

## ZXRE125 SOT23 MICROPOWER 1.22V VOLTAGE REFERENCE

### Description

The ZXRE125 is a bandgap circuit designed to achieve a precision micropower voltage reference of 1.22 volts. The device is available in the small outline SOT23 surface mount package which is ideal for applications where space saving is important.

SOT23 tolerance is available to 0.5% for precision applications. Excellent performance is maintained over the 8 $\mu$ A to 20mA operating current range with a typical temperature coefficient of only 20ppm/ $^{\circ}$ C. The device has been designed to be highly tolerant of capacitive loads so maintaining excellent stability.

This device offers a SOT23 pin for pin compatible replacement of the ZRA124 and ZRA125 series of voltage references.

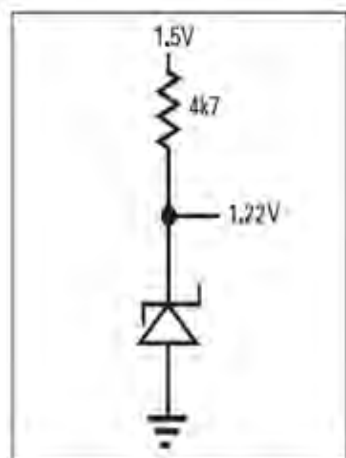
### Features

- High performance 1.220V reference
- Small outline SOT23
- 4 $\mu$ A knee current
- 20ppm/ $^{\circ}$ C typical temperature coefficient
- Unconditionally stable
- 0.5%, 1%, 2%, and 3% tolerance
- Green molding compound (No Br, Sb)

### Applications

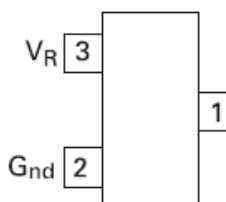
- Battery powered equipment
- Precision power supplies
- Portable instrumentation
- Portable communication devices
- Data acquisition systems

### Application Circuit



### Pin Assignments

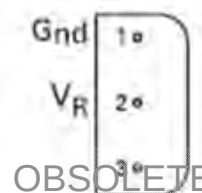
SOT23 Package Suffix - F



(Top View)

Pin 1 floating or connected to pin 2

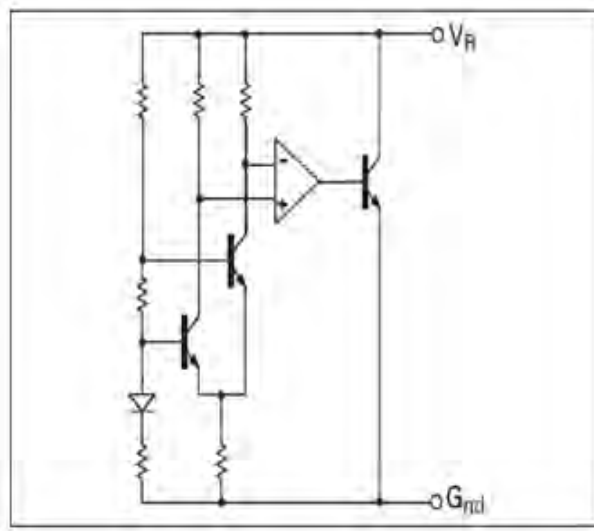
E-line  
Package Suffix - R



(Bottom View)

Pin 3 floating or connected to pin 1

### Schematic Diagram



**Absolute Maximum Ratings** (Voltages to GND Unless Otherwise Stated)

| Parameter                                            | Symbol    | Rating     | Unit |
|------------------------------------------------------|-----------|------------|------|
| Reverse Current                                      | $V_Z$     | 30         | mA   |
| Forward Current                                      |           | 10         | mA   |
| Operating Temperature                                | $T_{OMP}$ | -40 to 85  | °C   |
| Storage Temperature                                  | $T_{STG}$ | -55 to 125 | °C   |
| Power Dissipation ( $T_{AMB} = 25^{\circ}\text{C}$ ) | $P_D$     | 330        | mW   |

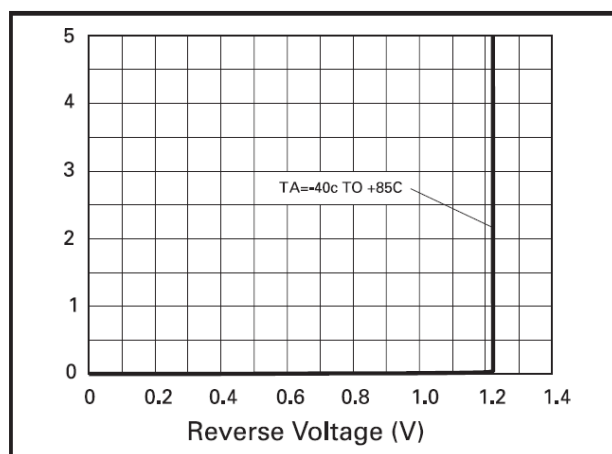
**Electrical Characteristics** (Test conditions:  $T_{amb} = 25^{\circ}\text{C}$ , unless otherwise specified.)

