

Description

The Abracon ABCM-60 series is a high-performance clock module, a type of frequency standard or reference clock that combines the overall stability of an Oven-Controlled Crystal Oscillator (OCXO) with the accuracy of GPS time signals. The Abracon ABCM-60 is available with a CMOS output with a supply voltage of 5Vdc. This clock module incorporates a GNSS receiver, which captures precise time signals from GNSS satellites, indicated by the lock pin feature. These signals contain extremely accurate time information, allowing the module to output both 10MHz and 1PPS (pulse per second) clocks. The ABCM-60 supports holdover operation when not locked to the GNSS signal.



Features

- GNSS receiver
- Frequency Stability over Temperature: ± 0.2 ppb
- Holdover: $\pm 1.5\mu\text{s}/24\text{h}$ @ $\pm 5^\circ\text{C}$
- 1 PPS output and 10 MHz output
- Operating Supply Voltage: +5Vdc
- CMOS Output
- UART interfaces
- REACH/RoHS II Compliant | MSL N/A
- ESD Sensitive

Typical Applications

- Wired communication
- Wireless communication
- Private power network
- Industrial control
- Instrumentation
- Broadcasting
- Financial Trading
- Navigation/Tracking

Electrical Specifications [Note 1,2]

Parameters	Min.	Typ.	Max.	Units	Notes
Supply Voltage (Vdd)	4.75	5.0	5.25	Vdc	
Warm-up Current			2.0	A	
Steady-State Current			1.0	A	During steady state operations @25°C
Operating Temperature	-40		+85	°C	See options
Storage Temperature	-55		+105	°C	
Clock Output	10 MHz			Pin 2	
Frequency Output		10		MHz	Synchronized with GNSS 1 PPS output
Frequency Accuracy	-0.001		+0.001	ppb	24 hour average when locked to 1 PPS
Frequency Stability	-0.2		+0.2	ppb	Over operating temperature range; temperature slope less than 2°C per minute
Short term stability	-0.02		+0.02	ppb	Tau = 1s; no EM/EMC or other interference
Aging (Daily)	-0.2		+0.2	ppb	Free run condition and after 30 days of operations
Aging (Yearly)	-10		+10	ppb	
Phase Noise		-118	-113	dBc/Hz	10 Hz offset
		-138	-133		100 Hz offset
		-148	-143		1 kHz offset
		-150	-145		10 kHz offset
		-150	-145		100 kHz offset
		-150	-150		1 MHz offset
1 PPS Output	1 Pulse Per Second			Pin 3	
Pulse Width		100		ms	
Accuracy (Standard Deviation)	-20		+20	ns	Synchronized with 1 PPS reference, standard deviation from reference after GPS locked for 24 hours.
Holdover	-1.5		+1.5	μs	24 hour holdover after being powered on for 7 days and GPS locked for 3 days. Temperature variable speed less than 1°C per minute, less than $\pm 5^\circ\text{C}$ over 24 hours. [See options]
Output Waveform	CMOS			All Outputs	
Output Logic High (VOH)	2.7			Vdc	
Output Logic Low (VOL)			0.4	Vdc	
Duty Cycle	45	50	55	%	
Rise/Fall time			10	ns	
Output Load			15	pF	

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

Note 2: Unless otherwise specified, all tests require nominal Vdd with AC ripple < 50 mV peak-to-peak (10 Hz to 1 MHz)

Electrical Specifications *continued* [Note 3,4,5,6]

Parameters	Min.	Typ.	Max.	Units	Notes
Lock Monitor					
					Pin 5
Output Logic High (VOH)	2.7			V	Indicates ABCM-60 is locked to GNSS reference
Output Logic Low (VOL)			0.4	V	Indicates ABCM-60 is not locked to GNSS reference
Sync Control					
					Pin 8
Input Logic High (VIH)	2.7			V	ABCM-60 will lock when appropriate
Input Logic Low (VIL)			0.4	V	ABCM-60 will not lock
GNSS Internal Receiver					
					SMA
Number of Channels			50	Channels	
Frequency Band	1575.42			MHz	L1
	1561.098			MHz	B1
Tracking Capability			12	Satellites	
Tracking Code					C/A Code
Sensitivity		-159		dBm	Tracking and Navigation
		-144		dBm	Acquisition

Note 3: The Lock pin (pin 5) indicates the lock status of the ABCM-60. High output indicates that the ABCM-60 is locked to GNSS reference. Low output indicates that the GNSS signal is not locked, thus the ABCM-60 is in either free-run or holdover mode.

