VRE210

[illegible]

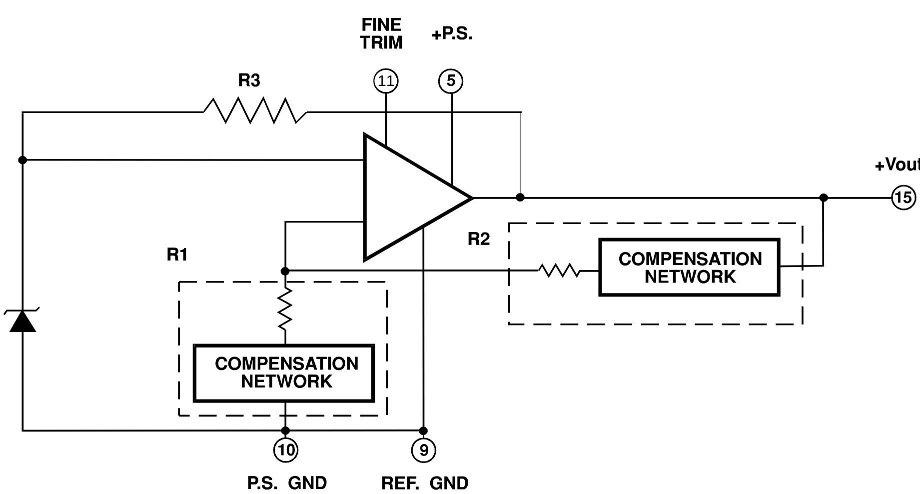
FEATURES
- ♦ Very High Accuracy: +10 V Output, ±0.3 mV
- ♦ Extremely Low Drift: 0.5 ppm/ºC (-55ºC to +125ºC)
- ♦ Low Warm-up Drift: 1 ppm Typical
- ♦ Excellent Stability: 6 ppm/1000 Hrs. Typical
- ♦ Excellent Line Regulation: 3 ppm/V Typical
- ♦ Hermetic 20-terminal Ceramic LCC Package
- ♦ Military Processing Option

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
VRE210 [illegible] **10 V** [illegible] and temperature coefficient as low as 0.5 ppm/ºC over [illegible] multipoint laser compensation technique. Significant [illegible] **VRE210** [illegible] **10 V** [illegible]

VRE210 [illegible] perature ranges, -25ºC to +85ºC and -55ºC to +125ºC, [illegible] are packaged in 20-terminal ceramic LCC packages [illegible]

BLOCK DIAGRAM



SELECTION GUIDE

Model	Output (V)	Temp. Operating Range	Volt Deviation (Max)
VRE210C VRE210CA	±10 ±10	-25ºC to +85ºC -25ºC to +85ºC	±0.6mV [illegible]
VRE210M **VRE210MA**	±10 ±10	-55ºC to +125ºC -55ºC to +125ºC	[illegible] ±0.5mV

20-terminal LCC [illegible]

1. CHARACTERISTICS AND SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

V_{PS} = ±15V, T = +25ºC, R_L = 10KΩ Unless Otherwise Noted.

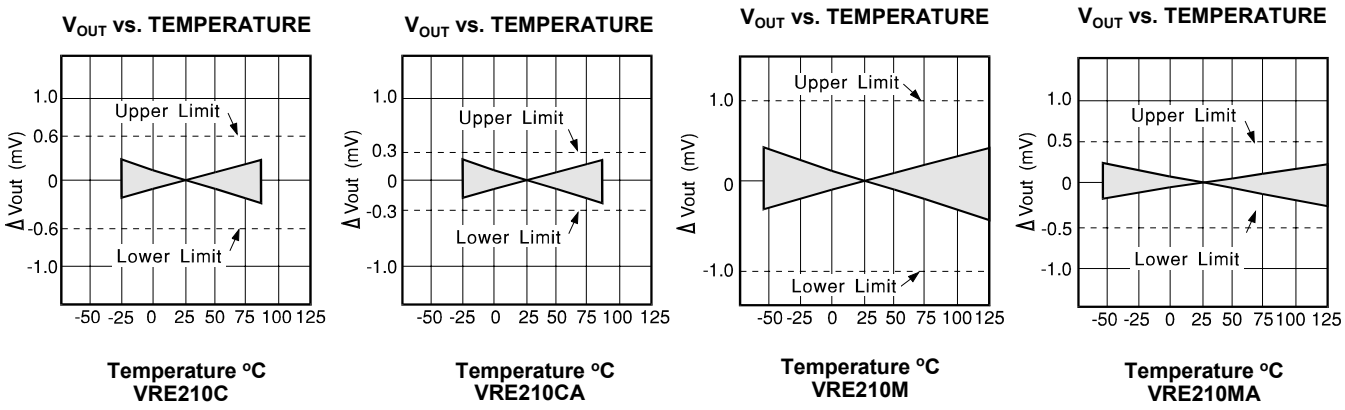
Model	VRE210C			VRE210CA			VRE210M			VRE210MA			
Parameter	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Min	Typ	Max	Units
ABSOLUTE MAXIMUM RATINGS													
Power Supply	+13.5		**±22**	*		*	*		*	*		*	**V**
Operating Temperature	-25		+85	*		*	-55		+125	-55		+125	ºC
Storage Temp	-65		+150	*		*	*		*	*		*	ºC
Short Circuit Protection	Continuous				*			*			*		
OUTPUT VOLTAGE													
VRE210		**±10**			*			*			*		**V**
OUTPUT VOLTAGE ERRORS													
Initial Error			±500			**±90**			±800			**±40**	**µV**
Warmup Drift		**2**			**1**			**2**			**1**		**ppm**
T_{MIN} - T_{MAX} (Note1)			600			**300**			**1000**			500	**µV**
Long Term Stability		6			*			*			*		ppm/1000hrs
Noise (0.1 - 10Hz)		6			*			*			*		**µVp**
OUTPUT CURRENT													
Range	**±10**			*			*			*			**mA**
REGULATION													
Line		**3**	**10**		*	*		*	*		*	*	ppm/V
Load		**3**			*			*			*		ppm/mA
OUTPUT ADJUSTMENT													
Range		**20**			*			*			*		**mV**
Temperature Coefficient		**4**			*			*			*		mV/ºC/mV
POWER SUPPLY CURRENT (Note 2)													
VRE210 IPS		5	**7**		*	*		*	*		*	*	**mA**

