

# ZRT062

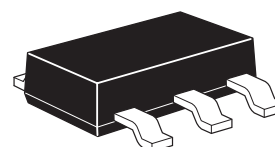
## 6.2V LOW POWER PRECISION REFERENCE SOURCE

### DESCRIPTION

The ZRT062 is a monolithic integrated circuit providing a precise stable reference voltage of 6.17V at 500 $\mu$ A.

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

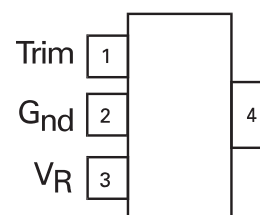
The ZRT062 is available in a SOT223 package for surface mount applications. This device offers a trim facility whereby the output voltage can be adjusted as shown in Fig.1. This facility is used when compensating for system errors or setting the reference output to a particular value. When the trim facility 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 stabilising capacitor required in most cases
- Low slope resistance
- SOT223 small outline package



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

### ORDERING INFORMATION

| DEVICE    | TOL% | OPERATING TEMP. | PACKAGE | PARTMARK |
|-----------|------|-----------------|---------|----------|
| ZRT062GC2 | 2    | -40 to 85°C     | SOT223  | ZRT062C2 |
| ZRT062GC1 | 1    | -40 to 85°C     | SOT223  | ZRT062C1 |
| ZRT062GA1 | 1    | -55 to 125°C    | SOT223  | ZRT062A1 |

A grade -55°C to 125°C

C grade -40°C to 85°C

# ZRT062

## ABSOLUTE MAXIMUM RATINGS

| PARAMETER                                    | SYMBOL           | LIMIT                   | UNIT     |
|----------------------------------------------|------------------|-------------------------|----------|
| Reverse current <sup>(1)</sup>               |                  | 50                      | mA       |
| Operating temperature:<br>A grade<br>C grade | T <sub>OMP</sub> | -55 to 125<br>-40 to 85 | °C<br>°C |
| Storage temperature                          | T <sub>STG</sub> | -55 to 150              | °C       |

<sup>(1)</sup> Above 25°C this figure should be linearly derated to 10mA at 125°C

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

| PACKAGE | VALUE | UNIT |
|---------|-------|------|
| SOT223  | 2     | W    |

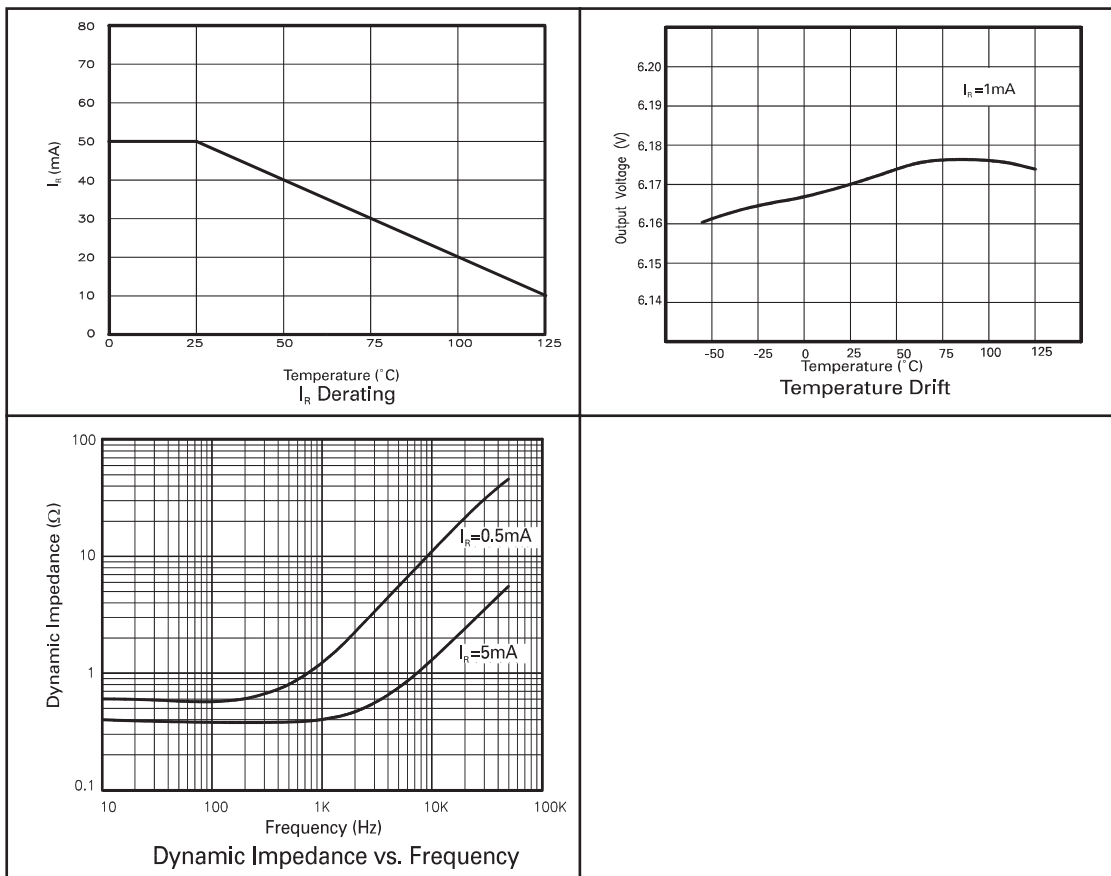
## TEMPERATURE DEPENDENT ELECTRICAL CHARACTERISTICS

