



## 3EZ6.8~3EZ51

### SILICON ZENER DIODES

**VOLTAGE** 6.8 to 51 Volt **POWER** 3 Watt

**DO-15**

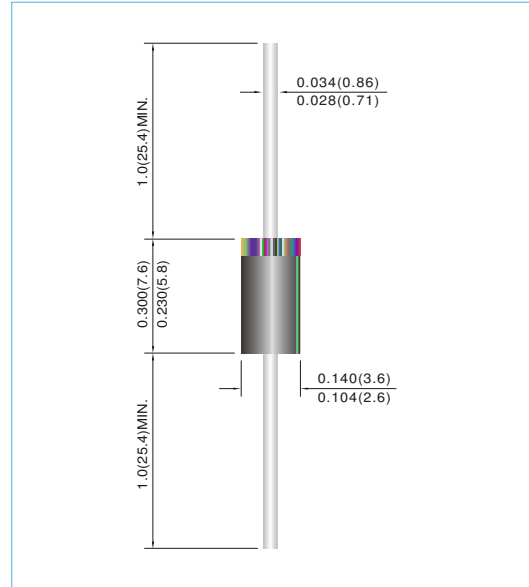
Unit : inch(mm)

#### FEATURES

- Low inductance
- Plastic package has Underwriters Laboratory Flammability Classification 94V-O
- High temperature soldering : 260°C /10 seconds at terminals
- Lead free in compliance with EU RoHS 2011/65/EU directive

#### MECHANICAL DATA

- Case: JEDEC DO-15, Molded plastic
- Terminals: Solder plated, solderable per MIL-STD-750, Method 2026
- Polarity: Color band denotes cathode end
- Standard packing: 52mm tape
- Weight: 0.014 ounce, 0.0397 gram



### MAXIMUM RATINGS AND ELECTRICAL CHARACTERISTICS

Ratings at 25°C ambient temperature unless otherwise specified.

Parameter	Symbol	Value	Units
Peak Pulse Power Dissipation on $T_L=50^\circ\text{C}$ (Notes A) Derate above 50°C	$P_D$	3	Watts
Peak Forward Surge Current 8.3ms single half sine-wave superimposed on rated load	$I_{FSM}$	15	Amps
Operating Junction and Storage Temperature Range	$T_J, T_{STG}$	-55 to + 150	°C

#### NOTES :

A.Mounted on 5mm<sup>2</sup> (0.013mm thick) land areas.

B.Measured on 8.3ms, and single half sine-wave or equivalent square wave, duty cycle=4 pulses per minute maximum

