PRECISION 1.235VOLT MICROPOWER VOLTAGE REFERENCE

DRAFT ISSUE A - MARCH 1998

ZR1004

DEVICE DESCRIPTION

The ZR1004 is a bandgap reference circuit design to operate from very low currents, typically 5µA. The device is available in a SOT23 surface mount package, offering the ultimate in space and power saving. These features make the ZR1004 particularly suitable for portable and battery powered applications.

The ZR1004 is also available in surface mount SO8 packaging as well as E-Line (TO92 equivalent) packaging for through hole applications. This device offers a pin for pin compatible alternative to the LT1004 and LM185/385 series of voltage references.

Excellent performance is maintained over the 8µA to 20mA operating range with a typical temperature coefficient of only 20ppm/°C. The device has been designed to be highly tolerant of capacitive loads so maintaining excellent stability.

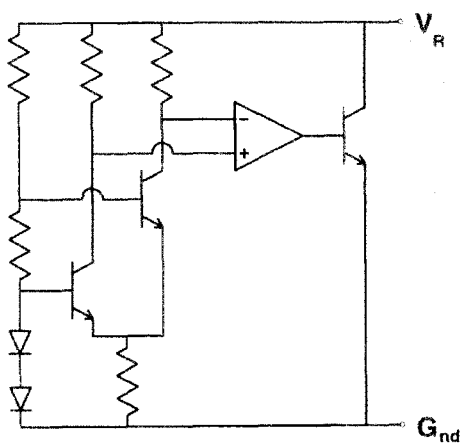
FEATURES

- 5µA typical knee current
- Small outline SOT23, SO8 and TO92 style packages
- No stabilising capacitor required
- 20ppm/°C typical temperature coefficient
- 3%, 2% and 1% tolerance

APPLICATIONS

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

SCHEMATIC DIAGRAM



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ABSOLUTE MAXIMUM RATING

Reverse Current	30mA	Power Dissipation (T_{amb}=25°C)	
Forward Current	10mA	SOT23	330mW
Operating Temperature	-40 to 85°C	E-Line, 3 pin (TO92)	500mW
Storage Temperature	-55 to 125°C	E-Line, 2 pin (TO92)	500mW
		SO8	625mW

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=100µA	1.223 1.21 1.198	1.235 1.235 1.235	1.247 1.26 1.272	1 2 3	V
I_{MIN}	Minimum Operating Current			5	8		µA
I_R	Recommended Operating Current		0.008		20		mA
T_C †	Average Reverse Breakdown Voltage Temp. Co.	$I_{R(min)}$ to $I_{R(max)}$		20	76		ppm/°C
R_S §	Slope Resistance				0.5		Ω
Z_R	Reverse Dynamic Impedance	I_R = 100µA f = 100Hz I_{AC}= 0.1 I_R		0.2	0.6		Ω
E_N	Wideband Noise Voltage	I_R = 150µA f = 100Hz to 10kHz		60			µV(rms)
$\frac{\Delta V_R}{\Delta Time}$	Long term stability	I_R = 100µA T_A=25°C±0.1°C		20			ppm/kHr

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

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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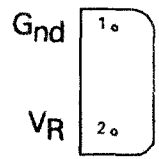
(Typical Characteristics available Q2 1998)

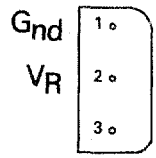
CONNECTION DIAGRAMS

E-Line, 2 pin Package Suffix – Y



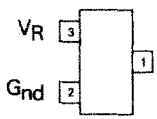
Bottom View

E-Line, 3 pin,Rev Package Suffix – R



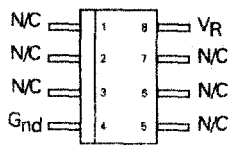
Bottom View –
Pin 3 floating or connected to pin 1

SOT23 Package Suffix – F



Top View –
Pin 1 floating or connected to pin 2

SO8 Package Suffix – N8



Top View

ORDERING INFORMATION

Part No	Tol %	Package	Partmark
ZR1004F01	1	SOT23	10C
ZR1004N801	1	SO8	ZR100401
ZR1004R01	1	E-Line *	ZR100401
ZR1004Y01	1	E-Line †	ZR100401
ZR1004F02	2	SOT23	10B
ZR1004N802	2	SO8	ZR100402
ZR1004R02	2	E-Line *	ZR100402
ZR1004Y02	2	E-Line †	ZR100402

Part No	Tol %	Package	Partmark
ZR1004F03	3	SOT23	10A
ZR1004N803	3	SO8	ZR100403
ZR1004R03	3	E-Line *	ZR100403
ZR1004Y03	3	E-Line †	ZR100403

* E-Line 3 pin Reversed
† E-Line 2 pin