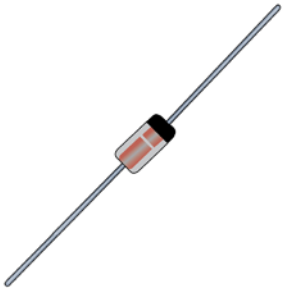
RoHS Available

12.8 Volt LOW NOISE TEMPERATURE COMPENSATED ZENER REFERENCE DIODES

DESCRIPTION

The 1N4896(A) through 1N4915(A) series provides a selection of temperature compensated 12.8 V (nominal) Zener diodes. The voltage tolerace is +/- 5% and the "A" version of the parts in this series have an expanded low temperature range down to -55 °C. Microsemi also offers numerous other Zener reference diode products for a variety of other voltages.

Important: For the latest information, visit our website http://www.microsemi.com.



DO-35 (DO-204AH) Package

FEATURES

- JEDEC registered 1N4896 thru 1N4915 series.
- 12.8 volt nominal Zener voltage +/- 5%.
- Temperature Coefficient range: 0.01 %/°C to 0.001%/°C.
- Metallurgically bonded.
- Double plug construction.
- RoHS compliant versions available.

APPLICATIONS / BENEFITS

- Provides minimal voltage changes over a broad temperature range.
- For instrumentation and other circuit designs requiring a stable voltage reference.
- Low noise.
- Flexible axial-lead mounting terminals.
- Non-sensitive to ESD per MIL-STD-750 method 1020.

MAXIMUM RATINGS

Parameters/Test Conditions	Symbol	Value	Unit
Junction and Storage Temperature	T_J and T_{STG}	-65 to +175	°C
Thermal Resistance, Junction to Lead @ 0.375 inches from body	$R_{\Theta JL}$	300	ºC/W
Off-State Power Dissipation @ T_A = +50 °C (1)	P_D	500	mW
Maximum Reverse Current @ 25 ºC and V_R = 8 V	I_{RM}	15	µA
Solder Temperature @ 10 s	T_{SP}	260	°C

Notes: 1. Derate at 4 mW/°C above T_A = +50 °C.

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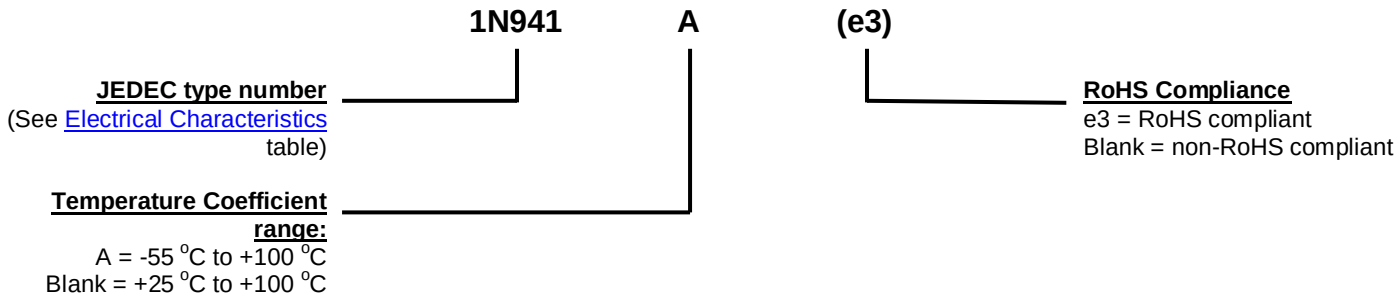
MECHANICAL and PACKAGING

- CASE: Hermetically sealed glass case with axial DO-35 (DO-204AH) package.
- TERMINALS: Tin-lead plated or RoHS compliant matte-tin plating available and solderable per MIL-STD-750, method 2026.
- MARKING: Part number and cathode band.
- POLARITY: Reference diode to be operated with the banded end positive with respect to the opposite end.
- TAPE & REEL option: Standard per EIA-296. Consult factory for quantities. (Add "TR" suffix to part number.)
- WEIGHT: 0.2 grams.
- See Package Dimensions on the last page.

PART NOMENCLATURE



SYMBOLS & DEFINITIONS

Symbol	Definition
I_R	Reverse Current: The maximum reverse (leakage) current that will flow at the specified voltage and temperature.
I_Z, I_{ZT}, I_{ZK}	Regulator Current: The dc regulator current (I_Z), at a specified test point (I_{ZT}), near breakdown knee (I_{ZK}).
I_{ZM}	Maximum Regulator (Zener) Current: The maximum rated dc current for the specified power rating.
V_Z	Zener Voltage: The Zener voltage the device will exhibit at a specified current (I_Z) in its breakdown region.
Z_{ZT} or Z_{ZK}	Dynamic Impedance: The small signal impedance of the diode when biased to operate in its breakdown region at a specified rms current modulation (typically 10% of I_{ZT} or I_{ZK}) and superimposed on I_{ZT} or I_{ZK} respectively.

