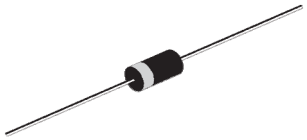
5W ZENER DIODES

1N53XXB SERIES



DO-15

DO-15 AXIL LEAD
Plastic Package
RoHS compliant

FEATURES:

1. Low Zener impedance.
2. High reliability chips.
3. Lead-free finish
4. The plastic package carries Underwriters Laboratory Flammability Classification 94V-0

APPLICATIONS:

1. Regulates voltage over a broad operating current and temperature range
2. Wide selection from 3.3 to 200V
3. Flexible axial-lead mounting terminals
4. Nonsensitive to ESD per MIL-STD-750 Method 1020
5. Withstands high surge stresses
6. Minimal changes of voltage versus current as specified by voltage regulation (ΔV_Z)
7. High specified maximum current (I_{ZM}) when adequately heat sunk
8. Moisture classification is Level 1 per IPC/JEDEC J-STD-020B with no dry pack required

ABSOLUTE MAXIMUM RATINGS (T_a=25℃ unless otherwise noted)

Parameter	Symbol	VALUE	UNIT
Power Dissipation	P_D	5	W
Thermal Resistance Junction To Ambient Air	$R_{\theta JA}$	100	°C/W
Thermal Resistance Junction To Leads	$R_{\theta JL}$	25	°C/W
Forward voltage @ I_F=200mA	V_F	1.2	V
Storage Temperature Range	T_{STG}	-55 to +150	°C
Operating Junction Temperature Range	T_J	-55 to +150	°C

ELECTRICAL CHARACTERISTICS at (Ta = 25 ℃ Unless otherwise specified)

Part Number	Zener voltage			Test current	Dynamic impedance	Knee current	Knee impedance	Reverse current	Reverse voltage	Max.DC current
	VZ /V			IZT	ZZT	IZK	ZZK	IR(Max.)	VR	IZM
	V_z(MIN)	V_z(NOR)	V_z(MAX)	mA	Ω	mA	Ω	μAdc	V	mA
1N5333B	3.135	3.300	3.465	380	3	1	400	300	1	1440
1N5334B	3.42	3.600	3.780	350	2.5	1	500	150	1	1320
1N5335B	3.705	3.900	4.095	320	2	1	500	50	1	1220
1N5336B	4.085	4.300	4.515	290	2	1	500	10	1	1100
1N5337B	4.465	4.700	4.935	260	2	1	450	5	1	1010
1N5338B	4.845	5.100	5.355	240	1.5	1	400	1	1	930
1N5339B	5.320	5.600	5.880	220	1	1	400	1	2	856
1N5340B	5.700	6.000	6.300	200	1	1	300	1	3	790
1N5341B	5.890	6.200	6.510	200	1	1	200	1	4	765
1N5342B	6.460	6.800	7.140	175	1	1	200	150	4.9	700
1N5343B	7.125	7.500	7.875	175	1.5	1	200	150	5.4	630
1N5344B	7.790	8.200	8.610	150	1.5	1	200	150	5.9	580
1N5345B	8.265	9.700	9.135	150	2	1	200	150	6.3	545
1N5346B	8.645	9.100	9.555	150	2	1	150	150	6.6	520
1N5347B	9.500	10.000	10.500	125	2	1	125	150	7.2	475
1N5348B	10.450	11.000	11.550	125	2.5	1	125	150	8	430
1N5349B	11.400	12.000	12.600	100	2.5	1	125	2	8.6	395
1N5350B	12.350	13.000	13.650	100	2.5	1	100	1	9.4	365
1N5351B	13.330	14.000	14.700	100	2.5	1	75	1	10.1	340
1N5352B	14.280	15.000	15.750	75	2.5	1	75	1	10.8	315
1N5353B	15.230	16.000	16.800	75	2.5	1	75	1	11.5	295
1N5354B	16.190	17.000	17.850	70	2.5	1	75	0.5	12.2	280
1N5355B	17.140	18.000	18.900	65	2.5	1	75	0.5	13	265
1N5356B	18.090	19.000	19.950	65	8	1	75	0.5	13.7	250
1N5357B	19.040	20.000	21.000	65	3	1	75	0.5	14.4	237
1N5358B	20.950	22.000	23.100	50	3.5	1	75	0.5	15.8	216
1N5359B	22.850	24.000	25.200	50	3.5	1	100	0.5	17.3	198
1N5360B	22.800	25.000	26.250	50	4	1	110	0.5	18	190
1N5361B	25.710	27.000	28.350	50	5	1	120	0.5	19.4	176
1N5362B	26.660	28.000	29.400	50	6	1	130	0.5	20.1	170
1N5363B	28.570	30.000	31.500	40	8	1	140	0.5	21.6	158
1N5364B	31.420	33.000	34.650	40	10	1	150	0.5	23.8	144
1N5365B	34.280	36.000	37.800	30	11	1	160	0.5	25.9	132

