

Coherent Population Trap (CPT) Atomic Clock, Rubidium Oscillator

Description

Abrakon's AR36CPT low phase noise Atomic Clock Oscillator offers the latest Coherent Population Trap (CPT) technology, enabling exceptional performance including tight frequency accuracy, low short-term stability, and reduced power consumption. The Abracon AR36CPT is available in a miniature 45mm x 36mm x 14.5mm package with a CMOS 1PPS and 10MHz output and an input supply voltage of +3.3Vdc. This clock oscillator accepts a 1PPS (pulse per second) input signal that contains extremely accurate time information. The module locks its 10MHz output to the 1PPS input clock, providing a highly accurate 10MHz frequency reference. Control of the module parameters is performed via UART communications interface.



Features

- CMOS output frequency 10MHz and 1PPS
- Ultra-tight frequency accuracy $\leq 5.0E-11$
- Low phase noise high precision atomic clock
- Operating supply voltage +3.3Vdc
- Low power consumption <1.6W
- Voltage control input feature with ± 100 ppb range
- Control functions via UART communication
- Tight frequency stability ± 0.5 ppb typical
- Extended operating temperature range -40 to +70°C

Typical Applications

- Satellite Timing and Frequency Communications
- Oil, Gas and Underwater Systems
- Test and Measurement Instrumentation
- Navigation Systems
- Telecommunication Infrastructure
- Reference for DTV, DAB, VHF, UHF & PMR TX, CMDA, UTMS, LTE, Tetra and IPTV

Electrical Specifications [Note 1]

Parameters	Min.	Typ.	Max.	Units	Notes
RF Output (Pin 12)					
Output Frequency		10		MHz	
High-level Output Voltage (VOH)	2.4			V	
Low-level Output Voltage (VOL)			0.4	V	
Output Signal		CMOS			
Output Load		15		pF	
Rise and Fall Time (Tr, Tf)			6	ns	10% to 90% of waveform
Duty Cycle	45		55	%	50% of waveform
Supply Voltage (Pin 7)					
Supply Voltage	3.2	3.3	3.4	Vdc	
Power Consumption, Warm Up		5.2		W	
Power Consumption, Steady-State			1.6	W	
Warm up Time			5	minutes	
1 PPS Input (Pin 9)					
1PPS Input Frequency		1		Hz	
Output Logic		CMOS			
High-level Input Voltage (VIH)	2.4			V	
Low-level Input Voltage (VIL)			0.4	V	
Pulse Width	1			ms	
Rise/Fall Time			10	ns	
Input Sync		± 50		ns	
1 PPS Output (Pin 10)					
1PPS Output Frequency		1		Hz	
Output Logic		CMOS			
High-level Output Voltage (VOH)	2.4			V	
Low-level Output Voltage (VOL)			0.4	V	
Pulse Width	1			ms	
Rise/Fall Time			10	ns	

Note 1: All measurements guaranteed at nominal Vdd and at +25°C unless otherwise specified.

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Electrical Specifications *continued* [Note 1]

