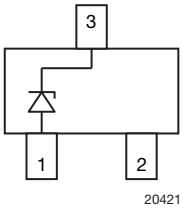
Small Signal Zener Diodes



FEATURES

- These diodes are also available in other case styles and other configurations including: the SOD-123 case with type designation BZT52 series, the zener diode common anode configuration in the SOT-23 case with type designation AZ23 series and the 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 “C” with “B” for 2 % tolerance.
- Silicon planar power Zener diodes
- AEC-Q101 qualified
- Compliant to RoHS Directive 2002/95/EC and in accordance to WEEE 2002/96/EC

Pb-free

e3

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
BZX84-V-series	BZX84-V-series-GS18	10 000 (8 mm tape on 13" reel)	10 000
BZX84-V-series	BZX84-V-series-GS08	3000 (8 mm tape on 7" reel)	15 000

PACKAGE				
PACKAGE NAME	WEIGHT	MOLDING COMPOUND FLAMMABILITY RATING	MOISTURE SENSITIVITY LEVEL	SOLDERING CONDITIONS
SOT-23	8.8 mg	UL 94 V-0	MSL level 1 (according J-STD-020)	260 °C/10 s at terminals

ABSOLUTE MAXIMUM RATINGS				
PARAMETER	TEST CONDITION	SYMBOL	VALUE	UNIT
Power dissipation	T_{amb} = 25 °C, device on fiberglass substrate, acc. layout on page 7	P_{tot}	300	mW
Thermal resistance junction to ambient air	T_{amb} = 25 °C, device on fiberglass substrate, acc. layout on page 7	R_{thJA}	420	K/W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	- 65 to + 150	°C

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LEAKAGE CURRENT		DYNAMIC RESISTANCE f = 1 kHz		TEMPERATURE COEFFICIENT	
		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}/°C	
		MIN.	NOM.	MAX.					MAX.	MAX.	MIN.	MAX.
BZX84C2V4-V	Z11	2.2	2.4	2.6	5	1	50	1	100	275	- 9	- 4
BZX84C2V7-V	Z12	2.5	2.7	2.9	5	1	20	1	100	600	- 9	- 4
BZX84C3V0-V	Z13	2.8	3.0	3.2	5	1	10	1	95	600	- 9	- 3
BZX84C3V3-V	Z14	3.1	3.3	3.5	5	1	5	1	95	600	- 8	- 3
BZX84C3V6-V	Z15	3.4	3.6	3.8	5	1	5	1	90	600	- 8	- 3
BZX84C3V9-V	Z16	3.7	3.9	4.1	5	1	3	1	90	600	- 7	- 3
BZX84C4V3-V	Z17	4.0	4.3	4.6	5	1	3	1	90	600	- 6	- 1
BZX84C4V7-V	Z1	4.4	4.7	5.0	5	1	3	2	80	500	- 5	2
BZX84C5V1-V	Z2	4.8	5.1	5.4	5	1	2	2	60	480	- 3	4
BZX84C5V6-V	Z3	5.2	5.6	6.0	5	1	1	2	40	400	- 2	6
BZX84C6V2-V	Z4	5.8	6.2	6.6	5	1	3	4	10	150	- 1	7
BZX84C6V8-V	Z5	6.4	6.8	7.2	5	1	2	4	15	80	2	7
BZX84C7V5-V	Z6	7.0	7.5	7.9	5	1	1	5	15	80	3	7
BZX84C8V2-V	Z7	7.7	8.2	8.7	5	1	0.7	5	15	80	4	7
BZX84C9V1-V	Z8	8.5	9.1	9.6	5	1	0.5	6	15	100	5	8
BZX84C10-V	Z9	9.4	10	10.6	5	1	0.2	7	20	150	5	8
BZX84C11-V	Y1	10.4	11	11.6	5	1	0.1	8	20	150	5	9
BZX84C12-V	Y2	11.4	12	12.7	5	1	0.1	8	25	150	6	9
BZX84C13-V	Y3	12.4	13	14.1	5	1	0.1	8	30	170	7	9
BZX84C15-V	Y4	13.8	15	15.6	5	1	0.05	10.5	30	200	7	9
BZX84C16-V	Y5	15.3	16	17.1	5	1	0.05	11.2	40	200	8	9.5
BZX84C18-V	Y6	16.8	18	19.1	5	1	0.05	12.6	45	225	8	9.5
BZX84C20-V	Y7	18.8	20	21.2	5	1	0.05	14.0	55	225	8	10
BZX84C22-V	Y8	20.8	22	23.3	5	1	0.05	15.4	55	250	8	10
BZX84C24-V	Y9	22.8	24	25.6	5	1	0.05	16.8	70	250	8	10
BZX84C27-V	Y10	25.1	27	28.9	2	0.5	0.05	18.9	80	300	8	10
BZX84C30-V	Y11	28	30	32	2	0.5	0.05	21.0	80	300	8	10
BZX84C33-V	Y12	31	33	35	2	0.5	0.05	23.1	80	325	8	10
BZX84C36-V	Y13	34	36	38	2	0.5	0.05	25.2	90	350	8	10
BZX84C39-V	Y14	37	39	41	2	0.5	0.05	27.3	130	350	10	12
BZX84C43-V	Y15	40	43	46	2	0.5	0.05	30.1	150	375	10	12
BZX84C47-V	Y16	44	47	50	2	0.5	0.05	32.9	170	375	10	12
BZX84C51-V	Y17	48	51	54	2	0.5	0.05	35.7	180	400	10	12
BZX84C56-V	Y18	52	56	60	2	0.5	0.05	39.2	200	425	9	11
BZX84C62-V	Y19	58	62	66	2	0.5	0.05	43.4	215	450	9	12
BZX84C68-V	Y20	64	68	72	2	0.5	0.05	47.6	240	475	10	12
BZX84C75-V	Y21	70	75	79	2	0.5	0.05	52.5	255	500	10	12