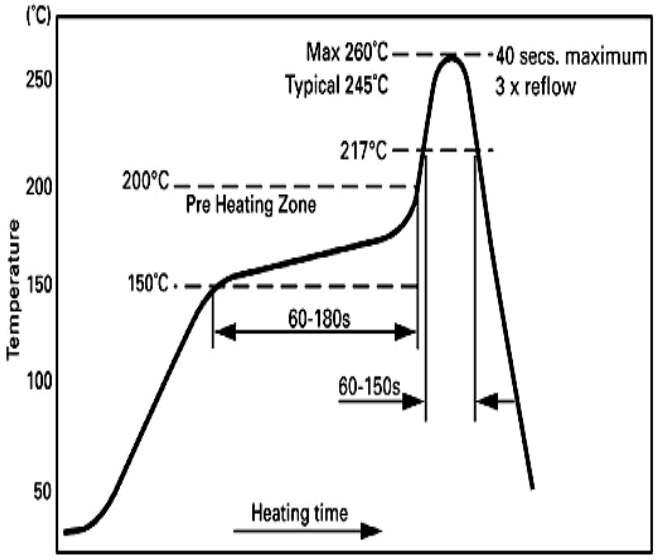
Part Number	Zener voltage			Test current	Dynamic impedance	Knee current	Knee impedance	Reverse current	Reverse voltage	Max.DC current
	VZ /V			IZT	ZZT	IZK	ZZK	IR(Max.)	VR	IZM
	V_z(MIN)	V_z(NOR)	V_z(MAX)	mA	Ω	mA	Ω	µAdc	V	mA
1N5366B	37.140	39.000	40.950	30	14	1	170	0.5	28.1	122
1N5367B	40.950	43.000	45.150	30	20	1	190	0.5	31	110
1N5368B	44.760	47.000	49.350	25	25	1	210	0.5	33.8	100
1N5369B	48.570	51.000	53.550	25	27	1	230	0.5	36.7	93
1N5370B	53.330	56.000	58.800	20	35	1	280	0.5	40.3	86
1N5371B	57.140	60.000	63.000	20	40	1	350	0.5	43	79
1N5372B	59.050	62.000	65.100	20	42	1	400	0.5	44.6	76
1N5373B	64.760	68.000	71.400	20	44	1	500	0.5	49	70
1N5374B	71.430	75.000	78.750	20	45	1	620	0.5	54	63
1N5375B	78.100	82.000	86.100	15	65	1	720	0.5	59	58
1N5376B	82.650	87.000	91.350	15	75	1	760	0.5	63	54.5
1N5377B	86.450	91.000	95.550	12	75	1	760	0.5	65.5	52.5
1N5378B	95.000	100.000	105.000	12	90	1	800	0.5	72	47.5
1N5379B	104.500	110.000	115.500	12	125	1	1000	0.5	79.2	43
1N5380B	114.000	120.000	126.000	10	170	1	1150	0.5	86.4	39.5
1N5381B	123.500	130.000	136.500	10	190	1	1250	0.5	93.2	36.6
1N5382B	133.000	140.000	147.000	8	230	1	1500	0.5	101	34
1N5383B	142.500	150.000	157.500	8	330	1	1500	0.5	108	31.6
1N5384B	152.000	160.000	168.000	8	350	1	1650	0.5	115	29.4
1N5385B	161.500	170.000	178.500	8	380	1	1750	0.5	122	28
1N5386B	171.000	180.000	189.000	5	430	1	1750	0.5	130	26.4
1N5387B	180.500	190.000	199.500	5	450	1	1850	0.5	137	25
1N5388B	190.000	200.000	210.000	5	480	1	1850	0.5	144	23.6

