

Description

Q-Tech's microcomputer compensated crystal oscillator, MCXO, uses a high stability overtone SC-cut crystal with microprocessor controlled compensation. The self-temperature sensing resonator, using a dual-mode oscillator, virtually eliminates thermometry related errors. As a result, all basic TCXO and OCXO limitations are overcome or significantly reduced in the MCXO.

Features

- Made in the USA
- ITAR
- DFARS 252-225-7014 Compliant: Electronic Component Exemption
- USML Registration # M17677
- Frequency Stability-Temperature: $\pm 2 \times 10^{-8}$ from -40°C to +85°C (Extended temperature range available)
- Outputs: 5 to 100MHz, 32.768kHz and 1PPS. Other frequency options available
- DC Power Input: 3.3Vdc, 105milliwatts max
- Inputs: Mode Control
Calibration Reference Signal
Sync (optional)
- Initialization: <5 seconds from power on to full performance
- Dual-Mode Oscillator: Specially developed for the MCXO
- Aging Correction: Auto calibration in the field
- Environmental: Inherently rugged design capable of full military screening
- Low Phase Noise and Jitter
- Small Form Factor
- G-Sensitivity 1PPB/G max.

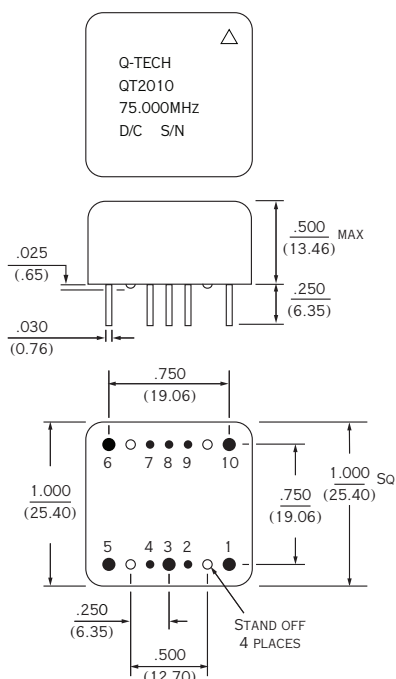
Applications

- Satellite terminals
- Underwater monitors
- GPS
- Mobile equipment



Package Outline and Pin Connections

Dimensions are in inches (mm)

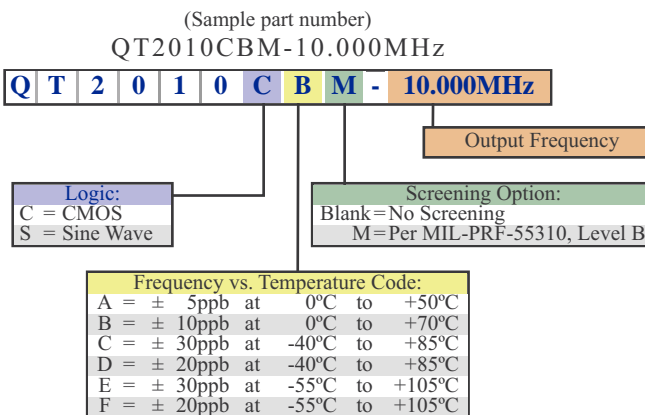


Pin No.	Function
1	Frequency Output
2, 4, 7	N/C
3	GND / CASE
5	Vc/Fref Input
6	1PPS Output
8	Mode Select
9	Status
10	Voltage Supply

Package Material:

- .025 + .002/- .003 Cold Rolled Steel
- Bright Nickel Plated 500 μ Solderable

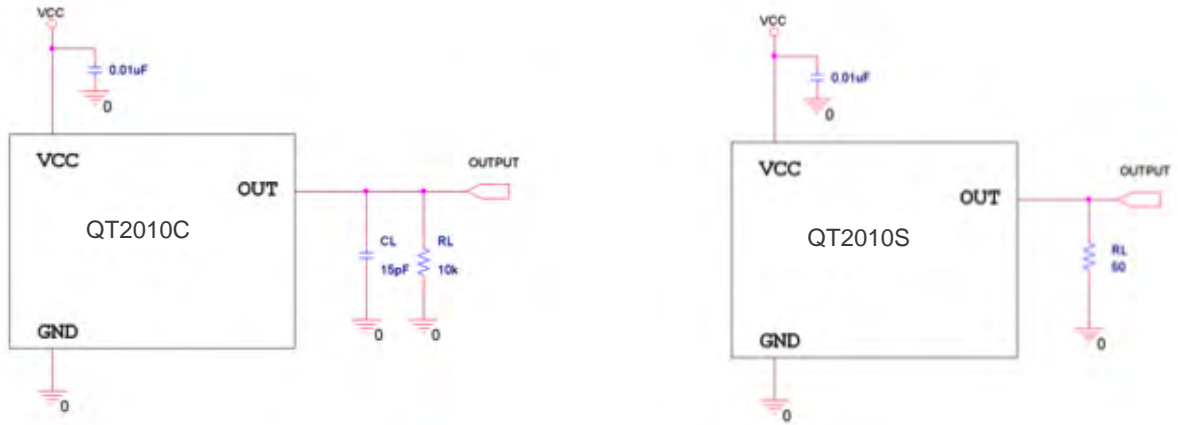
Ordering Information



For Non-Standard requirements, contact Q-Tech Corporation at
Sales@Q-Tech.com

Pinout Description

Pin #1 Frequency output. Depends on specification part number, Frequency output can be HCMOS or Sine Wave. HCMOS output has 10 kOhm in parallel with 15pF load. Sine Wave output has 50 Ohm load.