ELECTRICAL CHARACTERISTICS @ 25 °C unless otherwise specified.

JEDEC TYPE NUMBER	TEST CURRENT I_{ZT} (Note 1 & 5)	MAX. VOLTAGE CHANGE WITH TEMPERATURE ΔV_Z (Note 2 & 5)	TEMPERATURE RANGE	EFFECTIVE TEMPERATURE COEFFICIENT α_{VZ} (Note 3)	MAXIMUM DYNAMIC IMPEDANCE Z_{ZT} (Note 4)	MAXIMUM NOISE DENSITY N_D
	mA	Volts	°C	+/-%/°C	Ohms	uV√cps
1N4896	0.5	0.096	+25 to +100	0.01	400	0.8
1N4896A	0.5	0.198	-55 to +100	0.01	400	0.8
1N4897	0.5	0.048	+25 to +100	0.005	400	0.8
1N4897A	0.5	0.099	-55 to +100	0.005	400	0.8
1N4898	0.5	0.019	+25 to +100	0.002	400	0.8
1N4898A	0.5	0.040	-55 to +100	0.002	400	0.8
1N4899	0.5	0.010	+25 to +100	0.001	400	0.8
1N4899A	0.5	0.020	-55 to +100	0.001	400	0.8
1N4900	1.0	0.096	+25 to +100	0.01	200	0.4
1N4900A	1.0	0.198	-55 to +100	0.01	200	0.4
1N4901	1.0	0.048	+25 to +100	0.005	200	0.4
1N4901A	1.0	0.099	-55 to +100	0.005	200	0.4
1N4902	1.0	0.019	+25 to +100	0.002	200	0.4
1N4902A	1.0	0.040	-55 to +100	0.002	200	0.4
1N4903	1.0	0.010	+25 to +100	0.001	200	0.4
1N4903A	1.0	0.020	-55 to +100	0.001	200	0.4
1N4904	2.0	0.096	+25 to +100	0.01	100	0.25
1N4904A	2.0	0.198	-55 to +100	0.01	100	0.25
1N4905	2.0	0.048	+25 to +100	0.005	100	0.25
1N4905A	2.0	0.099	-55 to +100	0.005	100	0.25
1N4906	2.0	0.019	+25 to +100	0.002	100	0.25
1N4906A	2.0	0.040	-55 to +100	0.002	100	0.25
1N4907	2.0	0.010	+25 to +100	0.001	100	0.25
1N4907A	2.0	0.020	-55 to +100	0.001	100	0.25
1N4908	4.0	0.096	+25 to +100	0.01	50	0.22
1N4908A	4.0	0.198	-55 to +100	0.01	50	0.22
1N4909	4.0	0.048	+25 to +100	0.005	50	0.22
1N4909A	4.0	0.099	-55 to +100	0.005	50	0.22
1N4910	4.0	0.019	+25 to +100	0.002	50	0.22
1N4910A	4.0	0.040	-55 to +100	0.002	50	0.22
1N4911	4.0	0.010	+25 to +100	0.001	50	0.22
1N4911A	4.0	0.020	-55 to +100	0.001	50	0.22
1N4912	7.5	0.096	+25 to +100	0.01	25	0.20
1N4912A	7.5	0.198	-55 to +100	0.01	25	0.20
1N4913	7.5	0.048	+25 to +100	0.005	25	0.20
1N4913A	7.5	0.099	-55 to +100	0.005	25	0.20
1N4914	7.5	0.019	+25 to +100	0.002	25	0.20
1N4914A	7.5	0.040	-55 to +100	0.002	25	0.20
1N4915	7.5	0.010	+25 to +100	0.001	25	0.20
1N4915A	7.5	0.020	-55 to +100	0.001	25	0.20

*JEDEC Registered Data.

NOTES:

1. Nominal voltage for all types is 12.8 Volts +/-5%.
2. Referred to as the “box” measurement method, the ΔV_Z is the maximum voltage variance that will occur as the voltage is scanned thru all temperatures between the temperature range limits.
3. The effective temperature coefficients are tabulated in %/°C primarily for information only since temperature compensated diodes inherently have a non-linear voltage-temperature characteristic.
4. The dynamic Zener impedance Z_{ZT} is derived from the resulting AC voltage developed when a 60 cps, rms AC current equal to 10% of the DC Zener current I_{ZT} is superimposed on I_{ZT}.
5. Voltage measurements to be performed 15 seconds after application of DC current.
6. Consult factory for JANTX, JANTXV or JANS equivalent SCDs.