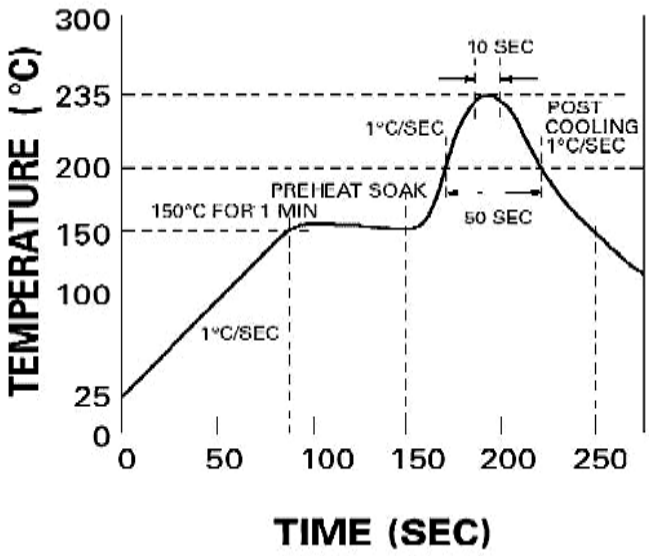
Recommended Reflow Solder Profiles

The recommended reflow solder profiles for Pb and Pb-free devices are shown below.

Figure 1 shows the recommended solder profile for devices that have Pb-free terminal plating, and where a Pb-free solder is used.

Figure 2 shows the recommended solder profile for devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with a leaded solder.



