

# 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.

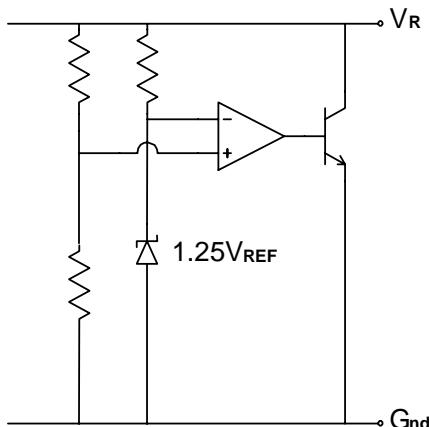
## FEATURES

- Small outline SOT23, SO8 and TO92 style package
- No stabilising capacitor required
- Typical  $T_c$  15ppm/ $^{\circ}$ C
- Typical slope resistance 0.26 $\Omega$
- $\pm 3\%$ , 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 ( $T_{amb}=25^{\circ}C$ )

SOT23	330mW
E-Line, 3 pin (TO92)	500mW
E-Line, 2 pin (TO92)	500mW
SO8	625mW

## ELECTRICAL CHARACTERISTICS

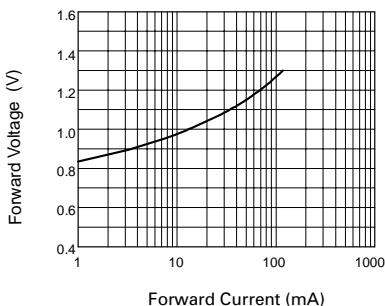
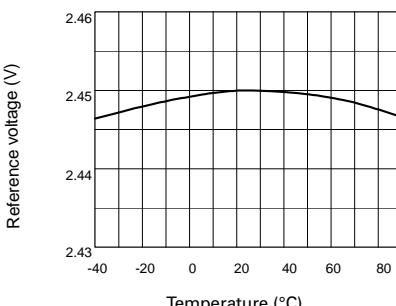
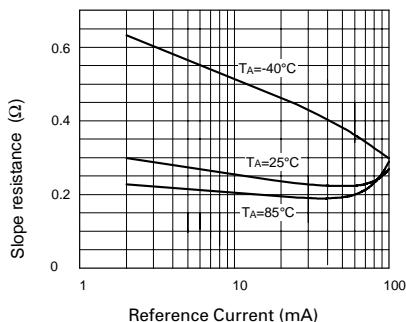
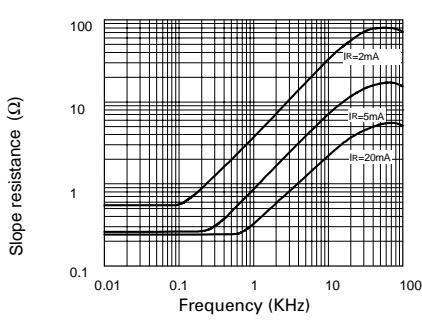
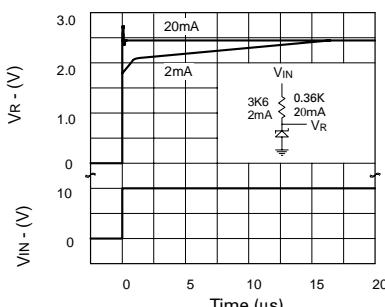
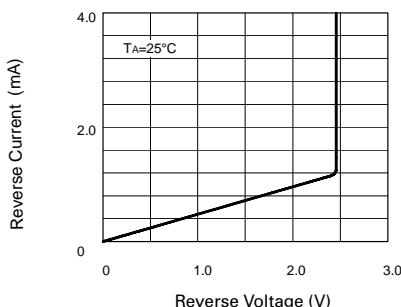
TEST CONDITIONS (Unless otherwise stated)  $T_{amb}=25^{\circ}C$

SYMBOL	PARAMETER	CONDITIONS	LIMITS			TOL. %	UNITS
			MIN	TYP	MAX		
$V_R$	Reverse Breakdown Voltage	$I_R=5mA$	2.43 2.40 2.38	2.45 2.45 2.45	2.47 2.50 2.52	1 2 3	V
$I_{MIN}$	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/ $^{\circ}C$
$R_S$ §	Slope Resistance			0.26	0.5		$\Omega$
$Z_R$	Reverse Dynamic Impedance	$I_R = 5mA$ $f = 100Hz$ $I_{AC}=0.1 I_R$		0.28	1		$\Omega$
$E_N$	Wideband Noise Voltage	$I_R = 5mA$ $f = 10Hz$ to $10kHz$		65			$\mu V(rms)$

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

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

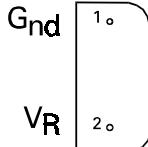
$$\S \quad R_S = \frac{V_R \text{ Change}(I_R(min) \text{ to } I_R(max))}{I_R(max) - I_R(min)}$$

**TYPICAL CHARACTERISTICS****Forward Characteristics****Temperature Drift****Slope Resistance v Current****Slope Resistance v Frequency****Transient Response****Reverse Characteristics**

# ZRA245

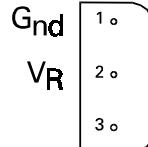
## CONNECTION DIAGRAMS

E-Line, 2 pin Package Suffix - Y



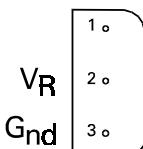
*Bottom View*

E-Line, 3 pin,Rev Package Suffix - R



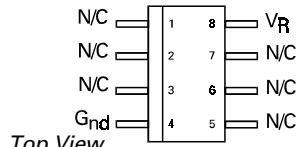
*Bottom View – Pin 3 floating or connected to pin 1*

E-Line, 3 pin Package Suffix - A



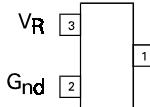
*Bottom View – Pin 1 floating or connected to pin 3*

SO8 Package Suffix - N8



*Top View*

SOT23 Package Suffix - F



*Top View – Pin 1 floating or connected to pin 2*

**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