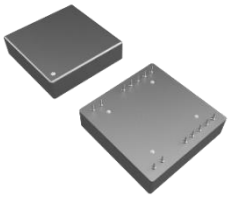
ABCM-51

OCXO Clock Module

Description



The ABCM-51 series is a high-performance clock module that takes advantage of the stability of an Oven-Controlled Crystal Oscillator (OCXO). It is designed to synchronize with the 1 PPS output from a GPS receiver. The ABCM-51 operates with a supply voltage of 5 Vdc within a 51 x 51 mm^2 package and provides a CMOS clock output at both 10 MHz and 1 PPS. The ABCM-51 provides exceptional frequency accuracy and short-term stability when locked to a 1 PPS signal and supports remarkable holdover when disconnected.

Features

- Frequency Accuracy ±1E-12 when locked
- Holdover: ±1.5µs/24h @ ±2°C
- Frequency Stability over Temperature: ±0.2 ppb
- 1 PPS output and 10 MHz output
- Operating Supply Voltage: +5Vdc
- CMOS Output

Typical Applications

- Wireless communication
- Private power network
- GPS receivers
- Industrial control
- Instrumentation
- Broadcasting
- 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			1.4	A	
Steady-State Current			0.6	A	During steady state operations @25°C
Operating Temperature	-10		+70	°C	
Storage Temperature	-55		+105	°C	
Clock Output (Pin 14)	**10 MHz**				**15 pF load**
Frequency Output		10		MHz	
Frequency Accuracy	-1E-12		1E-12		24 hour average when locked to 1 PPS reference frequency
Frequency Stability	-2E-10		2E-10		Over operating temperature range; temperature slope less than 2°C per minute
Short term stability	-2E-11		2E-11		Tau = 1s; no EMI/EMC or other interference. Test after powered on for 1 hour.
Aging (Daily)	-2E-10		2E-10		Free run condition and after 30 days of operations
Aging (Yearly)	-1E-8		1E-8		
Phase Noise		-118	-110	dBc/Hz	10 Hz offset
		-138	-130		100 Hz offset
		-148	-140		1 kHz offset
		-150	-145		10 kHz offset
		-150	-145		100 kHz offset
		-150	-150		1 MHz offset
1 PPS Output (Pin 12)	**1 Pulse Per Second**				**15 pF load**
Pulse Width		10		ms	
Accuracy (Standard Deviation)	-30		+30	ns	Synchronized with 1 PPS reference frequency, standard deviation from reference after locked for 24 hours.
Holdover	-1.5		+1.5	µs	24 hour holdover after being powered on for 7 days and locked for 3 days. Temperature variable speed less than 1°C per minute, less than ±2°C over 24 hours.
Phase Accuracy	-50		+50	ns	After being powered on for 7 days and locked for 3 days, using the 1 PPS output from the internal OCXO.
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	

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]

Parameters	Min.	Typ.	Max.	Units	Notes
1 PPS Reference Input (Pin 10)					**CMOS, 50 Ω Termination**
Input Logic High (VIH)	2.7			V	
Input Logic Low (VIL)			0.4	V	
Pulse Width	10			ns	
Lock Indicator (Pin 5)					
Output Logic High (VOH)	2.7			V	Indicates ABCM-51 is locked to external 1 PPS reference
Output Logic Low (VOL)			0.4	V	Indicates ABCM-51 is not locked to external 1 PPS reference
Sync Control (Pin 8)					
Input Logic High (VIH)	2.7			V	ABCM-51 will lock to an external 1 PPS reference when appropriate
Input Logic Low (VIL)			0.4	V	ABCM-51 will not lock to an external 1 PPS reference

