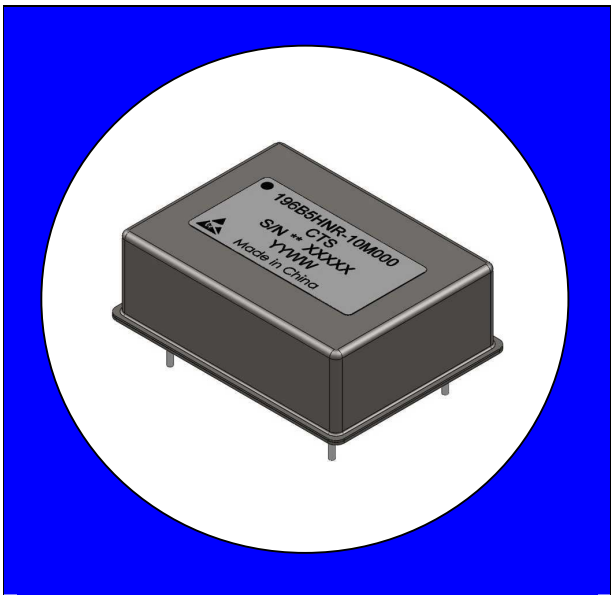
Model 196 OCXO

36 X 27 mm

APPLICATIONS :

Telecom Switching
Wireless Communication
Test and Measurement
Digital Video Broadcasting



FEATURES

- Industry Standard 36 X 27mm package
- 10 to 38.88 MHz
- 3.3V, 5.0V or 12V operation
- Commercial or Industrial Temperature Range
- Sine Wave or HCMOS Square Wave Output
- Low Phase Noise
- Optional Voltage Control
- Optional Reference Voltage
- Fully compliant to RoHS Directive 2011/65/EU

DESCRIPTION

CTS Model 196 is a versatile, high performance ovenized crystal oscillator. The high quality CTS SC-cut quartz crystal used in this OCXO offers high stability, low phase noise, and very low aging, making it an ideal frequency or timing reference for Telecommunications and Test & Measurement systems.

ELECTRICAL SPECIFICATIONS

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Operating Conditions					
Standard Frequencies	f_{NOM}	10	10, 12, 12.8, 13, 16, 16.384, 19.44, 20, 26, 32.768, 38.88	38.88	MHz
Operating Temperature Range	T_{OP}	-40	-	85	℃
Supply Voltage (Vcc)	3.3 V (Option 3)	3.135	3.3	3.465	Vdc
	5.0 V (Option 5)	4.75	5.0	5.25	Vdc
	12.0 V (Option 2)	11.4	12.0	12.6	Vdc
Power Consumption	during warm up	-	-	4	W
	steady state @ 25℃	-	-	1.5	W
Load - Square Wave	Output to Ground	5	10	15	pf
Load - Sine Wave	Output to Ground	45	50	55	ohms

North America: +1-800-982-5737 • International: +1-508-435-6831 • Asia: +65-655-17551 • frequencysales@ctscorp.com

