Small Signal Zener Diodes

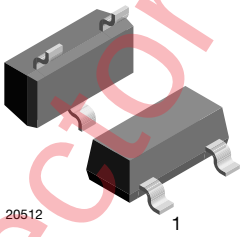
Features

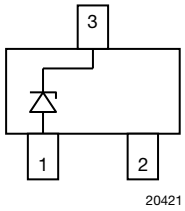
- These diodes are also available in other case styles and other configurations including: the SOD-123 case with type designation BZT52 series, the zener diode common anode configuration in the SOT-23 case with type designation AZ23 series and the zener diode common cathode configuration in the SOT-23 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





Mechanical Data

Case: SOT-23
Weight: approx. 8.8 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}	300 [1]	mW

[1] Device on fiberglass substrate, see layout on page 7.

Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		R_{thJA}	420 [1]	°C/W
Junction temperature		T_j	150	°C
Storage temperature range		T_{stg}	- 65 to + 150	°C

[1] Device on fiberglass substrate, see layout on page 7.

Electrical Characteristics

Part number	Marking code	Zener voltage range		Dynamic resistance		Test current	Temperature coefficient of zener voltage		Test current	Reverse voltage	
		V_Z at I_{ZT1}		r_{zj} at I_{ZT1}	r_{zj} at I_{ZT2}	I_{ZT1}	α_{VZ} at I_{ZT1}		I_{ZT2}	I_R	at V_R
		V		Ω		mA	10^{-4}/°C		mA	µA	V
		min.	max.				min.	max.			
BZX84C2V4-V	Z11	2.2	2.6	70 (≤ 100)	275	5	- 9	- 4	1	50	1
BZX84C2V7-V	Z12	2.5	2.9	75 (≤ 100)	300 (≤ 600)	5	- 9	- 4	1	20	1
BZX84C3V0-V	Z13	2.8	3.2	80 (≤ 95)	325 (≤ 600)	5	- 9	- 3	1	10	1
BZX84C3V3-V	Z14	3.1	3.5	85 (≤ 95)	350 (≤ 600)	5	- 8	- 3	1	5	1
BZX84C3V6-V	Z15	3.4	3.8	85 (≤ 90)	375 (≤ 600)	5	- 8	- 3	1	5	1
BZX84C3V9-V	Z16	3.7	4.1	85 (≤ 90)	400 (≤ 600)	5	- 7	- 3	1	3	1
BZX84C4V3-V	Z17	4	4.6	80 (≤ 90)	410 (≤ 600)	5	- 6	- 1	1	3	1
BZX84C4V7-V	Z1	4.4	5	50 (≤ 80)	425 (≤ 500)	5	- 5	+ 2	1	3	2
BZX84C5V1-V	Z2	4.8	5.4	40 (≤ 60)	400 (≤ 480)	5	- 3	+ 4	1	2	2
BZX84C5V6-V	Z3	5.2	6	15 (≤ 40)	80 (≤ 400)	5	- 2	+ 6	1	1	2
BZX84C6V2-V	Z4	5.8	6.6	6 (≤ 10)	40 (≤ 150)	5	- 1	+ 7	1	3	4
