

Precision Sine Wave Reference

FEATURES

- ◆ Very High Accuracy: $+7.071 \text{ Vrms} \pm 0.5\%$
- ◆ Extremely Low Drift: $20 \text{ ppm}/^\circ\text{C}$
(-55°C to $+125^\circ\text{C}$)
- ◆ Excellent Stability: $10 \text{ ppm}/1000 \text{ Hrs. Typical}$
- ◆ Low Distortion: $0.1\% \text{ Thd @ } f = 3300 \text{ Hz}$
- ◆ Hermetic 14-pin Ceramic DIP
- ◆ Military Processing Option

APPLICATIONS

- ◆ Transducer Excitation
- ◆ High Resolution Servo Systems
- ◆ High Precision Test and Measurement Instruments
- ◆ AC Voltage Standard
- ◆ L_{VDT} Or R_{VDT} Reference
- ◆ Multiplying D/A Reference

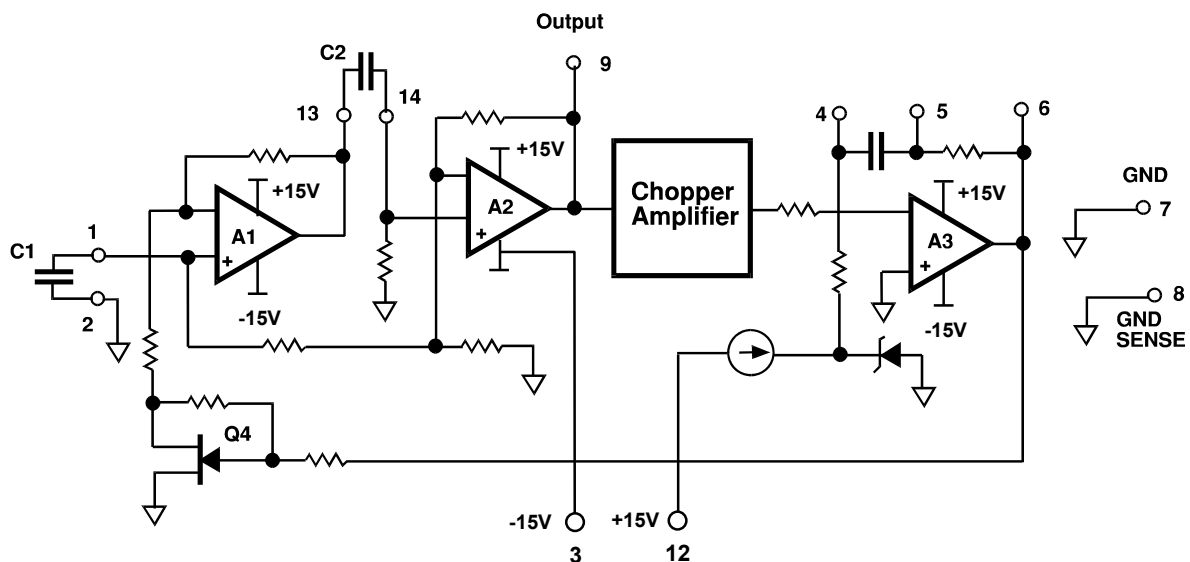
DESCRIPTION

SWR200 is a Precision Sine Wave Reference providing an ultra stable sine wave output of $+7.071 \text{ V}$ at $\pm 0.5\%$ initial accuracy and temperature coefficient as low as $20 \text{ ppm}/^\circ\text{C}$ over the full military temperature range. The extreme accuracy is made possible by a chopper-based AGC circuit. The temperature characteristic of the chopper circuit compensates the typical nonlinearity of the internal DC zener reference, resulting in a nearly linear amplitude-temperature characteristic. Frequency of the SWR200 is programmable with two external capacitors.

The SWR200 is available in a 14-pin bottom braze package. They are hermetically sealed and "M" versions are screened for high reliability and quality.

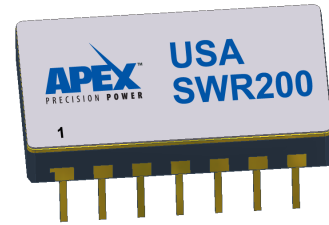
SWR200 is well suited for any application requiring a stable sine wave source. The SWR200 can be used as a reference source in precision sensing systems based on L_{VDT} or R_{VDT} position sensors. A programmable AC reference can be constructed using the SWR200 as a reference for a high accuracy multiplying Digital to Analog Converter.

