

Description

Abraccon's AR50LC embedded Rubidium Oscillator offers the latest technology that provides exceptional performance including excellent accuracy, short term stability and frequency stability. The Abraccon AR50LC is available with either a sinewave or CMOS output and with a supply voltage of +5Vdc or +12Vdc, with extended range up to +18Vdc. Additional features of this series include lock monitor output and voltage control function to support a wide range of applications.

Features

- Output Frequency 10MHz
- Low phase noise high precision atomic clock
- Excellent short-term stability
- Operating Supply Voltage: +5Vdc, +12Vdc
- Ultra-tight frequency tolerance ± 0.05 ppb
- Temp stability available to 0.3ppb (-20°C to $+65^{\circ}\text{C}$)
- Sinewave or CMOS Output
- REACH/RoHS II Compliant | MSL N/A
- ESD Sensitive

Typical Applications

- Satellite Timing and Frequency
- Oil and Gas Exploration
- GPS Receiver
- Telecommunication Infrastructure
- 4G/LTE/CDMA/EMTS
- Test and Measurement
- Underwater Sensor Systems
- Mining and Seismic Research

Electrical Specifications [Note 1]

Parameters	Min.	Typ.	Max.	Units	Notes
Frequency Output		10		MHz	
Supply Voltage (Vdd) [Note 2]	12	12.5 to 15	+18	Vdc	Option A
	4.9	5.0	+5.1	Vdc	Option B
Input Power (warm-up)		18		W	
Input Power (steady-state)		6		W	
Warm-up time to ± 0.5 ppb accuracy			8	minutes	
Operating Temperature Range	-20		+65	$^{\circ}\text{C}$	See options
Storage Temperature Range	-40		+90	$^{\circ}\text{C}$	
Initial Frequency Tolerance at time of shipment			± 0.05	ppb	@+25 $^{\circ}\text{C}$
Frequency Stability over Operating Temperature Range (in still air)		± 0.2	± 0.3	ppb	See options
Aging per day		5E-12			After 30 days
Aging per month		5E-11			After 30 days
Aging per year		5E-10			After 30 days
Warm-up time to lock			6	minutes	
Retrace			± 0.03	ppb	after 1 hour of continuous operation
Output Waveform	Sinewave				
Output Power	+8	+10	+12	dBm	
Output Load		50		Ω	
Spectral Purity, Spurious			-70	dBc	100kHz BW
Spectral Purity, Harmonics			-30	dBc	
Output Waveform	CMOS				
Output Logic High (VOH)	2.97			Vdc	
Output Logic Low (VOL)			0.33	Vdc	
Duty Cycle	40	50	60	%	
Rise/Fall time			10	nS	
Output Load			15	pF	

Note 1: All measurements guaranteed at +25 $^{\circ}\text{C}$ unless otherwise specified.

Note 2: The +12Vdc version can be powered up with any VDD value in the range of +12Vdc to +18Vdc.

Note 3: The application should maintain thermal stability to obtain optimum performance. The use of a heat sink or copper plate under the device should be avoided. Device mounting should allow for a minimum of 1mm clearance from the printed circuit board.

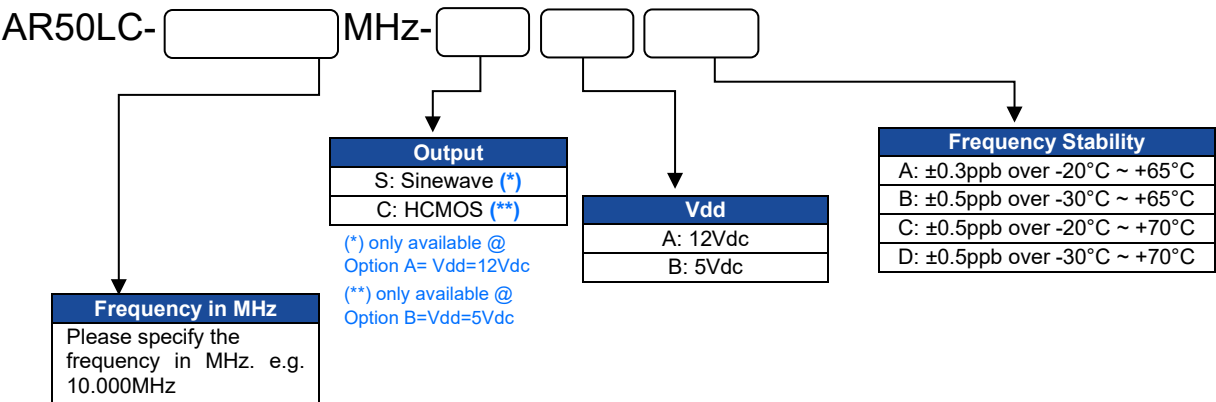
Electrical Specifications *continued* ^[Note 1]