GRAPHS

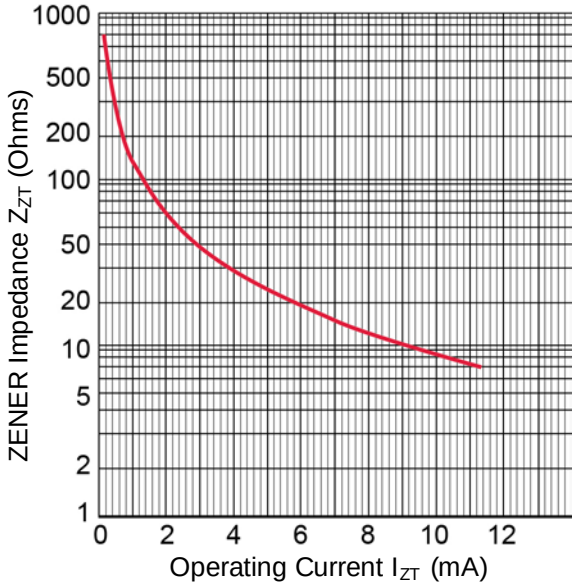


FIGURE 1
Zener Impedance vs. Operating Current
(1N4896 thru 1N4915A)

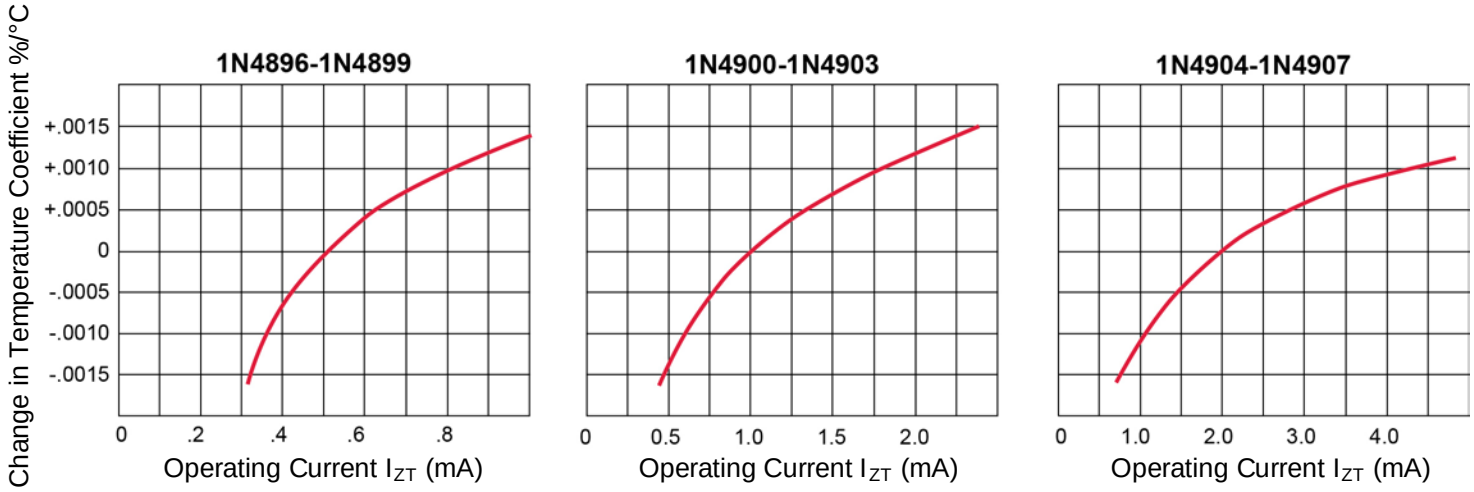


FIGURE 2
Typical Change of Temperature Coefficient with Change in Operating Current

GRAPHS (continued)

