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# Low Noise Zener Diode Series

1N4099UR-1 thru 1N4135UR-1 &  
1N4614UR-1 thru 1N4627UR-1



## Features

- Available in JAN, JANTX, JANTXV and JANS per MIL-PRF-19500/435
- Tight tolerances available in plus or minus 2% or 1% with C or D suffix respectively.
- 500 mW power handling
- Hermetically sealed MELF DO-213 package.
- Also available in axial-leaded glass DO-35 style package.

## Maximum Ratings

Operating & Storage Temperature: -65 to +175 °C

Thermal Resistance: 250 °C/W

Steady-State Power: 0.5 watts

Forward Voltage @200 MA: 1.1 V

## Electrical Specifications @ +25 °C (Unless Otherwise Specified)

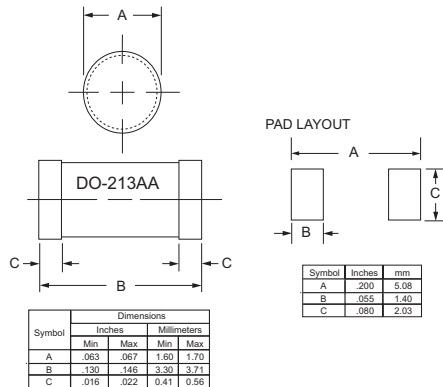
| JEDEC TYPE No.<br>(Note 1) | Normal Zener Voltage | Zener Test Current | Maximum Zener Impedance | Maximum Reverse Current |       | Maximum Noise Density | Maximum Zener Current |
|----------------------------|----------------------|--------------------|-------------------------|-------------------------|-------|-----------------------|-----------------------|
|                            | $V_z @ I_{ZT}$       | $I_{ZT}$           | $Z_{ZT}$                | $I_R @ V_R$             | $V_R$ | $N_D @ I_{ZT}$        | $I_{ZM}$              |
|                            | Volts                | µA                 | Ohms                    | µA                      | Volts | µV / √ Hz             | mA                    |
| 1N4614UR-1                 | 1.8                  | 250                | 1200                    | 7.5                     | 1     | 1                     | 120                   |
| 1N4615UR-1                 | 2.0                  | 250                | 1250                    | 5.0                     | 1     | 1                     | 110                   |
| 1N4616UR-1                 | 2.2                  | 250                | 1300                    | 4.0                     | 1     | 1                     | 100                   |
| 1N4617UR-1                 | 2.4                  | 250                | 1400                    | 2.0                     | 1     | 1                     | 95                    |
| 1N4618UR-1                 | 2.7                  | 250                | 1500                    | 1.0                     | 1     | 1                     | 90                    |
| 1N4619UR-1                 | 3.0                  | 250                | 1600                    | 0.8                     | 1     | 1                     | 87                    |
| 1N4620UR-1                 | 3.3                  | 250                | 1650                    | 7.5                     | 1.5   | 1                     | 85                    |
| 1N4621UR-1                 | 3.6                  | 250                | 1700                    | 7.5                     | 2     | 1                     | 83                    |
| 1N4622UR-1                 | 3.9                  | 250                | 1650                    | 5.0                     | 2     | 1                     | 80                    |
| 1N4623UR-1                 | 4.3                  | 250                | 1600                    | 4.0                     | 2     | 1                     | 77                    |
| 1N4624UR-1                 | 4.7                  | 250                | 1550                    | 10.0                    | 2     | 1                     | 75                    |
| 1N4625UR-1                 | 5.1                  | 250                | 1500                    | 10.0                    | 3     | 2                     | 70                    |
| 1N4626UR-1                 | 5.6                  | 250                | 1400                    | 10.0                    | 4     | 4                     | 65                    |
| 1N4627UR-1                 | 6.2                  | 250                | 1200                    | 10.0                    | 5     | 5                     | 61                    |
| 1N4099UR-1                 | 6.8                  | 250                | 200                     | 10.0                    | 5.17  | 40                    | 56                    |
| 1N4100UR-1                 | 7.5                  | 250                | 200                     | 10.0                    | 5.70  | 40                    | 51                    |
| 1N4101UR-1                 | 8.2                  | 250                | 200                     | 1.0                     | 6.24  | 40                    | 46                    |
| 1N4102UR-1                 | 8.7                  | 250                | 200                     | 1.0                     | 6.61  | 40                    | 44                    |
| 1N4103UR-1                 | 9.1                  | 250                | 200                     | 1.0                     | 6.92  | 40                    | 42                    |
| 1N4104UR-1                 | 10                   | 250                | 200                     | 1.0                     | 7.60  | 40                    | 38                    |
| 1N4105UR-1                 | 11                   | 250                | 200                     | 0.05                    | 8.44  | 40                    | 35                    |
| 1N4106UR-1                 | 12                   | 250                | 200                     | 0.05                    | 8.12  | 40                    | 32                    |
| 1N4107UR-1                 | 13                   | 250                | 200                     | 0.05                    | 9.857 | 40                    | 29                    |
| 1N4108UR-1                 | 14                   | 250                | 200                     | 0.05                    | 10.65 | 40                    | 27                    |
| 1N4109UR-1                 | 15                   | 250                | 100                     | 0.05                    | 11.40 | 40                    | 25                    |
| 1N4110UR-1                 | 16                   | 250                | 100                     | 0.05                    | 12.15 | 40                    | 24                    |
| 1N4111UR-1                 | 17                   | 250                | 100                     | 0.05                    | 12.92 | 40                    | 22                    |
| 1N4112UR-1                 | 18                   | 250                | 100                     | 0.05                    | 13.67 | 40                    | 21                    |
| 1N4113UR-1                 | 19                   | 250                | 150                     | 0.05                    | 14.44 | 40                    | 20                    |
| 1N4114UR-1                 | 20                   | 250                | 150                     | 0.01                    | 15.20 | 40                    | 19                    |
| 1N4115UR-1                 | 22                   | 250                | 150                     | 0.01                    | 16.72 | 40                    | 17                    |
| 1N4116UR-1                 | 24                   | 250                | 150                     | 0.01                    | 18.25 | 40                    | 16                    |
| 1N4117UR-1                 | 25                   | 250                | 150                     | 0.01                    | 19.00 | 40                    | 15                    |
| 1N4118UR-1                 | 27                   | 250                | 150                     | 0.01                    | 20.45 | 40                    | 14                    |
| 1N4119UR-1                 | 29                   | 250                | 200                     | 0.01                    | 21.28 | 40                    | 14                    |
| 1N4120UR-1                 | 30                   | 250                | 200                     | 0.01                    | 22.80 | 40                    | 13                    |
| 1N4121UR-1                 | 33                   | 250                | 200                     | 0.01                    | 25.08 | 40                    | 12                    |
| 1N4122UR-1                 | 36                   | 250                | 200                     | 0.01                    | 27.38 | 40                    | 11                    |
| 1N4123UR-1                 | 39                   | 250                | 200                     | 0.01                    | 29.65 | 40                    | 9.8                   |
| 1N4124UR-1                 | 43                   | 250                | 250                     | 0.01                    | 32.65 | 40                    | 8.9                   |
| 1N4125UR-1                 | 47                   | 250                | 250                     | 0.01                    | 35.75 | 40                    | 8.1                   |
| 1N4126UR-1                 | 51                   | 250                | 300                     | 0.01                    | 38.76 | 40                    | 7.5                   |
| 1N4127UR-1                 | 56                   | 250                | 300                     | 0.01                    | 42.60 | 40                    | 6.7                   |
| 1N4128UR-1                 | 60                   | 250                | 400                     | 0.01                    | 45.60 | 40                    | 6.4                   |
| 1N4129UR-1                 | 62                   | 250                | 500                     | 0.01                    | 47.10 | 40                    | 6.1                   |
| 1N4130UR-1                 | 68                   | 250                | 700                     | 0.01                    | 51.68 | 40                    | 5.6                   |
| 1N4131UR-1                 | 75                   | 250                | 700                     | 0.01                    | 57.00 | 40                    | 5.1                   |
| 1N4132UR-1                 | 82                   | 250                | 800                     | 0.01                    | 62.32 | 40                    | 4.6                   |
| 1N4133UR-1                 | 87                   | 250                | 1000                    | 0.01                    | 66.12 | 40                    | 4.4                   |
| 1N4134UR-1                 | 91                   | 250                | 1200                    | 0.01                    | 69.16 | 40                    | 4.2                   |
| 1N4135UR-1                 | 100                  | 250                | 1500                    | 0.01                    | 76.00 | 40                    | 3.0                   |

