

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 $\pm 5\%$; replace "C" with "B" for $\pm 2\%$ tolerance
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC


RoHS
COMPLIANT

PRIMARY CHARACTERISTICS

PARAMETER	VALUE	UNIT
V_Z range nom.	2.4 to 75	V
Test current I_{ZT}	2; 5	mA
V_Z specification	Pulse current	
Int. construction	Single	

ORDERING INFORMATION

DEVICE NAME	ORDERING CODE	TAPED UNITS PER REEL	MINIMUM ORDER QUANTITY
BZX384-V-series	BZX384-V-series-GS18	10 000 (8 mm tape on 13" reel)	10 000/box
BZX384-V-series	BZX384-V-series-GS08	3000 (8 mm tape on 7" reel)	15 000/box

PACKAGE

PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
SOD-323	4.3 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS ($T_{amb} = 25\text{ °C}$, unless otherwise specified)

PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	Device on fiberglass substrate	P_{tot}	200	mW
Junction to ambient air	Valid that electrodes are kept at ambient temperature	R_{thJA}	650	K/W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	- 65 to + 150	°C

**ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LAEKAGE CURRENT		DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT OF ZENER VOLTAGE	
		V_Z at I_{ZT1}			I_{ZT1}	I_{ZT2}	I_R at V_R		Z_Z at I_{ZT1}	Z_{ZK} at I_{ZT2}	α_{VZ} at I_{ZT1}	
		V			mA		μA	V	Ω		$10^{-4}/^{\circ}\text{C}$	
		MIN.	NOM.	MAX.			MAX.		MAX.	MAX.	MIN.	MAX.
BZX384C2V4-V	W1	2.2	2.4	2.6	5	1	50	1	70 (≤ 100)	275	- 9	- 4
BZX384C2V7-V	W2	2.5	2.7	2.9	5	1	20	1	75 (≤ 100)	300 (≤ 600)	- 9	- 4
BZX384C3V0-V	W3	2.8	3.0	3.2	5	1	10	1	80 (≤ 95)	325 (≤ 600)	- 9	- 3
BZX384C3V3-V	W4	3.1	3.3	3.5	5	1	5	1	85 (≤ 95)	350 (≤ 600)	- 8	- 3
BZX384C3V6-V	W5	3.4	3.6	3.8	5	1	5	1	85 (≤ 90)	375 (≤ 600)	- 8	- 3
BZX384C3V9-V	W6	3.7	3.9	4.1	5	1	3	1	85 (≤ 90)	400 (≤ 600)	- 7	- 3
BZX384C4V3-V	W7	4	4.3	4.6	5	1	3	1	80 (≤ 90)	410 (≤ 600)	- 6	- 1
BZX384C4V7-V	W8	4.4	4.7	5	5	1	3	2	50 (≤ 80)	425 (≤ 500)	- 5	2
BZX384C5V1-V	W9	4.8	5.1	5.4	5	1	2	2	40 (≤ 60)	400 (≤ 480)	- 3	4
BZX384C5V6-V	WA	5.2	5.6	6	5	1	1	2	15 (≤ 40)	80 (≤ 400)	- 2	6