ELECTRICAL CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

PART NUMBER	MARKING CODE	ZENER VOLTAGE RANGE			TEST CURRENT		REVERSE LEAKAGE CURRENT		DYNAMIC RESISTANCE f = 1 kHz		TEMPERATURE COEFFICIENT	
		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}/°C	
		MIN.	NOM.	MAX.					MAX.	MAX.	MIN.	MAX.
BZX84B2V4-V	Z50	2.35	2.4	2.45	5	1	50	1	100	275	- 9	- 4
BZX84B2V7-V	Z51	2.65	2.7	2.75	5	1	20	1	100	600	- 9	- 4
BZX84B3V0-V	Z52	2.94	3.0	3.06	5	1	10	1	95	600	- 9	- 3
BZX84B3V3-V	Z53	3.23	3.3	3.37	5	1	5	1	95	600	- 8	- 3
BZX84B3V6-V	Z54	3.53	3.6	3.67	5	1	5	1	90	600	- 8	- 3
BZX84B3V9-V	Z55	3.82	3.9	3.98	5	1	3	1	90	600	- 7	- 3
BZX84B4V3-V	Z56	4.21	4.3	4.39	5	1	3	1	90	600	- 6	- 1
BZX84B4V7-V	Z57	4.61	4.7	4.79	5	1	3	2	80	500	- 5	2
BZX84B5V1-V	Z58	5.0	5.1	5.2	5	1	2	2	60	480	- 3	4
BZX84B5V6-V	Z59	5.49	5.6	5.71	5	1	1	2	40	400	- 2	6
BZX84B6V2-V	Z60	6.08	6.2	6.32	5	1	3	4	10	150	- 1	7
BZX84B6V8-V	Z61	6.66	6.8	6.94	5	1	2	4	15	80	2	7
BZX84B7V5-V	Z62	7.35	7.5	7.65	5	1	1	5	15	80	3	7
BZX84B8V2-V	Z63	8.04	8.2	8.36	5	1	0.7	5	15	80	4	7
BZX84B9V1-V	Z64	8.92	9.1	9.28	5	1	0.5	6	15	100	5	8
BZX84B10-V	Z65	9.8	10	10.2	5	1	0.2	7	20	150	5	8
BZX84B11-V	Z66	10.8	11	11.2	5	1	0.1	8	20	150	5	9
BZX84B12-V	Z67	11.8	12	12.2	5	1	0.1	8	25	150	6	9
BZX84B13-V	Z68	12.7	13	13.3	5	1	0.1	8	30	170	7	9
BZX84B15-V	Z69	14.7	15	15.3	5	1	0.05	10.5	30	200	7	9
BZX84B16-V	Z70	15.7	16	16.3	5	1	0.05	11.2	40	200	8	9.5
BZX84B18-V	Z71	17.6	18	18.4	5	1	0.05	12.6	45	225	8	9.5
BZX84B20-V	Z72	19.6	20	20.4	5	1	0.05	14	55	225	8	10
BZX84B22-V	Z73	21.6	22	22.4	5	1	0.05	15.4	55	250	8	10
BZX84B24-V	Z74	23.5	24	24.5	5	1	0.05	16.8	70	250	8	10
BZX84B27-V	Z75	26.5	27	27.5	2	0.5	0.05	18.9	80	300	8	10
BZX84B30-V	Z76	29.4	30	30.6	2	0.5	0.05	21	80	300	8	10
BZX84B33-V	Z77	32.3	33	33.7	2	0.5	0.05	23.1	80	325	8	10
BZX84B36-V	Z78	35.3	36	36.7	2	0.5	0.05	25.2	90	350	8	10
BZX84B39-V	Z79	38.2	39	39.8	2	0.5	0.05	27.3	130	350	10	12
BZX84B43-V	Z80	42.1	43	43.9	2	0.5	0.05	30.1	150	375	10	12
BZX84B47-V	Z81	46.1	47	47.9	2	0.5	0.05	32.9	170	375	10	12
BZX84B51-V	Z82	50	51	52	2	0.5	0.05	35.7	180	400	10	12
BZX84B56-V	Z83	54.9	56	57.1	2	0.5	0.05	39.2	200	425	9	11
BZX84B62-V	Z84	60.8	62	63.2	2	0.5	0.05	43.4	215	450	9	12
BZX84B68-V	Z85	66.6	68	69.4	2	0.5	0.05	47.6	240	475	10	12
BZX84B75-V	Z86	73.5	75	76.5	2	0.5	0.05	52.5	255	500	10	12

