



# **ZRC250**

## PRECISION 2.5 VOLT LOW KNEE CURRENT VOLTAGE REFERENCE

### **Description**

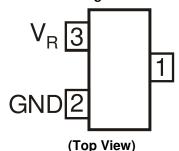
The ZRC250 uses a bandgap circuit design to achieve a precision micropower voltage reference of 2.5 volts. The device is available in a small outline surface mount package, ideal for applications where space saving is important, as well as a package for through hole requirements.

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.

### **Pin Assignments**

SOT23 Package Suffix - F



Pin 1 floating or connected to pin 2

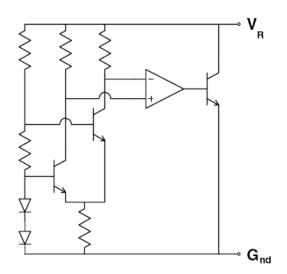
#### **Features**

- Small outline SOT23 package
- · No stabilizing capacitor required
- Low knee current, 15µA typical
- Typical T<sub>C</sub> 30ppm/°C
- Typical slope resistance 0.4Ω
- ±3, ±2 and ±1% tolerance
- Industrial temperature range
- Operating current 20µA to 5mA
- Transient response, stable in less than 10µs
- Green molding compound (No Br, Sb)

# **Applications**

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

## **Typical Application Circuit**





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### **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.)

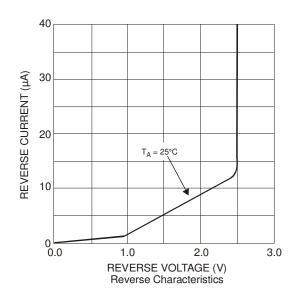
Symbol	Parameter	Condition	Min.	Тур.	Max.	Tol. (%)	Unit
			2.475	2.5	2.525	1	
$V_{R}$	Reverse breakdown voltage	$I_R = 150 \mu A$	2.45	2.5	2.55	2	V
			2.425	2.5	2.575	3	
I <sub>MIN</sub>	Minimum operating current			13	20		μΑ
I <sub>R</sub>	Recommended operating current		0.02		5		mA
T <sub>C</sub> <sup>(*)</sup>	Average reverse breakdown voltage temperature coefficient	I <sub>R(MIN)</sub> to		30	90		ppm/°C
R <sub>S</sub> <sup>(†)</sup>	Slope resistance	I <sub>R(MAX)</sub>		0.4	1		Ω
Z <sub>R</sub>	Reverse dynamic impedance	$I_{R} = 1 \text{mA}$ $f = 100 \text{Hz}$ $I_{AC} = 0.1 I_{R}$		0.3	0.8		Ω
E <sub>N</sub>	Wideband noise voltage	$I_R = 150\mu A$ f = 10Hz to 10kHz		60			μV(rms)

Note:

(\*) 
$$T_C = \frac{(V_{R(MAX)} - V_{R(MIN)})x1000000}{V_Rx(T_{(MAX)} - T_{(MIN)})}$$

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

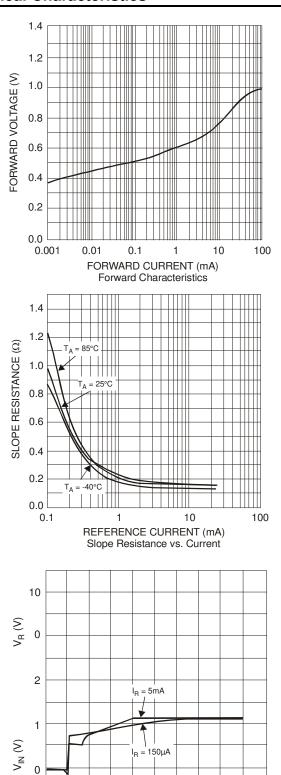
(†) 
$$R_S = \frac{V_R Change(I_{R(MIN)} to I_{R(MAX)})}{I_{R(MAX)} - I_{R(MIN)}}$$

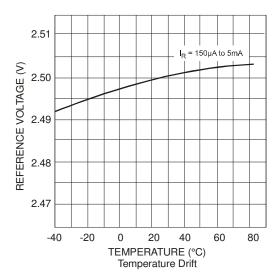


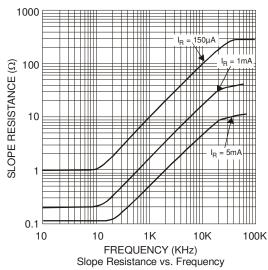


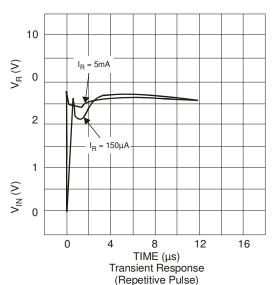
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## **Typical Characteristics**









0

8

TIME (µs)

Transient Response (SIngle Pulse)

12

16



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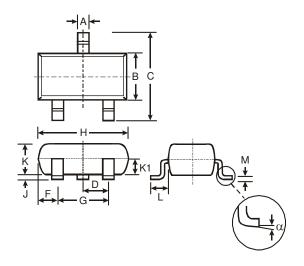
# **Ordering Information\***

R	Order leference	Tol (%)	Package	Device Mark	Reel Size (inches)	Quantity per reel	Tape Width (mm)
ZRO	C250F01TA	1	SOT23	25J	7	3000	8
ZRO	C250F02TA	2	SOT23	25H	7	3000	8
ZRO	C250F03TA	3	SOT23	25G	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**

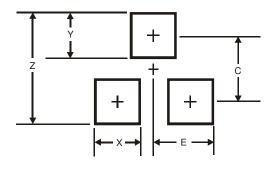
#### SOT23



SOT23						
Dim	Min	Max	Тур			
Α	0.37	0.51	0.40			
В	1.20	1.40	1.30			
C	2.30	2.50	2.40			
D	0.89	1.03	0.915			
F	0.45	0.60	0.535			
G	1.78	2.05	1.83			
Н	2.80	3.00	2.90			
J	0.013	0.10	0.05			
K	0.903	1.10	1.00			
K1	-	-	0.400			
٦	0.45	0.61	0.55			
М	0.085	0.18	0.11			
α	0°	8°	-			
All Dimensions in mm						

# Suggested Pad Layout

#### SOT23



Dimensions	Value (in mm)
Z	2.9
X	0.8
Υ	0.9
С	2.0
E	1.35



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