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ZRT040

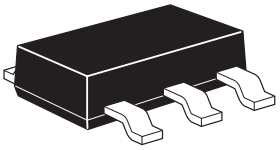
4.01V LOW POWER PRECISION REFERENCE SOURCE

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.

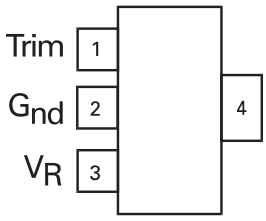
The ZRT040 is available in a SOT223 package for surface mount applications. This device offers a trim facility whereby the output voltage can be adjusted as shown in Fig.1. This facility is used when compensating for system errors or setting the reference output to a particular value. When the trim facility is not used, the pin should be left open circuit.



SOT223

FEATURES

- Trimmable output
- Excellent temperature stability
- Low output noise figure
- Available in three temperature ranges
- 1 and 2% initial voltage tolerance versions available
- No external stabilising capacitor required in most cases
- Low slope resistance
- SOT223 small outline packages



SOT223
Package suffix G
Top view (pin 4 floating or connected to pin 2)

ORDERING INFORMATION

DEVICE	TOL%	OPERATING TEMP.	PACKAGE	PARTMARK
ZRT040GC2	2	-40 to 85°C	SOT223	ZRT040C2
ZRT040GC1	1	-40 to 85°C	SOT223	ZRT040C1
ZRT040GA1	1	-55 to 125°C	SOT223	ZRT040A1

A grade -55°C to 125°C
C grade -40°C to 85°C

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ZRT040

ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Reverse current (1)		75	mA
Operating temperature:	T_{OMP}		
A grade		-55 to 125	°C
C grade		-40 to 85	°C
Storage temperature	T_{STG}	-55 to 150	°C

(1) Above 25°C this figure should be linearly derated to 15mA at 125°C

POWER DISSIPATION (at T_{amb} = 25°C unless otherwise stated)

PACKAGE	VALUE	UNIT
SOT223	2	W

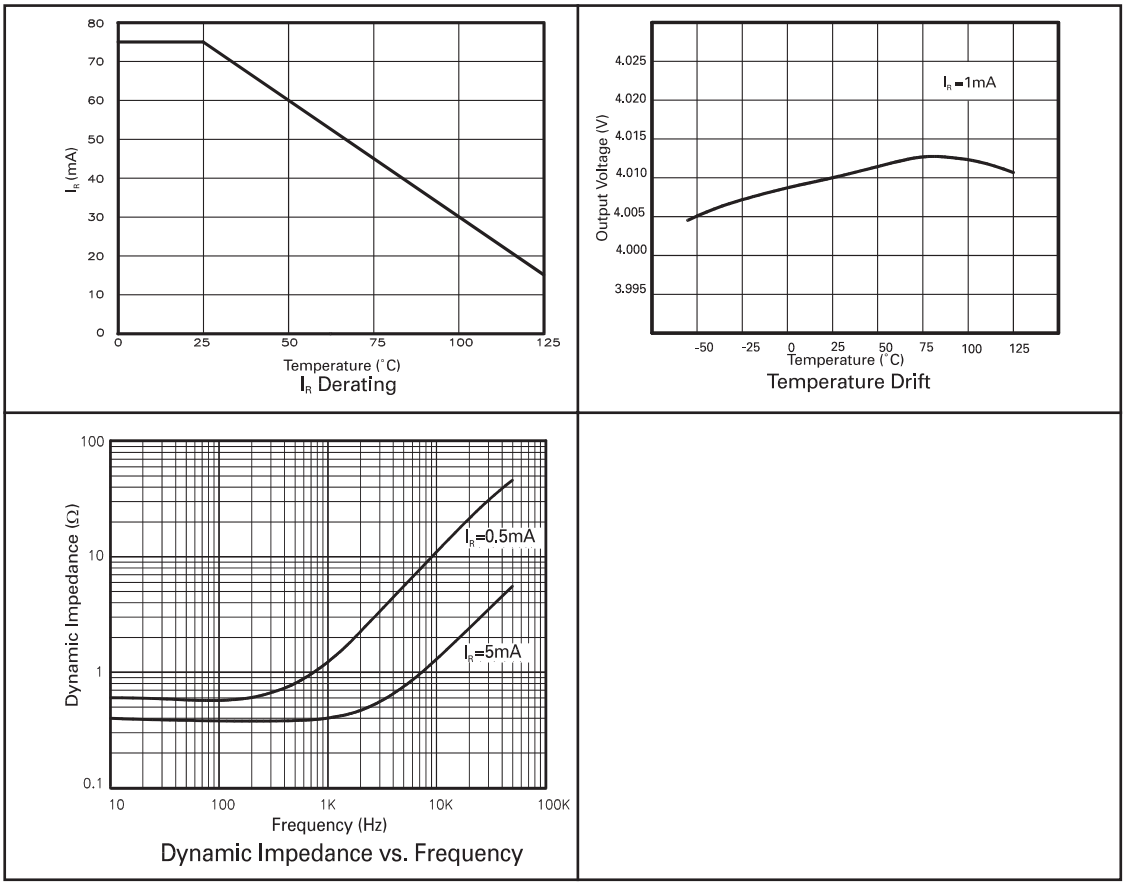
TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	INITIAL VOLTAGE TOLERANCE %	GRADE A		GRADE C		UNIT
			TYP	MAX	TYP	MAX	
ΔV_R	Output voltage change over relevant temperature range(See note (a))	1 & 2	11.0	36,0	7.5	24.0	mV
$T_C V_R$	Output voltage temperature coefficient (See note (b))	1 & 2	15.0	50.0	15.0	50.0	ppm/°C