Frequency Output range is 5MHz to 100MHz.

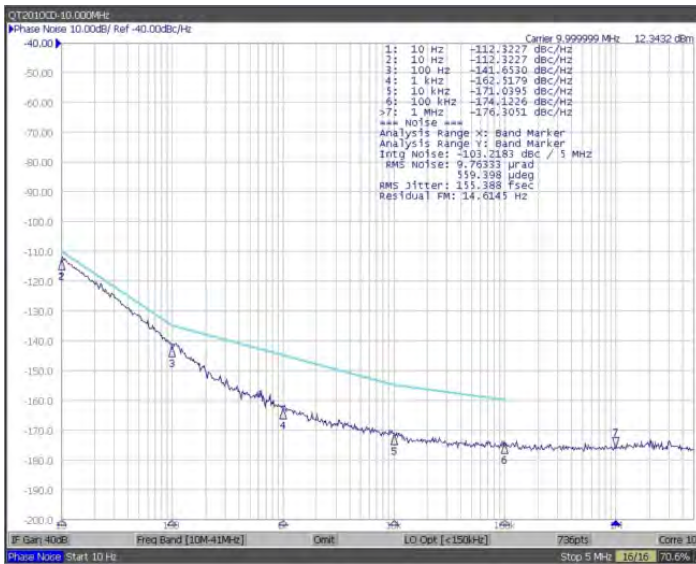
- Pin #3:** Case Ground. This pin provides negative voltage (0V) to the MCXO. It is connected to the oscillator case to reduce EMI.
- Pin #5:** Vc/Reference Input. This input can be configured as Voltage Control or Reference. The configuration is one time programming at the factory according to customer request. In case of Voltage Control setup, by providing voltage within range of 0 to +3.3V output Frequency on the both Frequency and timing outputs will be changed within range of +/-2.5PPM. Vc slope is positive. To get nominal frequency 1.65V on this input has to be applied. This function is used to compensate MCXO aging. In case of Reference Input setup, 10MHz signal should be applied to the input. When 10MHz signal (1V p-p min) is provided to the pin, MCXO starts aging correction routine and synchronizes both frequency and timing mode outputs to the reference signal. The routine takes about 10-15 seconds. After frequency is synchronized MCXO continues to operate as normal. In order to perform synchronization again, the reference should be disconnected and connected one more time. Precision of synchronization is +/-5PPB.
- Pin #6:** 1PPS Output. This output provides 1PPS (1Hz) HCMOS signal. It also can be configured to provide 32.768 kHz HCMOS signal. The configuration is one time programming at the factory according to customer request.
- Pin #8:** Mode Select. This pin is responsible for MCXO operating modes. If low level (<0.5v) signal is applied to the pin, MCXO will start to operate in Frequency Mode. It will output signal with specified frequency at the pin#1. Pin#6 will be disabled. Power consumption will be according to Frequency Mode specification. If high level (>2.8V) signal is applied to the pin, MCXO will start to operate in Timing Mode. It will output 1PPS or 32.768 kHz signal at Pin#6. Power consumption will be according to Timing Mode specification. Pin#1 will be disabled.
- Pin #9:** Status. Status output has low level signal during normal operation. It provides low frequency signal (2-4Hz) for 5-10 seconds after power is applied to Pin#10. It goes high during aging correction routine. It also goes high in case of MCXO malfunction. It can be connected to LED to indicate MCXO status.
- Pin #10:** Voltage Supply. This pin provides positive voltage (3.3V) to the MCXO. Minimum value of bypass capacitor is 2.2uF. It has to be installed close pin#10.
- Pins #2,4,7:** Not Connected. Leave these pins not connected. They have internal functions and grounding them may lead to MCXO malfunction.

Contact factory for deviations from the standard functions and operation.

