

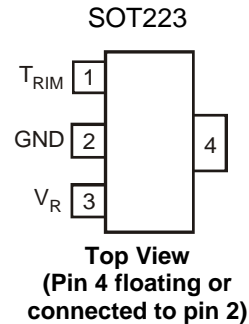
**Description**

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.

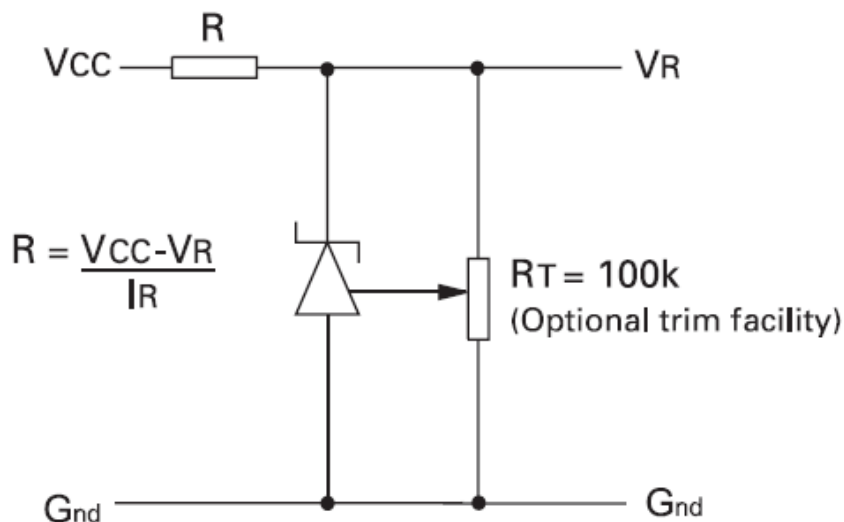
**Pin Assignments**



**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

**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 <sub>OMP</sub>	-40 to +85	°C
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C

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

### Power Dissipation (@T<sub>amb</sub> = 25°C unless otherwise stated)

Package	Value	Unit
SOT223	2	W

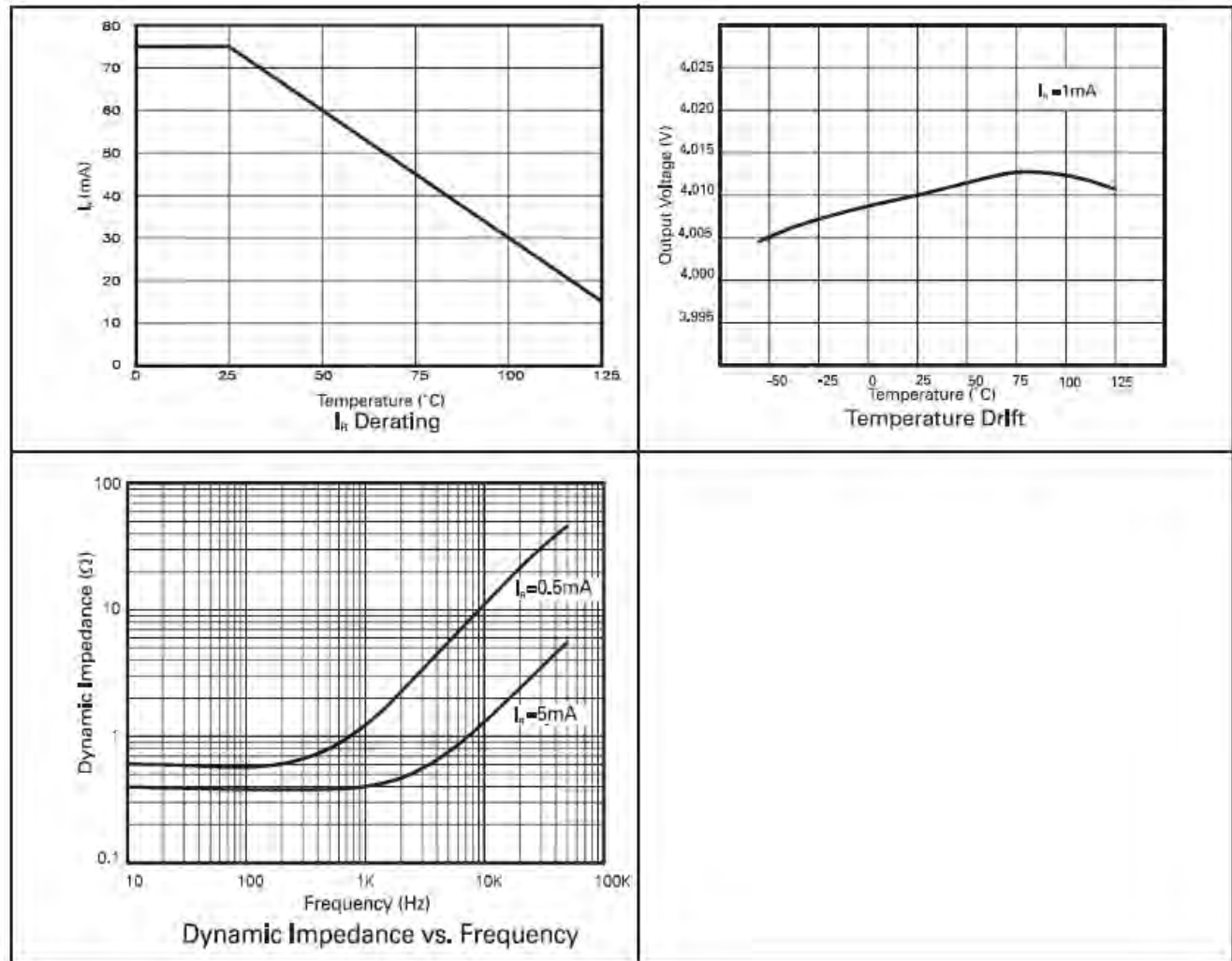
### Temperature Dependent Electrical Characteristics