Note 4: The ABCM-60 works to synchronize to a reference such as GNSS when the Sync Control pin (pin 8) is set high. The ABCM-60 will work in free-run or holdover mode when the Sync control pin is set low.

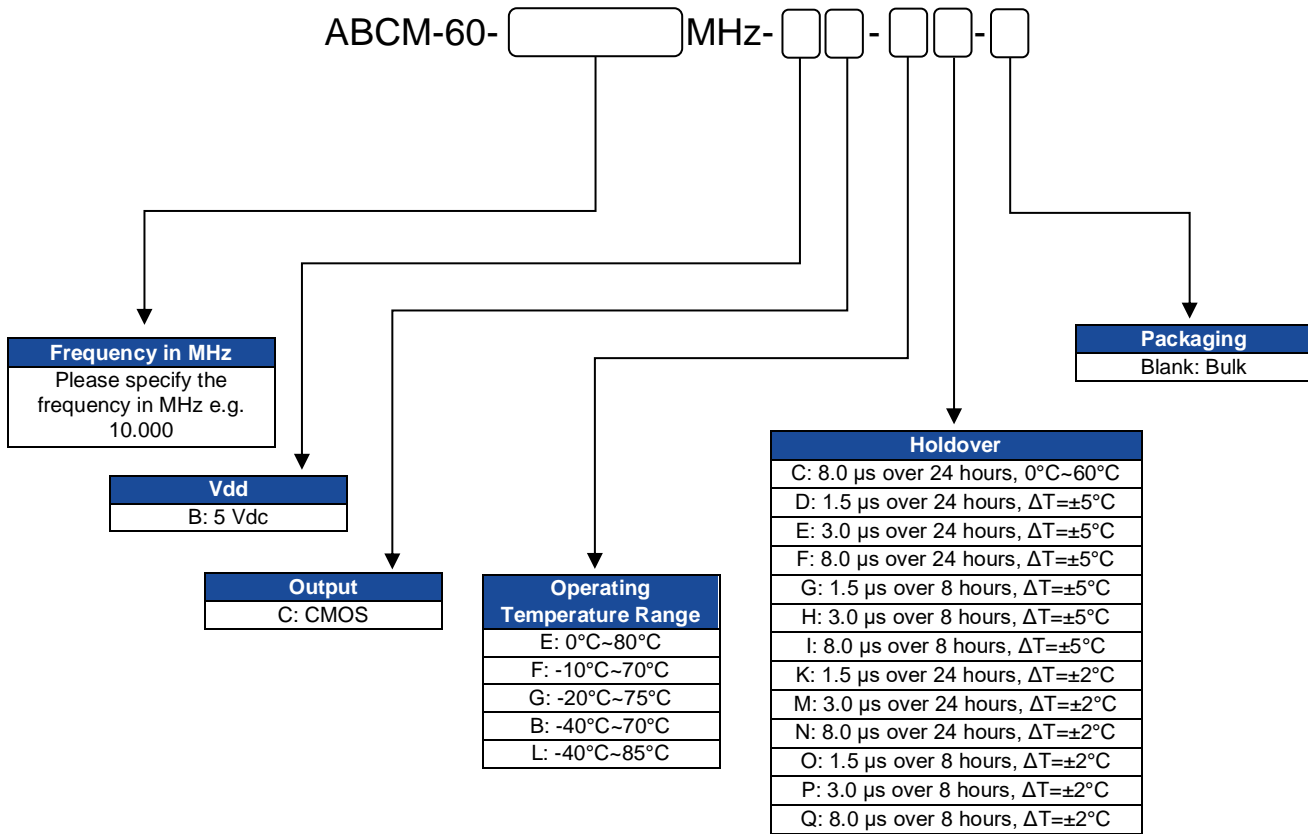
Note 5: UART interfaces are used for management and TOD. UART interfaces (pins 6 and 7) have a fixed baud rate of 9600 using 1 stop bit and no parity.