Parameters	Min.	Typ.	Max.	Units	Notes
Electrical Frequency Adjustment					
Control Voltage	0		5	Vdc	
Frequency Pull Range	±4.0			ppb	Option A=Vdd=12Vdc
	±2.0			ppb	Option B=Vdd=5Vdc
Frequency Pull Slope	Positive				
Control Voltage Port Impedance		10		kΩ	
Lock Monitor					
Warm-up time to lock			6	minutes	
Lock Monitor Output Logic High	4.0			Vdc	Unlocked
Lock Monitor Output Logic Low			0.5	Vdc	Locked
Phase Noise					
SSB Phase Noise (Output Waveform= Sinewave)		-95		dBc/Hz	@10Hz offset
		-126		dBc/Hz	@100Hz offset
		-135		dBc/Hz	@1kHz offset
		-145		dBc/Hz	@10kHz offset
		-145		dBc/Hz	@100kHz offset
SSB Phase Noise (Output Waveform= CMOS)		-95		dBc/Hz	@10Hz offset
		-125		dBc/Hz	@100Hz offset
		-135		dBc/Hz	@1kHz offset
		-140		dBc/Hz	@10kHz offset
		-140		dBc/Hz	@100kHz offset
Allan Deviation					
Allan Deviation (Output Waveform= Sinewave)		2E-11	5E-11		τ=1s
		8E-12	2E-11		τ=10s
		3E-12	7E-11		τ=100s
Allan Deviation (Output Waveform= CMOS)		3E-11	5E-11		τ=1s
		9E-12	2E-11		τ=10s
		5E-12	7E-11		τ=100s

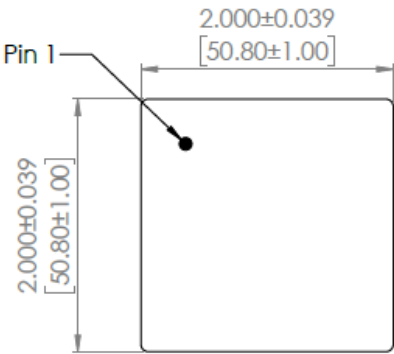
Environmental and Mechanical

Parameters	Description
Mechanical Shock	IEC 60068-2-27, Test Ea: Acceleration of 50G peak amplitude for 11ms duration
Vibration	IEC 60068-2-06, Test Fc: 10Hz-55Hz 1.5mm displacement, 55Hz-500Hz 10G
EMI	Compliant to FCC Part 15, Class B
Relative humidity	94% non-condensing
Magnetic Field sensitivity	2x10 ⁻¹² Gauss
Atmospheric pressure	-60m to 4000m 1x10 ⁻¹³ Per mbar
Approximate MTBF	100,000 Hours, Stationary
Weight	< 200 grams

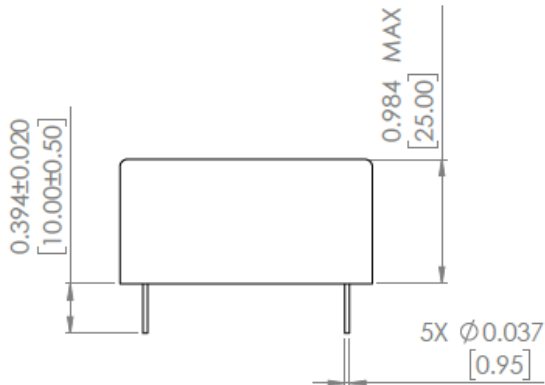
Part Identification



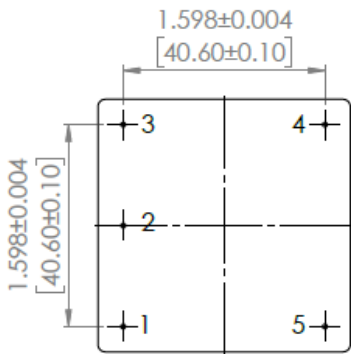
Mechanical Dimensions



TOP VIEW



FRONT VIEW



BOTTOM VIEW

Pin #	Function
1	Input frequency control
2	Lock monitor output
3	Output signal
4	Ground
5	Power supply input

Dimensions: inches [mm]