BZX84C6V8-V	Z5	6.4	7.2	6 (≤ 15)	30 (≤ 80)	5	+ 2	+ 7	1	2	4
BZX84C7V5-V	Z6	7	7.9	6 (≤ 15)	30 (≤ 80)	5	+ 3	+ 7	1	1	5
BZX84C8V2-V	Z7	7.7	8.7	6 (≤ 15)	40 (≤ 80)	5	+ 4	+ 7	1	0.7	5
BZX84C9V1-V	Z8	8.5	9.6	6 (≤ 15)	40 (≤ 100)	5	+ 5	+ 8	1	0.5	6
BZX84C10-V	Z9	9.4	10.6	8 (≤ 20)	50 (≤ 150)	5	+ 5	+ 8	1	0.2	7
BZX84C11-V	Y1	10.4	11.6	10 (≤ 20)	50 (≤ 150)	5	+ 5	+ 9	1	0.1	8
BZX84C12-V	Y2	11.4	12.7	10 (≤ 25)	50 (≤ 150)	5	+ 6	+ 9	1	0.1	8
BZX84C13-V	Y3	12.4	14.1	10 (≤ 30)	50 (≤ 170)	5	+ 7	+ 9	1	0.1	8
BZX84C15-V	Y4	13.8	15.6	10 (≤ 30)	50 (≤ 200)	5	+ 7	+ 9	1	0.05	0.7 $V_{Znom.}$
BZX84C16-V	Y5	15.3	17.1	10 (≤ 40)	50 (≤ 200)	5	+ 8	+ 9.5	1	0.05	0.7 $V_{Znom.}$
BZX84C18-V	Y6	16.8	19.1	10 (≤ 45)	50 (≤ 225)	5	+ 8	+ 9.5	1	0.05	0.7 $V_{Znom.}$
BZX84C20-V	Y7	18.8	21.2	15 (≤ 55)	60 (≤ 225)	5	+ 8	+ 10	1	0.05	0.7 $V_{Znom.}$
BZX84C22-V	Y8	20.8	23.3	20 (≤ 55)	60 (≤ 250)	5	+ 8	+ 10	1	0.05	0.7 $V_{Znom.}$
BZX84C24-V	Y9	22.8	25.6	25 (≤ 70)	60 (≤ 250)	5	+ 8	+ 10	1	0.05	0.7 $V_{Znom.}$
BZX84C27-V	Y10	25.1	28.9	25 (≤ 80)	65 (≤ 300)	2	+ 8	+ 10	0.5	0.05	0.7 $V_{Znom.}$
BZX84C30-V	Y11	28	32	30 (≤ 80)	70 (≤ 300)	2	+ 8	+ 10	0.5	0.05	0.7 $V_{Znom.}$
BZX84C33-V	Y12	31	35	35 (≤ 80)	75 (≤ 325)	2	+ 8	+ 10	0.5	0.05	0.7 $V_{Znom.}$
BZX84C36-V	Y13	34	38	35 (≤ 90)	80 (≤ 350)	2	+ 8	+ 10	0.5	0.05	0.7 $V_{Znom.}$
BZX84C39-V	Y14	37	41	40 (≤ 130)	80 (≤ 350)	2	+ 10	+ 12	0.5	0.05	0.7 $V_{Znom.}$
BZX84C43-V	Y15	40	46	45 (≤ 150)	85 (≤ 375)	2	+ 10	+ 12	0.5	0.05	0.7 $V_{Znom.}$
BZX84C47-V	Y16	44	50	50 (≤ 170)	85 (≤ 375)	2	+ 10	+ 12	0.5	0.05	0.7 $V_{Znom.}$
BZX84C51-V	Y17	48	54	60 (≤ 180)	85 (≤ 400)	2	+ 10	+ 12	0.5	0.05	0.7 $V_{Znom.}$
BZX84C56-V	Y18	52	60	70 (≤ 200)	100 (≤ 425)	2	+ 9	+ 11	0.5	0.05	0.7 $V_{Znom.}$
BZX84C62-V	Y19	58	66	80 (≤ 215)	100 (≤ 450)	2	+ 9	+ 12	0.5	0.05	0.7 $V_{Znom.}$
BZX84C68-V	Y20	64	72	90 (≤ 240)	150 (≤ 475)	2	+ 10	+ 12	0.5	0.05	0.7 $V_{Znom.}$
BZX84C75-V	Y21	70	79	95 (≤ 255)	170 (≤ 500)	2	+ 10	+ 12	0.5	0.05	0.7 $V_{Znom.}$

