

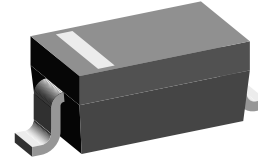
## Small Signal Zener Diodes

### Features

- Silicon planar power zener diodes
- These diodes are also available in other case styles and other configurations including: the SOT-23 case with type designation BZX84 series, the dual zener diode common anode configuration in the SOT-23 case with type designation AZ23 series and the dual 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.
- AEC-Q101 qualified
- Compliant to RoHS directive 2002/95/EC and in accordance to WEEE 2002/96/EC



**RoHS**  
COMPLIANT  
**GREEN**  
(5-2008)\*\*



17431

### Mechanical Data

**Case:** SOD-123

**Weight:** approx. 9.4 mg

**Packaging codes/options:**

18/10 k per 13 " reel (8 mm tape), 10 k/box

08/3 k per 7 " reel (8 mm tape), 15 k/box

### Absolute Maximum Ratings

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

Parameter	Test condition	Symbol	Value	Unit
Zener current see table " Characteristics "				
Power dissipation		$P_{tot}$	500 <sup>2)</sup>	mW
Power dissipation		$P_{tot}$	410 <sup>1)</sup>	mW

<sup>1)</sup> Diode on ceramic substrate 0.7 mm; 2.5 mm<sup>2</sup> pad areas

<sup>2)</sup> Diode on ceramic substrate 0.7 mm; 5 mm<sup>2</sup> pad areas

### Thermal Characteristics

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

Parameter	Test condition	Symbol	Value	Unit
Thermal resistance junction to ambient air		$R_{thJA}$	300 <sup>1)</sup>	$^{\circ}\text{C}/\text{W}$
Junction temperature		$T_J$	150	$^{\circ}\text{C}$
Storage temperature range		$T_S$	- 65 to + 150	$^{\circ}\text{C}$

<sup>1)</sup> Valid provided that electrodes are kept at ambient temperature

\*\* Please see document "Vishay Material Category Policy": [www.vishay.com/doc?99902](http://www.vishay.com/doc?99902)