Figure 1. BLOCK DIAGRAM



SELECTION GUIDE

Type	Output (Typ.)	Temperature Operating Range	Package
SWR200C	+7.071V	-25°C to +85°C	DIP
SWR200M	+7.071V	-55°C to +125°C	DIP


 Hermetic 14-pin Ceramic DIP
 Package Style HC

1. CHARACTERISTICS AND SPECIFICATIONS

ELECTRICAL SPECIFICATIONS

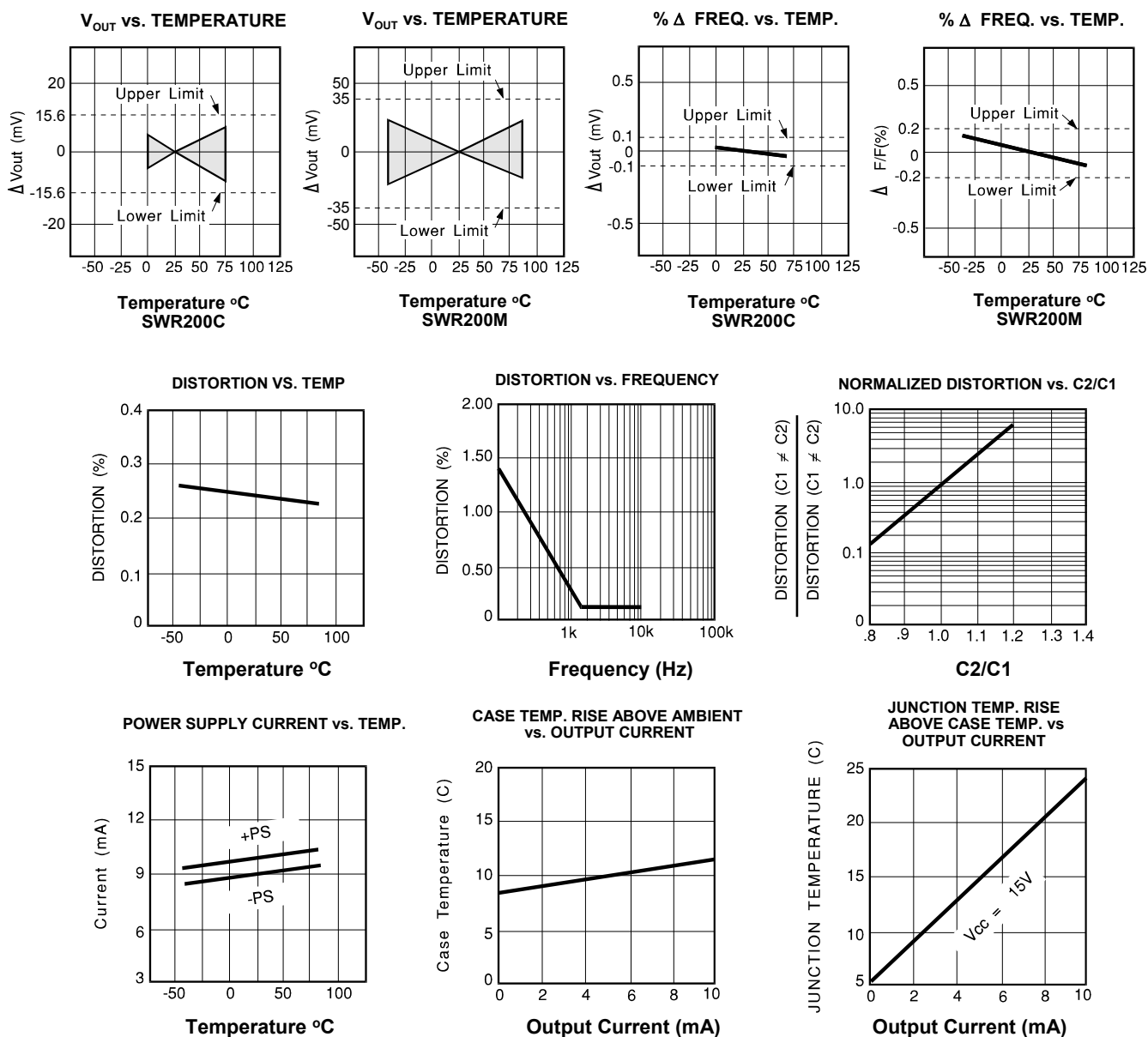
 $V_{PS} = \pm 15V$, $T = +25^{\circ}C$, $R_L = 10K\Omega$ UNLESS OTHERWISE NOTED.

