

## ZRC500

### PRECISION 5.0 VOLT LOW KNEE CURRENT VOLTAGE REFERENCE

#### Description

The ZRC500 uses a bandgap circuit design to achieve a precision micropower voltage reference of 5.0 volts. The device is available in small outline surface mount packages, ideal for applications where space saving is important, as well as packages for through hole requirements.

The ZRC500 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRC500 is recommended for operation between 25µA 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

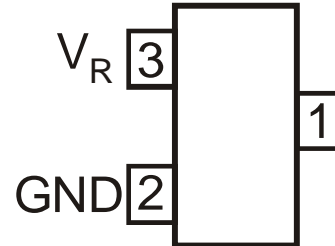
- Small outline SOT23 packages
- No stabilizing capacitor required
- Low knee current, 19µA typical
- Typical  $T_C$  30ppm/°C
- Typical slope resistance 0.4Ω
- ±2 and ±1% tolerance
- Industrial temperature range
- Operating current 25µA to 5mA
- Transient response, stable in less than 10µs
- Green molding compound (No Br, Sb)

#### Applications

- Battery powered and portable equipment
- Instrumentation
- Test equipment
- Metering and measurement systems

#### Pin Assignments

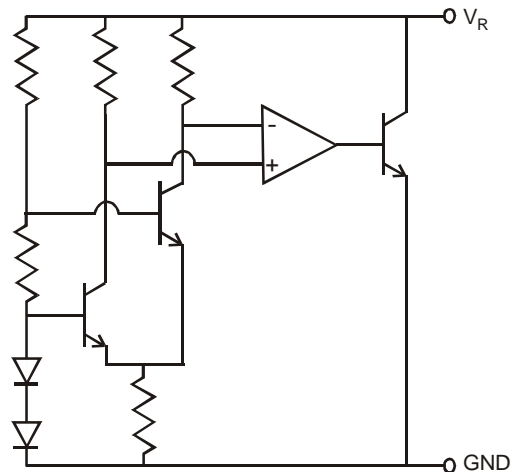
##### SOT23 Package Suffix – F



(Top View)

Pin 1 floating or connected to pin 2

#### Typical Application Circuit



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#### Absolute Maximum Ratings

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.)

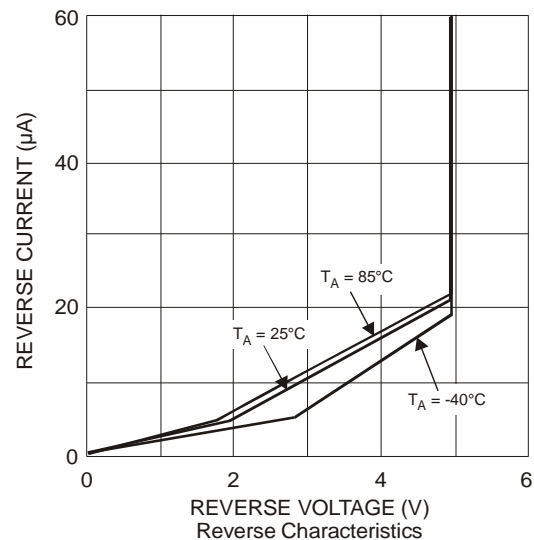
Symbol	Parameter	Condition	Min.	Typ.	Max.	Tol. (%)	Unit
V <sub>R</sub>	Reverse breakdown voltage	I <sub>R</sub> = 150μA	4.95 4.9	5.0 5.0	5.05 5.1	1 2	V
I <sub>MIN</sub>	Minimum operating current			19	25		μA
I <sub>R</sub>	Recommended operating current		0.025		5		mA
T <sub>C</sub> <sup>(*)</sup>	Average 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	2		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		105			μV(rms)

Note:

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

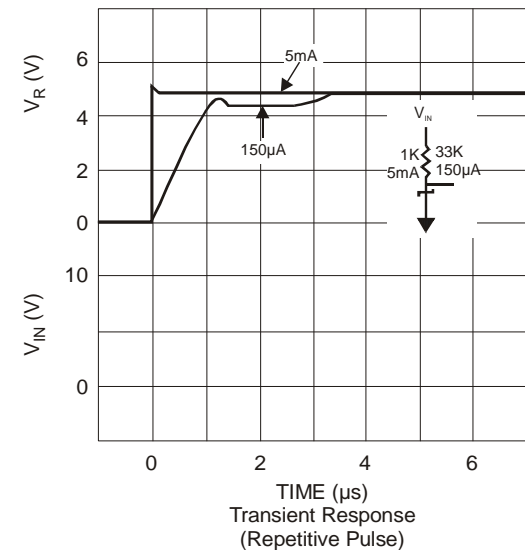
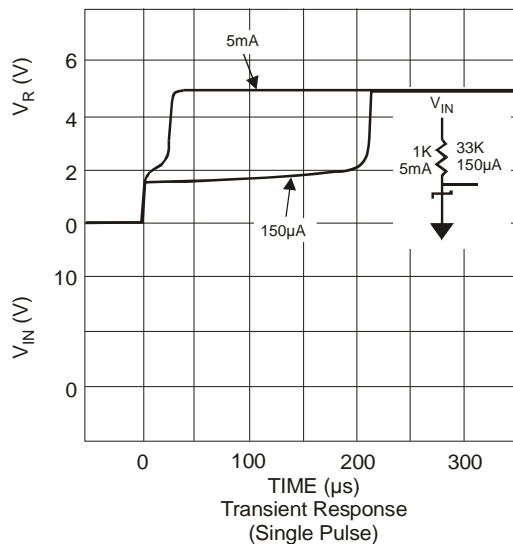
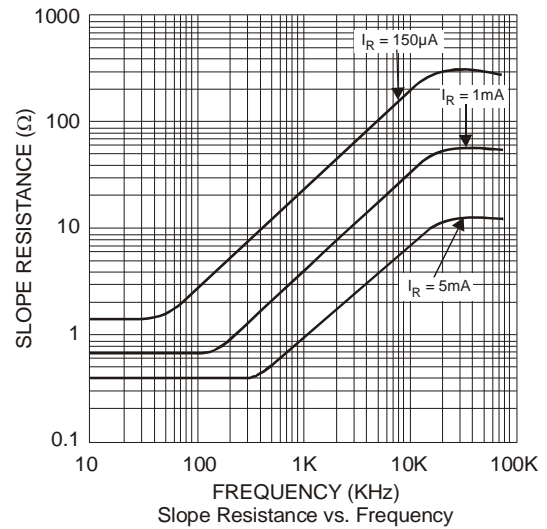
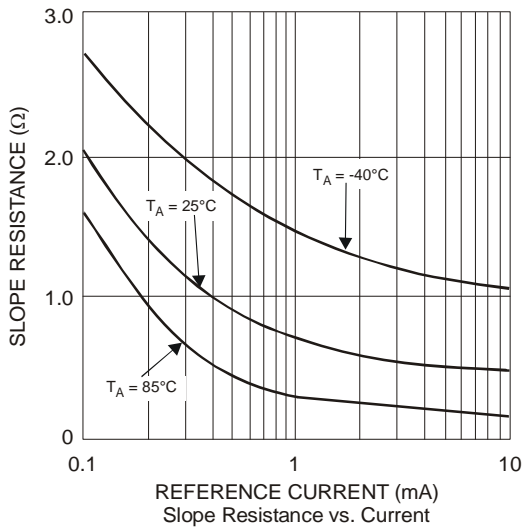
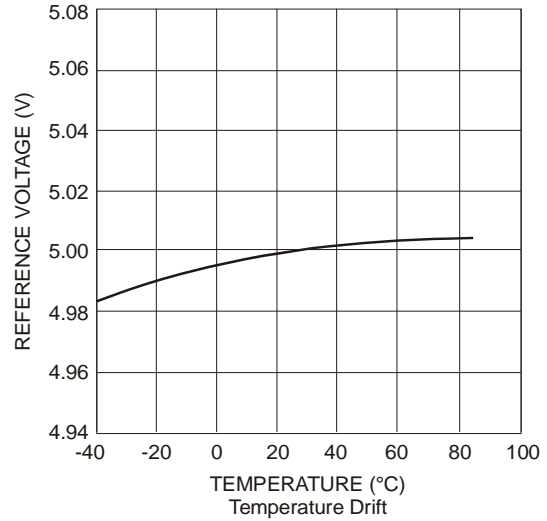
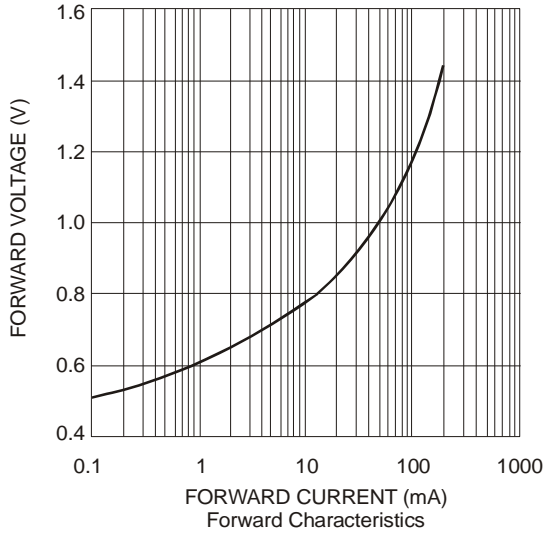
Note: V<sub>R(MAX)</sub> - V<sub>R(MIN)</sub> is the maximum deviation in reference voltage measured over the full operating temperature range