BZX384C6V2-V	WB	5.8	6.2	6.6	5	1	3	4	6 (≤ 10)	40 (≤ 150)	- 1	7
BZX384C6V8-V	WC	6.4	6.8	7.2	5	1	2	4	6 (≤ 15)	30 (≤ 80)	2	7
BZX384C7V5-V	WD	7	7.5	7.9	5	1	1	5	6 (≤ 15)	30 (≤ 80)	3	7
BZX384C8V2-V	WE	7.7	8.2	8.7	5	1	0.7	5	6 (≤ 15)	40 (≤ 80)	4	7
BZX384C9V1-V	WF	8.5	9.1	9.6	5	1	0.5	6	6 (≤ 15)	40 (≤ 100)	5	8
BZX384C10-V	WG	9.4	10	10.6	5	1	0.2	7	8 (≤ 20)	50 (≤ 150)	5	8
BZX384C11-V	WH	10.4	11	11.6	5	1	0.1	8	10 (≤ 20)	50 (≤ 150)	5	9
BZX384C12-V	WI	11.4	12	12.7	5	1	0.1	8	10 (≤ 25)	50 (≤ 150)	6	9
BZX384C13-V	WK	12.4	13	14.1	5	1	0.1	8	10 (≤ 30)	50 (≤ 170)	7	9
BZX384C15-V	WL	13.8	15	15.6	5	1	0.05	0.7 $V_{Znom.}$	10 (≤ 30)	50 (≤ 200)	7	9
BZX384C16-V	WM	15.3	16	17.1	5	1	0.05	0.7 $V_{Znom.}$	10 (≤ 40)	50 (≤ 200)	8	9.5
BZX384C18-V	WN	16.8	18	19.1	5	1	0.05	0.7 $V_{Znom.}$	10 (≤ 45)	50 (≤ 225)	8	9.5
BZX384C20-V	WO	18.8	20	21.2	5	1	0.05	0.7 $V_{Znom.}$	15 (≤ 55)	60 (≤ 225)	8	10
BZX384C22-V	WP	20.8	22	23.3	5	1	0.05	0.7 $V_{Znom.}$	20 (≤ 55)	60 (≤ 250)	8	10
BZX384C24-V	WR	22.8	24	25.6	5	1	0.05	0.7 $V_{Znom.}$	25 (≤ 70)	60 (≤ 250)	8	10
BZX384C27-V	WS	25.1	27	28.9	2	0.5	0.05	0.7 $V_{Znom.}$	25 (≤ 80)	65 (≤ 300)	8	10
BZX384C30-V	WT	28	30	32	2	0.5	0.05	0.7 $V_{Znom.}$	30 (≤ 80)	70 (≤ 300)	8	10
BZX384C33-V	WU	31	33	35	2	0.5	0.05	0.7 $V_{Znom.}$	35 (≤ 80)	75 (≤ 325)	8	10
BZX384C36-V	WW	34	36	38	2	0.5	0.05	0.7 $V_{Znom.}$	35 (≤ 90)	80 (≤ 350)	8	10
BZX384C39-V	WX	37	39	41	2	0.5	0.05	0.7 $V_{Znom.}$	40 (≤ 130)	80 (≤ 350)	10	12
BZX384C43-V	WY	40	43	46	2	0.5	0.05	0.7 $V_{Znom.}$	45 (≤ 150)	85 (≤ 375)	10	12
BZX384C47-V	WZ	44	47	50	2	0.5	0.05	0.7 $V_{Znom.}$	50 (≤ 170)	85 (≤ 375)	10	12
BZX384C51-V	X1	48	51	54	2	0.5	0.05	0.7 $V_{Znom.}$	60 (≤ 180)	85 (≤ 400)	8	10
BZX384C56-V	X2	52	56	60	2	0.5	0.05	0.7 $V_{Znom.}$	70 (≤ 200)	100 (≤ 425)	10	12
BZX384C62-V	X3	58	62	66	2	0.5	0.05	0.7 $V_{Znom.}$	80 (≤ 215)	100 (≤ 450)	10	12
BZX384C68-V	X4	64	68	72	2	0.5	0.05	0.7 $V_{Znom.}$	90 (≤ 240)	150 (≤ 475)	10	12
BZX384C75-V	X5	70	75	79	2	0.5	0.05	0.7 $V_{Znom.}$	95 (≤ 255)	170 (≤ 500)	10	12