NOTE 1: The JEDEC type numbers shown with no suffix have a standard tolerance of ±5% on the nominal Zener voltage; suffix C is used to identify ±2%; and suffix D is used to identify ±1% tolerance. Vz is measured with the diode in thermal equilibrium in 25°C still air.





### Outline Drawing



### LEADED DESIGN DATA

**CASE:** DO-213AA, Hermetically sealed glass case.  
(MELF, SOD-80, LL34)

**LEAD FINISH:** Tin / Lead

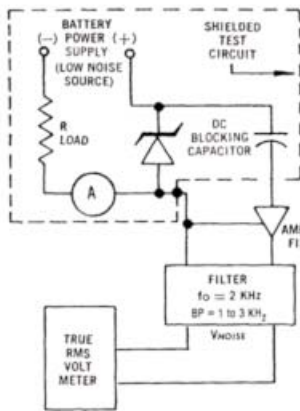
**THERMAL RESISTANCE:** ( $R_{\theta JEC}$ ): 100 °C/W maximum at L = 0 inch

**THERMAL IMPEDANCE:** ( $Z_{\theta JX}$ ): 25 °C/W maximum

**POLARITY:** Diode to be operated with the banded (cathode) end positive.

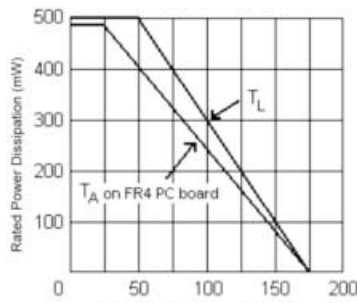
**MOUNTING POSITION:** Any.

### Circuits & Graphs

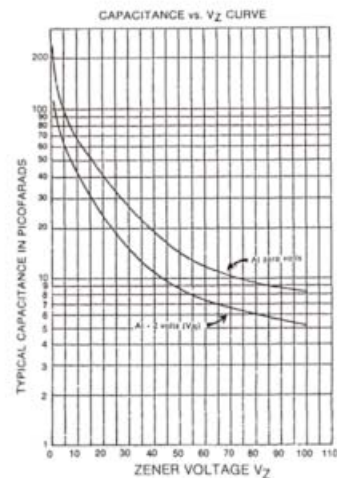


**FIGURE 1**  
NOISE DENSITY MEASUREMENT CIRCUIT

Noise density, ( $N_0$ ) is specified in microvolt-rms per square-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.  $N_0$  is calculated from the formula.



**FIGURE 2 – POWER DERATING CURVE**



**FIGURE 3**  
CAPACITANCE vs. ZENER VOLTAGE  
(TYPICAL)

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