PRECISION 3.3 VOLT LOW KNEE CURRENT VOLTAGE REFERENCE

ZRC330

ISSUE 5 - JANUARY 2003

DEVICE DESCRIPTION

The ZRC330 uses a bandgap circuit design to achieve a precision micropower voltage reference of 3.3 volts. The device is available in a small outline surface mount package, ideal for applications where space saving is important.

The ZRC330 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRC330 is recommended for operation between 20μA 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.

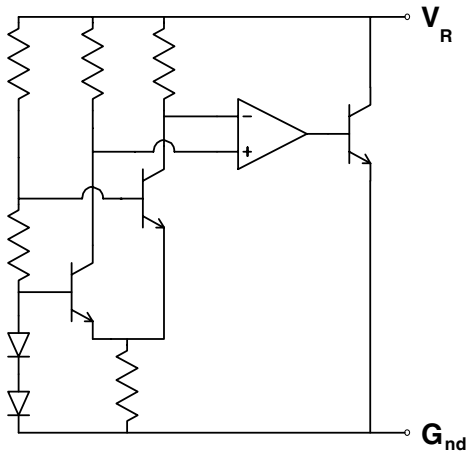
FEATURES

- Small outline SOT23 and TO92 style packages
- No stabilising capacitor required
- Low knee current, 15μA typical
- Typical slope resistance 0.6Ω
- ± 3%, 2% and 1% tolerance
- Industrial temperature range
- Operating current 20μA to 5mA

APPLICATIONS

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

SCHEMATIC DIAGRAM



ZRC330

ABSOLUTE MAXIMUM RATING

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

Power Dissipation (T_{amb}=25°C)

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

ELECTRICAL CHARACTERISTICS

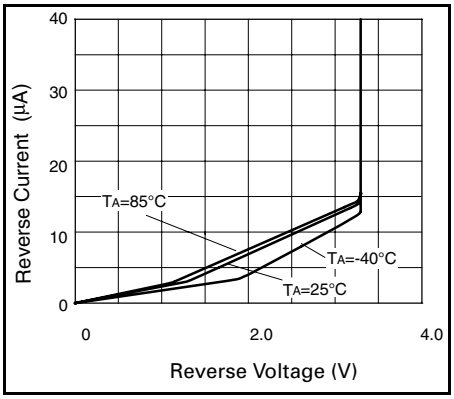
TEST CONDITIONS (Unless otherwise stated) T_{amb}=25°C

SYMBOL	PARAMETER	CONDITIONS	LIMITS			TOL.%	UNITS
			MIN	TYP	MAX		
V_R	Reverse Breakdown Voltage	I_R=150µA	3.27 3.234 3.2	3.3 3.3 3.3	3.33 3.366 3.4	1 2 3	V
I_{MIN}	Minimum Operating Current			15	20		µA
I_R	Recommended Operating Current		0.02		5		mA
T_C †	Average Reverse Breakdown Voltage Temp. Co.	$I_{R(min)}$ to $I_{R(max)}$		15	50		ppm/°C
R_S §	Slope Resistance			0.6	2		Ω
Z_R	Reverse Dynamic Impedance	I_R = 1mA f = 100Hz I_{AC}= 0.1 I_R		0.5	1.2		Ω
E_N	Wideband Noise Voltage	I_R = 150µA f = 10Hz to 10kHz		75			µV(rms)

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

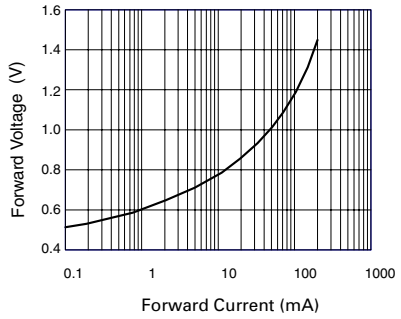
Note: $V_{R(max)}$ - $V_{R(min)}$ is the maximum deviation in reference voltage measured over the full operating temperature range.

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

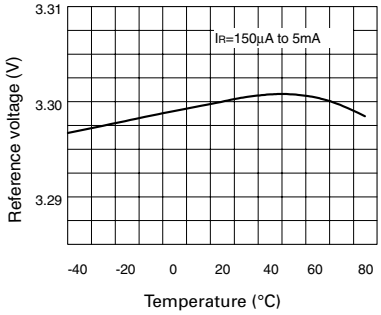


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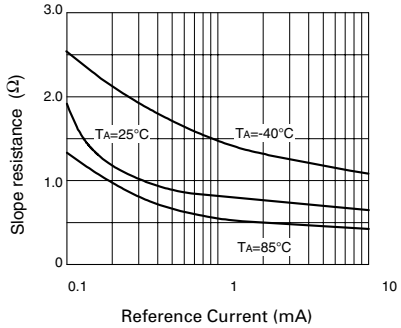
TYPICAL CHARACTERISTICS



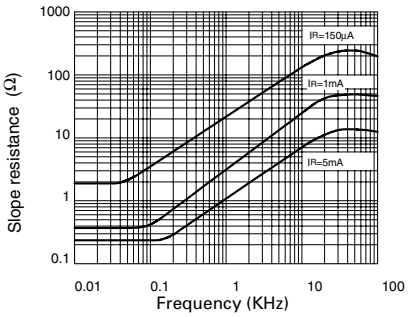
Forward Characteristics



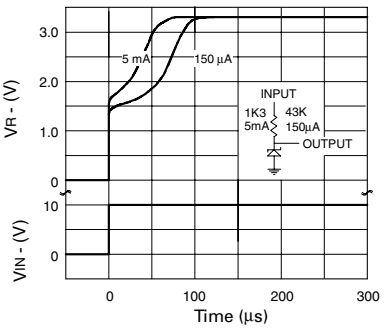
Temperature Drift



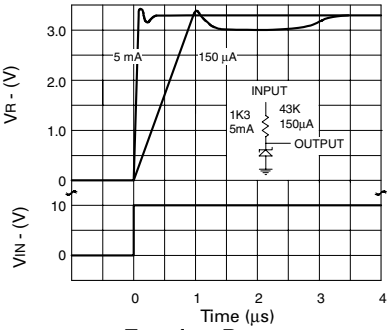
Slope Resistance v Current



Slope Resistance v Frequency



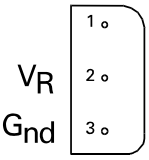
Transient Response (Single Pulse)



Transient Response (Repetitive Pulse)

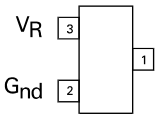
ZRC330

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

ORDERING INFORMATION

Part No	Tol%	Package	Partmark
ZRC330A03	3	E-Line •	ZRC33003
ZRC330A02	2	E-Line •	ZRC33002
ZRC330A01	1	E-Line •	ZRC33001
ZRC330F03	3	SOT23	33A
ZRC330F02	2	SOT23	33B
ZRC330F01	1	SOT23	33C

• E-Line 3 pin