SSM-2650

100 MHz Extended Temperature DOCXO Source Module

Key Features

- Four 100 MHz sine wave outputs and two 100 MHz LVDS differential outputs
- Integrated power supplies, filters, and distribution amplifier
- Disciplined or free-running operation
- Very low phase noise of -118 dBc/Hz at 100 Hz offset, and noise floor of -163 dBc/Hz

Applications

- Unmanned Aerial Vehicles (UAV's)
- Radar systems
- Military satcom terminals
- Tactical radios
- Test equipment

The Symmetricom® SSM-2650 is a ruggedized, compact, self-contained module that provides six 100 MHz outputs with high stability and very low phase noise, over a wide operating temperature range of -55°C to +80°C.

The SSM-2650 is based on a 10 MHz double-oven OCXO (DOCXO) with low g-sensitivity and low tilt sensitivity. The unit also contains a low-g 100 MHz crystal with ultra-low phase noise, to generate a signal with <-118 dBc/Hz phase noise at a 100 Hz offset, and a noise floor of <-163 dBc/Hz. The 100 MHz crystal is phase-locked to the 10 MHz DOCXO, and can be disciplined by an external 1 PPS or 10 MHz input. The SSM-2650 also includes an onboard microprocessor that provides aging and tempco correction of the 10 MHz and 100 MHz crystals.

Outputs are four separate 100 MHz sine wave signals with +6dBm amplitude, and two LVDS-compatible differential 100 MHz signals. The SSM-2650 also provides an LVDS-compatible 1 PPS output.

The SSM-2650 supports SCPI commands for status, control, and monitoring, and it also has TTL LOCK/ALARM status indicators. The built-in serial interface is user-selectable between TTL or RS-232-compatible levels.

The SSM-2650 consumes <4W steady state at +25°C, and it has a profile height of 0.93." As a free-running source, it has a holdover stability of ±10µs over a 4-hour period at +25°C.

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Specifications

ELECTRICAL SPECIFICATIONS (TYPICAL):

MODULE SPECIFICATIONS:

1 PPS Accuracy	±25ns rms to external reference, 16.666ns resolution
Frequency Accuracy	Better than ±2E-10 to external reference after 20 minutes
Holdover Stability	±10μs for 4 hour period @25°C with 20 minute lock to reference
ADEV	1s: <7E-12, 10s: <8E-12
1 PPS Outputs (OCXO Flywheel Generated)	LVDS rising-edge aligned, ultra low jitter, sawtooth removed
100MHz Outputs MMCX	2 x LVDS differential pairs at 100MHz, 4x 100MHz sine wave, +6dBm into 50 Ω
RS-232 Control	RS-232 levels standard, TTL levels optional
External Reference Input	1PPS LVDS or 10MHz sine, auto-switchover or manual select
TTL Alarm Output	Holdover and event indicator (low active, 3.3V CMOS)
Warm Up Time / Stabilization Time	<7 min to 1.0E-9 accuracy at +25°C, with onboard reference only (typical)
Supply Voltage (Vdd)	13.8V to 15.5V DC, 15V nominal, ≤100ms rise-time
Power Consumption	< 4W at +25°C, steady-state
Operating Temperature	-55°C to +80°C
Environmental Conformance	MIL-STD-202, method 204, condition I-A
Storage Temperature	-55°C to +90°C
Weight	< 60 grams

OSCILLATOR SPECIFICATION

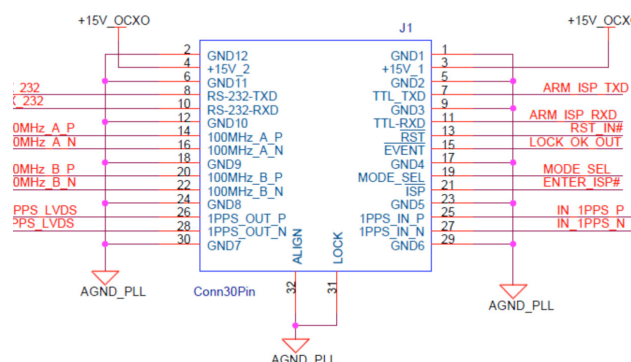|	
Frequency Output	4x 100MHz, MMCX connectors, 2x LVDS differential pairs, Samtec connector
100MHz Retrace	±2E-08 after 24 hrs. on, 24 hrs. off, 1 hr. on @ 25°C (no reference lock)
Frequency Stability	±2.5E-10 temperature coefficient
	±3.0E-10/g/axis acceleration sensitivity, 10MHz
	<±6.0E-10/g/axis acceleration sensitivity, 100MHz
Output Amplitude	6dBm ±1.5dB into 50Ω
Frequency Adjustment Range (SCPI Control or to External Reference)	At least ±100Hz @ 100MHz
Harmonics (Sine Output)	<-45dBc
Aging	<1ppm in 10 years

PHASE NOISE	100MHZ OUT
1Hz	-65dBc/Hz
10Hz	-98dBc/Hz
100Hz	-118dBc/Hz
1kHz	-146dBc/Hz
10kHz	-158dBc/Hz
100Khz	-163dBc/Hz
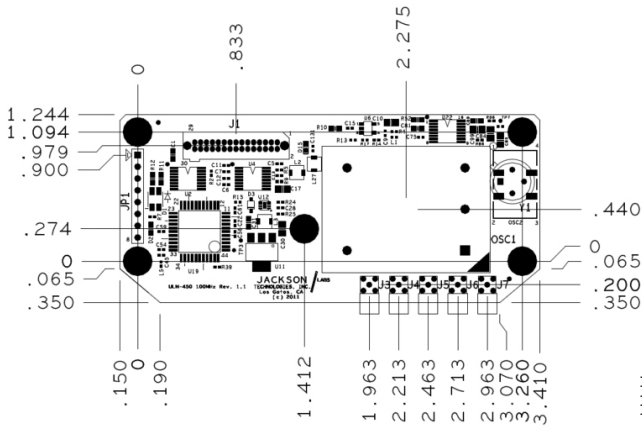
Connector Pinout Schematic

PIN	DESCRIPTION	LEVEL	IN/OUT
1	GND	GND	IN
2	GND	GND	IN
3	+15V Power	13.8V to 15.5V	IN
4	+15V Power	13.8V to 15.5V	IN
5	GND	GND	IN
6	GND	GND	IN
7	SCPI TXD TTL	3.3V CMOS	OUT
8	SCPI TXD RS232	RS232	OUT
9	GND	GND	IN
10	SCPI RXD RS232	RS232	IN
11	SCPI RXD TTL	3.3V CMOS	IN
12	GND	GND	IN
13	RESET#	3.3V Open Collector	IN
14	100MHz LVDS-A P	LVDS	OUT
15	EVENT#	3.3V CMOS	OUT
16	100MHz LVDS-A N	LVDS	OUT
17	GND	GND	IN
18	GND	GND	IN
19	TTL#/RS232	3.3V CMOS	IN
20	100MHz LVDS-B P	LVDS	OUT
21	ENTER ISP#	3.3V CMOS	IN
22	100MHz LVDS-B N	LVDS	OUT
23	GND	GND	IN
24	GND	GND	IN
25	1PPS REF-IN P	LVDS	IN
26	1PPS OUT P	LVDS	OUT
27	1PPS REF-IN N	LVDS	IN
28	1PPS OUT N	LVDS	OUT
29	GND	GND	IN
30	GND	GND	IN

Connector Pinout Schematic

Symmetricom®

DS/SSM-2650/052112   900-00425-000