

Description

The DIODES™ ZXRE1004 is a 1.22 volt bandgap reference circuit designed for ultra low current operation, typically 4μA. The device is available in a SOT23 surface mount package, offering the ultimate in space and power saving. These features make the ZXRE1004 particularly suitable for portable and battery powered applications.

SOT23 tolerance selection is available to 0.5% for precision applications. Excellent performance is maintained over the 8μA to 20mA operating current 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.

As well as the SOT23, the ZXRE1004 can offer a pin for pin compatible alternative to the REF1004, LT1004 and LM185/385 series of voltage references with an E-Line (TO92 style) equivalent.

Features

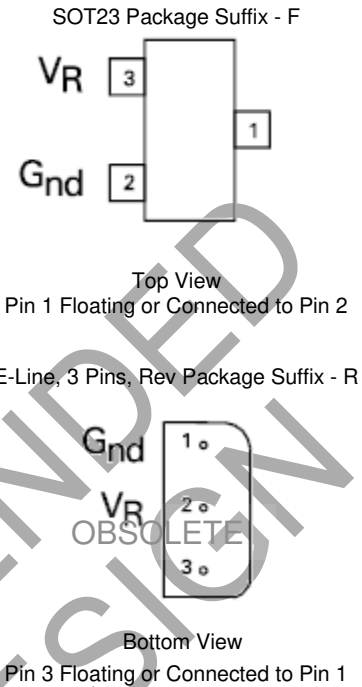
- High Performance Alternative to REF1004, LT1004 and LM185/385 References
- 4μA Typical Knee Current
- Small Outline SOT23 Package
- 20ppm/°C Typical Temperature Coefficient
- Unconditionally Stable
- 1% Tolerance
- Contact Diodes Incorporated Marketing for Availability of Tighter Tolerance Devices
- **Totally Lead-Free & Fully RoHS Compliant (Notes 1 & 2)**
- **Halogen and Antimony Free. "Green" Device (Note 3)**
- **For automotive applications requiring specific change control (i.e. parts qualified to AEC-Q100/101/104/200, PPAP capable, and manufactured in IATF 16949 certified facilities), please [contact us](#) or your local Diodes representative. <https://www.diodes.com/quality/product-definitions/>**

Applications

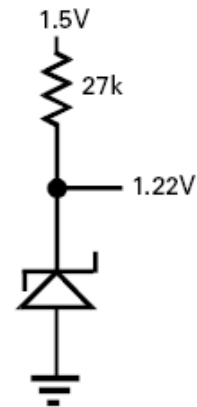
- Battery powered equipment
- Precision power supplies
- Portable instrumentations
- Portable communication devices
- Notebooks and palmtop computers
- Data acquisition systems
- A/D and D/A converters
- Test equipment

Notes: 1. No purposely added lead. Fully EU Directive 2002/95/EC (RoHS), 2011/65/EU (RoHS 2) & 2015/863/EU (RoHS 3) compliant.
 2. See <https://www.diodes.com/quality/lead-free/> for more information about Diodes Incorporated's definitions of Halogen- and Antimony-free, "Green" and Lead-free.
 3. Halogen- and Antimony-free "Green" products are defined as those which contain <900ppm bromine, <900ppm chlorine (<1500ppm total Br + Cl) and <1000ppm antimony compounds.

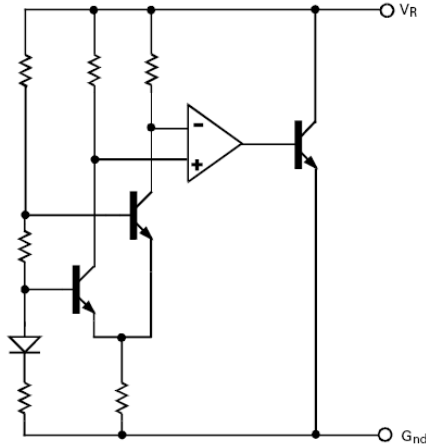
Pin Assignments



Applications Circuit



Schematic Diagram



Absolute Maximum Ratings (Voltages to GND, unless otherwise stated.)

Parameter	Rating	Unit
Reverse Current	30	mA
Forward Current	10	mA
Operating Temperature	-40 to +85	°C
Storage Temperature	-55 to +125	°C
Power Dissipation (T _{AMB} = +25°C) SOT23	330	mW

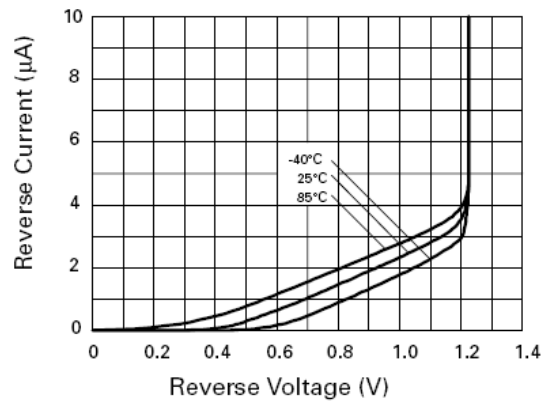
Electrical Characteristics (Test conditions: T_{AMB} = +25°C, unless otherwise specified.)

