

## 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
- No stabilizing capacitor required
- Low knee current, 15 $\mu$ A typical
- Typical  $T_C$  30ppm/ $^{\circ}$ C
- Typical slope resistance 0.4 $\Omega$
- $\pm 2$  and 1% tolerance
- Industrial temperature range
- Operating current 20 $\mu$ A to 5mA
- Transient response, stable in less than 10 $\mu$ s
- Green molding compound (No Br, Sb)

## Applications

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

## Pin Assignments

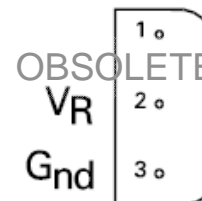
### SOT23 Package Suffix - F



(Top View)

Pin 1 floating or connected to pin 1

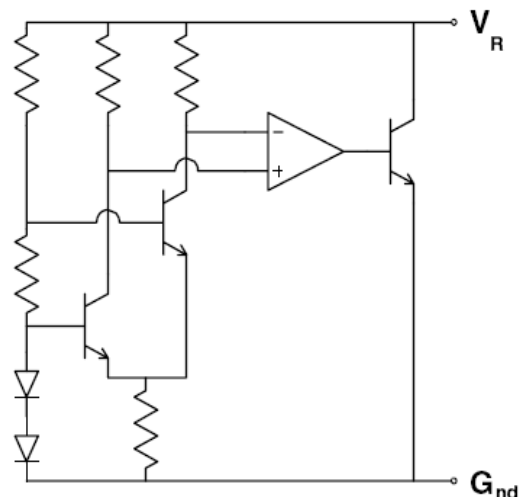
### E-Line, 3 pin Package Suffix - A



(Bottom View)

Pin 1 floating or connected to pin 3

## 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 <sub>AMB</sub> = 25°C) SOT23	330	mW

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

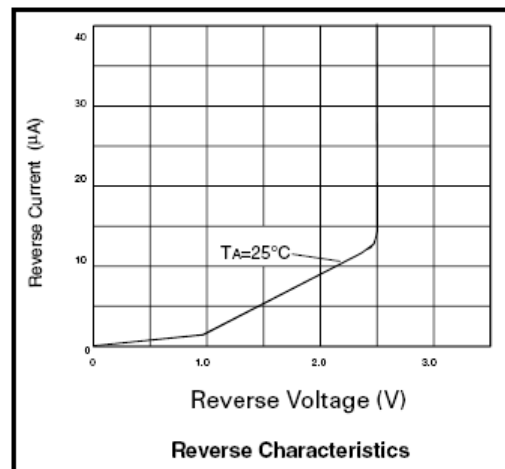
Symbol	Parameter	Condition	Min.	Typ.	Max.	Tol. (%)	Unit
V <sub>R</sub>	Reverse breakdown voltage	I <sub>R</sub> = 150μA	2.475 2.45	2.5 2.5	2.525 2.55	1 2	V
I <sub>MIN</sub>	Minimum operating current			13	20		μA
I <sub>R</sub>	Recommended operating current		0.02		5		mA
T <sub>C</sub> <sup>(*)</sup>	Average reverse breakdown voltage temperature coefficient	I <sub>R(MIN)</sub> to I <sub>R(MAX)</sub>		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 f = 100Hz 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 f = 10Hz to 10kHz		60			μV(rms)

Notes:

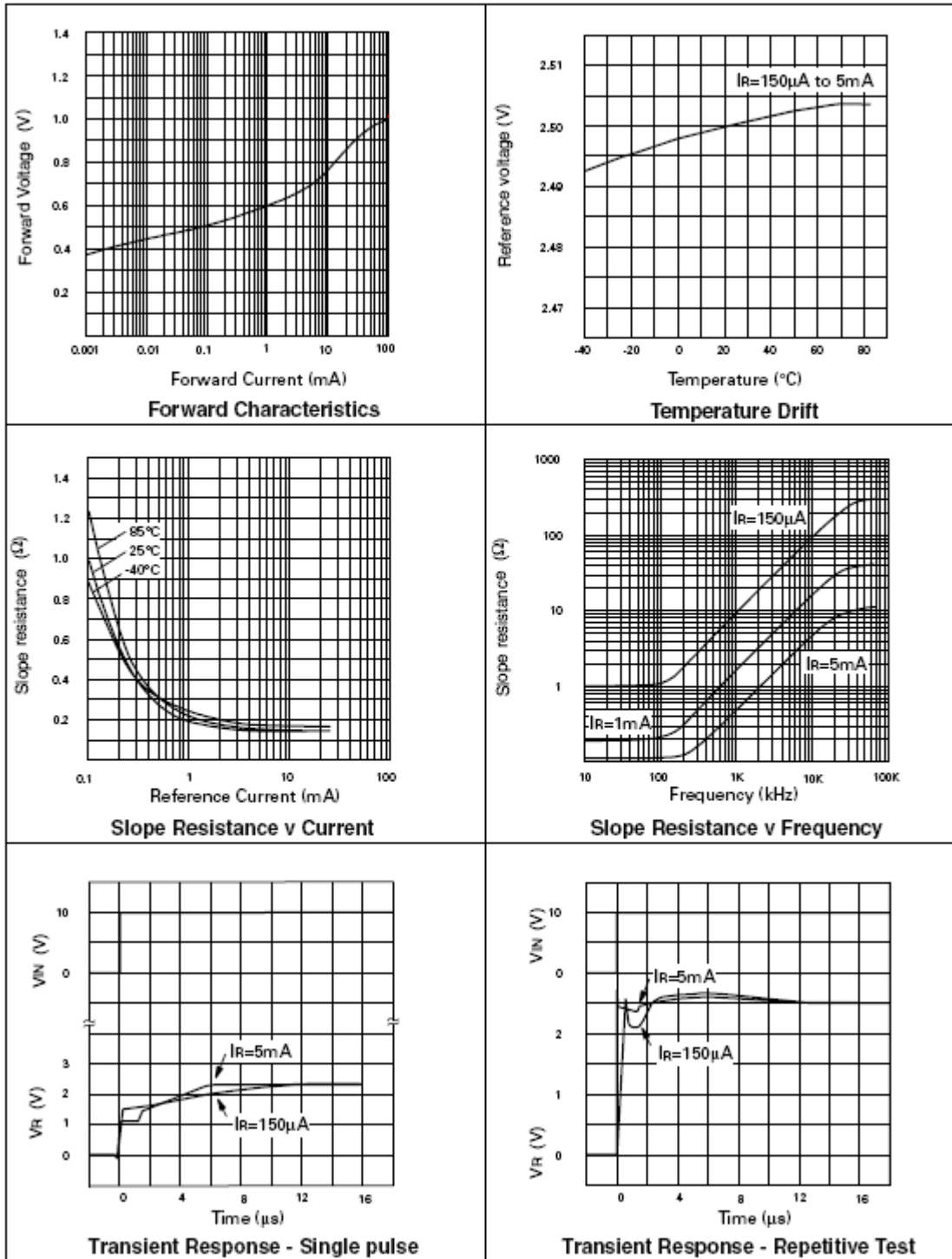
$$(*) T_C = \frac{(V_{R(MAX)} - V_{R(MIN)}) \times 1000000}{V_R \times (T_{(MAX)} - T_{(MIN)})}$$