**ELECTRICAL CHARACTERISTICS** ($T_{amb} = 25\text{ }^{\circ}\text{C}$, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LEAKAGE CURRENT		DYNAMIC RESISTANCE		TEMPERATURE COEFFICIENT OF ZENER VOLTAGE	
		V_Z at I_{ZT1}			I_{ZT1}	I_{ZT2}	I_R at V_R		Z_Z at I_{ZT1}	Z_{ZK} at I_{ZT2}	α_{VZ} at I_{ZT1}	
		V			mA		μA	V	Ω		$10^{-4}/^{\circ}\text{C}$	
		MIN.	NOM.	MAX.			MAX.		MAX.	MAX.	MIN.	MAX.
BZX384B2V4-V	W1	2.35	2.4	2.45	5	1	50	1	70 (≤ 100)	275	- 9	- 4
BZX384B2V7-V	W2	2.65	2.7	2.75	5	1	20	1	75 (≤ 100)	300 (≤ 600)	- 9	- 3
BZX384B3V0-V	W3	2.94	3.0	3.06	5	1	10	1	80 (≤ 95)	325 (≤ 600)	- 8	- 3
BZX384B3V3-V	W4	3.23	3.3	3.37	5	1	5	1	85 (≤ 95)	350 (≤ 600)	- 8	- 3
BZX384B3V6-V	W5	3.53	3.6	3.67	5	1	5	1	85 (≤ 90)	375 (≤ 600)	- 7	- 3
BZX384B3V9-V	W6	3.82	3.9	3.98	5	1	3	1	85 (≤ 90)	400 (≤ 600)	- 6	- 1
BZX384B4V3-V	W7	4.21	4.3	4.39	5	1	3	1	80 (≤ 90)	410 (≤ 600)	- 5	2
BZX384B4V7-V	W8	4.61	4.7	4.79	5	1	3	2	50 (≤ 80)	425 (≤ 500)	- 3	4
BZX384B5V1-V	W9	5	5.1	5.2	5	1	2	2	40 (≤ 60)	400 (≤ 480)	- 2	6
BZX384B5V6-V	WA	5.49	5.6	5.71	5	1	1	2	15 (≤ 40)	80 (≤ 400)	- 1	7
BZX384B6V2-V	WB	6.08	6.2	6.32	5	1	3	4	6 (≤ 10)	40 (≤ 150)	2	7
BZX384B6V8-V	WC	6.66	6.8	6.94	5	1	2	4	6 (≤ 15)	30 (≤ 80)	3	7
BZX384B7V5-V	WD	7.35	7.5	7.65	5	1	1	5	6 (≤ 15)	30 (≤ 80)	4	7
BZX384B8V2-V	WE	8.04	8.2	8.36	5	1	0.7	5	6 (≤ 15)	40 (≤ 80)	5	8
BZX384B9V1-V	WF	8.92	9.1	9.28	5	1	0.5	6	6 (≤ 15)	40 (≤ 100)	5	8
BZX384B10-V	WG	9.8	10	10.2	5	1	0.2	7	8 (≤ 20)	50 (≤ 150)	5	9
BZX384B11-V	WH	10.8	11	11.2	5	1	0.1	8	10 (≤ 20)	50 (≤ 150)	6	9
BZX384B12-V	WI	11.8	12	12.2	5	1	0.1	8	10 (≤ 25)	50 (≤ 150)	7	9
