

GPS-2700

10 MHz GPS Disciplined Oscillator, Featuring the Quantum™ SA.45s Chip Scale Atomic Clock (CSAC)



Features

- High-performance GPS receiver
- Unparalleled holdover: typically $\pm 2 \mu\text{s}$ over 24 hrs. at 25 °C
- Ultra low power consumption: $\leq 1.4 \text{ W}$ at 25 °C ($V_{\text{dd}} = 12 \text{ V}$)
- Fast warm-up time: $< 180 \text{ s}$ at 25 °C
- Industry leading 1PPS accuracy: $\pm 15 \text{ ns}$ to UTC RMS (1-sigma), GPS locked
- Small footprint and low profile: only 2.5" x 3" x 0.7"

Applications

- Unmanned aerial vehicles (UAV's)
- IED Jammers—fixed, mounted, and dismantled
- Radar systems
- Aircraft guidance systems
- Tactical radios
- Underwater systems using GPS for initialization

The Microsemi GPS-2700 is the pre-eminent solution for demanding mobile GPS applications. These include military man-pack radios that require very low-g static sensitivity, MILSATCOM terminals, avionics payloads for unmanned autonomous systems (UAS), and high acceleration applications such as jet fighters. All of these applications are increasingly expected to deliver mission critical performance even in GPS-denied environments. Other applications include network timing in stationary applications such as base-stations.

Product Description

The GPS-2700 is a 10 MHz CSAC-based GPS disciplined oscillators (GPSDOs). The GPS-2700 covers a temperature range of $-10 \text{ }^{\circ}\text{C}$ to $70 \text{ }^{\circ}\text{C}$. The product utilizes Microsemi's Quantum series SA.45s Chip Scale Atomic Clock, as its frequency reference, which enables unparalleled holdover capability, an ultra low-g static sensitivity, and a fast warm up time of $< 180 \text{ s}$. The built-in high-performance GPS receiver is able to operate in a base station position-hold mode using an auto survey feature, that allows operation with just a single satellite in view, and hence improves timing

stability. The unit can also be set to operate in highly-dynamic mobile environments with only a minimum loss in timing stability versus the position-hold mode.

Standard outputs, through a low-noise distribution amplifier, include four 10 MHz sine wave outputs, one 5 MHz CMOS output, and one 1PPS output. Other standard features include— a 16x2 character LCD driver (display not included) and a phase noise filter. The unit can be powered from standard aircraft or vehicle power with an 8 V to 36 V operating range, with a built-in reverse polarity protection. Alternatively the unit can be powered through a 5 V mini-USB power supply.

GPS-2700

10 MHz GPS Disciplined Oscillator, Featuring the Quantum™ SA.45s Chip Scale Atomic Clock (CSAC)

Specifications (Typical Values)

Frequency Characteristics

- Long-term oscillator aging (without GPS) Less than 0.3 ppb per month in holdover without GPS
- 1 PPS accuracy ± 15 ns to UTC RMS (1-Sigma) GPS locked in position-hold mode
- Frequency accuracy Better than $\pm 2 \times 10^{-10}$ after 3 minutes of GPS disciplining (after lock)
- Holdover stability $< \pm 2$ μ s over 24 hour period at 25 °C (after 3 days GPS disciplining)

Phase Noise

Frequency	Noise (SSB)
10 Hz	-90 dBc/Hz
100 Hz	-125 dBc/Hz
1 kHz	-145 dBc/Hz
10 kHz	-152 dBc/Hz
100 kHz	-153 dBc/Hz

Stability, ADEV (with GPS lock)

Time	ADEV
1 s	$< 1 \times 10^{-10}$
10 s	$< 2.5 \times 10^{-11}$
100 s	$< 2 \times 10^{-11}$
1000 s	$< 1 \times 10^{-11}$
10000 s	$< 2 \times 10^{-12}$

Power Supply

- Supply voltage (Vdd) Aircraft and vehicle power range: 8 V to 36 VDC (or 5 V via mini-USB)
- Power consumption < 1.4 W at 25 °C

GPS Characteristics

- GPS frequency, antenna L1 C/A 1574 MHz, passive or active antenna 5 V, MMCX connector
- GPS receiver 50 channels, mobile SBAS: WAAS, EGNOS, MSAS supported
- Sensitivity Acquisition - 144 dBm, Tracking - 160 dBm
- GPS TTFF Cold start - < 45 sec
Warm start - 1 sec
Hot start - 1 sec
- GPS receiver motion adaptive filter settings Optimized depending on vehicle velocity (auto-sensing, auto-switching)

