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# ZRT025

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## 2.5V LOW POWER PRECISION REFERENCE SOURCE

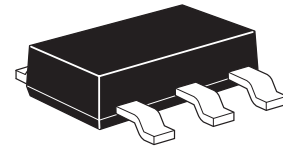
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### DESCRIPTION

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.

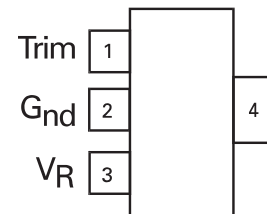
The ZRT025 is available for surface mount applications. This product offers a trim facility whereby the output voltage can be adjusted as shown in Fig.1. This facility is used when compensating for system errors or setting the reference output to a particular value. When the trim facility is not used, the pin should be left open circuit.



SOT223

### FEATURES

- Trimmable output
- Excellent temperature stability
- Low output noise figure
- Available in two temperature ranges
- 1 and 2% initial voltage tolerance versions available
- No external stabilizing capacitor required in most cases
- Low slope resistance
- No derating required at low temperatures
- SOT223 package



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

### ORDERING INFORMATION

DEVICE	TOL%	OPERATING TEMP °C	PARTMARK	REEL SIZE	TAPE WIDTH	QUANTITY PER REEL
ZRT025GC2TA	2	-40 to 85	ZRT025C2	7"	12mm	1,000 units
ZRT025GC1TA	1	-40 to 85	ZRT025C1	7"	12mm	1,000 units
ZRT025GA1TA	1	-55 to 125	ZRT025A1	7"	12mm	1,000 units

**A grade** -55 to 125°C

**C grade** -40 to 85°C

# ZRT025

## ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	LIMIT	UNIT
Reverse current <sup>(1)</sup>		75	mA
Operating temperature: A grade	T <sub>OMP</sub>	-55 to 125	°C
C grade		-40 to 85	°C
Storage temperature	T <sub>STG</sub>	-55 to 150	°C

<sup>(1)</sup> Above 72°C this figure should be linearly derated to 25mA at 125°C

## POWER DISSIPATION (at T<sub>amb</sub> = 25°C unless otherwise stated)

PACKAGE	VALUE	UNIT
SOT223	2	W

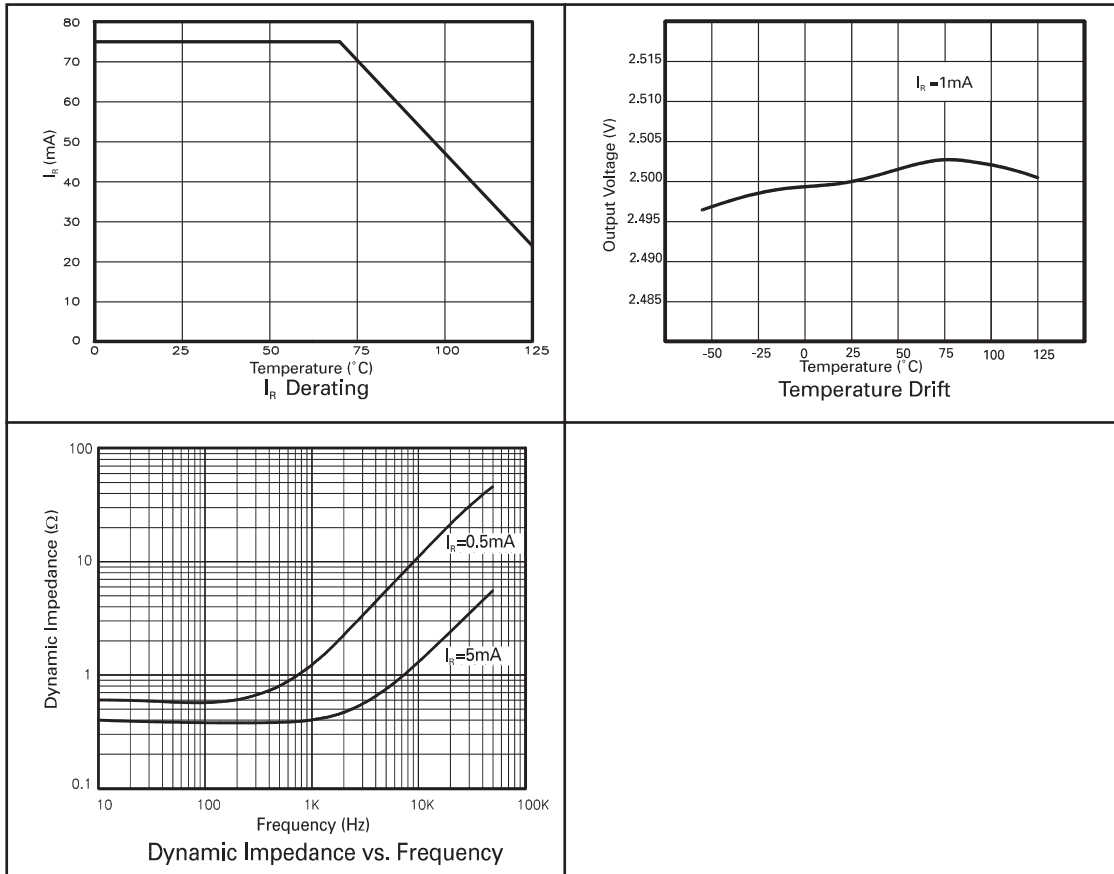
## TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

