



CURRENT REGULATOR DIODES

Qualified per MIL-PRF-19500/463

Qualified Levels:
JAN, JANTX, JANTXV
and JANS

DESCRIPTION

The popular 1N5283UR-1 thru 1N5314UR-1 series of 0.5 watt current regulators provides a selection from 0.22 mA to 4.7 mA in standard 10% tolerances. These devices regulate current over a broad voltage range as a counter part offering to Zeners (that regulate voltage over a broad current range). The DO-213AB package offers a double plug internal bond connection with a large die element for its unique function as a current limiter. Microsemi also offers numerous other Zener products to meet higher and lower power voltage regulation applications.

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

FEATURES

- JEDEC registered surface mount equivalent of 1N5283 thru 1N5314 series.
- High source impedance.
- Internal metallurgical bond.
- JAN, JANTX, JANTXV, and JANS qualifications are available per MIL-PRF-19500/463.
- Chips also available as JANHC and JANKC.
- RoHS compliant versions available (commercial grade only).



**DO-213AB
(MELF, LL41)
Package**

Also available in:

DO-7 Package
(axial-leaded)

 [1N5283-1 to 1N5314-1](#)

APPLICATIONS / BENEFITS

- Double-plug construction.
- Regulates current over a broad operating voltage and temperature range.
- Extensive selection from 0.22 mA to 4.7 mA.
- Standard current tolerances are plus/minus 10%.
- Non-sensitive to ESD.
- Inherently radiation hard as described in Microsemi "[MicroNote 050](#)".

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-End Cap @ L = 0 in | R _{θJEC} | 100 | °C/W |
| Thermal Impedance | Z _{θJX} | 25 | °C/W |
| Steady-State Power Dissipation @ T _{EC} = +125 °C, ⁽¹⁾ | P _D | 500 | mW |
| Working Peak Voltage | V _{WM} | 100 | V |
| Solder Pad Temperature @ 10 s max. | T _{SP} | 260 | °C |

Notes: 1. Derate at 10 mW/°C above +125 °C.

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MECHANICAL and PACKAGING

- CASE: Hermetically sealed glass case.
- TERMINALS: Tin/lead finished copper clad steel or RoHS compliant matte-tin finish available (commercial grade only).
- MARKING: Cathode band.
- POLARITY: Diode to be operated with the banded (cathode) end negative.
- MOUNTING SURFACE SELECTION: The Axial Coefficient of Expansion (COE) of this device is approximately +6PPM/°C. The COE of the Mounting Surface System should be selected to provide a suitable match with this device.
- WEIGHT: 0.2 grams.
- See [Package Dimensions](#) on last page.

PART NOMENCLATURE

SYMBOLS & DEFINITIONS

| Symbol | Definition |
|-----------------|---------------------------------------------------------------------------------------------------------------------------------|
| I_L | Limiting Current: A specified current below the lower knee of the current-regulating characteristic. |
| I_S | Regulator current: A current within the regulating range of a current-regulator diode. |
| P_D | Power Dissipation: The power dissipation, dc. |
| $R_{\theta JL}$ | Thermal Resistance Junction-to-Lead: The thermal resistance from the virtual junction(s) of a semiconductor device to the lead. |
| T_L | Lead Temperature: The temperature of a lead terminal. |
| T_{SP} | Temperature Solder Pad: The maximum solder temperature that can be safely applied to the terminal. |
| V_K | Knee Voltage: A specified regulator voltage near the lower knee of the current-regulating characteristic. |
| V_L | Limiting Voltage: The voltage at point I_L on the current-voltage characteristic. |
| V_S | Regulator Voltage: A voltage within the regulating range of a current-regulating diode. |
| Z_K | Knee Impedance: The small-signal impedance at operating point V_K on the current-voltage characteristic. |
| Z_S | Regulator Impedance: The small-signal impedance within the regulating range of a current-regulator diode. |
| $Z_{\theta JX}$ | Thermal Impedance: The thermal impedance junction to reference point. |

ELECTRICAL CHARACTERISTICS ($T_A = 25^\circ\text{C}$, unless otherwise specified)