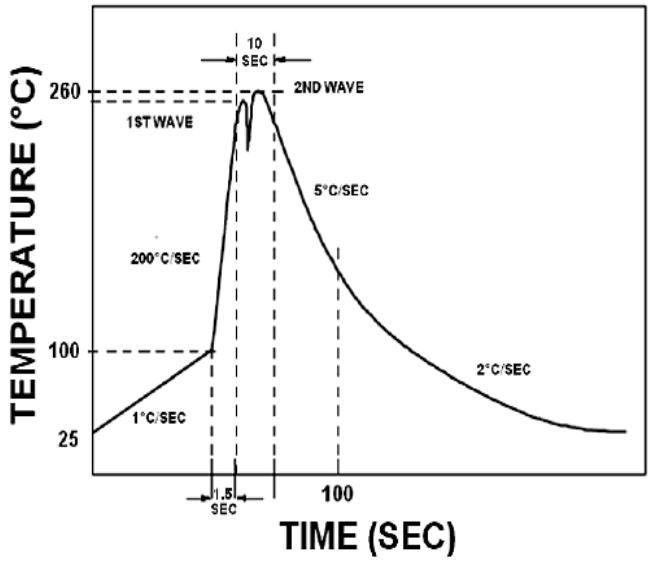


Reflow profiles in tabular form

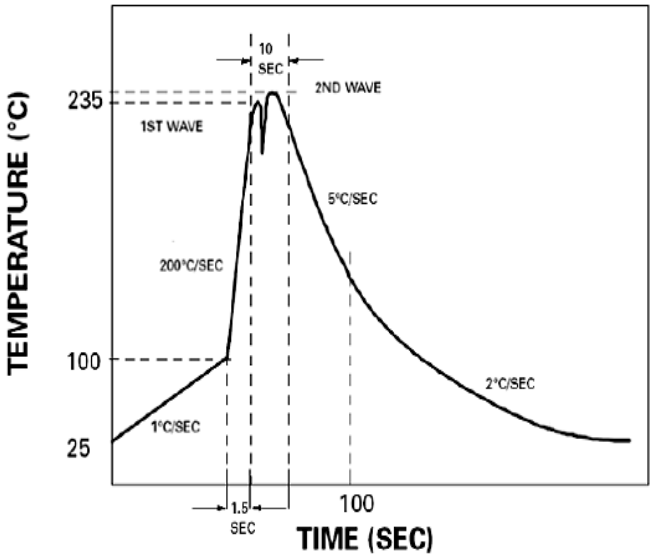
Profile Feature	Sn-Pb System	Pb-Free System
Average Ramp-Up Rate	~3°C/second	~3°C/second
Preheat – Temperature Range – Time	 150-170°C 60-180 seconds	 150-200°C 60-180 seconds
Time maintained above: – Temperature – Time	 200°C 30-50 seconds	 217°C 60-150 seconds
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	40 seconds
Ramp-Down Rate	3°C/second max.	6°C/second max.

Recommended Wave Solder Profiles

The Recommended solder Profile For Devices with Pb-free terminal plating where a Pb-free solder is used



The Recommended solder Profile For Devices with Pb-free terminal plating used with leaded solder, or for devices with leaded terminal plating used with leaded solder



Wave Profiles in Tabular Form

Profile Feature	Sn-Pb System	Pb-free System
Average Ramp-Up Rate	~200°C/second	~200°C/second
Heating rate during preheat	Typical 1-2, Max 4°C/sec	Typical 1-2, Max 4°C/Sec
Final preheat Temperature	Within 125°C of Solder Temp	Within 125°C of Solder Temp
Peak Temperature	235°C	260°C max.
Time within +0 -5°C of actual Peak	10 seconds	10 seconds
Ramp-Down Rate	5°C/second max.	5°C/second max.

