Product Innovation From CIRRUS LOGIC

VRE204

Precision Voltage Reference

FEATURES

- Very High Accuracy: +4.5 V Output, ±0.4 mV
- Extremely Low Drift: 0.6 ppm/°C (-55°C to [illegible])
- Excellent Stability: 6 ppm/1000 Hrs. Typical
- Excellent Line Regulation: 6 ppm/V Typical
- Wide Supply Range: ±13.5 V to ±22.0 V
- Hermetic 20-terminal Ceramic LCC
- Military Processing Available

APPLICATIONS

- Precision A/D and D/A Converters
- Transducer Excitation
- Accurate Comparator Threshold Reference
- High Resolution Servo Systems
- Digital Voltmeters
- High Precision Test and Measurement Instru[illegible]

DESCRIPTION

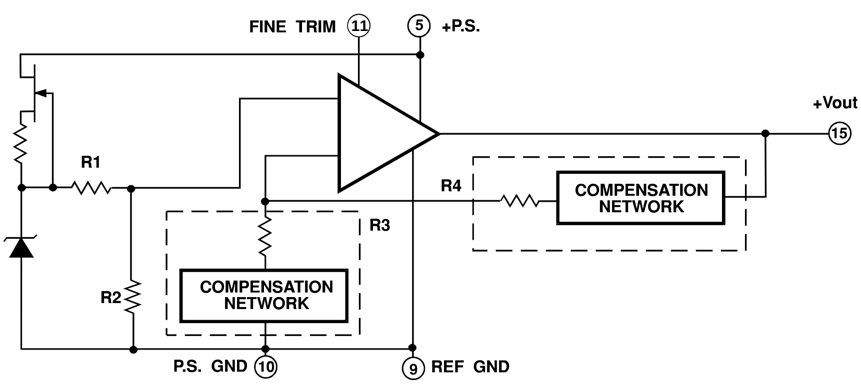
VRE204 [illegible] accuracy and temperature coefficient as low as 0.6 [illegible]

These references are specifically designed to be used [illegible] VRE204 [illegible]

[illegible] VRE204 [illegible]

[illegible] VRE204 [illegible] 4.5V [illegible] tation are some other applications which can benefit [illegible] VRE204.

FIG. 1. BLOCK DIAGRAM



SELECTION GUIDE

Model	Output (V)	Temp. Operating Range	Volt Deviation (MAX)
VRE204M	[illegible]	[illegible]	±0.6mV
VRE204MA	[illegible]	[illegible]	±0.3mV

20[illegible] LCC
[illegible]

1. CHARACTERISTICS AND SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

V_{PS} = ±15V, T = 25°C, R_L = 10K Ω UNLESS OTHERWISE NOTED.

MODEL							
PARAMETER	MIN	TYP	MAX	MIN	TYP	MAX	UNITS
ABSOLUTE MAXIMUM RATINGS							
Power Supply	+13.5		±22	*		*	V
Operating Temperature	-55		+125	*		*	°C
Storage Temp.	-65		+150	*		*	°C
Short Circuit Protection		Continuous			*		
OUTPUT VOLTAGE							
VRE204		4.5			*		V
OUTPUT VOLTAGE ERRORS							
Initial Error			±80			±400	µV
Warmup Drift		2			1		ppm
T_{MIN} - T_{MAX} (Note1)			600			300	µV
Long Term Stability		6			*		ppm/1000hr
Noise (0.1 - 10Hz)		3			*		µVp-p
OUTPUT CURRENT							
Range	±10			*			mA
REGULATION							
Line		6	10		*	*	ppm/V
Load		3			*		ppm/mA
OUTPUT ADJUSTMENT							
Range		±0.1			*		mV
Temperature Coefficient		4			*		ppm/°C
POWER SUPPLY CURRENT (Note 2)							
VRE204 IPS		5	7		*	*	mA

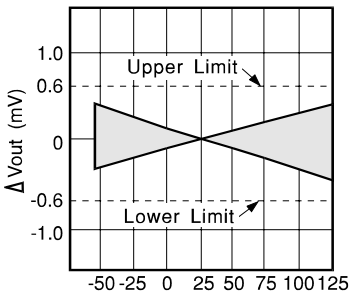
NOTES:

* Same as +25°C value.

1. Using the box method, the specified value is the maximum deviation from the output voltage at 25°C over the specified operating temperature range.
2. The specified values are unloaded.