Symbol	Parameter	Condition	Min	Typ	Max	Tol. (%)	Unit
V _R	Reverse Breakdown Voltage	I _R = 100µA	1.208 1.183	1.22 1.22	1.232 1.257	1 3	V
I _{MIN}	Minimum Knee Current	—	—	4	8	—	µA
I _R	Recommended Operating Current Range	—	0.008	—	20	—	mA
T _C (*)	Average Reverse Breakdown Voltage Temperature Coefficient	I _{R(MIN)} to I _{R(MAX)}	—	20	75	—	ppm/°C
$\frac{\Delta V_R}{\Delta I_R}$	Reverse Breakdown Voltage Change with Current	I _R = 8µA to 1mA I _R = 1mA to 20mA	—	—	1 10	—	mV
Z _R	Reverse Dynamic Impedance	I _R = 1mA f = 100Hz I _{AC} = 0.1I _R	—	0.2	0.6	—	Ω
E _N	Wideband Noise Voltage	I _R = 8µA to 100µA f = 10Hz to 10kHz	—	60	—	—	µV(rms)

Notes:

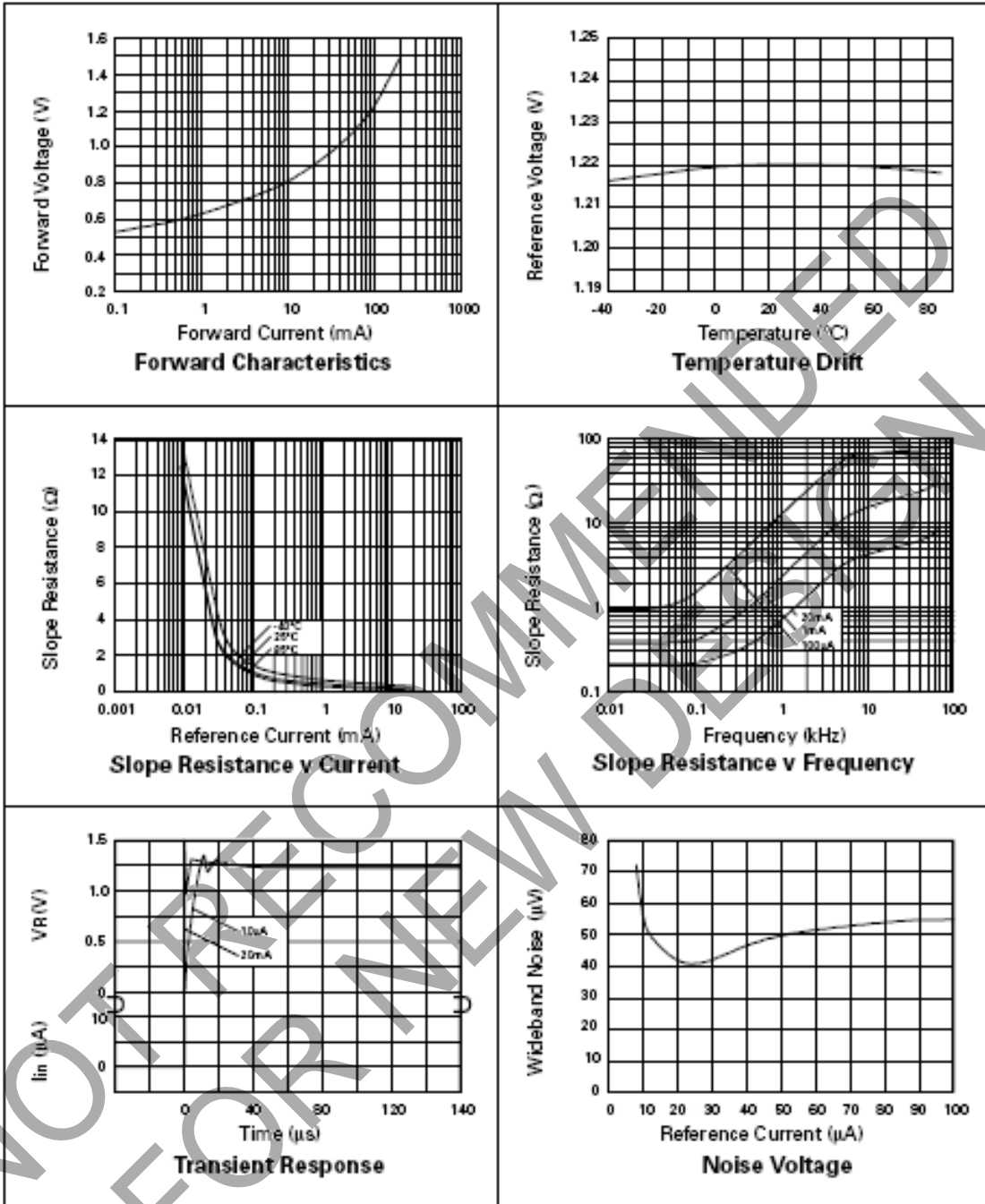
$$(*) T_C = \frac{(V_{R(MAX)} - V_{R(MIN)}) \times 1000000}{V_R \times (T_{(MAX)} - T_{(MIN)})}$$

