



# Zener diode

## Features

- 1. High reliability
- 2. Very sharp reverse characteristic
- 3. Zener voltage 2.4V to 47V
- 4.  $V_Z$ -tolerance  $\pm 5\%$

## Applications

Voltage stabilization



## Absolute Maximum Ratings

$T_j=25^\circ\text{C}$

Parameter	Test Conditions	Type	Symbol	Value	Unit
Power dissipation	$T_{amb} \leq 75^\circ\text{C}$		$P_V$	500	mW
Z-current			$I_Z$	$P_V/V_Z$	mA
Junction temperature			$T_j$	200	$^\circ\text{C}$
Storage temperature range			$T_{stg}$	-65~+200	$^\circ\text{C}$

## Maximum Thermal Resistance

$T_j=25^\circ\text{C}$

Parameter	Test Conditions	Symbol	Value	Unit
Junction ambient	$l=9.5\text{mm}(3/8")$ $T_L=\text{constant}$	$R_{thJA}$	300	K/W

Stresses exceeding maximum ratings may damage the device. Maximum ratings are stress ratings only. Functional operation above the recommended operating conditions is not implied. Extended exposure to stresses above the recommended operating conditions may affect device reliability.

## Electrical Characteristics

$T_j=25^\circ\text{C}$

Parameter	Test Conditions	Type	Symbol	Min	Typ	Max	Unit
Forward voltage	$I_F=100\text{mA}$		$V_F$			1.5	V



Type <sup>1)</sup>	V <sub>Znom</sub>	I <sub>ZT</sub>	for V <sub>ZT</sub> and	Z <sub>ZT</sub>	Z <sub>ZK</sub> at	I <sub>ZK</sub>	I <sub>R</sub> at	V <sub>R</sub>	I <sub>ZM</sub> <sup>2)</sup>
	V	mA	V <sup>1)</sup>	Ω	Ω	mA	μ A	V	mA
1N5985B	2.4	5	2.28~2.52	100	1800	0.25	100	1.0	208
1N5987B	3.0	5	2.85~3.15	95	2000	0.25	50	1.0	167
1N5988B	3.3	5	3.13~3.46	95	2200	0.25	25	1.0	152
1N5989B	3.6	5	3.42~3.78	90	2300	0.25	15	1.0	139
1N5990B	3.9	5	3.7~4.09	90	2400	0.25	10	1.0	128
1N5991B	4.3	5	4.08~4.51	88	2500	0.25	5	1.0	116
1N5992B	4.7	5	4.46~4.93	70	2200	0.25	3	1.5	106
1N5993B	5.1	5	4.84~5.35	50	2050	0.25	2	2.0	98
1N5994B	5.6	5	5.32~5.88	25	1800	0.25	2	3.0	89
1N5995B	6.2	5	5.89~6.51	10	1300	0.25	1	4.0	81
1N5996B	6.8	5	6.46~7.14	8.0	750	0.25	1	5.2	74
1N5997B	7.5	5	7.12~7.87	7.0	600	0.25	0.5	6.0	67
1N5998B	8.2	5	7.79~8.61	7.0	600	0.25	0.5	6.5	61
1N5999B	9.1	5	8.64~9.55	10	600	0.25	0.1	7.0	55
1N6000B	10	5	9.5~10.5	15	600	0.25	0.1	8.0	50
1N6001B	11	5	10.45~11.55	18	600	0.25	0.1	8.4	45
1N6002B	12	5	11.4~12.6	22	600	0.25	0.1	9.1	42
1N6003B	13	5	12.35~13.65	25	600	0.25	0.1	9.9	38
1N6004B	15	5	14.25~15.75	32	600	0.25	0.1	11	33
1N6005B	16	5	15.2~16.8	36	600	0.25	0.1	12	31
1N6006B	18	5	17.1~18.9	42	600	0.25	0.1	14	28
1N6007B	20	5	19~21	48	600	0.25	0.1	15	25
1N6008B	22	5	20.9~23.1	55	600	0.25	0.1	17	23
1N6009B	24	5	22.8~25.2	62	600	0.25	0.1	18	21
1N6010B	27	5	25.65~28.35	70	600	0.25	0.1	21	19
1N6011B	30	5	28.5~31.5	78	600	0.25	0.1	23	17
1N6012B	33	5	31.35~34.65	88	700	0.25	0.1	25	15
1N6013B	36	5	34.2~37.8	95	700	0.25	0.1	27	14
1N6014B	39	2	37.05~40.95	130	800	0.25	0.1	30	13
1N6015B	43	2	40.85~45.15	150	900	0.25	0.1	33	12
1N6016B	47	2	44.65~49.35	170	1000	0.25	0.1	36	11