Parameter	Conditions & Remarks	Min	Typical	Max	Unit
Frequency Stability					
Initial Calibration	$\Delta f/f_{NOM}$; T_A=25°C; at time of shipment @ 0.5 X Vref (or 0.5 x Vcc if no Vref option)	-	-	± 200	ppb
vs Temperature	-10° to 70°C; ref. 25°C (Option A)	-	±5	±10	ppb
	-40° to 85°C; ref. 25°C (Option B)	-	±10	±20	ppb
vs Supply Voltage	± 5%	-	-	± 5	ppb
vs Load	± 10%	-	-	± 1	ppb
Aging	at time of shipment	-	-	± 1	ppb/day
	first year	-	-	± 100	ppb/year
Short Term Stability Allan Deviation	In Still Air @ 0.1 sec tau	-	-	0.01	ppb
	In Still Air @ 1.0 sec tau	-	-	0.01	ppb
Warm-Up Time	T_A=25°C; to within 50ppb of freq. @ 30 min	-	-	4	minutes
Electronic Frequency Control (Option V)					
Input Impedance	Z_i	10	-	-	kΩ
Modulation Bandwidth	-3dB	500	-	-	Hz
Control Voltage Range, positive monotonic transfer	V_C for 3.3V Vcc	0	-	Vcc or Vref	Vdc
	V_C for 5V Vcc	0	-	Vcc or Vref	Vdc
	V_C for 12V Vcc	0	-	5	Vdc
Tuning Range	Sufficient range for 10 yr aging	±0.7	-	-	ppm
Tuning Coverage		20	-	-	years
Linearity	Positive monotonic	-	-	10	%
Reference Voltage (Option R)					
Vref	For Vcc @ 3.3 Vdc; 4 ma Max	2.70	2.80	2.90	Vdc
	For Vcc @ 5.0 Vdc; 4 ma Max	3.85	4.00	4.15	Vdc
	For Vcc @ 12 Vdc; 4 ma Max	4.85	5.00	5.15	Vdc
Phase Noise					
Typical for 10 MHz	1 Hz	-	-90	-	dBc/Hz
	10 Hz	-	-125	-	dBc/Hz
	100 Hz	-	-140	-	dBc/Hz
	1 kHz	-	-150	-	dBc/Hz
	10 kHz	-	-155	-	dBc/Hz

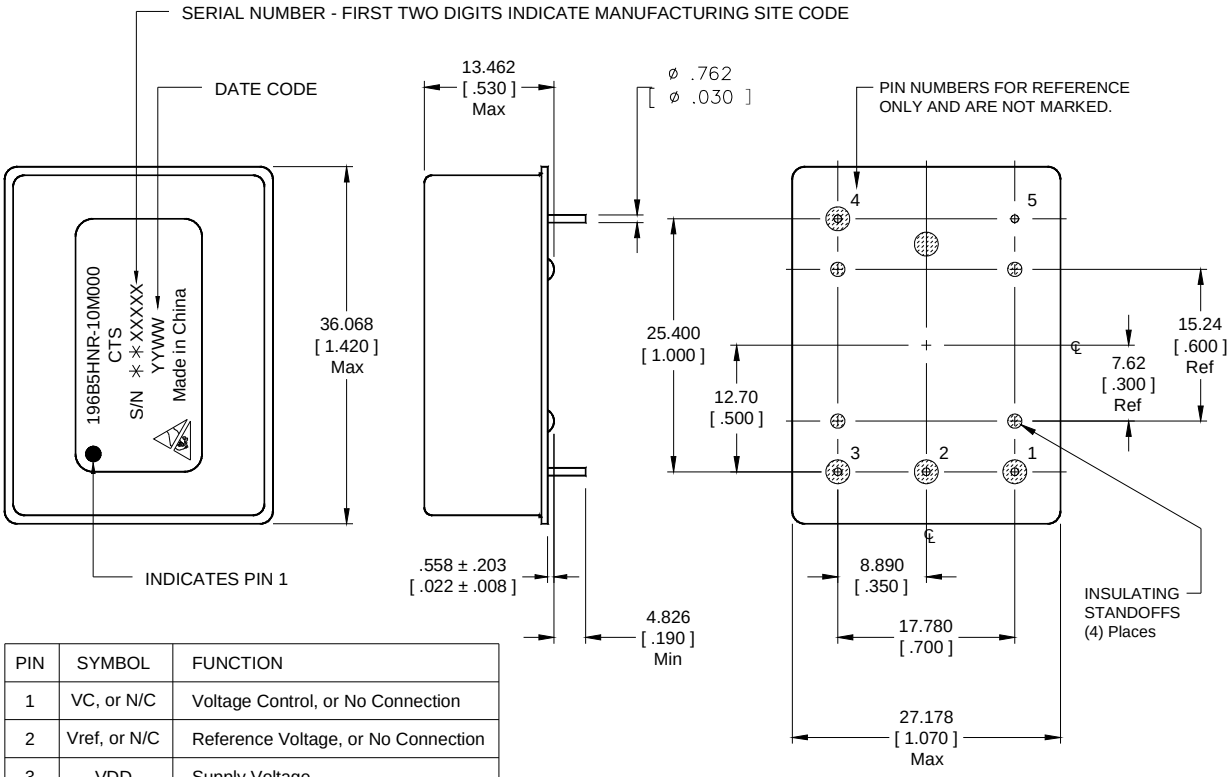
North America: +1-800-982-5737 • International: +1-508-435-6831 • Asia: +65-655-17551 • frequencysales@ctscorp.com