BASIC CHARACTERISTICS (T_{amb} = 25 °C, unless otherwise specified)

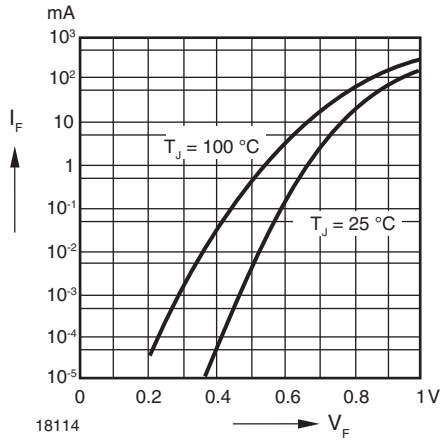


Fig. 1 - Forward Characteristics

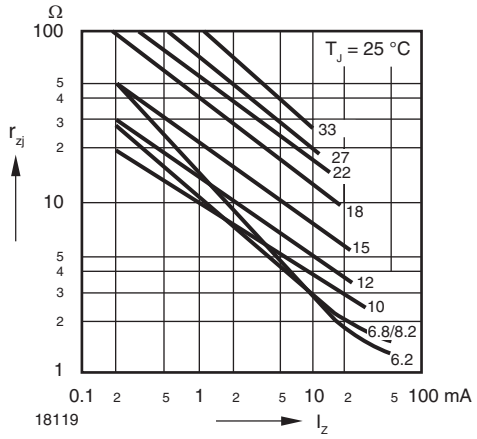


Fig. 4 - Dynamic Resistance vs. Zener Current

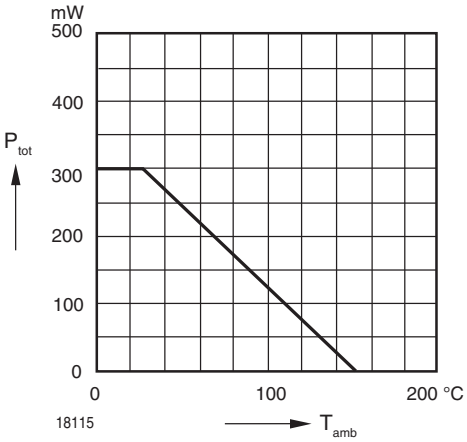


Fig. 2 - Admissible Power Dissipation vs. Ambient Temperature

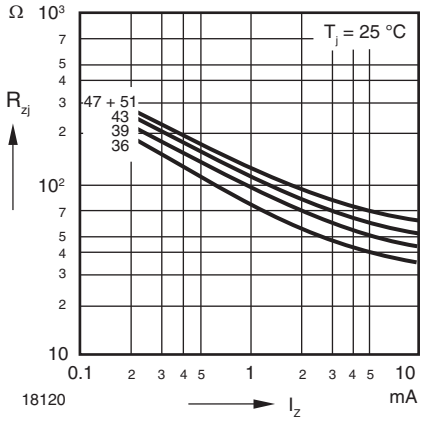


Fig. 5 - Dynamic Resistance vs. Zener Current

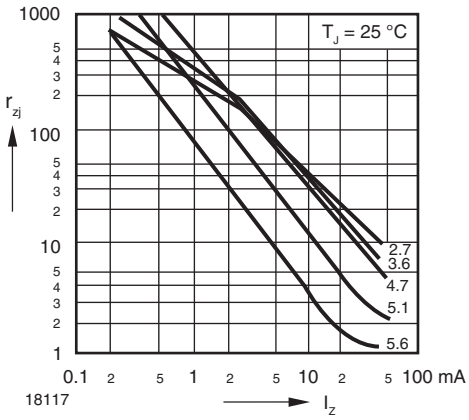


Fig. 3 - Dynamic Resistance vs. Zener Current

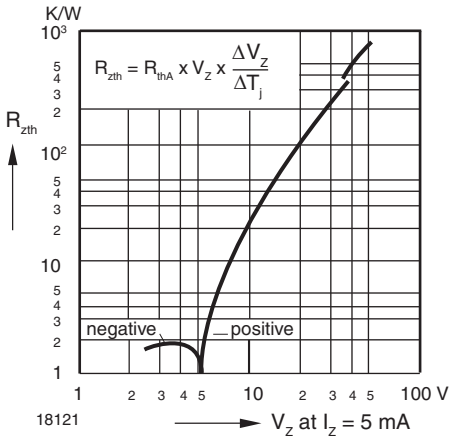