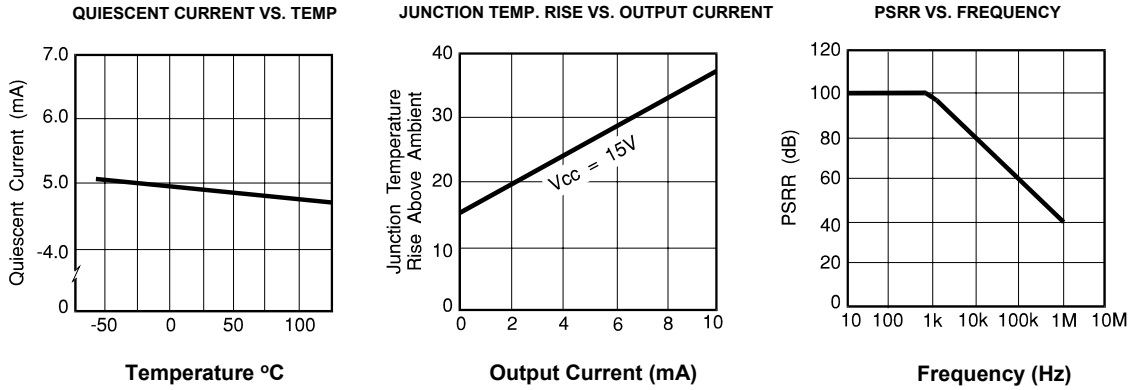
NOTES:

* Same as C Models.

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

2. TYPICAL PERFORMANCE CURVES





3. THEORY OF OPERATION

The following discussion refers to the block diagram in Figure 1. In operation, approximately 6.3 volts is applied to the noninverting input of the op amp. The voltage is amplified by the op amp to produce a 10 V output. The gain is determined by the networks R1 and R2: G=1 + R2/R1. The 6.3V zener diode is used because it is the most stable

The zener operating current is derived from the regulated output voltage through R3. This feedback arrangement provides a closely regulated zener current. This current determines the slope of the references' voltage vs. temperature function. By trimming the zener current a lower drift over temperature can be achieved. But since the voltage

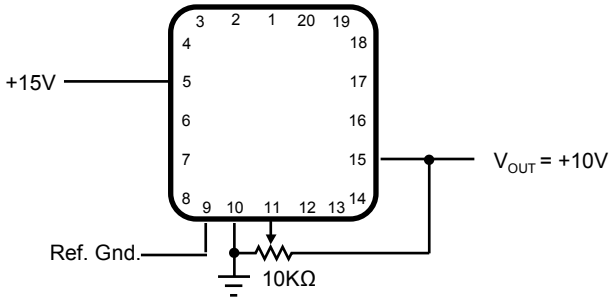
ing the slope, Thaler Corporation produces a very stable voltage over wide temperature ranges. This network is less

4. APPLICATION INFORMATION

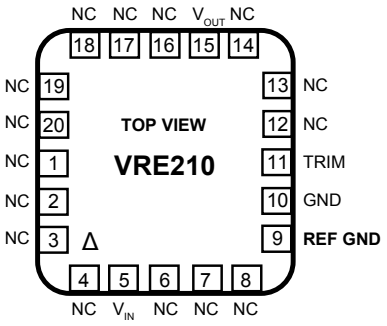
The VRE210 series voltage references

The VRE210 series voltage references have the ground terminal brought out on two pins (pin 9 and pin 10) which
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 pin 10 to the power supply ground and pin 9 to a high impedance ground point in the measurement circuit, 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 other locations

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