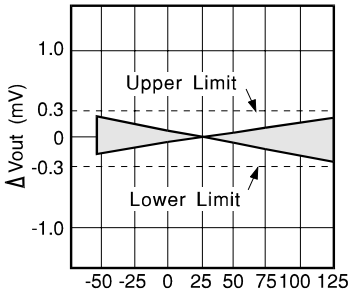
2. TYPICAL PERFORMANCE GRAPHS

V_{OUT} vs. TEMPERATURE



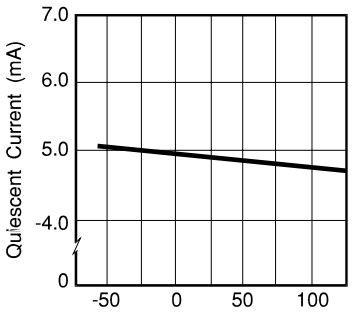
Temperature °C
VRE204M

V_{OUT} vs. TEMPERATURE



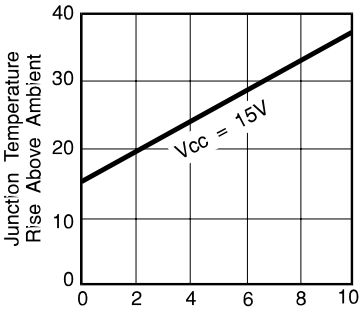
Temperature °C
VRE204MA

QUIESCENT CURRENT VS. TEMP



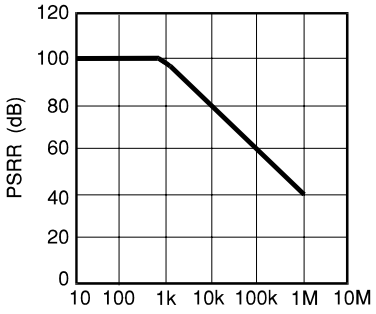
Temperature °C

JUNCTION TEMP. RISE VS OUTPUT CURRENT



Output Current (mA)

PSRR VS. FREQUENCY



Frequency (Hz)

3. THEORY OF OPERATION

The following discussion refers to the block diagram in Figure 1. A FET current source is used to bias a 6.3 zener diode. The zener voltage is divided by the resistor network R1 and R2. This voltage is then applied to the noninverting input of the operational amplifier which amplifies the voltage to produce a 4.5 V output. The gain is determined by the resistor networks R3 and R4: G=1 + R4/R3. The 6.3 zener diode is used because it is the most stable diode

The current source provides a closely regulated zener current, which determines the slope of the references' voltage vs. temperature function. By trimming the zener current a lower drift over temperature can be achieved. But

4. APPLICATION INFORMATION

The VRE204 is designed

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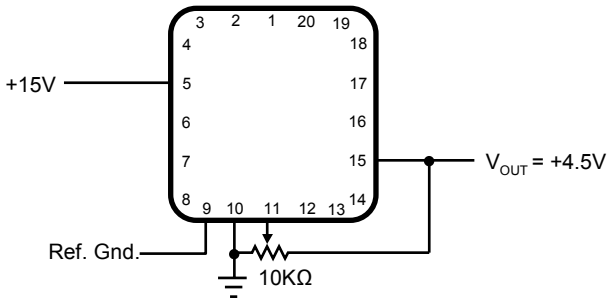
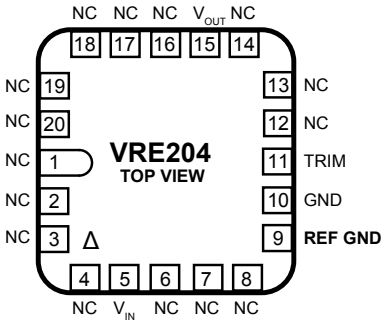
references have a voltage drop across their power supply ground pin due to quiescent current flowing through the contact resistance. If the contact resistance was constant with time and temperature, this voltage drop could be trimmed out. When the reference is plugged into a socket, this source of error can be as high as 20 ppm. By connecting the reference directly to the load, the error due to the contact resistance can be eliminated. If the unit is soldered into place, the contact resistance is sufficiently small that it does not effect performance.

EXTERNAL CONNECTIONS



PIN CONFIGURATION



CONTACTING CIRRUS LOGIC SUPPORT

For all Apex Precision Power product questions and inquiries, call toll free 800-546-2739 in North America.

For

International customers can also request support by contacting their local Cirrus Logic Sales Representative.
To find the one nearest to you, go to www.cirrus.com