ELECTRICAL CHARACTERISTICS (at T_{amb} = 25°C unless otherwise stated)

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V_R	Output voltage					
	1% tolerance (A1,C1)	I_R=500μA	3.97	4.01	4.05	V
	2% tolerance (C2)		3.93	4.01	4.09	V
ΔV_{TRIM}	Output voltage adjustment range	R_T=100kΩ		±5		%
$T_C \Delta V_{TRIM}$	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	I_R= 0.5mA to 5mA (See note (c))		1.1	3.0	Ω

TYPICAL CHARACTERISTICS



NOTES:

(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 (TCV_R)

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

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

ΔT= Full temperature range

(c) Operating current (I_R)

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

(d) Slope resistance (RS)

The slope resistance is defined as:

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

ΔI=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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SCHEMATIC DIAGRAM

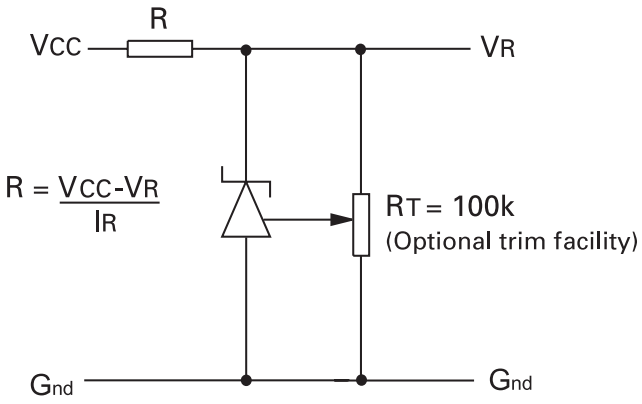
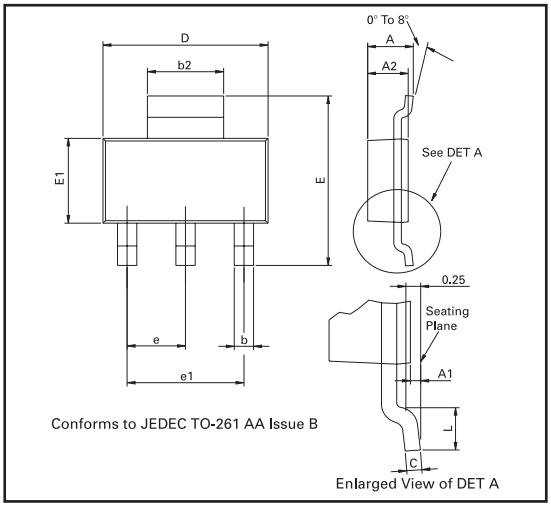


Figure 1:
This circuit will allow the reference to be trimmed over a wide range. The device is specified over a ±5% trim range.

PACKAGE OUTLINE



Controlling dimensions are in millimeters. Approximate conversions are given in inches

PACKAGE DIMENSIONS

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	–	0.0355	–
D	6.30	6.70	0.248	0.264		–	–	–	–

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