

# PRECISION 2.5 VOLT LOW KNEE CURRENT VOLTAGE REFERENCE

## ZRC250

ISSUE 4 - JANUARY 2003

### DEVICE DESCRIPTION

The ZRC250 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 a package for through hole requirements.

The ZRC250 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRC250 is recommended for operation between 20 $\mu$ A 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.

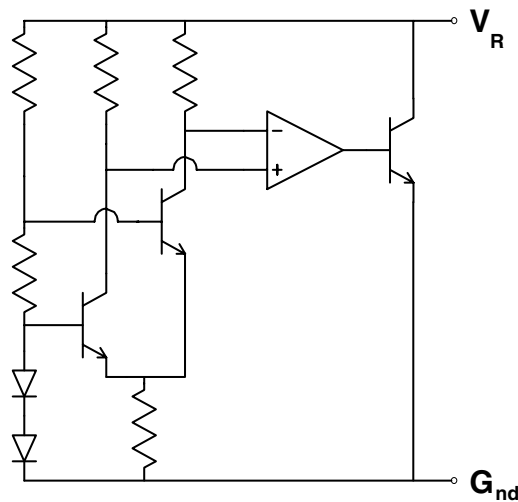
### FEATURES

- Small outline SOT23 package
- TO92 style packages
- No stabilising capacitor required
- Low knee current, 15 $\mu$ A typical
- Typical  $T_c$  30ppm/ $^{\circ}$ C
- Typical slope resistance 0.4 $\Omega$
- $\pm$  3, 2 and 1% tolerance
- Industrial temperature range
- Operating current 20 $\mu$ A to 5mA
- Transient response, stable in less than 10 $\mu$ s
- Optional extended current range

### APPLICATIONS

- Battery powered and portable equipment.
- Instrumentation.
- Test equipment.

### SCHEMATIC DIAGRAM



# ZRC250

## ABSOLUTE MAXIMUM RATING

Reverse Current	25mA
Forward Current	25mA
Operating Temperature	-40 to 85°C
Storage Temperature	-55 to 125°C

## Power Dissipation (T<sub>amb</sub>=25°C)

SOT23	330mW
E-line, 3 pin (TO92)	500mW

## ELECTRICAL CHARACTERISTICS

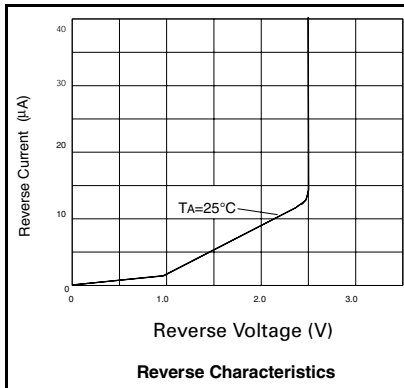
TEST CONDITIONS (Unless otherwise stated) T<sub>amb</sub>=25°C

SYMBOL	PARAMETER	CONDITIONS	LIMITS			TOL%	UNITS
			MIN	TYP	MAX		
V <sub>R</sub>	Reverse Breakdown Voltage	I <sub>R</sub> =150μA	2.475 2.45 2.425	2.5 2.5 2.5	2.525 2.55 2.575	1 2 3	V
I <sub>MIN</sub>	Minimum Operating Current			13	20		μA
I <sub>R</sub>	Recommended Operating Current		0.02		5		mA
T <sub>C</sub> †	Average Reverse Breakdown Voltage Temp. Co.	I <sub>R(min)</sub> to I <sub>R(max)</sub>		30	90		ppm/°C
R <sub>S</sub> §	Slope Resistance			0.4	1		Ω
Z <sub>R</sub>	Reverse Dynamic Impedance	I <sub>R</sub> = 1mA f = 100Hz I <sub>AC</sub> =0.1 I <sub>R</sub>		0.3	0.8		Ω
E <sub>N</sub>	Wideband Noise Voltage	I <sub>R</sub> = 150μA f = 10Hz to 10kHz		60			μV(rms)

$$\dagger T_C = \frac{(V_{R(max)} - V_{R(min)}) \times 1000000}{V_R \times (T_{(max)} - T_{(min)})}$$