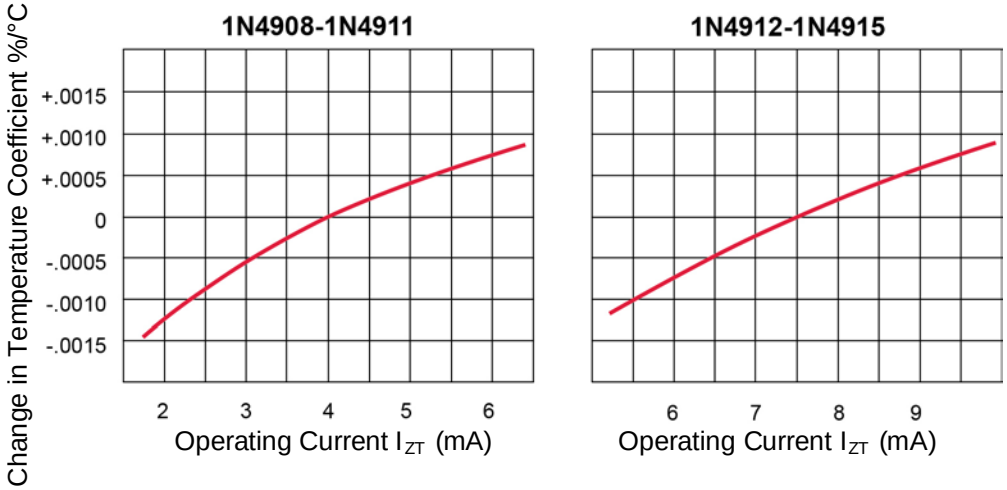
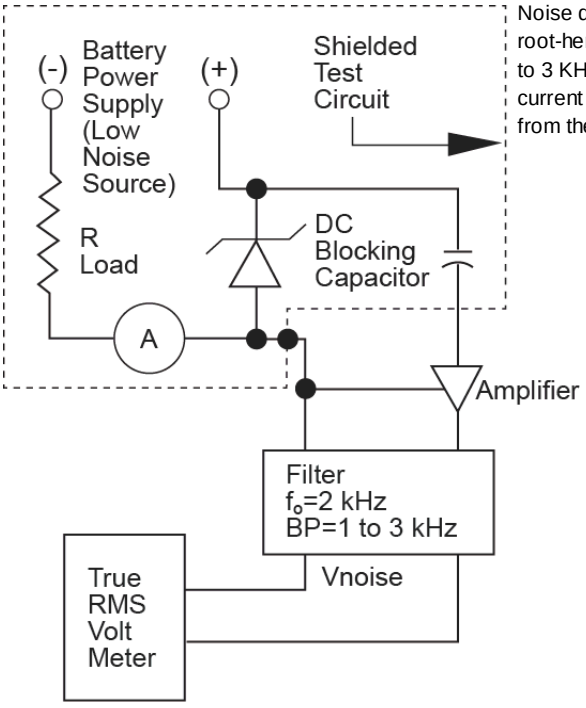


FIGURE 2 (continued)
Typical Change of Temperature Coefficient with Change in Operating Current



Noise density, (N_D) is specified in microvolt-rms per squre-root-hertz. Actual measurement is performed using a 1 KHz to 3 KHz frequency bandpass filter at a constant Zener test current (I_{ZT}) AT 25 °C ambient temperature. N_D is calculated from the formula.

FIGURE 3
Noise Density Measurement Circuit

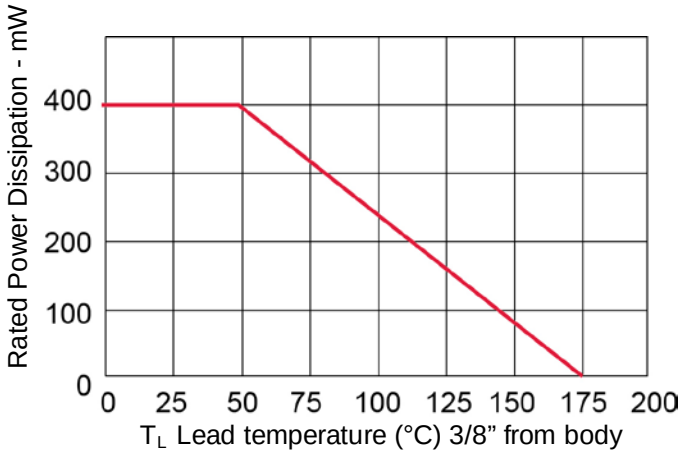
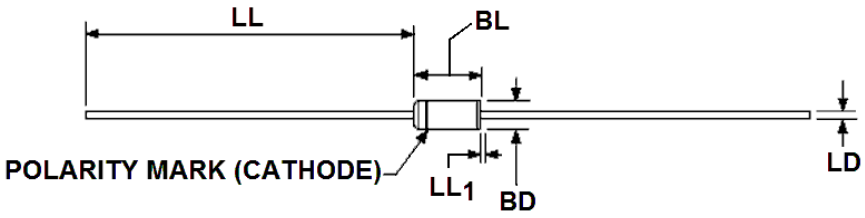


FIGURE 4
Power Derating Curve

PACKAGE DIMENSIONS



Symbol	Dimensions				Notes
	Inch		Millimeters		
	Min	Max	Min	Max	
BD	.060	.107	1.52	2.72	3
BL	.120	.300	3.05	7.62	3
LD	.018	.023	0.46	0.58	
LL	1.000	1.500	25.40	38.10	
LL_1		.050		1.27	4

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. Package contour optional within BD and length BL. Heat slugs, if any, shall be included within this cylinder but shall not be subject to minimum limit of BD.
4. Within this zone, lead diameter may vary to allow for lead finishes and irregularities, other than heat slugs.
5. In accordance with ASME Y14.5M, diameters are equivalent to ΦX symbology.