BZX384B13-V	WK	12.7	13	13.3	5	1	0.1	8	10 (≤ 30)	50 (≤ 170)	7	9
BZX384B15-V	WL	14.7	15	15.3	5	1	0.05	0.7 $V_{Znom.}$	10 (≤ 30)	50 (≤ 200)	8	9.5
BZX384B16-V	WM	15.7	16	16.3	5	1	0.05	0.7 $V_{Znom.}$	10 (≤ 40)	50 (≤ 200)	8	9.5
BZX384B18-V	WN	17.6	18	18.4	5	1	0.05	0.7 $V_{Znom.}$	10 (≤ 45)	50 (≤ 225)	8	10
BZX384B20-V	WO	19.6	20	20.4	5	1	0.05	0.7 $V_{Znom.}$	15 (≤ 55)	60 (≤ 225)	8	10
BZX384B22-V	WP	21.6	22	22.4	5	1	0.05	0.7 $V_{Znom.}$	20 (≤ 55)	60 (≤ 250)	8	10
BZX384B24-V	WR	23.5	24	24.5	5	1	0.05	0.7 $V_{Znom.}$	25 (≤ 70)	60 (≤ 250)	8	10
BZX384B27-V	WS	26.5	27	27.5	2	0.5	0.05	0.7 $V_{Znom.}$	25 (≤ 80)	65 (≤ 300)	8	10
BZX384B30-V	WT	29.4	30	30.6	2	0.5	0.05	0.7 $V_{Znom.}$	30 (≤ 80)	70 (≤ 300)	8	10
BZX384B33-V	WU	32.3	33	33.7	2	0.5	0.05	0.7 $V_{Znom.}$	35 (≤ 80)	75 (≤ 325)	8	10
BZX384B36-V	WW	35.3	36	36.7	2	0.5	0.05	0.7 $V_{Znom.}$	35 (≤ 90)	80 (≤ 350)	10	12
BZX384B39-V	WX	38.2	39	39.8	2	0.5	0.05	0.7 $V_{Znom.}$	40 (≤ 130)	80 (≤ 350)	10	12
BZX384B43-V	WY	42.1	43	43.9	2	0.5	0.05	0.7 $V_{Znom.}$	45 (≤ 150)	85 (≤ 375)	10	12
BZX384B47-V	WZ	46.1	47	47.9	2	0.5	0.05	0.7 $V_{Znom.}$	50 (≤ 170)	85 (≤ 375)	10	12
BZX384B51-V	X1	50	51	52	2	0.5	0.05	0.7 $V_{Znom.}$	60 (≤ 180)	85 (≤ 400)	10	12
BZX384B56-V	X2	54.9	56	57.1	2	0.5	0.05	0.7 $V_{Znom.}$	70 (≤ 200)	100 (≤ 425)	10	12
BZX384B62-V	X3	60.8	62	63.2	2	0.5	0.05	0.7 $V_{Znom.}$	80 (≤ 215)	100 (≤ 450)	10	12
BZX384B68-V	X4	66.6	68	69.4	2	0.5	0.05	0.7 $V_{Znom.}$	90 (≤ 240)	150 (≤ 475)	10	12
BZX384B75-V	X5	73.5	75	76.5	2	0.5	0.05	0.7 $V_{Znom.}$	95 (≤ 255)	170 (≤ 500)	10	12