**1) Tolerance and voltage designation(Vz):**

Tolerance designation – Device tolerance of  $\pm 5\%$  is indicated by a “B” suffix.

**2) Maximum zener current ratings(I<sub>ZM</sub>):**

This data was calculated using nominal voltages. The maximum current handling capability on a worst case basis is limited by the actual zener voltage at the operation point and the power derating curve.



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

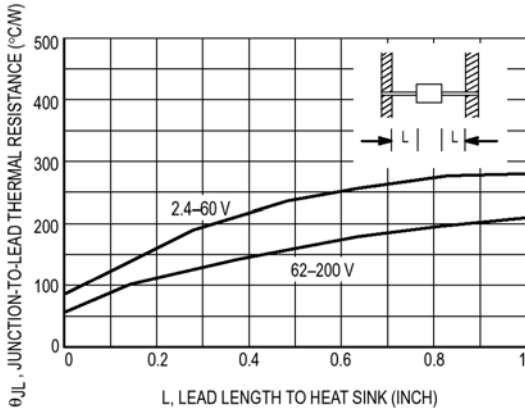


Figure 1. Typical Thermal Resistance

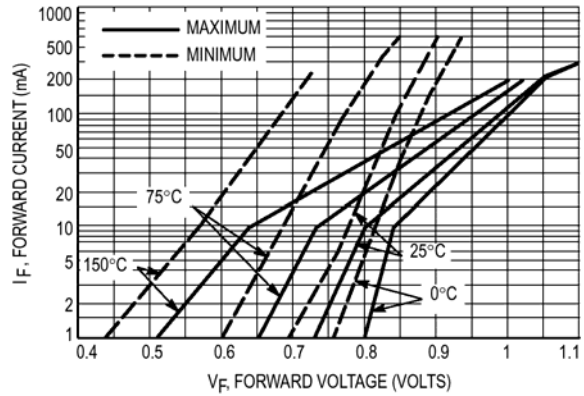


Figure 2. Typical Forward Characteristics

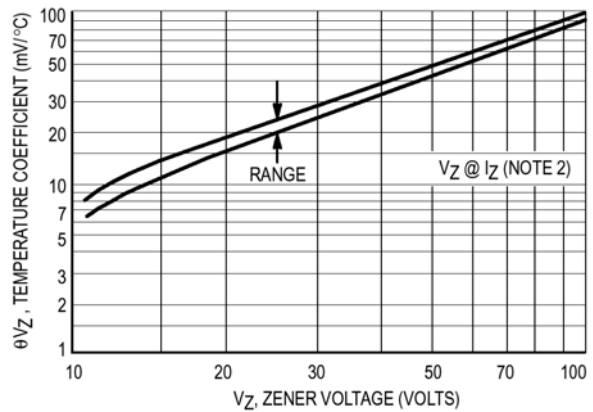
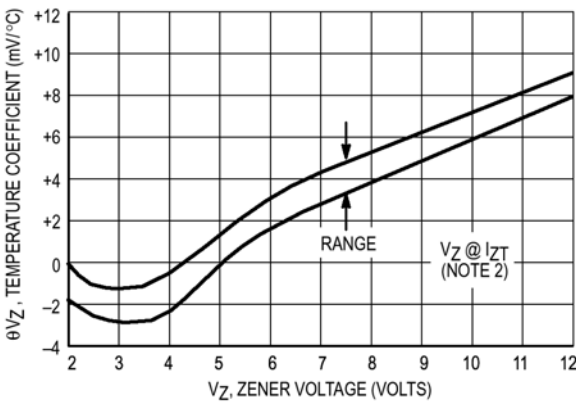


Figure 3. Temperature coefficients

( $-55^\circ\text{C}$  to  $+150^\circ\text{C}$  temperature range; 90% of the units are in the ranges indicated.)