Parameter	Conditions & Remarks		Min	Typical	Max	Unit
Output Parameters						
Square Wave (Option H)				LVCMOS or HCMOS		
Amplitude	V_{OL}	3.3V	-	-	10% Vcc	Vdc
		5V	-	-	10% Vcc	
		12V	-	-	0.5	
	V_{OH}	3.3V	90% Vcc	-	-	
		5V	90% Vcc	-	-	
		12V	4.5V	-	-	
Rise / Fall Times	10% to 90% @ 10pf load		-	-	7	ns
Duty Cycle	@ 50 % of output signal		45	50	55	%
Sub-harmonics	For Fo > 16 MHz		-	-	-25	dBc
Spurious			-	-	-70	dBc
Sine Wave (Option S)				Sine Wave		
Amplitude	Sine Wave into 50 Ohm		2	5	8	dBm
Harmonics			-	-	-25	dBc
Sub-harmonics	for Fo > 16 MHz		-	-	-25	dBc

Environmental	
Soldering	Maximum reflow temperature, 245℃ for 10 seconds, 240℃ for 20 seconds, per IPC/JEDEC J-STD-020C
MSL	Level 1
Shock :	500 G's 1 ms, Halfsine, 3 shock per direction, per MIL-STD-202F, Method 213B, Test Condition D.
Sinusoidal Vibration :	0.06" D.A. or 10 G's Peak, 10 to 500 Hz, per MIL-STD-202F, Method 204D, Test Condition A.
Random Vibration :	5.35 G's RMS. 20 to 2000 Hz, per MIL-STD-202F, Method 214, Test Condition 1A, 15 minutes each axis.
Seal :	Hermetic
Marking Permanency :	per MIL-STD-202F, Method 215J.
Attachment Method :	Through-Hole
Lead Finish	Solder coated, 96.5/3.5 Sn/Ag
Storage Temperature Range:	-55℃ to +125℃
RoHS	Lead-free and fully compliant to RoHS Directive 2011/65/EU

North America: +1-800-982-5737 • International: +1-508-435-6831 • Asia: +65-655-17551 • frequencysales@ctscorp.com

MECHANICAL SPECIFICATIONS
PACKAGE DRAWING



PIN	SYMBOL	FUNCTION
1	VC, or N/C	Voltage Control, or No Connection
2	Vref, or N/C	Reference Voltage, or No Connection
3	VDD	Supply Voltage
4	Output	RF Output
5	GND	Circuit and Case Ground

Dimension Key: MM [Inch]

Tolerance unless otherwise specified : ± .127 [± .005]

North America: +1-800-982-5737 • International: +1-508-435-6831 • Asia: +65-655-17551 • frequencysales@ctscorp.com

Table 1

Generate CTS part number for standard options. (See factory representative for other requirements.)

Model	Temperature Range	Supply Voltage	Output Waveform	Electronic Frequency Control	Ref. Voltage or Enable		Frequency Code		
196						-	_ _	M	_ _ _

Code	Specification
A	-10°C to +70°C
B	-40°C to +85°C

Code	Specification
V	EFC
N	No EFC

Code	Specification
3	3.3V ± 5%
5	5 V ± 5%
2	12 V ±5%

Code	Specification
R	Reference Voltage, Vref
N	No reference voltage

Code	Specification
H	HCMOS
S	Sine

Code	Frequency
10M000	10.000 MHz
12M800	12.800 MHz
13M000	13.000 MHz
16M384	16.384 MHz
19M440	19.440 MHz
20M000	20.000 MHz
25M600	25.600 MHz
26M000	26.000 MHz
32M768	32.768 MHz
38M880	38.880 MHz

Part Number Example: 196B2HVR-16M384

North America: +1-800-982-5737 • International: +1-508-435-6831 • Asia: +65-655-17551 • frequencysales@ctscorp.com