Note 6: Active antenna recommended for SMA input CN1.

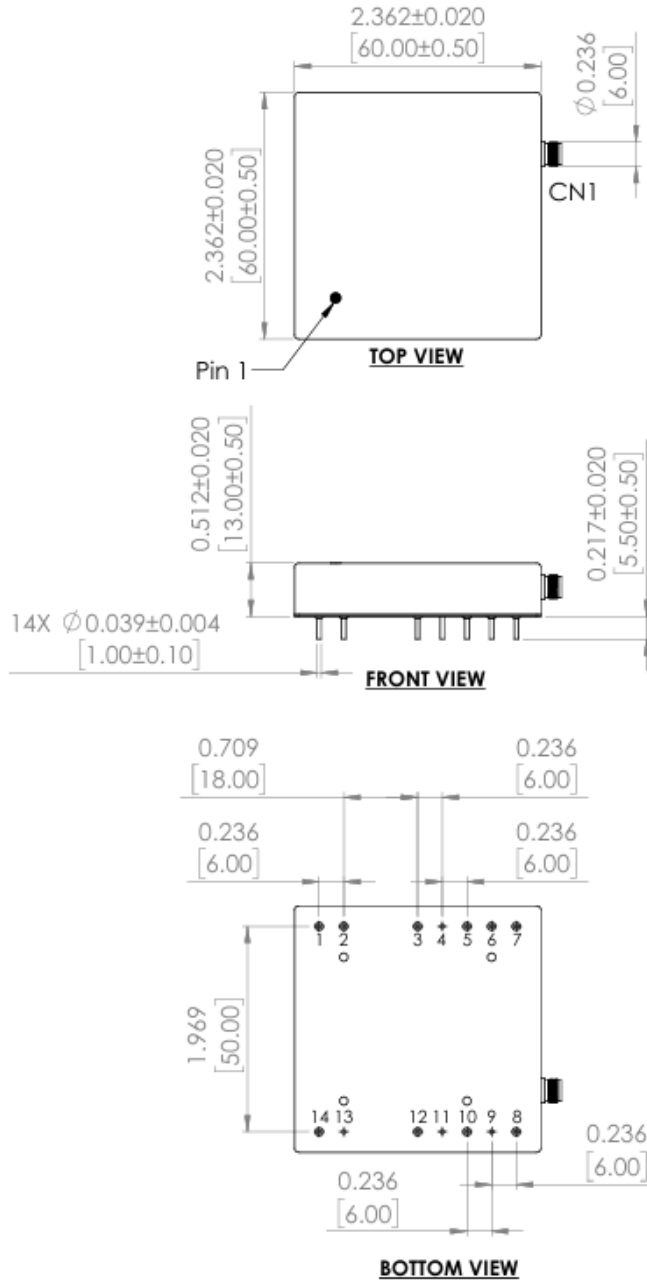
Environmental and Mechanical

Parameters	Description
Storage Humidity	30% - 80 %
ESD Level	Human Body Model, Class 2: 2000V to 4000V; ANSI/ESDA/JEDEC JS-001-2010
	Machine Model, Class B: 200V to 400V; JEDEC JESD22-A115C
Moisture Sensitivity Level	N/A
Vibration	Test condition: 0.75 mm; acceleration = 10g; 10 Hz ~ 500 Hz, 30 minute cycles, test for 2 hours. (3 times each direction: X, Y, Z), IEC 68-2-06 Test Fc.
Shock	50g; 11ms; half sine wave (3 times each direction: X, Y, Z), IEC 68-2-27 Test Ea/Severity 50A

Part Identification



Mechanical Dimensions



Pin #	Function	Type
1	Do not connect	N/A
2	10 MHz clock output	Output
3	1 PPS clock output	Output
4	Ground	Ground
5	Lock pin	Output
6	UART RDX	Input
7	UART TXD	Output
8	Sync control	Input
9	Ground	Ground
10	1 PPS GNSS output	Output
11	Ground	Ground
12	VDD	Power
13	Ground	Ground
14	Do not Connect	N/A
CN1	SMA GNSS input	Input

Dimensions: inches [mm]