6.2V LOW POWER
PRECISION REFERENCE SOURCE

ISSUE 1 - OCTOBER 1995

ZRT062

DEVICE DESCRIPTION

The ZRT062 is a monolithic integrated circuit providing a precise stable reference voltage of 6.17V at 500µA.

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

The ZRT062 is available in a 3-pin metal can package for through hole applications as well as SOT223 and SO8 packages for surface mount applications. Each package option 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.

FEATURES

- Trimmable output
- Excellent temperature stability
- Low output noise figure
- Available in two temperature ranges
- 1 and 2% initial voltage tolerance versions available
- No external stabilising capacitor required in most cases
- Low slope resistance
- TO18 package
- SOT223 and SO8 small outline packages
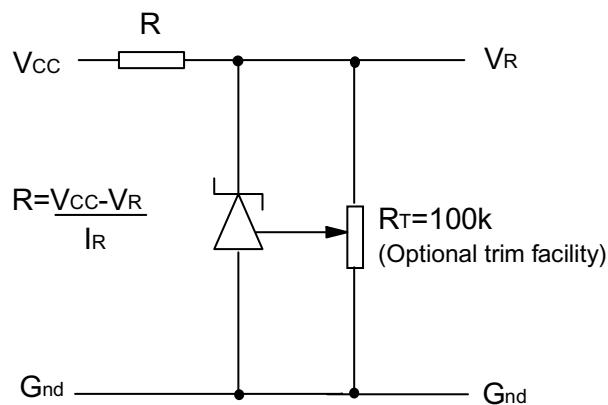
SCHEMATIC DIAGRAM

$$R = \frac{V_{CC} - V_R}{I_R}$$

$R_T = 100k$
(Optional trim facility)

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

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ABSOLUTE MAXIMUM RATING

Reverse Current $\quad$ 50mA ø
Operating Temperature
$\qquad$ A grade $\qquad$ -55°C to 125°C
$\qquad$ C grade $\qquad$ 0°C to 70°C
Storage Temperature
$\qquad$ TO18 $\qquad$ -55 °C to 175 °C
$\qquad$ SO8, SOT223 $\quad$ -55 °C to 125 °C

Power Dissipation (T_{amb}=25°C)
TO18 $\qquad$ 300mW
SO8 $\qquad$ 625mW
SOT223 $\qquad$ 2W
ø Above 25°C this figure should be linearly derated to 10mA at 125°C
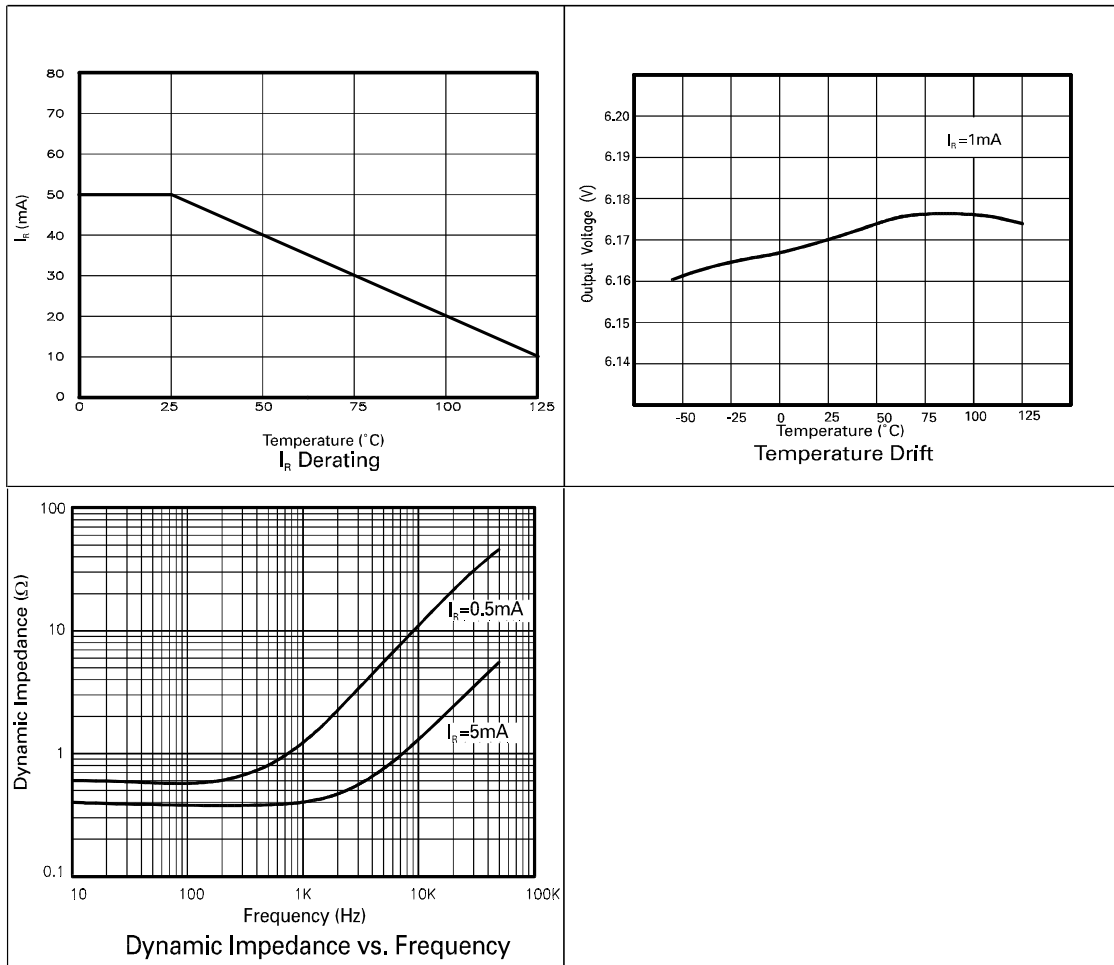
TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	INITIAL VOLTAGE TOLERANCE %	GRADE A -55°C TO 125°C		GRADE C 0°C TO 70°C		UNITS
			TYP	MAX	TYP	MAX	
ΔV_R	Output voltage change over relevant temperature range (See note (a))	1 & 2	15.0	40.0	6.5	22.0	mV
$T_C V_R$	Output voltage temperature coefficient (See note (b))	1 & 2	15.0	40.0	15.0	50.0	ppm/°C

