



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

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

### MSC - Lawrence

6 Lake Street, Lawrence, MA 01841 Tel: 1-800-446-1158 or (978) 620-2600

Fax: (978) 689-0803

#### MSC - Ireland

Gort Road Business Park, Ennis, Co. Clare, Ireland Tel: +353 (0) 65 6840044 Fax: +353 (0) 65 6822298

#### Website:

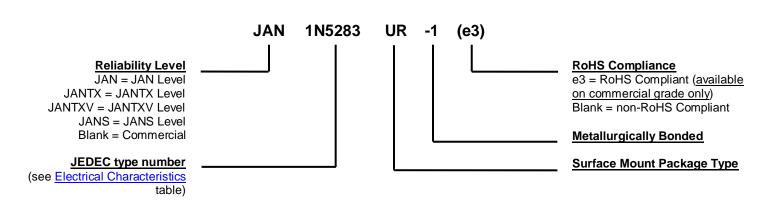
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### **MECHANICAL and PACKAGING**

- 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					
IL	Limiting Current: A specified current below the lower knee of the current-regulating characteristic.					
Is	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 semiconducter 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.					
VL	Limiting Voltage: The voltage at point I <sub>L</sub> on the current-voltage characteristic.					
Vs	Regulator Voltage: A voltage within the regulating range of a current-regulating diode.					
Z <sub>k</sub>	Knee Impedance: The small-signal impedance at operating point VK on the current-voltage characteristic.					
Zs	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<sub>A</sub> = 25°C, unless otherwise specified)

TYPE NUMBER	REGULATOR CURRENT IS (mA) @ VS = 25 V			MINIMUM DYNAMIC IMPEDANCE @VS = 25 V $z_S (M\Omega)$	MINIMUM KNEE IMPEDANCE @VK = 6.0 V zk (MΩ)	MAXIMUM LIMITING VOLTAGE @ IL = 0.8 IS (min) VL (Volts)
	NOM	MIN	MAX	(Note 1)	(Note 2)	, ,
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 1N5314UR	4.30 4.70	3.870 4.230	4.730 5.170	0.245 0.235	0.014 0.012	2.75 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**

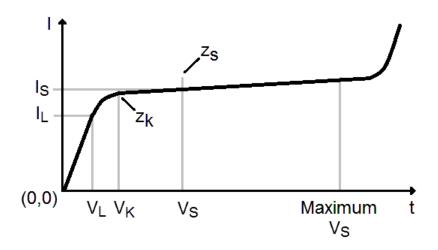


FIGURE 1 – CURRENT-REGULATOR CHARACTERISTICS

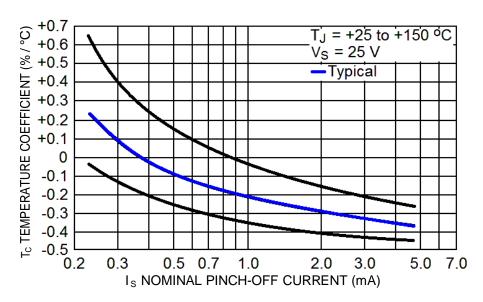


FIGURE 2 – TEMPERATURE COEFFICIENT



# **GRAPHS** (continued)

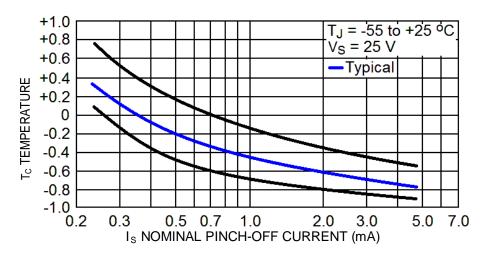


FIGURE 3 – TEMPERATURE COEFFICIENT

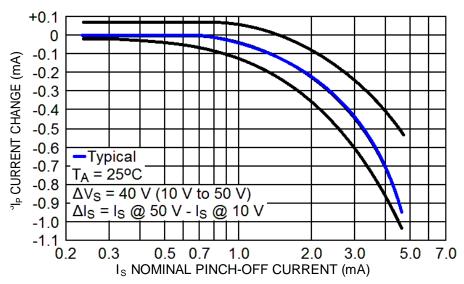
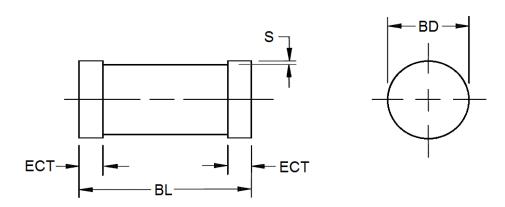


FIGURE 4 – CURRENT REGULATION FACTOR



# **PACKAGE DIMENSIONS**



	Dimensions				
Symbol	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  $\Phi x$  symbology.