### Electrical Characteristics

Part number	Marking code	Zener voltage range <sup>1)</sup>		Dynamic resistance		Test current	Temp. coefficient	Reverse voltage	Admissible Zener current <sup>4)</sup>	
		$V_Z$ at $I_{ZT1}$		$r_{zj}$ at $I_{ZT1}$	$r_{zj}$ at $I_{ZT2}$	$I_{ZT1}$	at $I_{ZT1}$	$V_R$ at $I_R = 100$ nA	$I_Z$ at $T_{amb} = 45$ °C	$I_Z$ at $T_{amb} = 25$ °C
		V		Ω		mA	$\alpha_{VZ}$ ( $10^{-4}/^{\circ}C$ )	V	mA	
		min.	max.							
BZT52C2V4-V-G	Y1	2.2	2.6	85	600	5	- 9 to - 4	-	-	-
BZT52C2V7-V-G	Y2	2.5	2.9	75 (< 83)	< 500	5	- 9 to - 4	-	113	134
BZT52C3V0-V-G	Y3	2.8	3.2	80 (< 95)	< 500	5	- 9 to - 3	-	98	118
BZT52C3V3-V-G	Y4	3.1	3.5	80 (< 95)	< 500	5	- 8 to - 3	-	92	109
BZT52C3V6-V-G	Y5	3.4	3.8	80 (< 95)	< 500	5	- 8 to - 3	-	85	100
BZT52C3V9-V-G	Y6	3.7	4.1	80 (< 95)	< 500	5	- 7 to - 3	-	77	92
BZT52C4V3-V-G	Y7	4	4.6	80 (< 95)	< 500	5	- 6 to - 1	-	71	84
BZT52C4V7-V-G	Y8	4.4	5	70 (< 78)	< 500	5	- 5 to + 2	-	64	76
BZT52C5V1-V-G	Y9	4.8	5.4	30 (< 60)	< 480	5	- 3 to + 4	> 0.8	56	67
BZT52C5V6-V-G	YA	5.2	6	10 (< 40)	< 400	5	- 2 to + 6	> 1	50	59
BZT52C6V2-V-G	YB	5.8	6.6	4.8 (< 10)	< 200	5	- 1 to + 7	> 2	45	54
BZT52C6V8-V-G	YC	6.4	7.2	4.5 (< 8)	< 150	5	+ 2 to + 7	> 3	41	49
BZT52C7V5-V-G	YD	7	7.9	4 (< 7)	< 50	5	+ 3 to + 7	> 5	37	44
BZT52C8V2-V-G	YE	7.7	8.7	4.5 (< 7)	< 50	5	+ 4 to + 7	> 6	34	40
BZT52C9V1-V-G	YF	8.5	9.6	4.8 (< 10)	< 50	5	+ 5 to + 8	> 7	30	36
BZT52C10-V-G	YG	9.4	10.6	5.2 (< 15)	< 70	5	+ 5 to + 8	> 7.5	28	33
BZT52C11-V-G	YH	10.4	11.6	6 (< 20)	< 70	5	+ 5 to + 9	> 8.5	25	30
BZT52C12-V-G	YI	11.4	12.7	7 (< 20)	< 90	5	+ 6 to + 9	> 9	23	28
BZT52C13-V-G	YK	12.4	14.1	9 (< 25)	< 110	5	+ 7 to + 9	> 10	21	25
BZT52C15-V-G	YL	13.8	15.6	11 (< 30)	< 110	5	+ 7 to + 9	> 11	19	23
BZT52C16-V-G	YM	15.3	17.1	13 (< 40)	< 170	5	+ 8 to + 9.5	> 12	17	20
BZT52C18-V-G	YN	16.8	19.1	18 (< 50)	< 170	5	+ 8 to + 9.5	> 14	15	18
BZT52C20-V-G	YO	18.8	21.2	20 (< 50)	< 220	5	+ 8 to + 10	> 15	14	17
BZT52C22-V-G	YP	20.8	23.3	25 (< 55)	< 220	5	+ 8 to + 10	> 17	13	16
BZT52C24-V-G	YR	22.8	25.6	28 (< 80)	< 220	5	+ 8 to + 10	> 18	11	13
BZT52C27-V-G	YS	25.1	28.9	30 (< 80)	< 250	5	+ 8 to + 10	> 20	10	12
BZT52C30-V-G	YT	28	32	35 (< 80)	< 250	5	+ 8 to + 10	> 22.5	9	10
BZT52C33-V-G	YU	31	35	40 (< 80)	< 250	5	+ 8 to + 10	> 25	8	9
BZT52C36-V-G	YW	34	38	40 (< 90)	< 250	5	+ 8 to + 10	> 27	8	9
BZT52C39-V-G	YX	37	41	50 (< 90)	< 300	5	+ 10 to + 12	> 29	7	8
BZT52C43-V-G	YY	40	46	60 (< 100)	< 700	5	+ 10 to + 12	> 32	6	7
BZT52C47-V-G	YZ	44	50	70 (< 100)	< 750	5	+ 10 to + 12	> 35	5	6
BZT52C51-V-G	Z1	48	54	70 (< 100)	< 750	5	+ 10 to + 12	> 38	5	6
BZT52C56-V-G	Z2	52	60	< 135 <sup>2)</sup>	< 1000 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-
BZT52C62-V-G	Z3	58	66	< 150 <sup>2)</sup>	< 1000 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-
BZT52C68-V-G	Z4	64	72	< 200 <sup>2)</sup>	< 1000 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-
BZT52C75-V-G	Z5	70	79	< 250 <sup>2)</sup>	< 1500 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-