ELECTRICAL CHARACTERISTICS
(at T_{amb}=25°C and Trim pin o/c unless otherwise stated)

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNITS	COMMENTS
V_R	Output voltage 1% tolerance (A1,C1) 2% tolerance (C2)	6.11 6.05	6.17 6.17	6.23 6.29	V	I_R=500µA
ΔV_{TRIM}	Output voltage adjustment range		$\pm$5		%	R_T=100kΩ
$T_C \Delta V_{TRIM}$	Change in $T_C V_R$ with output adjustment		5.0		ppm/°C/%	
I_R	Operating current range	0.15		50	mA	See note (c)
t_{on} t_{off}	Turn-on time Turn-off time		250 0.3		µs	R_L=1kΩ
e_{np-p}	Output voltage noise (over the range 0.1 to 10Hz)		50		µV	Peak to peak measurement
R_S	Slope resistance		1.4	3.0	Ω	I_R = 0.5mA to 5mA See note (d)

TYPICAL CHARACTERISTICS

I_R Derating

Temperature Drift

Dynamic Impedance vs. Frequency

NOTES

(a)   Output change with temperature (V_R)

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

$$T_c V_R = \frac{\Delta V_R \times 10^6}{V_R \times \Delta T} \ ppm/°C$$

ΔT= 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 :

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

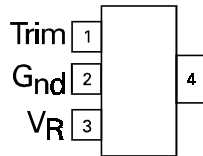$\Delta I = 5 - 0.5 = 4.5 mA$ (typically)

(e)   Line regulation

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

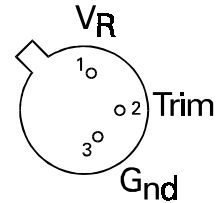$$\frac{R_S \times 100}{V_R \times R_{source}} \ \%/V$$

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CONNECTION DIAGRAMS

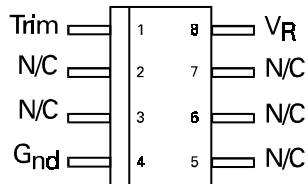### SOT223   Package Suffix – G

Top View
Pin 4 floating or connected to pin 2

TO18   Package Suffix – None

Bottom View –
Case is internally connected to pin 3

SO8   Package Suffix – N8

Top View

ORDERING INFORMATION

Part No	Tol%	Operating Temp.(°C)	Package	Partmark
ZRT062C2	2	0 to 70	TO18	ZRT062C2
ZRT062C1	1	0 to 70	TO18	ZRT062C1
ZRT062A1	1	-55 to 125	TO18	ZRT062A1
ZRT062GC2	2	0 to 70	SOT223	ZRT062C2
ZRT062GC1	1	0 to 70	SOT223	ZRT062C1
ZRT062GA1	1	-55 to 125	SOT223	ZRT062A1
ZRT062N8C2	2	0 to 70	SO8	ZRT062C2
ZRT062N8C1	1	0 to 70	SO8	ZRT062C1
ZRT062N8A1	1	-55 to 125	SO8	ZRT062A1