

MO

HIGH-PERFORMANCE, SPACE-QUALIFIED MASTER CRYSTAL OSCILLATOR.



The MO is a cost-effective, high-performance master crystal oscillator. It's designed with long- lifetime, high-reliability technology for advanced space applications.

Key Features

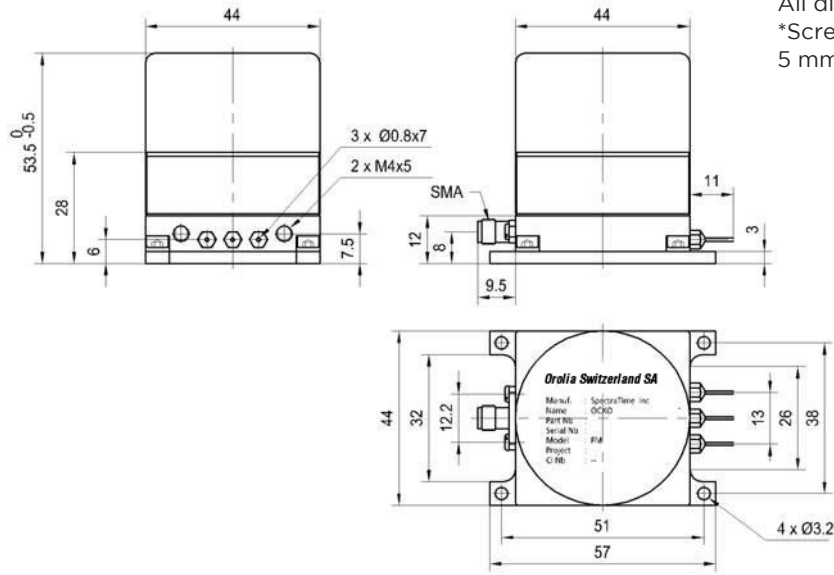
- Small mass and volume
- Low power consumption
- Low temperature sensitivity
- Excellent short and long term stability
- Fast warm-up
- Wide operating temperature
- Pre-adjusted frequency

Applications

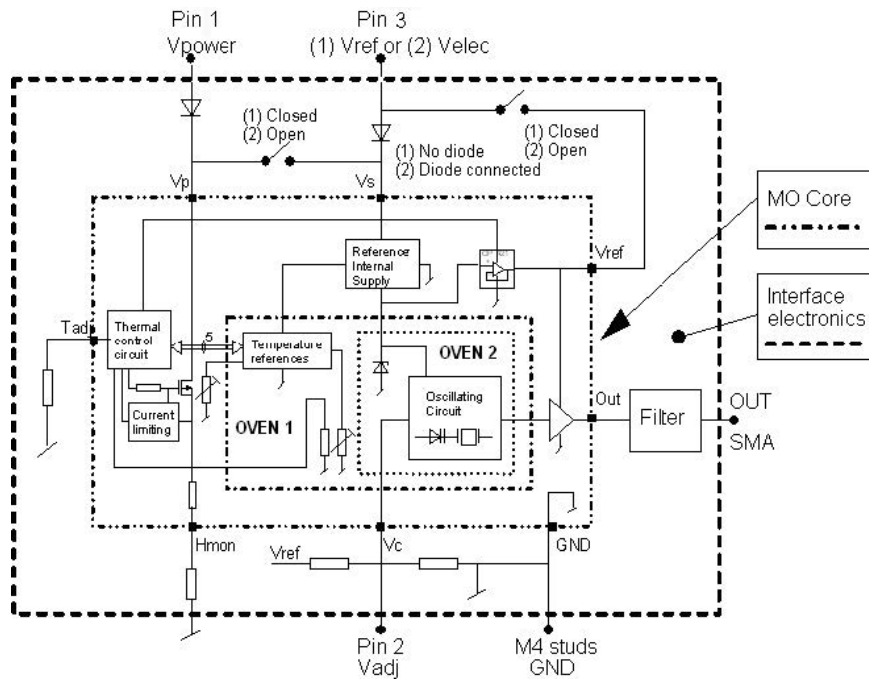
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Master Oscillator external dimensions



All dimensions in mm
 *Screw length not to exceed 5 mm length within case



FUNCTIONAL BLOCK DIAGRAM OF THE MO

User Accessible Parameters:

The externally accessible parameters are the frequency adjustment control voltage (V_{adj}) and the reference voltage (V_{ref})

To adjust the frequency, a control voltage shall be applied on the V_{adj} pin. The allowed voltage range is $GND \leq V_{adj} \leq V_{ref}$. This can be performed through the use of a resistor bridge or a 100kff variable resistor, connected between the V_{ref} pin and the power ground. In the standard version, all the modifiable parameters are factory adjusted by fixed value SMD resistors which are soldered on the user accessible interface PCB. The parameters can also be re-adjusted by the user, if required.