Environmental

- Storage temperature -40 °C to 85 °C
- Operating temperature -10 °C to 70 °C
- Frequency stability over temperature (-10 °C to 70 °C) $< 5 \times 10^{-10}$ (CSAC only, no GPS disciplining, maximum rate of change is 0.5 °C/minute)
- g-sensitivity < 0.2 ppb per-g per-axis
- Magnetic sensitivity (± 2.0 Gauss) $< 9.0 \times 10^{-11}$ /Gauss,

Health Monitoring and Communication

- RS-232 control (Including USB port) Full SCPI-99 control commands at 9.6 K, 19.2 K, 38.4 K, 57.6 K, 115.2 K
- RS-232 NMEA output sentences NMEA 0183 rev. 2.3, sentences: GGA, RMC, ZDA, PASHR, and others
- TTL alarm output GPS unlock and event indicator
- USB, LCD support Optionally USB powered and controlled, supports 16x2 LCD displays

Miscellaneous

- Warm-up time/ stabilization time < 2 min at 25 °C to $< 5 \times 10^{-10}$ accuracy typ. (no GPS)
- MTBF $> 100,000$ hours

GPS-2700

10 MHz GPS Disciplined Oscillator, Featuring the Quantum™ SA.45s Chip Scale Atomic Clock (CSAC)

Electrical

- 1 PPS output (CSAC flywheel generated) 5 V CMOS output, can be shifted in 1 ns steps relative to UTC
- 10 MHz and 5 MHz output Four isolated 10 MHz sine wave 13 dBm \pm 3 dB, one 5 MHz CMOS 5 V
- Distribution amplifier port isolation 2 MHz: >98 dB, 10 MHz: >85 dB

Ordering Information

Part Number	Description
090-00925-000	10 MHz GPSDO, standard temperature range



Microsemi Corporate Headquarters
One Enterprise, Aliso Viejo, CA 92656 USA
Within the USA: +1 (800) 713-4113
Outside the USA: +1 (949) 380-6100
Fax: +1 (949) 215-4996
Email: sales.support@microsemi.com
www.microsemi.com

©2016 Microsemi Corporation. All rights reserved. Microsemi and the Microsemi logo are registered trademarks of Microsemi Corporation. All other trademarks and service marks are the property of their respective owners.

Microsemi Corporation (Nasdaq: MSCC) offers a comprehensive portfolio of semiconductor and system solutions for aerospace & defense, communications, data center and industrial markets. Products include high-performance and radiation-hardened analog mixed-signal integrated circuits, FPGAs, SoCs and ASICs; power management products; timing and synchronization devices and precise time solutions, setting the world's standard for time; voice processing devices; RF solutions; discrete components; enterprise storage and communication solutions, security technologies and scalable anti-tamper products; Ethernet solutions; Power-over-Ethernet ICs and midspans; as well as custom design capabilities and services. Microsemi is headquartered in Aliso Viejo, California and has approximately 4,800 employees globally. Learn more at www.microsemi.com.

Microsemi makes no warranty, representation, or guarantee regarding the information contained herein or the suitability of its products and services for any particular purpose, nor does Microsemi assume any liability whatsoever arising out of the application or use of any product or circuit. The products sold hereunder and any other products sold by Microsemi have been subject to limited testing and should not be used in conjunction with mission-critical equipment or applications. Any performance specifications are believed to be reliable but are not verified, and Buyer must conduct and complete all performance and other testing of the products, alone and together with, or installed in, any end-products. Buyer shall not rely on any data and performance specifications or parameters provided by Microsemi. It is the Buyer's responsibility to independently determine suitability of any products and to test and verify the same. The information provided by Microsemi hereunder is provided "as is, where is" and with all faults, and the entire risk associated with such information is entirely with the Buyer. Microsemi does not grant, explicitly or implicitly, to any party any patent rights, licenses, or any other IP rights, whether with regard to such information itself or anything described by such information. Information provided in this document is proprietary to Microsemi, and Microsemi reserves the right to make any changes to the information in this document or to any products and services at any time without notice.