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Diodes Incorporated
ZRT040GC1TA

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ZRT040

4.01V LOW POWER PRECISION REFERENCE SOURCE

Description

The ZRT040 is a monolithic integrated circuit providing a precise stable reference voltage of 4.01V at 500µA.

The circuit features a knee current of 150µA and operation over a wide range of temperatures and currents.

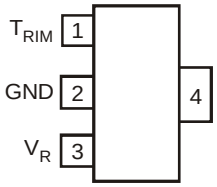
The ZRT040 is available in a SOT223 package for surface mount applications. This device offers a trim facility whereby the output voltage can be adjusted as shown in the schematic diagram. This facility is used when compensating for system errors or setting the reference output to a particular value. When the trim facility is not used, the pin should be left open circuit.

Features

- Trimmable output
- Excellent temperature stability
- Low output noise figure
- -40 to 85°C operating temperature range
- 1% initial voltage tolerance
- No external stabilizing capacitor required in most cases
- Low slope resistance
- No derating required at low temperatures
- SOT223 package

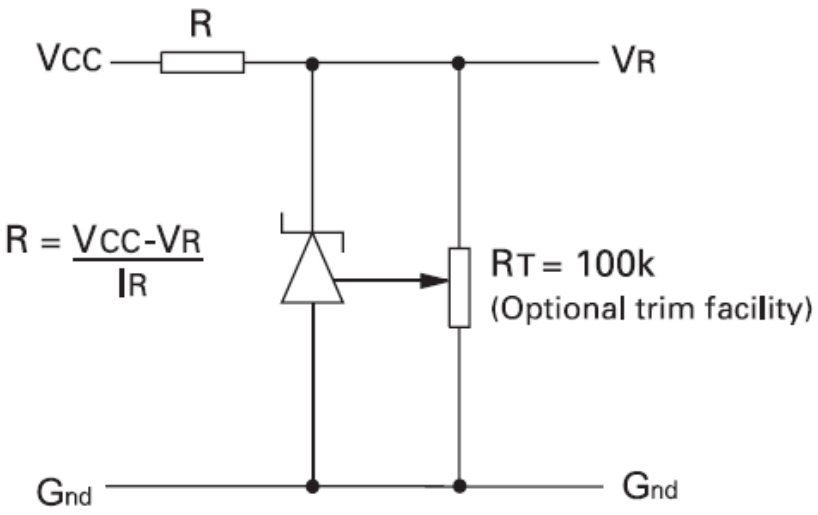
Pin Assignments

SOT223



Top View
(Pin 4 floating or connected to pin 2)

Schematic Diagram



This circuit will allow the reference to be trimmed over a wide range. The device is specified over a ±5% trim range.

Absolute Maximum Ratings

Parameter	Symbol	Value	Unit
Reverse Current (Note 1)		75	mA
Operating Temperature: C grade	T_{OMP}	-40 to +85	°C
Storage Temperature	T_{STG}	-55 to +150	°C

Notes: 1. Above 72°C this figure should be linearly derated to 15mA @ 125°C

Power Dissipation (@T_{amb} = 25°C unless otherwise stated)

Package	Value	Unit
SOT223	2	W

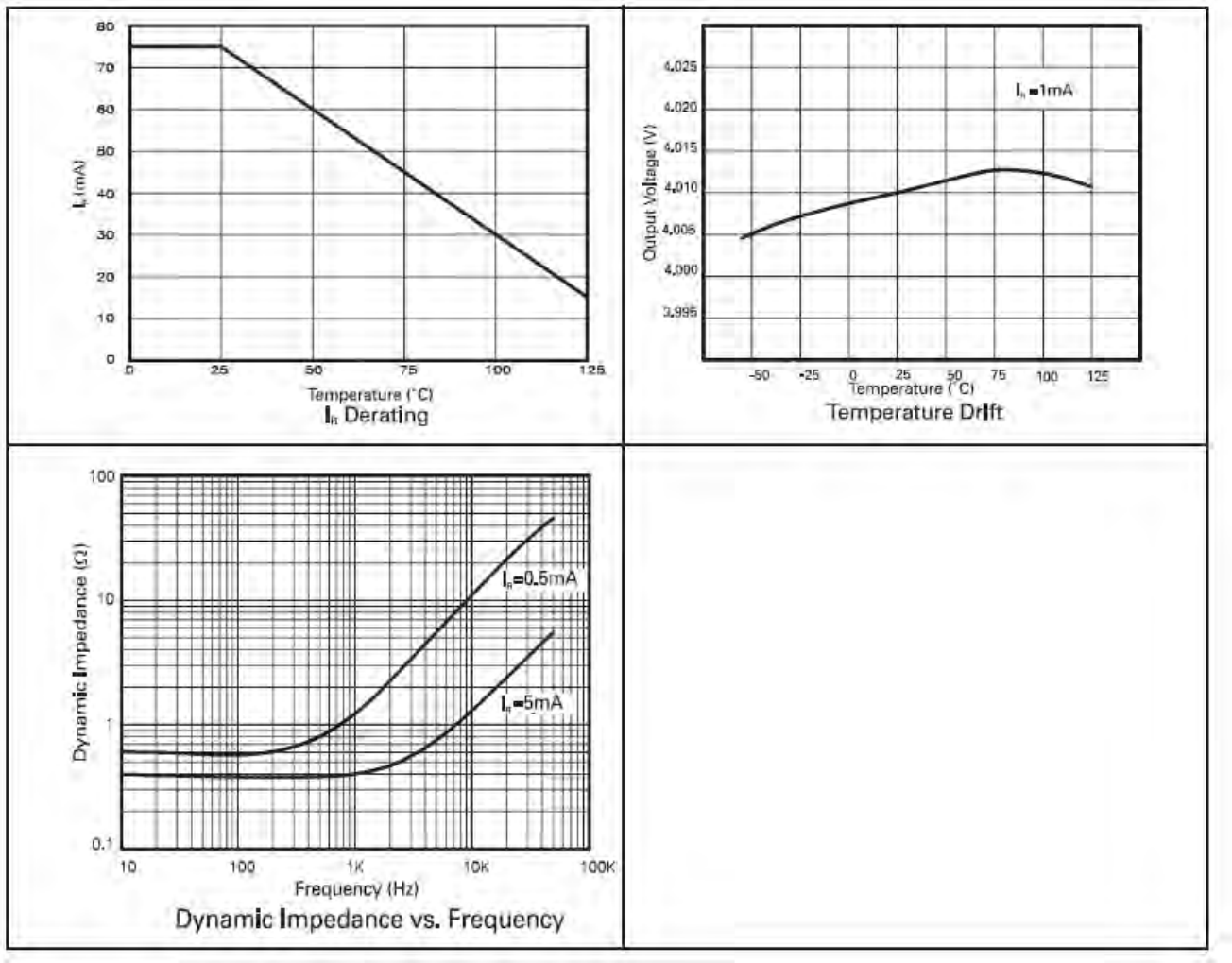
Temperature Dependent Electrical Characteristics