TYPICAL CHARACTERISTICS CURVES

Fig 1: Power Temperature Derating Curve

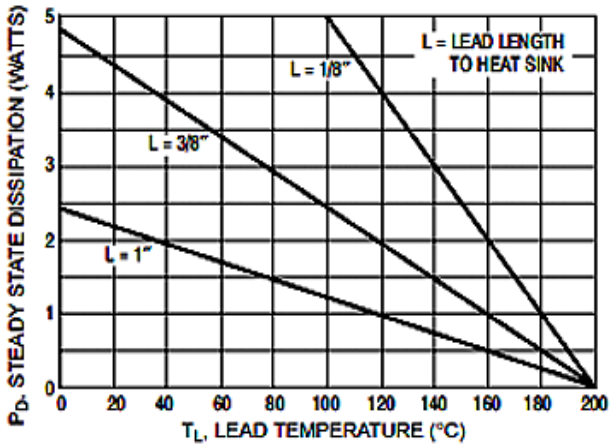


Fig 2: Typical Capacitance vs. Reverse Voltage for 5 Watt Zeners

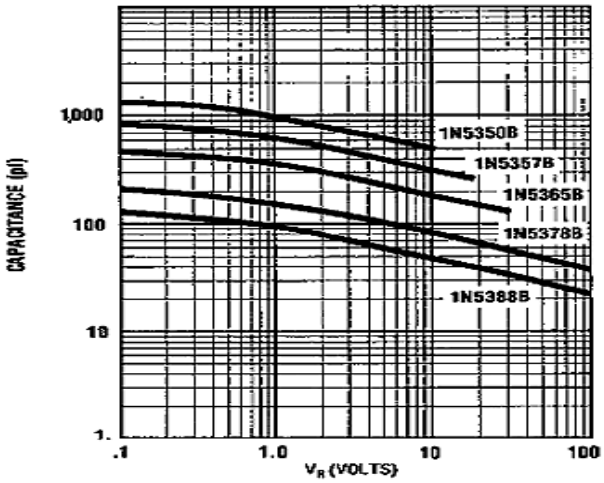


Fig 3: Typical Capacitance vs. Reverse Voltage for 5 Watt Zeners

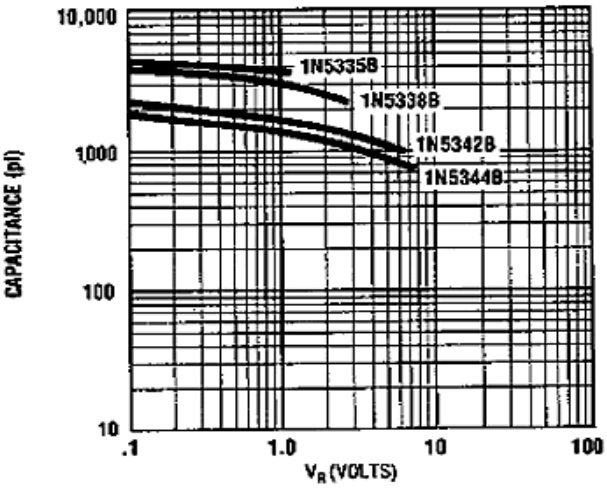


Fig 4: Typical Thermal Resistance

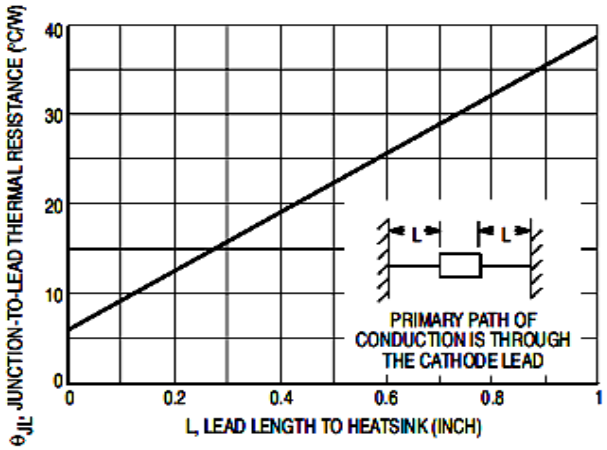