| TYPE NUMBER | REGULATOR CURRENT I_S (mA) @ $V_S = 25$ V | | | MINIMUM DYNAMIC IMPEDANCE @ $V_S = 25$ V z_s (M Ω) (Note 1) | MINIMUM KNEE IMPEDANCE @ $V_K = 6.0$ V z_k (M Ω) (Note 2) | MAXIMUM LIMITING VOLTAGE @ $I_L = 0.8 I_S$ (min) V_L (Volts) |
|-------------|------------------------------------------------|-------|-------|--------------------------------------------------------------------------------|------------------------------------------------------------------------------|-------------------------------------------------------------------------|
| | NOM | MIN | MAX | | | |
| 1N5283UR | 0.22 | 0.198 | 0.242 | 25.00 | 2.750 | 1.00 |
| 1N5284UR | 0.24 | 0.216 | 0.264 | 19.00 | 2.350 | 1.00 |
| 1N5285UR | 0.27 | 0.243 | 0.297 | 14.00 | 1.950 | 1.00 |
| 1N5286UR | 0.30 | 0.270 | 0.330 | 9.000 | 1.600 | 1.00 |
| 1N5287UR | 0.33 | 0.297 | 0.363 | 6.600 | 1.350 | 1.00 |
| 1N5288UR | 0.39 | 0.351 | 0.429 | 4.100 | 1.000 | 1.05 |
| 1N5289UR | 0.43 | 0.387 | 0.473 | 3.300 | 0.870 | 1.05 |
| 1N5290UR | 0.47 | 0.423 | 0.517 | 2.700 | 0.750 | 1.05 |
| 1N5291UR | 0.56 | 0.504 | 0.616 | 1.900 | 0.560 | 1.10 |
| 1N5292UR | 0.62 | 0.558 | 0.682 | 1.550 | 0.470 | 1.13 |
| 1N5293UR | 0.68 | 0.612 | 0.748 | 1.350 | 0.400 | 1.15 |
| 1N5294UR | 0.75 | 0.675 | 0.825 | 1.150 | 0.335 | 1.20 |
| 1N5295UR | 0.82 | 0.738 | 0.902 | 1.000 | 0.290 | 1.25 |
| 1N5296UR | 0.91 | 0.819 | 1.001 | 0.880 | 0.240 | 1.29 |
| 1N5297UR | 1.00 | 0.900 | 1.100 | 0.800 | 0.205 | 1.35 |
| 1N5298UR | 1.10 | 0.990 | 1.210 | 0.700 | 0.180 | 1.40 |
| 1N5299UR | 1.20 | 1.080 | 1.320 | 0.640 | 0.155 | 1.45 |
| 1N5300UR | 1.30 | 1.170 | 1.430 | 0.580 | 0.135 | 1.50 |
| 1N5301UR | 1.40 | 1.260 | 1.540 | 0.540 | 0.115 | 1.55 |
| 1N5302UR | 1.50 | 1.350 | 1.650 | 0.510 | 0.105 | 1.60 |
| 1N5303UR | 1.60 | 1.440 | 1.760 | 0.475 | 0.092 | 1.65 |
| 1N5304UR | 1.80 | 1.620 | 1.980 | 0.420 | 0.074 | 1.75 |
| 1N5305UR | 2.00 | 1.800 | 2.200 | 0.395 | 0.061 | 1.85 |
| 1N5306UR | 2.20 | 1.980 | 2.420 | 0.370 | 0.052 | 1.95 |
| 1N5307UR | 2.40 | 2.160 | 2.640 | 0.345 | 0.044 | 2.00 |
| 1N5308UR | 2.70 | 2.430 | 2.970 | 0.320 | 0.035 | 2.15 |
| 1N5309UR | 3.00 | 2.700 | 3.300 | 0.300 | 0.029 | 2.25 |
| 1N5310UR | 3.30 | 2.970 | 3.630 | 0.280 | 0.024 | 2.35 |
| 1N5311UR | 3.60 | 3.240 | 3.960 | 0.265 | 0.020 | 2.50 |
| 1N5312UR | 3.90 | 3.510 | 4.290 | 0.255 | 0.017 | 2.60 |
| 1N5313UR | 4.30 | 3.870 | 4.730 | 0.245 | 0.014 | 2.75 |
| 1N5314UR | 4.70 | 4.230 | 5.170 | 0.235 | 0.012 | 2.90 |

NOTE 1: z_s is derived by superimposing a 90 Hz RMS signal equal to 10% of V_S on V_S .

NOTE 2: z_k is derived by superimposing a 90 Hz RMS signal equal to 10% of V_K on V_K .

GRAPHS



FIGURE 1 – CURRENT-REGULATOR CHARACTERISTICS



FIGURE 2 – TEMPERATURE COEFFICIENT

GRAPHS (continued)



FIGURE 3 – TEMPERATURE COEFFICIENT



FIGURE 4 – CURRENT REGULATION FACTOR

PACKAGE DIMENSIONS


| Symbol | Dimensions | | | |
|------------|------------|------|-------------|------|
| | Inch | | Millimeters | |
| | Min | Max | Min | Max |
| BD | 0.94 | .105 | 2.39 | 2.67 |
| BL | .189 | .205 | 4.80 | 5.21 |
| ECT | .016 | .022 | 0.41 | 0.55 |
| S | .001 min | | 0.03 min | |

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. In accordance with ASME Y14.5M, diameters are equivalent to Φ x symbology.

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