Symbol	Parameter	Grade C -40 to 85°C		Unit
		Typ.	Max.	
ΔV_R	Output voltage change over operating temperature range	7.5	24.0	mV
$T_C V_R$	Output voltage temperature coefficient (see Note B)	15.0	50.0	ppm/°C

Electrical Characteristics (@T_{amb} = 25°C unless otherwise stated)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V_R	Output voltage: 1% tolerance	I_R = 500 µA	3.97	4.01	4.05	V
V_{TRIM}	Output voltage adjustment range	R_T = 100kΩ		±5		%
$T_C V_{TRIM}$	Change in $T_C V_R$ with output adjustment			2.5		ppm/°C
I_R	Operating current range		0.15		75	mA
t_{on} t_{off}	Turn-on time Turn-off time	R_L = 1kΩ		40 0.3		µs
e_{np-p}	Output voltage noise (over the range 0.1 to 10Hz)	Peak to peak measurement		50		µV
R_S	Slope resistance (see Note C)	I_R = 0.5mA to 5mA		1.1	3.0	Ω

Typical Characteristics



(a) Output change with temperature

The absolute maximum difference between the maximum output voltage and the minimum output voltage over the specified temperature range:

$$\Delta V_R = V_{MAX} - V_{MIN}$$

(b) Output temperature coefficient (T_CV_R)

The ratio of the output change with temperature to the specified temperature range expressed in ppm/°C:

$$T_CV_R = \frac{\Delta V_R x 10^6}{V_R x \Delta T} ppm°C$$

ΔT= Full temperature range

(c) Operating current (IR)

Maximum operating current must be derated as indicated in maximum ratings.

(d) Slope resistance (RS)

The slope resistance is defined as:

$$RS = \frac{change in V_R}{specific current range}$$

$$\Delta I = 5 - 0.5 = 4.5mA \ (typically)$$

(e) Line regulation

The ratio of change in output voltage to the change in input voltage producing it:

$$\frac{R_S x 100}{V_R x R_{SOURCE}} \% / V$$

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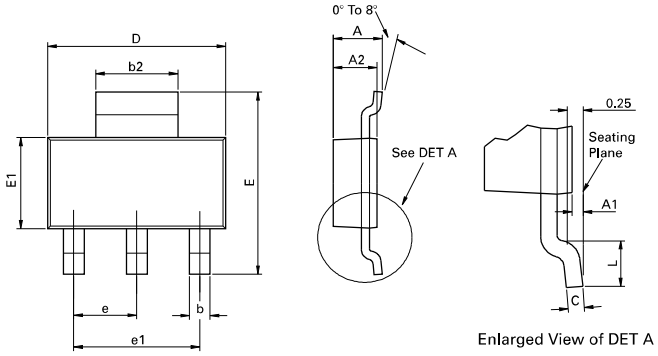
Ordering Information

Device	Tol %	Operating Temperature	Part Mark	Reel Size	Tape Width	Quantity Per Reel
ZRT040GC1	1	-40 to +85°C	ZRT040C1	7”	12mm	1000

Package Outline Dimensions (All Dimensions in mm)

SOT223



Conforms to JEDEC TO-261 AA Issue B

DIM	Millimeters		Inches		DIM	Millimeters		Inches	
	Min	Max	Min	Max		Min	Max	Min	Max
A	-	1.80	-	0.071	e	2.30 BSC		0.0905 BSC	
A1	0.02	0.10	0.0008	0.004	e1	4.60 BSC		0.181 BSC	
b	0.66	0.84	0.026	0.033	E	6.70	7.30	0.264	0.287
b2	2.90	3.10	0.114	0.122	E1	3.30	3.70	0.130	0.146
C	0.23	0.33	0.009	0.013	L	0.90	-	0.355	-
D	6.30	6.70	0.248	0.264	-	-	-	-	-

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches.

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