Fig 5: Temperature Coefficient-Range for Units 3 to 10 Volts

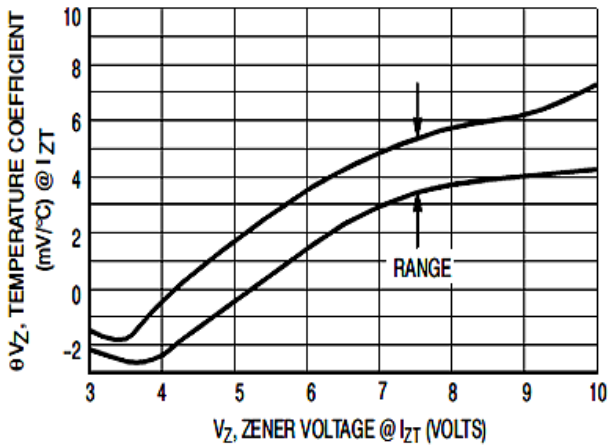


Fig 8: Temperature Coefficient-Range for Units 10 to 220 Volts

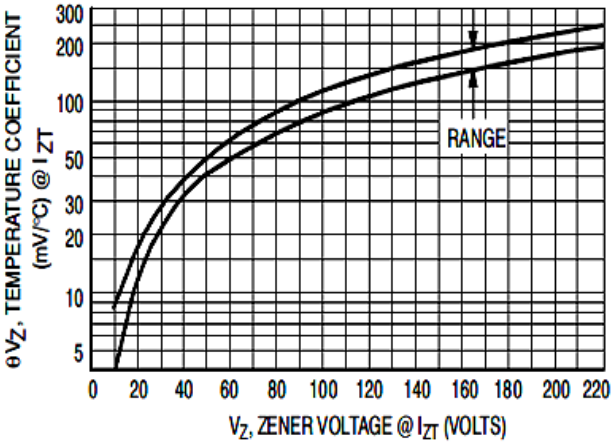


Fig 6: Typical Thermal Response

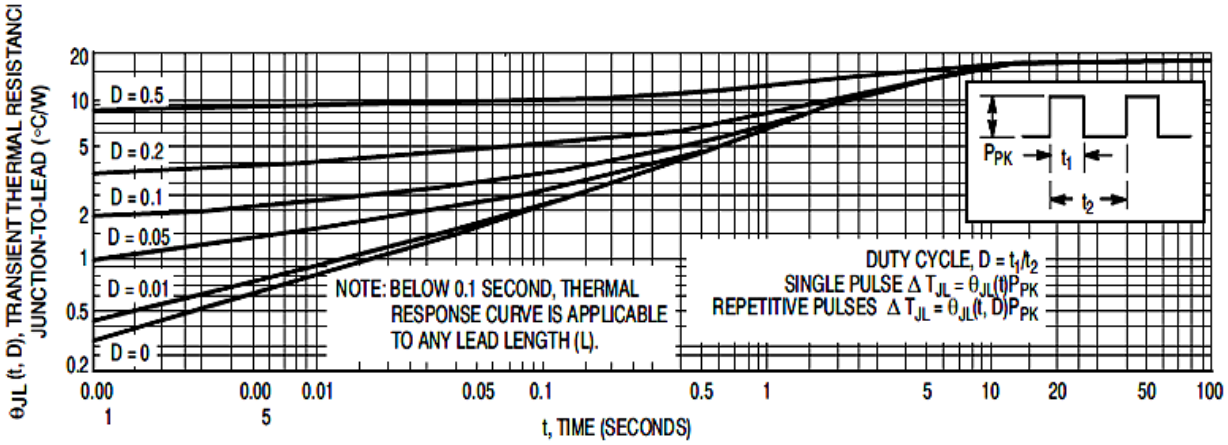


Fig 7: Maximum Non-Repetitive Surge Current versus Nominal Zener Voltage

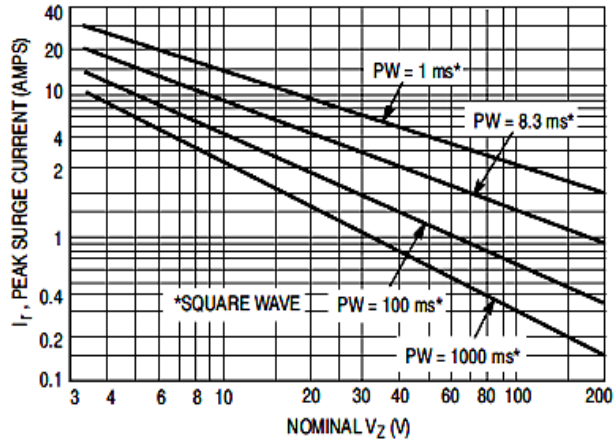


