

PRECISION 2.45 VOLT VOLTAGE REFERENCE

ISSUE 3 — MARCH 1998

ZRA245

DEVICE DESCRIPTION

The ZRA245 uses a bandgap circuit design to achieve a precision voltage reference of 2.45 volts. The device is available in small outline surface mount packages, ideal for applications where space saving is important.

The ZRA245 design provides a stable voltage without an external capacitor and is stable with capacitive loads. The ZRA245 is recommended for operation between 2mA and 120mA.

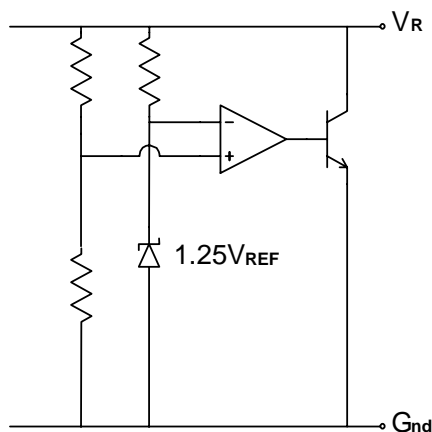
FEATURES

- Small outline SOT23, SO8 and TO92 style package
- No stabilising capacitor required
- Typical T_c 15ppm/°C
- Typical slope resistance 0.26Ω
- ±3% , 2% and 1% tolerance
- Industrial temperature range
- Operating current 2mA to 120mA

APPLICATIONS

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

SCHEMATIC DIAGRAM



ZRA245

ABSOLUTE MAXIMUM RATING

| | |
|-----------------------|--------------|
| Reverse Current | 200mA |
| 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 |
| 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 =5mA | 2.43 | 2.45 | 2.47 | 1 | V |
| | | | 2.40 | 2.45 | 2.50 | 2 | |
| | | | 2.38 | 2.45 | 2.52 | 3 | |
| I _{MIN} | Minimum Operating Current | | | 2 | | mA | |
| I _R | Recommended Operating Current | | 2 | 120 | | mA | |
| T _C † | Average Reverse Breakdown Voltage Temp. Co. | I _{R(min)} to I _{R(max)} | | 15 | 50 | | ppm/°C |
| R _S § | | | Slope Resistance | | 0.26 | 0.5 | |
| Z _R | Reverse Dynamic Impedance | I _R = 5mA f = 100Hz I _{AC} =0.1 I _R | | 0.28 | 1 | | Ω |
| E _N | Wideband Noise Voltage | I _R = 5mA f = 10Hz to 10kHz | | 65 | | | μV(rms) |

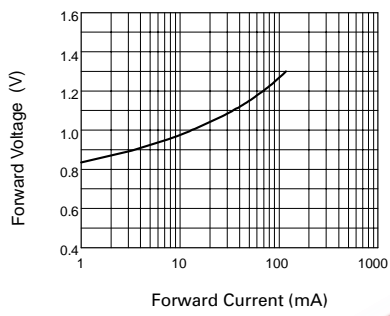
$$\dagger T_C = \frac{(V_{R(max)} - V_{R(min)}) \times 1000000}{V_R \times (T_{(max)} - T_{(min)})}$$

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

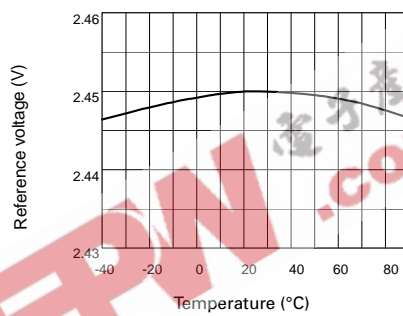
$$\S R_S = \frac{V_R \text{ Change}(I_R(\text{min}) \text{ to } I_R(\text{max}))}{I_R(\text{max}) - I_R(\text{min})}$$