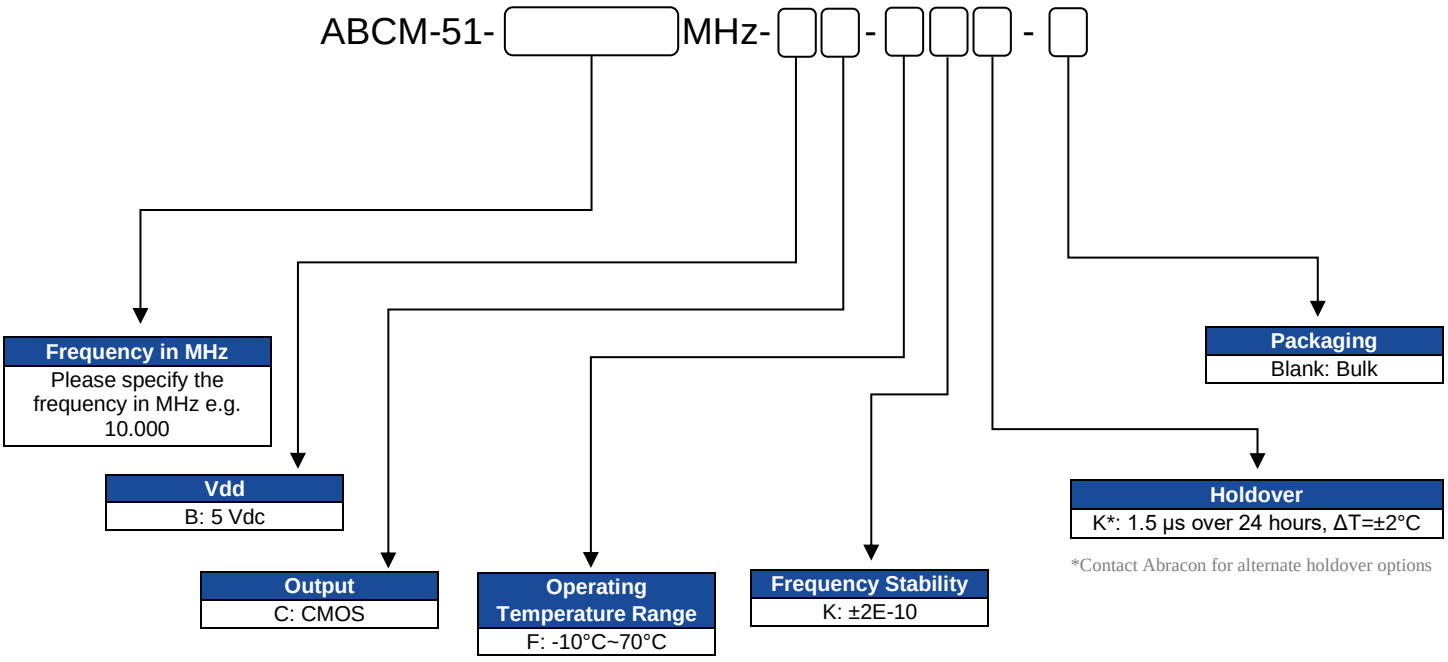
Note 3: The lock monitor (pin 5) indicates the lock status of the ABCM-51. The lock monitor pin is disabled until the clock module has finished warming up. After warm-up, a high output (2.7 V minimum) indicates that the ABCM-51 is locked to 1 PPS reference. A low output (0.4 V maximum) indicates that the 1 PPS reference is not locked, thus the ABCM-51 is in either free-run or holdover mode.

Note 4: The ABCM-51 works to synchronize to a 1 PPS reference when the Sync Control pin (pin 8) is set high. The ABCM-51 will work in free-run or holdover mode when the Sync Control pin is set low.