$I_{ZT1} = 5$  mA,  $I_{ZT2} = 1$  mA

1) Measured with pulses  $T_p = 5$  ms

2) =  $I_{ZT1} = 2.5$  mA

3) =  $I_{ZT2} = 0.5$  mA

4) Valid provided that electrodes are kept at ambient temperature



## Electrical Characteristics

Part number	Marking code	Zener voltage range <sup>1)</sup>		Dynamic resistance		Test current	Temp. coefficient	Reverse voltage	Admissible Zener current <sup>4)</sup>	
		$V_Z$ at $I_{ZT1}$		$r_{zj}$ at $I_{ZT1}$	$r_{zj}$ at $I_{ZT2}$	$I_{ZT1}$	at $I_{ZT1}$	$V_R$ at $I_R = 100$ nA	$I_Z$ at $T_{amb} = 45$ °C	$I_Z$ at $T_{amb} = 25$ °C
		V		Ω		mA	$\alpha_{VZ}$ ( $10^{-4}/^{\circ}C$ )	V	mA	
		min.	max.							
BZT52B2V4-V-G	V1	2.35	2.45	85	600	5	- 9 to - 4	-	-	-
BZT52B2V7-V-G	V2	2.65	2.75	75 (< 83)	< 500	5	- 9 to - 4	-	113	134
BZT52B3V0-V-G	V3	2.94	3.06	80 (< 95)	< 500	5	- 9 to - 3	-	98	118
BZT52B3V3-V-G	V4	3.23	3.37	80 (< 95)	< 500	5	- 8 to - 3	-	92	109
BZT52B3V6-V-G	V5	3.53	3.67	80 (< 95)	< 500	5	- 8 to - 3	-	85	100
BZT52B3V9-V-G	V6	3.82	3.98	80 (< 95)	< 500	5	- 7 to - 3	-	77	92
BZT52B4V3-V-G	V7	4.21	4.39	80 (< 95)	< 500	5	- 6 to - 1	-	71	84
BZT52B4V7-V-G	V8	4.61	4.79	70 (< 78)	< 500	5	- 5 to + 2	-	64	76
BZT52B5V1-V-G	V9	5	5.2	30 (< 60)	< 480	5	- 3 to + 4	> 0.8	56	67
BZT52B5V6-V-G	VA	5.49	5.71	10 (< 40)	< 400	5	- 2 to + 6	> 1	50	59
BZT52B6V2-V-G	VB	6.08	6.32	4.8 (< 10)	< 200	5	- 1 to + 7	> 2	45	54
BZT52B6V8-V-G	VC	6.66	6.94	4.5 (< 8)	< 150	5	+ 2 to + 7	> 3	41	49
BZT52B7V5-V-G	VD	7.35	7.65	4 (< 7)	< 50	5	+ 3 to + 7	> 5	37	44
BZT52B8V2-V-G	VE	8.04	8.36	4.5 (< 7)	< 50	5	+ 4 to + 7	> 6	34	40
BZT52B9V1-V-G	VF	8.92	9.28	4.8 (< 10)	< 50	5	+ 5 to + 8	> 7	30	36
BZT52B10-V-G	VG	9.8	10.2	5.2 (< 15)	< 70	5	+ 5 to + 8	> 7.5	28	33
BZT52B11-V-G	VH	10.8	11.2	6 (< 20)	< 70	5	+ 5 to + 9	> 8.5	25	30
BZT52B12-V-G	VI	11.8	12.2	7 (< 20)	< 90	5	+ 6 to + 9	> 9	23	28
BZT52B13-V-G	VK	12.7	13.3	9 (< 25)	< 110	5	+ 7 to + 9	> 10	21	25
BZT52B15-V-G	VL	14.7	15.3	11 (< 30)	< 110	5	+ 7 to + 9	> 11	19	23
BZT52B16-V-G	VM	15.7	16.3	13 (< 40)	< 170	5	+ 8 to + 9.5	> 12	17	20
BZT52B18-V-G	VN	17.6	18.4	18 (< 50)	< 170	5	+ 8 to + 9.5	> 14	15	18
BZT52B20-V-G	VO	19.6	20.4	20 (< 50)	< 220	5	+ 8 to + 10	> 15	14	17
BZT52B22-V-G	VP	21.6	22.4	25 (< 55)	< 220	5	+ 8 to + 10	> 17	13	16
BZT52B24-V-G	VR	23.5	24.5	28 (< 80)	< 220	5	+ 8 to + 10	> 18	11	13
BZT52B27-V-G	VS	26.5	27.5	30 (< 80)	< 250	5	+ 8 to + 10	> 20	10	12
BZT52B30-V-G	VT	29.4	30.6	35 (< 80)	< 250	5	+ 8 to + 10	> 22.5	9	10
BZT52B33-V-G	VU	32.3	33.7	40 (< 80)	< 250	5	+ 8 to + 10	> 25	8	9
BZT52B36-V-G	VW	35.3	36.7	40 (< 90)	< 250	5	+ 8 to + 10	> 27	8	9
BZT52B39-V-G	VX	38.2	39.8	50 (< 90)	< 300	5	+ 10 to + 12	> 29	7	8
BZT52B43-V-G	VY	42.1	43.9	60 (< 100)	< 700	5	+ 10 to + 12	> 32	6	7
BZT52B47-V-G	VZ	46.1	47.9	70 (< 100)	< 750	5	+ 10 to + 12	> 35	5	6
BZT52B51-V-G	U1	50	52	70 (< 100)	< 750	5	+ 10 to + 12	> 38	5	6
BZT52B56-V-G	U2	54.9	57.1	< 135 <sup>2)</sup>	< 1000 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-
BZT52B62-V-G	U3	60.8	63.2	< 150 <sup>2)</sup>	< 1000 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-
BZT52B68-V-G	U4	66.6	69.4	< 200 <sup>2)</sup>	< 1000 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-
BZT52B75-V-G	U5	73.5	76.5	< 250 <sup>2)</sup>	< 1500 <sup>3)</sup>	2.5	typ. + 10 <sup>2)</sup>	-	-	-