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**



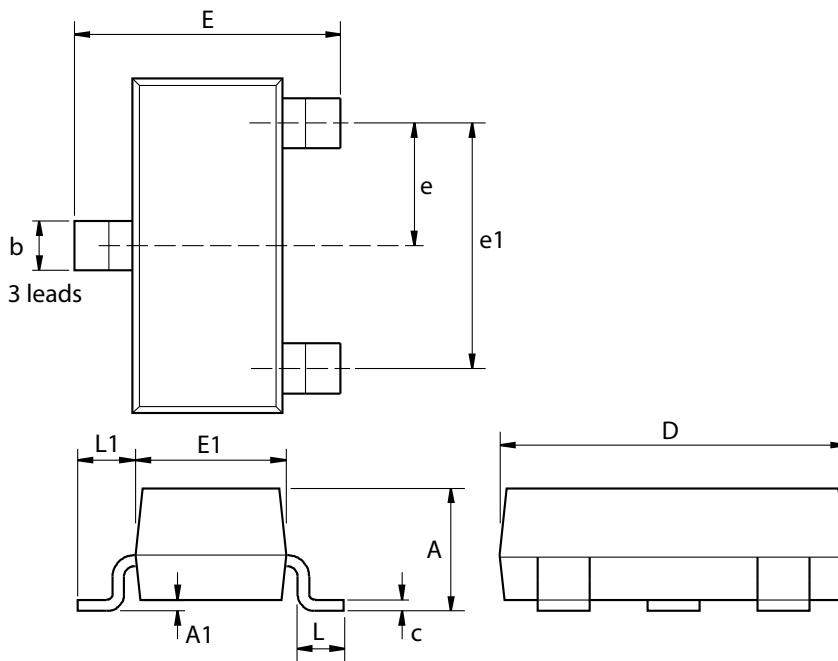
**Ordering Information\***

Order Reference	Tol (%)	Package	Device Mark	Status (*)	Reel Size (inches)	Quantity per reel	Tape Width (mm)
ZRC250F01TA	1	SOT23	25J	Released	7	3000	8
ZRC250F02TA	2	SOT23	25H	Released	7	3000	8
ZRC250F03TA	3	SOT23	25G	Obsolete	7	3000	8

Notes: \*All ZRC250A variants (E-Line) are obsolete no longer available for sale. The closest alternative is the SOT23.

**Package Outline Dimensions**

**SOT23**

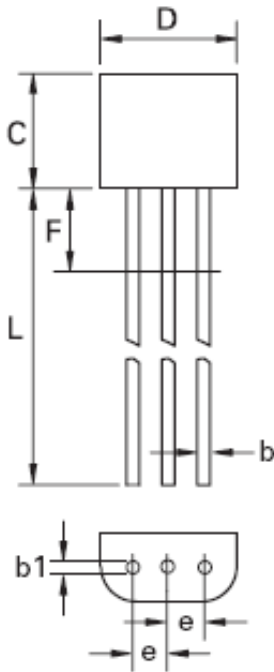


Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
c	0.085	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110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

**Package Outline Dimensions**

**E-Line, 3 pin**



DIM	Millimeters		Inches	
	Min.	Max.	Min.	Max.
A	2.16	2.41	0.085	0.095
b	0.41	0.495	0.016	0.0195
b1	0.41	0.495	0.016	0.0195
D	4.37	4.77	0.172	0.188
E	3.61	4.01	0.142	0.158
e	1.27 NOM		0.050 NOM	
F	—	2.50	—	0.098
L	13.00	13.97	0.512	0.550

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

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