Fig. 6 - Thermal Differential Resistance vs. Zener Voltage

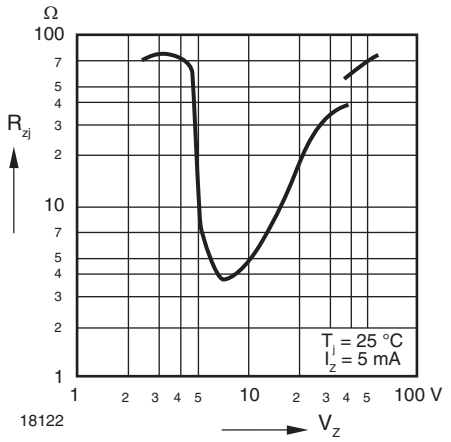


Fig. 7 - Dynamic Resistance vs. Zener Voltage

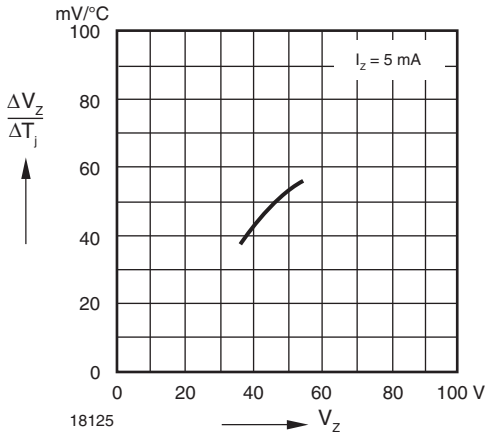


Fig. 10 - Temperature Dependence of Zener Voltage vs. Zener Voltage

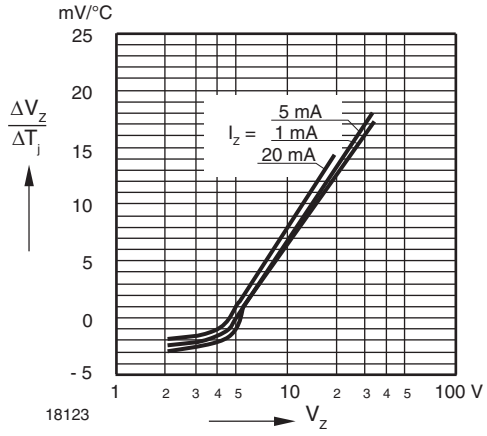


Fig. 8 - Temperature Dependence of Zener Voltage vs. Zener Voltage

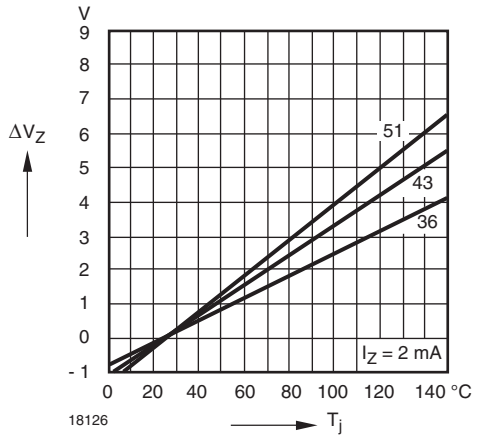


Fig. 11 - Change of Zener Voltage vs. Junction Temperature

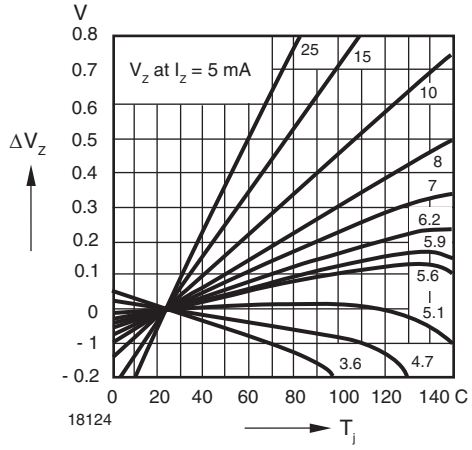


Fig. 9 - Change of Zener Voltage vs. Junction Temperature

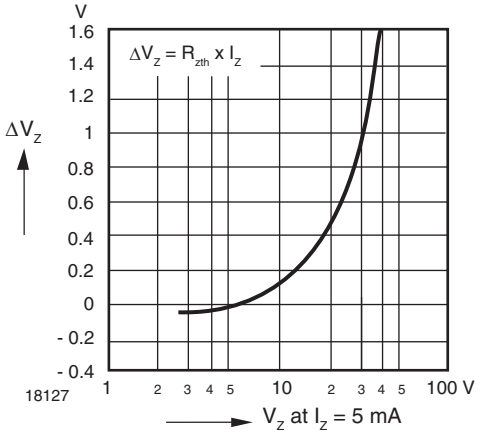