$I_{ZT1} = 5$  mA,  $I_{ZT2} = 1$  mA

<sup>1)</sup> Measured with pulses  $T_p = 5$  ms

<sup>2)</sup> =  $I_{ZT1} = 2.5$  mA

<sup>3)</sup> =  $I_{ZT2} = 0.5$  mA

<sup>4)</sup> Valid provided that electrodes are kept at ambient temperature

Typical Characteristics ( $T_{amb} = 25\text{ }^{\circ}\text{C}$  unless otherwise specified)

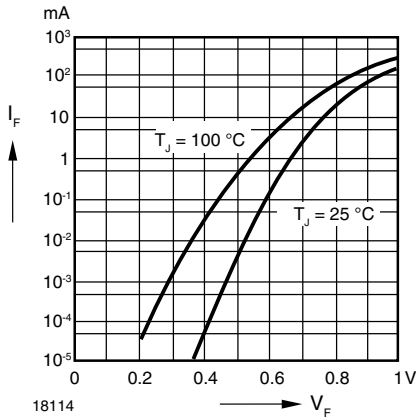


Figure 1. Forward Characteristics

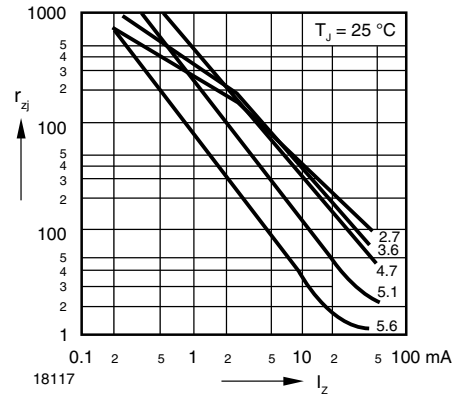


Figure 4. Dynamic Resistance vs. Zener Current

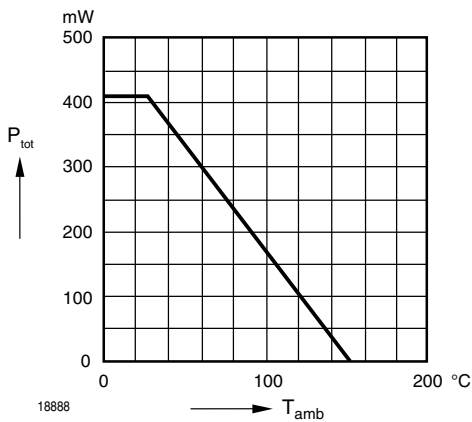


Figure 2. Admissible Power Dissipation vs. Ambient Temperature