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Electrical Characteristics

Part number	Marking code	Zener voltage range		Dynamic resistance		Test current	Temperature coefficient of zener voltage		Test current	Reverse voltage	
		V_Z at I_{ZT1}		r_{zj} at I_{ZT1}	r_{zj} at I_{ZT2}	I_{ZT1}	α_{VZ} at I_{ZT1}		I_{ZT2}	I_R	at V_R
		V		Ω		mA	10^{-4}/°C		mA	µA	V
		min.	max.				min.	max.			
BZX84B2V4-V	Z50	2.35	2.45	70 (≤ 100)	275	5	- 9	- 4	1	50	1
BZX84B2V7-V	Z51	2.65	2.75	75 (≤ 100)	300 (≤ 600)	5	- 9	- 4	1	20	1
BZX84B3V0-V	Z52	2.94	3.06	80 (≤ 95)	325 (= 600)	5	- 9	- 3	1	10	1
BZX84B3V3-V	Z53	3.23	3.37	85 (≤ 95)	350 (≤ 600)	5	- 8	- 3	1	5	1
BZX84B3V6-V	Z54	3.53	3.67	85 (≤ 90)	375 (≤ 600)	5	- 8	- 3	1	5	1
BZX84B3V9-V	Z55	3.82	3.98	85 (≤ 90)	400 (≤ 600)	5	- 7	- 3	1	3	1
BZX84B4V3-V	Z56	4.21	4.39	80 (≤ 90)	410 (≤ 600)	5	- 6	- 1	1	3	1
BZX84B4V7-V	Z57	4.61	4.79	50 (≤ 80)	425 (≤ 500)	5	- 5	2	1	3	2
BZX84B5V1-V	Z58	5	5.2	40 (≤ 60)	400 (≤ 480)	5	- 3	4	1	2	2
BZX84B5V6-V	Z59	5.49	5.71	15 (≤ 40)	80 (≤ 400)	5	- 2	6	1	1	2
BZX84B6V2-V	Z60	6.08	6.32	6 (≤ 10)	40 (≤ 150)	5	- 1	7	1	3	4
BZX84B6V8-V	Z61	6.66	6.94	6 (≤ 15)	30 (≤ 80)	5	2	7	1	2	4
BZX84B7V5-V	Z62	7.35	7.65	6 (≤ 15)	30 (≤ 80)	5	3	7	1	1	5
BZX84B8V2-V	Z63	8.04	8.36	6 (≤ 15)	40 (≤ 80)	5	4	7	1	0.7	5
BZX84B9V1-V	Z64	8.92	9.28	6 (≤ 15)	40 (≤ 100)	5	5	8	1	0.5	6
BZX84B10-V	Z65	9.8	10.2	8 (≤ 20)	50 (≤ 150)	5	5	8	1	0.2	7
BZX84B11-V	Z66	10.8	11.2	10 (≤ 20)	50 (≤ 150)	5	5	9	1	0.1	8
BZX84B12-V	Z67	11.8	12.2	10 (≤ 25)	50 (£ 150)	5	6	9	1	0.1	8
BZX84B13-V	Z68	12.7	13.3	10 (≤ 30)	50 (≤ 170)	5	7	9	1	0.1	8
BZX84B15-V	Z69	14.7	15.3	10 (≤ 30)	50 (≤ 200)	5	7	9	1	0.05	0.7 $V_{Znom.}$
BZX84B16-V	Z70	15.7	16.3	10 (≤ 40)	50 (≤ 200)	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX84B18-V	Z71	17.6	18.4	10 (≤ 45)	50 (≤ 225)	5	8	9.5	1	0.05	0.7 $V_{Znom.}$
BZX84B20-V	Z72	19.6	20.4	15 (≤ 55)	60 (≤ 225)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX84B22-V	Z73	21.6	22.4	20 (≤ 55)	60 (≤ 250)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX84B24-V	Z74	23.5	24.5	25 (≤ 70)	60 (≤ 250)	5	8	10	1	0.05	0.7 $V_{Znom.}$
BZX84B27-V	Z75	26.5	27.5	25 (≤ 80)	65 (≤ 300)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B30-V	Z76	29.4	30.6	30 (≤ 80)	70 (≤ 300)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B33-V	Z77	32.3	33.7	35 (≤ 80)	75 (≤ 325)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B36-V	Z78	35.3	36.7	35 (≤ 90)	80 (≤ 350)	2	8	10	0.5	0.05	0.7 $V_{Znom.}$
BZX84B39-V	Z79	38.2	39.8	40 (≤ 130)	80 (≤ 350)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B43-V	Z80	42.1	43.9	45 (≤ 150)	85 (≤ 375)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B47-V	Z81	46.1	47.9	50 (≤ 170)	85 (≤ 375)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B51-V	Z82	50	52	60 (≤ 180)	85 (≤ 400)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B56-V	Z83	54.9	57.1	70 (≤ 200)	100 (≤ 425)	2	9	11	0.5	0.05	0.7 $V_{Znom.}$
BZX84B62-V	Z84	60.8	63.2	80 (≤ 215)	100 (≤ 450)	2	9	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B68-V	Z85	66.6	69.4	90 (≤ 240)	150 (≤ 475)	2	10	12	0.5	0.05	0.7 $V_{Znom.}$
BZX84B75-V	Z86	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)