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

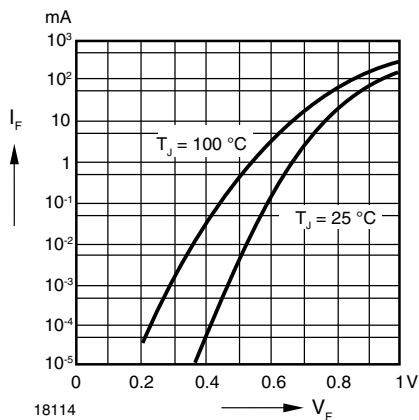


Fig. 1 - Forward characteristics

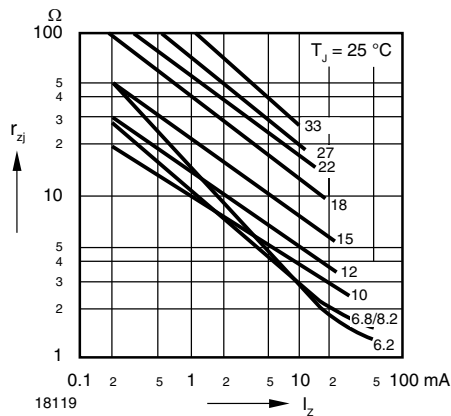


Fig. 4 - Dynamic Resistance vs. Zener Current

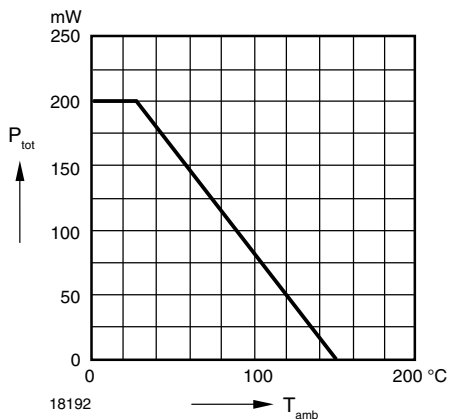


Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

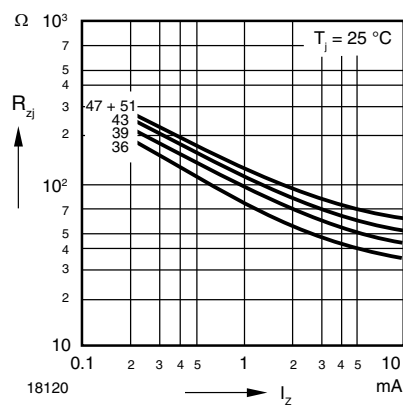


Fig. 5 - Dynamic Resistance vs. Zener Current

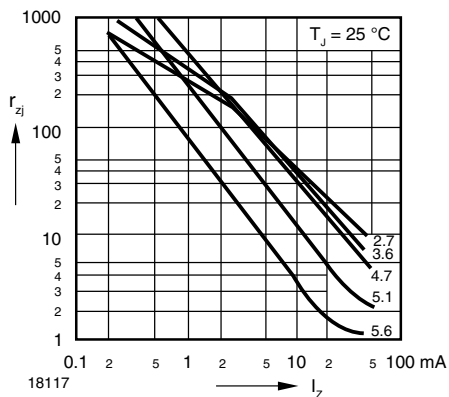


Fig. 3 - Dynamic Resistance vs. Zener Current

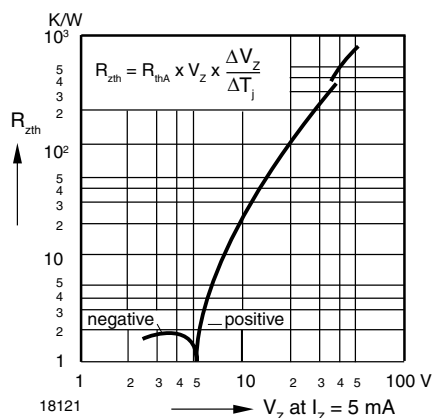


Fig. 6 - Thermal Differential Resistance vs. Zener Voltage

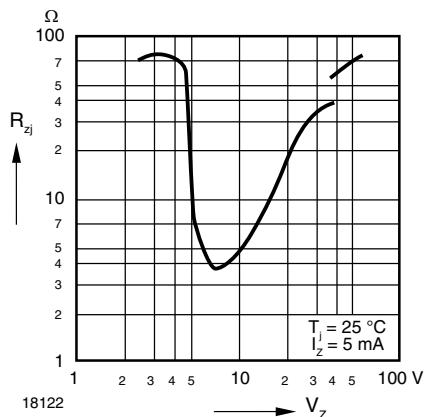