Fig. 12 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

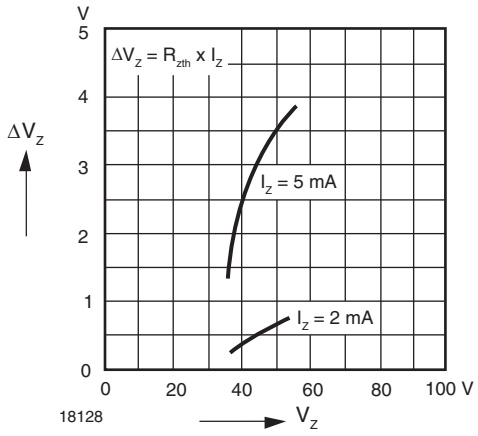


Fig. 13 - Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

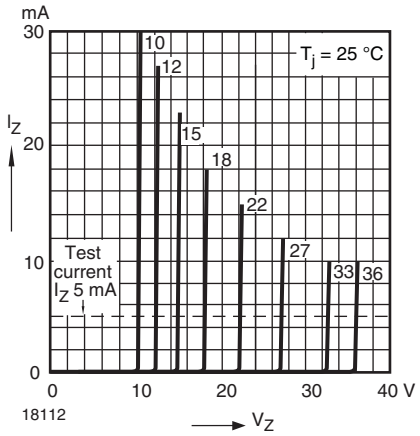


Fig. 15 - Breakdown Characteristics

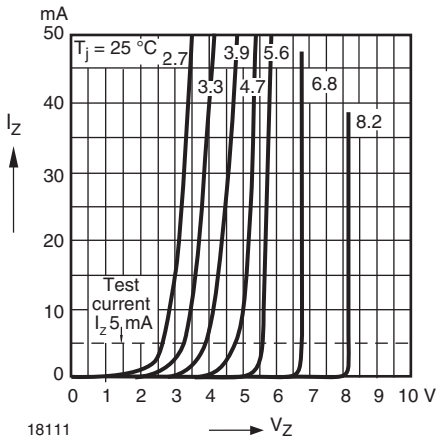


Fig. 14 - Breakdown Characteristics

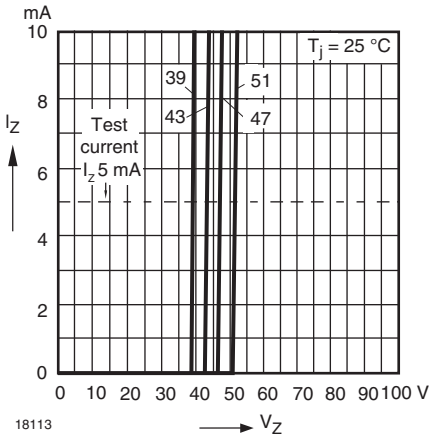
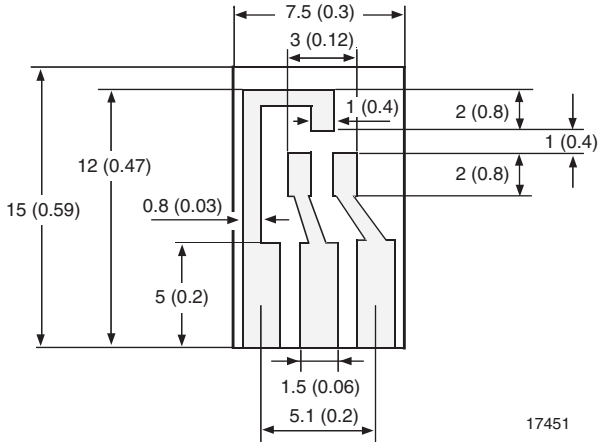


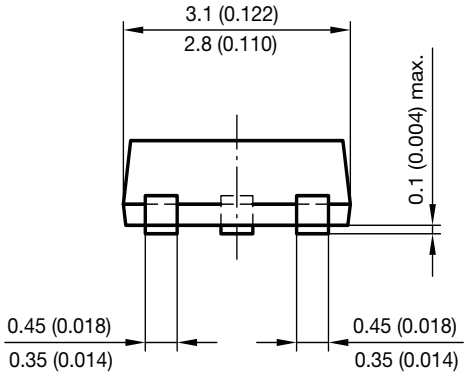
Fig. 16 - Breakdown Characteristics

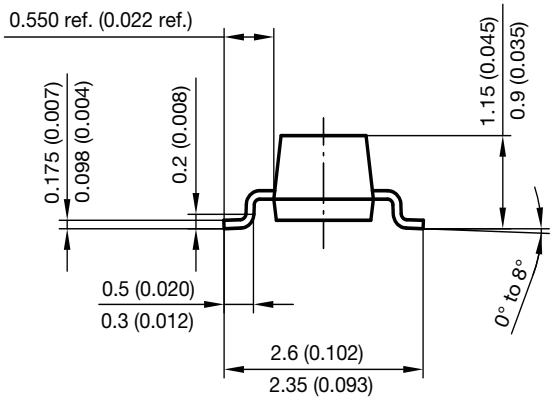
LAYOUT FOR $R_{\theta; JA}$ TEST