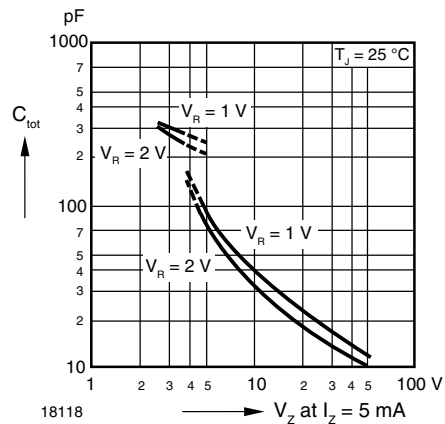


Figure 5. Capacitance vs. Zener Voltage

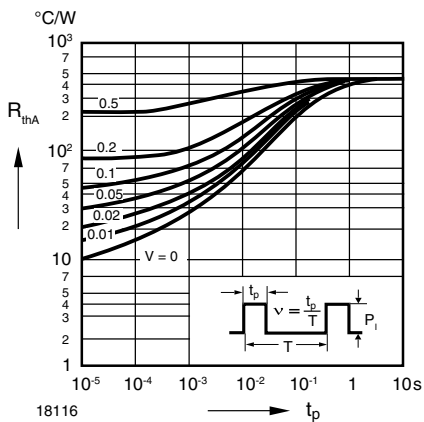


Figure 3. Pulse Thermal Resistance vs. Pulse Duration

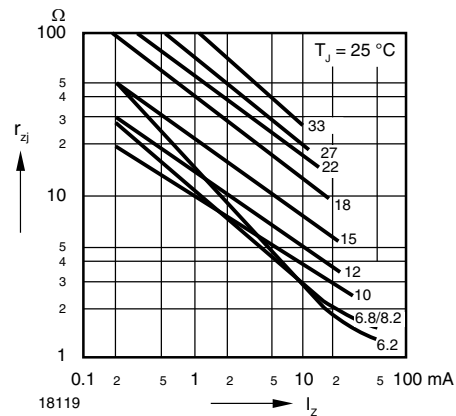


Figure 6. Dynamic Resistance vs. Zener Current

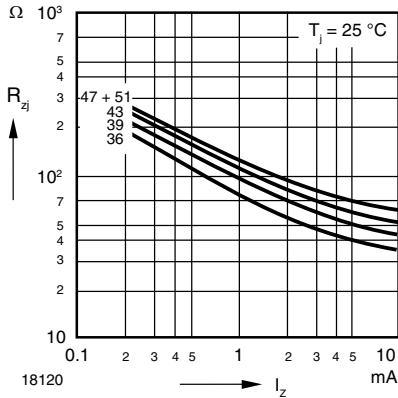


Figure 7. Dynamic Resistance vs. Zener Current

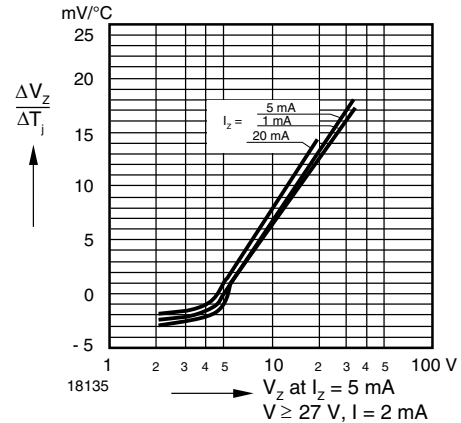


Figure 10. Temperature Dependence of Zener Voltage vs. Zener Voltage

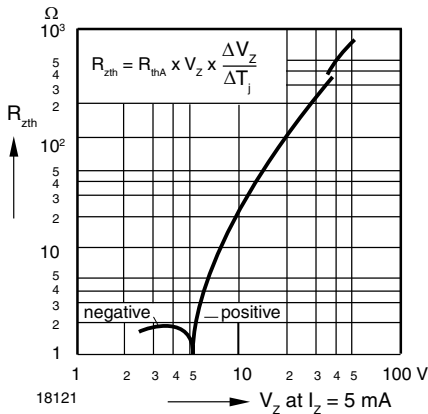


Figure 8. Thermal Differential Resistance vs. Zener Voltage