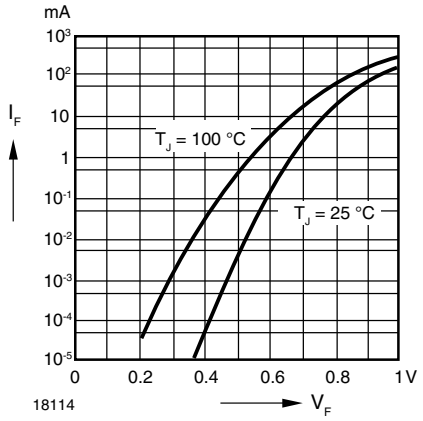

Figure 1. Forward characteristics

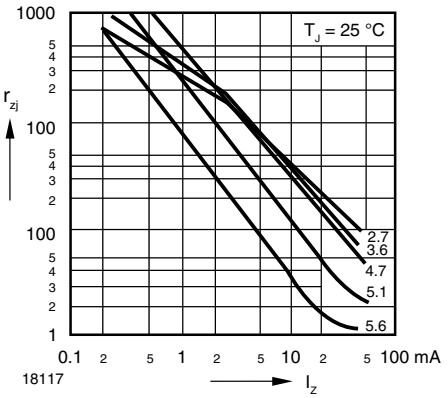

Figure 4. Dynamic Resistance vs. Zener Current

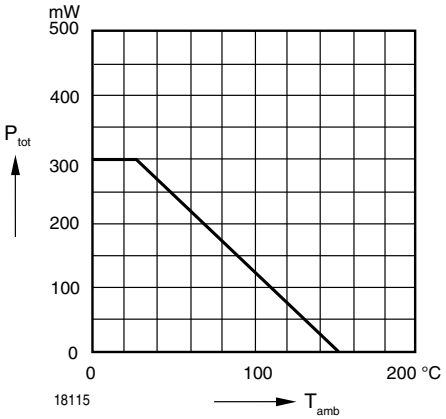

Figure 2. Admissible Power Dissipation vs. Ambient Temperature

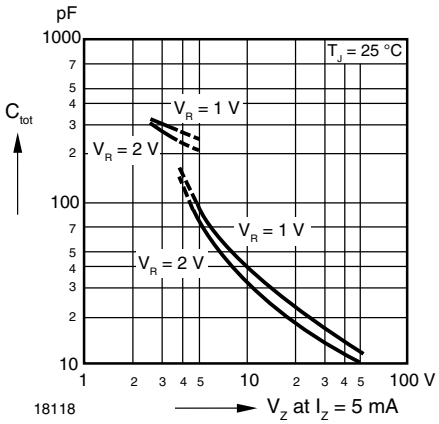

Figure 5. Capacitance vs. Zener Voltage

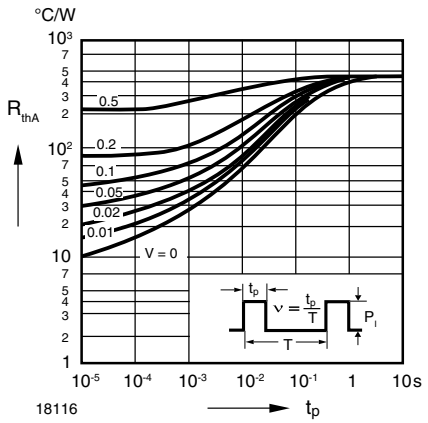

Figure 3. Pulse Thermal Resistance vs. Pulse Duration

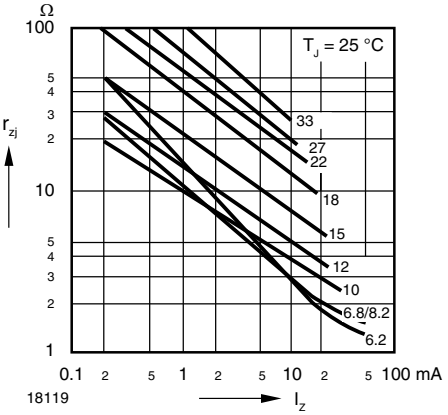

Figure 6. Dynamic Resistance vs. Zener Current

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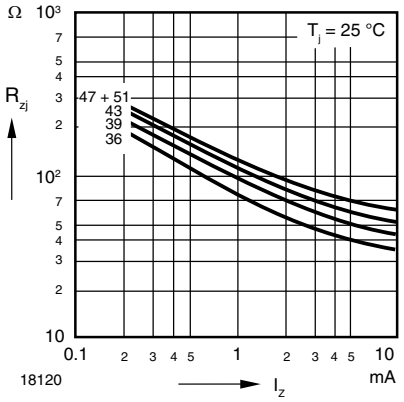

