RoHS
Available on commercial versions

CURRENT REGULATOR DIODES

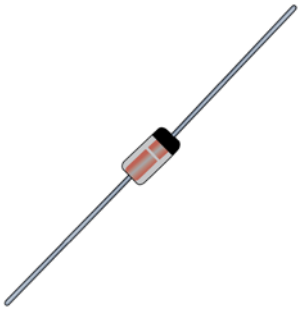
Qualified per MIL-PRF-19500/463

Qualified Levels:
JAN, JANTX, JANTXV and JANS

DESCRIPTION

The popular 1N5283-1 thru 1N5314-1 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) in similar size axial-leaded packages. The somewhat larger DO-7 packaging option offers a double-plug internal bond connection with a larger active 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.



DO-7 Package

Also available in:

DO-213AB Package
(surface mount)
1N5283UR-1 to 1N5314UR-1

FEATURES

- JEDEC registered 1N5283 thru 1N5314.
- 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%.
- Flexible axial-lead mounting terminals.
- 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-Lead @ L = .375 in	$R_{\Theta JL}$	250	°C/W
Thermal Impedance	$Z_{\Theta JX}$	25	°C/W
Steady-State Power Dissipation @ T_L = +50 °C, L = 3/8" (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 4mW/°C above +50°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: Part number and cathode band.
- POLARITY: Diode to be operated with the banded (cathode) end negative.
- TAPE & REEL option: Standard per EIA-296 (add "TR" suffix to part number). Consult factory for quantities.
- WEIGHT: 0.2 grams.
- See Package Dimensions on last page.

PART NOMENCLATURE

JAN 1N5283 -1 (e3)

Reliability Level
JAN = JAN Level
JANTX = JANTX Level
JANTXV = JANTXV Level
JANS = JANS Level
Blank = Commercial

JEDEC type number
(see Electrical Characteristics table)

RoHS Compliance
e3 = RoHS Compliant (available on commercial grade only)
Blank = non-RoHS Compliant

Metallurgically Bonded

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 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.
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 VK 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.

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ELECTRICAL CHARACTERISTICS (T_A = 25°C, unless otherwise specified)

TYPE NUMBER	REGULATOR CURRENT I_S (mA) @ V_S = 25 V			MINIMUM DYNAMIC IMPEDANCE @V_S = 25 V z_S (MΩ) (Note 1)	MINIMUM KNEE IMPEDANCE @V_K = 6.0 V z_k (MΩ) (Note 2)	MAXIMUM LIMITING VOLTAGE @ I_L = 0.8 I_S (min) V_L (Volts)
	NOM	MIN	MAX			
1N5283	0.22	0.198	0.242	25.00	2.750	1.00
1N5284	0.24	0.216	0.264	19.00	2.350	1.00
1N5285	0.27	0.243	0.297	14.00	1.950	1.00
1N5286	0.30	0.270	0.330	9.000	1.600	1.00
1N5287	0.33	0.297	0.363	6.600	1.350	1.00
1N5288	0.39	0.351	0.429	4.100	1.000	1.05
1N5289	0.43	0.387	0.473	3.300	0.870	1.05
1N5290	0.47	0.423	0.517	2.700	0.750	1.05
1N5291	0.56	0.504	0.616	1.900	0.560	1.10
1N5292	0.62	0.558	0.682	1.550	0.470	1.13
1N5293	0.68	0.612	0.748	1.350	0.400	1.15
1N5294	0.75	0.675	0.825	1.150	0.335	1.20
1N5295	0.82	0.738	0.902	1.000	0.290	1.25
1N5296	0.91	0.819	1.001	0.880	0.240	1.29
1N5297	1.00	0.900	1.100	0.800	0.205	1.35
1N5298	1.10	0.990	1.210	0.700	0.180	1.40
1N5299	1.20	1.080	1.320	0.640	0.155	1.45
1N5300	1.30	1.170	1.430	0.580	0.135	1.50
1N5301	1.40	1.260	1.540	0.540	0.115	1.55
1N5302	1.50	1.350	1.650	0.510	0.105	1.60
1N5303	1.60	1.440	1.760	0.475	0.092	1.65
1N5304	1.80	1.620	1.980	0.420	0.074	1.75
1N5305	2.00	1.800	2.200	0.395	0.061	1.85
1N5306	2.20	1.980	2.420	0.370	0.052	1.95
1N5307	2.40	2.160	2.640	0.345	0.044	2.00
1N5308	2.70	2.430	2.970	0.320	0.035	2.15
1N5309	3.00	2.700	3.300	0.300	0.029	2.25
1N5310	3.30	2.970	3.630	0.280	0.024	2.35
1N5311	3.60	3.240	3.960	0.265	0.020	2.50
1N5312	3.90	3.510	4.290	0.255	0.017	2.60
1N5313	4.30	3.870	4.730	0.245	0.014	2.75
1N5314	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.

