

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, transfer-molded 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-Free Packages are Available*

Mechanical Characteristics

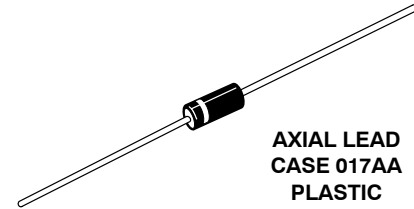
CASE: Void free, transfer-molded, thermosetting plastic

FINISH: All external surfaces are corrosion resistant and leads are readily solderable

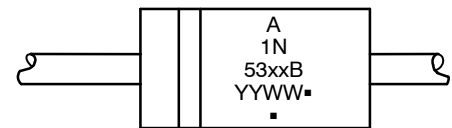
MAXIMUM LEAD TEMPERATURE FOR SOLDERING PURPOSES: 260°C, 1/16 in. from the case for 10 seconds

POLARITY: Cathode indicated by polarity band

MOUNTING POSITION: Any



MARKING DIAGRAM



- A = Assembly Location
 1N53xxB = Device Number
 (Refer to Tables on Pages 3 & 4)
 YY = Year
 WW = Work Week
 ■ = Pb-Free Package

(Note: Microdot may be in either location)

MAXIMUM RATINGS

Rating	Symbol	Value	Unit
Max. Steady State Power Dissipation @ $T_L = 25^\circ\text{C}$, Lead Length = 3/8 in Derate above 25°C	P_D	5	W
Junction-to-Lead Thermal Resistance	θ_{JL}	40	mW/°C
		25	°C/W
Operating and Storage Temperature Range	T_J, T_{stg}	-65 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-repetitive.

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

ORDERING INFORMATION

Device	Package	Shipping†
1N53xxB, G	Axial Lead (Pb-Free)	1000 Units/Box
1N53xxBRL, G	Axial Lead (Pb-Free)	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.

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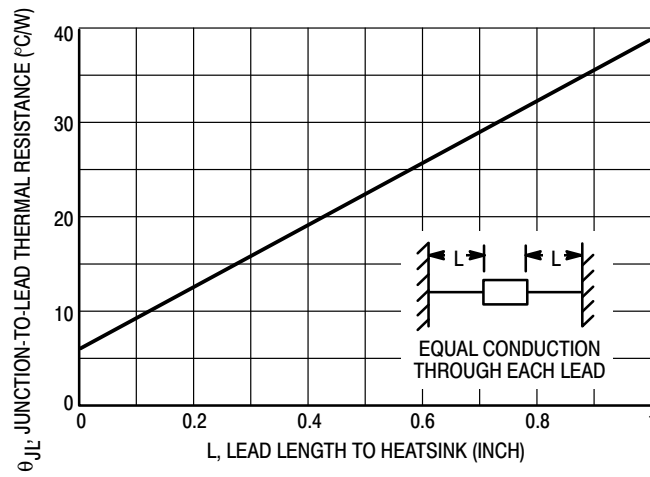