Fig 9: Peak Surge Current versus Pulse Width

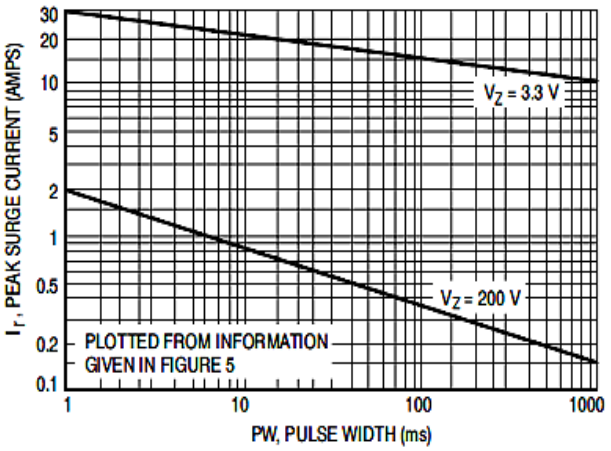


Fig 10: Zener Voltage versus Zener Current
V_Z = 3.3 thru 10 Volts

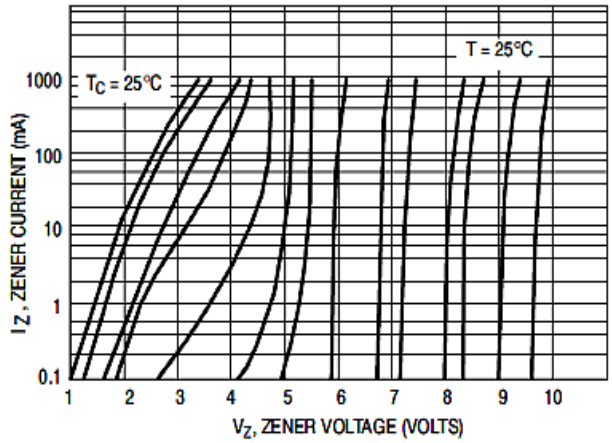


Fig 11: Zener Voltage versus Zener Current
V_Z = 82 thru 200 Volts

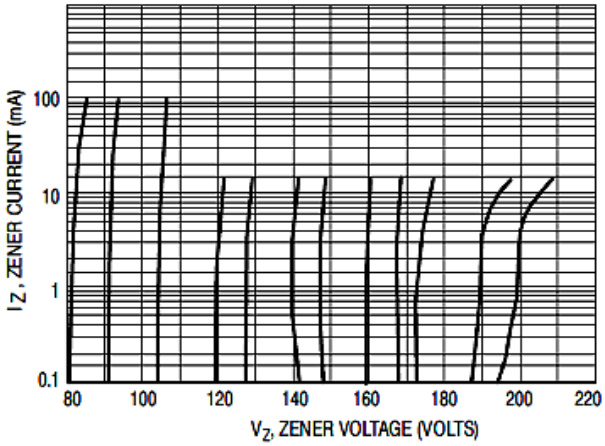
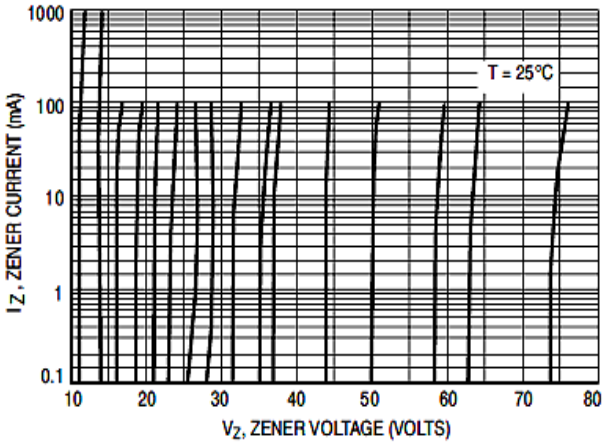
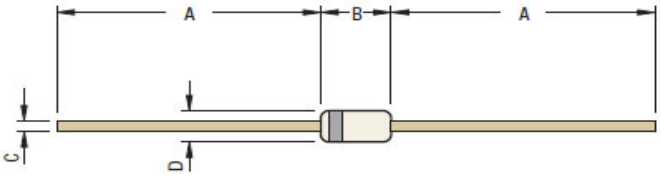