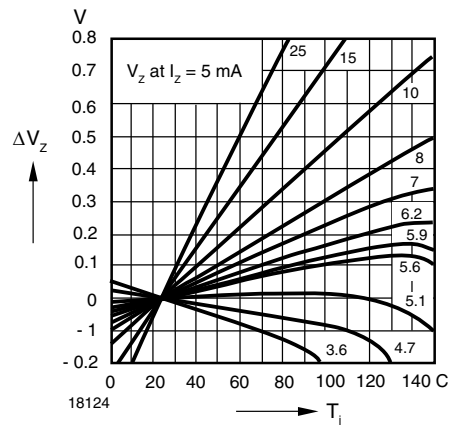


Figure 11. Change of Zener Voltage vs. Junction Temperature

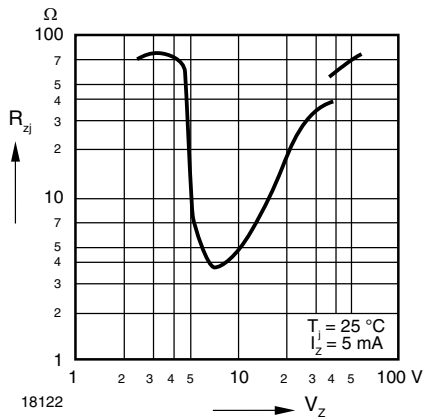


Figure 9. Dynamic Resistance vs. Zener Voltage

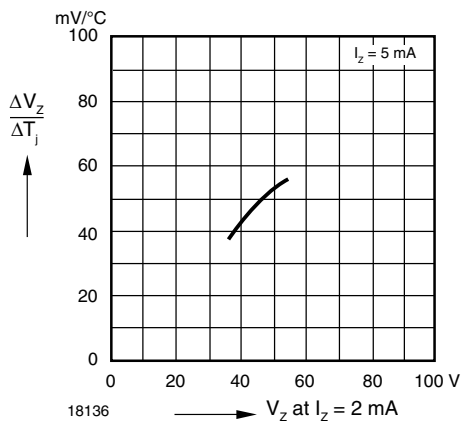


Figure 12. Temperature Dependence of Zener Voltage vs. Zener Voltage

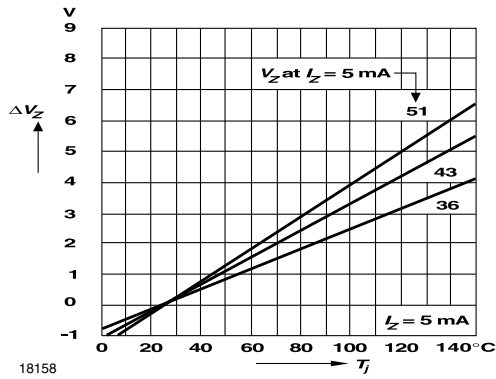


Figure 13. Change of Zener Voltage vs. Junction Temperature

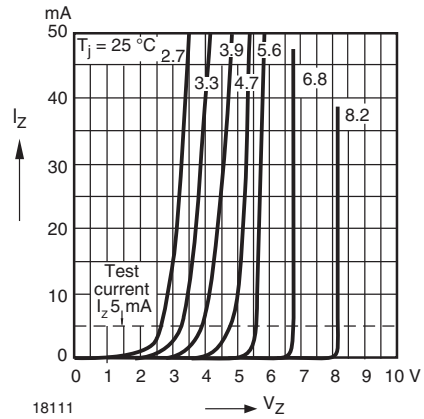


Figure 16. Breakdown Characteristics

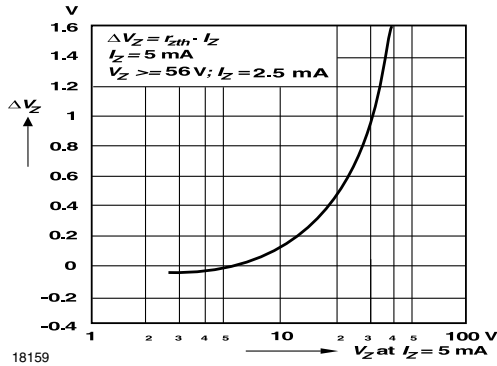


Figure 14. Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage

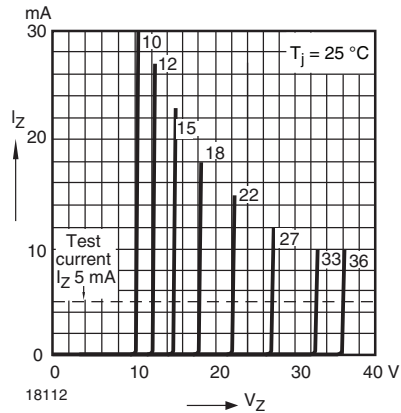


Figure 17. Breakdown Characteristics

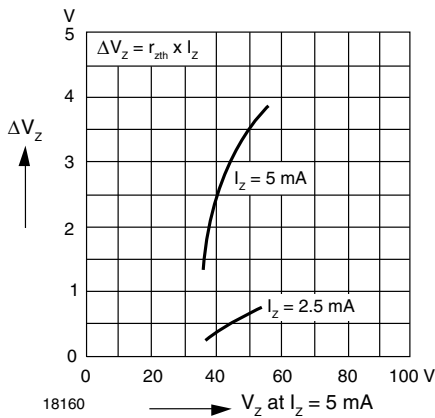
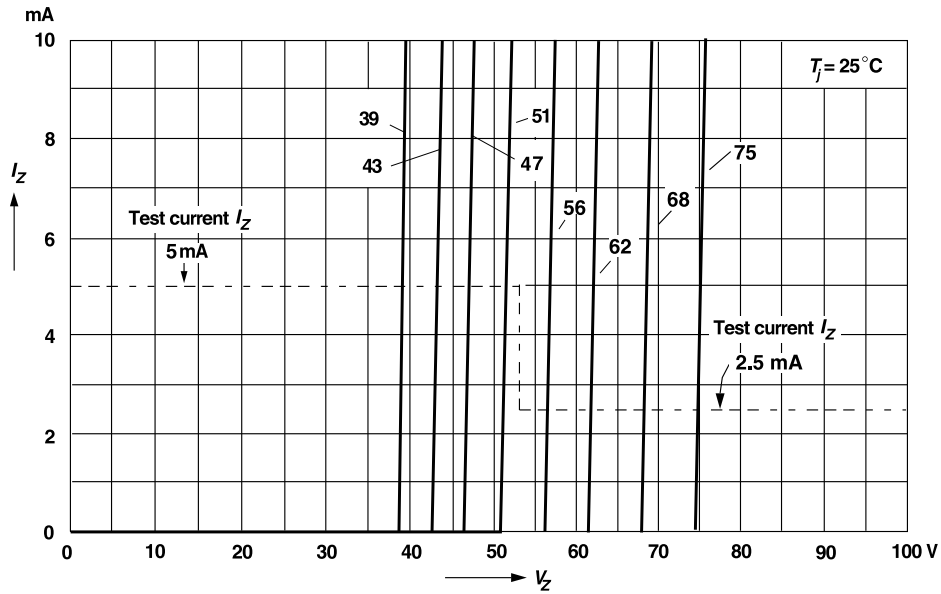


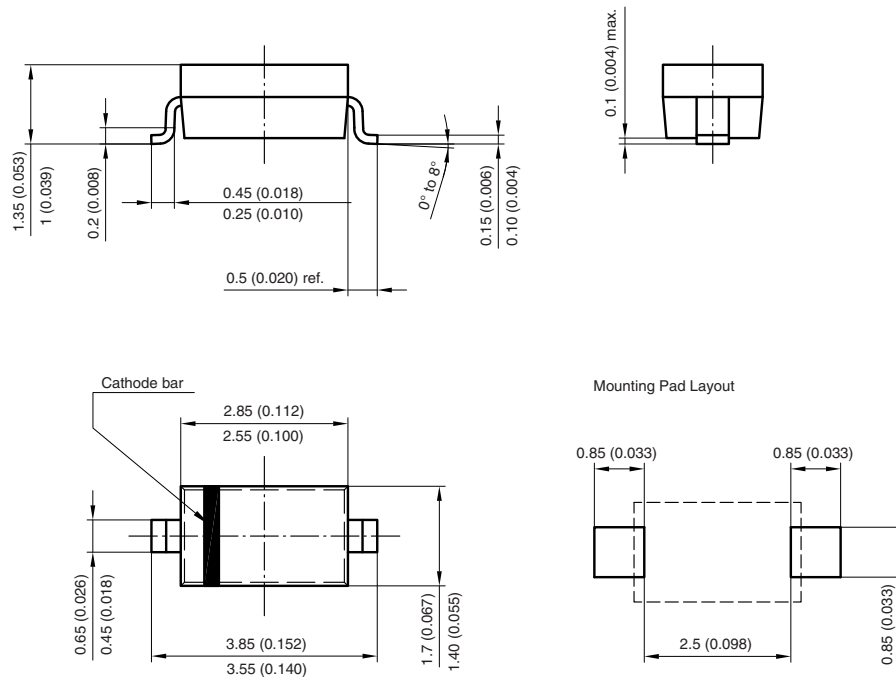
Figure 15. Change of Zener Voltage from Turn-on up to the Point of Thermal Equilibrium vs. Zener Voltage



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Figure 18. Breakdown Characteristics

## Package Dimensions in millimeters (inches): SOD-123



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 Document no.: S8-V-3910.01-001 (4)  
 17432



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