| SYMBOL                        | PARAMETER                                                           | INITIAL<br>VOLTAGE<br>TOLERANCE % | GRADE A |      | GRADE C |      | UNIT   |
|-------------------------------|---------------------------------------------------------------------|-----------------------------------|---------|------|---------|------|--------|
|                               |                                                                     |                                   | TYP     | MAX  | TYP     | MAX  |        |
| ΔV <sub>R</sub>               | Output voltage change over relevant temperature range(See note (a)) | 1 & 2                             | 15.0    | 40.0 | 6.5     | 22.0 | mV     |
| T <sub>C</sub> V <sub>R</sub> | Output voltage temperature coefficient (See note (b))               | 1 & 2                             | 15.0    | 40.0 | 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                                                 |                                               |      |            |      |          |
|                                     | 1% tolerance (A1,C1)                                           | I <sub>R</sub> =500μA                         | 6.11 | 6.17       | 6.23 | V        |
|                                     | 2% tolerance (C2)                                              |                                               | 6.05 | 6.17       | 6.29 | 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 |                                               |      | 5.0        |      | ppm/°C/% |
| I <sub>R</sub>                      | Operating current range                                        | See note (c)                                  | 0.15 |            | 50   | mA       |
| t <sub>on</sub><br>t <sub>off</sub> | Turn-on time<br>Turn-off time                                  | R <sub>L</sub> =1kΩ                           |      | 250<br>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<br>See note (d) |      | 1.4        | 3.0  | 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:

$$\Delta V_R = V_{\text{max}} - V_{\text{min}}$$

#### (b) Output temperature coefficient ( $T_C V_R$ )

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

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

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

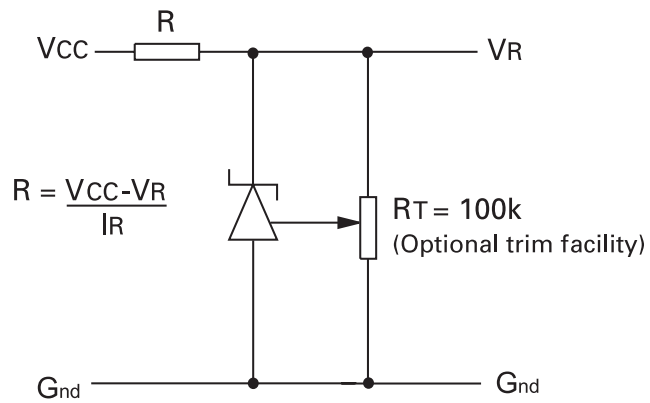
#### (e) Line regulation

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

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

# ZRT062

## SCHEMATIC DIAGRAM

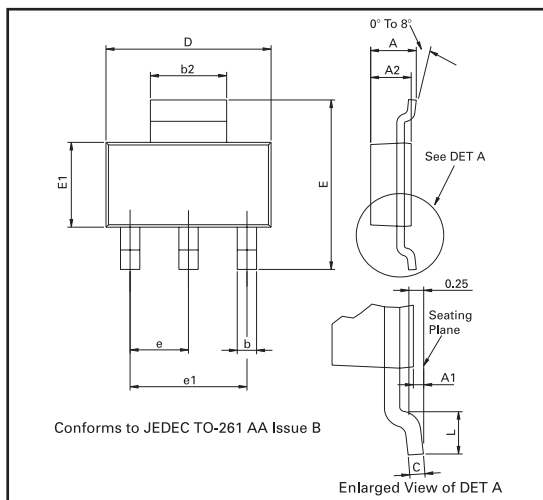


**Figure 1:**

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

# ZRT062

## 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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### Europe

Zetex plc  
Fields New Road  
Chadderton  
Oldham, OL9 8NP  
United Kingdom  
Telephone (44) 161 622 4444  
Fax: (44) 161 622 4446  
hq@zetex.com

Zetex GmbH  
Streitfeldstraße 19  
D-81673 München  
Germany  
Telefon: (49) 89 45 49 49 0  
Fax: (49) 89 45 49 49 49  
europe.sales@zetex.com

### Americas

Zetex Inc  
700 Veterans Memorial Hwy  
Hauppauge, NY 11788  
USA  
Telephone: (1) 631 360 2222  
Fax: (1) 631 360 8222  
usa.sales@zetex.com

### Asia Pacific

Zetex (Asia) Ltd  
3701-04 Metroplaza Tower 1  
Hing Fong Road  
Kwai Fong  
Hong Kong  
Telephone: (852) 26100 611  
Fax: (852) 24250 494  
asia.sales@zetex.com

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