SYMBOL	PARAMETER	INITIAL VOLTAGE TOLERANCE %	GRADE A -55 TO 125°C		GRADE C -40 TO 85°C		UNIT
ΔV <sub>R</sub>	Output voltage change over relevant temperature range(See note (a))	1 & 2	6.8	22.5	2.7	8.8	mV
T <sub>C</sub> V <sub>R</sub>	Output voltage temperature coefficient (See note (b))	1 & 2	15.0	50.0	15.0	50.0	ppm/°C

## ELECTRICAL CHARACTERISTICS (at T<sub>amb</sub> = 25°C unless otherwise stated)

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
V <sub>R</sub>	Output voltage	I <sub>R</sub> =500μA	2.475	2.500	2.525	V
	1% tolerance (A1,C1)					
	2% tolerance (C2)		2.450	2.500	2.550	V
ΔV <sub>TRIM</sub>	Output voltage adjustment range	R <sub>T</sub> =100kΩ		±5		%
T <sub>C</sub> ΔV <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 timeTurn-off time	R <sub>L</sub> =1kΩ		10 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	I <sub>R</sub> = 0.5mA to 5mA (See note (c))		0.85	2.0	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 (TCVR)

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

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

$\Delta T$  = Full temperature range

#### (c) Slope resistance (RS)

The slope resistance is defined as :

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

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

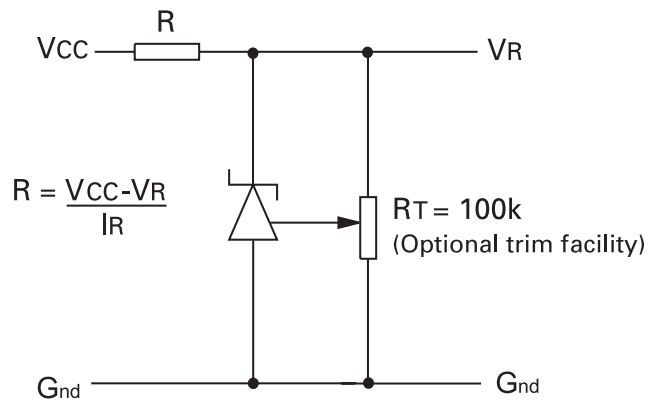
#### (d) Line regulation

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

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

# ZRT025

## SCHEMATIC DIAGRAM



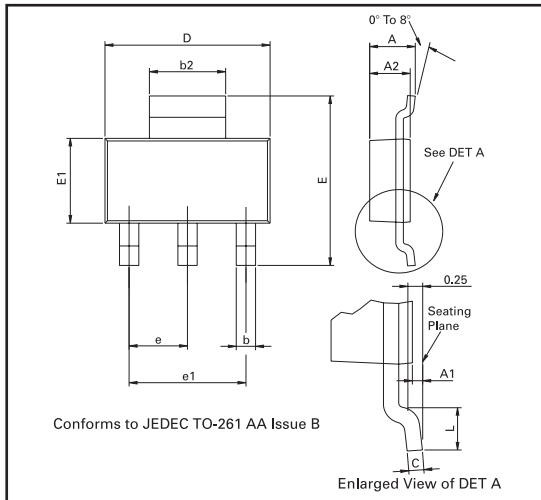
**Figure 1:**

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



# ZRT025

## 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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