# PRECISION 1.24 VOLT MICROPOWER VOLTAGE REFERENCE

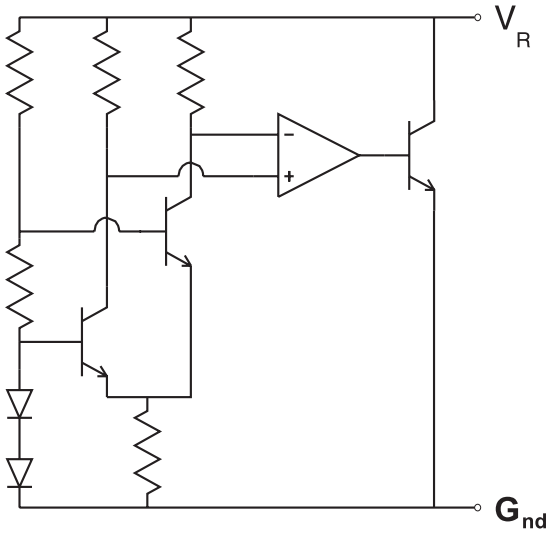
## DEVICE DESCRIPTION

The ZRA124 uses a bandgap circuit design to achieve a precision micropower voltage reference of 1.24 volts. The device is available in a small outline surface mount packages, ideal for applications where space saving is important.

The ZRA124 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRA124 is recommended for operation between 50μA and 5mA and so is ideally suited to low power and battery powered applications.

Excellent performance is maintained to an absolute maximum of 25mA, however the rugged design and 20 volt processing allows the reference to withstand transient effects and currents up to 200mA. Superior switching capability allows the device to reach stable operating conditions in only a few microseconds.

## SCHEMATIC DIAGRAM

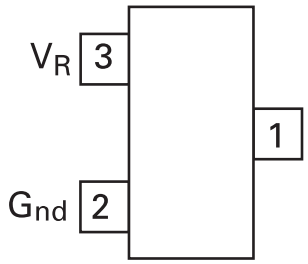



## FEATURES

- Typical $T_C$ 30ppm/°C
- Typical slope resistance 0.65Ω
- ± 1% tolerance
- Industrial temperature range
- Operating current 50μA to 5mA
- No stabilising capacitor required
- Transient response, stable in less than 10μs
- Small SOT23 package

## APPLICATIONS

- Battery powered and portable equipment
- Metering and measurement systems
- Instrumentation
- Precision power supplies
- Test equipment
- Data acquisition systems




**TOP VIEW**

Pin 1 floating or connected to pin 2

## ORDERING INFORMATION

| DEVICE | TOL % | REEL SIZE | TAPE WIDTH | REEL QUANTITY | PART MARK |
|---|---|---|---|---|---|
| ZRA124F01TA | 1 | 7" | 8mm | 3,000 | 12C |

# ZRA124

## ABSOLUTE MAXIMUM RATING

| | |
|---|---|
| Reverse current | 25mA |
| Forward current | 25mA |
| Operating temperature | -40 to 85°C |
| Storage temperature | -55 to 125°C |

**Power dissipation ($T_{amb}$ = 25°C)**

| | |
|---|---|
| SOT23 | 330mW |

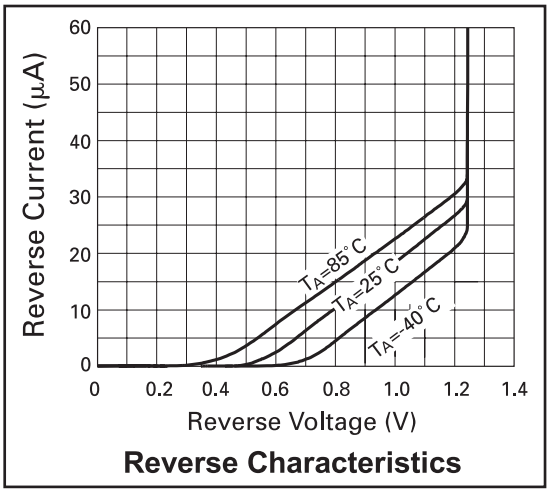
**ELECTRICAL CHARACTERISTICS TEST CONDITIONS** (Unless otherwise stated) $T_{amb}$=25°C

| SYMBOL | PARAMETER | CONDITIONS | LIMITS | | | TOL % | UNITS |
|---|---|---|---|---|---|---|---|
| | | | MIN. | TYP. | MAX. | | |
| $V_R$ | Reverse breakdown voltage | $I_R$ = 150μA | 1.228 | 1.24 | 1.252 | 1 | V |
| $I_{MIN}$ | Minimum operating current | | | 30 | 50 | | μA |
| $I_R$ | Recomended operating current | | 0.05 | | 5 | | mA |
| $T_C$ (1) | Average reverse breakdown voltage temp. co. | $I_R$(min) to $I_R$(max) | | 30 | 90 | | ppm/°C |
| $R_S$ (2) | Slope resistance | | | 0.65 | 2 | | Ω |
| $Z_R$ | Reverse dynamic impedance | $I_R$ = 1mA f = 100Hz $1_{AC}$ = 0.1IR | | 0.5 | 1 | | Ω |
| $E_N$ | Wideband noise voltage | $I_R$ = 150μA f = 100Hz to 10kHz | | 40 | | | μV(rms) |