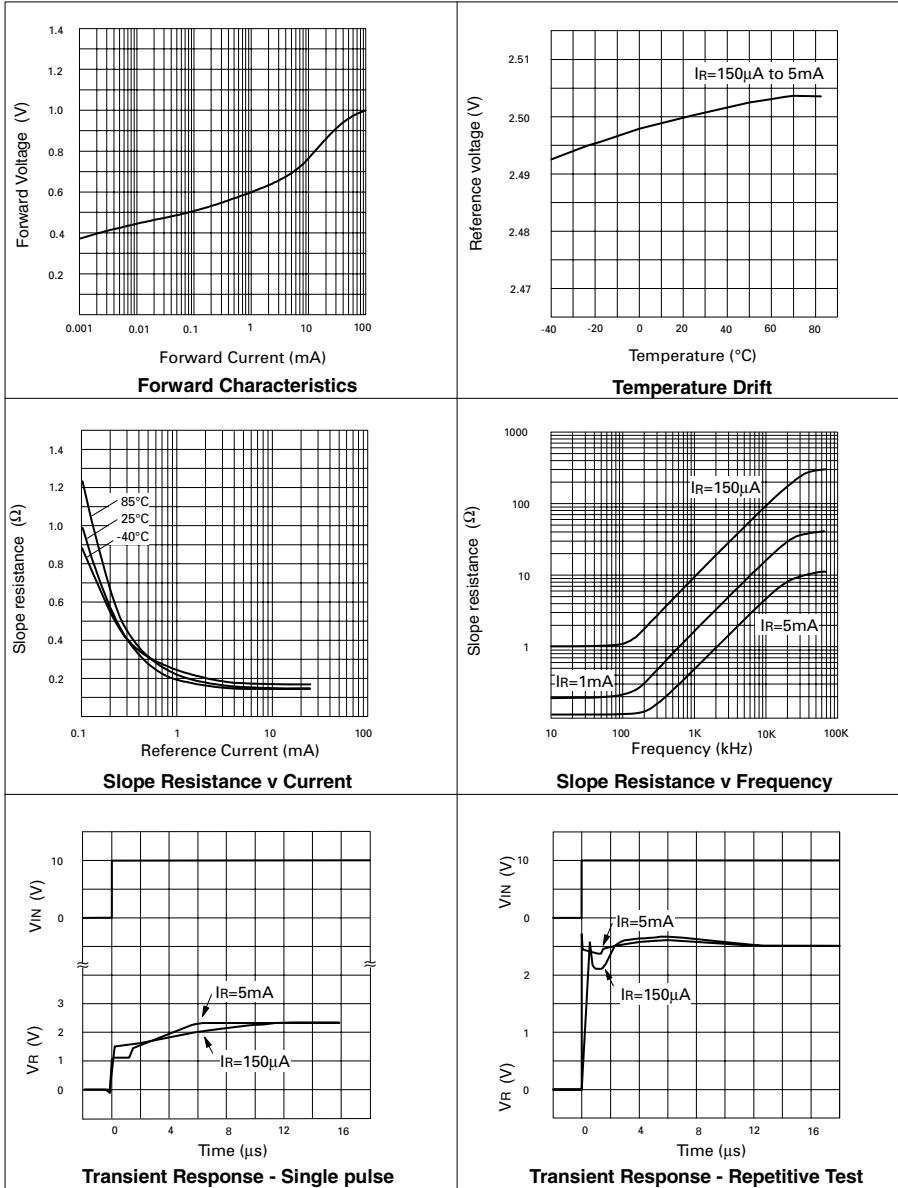
Note: V<sub>R(max)</sub> - V<sub>R(min)</sub> is the maximum deviation in reference voltage measured over the full operating temperature range.

$$\S R_S = \frac{V_R \text{ Change } (I_{R(min)} \text{ to } I_{R(max)})}{I_{R(max)} - I_{R(min)}}$$



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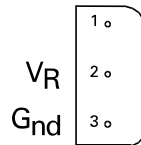
## TYPICAL CHARACTERISTICS



# ZRC250

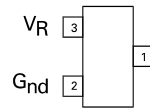
## CONNECTION DIAGRAMS

**E-Line, 3 pin Package Suffix - A**



*Bottom View -  
Pin 1 floating or connected to pin 3*

**SOT23 Package Suffix - F**



*Top View -  
Pin 1 floating or connected to pin 2*

# ZRC250

## ORDERING INFORMATION

Part No	Tol%	Package	Partmark
ZRC250A03	3	E-Line •	ZRC25003
ZRC250A02	2	E-Line •	ZRC25002
ZRC250A01	1	E-Line •	ZRC25001
ZRC250F03	3	SOT23	25G
ZRC250F02	2	SOT23	25H
ZRC250F01	1	SOT23	25J

- E-Line 3 pin