Model	SWR200C			SWR200M			
Parameter	Min	Typ	Max	Min	Typ	Max	Units
ABSOLUTE MAXIMUM RATINGS							
Power Supply	± 13.5	± 15	± 22	*	*	*	V
Operating Temperature	-25		+85	-55		+125	°C
Storage Temperature	-65		+85	*		*	°C
Short Circuit Protection	Continuous			*			Vrms
OUTPUT VOLTAGE		7.071			*		V
OUTPUT VOLTAGE ERRORS							
Initial Error			± 0.5			*	%
Warmup Drift		100			*		μV
DC Offset			3			*	mV
DC Offset Over Temp.		3	18		*	*	$\mu V / ^{\circ}C$
$T_{MIN} - T_{MAX}$			20.0			30.0	ppm/°C
Long-Term Stability		10			*		ppm/°C
OUTPUT CURRENT							
Range	± 10			*			mA
REGULATION							
Line		10			*		ppm/V
Load		3			*		ppm/mA
POWER SUPPLY CURRENTS							
+PS		10.5	13		*	*	mA
-PS		9.5	13		*	*	mA
DISTORTION			0.5			*	%
FREQUENCY							
Range (f) $f = \frac{10^{-5}}{\sqrt{C_1 C_2}}$ $\frac{\Delta f}{f}$ vs. temperature	.98	1	1.02	*	*	*	Hz
	400		10K	*		*	Hz
			15			*	ppm/°C

NOTES:

- * Same as C Models.
- 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.
- 3. Pin 8 is internally connected to Pin 7 and can be used as Ref. GND.
- 4. The frequency range can be extended to any desired lower value by using 2 external AGC capacitors (see AN-3).
- 5. The increase in distortion at lower frequencies can be eliminated by using external AGC capacitors (see AN-3).

2. TYPICAL PERFORMANCE GRAPHS



3. THEORY OF OPERATION

The following refers to the schematic in Figure 1. A1 and A2 are connected as a phase-shift oscillator circuit with the frequency set by the external capacitors C1 and C2. Q4 is included in the feedback loop of A1 as a gain control element.

The oscillator output is fed to the chopper amplifier which develops an absolute value representation of the oscillator output. The chopper output is compared to a precision DC reference in integrator amplifier A3. This DC error signal is used to control the gain setting FET Q4.

As in all precision zener based DC references, the drift of the zener becomes nonlinear at temperature extremes. The chopper amplifier drift characteristic is complementary to this nonlinearity and compensates for the reference drift.

4. APPLICATION INFORMATION

Figure 1 shows the connections for the SWR200 including the two frequency setting capacitors. The frequency is:

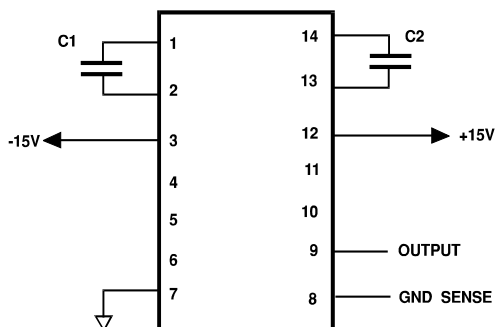
$$f = \frac{10^{-5}}{\sqrt{C_1 C_2}}$$

The frequency stability is directly related to the stability of the capacitors, therefore stable capacitors like NPO ceramic, or polycarbonate or polystyrene film should be used.

Two separate ground pins are provided for accurate ground sensing. This minimizes errors due to drops in the ground pin which can become a significant source of error in sockets.

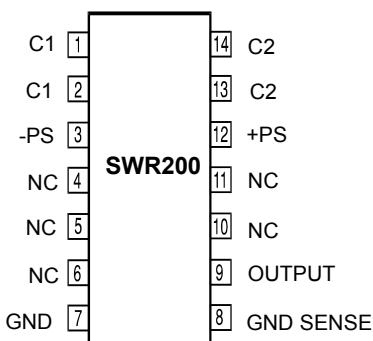
The offset of the SWR200 is fully specified for initial offset and drift and is low enough that it can normally be neglected. In applications which are especially sensitive to offset the output can be AC coupled. Proper capacitor sizing and high impedance sensing will minimize errors due to capacitive coupling.

EXTERNAL CONNECTIONS



PIN CONFIGURATION

TOP VIEW



CONTACTING CIRRUS LOGIC SUPPORT

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

For inquiries via email, please contact apex.support@cirrus.com.

