



# 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).

## 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 <sub>J</sub> and T <sub>STG</sub>	-65 to +175	°C
Thermal Resistance Junction-to-End Cap @ L = 0 in	R <sub>θJEC</sub>	100	°C/W
Thermal Impedance	Z <sub>θJX</sub>	25	°C/W
Steady-State Power Dissipation @ T <sub>EC</sub> = +125 °C, <sup>(1)</sup>	P <sub>D</sub>	500	mW
Working Peak Voltage	V <sub>WM</sub>	100	V
Solder Pad Temperature @ 10 s max.	T <sub>SP</sub>	260	°C

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



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

Also available in:

**DO-7 Package**  
(axial-leaded)

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

### **MSC – Lawrence**

6 Lake Street,  
Lawrence, MA 01841  
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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) @ $V_S = 25\text{ V}$			MINIMUM DYNAMIC IMPEDANCE @ $V_S = 25\text{ V}$ $z_s$ (M $\Omega$ ) (Note 1)	MINIMUM KNEE IMPEDANCE @ $V_K = 6.0\text{ V}$ $z_k$ (M $\Omega$ ) (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
<b>BD</b>	0.94	.105	2.39	2.67
<b>BL</b>	.189	.205	4.80	5.21
<b>ECT</b>	.016	.022	0.41	0.55
<b>S</b>	.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  $\Phi$ x symbology.

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