Fig 12 : Zener Voltage versus Zener Current
V_Z = 11 thru 75 Volts



PACKAGE DETAILS

DO-15 Axial Plastic Package



DIM	Millimeters		Inches	
	Min	Max	Min	Max
A	25.4	--	1.000	--
B	5.80	7.60	0.230	0.300
C	0.70	0.90	0.028	0.034
D	2.60	3.60	0.104	0.140

Recommended Product Storage Environment for Discrete Semiconductor Devices

This storage environment assumes that the Diodes and transistors are packed properly inside the original packing supplied by CDIL.

- Temperature 5 °C to 30 °C
- Humidity between 40 to 70 %RH
- Air should be clean.
- Avoid harmful gas or dust.
- Avoid outdoor exposure or storage in areas subject to rain or water spraying .
- Avoid storage in areas subject to corrosive gas or dust. Product shall not be stored in areas exposed to direct sunlight.
- Avoid rapid change of temperature.
- Avoid condensation.
- Mechanical stress such as vibration and impact shall be avoided.
- The product shall not be placed directly on the floor.
- The product shall be stored on a plane area. They should not be turned upside down. They should not be placed against the wall.

Shelf Life of CDIL Products

The shelf life of products is the period from product manufacture to shipment to customers. The product can be unconditionally shipped within this period. The period is defined as 2 years.
If products are stored longer than the shelf life of 2 years the products shall be subjected to quality check as per CDIL quality procedure.
The products are further warranted for another one year after the date of shipment subject to the above conditions in CDIL original packing.

Floor Life of CDIL Products and MSL Level

When the products are opened from the original packing, the floor life will start.
For this, the following JEDEC table may be referred:

JEDEC MSL Level		
Level	**Time**	**Condition**
1	Unlimited	≤30 °C / 85% RH
2	1 Year	≤30 °C / 60% RH
2a	4 Weeks	≤30 °C / 60% RH
3	168 Hours	≤30 °C / 60% RH
4	72 Hours	≤30 °C / 60% RH
5	48 Hours	≤30 °C / 60% RH
5a	24 Hours	≤30 °C / 60% RH
6	Time on Label(TOL)	≤30 °C / 60% RH

Customer Notes

Component Disposal Instructions

1. CDIL Semiconductor Devices are RoHS compliant, customers are requested to please dispose as per prevailing Environmental Legislation of their Country.
2. In Europe, please dispose as per EU Directive 2002/96/EC on Waste Electrical and Electronic Equipment (WEEE).

Disclaimer

The product information and the selection guides facilitate selection of the CDIL's Semiconductor Device(s) best suited for application in your product(s) as per your requirement. It is commended that you completely review our Data Sheet(s) so as to confirm that the Device(s) meet functionality parameters for your application. The information furnished in the Data Sheet and on the CDIL Web Site/CD are believed to be accurate and reliable. CDIL however, does not assume responsibility for inaccuracies or incomplete information. Furthermore, CDIL does not assume liability whatsoever, arising out of the application or use of any CDIL product; neither does it convey any license under its patent rights nor rights of others. These products are not designed for use in life saving/support appliances or systems. CDIL customers selling these products (either as individual Semiconductor Devices or incorporated in their end products), in any life saving/support appliances or systems or applications do so at their own risk and CDIL will not be responsible for any damages resulting from such sale(s).
CDIL strives for continuous improvement and reserves the right to change the specifications of its products without prior notice.

Continental Device India Pvt. Limited
C-120 Naraina Industrial Area, New Delhi 110 028, India.
Telephone +91-11-2579 6150, 4141 1112 Fax +91-11-2579 5290, 4141 1119
email@cdil.com www.cdil.com
CIN No. U32109DL1964PTC004291

1N53XX
Rev04_16052023E