

5 Watt Surmetic 40 Zener Voltage Regulators

1N53 Series

This is a complete series of 5 Watt Zener diodes with tight limits and better operating characteristics that reflect the superior capabilities of silicon oxide passivated junctions. All this in an axial lead, transfermolded plastic package that offers protection in all common environmental conditions.

Features

- € Zener Voltage Range 3.3 V to 200 V
- € ESD Rating of Class 3 (>16 kV) per Human Body Model
- € Surge Rating of up to 180 W @ 8.3 ms
- € Maximum Limits Guaranteed on up to Six Electrical Parameters
- € Pb iFree Packages available*

Mechanical Characteristics

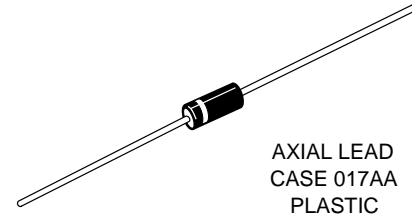
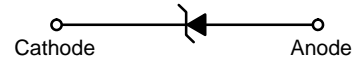
- CASE: Void free, transfermolded, thermosetting plastic
- FINISH: All external surfaces are corrosion resistant and leads are readily solderable
- MAXIMUM LEAD TEMPERATURE FOR SOLDERING PURPOSES: 260°C, 1/16 in. from the case for 10 seconds
- POLARITY: Cathode indicated by polarity band
- MOUNTING POSITION: Any

MAXIMUM RATINGS

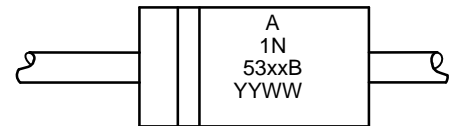
Rating	Symbol	Value	Unit
Max. Steady State Power Dissipation @ T _L = 25°C, Lead Length = 3/8 in Derate above 25°C	P _D	5	W
Junction to iLead Thermal Resistance	J _L	40	mW/°C
Operating and Storage Temperature Range	T _J , T _{stg}	i65 to +200 (Note 1)	°C

Stresses exceeding those listed in the Maximum Ratings table may damage the device. If any of these limits are exceeded, device functionality should not be assumed, damage may occur and reliability may be affected.

1. Max operating temperature for DC conditions is 150°C, but not to exceed 200°C for pulsed conditions with low duty cycle or non i repetitive.



MARKING DIAGRAM



- A = Assembly Location
 - 1N53xxB = Device Number (Refer to Tables on Pages 3 & 4)
 - YY = Year
 - WW = Work Week
 - = Pb iFree Package
- (Note: Microdot may be in either location)

ORDERING INFORMATION

Device	Package	Shipping †
1N53xxB, G	Axial Lead (Pb iFree)	1000 Units/Box
1N53xxBRL, G	Axial Lead (Pb iFree)	4000/Tape & Reel

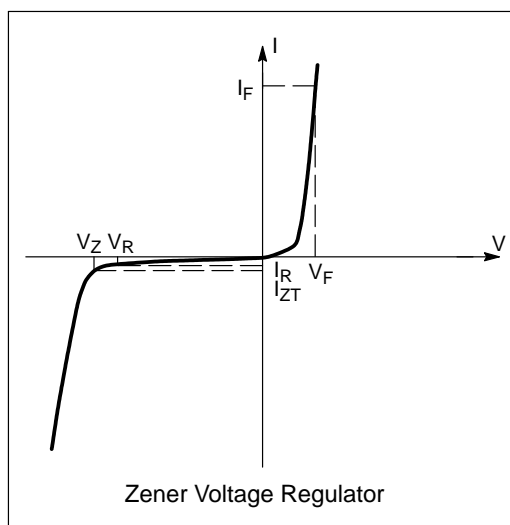
†For information on tape and reel specifications, including part orientation and tape sizes, please refer to our Tape and Reel Packaging Specifications Brochure, BRD8011/D.

*For additional information on our Pb iFree strategy and soldering details, please download the onsemi Soldering and Mounting Techniques Reference Manual, SOLDERRM/D.

1N53 Series

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 1.2\text{ V Max}$ @ $I_F = 1.0\text{ A}$ for all types)

Symbol	Parameter
V_Z	Reverse Zener Voltage @ I_{ZT}
I_{ZT}	Reverse Current
Z_{ZT}	Maximum Zener Impedance @ I_{ZT}
I_{ZK}	Reverse Current
Z_{ZK}	Maximum Zener Impedance @ I_{ZK}
I_R	Reverse Leakage Current @ V_R
V_R	Breakdown Voltage
I_F	Forward Current
V_F	Forward Voltage @ I_F
I_R	Maximum Surge Current @ $T_A = 25^\circ\text{C}$
V_Z	Reverse Zener Voltage Change
I_{ZM}	Maximum DC Zener Current



ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 1.2\text{ V Max}$ @ $I_F = 1.0\text{ A}$ for all types)