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GRAPHS

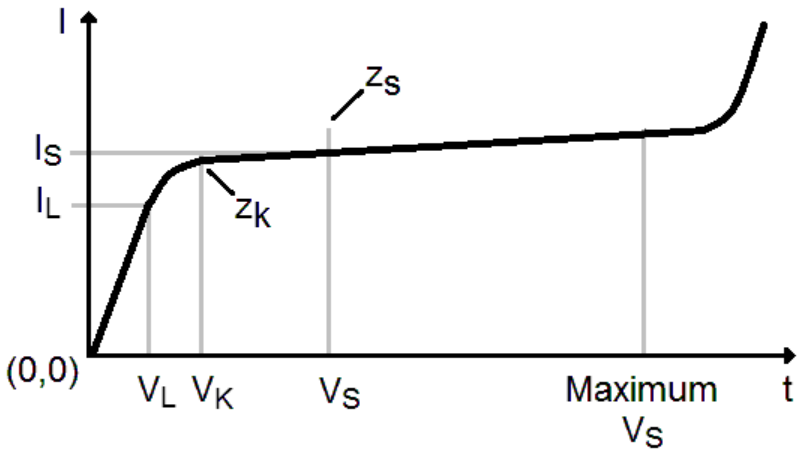

FIGURE 1 – CURRENT-REGULATOR CHARACTERISTICS

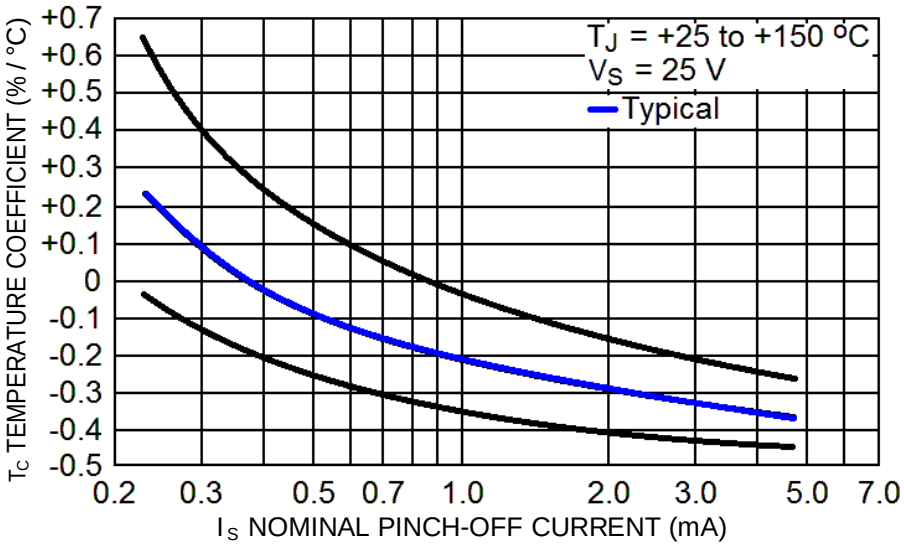

FIGURE 2 – TEMPERATURE COEFFICIENT

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GRAPHS (continued)

