (≤15)	30 (≤80)	5	2	7	1	2	4
BZX384B7V5	WD	7.35	7.65	6.0 (≤15)	30 (≤80)	5	3	7	1	1	5
BZX384B8V2	WE	8.04	8.36	6.0 (≤15)	40 (≤80)	5	4	7	1	0.7	5
BZX384B9V1	WF	8.92	9.28	6.0 (≤15)	40 (≤100)	5	5	8	1	0.5	6
BZX384B10	WG	9.80	10.2	8.0 (≤20)	50 (≤150)	5	5	8	1	0.2	7
BZX384B11	WH	10.8	11.2	10 (≤20)	50 (≤150)	5	5	9	1	0.1	8
BZX384B12	WI	11.8	12.2	10 (≤25)	50 (≤150)	5	6	9	1	0.1	8
BZX384B13	WK	12.7	13.3	10 (≤30)	50 (≤170)	5	7	9	1	0.1	8
BZX384B15	WL	14.7	15.3	10 (≤30)	50 (≤200)	5	7	9	1	0.05	$0.7V_{Znom.}$
BZX384B16	WM	15.7	16.3	10 (≤40)	50 (≤200)	5	8	9.5	1	0.05	$0.7V_{Znom.}$
BZX384B18	WN	17.6	18.4	10 (≤45)	50 (≤225)	5	8	9.5	1	0.05	$0.7V_{Znom.}$
BZX384B20	WO	19.6	20.4	15 (≤55)	60 (≤225)	5	8	10	1	0.05	$0.7V_{Znom.}$
BZX384B22	WP	21.6	22.4	20 (≤55)	60 (≤250)	5	8	10	1	0.05	$0.7V_{Znom.}$
BZX384B24	WR	23.5	24.5	25 (≤70)	60 (≤250)	5	8	10	1	0.05	$0.7V_{Znom.}$
BZX384B27	WS	26.5	27.5	25 (≤80)	65 (≤300)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384B30	WT	29.4	30.6	30 (≤80)	70 (≤300)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384B33	WU	32.3	33.7	35 (≤80)	75 (≤325)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384B36	WW	35.3	36.7	35 (≤90)	80 (≤350)	2	8	10	0.5	0.05	$0.7V_{Znom.}$
BZX384B39	WX	38.2	39.8	40 (≤130)	80 (≤350)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384B43	WY	42.1	43.9	45 (≤150)	85 (≤375)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384B47	WZ	46.1	47.9	50 (≤170)	85 (≤375)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384B51	X1	50.0	52.0	60 (≤180)	85 (≤400)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384B56	X2	54.9	57.1	70 (≤200)	100 (≤425)	2	9	11	0.5	0.05	$0.7V_{Znom.}$
BZX384B62	X3	60.8	63.2	80 (≤215)	100 (≤450)	2	9	12	0.5	0.05	$0.7V_{Znom.}$
BZX384B68	X4	66.6	69.4	90 (≤240)	150 (≤475)	2	10	12	0.5	0.05	$0.7V_{Znom.}$
BZX384B75	X5	73.5	76.5	95 (≤255)	170 (≤500)	2	10	12	0.5	0.05	$0.7V_{Znom.}$

Typical Characteristics (T_{amb} = 25 °C unless otherwise specified)