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

IMPORTANT NOTICE

Cirrus Logic, Inc. and its subsidiaries ("Cirrus") believe that the information contained in this document is accurate and reliable. However, the information is subject to change without notice and is provided "AS IS" without warranty of any kind (express or implied). Customers are advised to obtain the latest version of relevant information to verify, before placing orders, that information being relied on is current and complete. All products are sold subject to the terms and conditions of sale supplied at the time of order acknowledgment, including those pertaining to warranty, indemnification, and limitation of liability. No responsibility is assumed by Cirrus for the use of this information, including use of this information as the basis for manufacture or sale of any items, or for infringement of patents or other rights of third parties. This document is the property of Cirrus and by furnishing this information, Cirrus grants no license, express or implied under any patents, mask work rights, copyrights, trademarks, trade secrets or other intellectual property rights. Cirrus owns the copyrights associated with the information contained herein and gives consent for copies to be made of the information only for use within your organization with respect to Cirrus integrated circuits or other products of Cirrus. This consent does not extend to other copying such as copying for general distribution, advertising or promotional purposes, or for creating any work for resale.

CERTAIN APPLICATIONS USING SEMICONDUCTOR PRODUCTS MAY INVOLVE POTENTIAL RISKS OF DEATH, PERSONAL INJURY, OR SEVERE PROPERTY OR ENVIRONMENTAL DAMAGE ("CRITICAL APPLICATIONS"). CIRRUS PRODUCTS ARE NOT DESIGNED, AUTHORIZED OR WARRANTED TO BE SUITABLE FOR USE IN PRODUCTS SURGICALLY IMPLANTED INTO THE BODY, AUTOMOTIVE SAFETY OR SECURITY DEVICES, LIFE SUPPORT PRODUCTS OR OTHER CRITICAL APPLICATIONS. INCLUSION OF CIRRUS PRODUCTS IN SUCH APPLICATIONS IS UNDERSTOOD TO BE FULLY AT THE CUSTOMER'S RISK AND CIRRUS DISCLAIMS AND MAKES NO WARRANTY, EXPRESS, STATUTORY OR IMPLIED, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR PARTICULAR PURPOSE, WITH REGARD TO ANY CIRRUS PRODUCT THAT IS USED IN SUCH A MANNER. IF THE CUSTOMER OR CUSTOMER'S CUSTOMER USES OR PERMITS THE USE OF CIRRUS PRODUCTS IN CRITICAL APPLICATIONS, CUSTOMER AGREES, BY SUCH USE, TO FULLY INDEMNIFY CIRRUS, ITS OFFICERS, DIRECTORS, EMPLOYEES, DISTRIBUTORS AND OTHER AGENTS FROM ANY AND ALL LIABILITY, INCLUDING ATTORNEYS' FEES AND COSTS, THAT MAY RESULT FROM OR ARISE IN CONNECTION WITH THESE USES.

Cirrus Logic, Cirrus, and the Cirrus Logic logo designs, Apex Precision Power, Apex and the Apex Precision Power logo designs are trademarks of Cirrus Logic, Inc. All other brand and product names in this document may be trademarks or service marks of their respective owners.

Компания «Life Electronics» занимается поставками электронных компонентов импортного и отечественного производства от производителей и со складов крупных дистрибьюторов Европы, Америки и Азии.

С конца 2013 года компания активно расширяет линейку поставок компонентов по направлению коаксиальный кабель, кварцевые генераторы и конденсаторы (керамические, пленочные, электролитические), за счёт заключения дистрибьюторских договоров

Мы предлагаем:

- Конкурентоспособные цены и скидки постоянным клиентам.
- Специальные условия для постоянных клиентов.
- Подбор аналогов.
- Поставку компонентов в любых объемах, удовлетворяющих вашим потребностям.
- Приемлемые сроки поставки, возможна ускоренная поставка.
- Доставку товара в любую точку России и стран СНГ.
- Комплексную поставку.
- Работу по проектам и поставку образцов.
- Формирование склада под заказчика.
- Сертификаты соответствия на поставляемую продукцию (по желанию клиента).
- Тестирование поставляемой продукции.
- Поставку компонентов, требующих военную и космическую приемку.
- Входной контроль качества.
- Наличие сертификата ISO.

В составе нашей компании организован Конструкторский отдел, призванный помогать разработчикам, и инженерам.

Конструкторский отдел помогает осуществить:

- Регистрацию проекта у производителя компонентов.
- Техническую поддержку проекта.
- Защиту от снятия компонента с производства.
- Оценку стоимости проекта по компонентам.
- Изготовление тестовой платы монтаж и пусконаладочные работы.



Тел: +7 (812) 336 43 04 (многоканальный)

Email: org@lifeelectronics.ru

www.lifeelectronics.ru