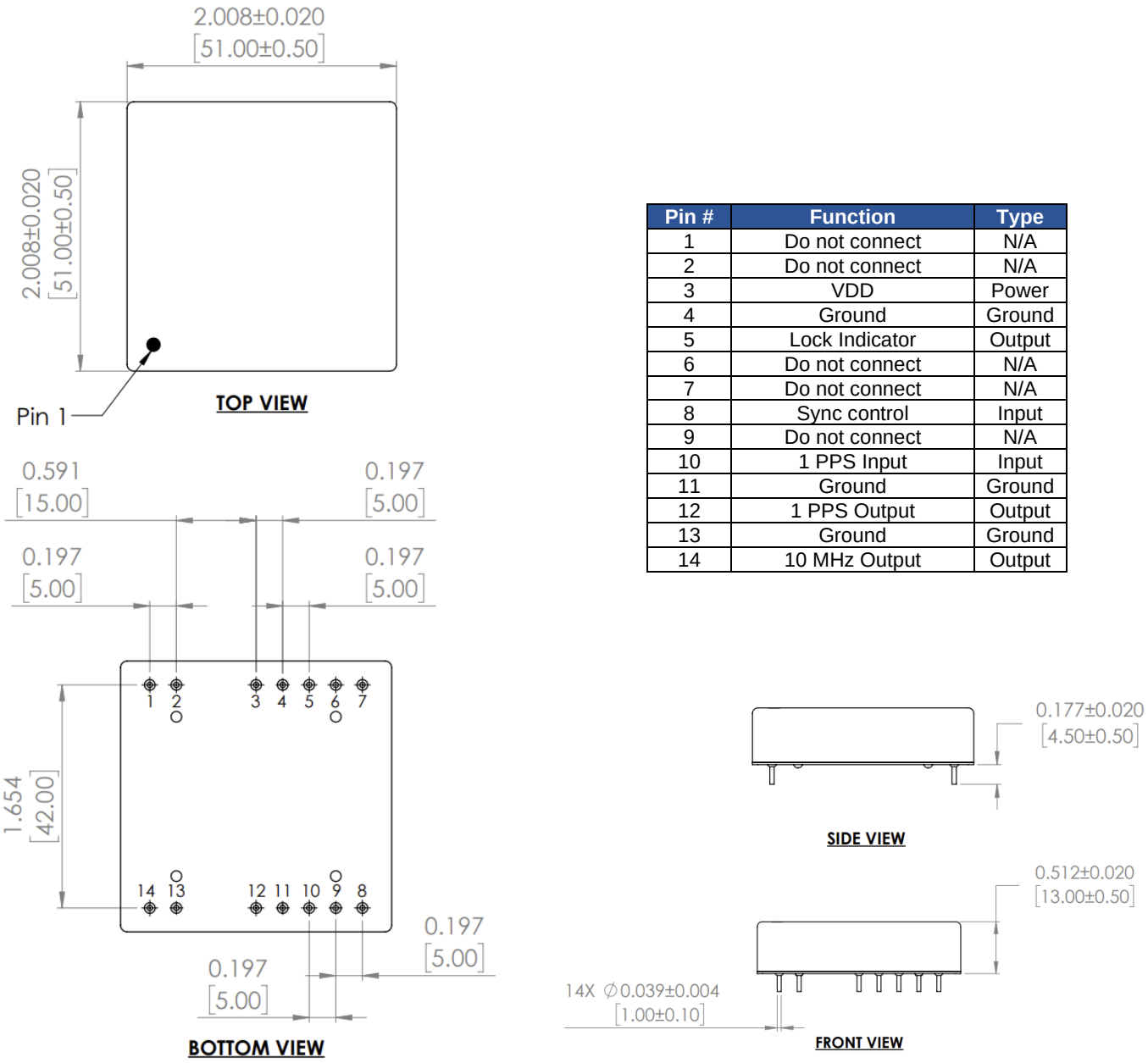
Environmental and Mechanical

Parameters	Description
Storage Humidity	20% - 70 %
ESD Level	Human Body Model, Class 2: 2000V to 4000V
	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
Reach	Compliant
RoHS	Compliant, Exemption 7(c)-I

Part Identification



Mechanical Dimensions



Pin #	Function	Type
1	Do not connect	N/A
2	Do not connect	N/A
3	VDD	Power
4	Ground	Ground
5	Lock Indicator	Output
6	Do not connect	N/A
7	Do not connect	N/A
8	Sync control	Input
9	Do not connect	N/A
10	1 PPS Input	Input
11	Ground	Ground
12	1 PPS Output	Output
13	Ground	Ground
14	10 MHz Output	Output

Dimensions: inches [mm]