Symbol	Parameter	Grade C -40 to 85°C		Unit
		Typ.	Max.	
ΔV <sub>R</sub>	Output voltage change over operating temperature range	7.5	24.0	mV
T <sub>C</sub> V <sub>R</sub>	Output voltage temperature coefficient (see Note B)	15.0	50.0	ppm/°C

### Electrical Characteristics (@T<sub>amb</sub> = 25°C unless otherwise stated)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>R</sub>	Output voltage: 1% tolerance	I <sub>R</sub> = 500 μA	3.97	4.01	4.05	V
V <sub>TRIM</sub>	Output voltage adjustment range	R <sub>T</sub> = 100kΩ		±5		%
T <sub>C</sub> V <sub>TRIM</sub>	Change in T <sub>C</sub> V <sub>R</sub> with output adjustment			2.5		ppm/°C
I <sub>R</sub>	Operating current range		0.15		75	mA
t <sub>on</sub> t <sub>off</sub>	Turn-on time Turn-off time	R <sub>L</sub> = 1kΩ		40 0.3		μs
e <sub>np-p</sub>	Output voltage noise (over the range 0.1 to 10Hz)	Peak to peak measurement		50		μV
R <sub>S</sub>	Slope resistance (see Note C)	I <sub>R</sub> = 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 ( $T_C V_R$ )**

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

$$T_C V_R = \frac{\Delta V_R \times 10^6}{V_R \times \Delta T} \text{ ppm}^\circ\text{C}$$

$\Delta T$  = Full temperature range

**(c) Operating current ( $I_R$ )**

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

**(d) Slope resistance ( $R_S$ )**

The slope resistance is defined as:

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

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

**(e) Line regulation**

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

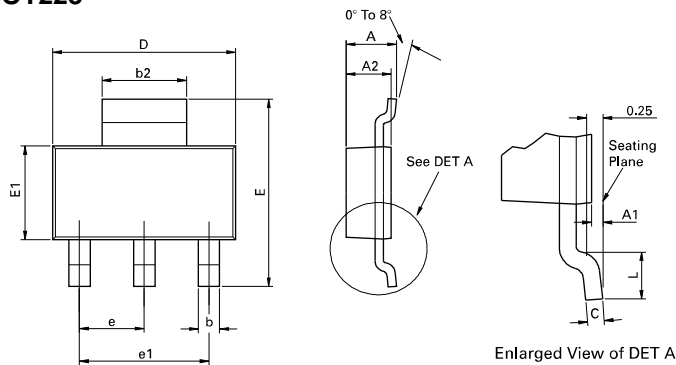
$$\frac{R_S \times 100}{V_R \times R_{SOURCE}} \% / V$$

**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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