**NOTES:**

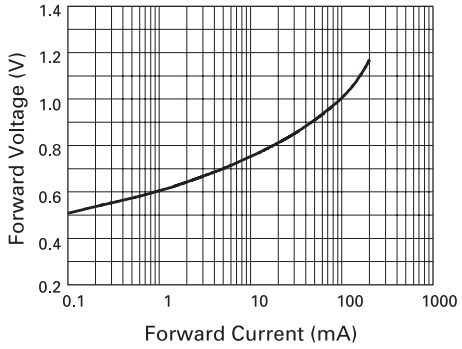
(1) $T_C = \dfrac{V_R \text{ Change } x\ 1000000}{V_R \ x \text{ Temperature Change}}$

(2) $R_S = \dfrac{V_R \text{ Change } (I_R(\min) \text{ to } I_R(\max))}{I_R(\max) - I_R(\min)}$

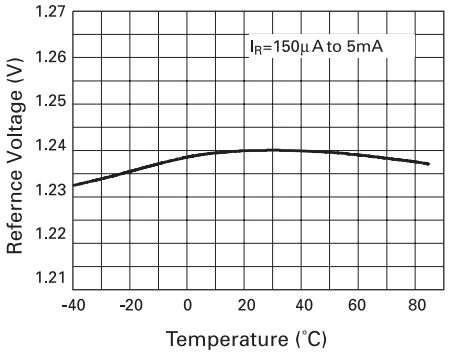


**Reverse Characteristics**

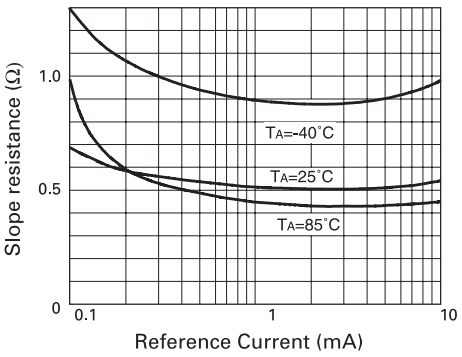
## TYPICAL CHARACTERISTICS



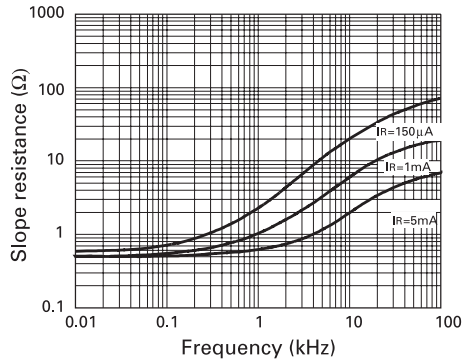

**Forward Characteristics**



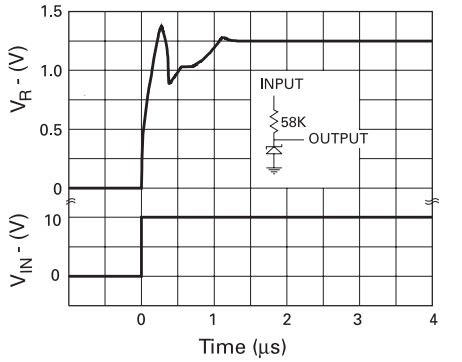

**Temperature Drift**



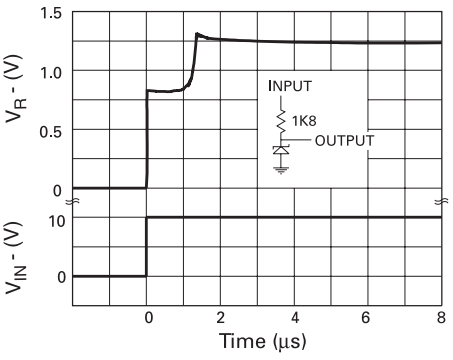

**Slope Resistance v Reference Current**




**Slope Resistance v Frequency**



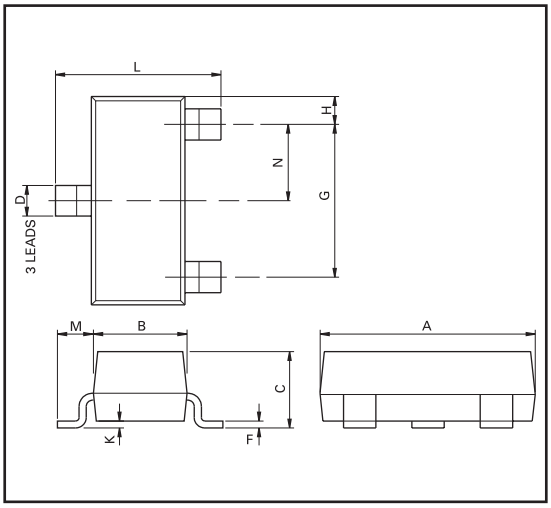

**Transient Response ($I_R$=150µA)**




**Transient Response ($I_R$=5mA)**

# ZRA124

## 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 | Max | Max |
| A | 2.67 | 3.05 | 0.105 | 0.120 | H | 0.33 | 0.51 | 0.013 | 0.020 |
| B | 1.20 | 1.40 | 0.047 | 0.055 | K | 0.01 | 0.10 | 0.0004 | 0.004 |
| C | — | 1.10 | — | 0.043 | L | 2.10 | 2.50 | 0.083 | 0.0985 |
| D | 0.37 | 0.53 | 0.015 | 0.021 | M | 0.45 | 0.64 | 0.018 | 0.025 |
| F | 0.085 | 0.15 | 0.0034 | 0.0059 | N | 0.95 NOM | | 0.0375 NOM | |
| G | 1.90 NOM | | 0.075 NOM | | — | — | | — | |

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