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 $500\mu A$.

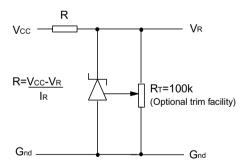
The circuit features a knee current of $150\mu A$ and operation over a wide range of temperatures and currents.

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 \pm 5% trim range.

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ABSOLUTE MAXIMUM RATING

Reverse Current	75mA ø	Power Dissipation (T _{amb} =25°C)			
Operating Temperature		TO18	300mW		
A grade	-55°C to 125°C 0°C to 70°C	SO8	625mW		
C grade		SOT223	2W		
Storage Temperature		ø Above 72°C this figure should be linearly			
TO18	-55 °C to 175 °C	derated to 25mA a	it 125°C		
SO8, SOT223	-55 °C to 125 °C				

TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

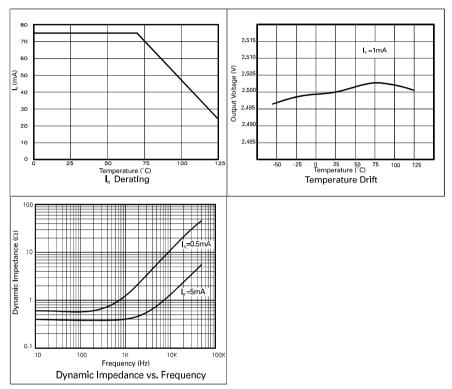
SYMBOL	SYMBOL PARAMETER		GRADE A -55°C TO 125°C		GRADE C 0°C TO 70°C		UNITS
		TOLERANCE %	TYP	MAX	ТҮР	MAX	
ΔV_R	Output voltage change over relevant temperature range (See note (a))	1 & 2	6.8	22.5	2.7	8.8	mV
T _C V _R	Output voltage temperature coefficient (See note (b))	1 & 2	15.0	50.0	15.0	50.0	ppm/°C

ELECTRICAL CHARACTERISTICS

(at T_{amb}=25°C and 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)	2.475 2.450	2.500 2.500	2.525 2.550	v	Ι _R =500μΑ
ΔV_{TRIM}	Output voltage adjustment range		± 5		%	R_T =100k Ω
$T_C \Delta V_{TRIM}$	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	$R_L=1k\Omega$
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)

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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 (T_CV_R)

The ratio of the output change with temperature to the specified temperature range expressed in $ppm/^{\circ}C$

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

∆T= Full temperature range

(c) Slope resistance (R_S)

The slope resistance is defined as :

$$R_{S} = \frac{changein V_{R}}{specifiedcurrentrange}$$

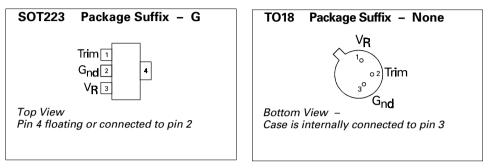
$$\Delta I = 5 - 0.5 = 4.5 \text{mA}$$
 (typically)

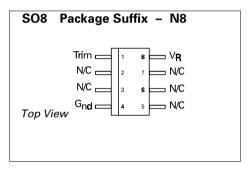
(d) Line regulation

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

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

CONNECTION DIAGRAMS





ORDERING INFORMATION

Part No	Tol%	Operating Temp.(°C)	Package	Partmark
ZRT025C2	2	0 to 70	TO18	ZRT025C2
ZRT025C1	1	0 to 70	TO18	ZRT025C1
ZRT025A1	1	-55 to 125	TO18	ZRT025A1
ZRT025GC2	2	0 to 70	SOT223	ZRT025C2
ZRT025GC1	1	0 to 70	SOT223	ZRT025C1
ZRT025GA1	1	-55 to 125	SOT223	ZRT025A1
ZRT025N8C2	2	0 to 70	SO8	ZRT025C2
ZRT025N8C1	1	0 to 70	SO8	ZRT025C1
ZRT025N8A1	1	-55 to 125	SO8	ZRT025A1