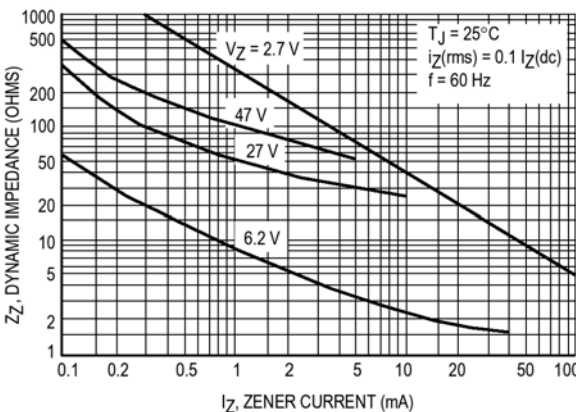


Figure 4. Effect of zener current on zener impedance

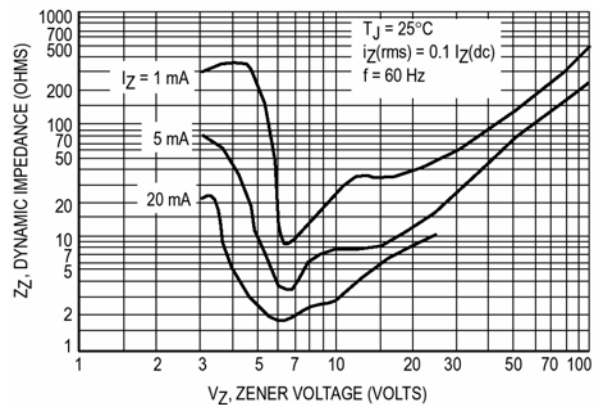


Figure 5. Effect of zener voltage on zener impedance

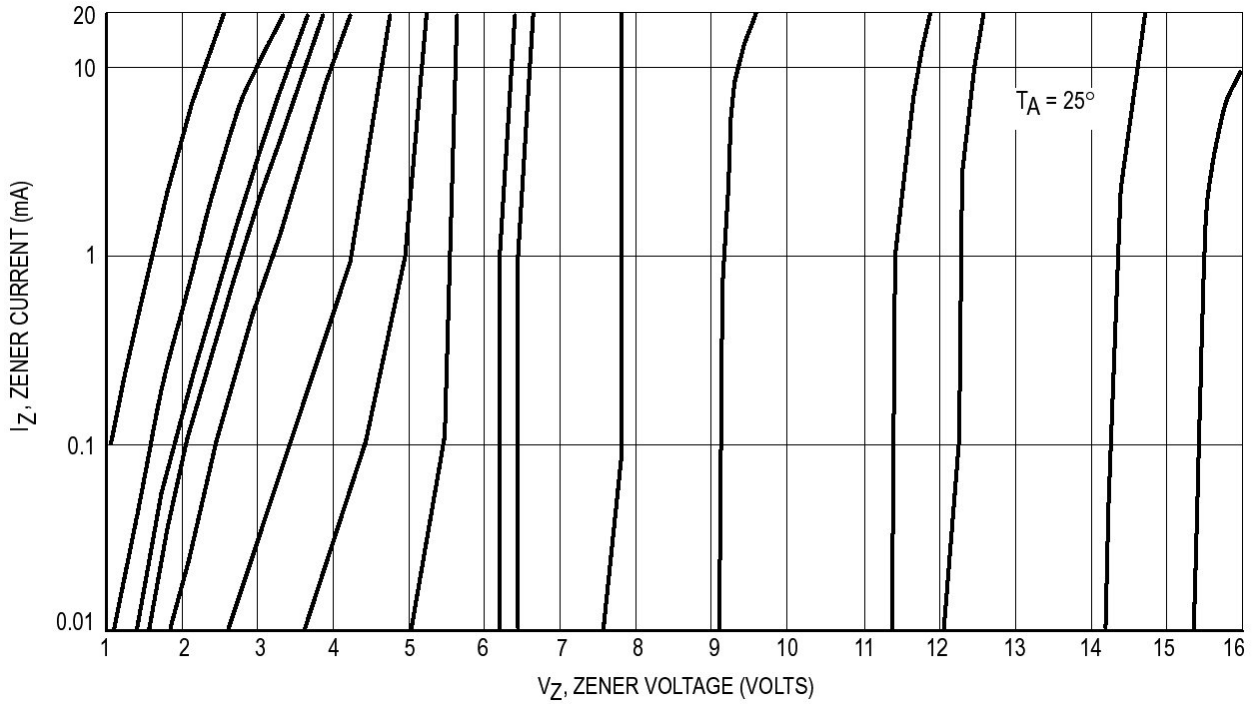


