

## Excellent Integrated System Limited

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[Diodes Incorporated](#)  
[ZRT025GC1TA](#)

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**ZRT025**

**2.5V LOW POWER PRECISION REFERENCE SOURCE**

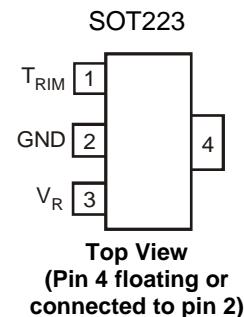
## Description

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 the schematic diagram. 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.

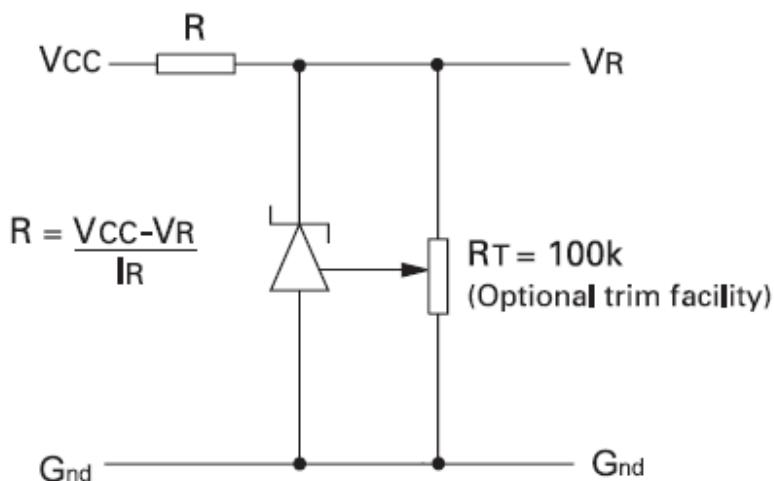
## Pin Assignments



## Features

- Trimmable output
- Excellent temperature stability
- Low output noise figure
- -40 to 85°C operating temperature range
- 1% initial voltage tolerance
- No external stabilizing capacitor required in most cases
- Low slope resistance
- No derating required at low temperatures
- SOT223 package

## 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 Ratings

Parameter	Symbol	Value	Unit
Reverse Current (Note 1)		75	mA
Operating Temperature: C grade	T <sub>OMP</sub>	-40 to +85	°C
Storage Temperature	T <sub>STG</sub>	-55 to +150	°C

Notes: 1. Above 72°C this figure should be linearly derated to 25mA @ 125°C

### Power Dissipation (@T<sub>amb</sub> = 25°C unless otherwise stated)

Package	Value	Unit
SOT223	2	W

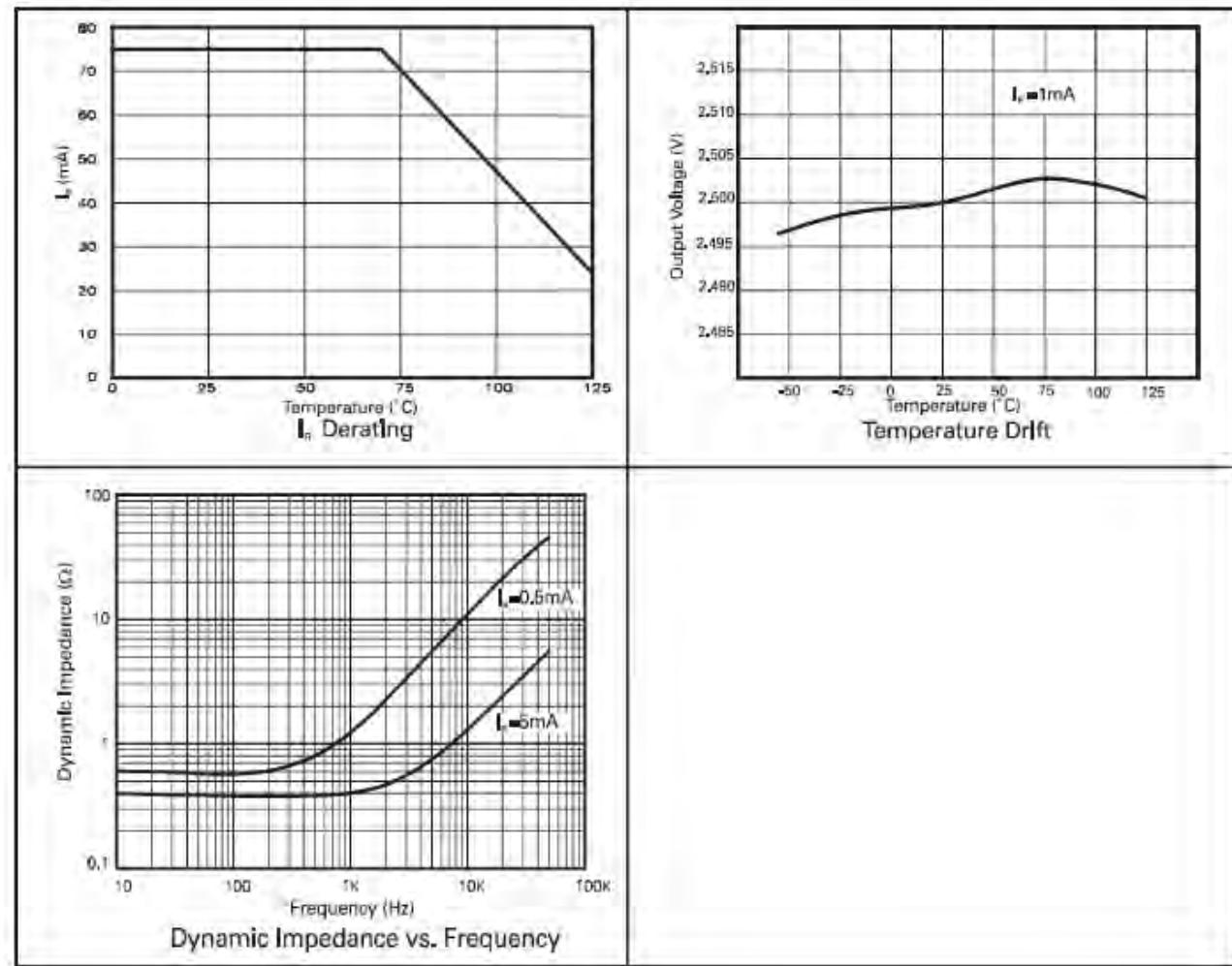
### Temperature Dependent Electrical Characteristics

