

ZR4040-2.5
PRECISION 2.5 VOLT MICROPOWER VOLTAGE REFERENCE

Description

The ZR4040-2.5 uses a bandgap circuit design to achieve a precision micropower voltage reference of 2.5 volts. The device is available in a small outline surface mount package, ideal for applications where space saving is important, as well as packages for through hole requirements.

The ZR4040-2.5 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZR4040-2.5 is recommended for operation between 60µA and 15mA 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.

Features

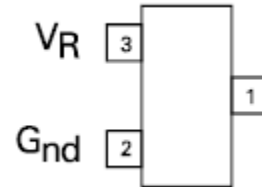
- Small outline SOT23 package
- No stabilizing capacitor required
- Typical T_C 30ppm/°C
- Typical slope resistance 0.4Ω
- 2%, 1% and 0.5% tolerance
- Industrial temperature range
- Operating current 60µA to 15mA
- Transient response, stable in less than 10µs
- Green molding compound (No Br, Sb)

Applications

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

Pin Assignments

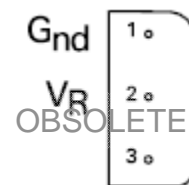
SOT23 Package Suffix - F



(Top View)

Pin 1 floating or connected to pin 2

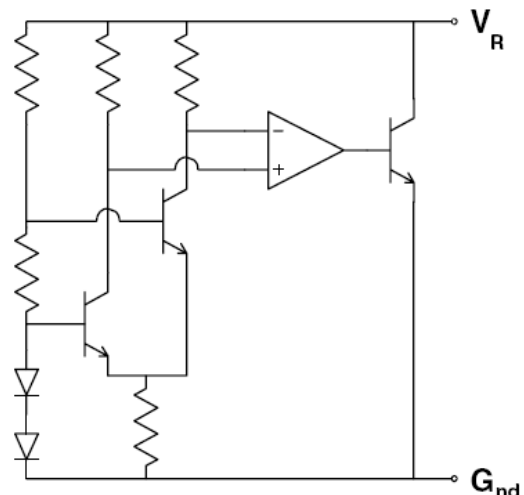
E-Line, 3 pin, Rev Package Suffix – R



(Bottom View)

Pin 3 floating or connected to pin 1

Typical Application Circuit



Absolute Maximum Ratings (Voltages to GND Unless Otherwise Stated)

| Parameter | Rating | Unit |
|--|------------|------|
| Reverse Current | 25 | mA |
| Forward Current | 25 | mA |
| Operating Temperature | -40 to 85 | °C |
| Storage Temperature | -55 to 125 | °C |
| Power Dissipation (T _{AMB} = 25°C) SOT23 | 330 | mW |

Electrical Characteristics (Test conditions: T_{amb} = 25°C, unless otherwise specified.)

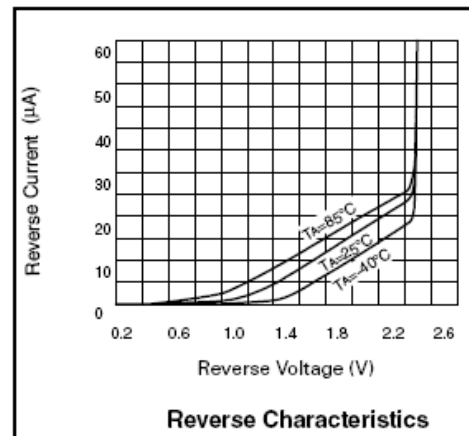
| Symbol | Parameter | Condition | Min. | Typ. | Max. | Tol. (%) | Unit |
|-------------------------------|---|--|-------------------------|-------------------|-------------------------|---------------|---------|
| V _R | Reverse breakdown voltage | I _R = 150µA | 2.4875 2.475 2.45 | 2.5 2.5 2.5 | 2.5125 2.525 2.55 | 0.5 1 2 | V |
| I _{MIN} | Minimum operating current | | | 25 | 60 | | µA |
| I _R | Recommended operating current | | 0.06 | | 15 | | mA |
| T _C ^(*) | Average reverse breakdown voltage temperature coefficient | I _R (MIN) to I _R (MAX) | | 30 | 100 | | ppm/°C |
| R _S ^(†) | Slope resistance | | | 0.4 | 2 | | Ω |
| Z _R | Reverse dynamic impedance | I _R = 1mA f = 100Hz I _{AC} = 0.1I _R | | 0.3 | 0.8 | | Ω |
| E _N | Wideband noise voltage | I _R = 1mA f = 10Hz to 10kHz | | 45 | | | µV(rms) |

Notes:

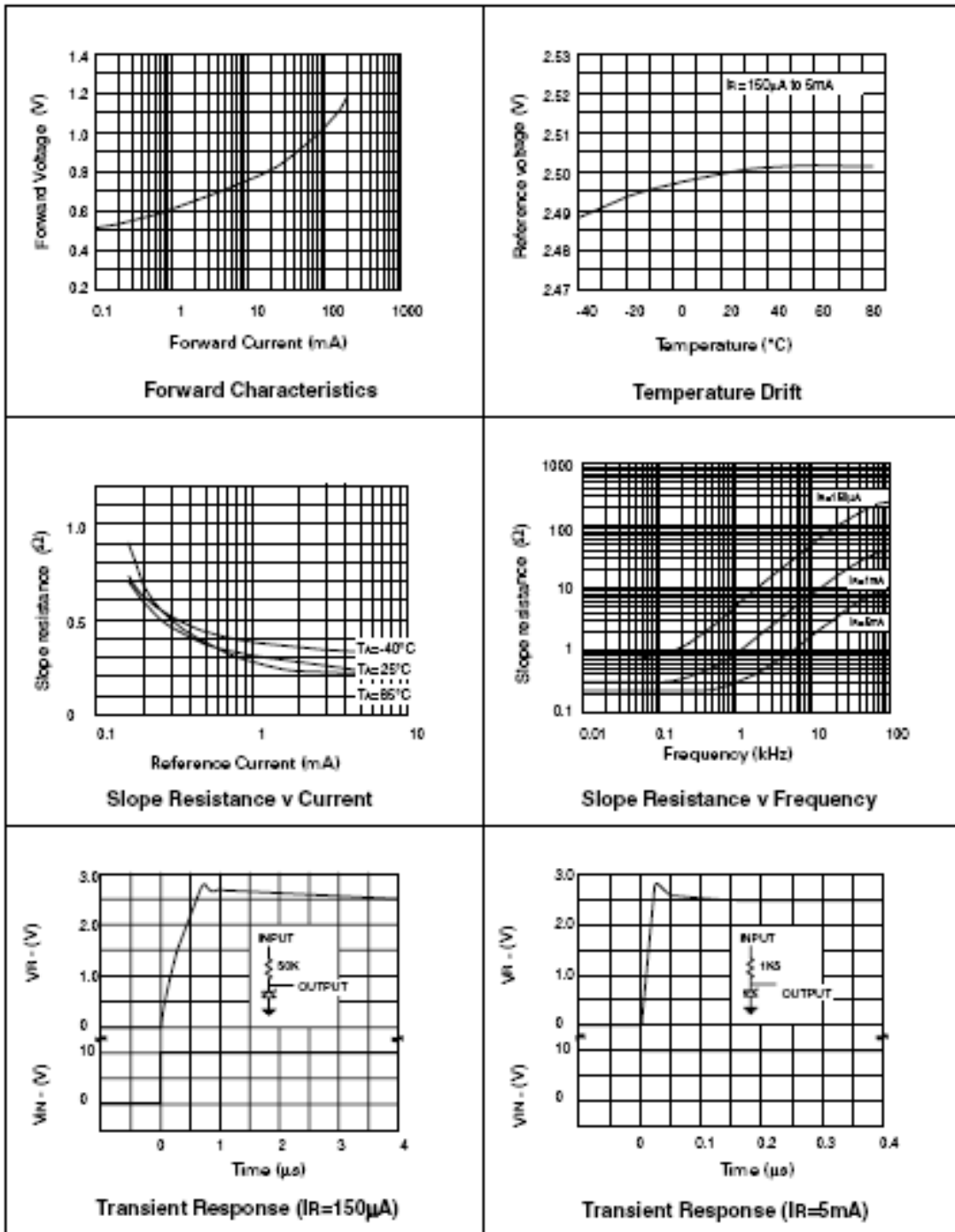
$$(*) T_C = \frac{(V_{R(MAX)} - V_{R(MIN)}) \times 1000000}{V_R \times (T_{(MAX)} - T_{(MIN)})}$$

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

$$(†) R_S = \frac{V_R \text{ Change (I}_{R(MIN)} \text{ to I}_{R(MAX)})}{I_{R(MAX)} - I_{R(MIN)}}$$



Typical Characteristics



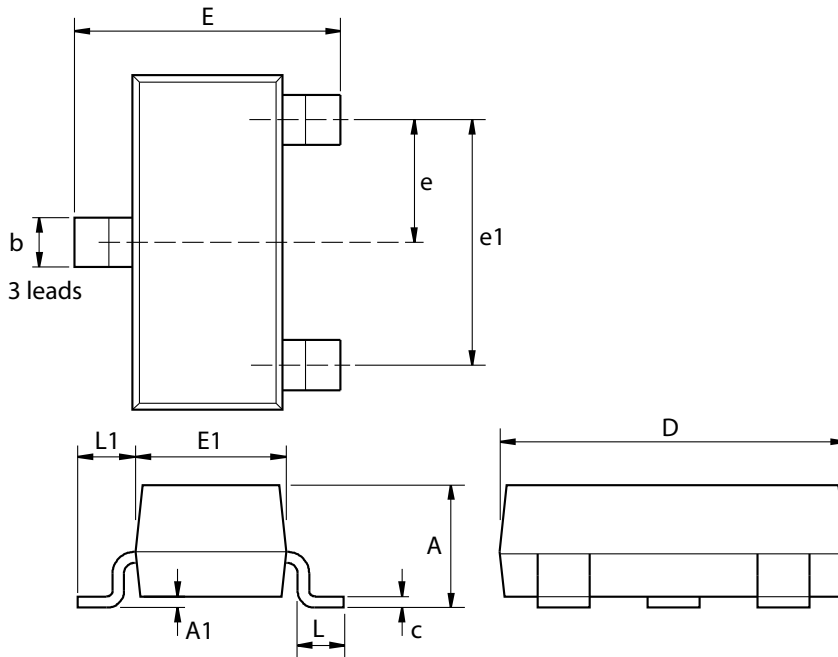
Ordering Information*

| Order Reference | Tol (%) | Package | Device Mark | Status (*) | Reel Size (inches) | Quantity per reel | Tape Width (mm) |
|-----------------|---------|---------|-------------|------------|--------------------|-------------------|-----------------|
| ZR40401F25TA | 1 | SOT23 | 25M | Released | 7 | 3000 | 8 |
| ZR40402F25TA | 2 | SOT23 | 25L | Released | 7 | 3000 | 8 |
| ZR404005F25TA | 0.5 | SOT23 | 25V | Released | 7 | 3000 | 8 |

Notes: *All ZR4040R25 variants (E-Line) are obsolete and no longer available for sale. The closest alternative is the SOT23.

Package Outline Dimensions

SOT23



| 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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