Figure 7. Dynamic Resistance vs. Zener Current

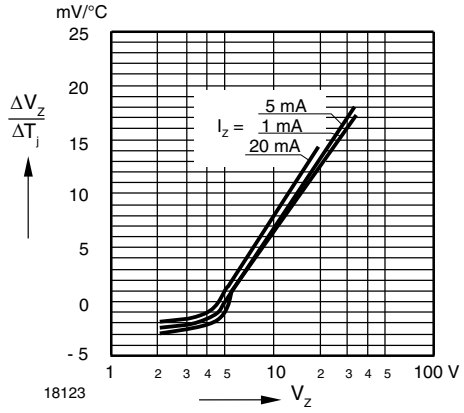

Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

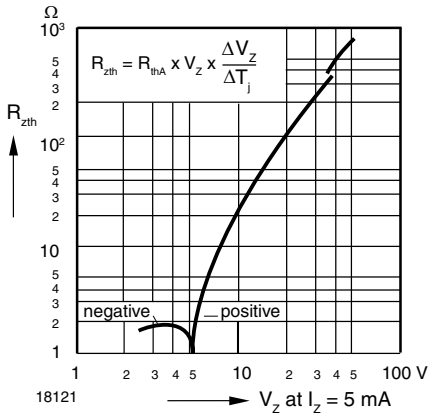

Figure 8. Thermal Differential Resistance vs. Zener Voltage

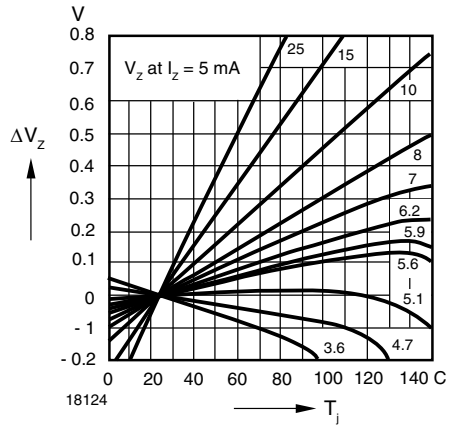

Figure 11. Change of Zener Voltage vs. Junction Temperature

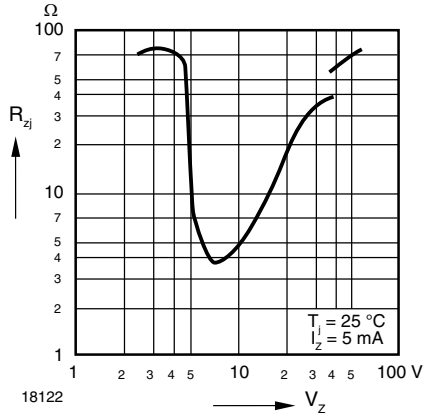

Figure 9. Dynamic Resistance vs. Zener Voltage

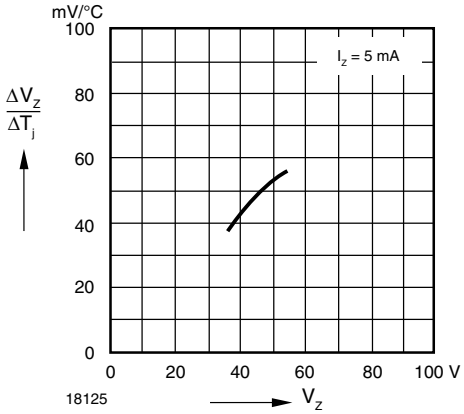

Figure 12. Temperature Dependence of Zener Voltage vs. Zener Voltage