Technical Specifications

Type		MO4D-SC	
Parameter	Value		
Dimensions	44 x 54 x 57 (44) mm		
Output signal frequency	10 MHz*		
Frequency long term stability, 1st year Average ageing per day after 1 month	< $\pm 3 \times 10^{-9}$ / year < $\pm 1 \times 10^{-10}$ / day		
Frequency long term stability, years after	< $\pm 1 \times 10^{-8}$ / year		
Frequency short term stability(0.1-10 s)	LN < 5×10^{-13}	Std < 3×10^{-12}	
Frequency stability over full temp. range	< $\pm 1 \times 10^{-9}$		
Frequency adjustment	> ± 1.5 Hz		
SSB phase noise assuming 10MHz carrier in dBc/Hz	LN	Std	
	1 Hz	< -105	< -100
	10 Hz	< -135*	< -130*
	100 Hz	< -145	< -140
	1000 Hz	< -155	< -150
	10000 Hz	< -160	< -155
* Subject to export control (end user statement required)			
Output signal level	4,5 dBm \pm 1dBm		
Output impedance	50 Ω \pm 20%		
Harmonics	-30 dBc		
Spurious signals	-120 dBc		
Power consumption during warm-up	8 W		
Nominal power consumption	3.5 W		
Maximum power consumption in operation	5.5 W		
Volume	< 0.15 dm ³		
Power supply	12 - 18 V		
Warm-up time (accuracy < $\pm 2 \times 10^{-8}$ at 25°C)	20 minutes		
Mass (stainless steel cover)	220 gr		

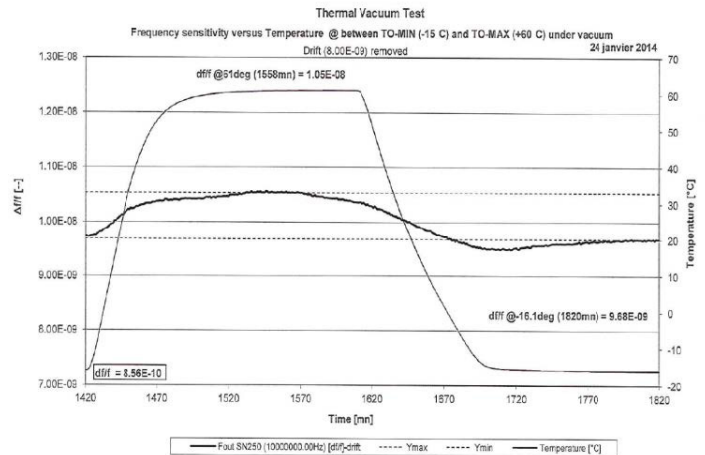


Typical MO LN Phase Noise at 10MHz



Typical MO LN Allan Deviation at 10MHz

Connectors	1) Power / TC 2) RF Output 3) Case ground	3 x solderable pins SMA 2 x M4 screw***
Mechanical interface	flat base plate	
Max. baseplate operating temperature	+60 °C	
Min. baseplate operating temperature	-20 °C	
Storage temperature	-40 to +85 °C	
First natural resonance	> 800 Hz	
Random Vibration	20 - 80 Hz	+6 dB/oct
tested, with axis	80 - 350 Hz	0.56 (0.8) g ² /Hz**
perpendicular	350 - 443 Hz	-6 dB/oct
to the mounting	443 - 600Hz	0.35 (0.5) g ² /Hz**
plane.	600 - 2000 Hz	-6 dB/oct
Duration	60 (120) sec/axis**	
Random Vibration	20 - 80 Hz	+6 dB/oct
tested, with axis	80 - 350 Hz	0.22 (0.32) g ² /Hz**
parallel to the	350 - 443 Hz	-6 dB/oct
mounting plane.	443 - 950 Hz	0.14 (0.2) g ² /Hz**
	950 - 2000 Hz	-6 dB/oct
Duration	60 (120) sec/axis**	
Sinusoidal vibration	5 - 19 Hz	11 mm 0-peak
	19 - 80 Hz	16 g
	80 - 100 Hz	8 g
Sweep rate	2(1) oct/min.**	
Life time / MTBF	15 years/9 Mio hrs	
Pressure sensitivity vacuum to atmosphere (thermal effect)	< $\pm 1 \times 10^{-8}$ @25°C	



Typical MO Frequency Stability versus Temperature

* Other frequencies (5 MHz to 15 MHz) and related specifications available upon request.

** Values in brackets only applicable for qualification testing

*** Screw length not to exceed 5 mm length within case

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