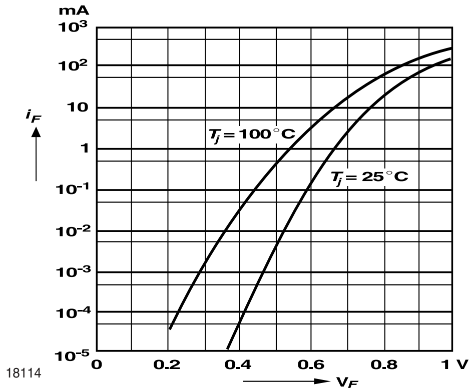


Figure 1. Forward characteristics

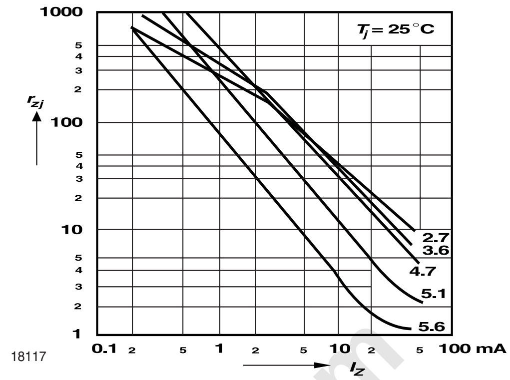


Figure 4. Dynamic Resistance vs. Zener Current

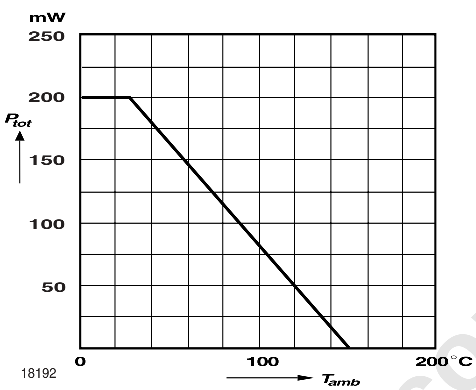


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

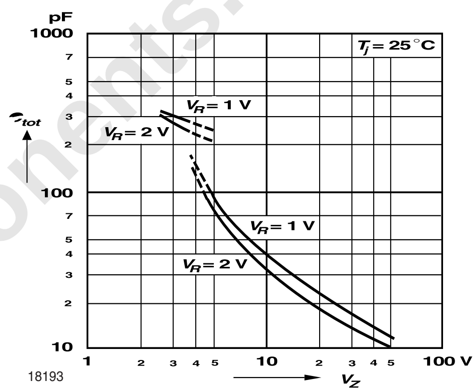


Figure 5. Capacitance vs. Zener Voltage

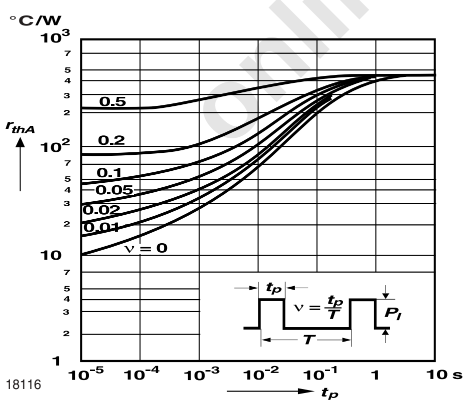


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