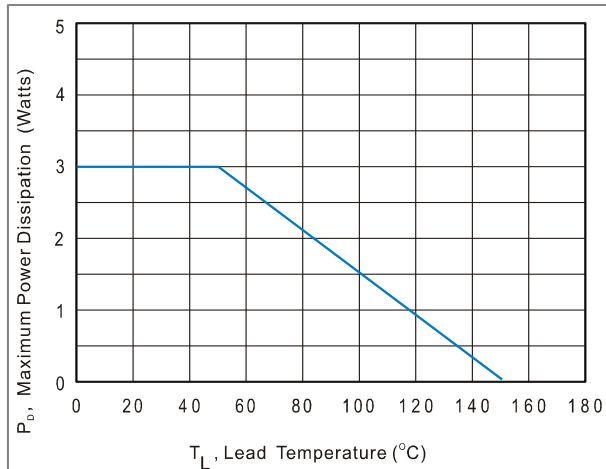


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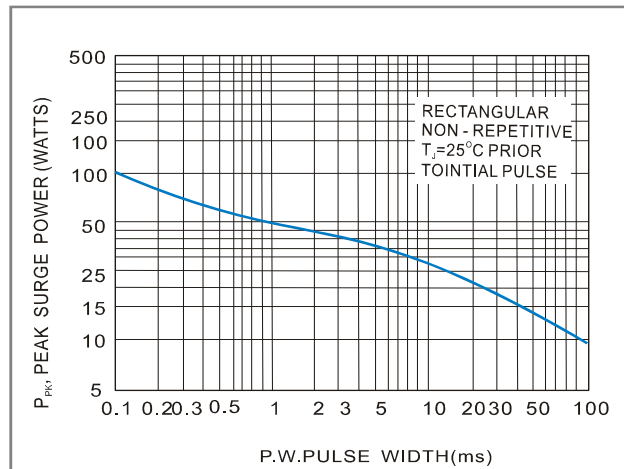
Part Number	Nominal Zener Voltage			Maximum Zener Impedance				Max Reverse Leakage Current		Marking Code
	V <sub>Z</sub> @ I <sub>ZT</sub>			Z <sub>ZT</sub> @ I <sub>ZT</sub>	I <sub>ZT</sub>	Z <sub>ZK</sub> @ I <sub>ZK</sub>	I <sub>ZK</sub>	I <sub>R</sub> @ V <sub>R</sub>		
	Nom. V	Min. V	Max. V	Ω	mA	Ω	mA	μA	V	
3.0 Watt ZENER										
3EZ6.8	6.8	6.46	7.14	2	110	700	1	5	4	3EZ6.8
3EZ7.5	7.5	7.13	7.88	2	100	700	0.5	5	5	3EZ7.5
3EZ8.2	8.2	7.79	8.61	2	91	700	0.5	5	6	3EZ8.2
3EZ8.7	8.7	8.27	9.14	2	85	700	0.5	4	6.6	3EZ8.7
3EZ9.1	9.1	8.65	9.56	3	82	700	0.5	3	7	3EZ9.1
3EZ10	10	9.5	10.5	4	75	700	0.25	3	7.6	3EZ10
3EZ11	11	10.45	11.55	4	68	700	0.25	1	8.4	3EZ11
3EZ12	12	11.4	12.6	5	63	700	0.25	1	9.1	3EZ12
3EZ13	13	12.35	13.65	5	58	700	0.25	0.5	9.9	3EZ13
3EZ14	14	13.3	14.7	5	53	700	0.25	0.5	10.6	3EZ14
3EZ15	15	14.25	15.75	6	50	700	0.25	0.5	11.4	3EZ15
3EZ16	16	15.2	16.8	6	47	700	0.25	0.5	12.2	3EZ16
3EZ17	17	16.15	17.85	6	44	750	0.25	0.5	13	3EZ17
3EZ18	18	17.1	18.9	6	42	750	0.25	0.5	13.7	3EZ18
3EZ19	19	18.05	19.95	7	40	750	0.25	0.5	14.4	3EZ19
3EZ20	20	19	21	7	37	750	0.25	0.5	15.2	3EZ20
3EZ22	22	20.9	23.1	8	34	750	0.25	0.5	16.7	3EZ22
3EZ24	24	22.8	25.2	9	31	750	0.25	0.5	18.2	3EZ24
3EZ25	25	23.75	26.25	10	30	750	0.25	0.5	19	3EZ25
3EZ27	27	25.65	28.35	10	28	750	0.25	0.5	20.6	3EZ27
3EZ28	28	26.6	29.4	12	27	750	0.25	0.5	21.3	3EZ28
3EZ30	30	28.5	31.5	16	25	1000	0.25	0.5	22.5	3EZ30
3EZ33	33	31.35	34.65	20	23	1000	0.25	0.5	25.1	3EZ33
3EZ36	36	34.2	37.8	22	21	1000	0.25	0.5	27.4	3EZ36
3EZ39	39	37.05	40.95	28	19	1000	0.25	0.5	29.7	3EZ39
3EZ43	43	40.85	45.15	33	17	1500	0.25	0.5	32.7	3EZ43
3EZ47	47	44.65	49.35	38	16	1500	0.25	0.5	35.8	3EZ47
3EZ51	51	48.45	53.55	45	15	1500	0.25	0.5	38.8	3EZ51



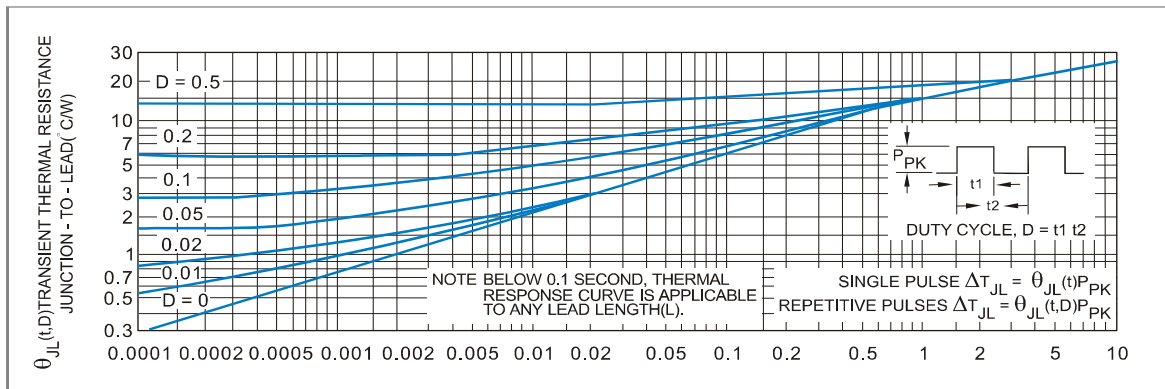
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**Fig.1 Power Temperature Derating Curve**



**FIGURE 2. MAXIMUM SURGE POWER**



**FIGURE 3. TYPICAL THERMAL RESPONSE,**

### APPLICATION NOTE:

Since the actual voltage available from a given zener diode is temperature dependent, it is necessary to determine junction temperature under any set of operating conditions in order to calculate its value. The following procedure is recommended:

Lead Temperature,  $T_L$ , should be determined from:

$$T_L = \theta_{L_A} P_D + T_A$$

$\theta_{L_A}$  is the lead-to-ambient thermal resistance ( $^{\circ}\text{C}/\text{W}$ ) and  $P_D$  is the power dissipation. The value for  $\theta_{L_A}$  will vary and depends on the device mounting method.  $\theta_{L_A}$  is generally  $30\text{-}40\text{ }^{\circ}\text{C}/\text{W}$  for the various clips and tie points in common use and for printed circuit board wiring.