Figure 1. Typical Thermal Resistance

TEMPERATURE COEFFICIENTS

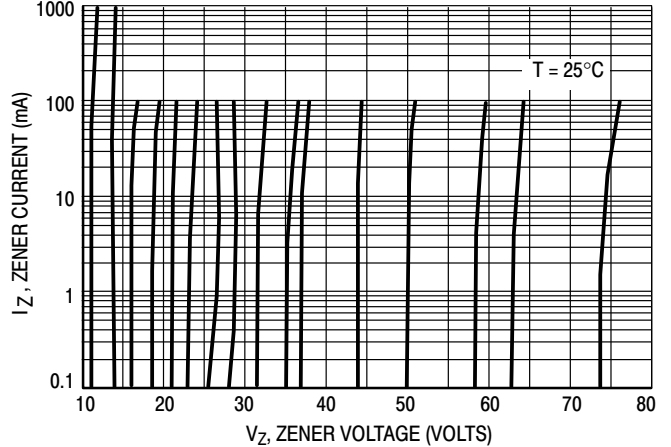
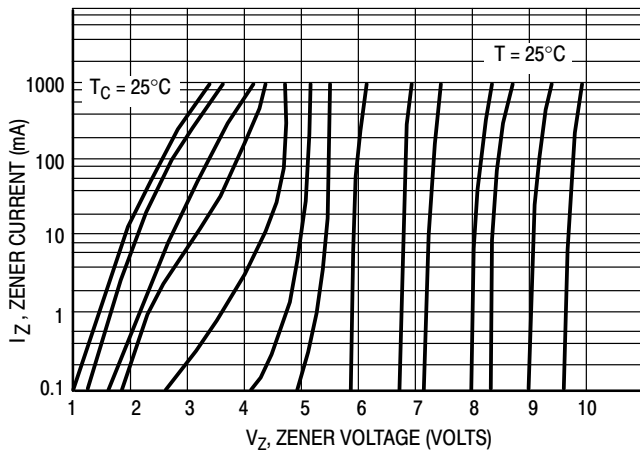
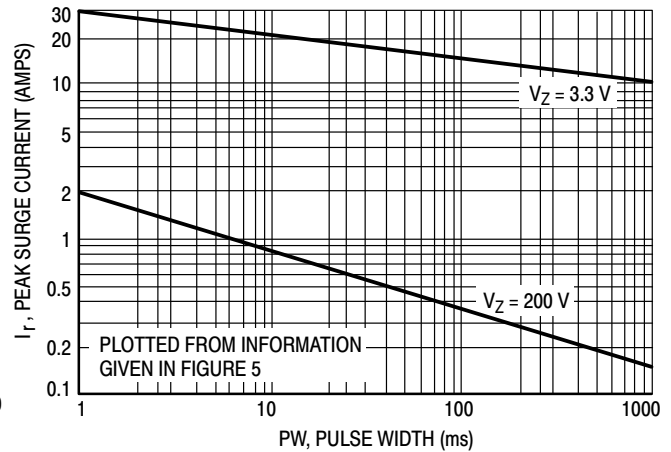
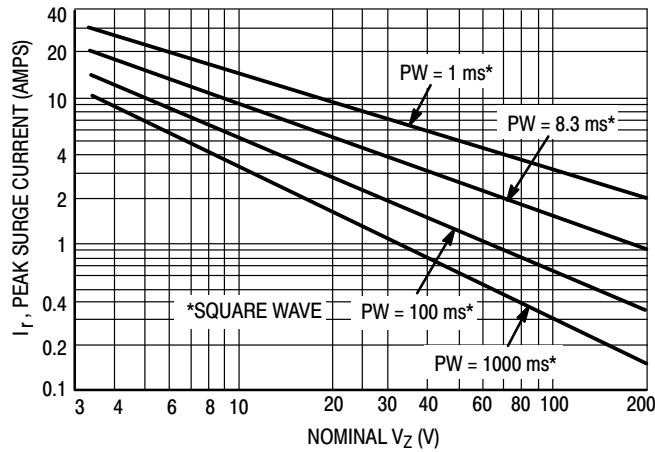


Figure 2. Temperature Coefficient-Range for Units 3 to 10 Volts



Figure 3. Temperature Coefficient-Range for Units 10 to 220 Volts

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Figure 9. Zener Voltage versus Zener Current
 $V_Z = 82$ thru 200 Volts

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:

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

θ_{LA} is the lead-to-ambient thermal resistance and P_D is the power dissipation.

Junction Temperature, T_J , may be found from:

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

ΔT_{JL} is the increase in junction temperature above the lead temperature and may be found from Figure 4 for a train of power pulses or from Figure 1 for dc power.

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

SURMETIC 40, AXIAL LEAD
CASE 017AA
ISSUE O

DATE 23 SEP 2005



SCALE 1:1



NOTES:

1. CONTROLLING DIMENSION: INCH
2. LEAD DIAMETER AND FINISH NOT CONTROLLED WITHIN DIMENSION F.
3. CATHODE BAND INDICATES POLARITY

DIM	INCHES		MILLIMETERS	
	MIN	MAX	MIN	MAX
A	0.330	0.350	8.38	8.89
B	0.130	0.145	3.30	3.68
D	0.037	0.043	0.94	1.09
F	---	0.050	---	1.27
K	1.000	1.250	25.40	31.75

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