| Symbol                          | Parameter                                                 | Condition                                                               | Min.                             | Typ.                             | Max.                             | Tol. (%)                                  | Unit               |
|---------------------------------|-----------------------------------------------------------|-------------------------------------------------------------------------|----------------------------------|----------------------------------|----------------------------------|-------------------------------------------|--------------------|
| $V_R$                           | Reverse breakdown voltage                                 | $I_R = 100\mu\text{A}$                                                  | 1.214<br>1.208<br>1.196<br>1.183 | 1.220<br>1.220<br>1.220<br>1.220 | 1.226<br>1.232<br>1.244<br>1.257 | C/0.5 <sup>(1)</sup><br>D/1<br>E/2<br>F/3 | V                  |
| $I_{MIN}$                       | Minimum operating current                                 |                                                                         |                                  | 4                                | 8                                |                                           | $\mu\text{A}$      |
| $I_R$                           | Recommended operating current                             |                                                                         | 0.008                            |                                  | 20                               |                                           | mA                 |
| $T_C^{(*)}$                     | Average reverse breakdown voltage temperature coefficient | $I_{R(min)}$ to $I_{R(max)}$                                            |                                  | 20                               | 75                               |                                           | ppm/°C             |
| $\frac{\Delta V_R}{\Delta I_R}$ | Reverse Breakdown Change with Current Voltage             | $I_R = 30\mu\text{A}$ to 1mA<br>$I_R = 1\text{mA}$ to 12mA              |                                  |                                  | 1<br>10                          |                                           | mV                 |
| $Z_R$                           | Reverse dynamic impedance                                 | $I_R = 1\text{mA}$<br>$f = 100\text{Hz}$<br>$I_{AC} = 0.1I_R$           |                                  | 0.2                              | 0.6                              |                                           | $\Omega$           |
| $E_N$                           | Wideband noise voltage                                    | $I_R = 8\mu\text{A}$ to 100 $\mu\text{A}$<br>$f = 10\text{Hz}$ to 10kHz |                                  | 60                               |                                  |                                           | $\mu\text{V(rms)}$ |

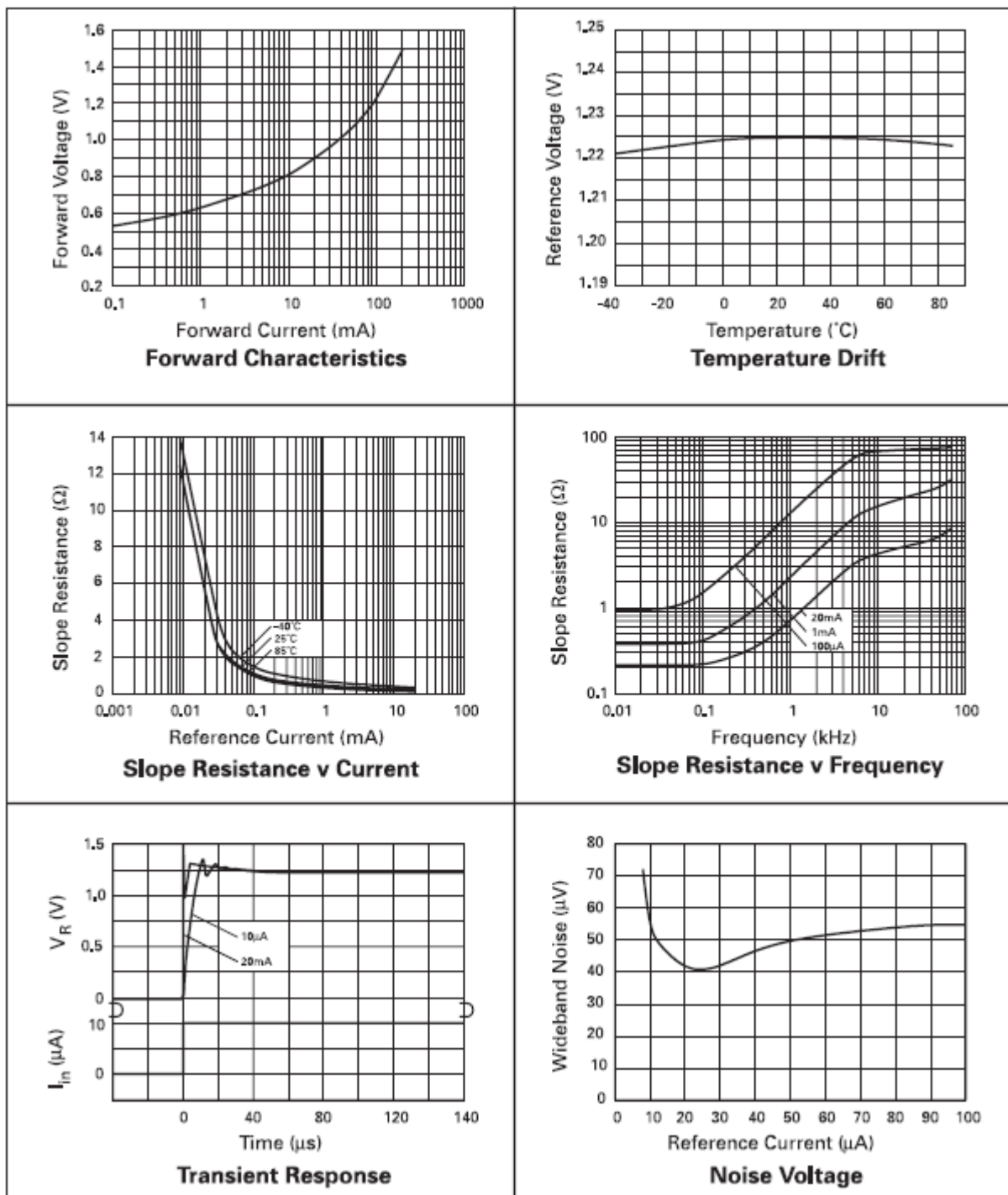
Notes:

$$1. \quad (*) \quad T_C = \frac{(V_{R(MAX)} - V_{R(MIN)}) \times 1000000}{V_R \times (T_{(MAX)} - T_{(MIN)})}$$

 Note:  $V_{R(MAX)} - V_{R(MIN)}$  is the maximum deviation in reference voltage measured over the full operating temperature range.

**REVERSE CHARACTERISTICS**


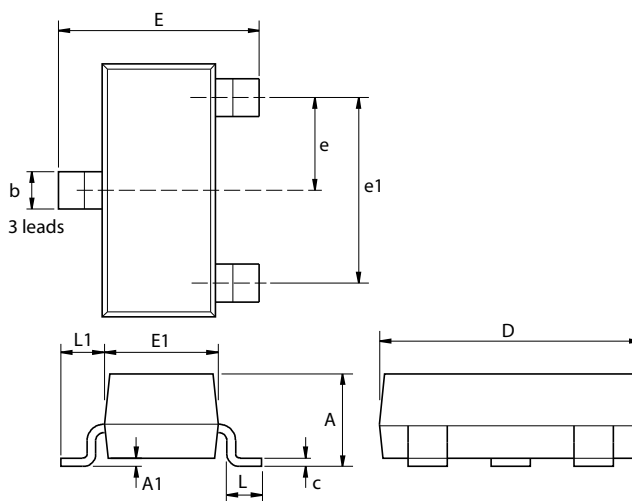
## Typical Characteristics



**Ordering Information<sup>(\*)</sup>**

| Order Reference | Tol (%) | Device Mark | Grade | Status (*) | Reel Size (inches) | Quantity per reel | Tape Width (mm) |
|-----------------|---------|-------------|-------|------------|--------------------|-------------------|-----------------|
| ZXRE125CFTA     | 0.5     | 12J         | C     | Released   | 7                  | 3000              | 8               |
| ZXRE125DFTA     | 1       | 12H         | D     | Released   | 7                  | 3000              | 8               |
| ZXRE125EFTA     | 2       | 12G         | E     | Released   | 7                  | 3000              | 8               |
| ZXRE125FFTA     | 3       | 12F         | F     | Released   | 7                  | 3000              | 8               |

Notes: \* All ZXRE125 E-line variants are obsolete and no longer available for sale.

**Package Outline Dimensions**


| Dim. | Millimeters |      | Inches    |       | Dim. | Millimeters |      | Inches    |        |
|------|-------------|------|-----------|-------|------|-------------|------|-----------|--------|
|      | Min.        | Max. | Min.      | Max.  |      | Min.        | Max. | Min.      | Max.   |
| A    | -           | 1.12 | -         | 0.044 | e1   | 1.90 NOM    |      | 0.075 NOM |        |
| A1   | 0.01        | 0.10 | 0.0004    | 0.004 | E    | 2.10        | 2.64 | 0.083     | 0.104  |
| b    | 0.30        | 0.50 | 0.012     | 0.020 | E1   | 1.20        | 1.40 | 0.047     | 0.055  |
| c    | 0.085       | 0.20 | 0.003     | 0.008 | L    | 0.25        | 0.60 | 0.0098    | 0.0236 |
| D    | 2.80        | 3.04 | 0.110     | 0.120 | L1   | 0.45        | 0.62 | 0.018     | 0.024  |
| e    | 0.95 NOM    |      | 0.037 NOM |       | -    | -           | -    | -         | -      |

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

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