PRECISION 4.096 VOLT LOW KNEE CURRENT VOLTAGE REFERENCE

ZRC400

ISSUE 4 - JANUARY 2003

DEVICE DESCRIPTION

The ZRC400 uses a bandgap circuit design to achieve a precision micropower voltage reference of 4.096 volts. The device is available in a small outline surface mount package, ideal for applications where space saving is important, as well as packages for through hole requirements.

The ZRC400 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRC400 is recommended for operation between $23\mu A$ 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.

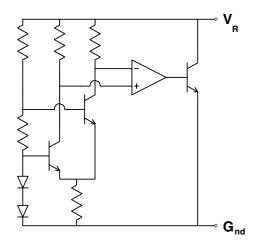
FEATURES

- Small outline SOT23 and TO92 style packages
- No stabilising capacitor required
- Low knee current, 18μA typical
- Typical T_C 30ppm/°C
- Typical slope resistance 0.4Ω
- ± 3%, 2% and 1% tolerance
- Industrial temperature range
- Operating current 23μA to 5mA
- Transient response, stable in less than 10μs
- Optional extended current range

APPLICATIONS

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

SCHEMATIC DIAGRAM



ABSOLUTE MAXIMUM RATING

Reverse Current 25mA **Power Dissipation (T**amb=25°C)
Forward Current 25mA SOT23 330mW
Operating Temperature -40 to 85°C E-Line, 3 pin (TO92) 500mW

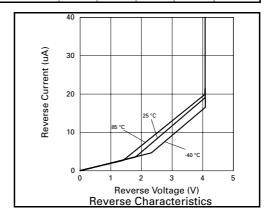
Storage Temperature -55 to 125°C

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

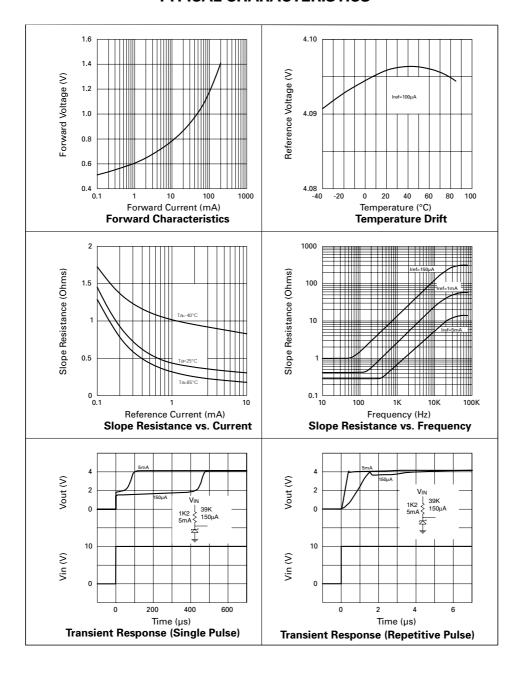
| SYMBO | PARAMETER | CONDITIONS | LIMITS | | TOL. | UNITS | |
|------------------|--|--|----------------|----------------|----------------|--------|---------|
| | | | MIN | TYP | MAX | % | |
| V_R | Reverse Breakdown Voltage | I _R =150μA | 4.055 | 4.096 | 4.137 | 1 | V |
| | | | 4.014 3.973 | 4.096 4.096 | 4.178 4.219 | 2 3 | |
| I _{MIN} | Minimum Operating Current | | | 18 | 23 | | μΑ |
| I _R | Recommended Operating Current | | 0.023 | | 5 | | mA |
| T _C † | Average Reverse Breakdown Voltage Temp. Co. | I _{R(min)} to I _{R(max)} | | 30 | 90 | | ppm/°C |
| R _S § | Slope Resistance | | | 0.4 | 2 | | Ω |
| Z _R | Reverse Dynamic Impedance | I _R = 1mA f = 100Hz I _{AC} =0.1 I _R | | 0.3 | 0.8 | | Ω |
| E _N | Wideband Noise Voltage | I _R = 150μA f = 10Hz to 10kHz | | 90 | | | μV(rms) |

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

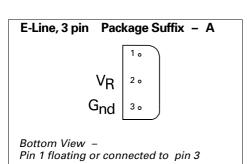
Note: $V_{R(max)} \cdot V_{R(min)}$ is the maximum deviation in reference voltage measured over the full operating temperature range.

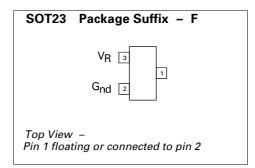


TYPICAL CHARACTERISTICS



CONNECTION DIAGRAMS





ORDERING INFORMATION

| Part No | Tol% | Package | Partmark | | |
|-----------|------|----------|----------|--|--|
| ZRC400A03 | 3 | E-Line • | ZRC40003 | | |
| ZRC400A02 | 2 | E-Line • | ZRC40002 | | |
| ZRC400A01 | 1 | E-Line • | ZRC40001 | | |
| ZRC400F03 | 3 | SOT23 | 40D | | |
| ZRC400F02 | 2 | SOT23 | 40G | | |
| ZRC400F01 | 1 | SOT23 | 40H | | |

[•] E-Line 3 pin