PRECISION 5.0 VOLT MICROPOWER VOLTAGE REFERENCE

ZR4040-5.0

ISSUE 1 - JULY 1995

DEVICE DESCRIPTION

The ZR4040-5.0 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 ZR4040-5.0 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZR4040-5.0 is recommended for operation between 60µA and 15mA and so is ideally suited to low power and battery powered applications.

Excellent performance is maintained to a suggested 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.

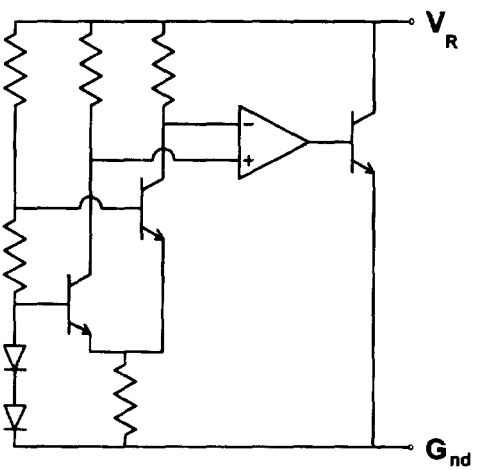
FEATURES

- Small outline SO8 and SOT23 packages
- TO92 style package
- No stabilising capacitor required
- Typical T_C 20ppm/°C
- Typical slope resistance 0.33Ω
- 2% and 1% tolerance
- Industrial temperature range
- Operating current 60µA to 15mA
- Transient response,stable in less than 10µs

APPLICATIONS

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

SCHEMETIC DIAGRAM



CONNECTION TABLE			
Pin	SO8	SOT23	E-LINE 3 pin R
1	N/C	-	G_{nd}
2	N/C	G_{nd}	V_R
3	N/C	V_R	-
4	G_{nd}	–	–
5	N/C	–	–
6	N/C	–	–
7	N/C	–	–
8	V_R	–	–
Pack	N8	F	R
see Diagrams Page 1 - 8			

ZR4040-5.0

ABSOLUTE MAXIMUM RATING

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

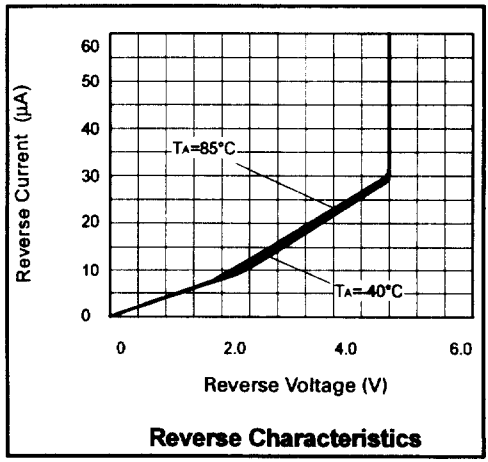
Power Dissipation (T_{amb}=25°C)

SOT23	330mW
SO8	625mW
E-line, 3 pin (TO92)	500mW

SYMBOL	PARAMETER	CONDITIONS	LIMITS			TOL. %	UNITS
			MIN	TYP	MAX		
V_R	Reverse Breakdown Voltage	I_R=150µA	4.95 4.90	5.0 5.0	5.05 5.10	1 2	V
I_{MIN}	Minimum Operating Current			30	60		µA
I_R	Recommended Operating Current		0.06		15		mA
T_C †	Average Reverse Breakdown Voltage Temp. Co.	$I_{R(min)}$ to $I_{R(max)}$		20	100		ppm/°C
R_S §	Slope Resistance			0.33	1.5		Ω
Z_R	Reverse Dynamic Impedance	I_R = 1mA f = 100Hz I_{AC}= 0.1 I_R		0.4	1.0		Ω
E_N	Wideband Noise Voltage	I_R = 1mA f = 10Hz to 10kHZ		100			µV (rms)

† $$T_C = \frac{V_R \text{ Change } \times 1000000}{V_R \times \text{Temperature Change}}$$

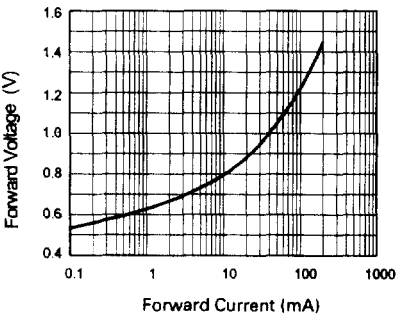
§ $$R_S = \frac{V_R \text{ Change } (I_R(min) \text{ to } I_R(max))}{I_R(max) - I_R(min)}$$



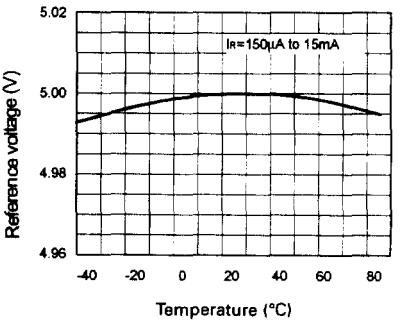
Reverse Characteristics

ZR4040-5.0

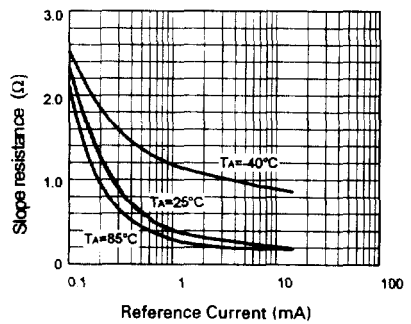
TYPICAL CHARACTERISTICS



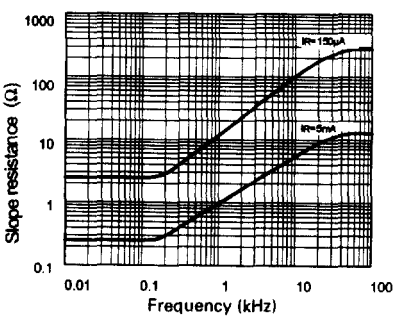
Forward Characteristics



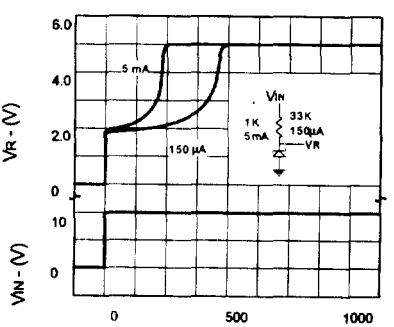
Temperature Drift



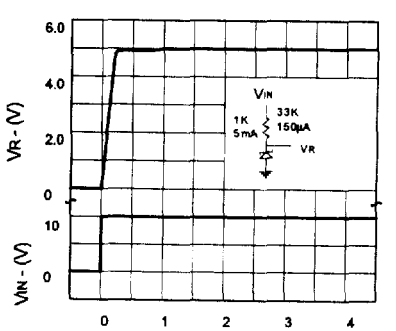
Slope Resistance v Current



Slope Resistance v Frequency



Transient Response (Single Pulse)



Transient Response (Repetitive Pulse)