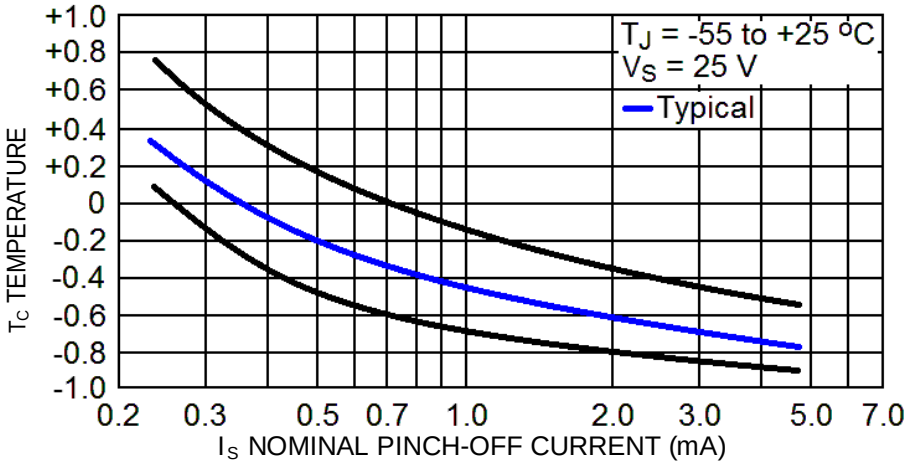

FIGURE 3 – TEMPERATURE COEFFICIENT

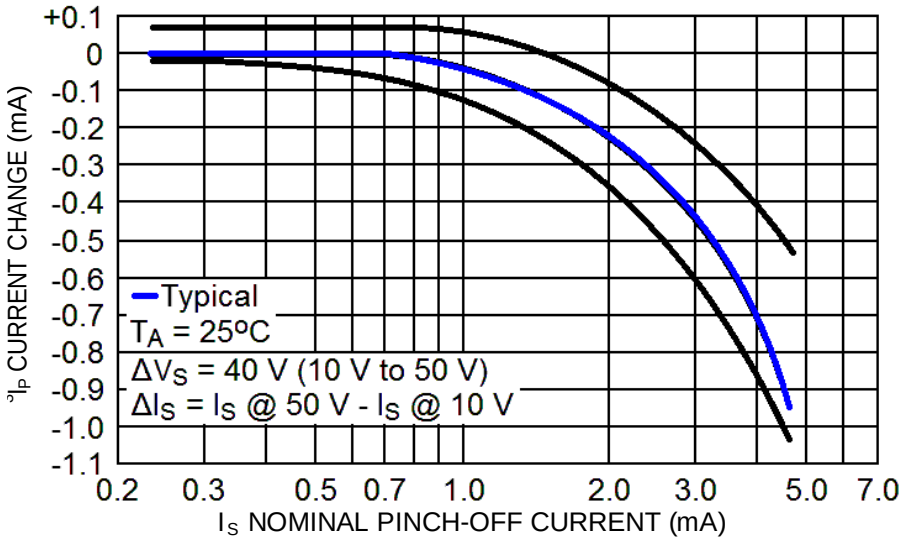

FIGURE 4 – CURRENT REGULATION FACTOR

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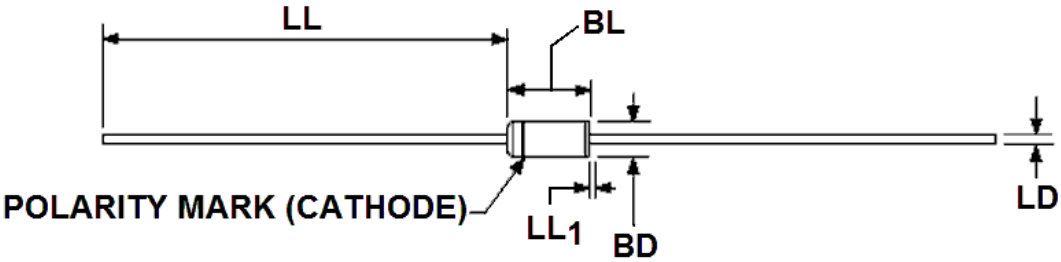
PACKAGE DIMENSIONS



Symbol	Dimensions			
	Inch		Millimeters	
	Min	Max	Min	Max
BD	.060	.107	1.52	2.72
BL	.120	.300	3.05	7.62
LD	.018	.023	0.46	0.58
LL	1.000	1.500	25.40	38.10
LL_1		0.050		1.27

NOTES:

1. Dimensions are in inches.
2. Millimeters are given for general information only.
3. The minimum body diameter shall be maintained over .15 inch (3.81 mm) inch of body length.
4. The specified lead diameter applies in the zone between .050 inch (1.27 mm) and the end of the lead. Outside of this zone the lead diameter shall not exceed LD.
5. Both leads shall be within the specified dimension.
6. See 3.3 for L and T_L definitions.
7. In accordance with ASME Y14.5M, diameters are equivalent to Φx symbology.

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