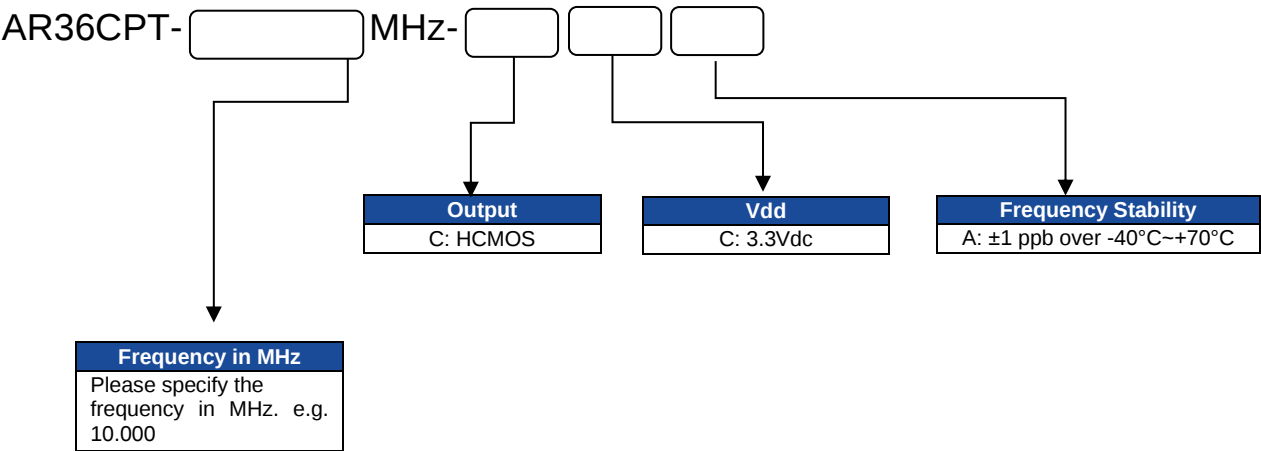
Parameters	Min.	Typ.	Max.	Units	Notes
Frequency Stability (Pin 12)					
Operating Temperature Range	-40		70	°C	
Storage Temperature Range	-55		85	°C	Non-operating
Initial Frequency Tolerance at time of shipment	-5.0E-11		+5.0E-11		@+25°C
Frequency Stability	-1E-9	±5E-10	+1E-9		-40°C to +70°C
Allan Deviation		2.0E-10			$\tau=1s$
		7.0E-11			$\tau=10s$
		2.0E-11			$\tau=100s$
		7.0E-11			$\tau=1000s$
Aging per day		4.1E-12	5.0E-12		@+25°C, after 30 days
SSB Phase Noise		-90		dBc/Hz	@10Hz offset
		-120		dBc/Hz	@100Hz offset
		-140		dBc/Hz	@1kHz offset
		-150		dBc/Hz	@10kHz offset
Retrace		5.0E-11			
Lock Indication Output (Pin 4)					
High-level Output Voltage (VOH)	2.4			V	Alarm
Low-level Output Voltage (VOL)			0.4	V	Normal Operation
Digital Tuning Output (Pin 12)					
Digital Tuning, Range		100		ppb	
Digital Tuning, Resolution		1.0E-12			
Remote System Interface and Input Control (Pins 5 and 6)					
Protocol		UART			LVTTL
High-level Input Voltage (VIH)	2.4			V	
Low-level Input Voltage (VIL)			0.4	V	
Baud Rate		57600			
Number of Data Bits			8		
Number of Stop Bits			1		
Parity			None		

Note 1: All measurements guaranteed at nominal Vdd and at +25°C unless otherwise specified.

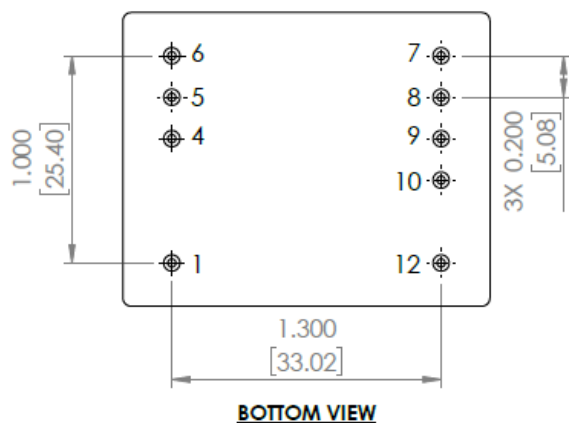
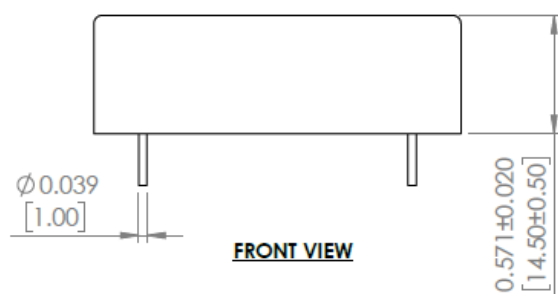
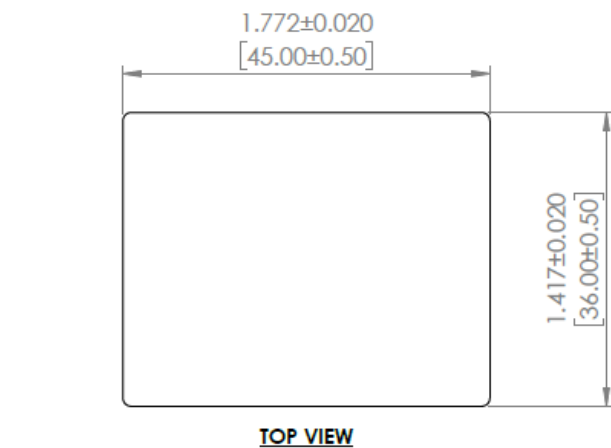
Environmental Parameters

Parameters	Description
Humidity	75% (Non Condensing)
MSL	N/A
REACH/RoHS II	Compliant, No Exemptions
Weight	<45g Typical

Part Identification



Mechanical Dimensions



Pin #	Function
1	Do not connect
2	No pin
3	No pin
4	Lock Indication
5	TXD
6	RXD
7	Supply Voltage (V _{DD})
8	GND
9	1PPS Input
10	1PPS Output
11	No pin
12	10MHz Output

Dimensions: inches [mm]