Figure 6. Zener Voltage versus Zener Current –  $V_Z=1$  thru 16 Volts

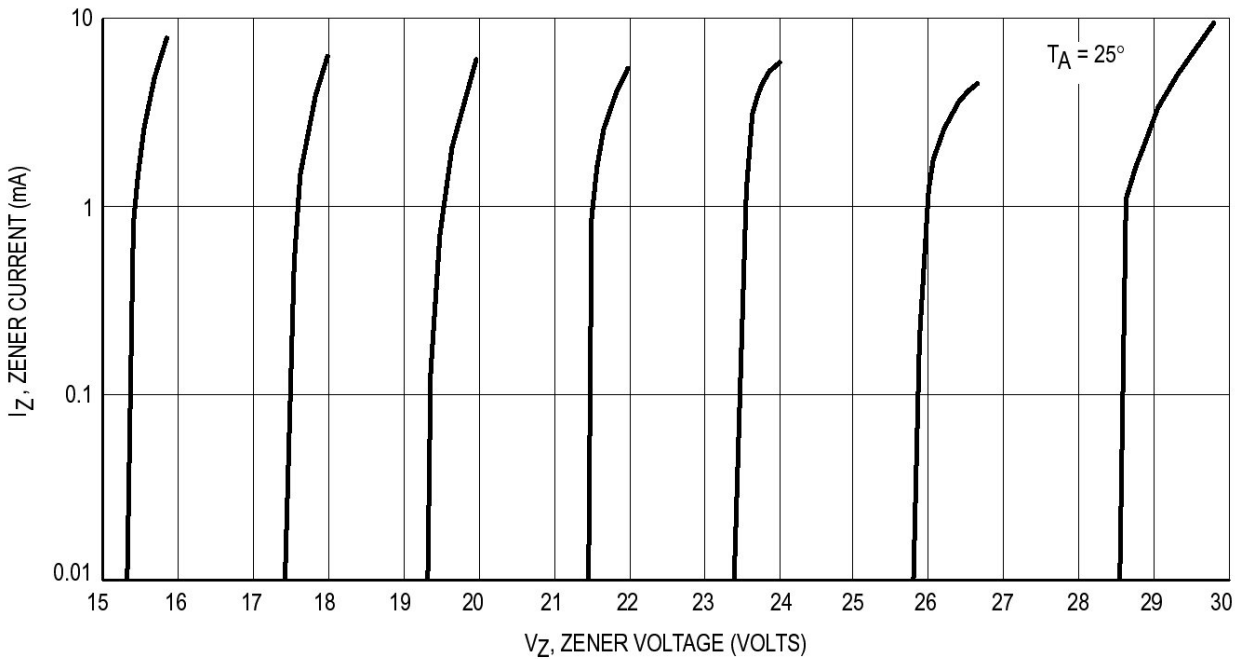


Figure 7. Zener Voltage versus Zener Current –  $V_Z=15$  thru 30 Volts