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



Reverse Characteristics

Typical Characteristics



Ordering Information (Note 4)

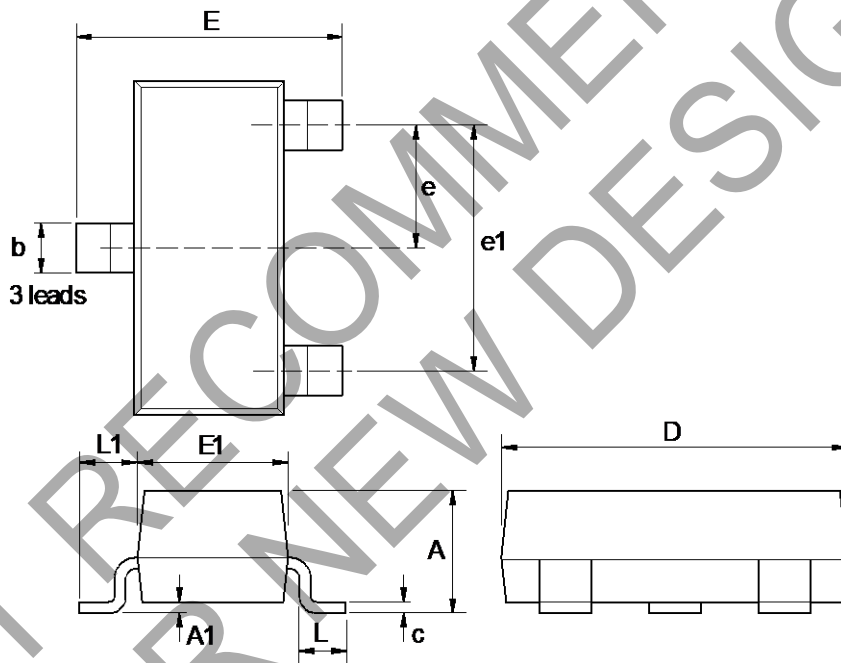
Part Number	Tol (%)	Package	Device Mark	Status (Note 4)	Reel Size (inches)	Tape Width (mm)	Packing	
							Qty.	Carrier
ZXRE1004CFTA	0.5	SOT23	10D	Obsolete	7	8	3000	Reel
ZXRE1004DFTA	1	SOT23	10C	Not Recommended for New Design	7	8	3000	Reel
ZXRE1004EFTA	2	SOT23	10B	Not Recommended for New Design	7	8	3000	Reel
ZXRE1004FFTA	3	SOT23	10A	Not Recommended for New Design	7	8	3000	Reel

Note: 4. All ZXRE1004xR variants (E-Line) are obsolete. For tape and reel options, add suffix TA to the part number eg ZXRE1004DFTA.

Package Outline Dimensions

Please see <http://www.diodes.com/package-outlines.html> for the latest version.

SOT23



Dim.	Millimeters		Inches		Dim.	Millimeters		Inches	
	Min.	Max.	Min.	Max.		Min.	Max.	Min.	Max.
A	-	1.12	-	0.044	e1	1.90 NOM		0.075 NOM	
A1	0.01	0.10	0.0004	0.004	E	2.10	2.64	0.083	0.104
b	0.30	0.50	0.012	0.020	E1	1.20	1.40	0.047	0.055
c	0.085	0.20	0.003	0.008	L	0.25	0.60	0.0098	0.0236
D	2.80	3.04	0.110	0.120	L1	0.45	0.62	0.018	0.024
e	0.95 NOM		0.037 NOM		-	-	-	-	-

Note: 5. Controlling dimensions are in millimeters. Approximate dimensions are provided in inches.

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