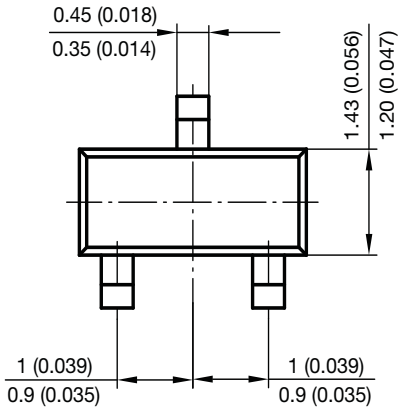
Thickness: fiberglass 0.059" (1.5 mm)
Copper leads 0.012" (0.3 mm)



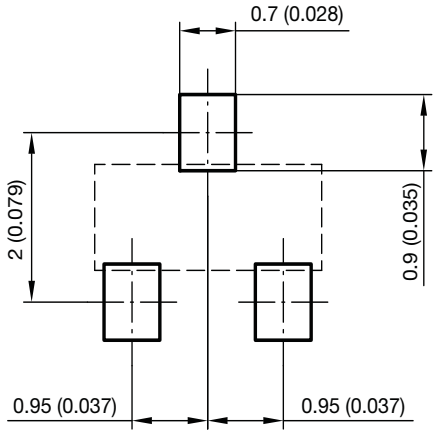
PACKAGE DIMENSIONS in millimeters (inches): SOT-23







Foot print recommendation:



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Rev. 8 - Date: 23.Sept.2009
17418

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Please note that some Vishay documentation may still make reference to RoHS Directive 2002/95/EC. We confirm that all the products identified as being compliant to Directive 2002/95/EC conform to Directive 2011/65/EU.