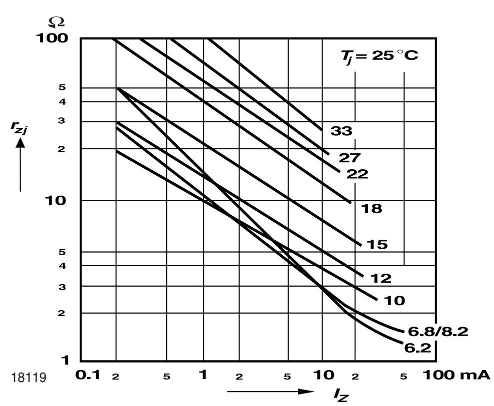


Figure 6. Dynamic Resistance vs. Zener Current

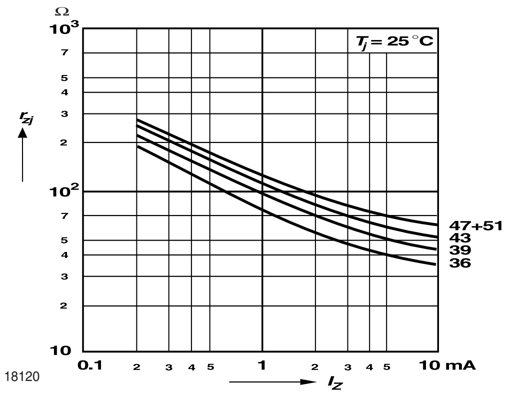


Figure 7. Dynamic Resistance vs. Zener Current

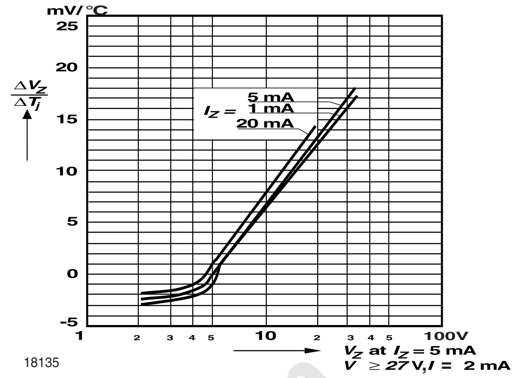


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

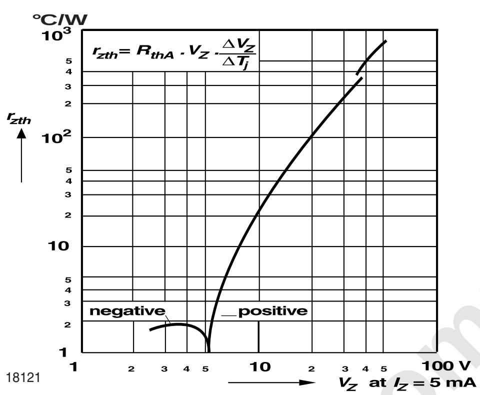


Figure 8. Thermal Differential Resistance vs. Zener Voltage

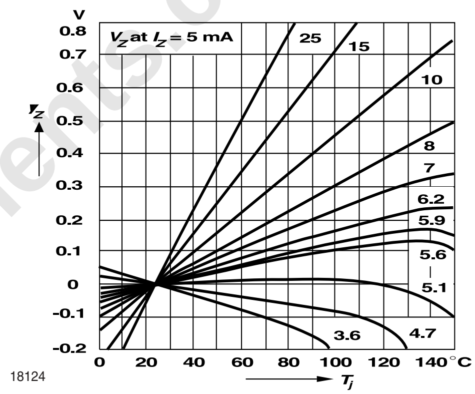


Figure 11. Change of Zener Voltage vs. Junction Temperature