The temperature of the lead can also be measured using a thermocouple placed on the lead as close as possible to the tie point.

The thermal mass connected to the tie point is normally large enough so that it will not significantly respond to heat surges generated in the diode as a result of pulsed operation once steady-state conditions are achieved. Using the measured value of  $T_L$ , the junction temperature may be determined by:

$$T_J = T_L + \Delta T_{JL}$$

$\Delta T_{JL}$  is the increase in junction temperature above the lead temperature and may be found from Figure 3 for a train of power pulses

$$\Delta T_{JL} = \theta_{JL} P_D$$

For worst-case design, using expected limits of  $I_Z$ , limits of  $P_D$  and the extremes of  $T_J(\Delta T_J)$  may be estimated. Changes in voltage,  $V_Z$ , can then be found from:

$$\Delta V = \theta_V V_Z \Delta T_J$$

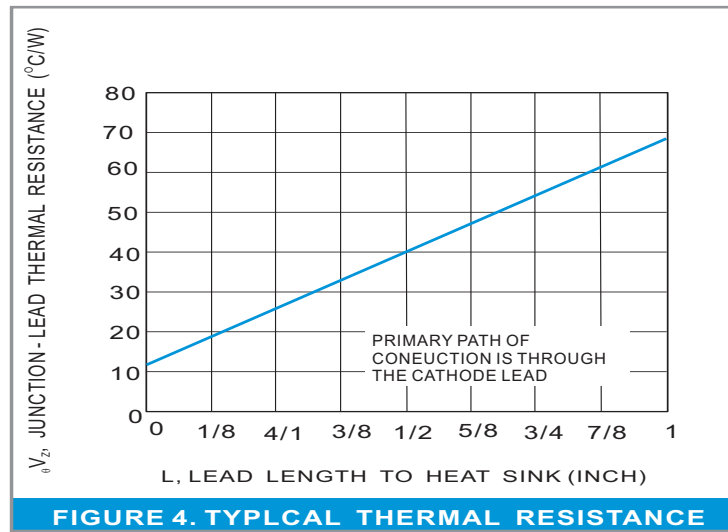
$\theta_V V_Z$ , the zener voltage temperature coefficient, is found from Figures 5 and 6.

Under high power-pulse operation, the zener voltage will vary with time and may also be affected significantly by the zener resistance. For best regulation, keep current excursions as low as possible.

Data of Figure 3 should not be used to compute surge capability. Surge limitations are given in Figure 2. They are lower than would be expected by considering only junction temperature, as current crowding effects cause temperatures to be extremely high in small spots resulting in device degradation should the limits of Figure 2 be exceeded.



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### Part No\_packing code\_Version

3EZ6.8\_AY\_00001  
 3EZ6.8\_AY\_10001  
 3EZ6.8\_B0\_00001  
 3EZ6.8\_B0\_10001  
 3EZ6.8\_R2\_00001  
 3EZ6.8\_R2\_10001

For example :

**RB500V-40\_R2\_00001**



Packing Code <b>XX</b>				Version Code <b>XXXXX</b>		
Packing type	1 <sup>st</sup> Code	Packing size code	2 <sup>nd</sup> Code	HF or RoHS	1 <sup>st</sup> Code	2 <sup>nd</sup> ~5 <sup>th</sup> Code
Tape and Ammunition Box (T/B)	<b>A</b>	N/A	<b>0</b>	<b>HF</b>	<b>0</b>	serial number
Tape and Reel (T/R)	<b>R</b>	7"	<b>1</b>	<b>RoHS</b>	<b>1</b>	serial number
Bulk Packing (B/P)	<b>B</b>	13"	<b>2</b>			
Tube Packing (T/P)	<b>T</b>	26mm	<b>X</b>			
Tape and Reel (Right Oriented) (TRR)	<b>S</b>	52mm	<b>Y</b>			
Tape and Reel (Left Oriented) (TRL)	<b>L</b>	PANASERT T/B CATHODE UP (PBCU)	<b>U</b>			
FORMING	<b>F</b>	PANASERT T/B CATHODE DOWN (PBCD)	<b>D</b>			



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