2.5V LOW POWER PRECISION REFERENCE SOURCE

ZRT025

ISSUE 1 - OCTOBER 1995

DEVICE DESCRIPTION

The ZRT025 is a monolithic integrated circuit providing a precise stable reference voltage of 2.5V at 500µA.

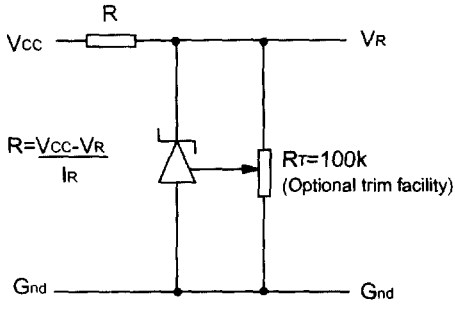
The circuit features a knee current of 150µA and operation over a wide range of temperatures and currents.

The ZRT025 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
- No derating required at low temperatures
- TO18 package
- SOT223 and SO8 small outline packages

SCHEMATIC DIAGRAM



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

CONNECTION TABLE

Pin	SO8	SOT223	TO18
1	Trim	Trim	V_R
2	N/C	Gnd	Trim
3	N/C	V_R	Gnd
4	Gnd	-	-
5	N/C	-	-
6	N/C	-	-
7	N/C	-	-
8	V_R	-	-
Pack	N8	G	-

see Diagrams Page 1 - 8

ZRT025

ABSOLUTE MAXIMUM RATING

Reverse Current 75mA ø

Operating Temperature
- A grade -55°C to 125°C
- C grade 0°C to 70°C

Storage Temperature
- TO18 -55 °C to 175 °C
- SO8, SOT223 -55 °C to 125 °C

Power Dissipation (T_{amb}=25°C)

TO18	300mW
SO8	625mW
SOT223	2W

ø Above 72°C this figure should be linearly derated to 25mA at 125°C

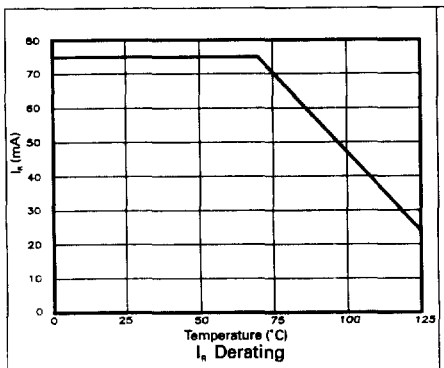
TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

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	6.8	22.5	2.7	8.8	mV
$T_C V_R$	Output voltage temperature coefficient (See note (b))	1 & 2	15.0	50.0	15.0	50.0	ppm/°C

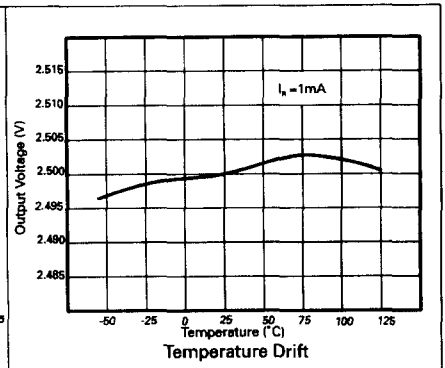
ELECTRICAL CHARACTERISTICS
(at T_{amb}=25°C and Pin 2 o/c unless otherwise stated)

SYMBOL	PARAMETER	MIN.	TYP.	MAX.	UNITS	Comments
V_R	Output voltage 1% tolerance (A1,C1) 2% tolerance (C2)	 2.475 2.450	 2.500 2.500	 2.525 2.550	V	I_R=500µA
ΔV_{TRIM}	Output voltage adjustment range		±5		%	R_T=100kΩ
$T_C \Delta V_{TRIM}$	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		10 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		0.85	2.0	Ω	I_R 0.5mA to 5mA See note (c)

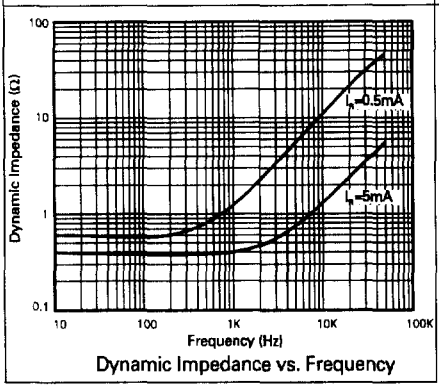
TYPICAL CHARACTERISTICS



I_R Derating



Temperature Drift



Dynamic Impedance vs. Frequency

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 (T_CV_R)

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

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

ΔT= Full temperature range

(c) Slope resistance (R_S)

The slope resistance is defined as :

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

ΔI = 5 - 0.5 = 4.5mA (typically)

(d) Line regulation

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

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