Device † (Note 2)	Device Marking	Zener Voltage (Note 3)				Zener Impedance (Note 3)			Leakage Current		I_R (Note 4)	V_Z (Note 5)	I_{ZM} (Note 6)
		V_Z (Volts)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R @ V_R				
		Min	Nom	Max	mA			mA	A Max	Volts			
1N5333B	1N5333B	3.14	3.3	3.47	380	3	400	1	300	1	20	0.85	1440
1N5334B	1N5334B	3.42	3.6	3.78	350	2.5	500	1	150	1	18.7	0.8	1320
1N5335B	1N5335B	3.71	3.9	4.10	320	2	500	1	50	1	17.6	0.54	1220
1N5336B	1N5336B	4.09	4.3	4.52	290	2	500	1	10	1	16.4	0.49	1100
1N5337B	1N5337B	4.47	4.7	4.94	260	2	450	1	5	1	15.3	0.44	1010
1N5338B	1N5338B	4.85	5.1	5.36	240	1.5	400	1	1	1	14.4	0.39	930
1N5339B	1N5339B	5.32	5.6	5.88	220	1	400	1	1	2	13.4	0.25	865
1N5340B	1N5340B	5.70	6.0	6.30	200	1	300	1	1	3	12.7	0.19	790
1N5341B	1N5341B	5.89	6.2	6.51	200	1	200	1	1	3	12.4	0.1	765
1N5342B	1N5342B	6.46	6.8	7.14	175	1	200	1	10	5.2	11.5	0.15	700
1N5343B	1N5343B	7.13	7.5	7.88	175	1.5	200	1	10	5.7	10.7	0.15	630
1N5344B	1N5344B	7.79	8.2	8.61	150	1.5	200	1	10	6.2	10	0.2	580
1N5345B	1N5345B	8.27	8.7	9.14	150	2	200	1	10	6.6	9.5	0.2	545
1N5346B	1N5346B	8.65	9.1	9.56	150	2	150	1	7.5	6.9	9.2	0.22	520
1N5347B	1N5347B	9.50	10	10.5	125	2	125	1	5	7.6	8.6	0.22	475

Devices listed in bold, italic are onsemi Preferred devices. Preferred devices are recommended choices for future use and best overall value.

2. TOLERANCE AND TYPE NUMBER DESIGNATION: The JEDEC type numbers shown indicate a tolerance of $\pm 5\%$.

3. ZENER VOLTAGE (V_Z) and IMPEDANCE (I_{ZT} and I_{ZK}): Test conditions for zener voltage and impedance are as follows: I_Z is applied $40 \pm 10\text{ ms}$ prior to reading. Mounting contacts are located $3/8$ to $1/2$ from the inside edge of mounting clips to the body of the diode ($T_A = 25^\circ\text{C} + 8^\circ\text{C}$, $i^2t^\circ\text{C}$).

4. SURGE CURRENT (I_R): Surge current is specified as the maximum allowable peak, non recurrent square wave current with a pulse width, PW, of 8.3 ms. The data given in Figure 5 may be used to find the maximum surge current for a square wave of any pulse width between 1 ms and 1000 ms by plotting the applicable points on logarithmic paper. Examples of this, using the 3.3 V and 200 V zener are shown in Figure 6. Mounting contact located as specified in Note 2 ($T_A = 25^\circ\text{C} + 8^\circ\text{C}$, $i^2t^\circ\text{C}$).

5. VOLTAGE REGULATION (V_Z): The conditions for voltage regulation are as follows: V_Z measurements are made at 10% and then at 50% of the I_Z max value listed in the electrical characteristics table. The test current time duration for each V_Z measurement is $40 \pm 10\text{ ms}$. Mounting contact located as specified in Note 2 ($T_A = 25^\circ\text{C} + 8^\circ\text{C}$, $i^2t^\circ\text{C}$).

6. MAXIMUM REGULATOR CURRENT (I_{ZM}): The maximum current shown is based on the maximum voltage of a 5% type unit, therefore, it applies only to the B suffix device. The actual I_{ZM} for any device may not exceed the value of 5 watts divided by the actual V_Z of the device. $T_L = 25^\circ\text{C}$ at $3/8$ maximum from the device body.

†The "G" suffix indicates Pb free package or Pb free packages are available.

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ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$ unless otherwise noted, $V_F = 1.2\text{ V Max @ } I_F = 1.0\text{ A}$ for all types)

Device † (Note 7)	Device Marking	Zener Voltage (Note 8)			Zener Impedance (Note 8)			Leakage Current		I_R (Note 9)	V_Z (Note 10)	I_{ZM} (Note 11)
		V_Z (Volts)			@ I_{ZT}	Z_{ZT} @ I_{ZT}	Z_{ZK} @ I_{ZK}	I_{ZK}	I_R @ V_R			
		Min	Nom	Max	mA			mA	A Max	Volts	A	Volts