Fig. 7 - Dynamic Resistance vs. Zener Voltage

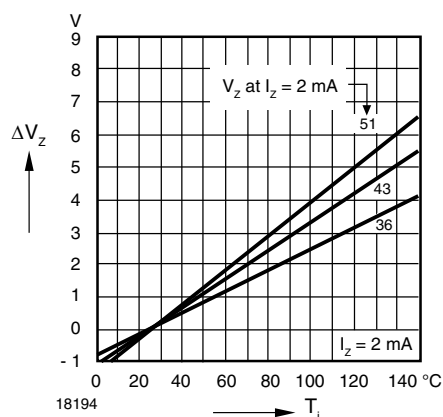


Fig. 10 - Change of Zener Voltage vs. Junction Temperature

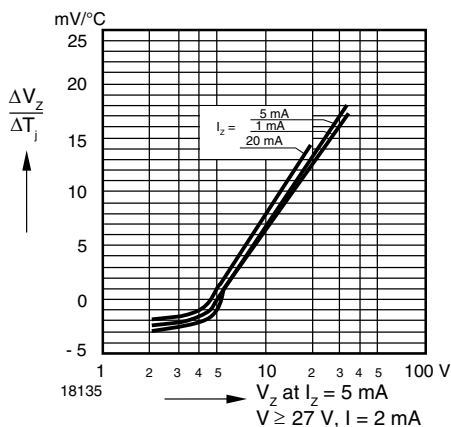


Fig. 8 - Temperature Dependence of Zener Voltage vs. Zener Voltage

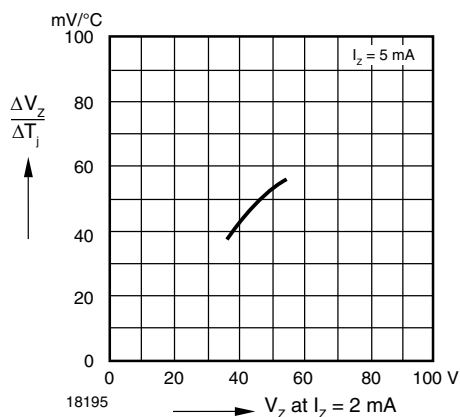


Fig. 11 - Temperature Dependence of Zener Voltage vs. Zener Voltage

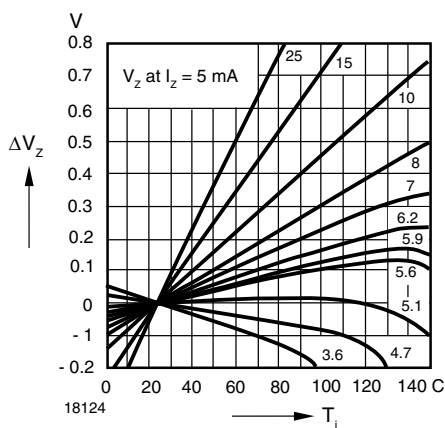


Fig. 9 - Change of Zener Voltage vs. Junction Temperature

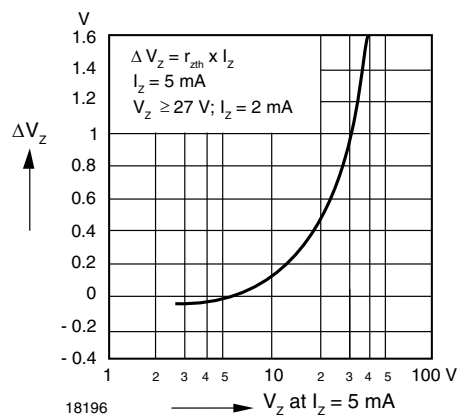


Fig. 12 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

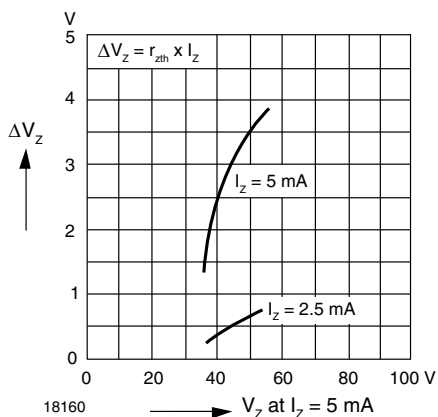


Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

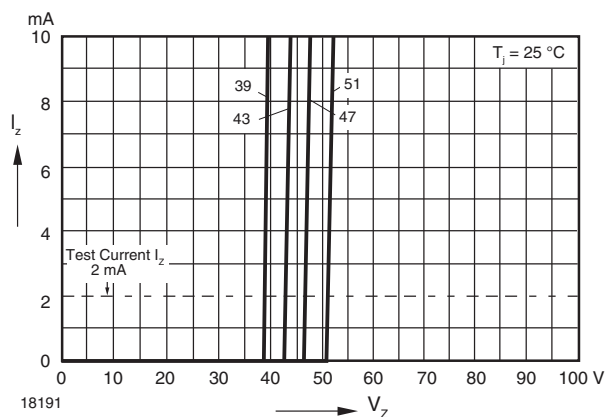


Fig. 16 - Breakdown Characteristics

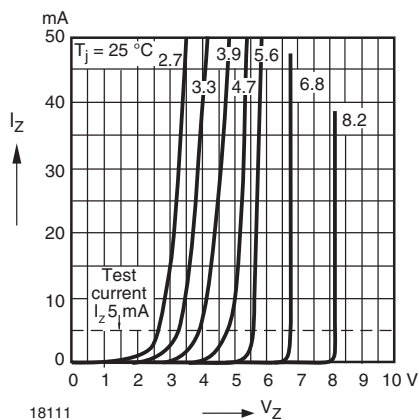


Fig. 14 - Breakdown Characteristics

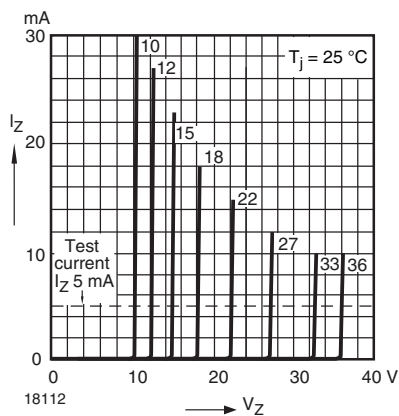
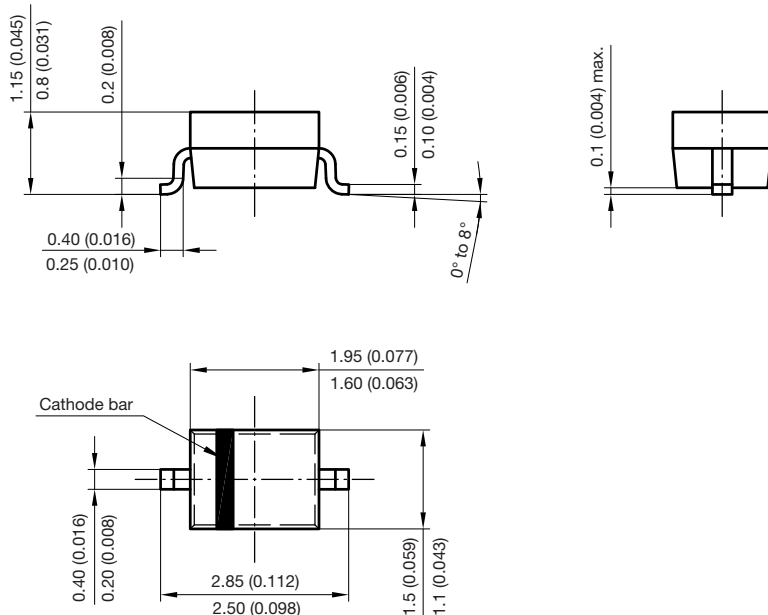


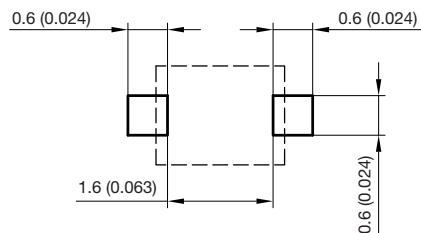
Fig. 15 - Breakdown Characteristics



PACKAGE DIMENSIONS in millimeters (inches): **SOD-323**



Foot print recommendation:



Document no.:S8-V-3910.02-001 (4)
Created - Date: 24.August.2004
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17443



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