

ULN 2550

25 or 50 MHz GPSDO DOCXO Module

Defense | 5G Communications | SATCOM | Transportation
 Data Center Energy | Financial | Critical Infrastructure

The ULN-2550 time-, frequency-, and position-reference is an extremely small Global Positioning System Disciplined Oscillator (GPSDO) optimized for up-conversion applications that require 10 MHz, 25 MHz, 50 MHz, and/or 100 MHz sources.

With the exception of the GPS antenna connection, the ULN-2550 I/O and power-inputs are combined into a single connector that can either have a board-to-board interface, or a cable harness, making system integration straight forward, and compatible to stringent military requirements.

All outputs are frequency and phase-synchronized to UTC via the GPS system and thus provide Better-Than-Cesium™ long-term performance.

Applications

- The ULN-2550 is ideal for Ultra Low-Phase-Noise up-conversion systems as used in Radar and Satellite communication equipment.



ULN 2550

Highlights

- 10 MHz, 25 MHz/50 MHz, and 100 MHz outputs with 4x LVDS
- Typical Allan Deviations of $<5E-11$ with GPS lock for measurement intervals from 1 to 1000 s
- Phase noise of <125 dBc at >10 Hz offsets is standard
- Power consumption of <4 W with DOCXO at 25°C
- A high-end WAAS/EGNOS/MSAS GPS receiver drives an ultra-stable OCXO frequency reference under the control of a 32-bit Processor
- Sine Wave, CMOS, and LVDS outputs
- GPSCon Windows graphing and SNTP server software compatible

Typical Electrical Specifications

Module Specifications	Description
1 PPS Accuracy	± 30 ns to UTC RMS (1-Sigma) GPS Locked
Frequency Accuracy	Better than $\pm 3E-010$ after 1 hour operation with GPS locked
Holdover Stability	$< \pm 7$ μ s over 24-Hour Period @+25°C (No Motion, after 5 days with GPS)
ADEV	1 s to 1000 s: $< 5 E-11$ with GPS lock typical
1 PPS Outputs (OCXO Flywheel Generated)	Two outputs: 5 V CMOS and LVDS
10/25/100 MHz Outputs (6x total, 4x @25/50 MHz, 10 MHz, 100 MHz)	4x LVDS 25/50 MHz, 1x CMOS 100 MHz, 1x CMOS 10 MHz
RS-232 Control (TTL Level, RS-232 levels optional)	TTL Level, Full control via SCPI-99 Control Commands, NMEA 0183
GPS Frequency	L1, C/A 1574 MHz
GPS Antenna	Passive or Active, 5 V
GPS Receiver	50 Channels, Mobile, GPS, WAAS, EGNOS, MSAS supported, Galileo ready
Sensitivity	
Acquisition	-144 dBm
Tracking	-160 dBm
GPS TTFF	
Cold Start	<45 sec
Warm Start	1 sec
Hot Start	1 sec
TTL Alarm Output	GPS Unlock and Hardware Failure indicator
Warm Up Time/Stabilization Time	<10 min at +25°C to 1E-09 Accuracy Typical
Supply Voltage (Vdd)	11.0 V to 16.0 V DC Nominal
Power Consumption	<4 W at +25°C with DOCX0
Environmental Conformance	MIL-STD-202, Method 204, Condition I-A
Temperature	
Operating Temperature	-25°C to +75°C
Storage Temperature	-45°C to +85°C
Oscillator Specifications	Description
Frequency Output	10 MHz, 25/50 MHz, and 100 MHz outputs
10/100 MHz Retrace without GPS	$\pm 2E-08$ After 1 Hour
Frequency Stability	$\pm 2.5E-010$ over temperature, low-g option: $\pm 3E-010$ per g per axis

Typical Electrical Specifications continued

Oscillator Specifications Cont.	Description		
Output Amplitude			
10 MHz	CMOS 5V		
25/50 MHz	LVDS		
100 MHz	CMOS 3.3V		
Warm Up Time	<12 min		
Phase Noise		25 MHz Out	10 MHz Out
	1 Hz	-88 dBc/Hz	-100 dBc/Hz
	10 Hz	-109 dBc/Hz	-125 dBc/Hz
	100 Hz	-125 dBc/Hz	-142 dBc/Hz
	1 kHz	-145 dBc/Hz	-152 dBc/Hz
	10 kHz	-155 dBc/Hz	-155 dBc/Hz
	100 kHz	-160 dBc/Hz	-155 dBc/Hz
Designed Lifetime	>10 years		

NOTE: Specifications subject to change without notice.

Product Ordering Information

VIAVI offers the ULN-2550 in the following configurations:

Product Number	Description	SOCXO	DOCXO	RS-232	RoHS
1002501-G2	ULN 2550 25MHz SOCXO GPSDO OEM Board - non-RoHS	•			
22174855	ULN 2550 25MHz SOCXO GPSDO OEM Board - RoHS	•			•
22174860	ULN 2550-G2 50MHz SOCXO - RoHS	•			•
22174861	ULN 2550-G2 50MHz SOCXO RS232 - RoHS	•		•	•
1001026-ST-G2	ULN-2550 25MHz DOCXO Ruggedized EC GPSDO OEM Board Low G - non-RoHS		•		
22174845	ULN-2550 25MHz DOCXO Ruggedized CC GPSDO OEM Board Low G - RoHS		•		•



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