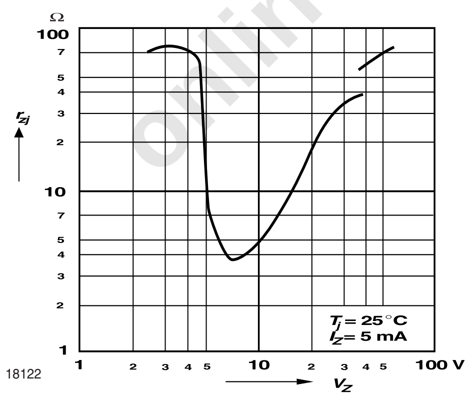


Figure 9. Dynamic Resistance vs. Zener Voltage

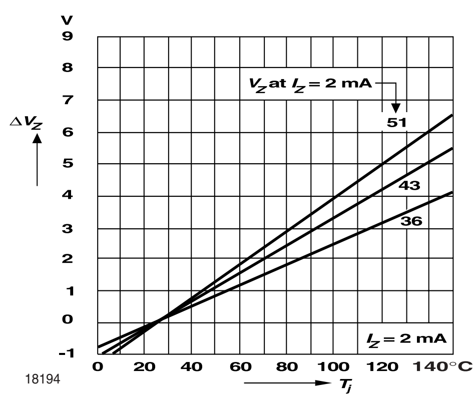


Figure 12. Change of Zener Voltage vs. Junction Temperature

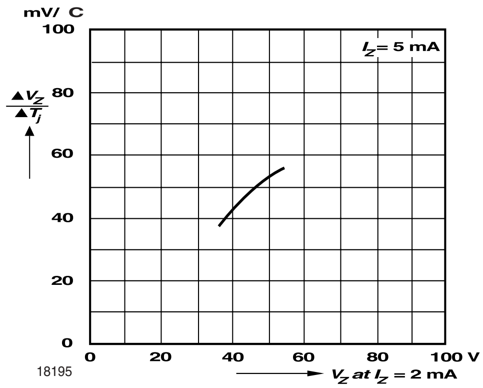


Figure 13. Temperature Dependence of Zener Voltage vs. Zener Voltage

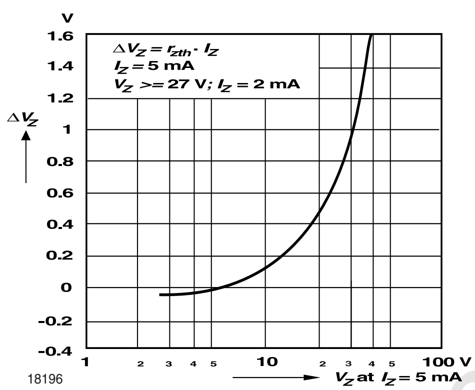


Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

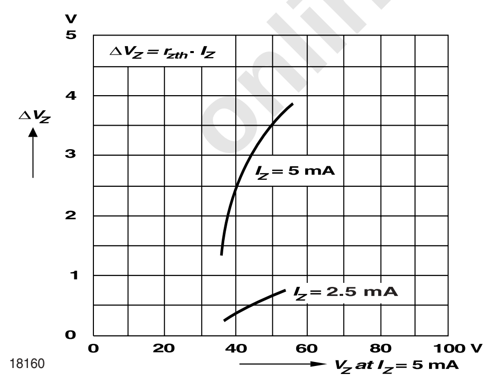


Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

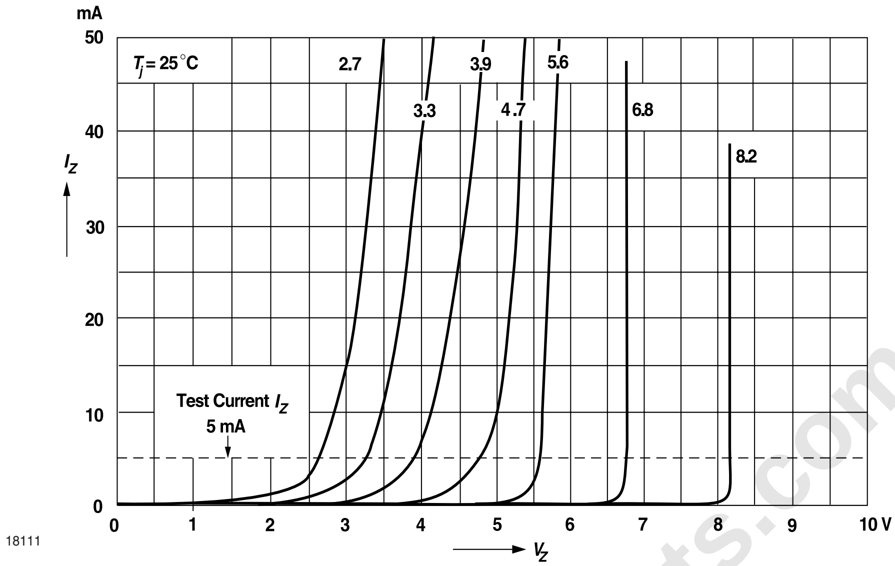


Figure 16. Breakdown Characteristics

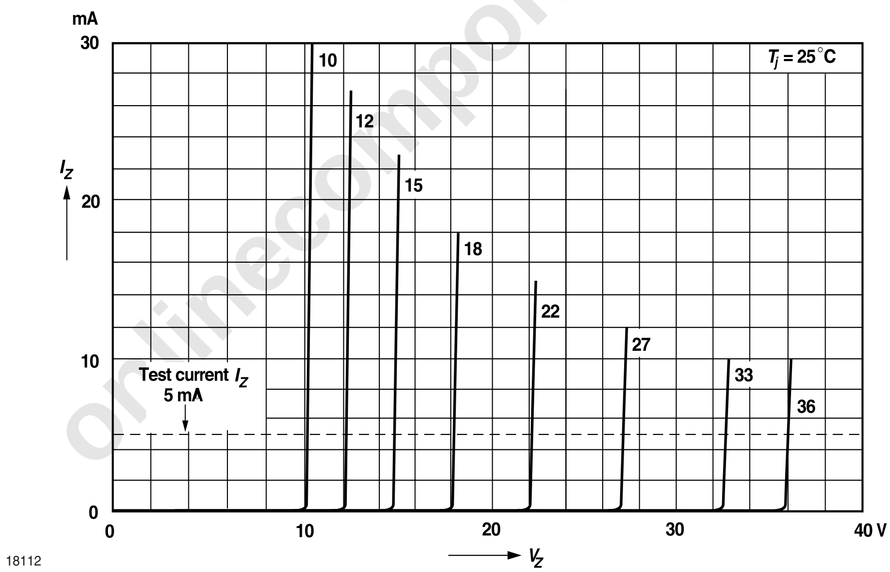


Figure 17. Breakdown Characteristics

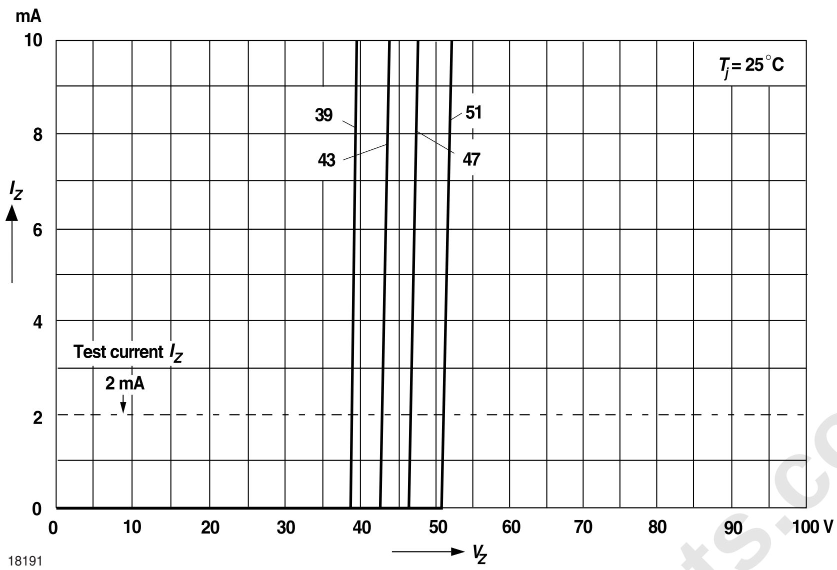
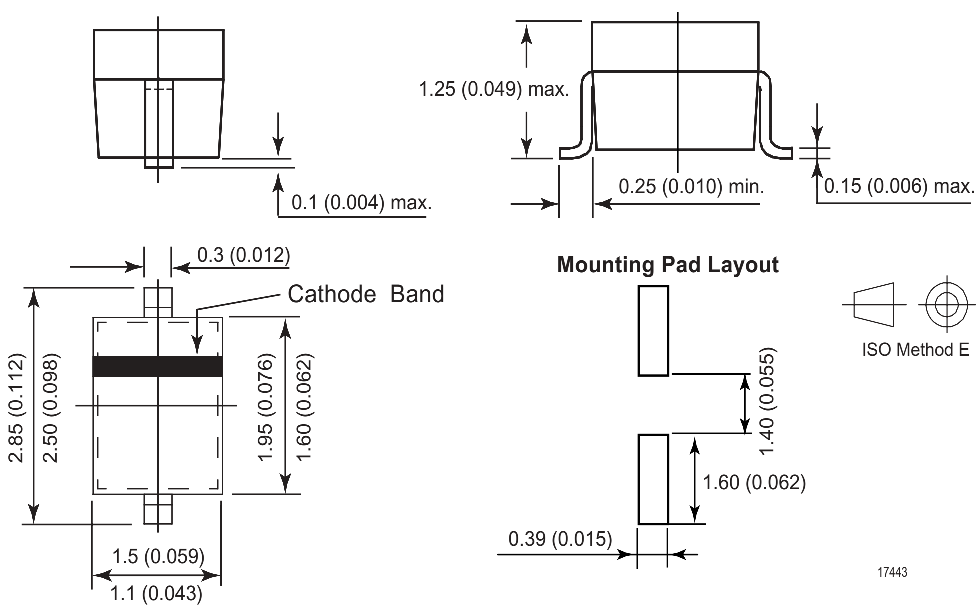


Figure 18. Breakdown Characteristics

Package Dimensions in mm (Inches)



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.

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