

**ZR285**  
**PRECISION 2.5V MICROPOWER VOLTAGE REFERENCE**

**Description**

The ZR285 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.

The ZR285 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZR285 is recommended for operation between 20µA and 20mA and so is ideally suited to low power and battery powered applications.

Excellent performance is maintained to an absolute maximum of 30mA, 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**

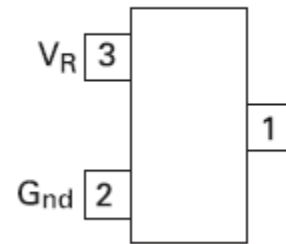
- Small outline SOT23 style package
- No stabilizing capacitor required
- Low knee current, 15µA typical
- Typical  $T_c$  30ppm/°C
- Typical slope resistance 0.4Ω
- ± 2% tolerance
- Industrial temperature range
- Operating current 20µA to 20mA

**Applications**

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

**Pin Assignment**

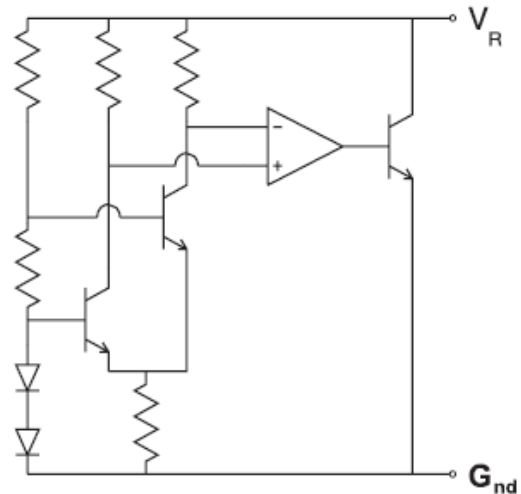
SOT23 Package Suffix - F



(Top View)

Pin 1 floating or connected to pin 2

**Typical Application Circuit**



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

| Parameter  | Rating     | Unit |
|--|------------|------|
| Reverse Current                                      | 30         | mA   |
| Forward Current                                      | 25         | mA   |
| Operating Temperature                                | -40 to 85  | °C   |
| Storage Temperature                                  | -55 to 150 | °C   |
| Power Dissipation (T <sub>AMB</sub> = 25°C)<br>SOT23 | 330        | mW   |

**Electrical Characteristics** (Test conditions: T<sub>amb</sub> = 25°C, unless otherwise specified.)

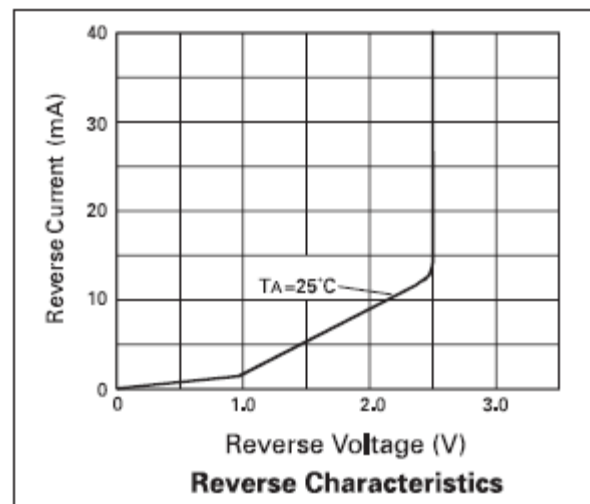
| Symbol                        | Parameter   | Condition  | Min. | Typ. | Max. | Tol. (%) | Unit    |
|-------------------------------|---|--|------|------|------|----------|---------|
| V <sub>R</sub>                | Reverse breakdown voltage                                 | I <sub>R</sub> = 150µA   | 2.45 | 2.5  | 2.55 | 2        | V       |
| I <sub>MIN</sub>              | Minimum operating current                                 |  |      | 13   | 20   |          | µA      |
| I <sub>R</sub>                | Recommended operating current                             |  | 0.02 |      | 20   |          | mA      |
| T <sub>C</sub> <sup>(*)</sup> | Average reverse breakdown voltage temperature coefficient | I <sub>R</sub> = 1mA to 20mA   |      | 30   | 90   |          | ppm/°C  |
| R <sub>S</sub> <sup>(†)</sup> | Slope resistance  |  |      | 0.4  | 1    |          | Ω       |
| Z <sub>R</sub>                | Reverse dynamic impedance                                 | I <sub>R</sub> = 1mA<br>f = 100Hz<br>I <sub>AC</sub> = 0.1I <sub>R</sub> |      | 0.3  | 0.8  |          | Ω       |
| E <sub>N</sub>                | Wideband noise voltage                                    | I <sub>R</sub> = 150µA<br>f = 10Hz to 10kHz                              |      | 60   |      |          | µV(rms) |

Notes:

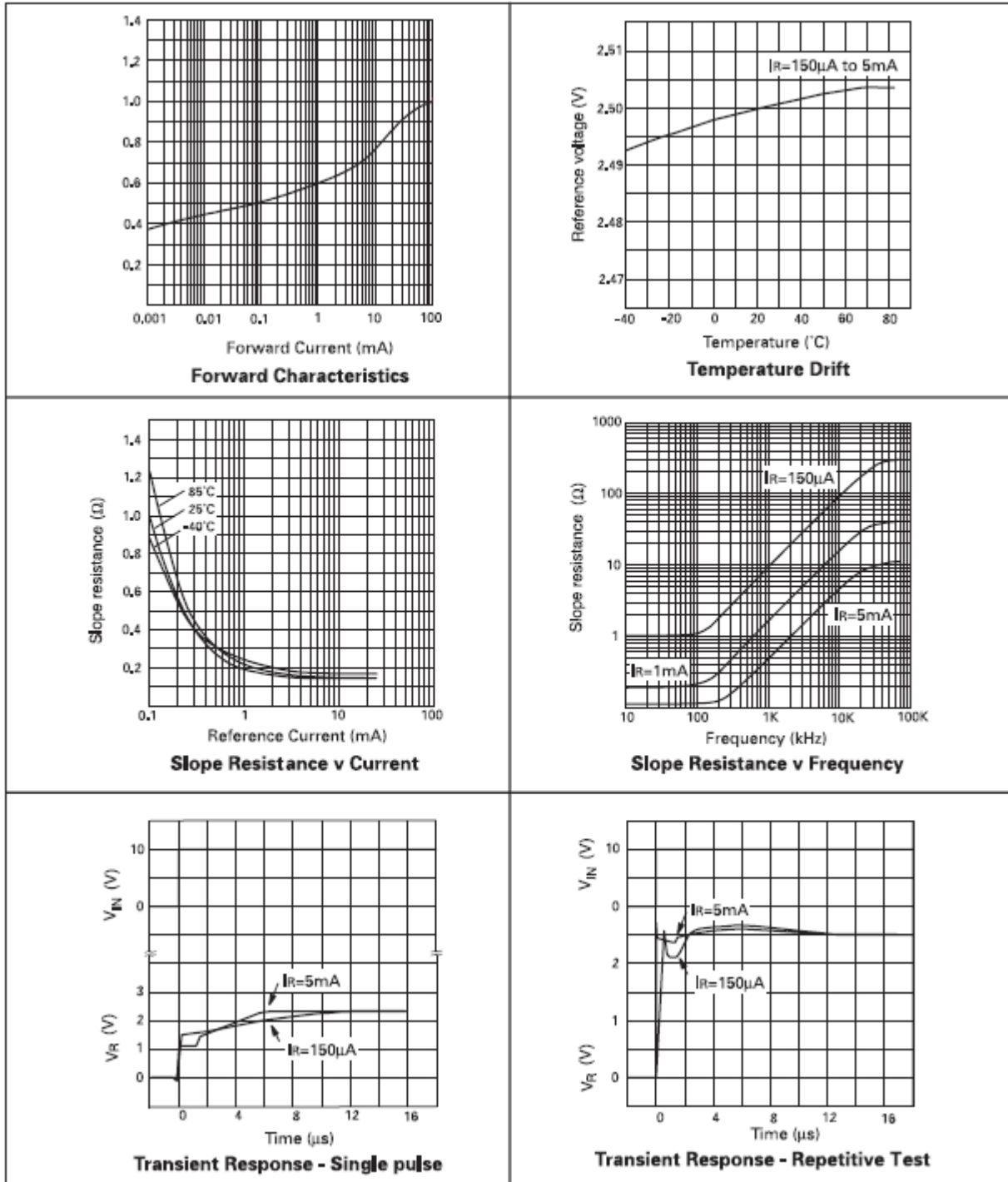
$$(*) T_C = \frac{(V_{R(MAX)} - V_{R(MIN)}) \times 1000000}{V_R \times (T_{(MAX)} - T_{(MIN)})}$$

Note: V<sub>R(MAX)</sub> - V<sub>R(MIN)</sub> 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**

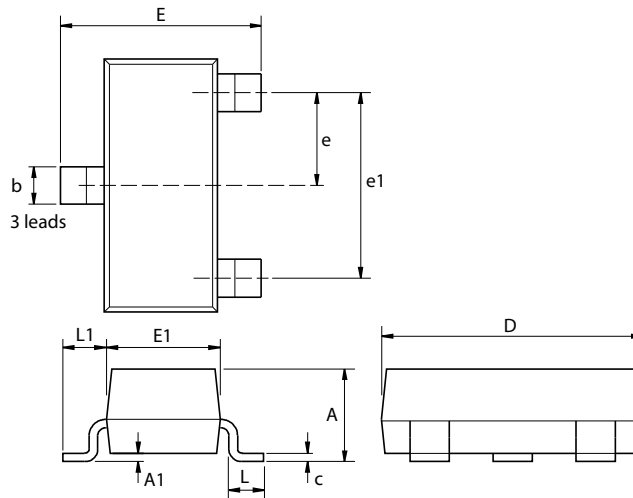


### Ordering Information\*

| Order Reference | Tol (%) | Device Mark | Status (*) | Reel Size (inches) | Quantity per reel | Tape Width (mm) |
|-----------------|---------|-------------|------------|--------------------|-------------------|-----------------|
| ZR285F01TA      | 1       | 28C         | Obsolete   | 7                  | 3000              | 8               |
| ZR285F02TA      | 2       | 28B         | Released   | 7                  | 3000              | 8               |
| ZR285F03TA      | 3       | 28A         | Obsolete   | 7                  | 3000              | 8               |

Notes: \*ZR285F02TA is not recommended for new designs.

### 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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