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



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**Typical Characteristics**



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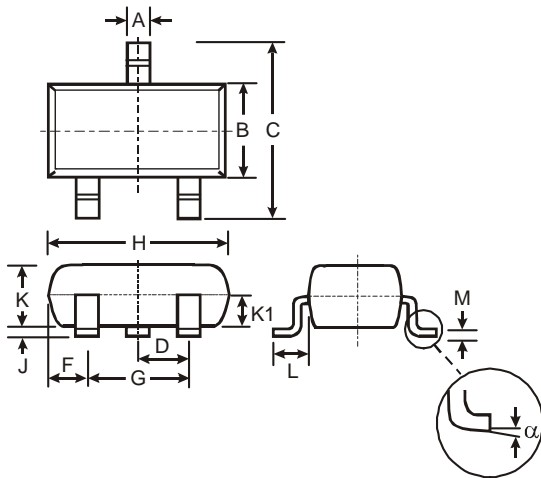
**Ordering Information\***

Order Reference	Tol (%)	Device Mark	Reel Size (inches)	Quantity per reel	Tape Width (mm)
ZRC500F02TA	2	50T	7	3000	8
ZRC500F01TA	1	50X	7	3000	8

Notes: \*All ZRC500A variants (E-Line 3-pin), ZRC500Y variants (E-Line 2-pin), ZRC500R variants (E-Line 3-pin reversed) and ZRC500N8 variants (SO-8) are obsolete.

**Package Outline Dimensions**

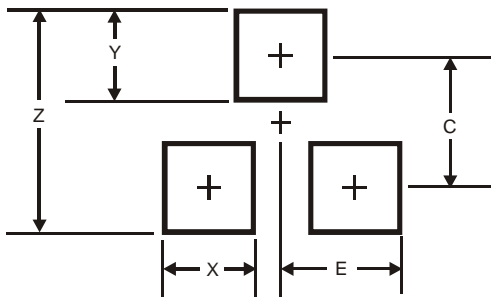
**SOT23**



SOT23			
Dim	Min	Max	Typ
A	0.37	0.51	0.40
B	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
H	2.80	3.00	2.90
J	0.013	0.10	0.05
K	0.903	1.10	1.00
K1	-	-	0.400
L	0.45	0.61	0.55
M	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
Y	0.9
C	2.0
E	1.35

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