Symbol	Parameter	Grade C -40 to 85°C		Unit
ΔV <sub>R</sub>	Output voltage change over relevant temperature range	2.7	8.8	mV
T <sub>C</sub> V <sub>R</sub>	Output voltage temperature coefficient	15.0	50.0	ppm/°C

### Electrical Characteristics (@T<sub>amb</sub> = 25°C unless otherwise stated)

Symbol	Parameter	Conditions	Min.	Typ.	Max.	Unit
V <sub>R</sub>	Output voltage 1% tolerance	I <sub>R</sub> = 500 μA	2.475	2.500	2.525	V
V <sub>TRIM</sub>	Output voltage adjustment range	R <sub>T</sub> = 100kΩ		±5		%
T <sub>C</sub> V <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 time Turn-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 (see note C)	I <sub>R</sub> = 0.5mA to 5mA		0.85	2.0	Ω

### Typical Characteristics



**(a) Output change with temperature**

The absolute maximum difference between the maximum output voltage and the minimum output voltage over the specified temperature range

$$\Delta V_R = V_{\text{MAX}} - V_{\text{MIN}}$$

**(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

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

$\Delta T$  = Full temperature range

**(c) Slope resistance ( $R_S$ )**

The slope resistance is defined as :

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

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

**(d) Line regulation**

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

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



**ZRT025**

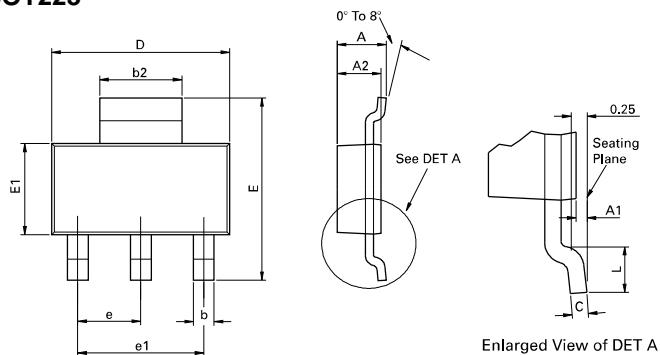
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### Ordering Information

Device	Tol %	Operating Temperature	Part Mark	Reel Size	Tape Width	Quantity Per Reel
ZRT025GC1TA	1	-40 to +85	ZRT025C1	7"	12mm	1000

### Package Outline Dimensions (All Dimensions in mm)

#### SOT223



Conforms to JEDEC TO-261 AA Issue B

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	-	0.355	-
D	6.30	6.70	0.248	0.264	-	-	-	-	-

Note: Controlling dimensions are in millimeters. Approximate dimensions are provided in inches.

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