1N2163 thru 1N2171 (SILICON)

1N2163A thru 1N2171A

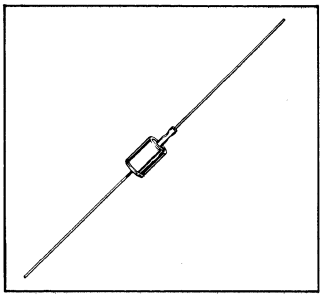
1N3580, A, B thru 1N3583, A, B

TEMPERATURE-COMPENSATED ZENER REFERENCE DIODES

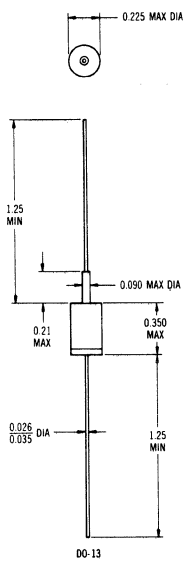
Highly reliable reference sources utilizing an oxide-passivated junction for long-term voltage stability. Construction consists of welded hermetically sealed metal and glass case.

- Low Dynamic Impedance
- Choice of Three Temperature Ranges
- "Box Method" Specifications Guarantee Maximum Voltage Deviation.

TEMPERATURE-COMPENSATED SILICON ZENER REFERENCE DIODES



Temperature compensated reference diodes are made by taking advantage of the differing thermal characteristics of forward and reverse biased silicon PN junctions. A forward biased junction has a negative temperature coefficient of approximately 2.0 millivolts/°C. Reverse biased junctions above 5.0 volts have a positive temperature coefficient and therefore it is possible by judicious selection of combinations of forward and reverse biased junctions to obtain a device that shows a very low temperature coefficient due to cancellation. Because of the differing impedance versus temperature characteristics of the junctions involved, optimum temperature stability is obtained by operating in the zener current range at which the temperature coefficient is a minimum.



CASE 52
(DO-13)

MAXIMUM RATINGS

Junction Temperature: -55 to +200°C

Storage Temperature: -65 to +200°C

DC Power Dissipation: 750 mW @ T_A = 25°C

MECHANICAL CHARACTERISTICS

CASE: Hermetically sealed, welded metal glass

DIMENSIONS: See outline drawing.

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

POLARITY: Cathode to case

WEIGHT: 1.5 Grams (approx)

MOUNTING POSITION: Any

1N2163 thru 1N2171, 1N2163A thru 1N2171A, 1N3580, A, B thru 1N3583, A, B (continued)

ELECTRICAL CHARACTERISTICS

V_Z = 9.4 Volts ± 0.4 V (± 0.2 V Suffix "A") @ (I_{ZT} = 10 mA)				
Type Number	Max Voltage Change (Note 1) ΔV_Z (Volts)	Test Temperatures °C	Temperature Coefficient (Note 1) %/°C	Max Dynamic Impedance (Note 2) Z_{ZT} (Ohms)
1N2163,A	0.033	0, +25, +70	0.005	15
1N2164,A	0.086	-55, 0, +25, +75, +125	0.005	
1N2165,A	0.115	-55, 0, +25, +75, +125, +185	0.005	
1N2166,A	0.007	0, +25, +70	0.001	15
1N2167,A	0.017	-55, 0, +25, +75, +125	0.001	
1N2168,A	0.023	-55, 0, +25, +75, +125, +185	0.001	
1N2169,A	0.004	0, +25, +70	0.0005	15
1N2170,A	0.009	-55, 0, +25, +75, +125	0.0005	
1N2171,A	0.012	-55, 0, +25, +75, +125, +185	0.0005	

NOTE 1:

Voltage Variation (ΔV_Z) and Temperature Coefficient.

All reference diodes are characterized by the "box method". This guarantees a maximum voltage variation (ΔV_Z) over the specified temperature range, at the specified test current (I_{ZT}), verified by tests at indicated temperature points within the range. V_Z is measured and recorded at each temperature specified. The ΔV_Z between the highest and lowest values must not exceed the maximum ΔV_Z given.

This method of indicating voltage stability is now used for JEDEC registration as well as for military qualification. The former method of indicating voltage stability — by means of temperature coefficient — accurately reflects the voltage deviation at the temperature extremes, but is not necessarily accurate within the temperature range because reference diodes have a nonlinear temperature relationship. The temperature coefficient, therefore, is given only as a reference.

ELECTRICAL CHARACTERISTICS

V_Z = 11.7 Volts ± 5.0% (I_{ZT} = 7.5 mA)				
Type Number	Max Voltage Change (Note 1) ΔV_Z (Volts)	Test Temperatures °C	Temperature Coefficient (Note 1) %/°C	Max Dynamic Impedance (Note 2) Z_{ZT} (Ohms)
1N3580	0.088	0, +25, +75	0.01	25
1N3581	0.044		0.005	
1N3582	0.018		0.002	
1N3583	0.009		0.001	
1N3580A	0.181	-55, 0, +25, +75, +100	0.01	25
1N3581A	0.090		0.005	
1N3582A	0.036		0.002	
1N3583A	0.018		0.001	
1N3580B	0.239	-55, 0, +25 +75, +100, +150	0.01	25
1N3581B	0.120		0.005	
1N3582B	0.048		0.002	
1N3583B	0.024		0.001	

NOTE 2:

The dynamic zener impedance, Z_{ZT}, is derived from the 60-Hz ac voltage drop which results when an ac current with an rms value equal to 10% of the dc zener current, I_{ZT}, is superimposed on I_{ZT}. A cathode-ray tube curve-trace test on a sample basis is used to ensure that the zener has a sharp and stable knee region.

1N2382 thru 1N2385

For Specifications, See 1N1730 Data.

1N2498 thru 1N2500

CASE 56
(DO-4)

Recommended for applications requiring an exact replacement only. For new designs and for industry preferred replacement devices, see 1N2970 series.

1N2609 thru 1N2617

Obsolete, discontinued types, replace with devices from the 1N4001 series.