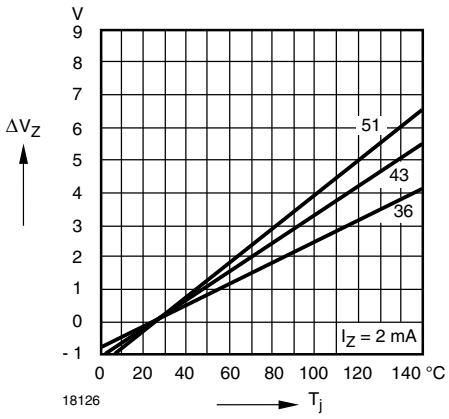

Figure 13. Change of Zener Voltage vs. Junction Temperature

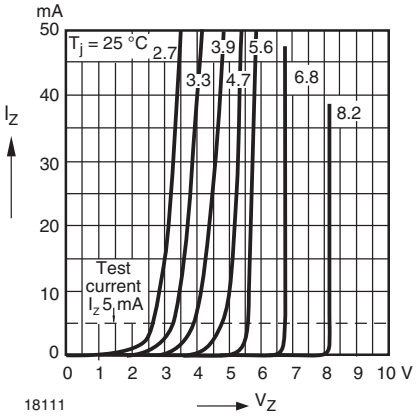

Figure 16. Breakdown Characteristics

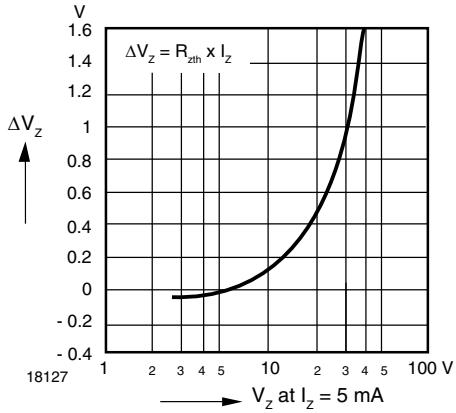

Figure 14. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

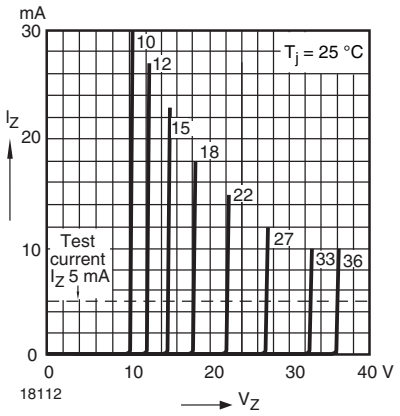

Figure 17. Breakdown Characteristics

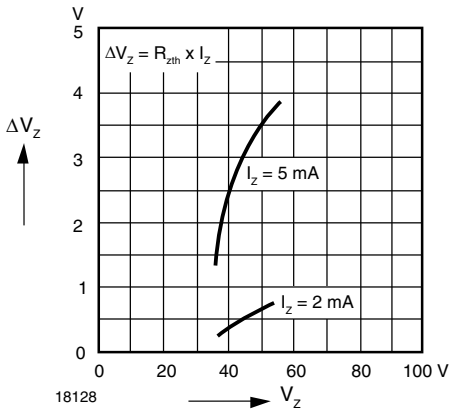

Figure 15. Change of Zener voltage from turn-on up to the point of thermal equilibrium vs. Zener voltage