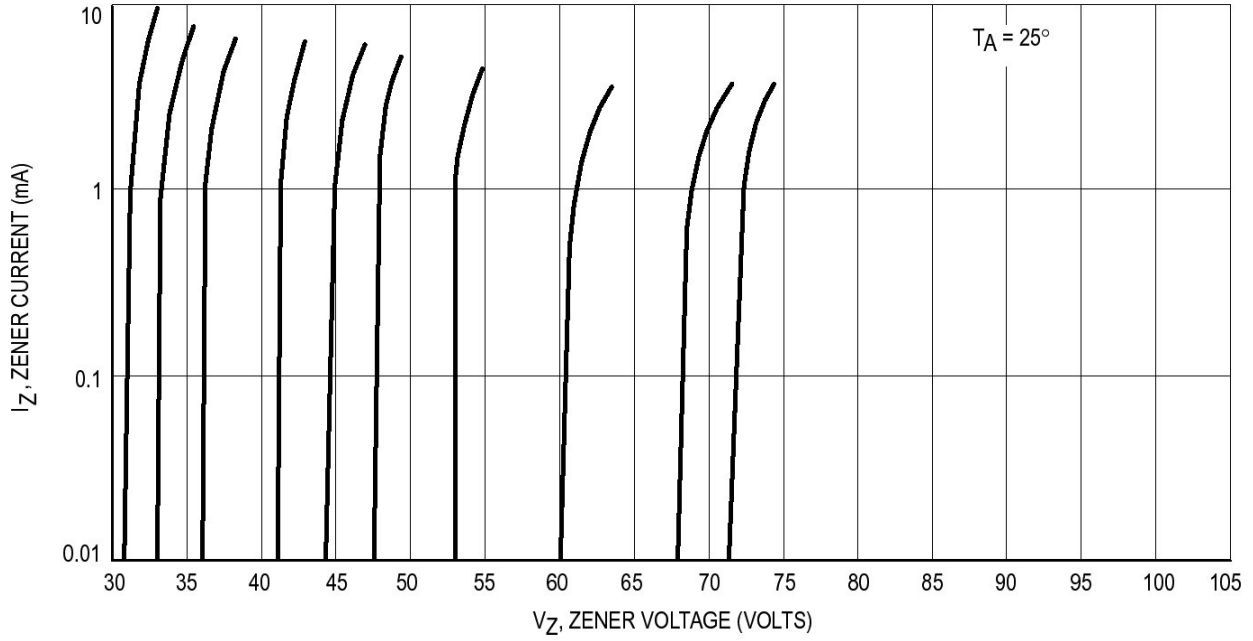
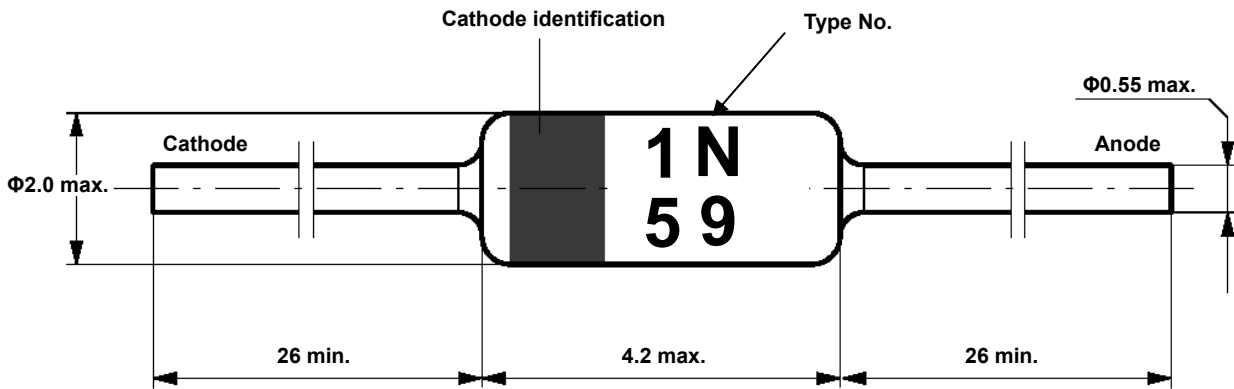


Figure 8. Zener Voltage versus Zener Current –  $V_Z=30$  thru 75 Volts



### Dimensions in mm



Standard Glass Case  
JEDEC DO-35

### Marking