ZRA245

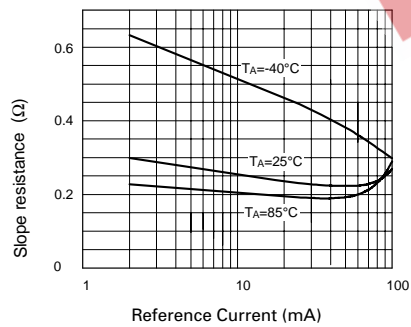
TYPICAL CHARACTERISTICS



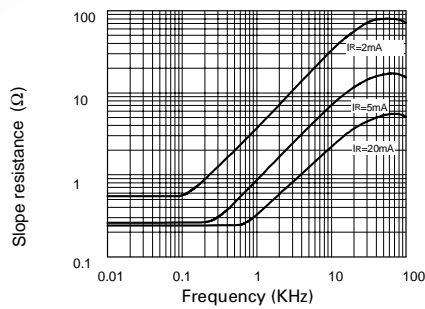
Forward Characteristics



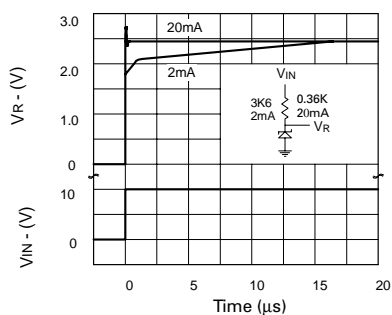
Temperature Drift



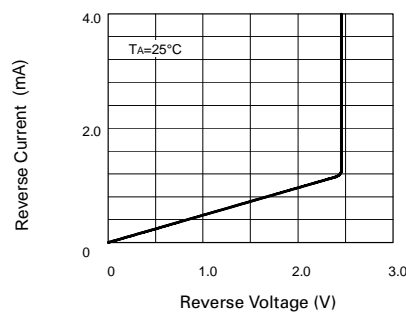
Slope Resistance v Current



Slope Resistance v Frequency



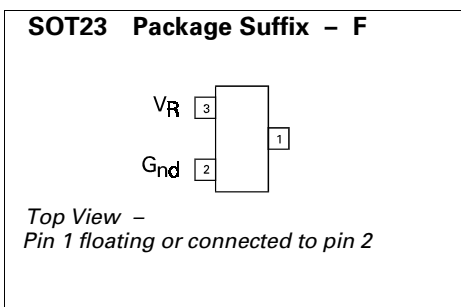
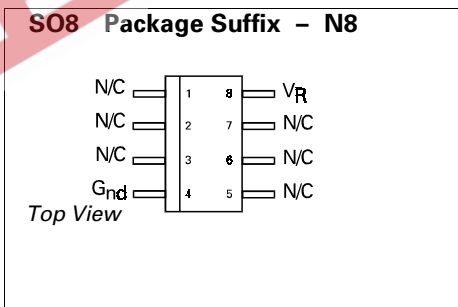
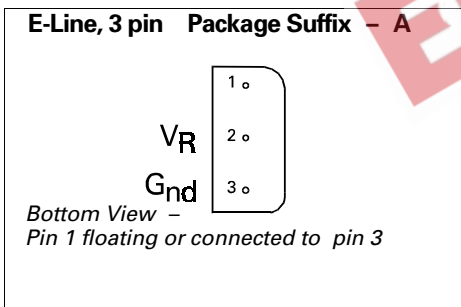
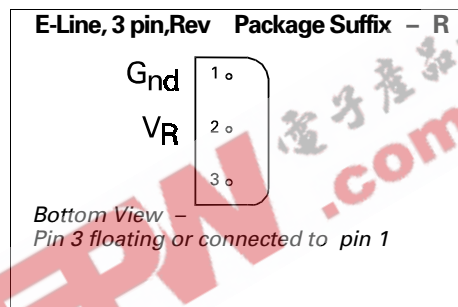
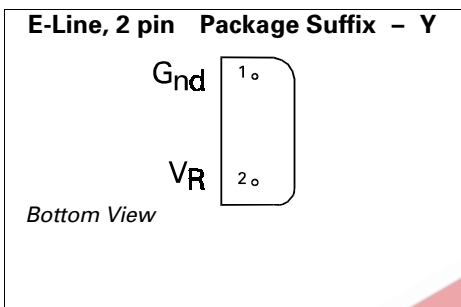
Transient Response



Reverse Characteristics

ZRA245

CONNECTION DIAGRAMS



ZRA245

ORDERING INFORMATION

| Part No | Tol% | Package | Partmark |
|------------|------|----------|----------|
| ZRA245A03 | 3 | E-Line • | ZRA24503 |
| ZRA245A02 | 2 | E-Line • | ZRA24502 |
| ZRA245A01 | 1 | E-Line • | ZRA24501 |
| ZRA245F03 | 3 | SOT23 | 24A |
| ZRA245F02 | 2 | SOT23 | 24B |
| ZRA245F01 | 1 | SOT23 | 24C |
| ZRA245N803 | 3 | SO8 | ZRA24503 |
| ZRA245N802 | 2 | SO8 | ZRA24502 |
| ZRA245N801 | 1 | SO8 | ZRA24501 |

| Part No | Tol% | Package | Partmark |
|-----------|------|----------|----------|
| ZRA245R03 | 3 | E-Line * | ZRA245R3 |
| ZRA245R02 | 2 | E-Line * | ZRA245R2 |
| ZRA245R01 | 1 | E-Line * | ZRA245R1 |
| ZRA245Y03 | 3 | E-Line † | ZRA24503 |
| ZRA245Y02 | 2 | E-Line † | ZRA24502 |
| ZRA245Y01 | 1 | E-Line † | ZRA24501 |

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