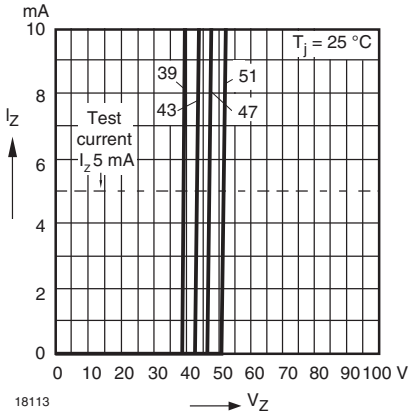

Figure 18. Breakdown Characteristics

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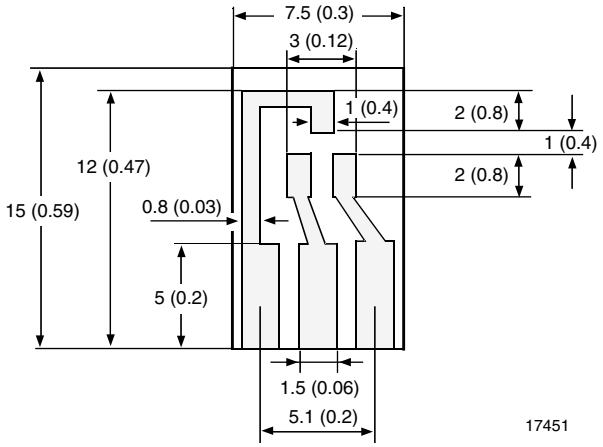
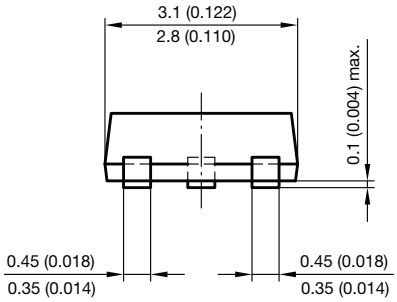
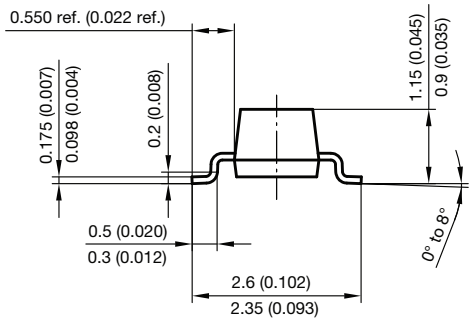
Layout for R_{thJA} test

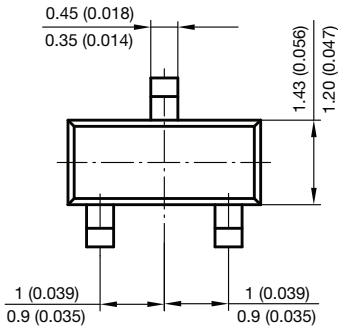
Thickness: fiberglass 0.059 in. (1.5 mm)
Copper leads 0.012 in. (0.3 mm)



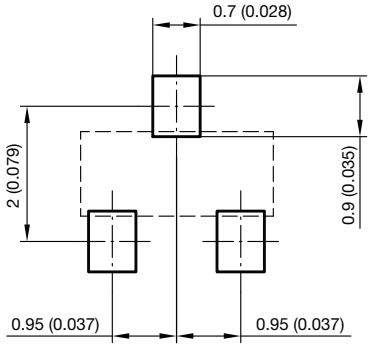
Package Dimensions in millimeters (inches): SOT-23







Foot print recommendation:



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