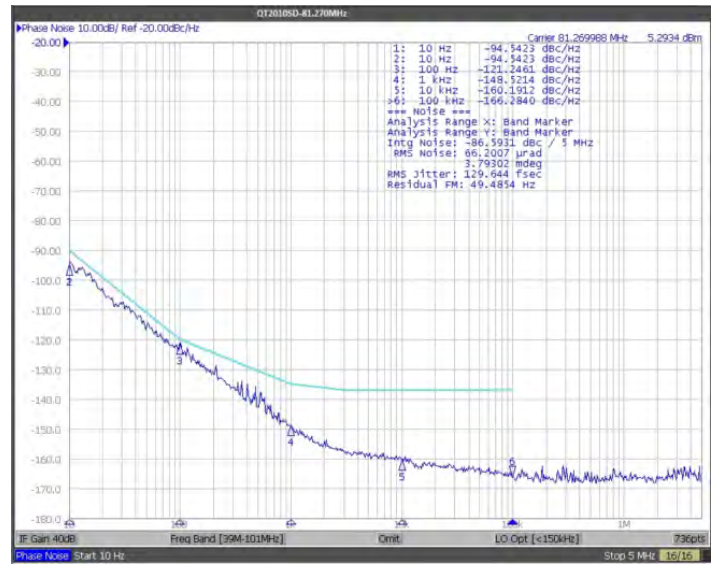
Electrical Characteristics

Parameters	Symbol	Conditions	Value	Unit	
Frequency Mode Parameters					
Frequency Range	fo	-	5.000-100.000	MHz	
Supply voltage, Nom.	Vs	Vs±5%	3.3	V	
Power Consumption, max.	Ps	Vs, nom. / Ta=+25°C (No load)	105	mW	
Nominal Tolerance	Fnom	Vs, nom. / Ta=+25°C	±10	ppb	
Freq. Stability vs. Temperature	$\Delta f/f_c$ (Ta)	Ta=-40°C...+85°C	±20	ppb	
Freq. Stability vs. Load Variation	Δf_l	HCMOS 10k Ω //15pF ±5% Load Change	SINE WAVE 50 Ω ±5%	±20	ppb
Freq. Stability vs. Voltage Supply Variation	Δf_v	±5% Input Voltage Change	±20	ppb	
Aging (Max)	$\Delta f/f_o$	Per Day	±1.0	ppb	
		Over 10 Years	±1.0	ppm	
		Over 20 Years	±1.5	ppm	
Output Waveform			HCMOS 3.3V	SINE WAVE 3dBm±3dBm	
Symmetry		Ta=-40°C...+85°C	50±5	%	
Rise/Fall Time (Max)		Ta=-40°C...+85°C	3	nSec	
Startup Time (Max)		Ta=-40°C...+85°C, to ±50.0 ppm	20	mSec	
Stabilization Time (Max)		Ta=-40°C...+85°C, to ±0.03 ppm	3	Sec	
Phase Noise (10MHz)		10Hz	-110	dBc/Hz	
		100Hz	-135	dBc/Hz	
		1kHz	-145	dBc/Hz	
		10kHz	-155	dBc/Hz	
		100kHz	-160	dBc/Hz	
Phase Noise Jitter		1kHz to 20MHz	1	pSec	
Spurious (Max)		Ta=-40°C...+85°C, >1kHz offset	-100	dBc	
Aging Adjustment (10MHz ref)		Ta=+25°C, stable environment	±0.02	ppm	
Timekeeping Mode Parameters					
Frequency Nom.	Ft	Ta=-40°C...+85°C	1	PPS	
Power Consumption, max.	Ps	Vs, nom. / Ta=+25°C (No load)	90	mW	
Freq. Stability vs. Temperature	$\Delta f/F_t$ (Ta)	Ta=-40°C...+85°C	±20	ppb	
Output Waveform			HCMOS 3.3V		
Symmetry		Ta=-40°C...+85°C	50±5	%	
Rise/Fall Time (Max)		Ta=-40°C...+85°C	100	nSec	
Startup Time (Max)		Ta=-40°C...+85°C, to ±120.0 ppm	500	mSec	
Stabilization Time (Max)		Ta=-40°C...+85°C, to ±0.03 ppm	3	Sec	
Period Jitter			5	nSec	

Phase Noise Plots

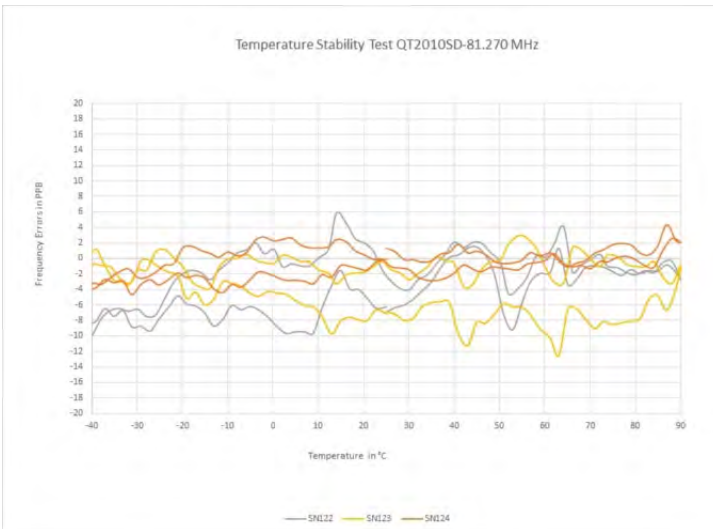


QT2010CD-10.000MHZ



QT2010SD-81.270MHZ

Temperature Stability



Revision History

ECO	REV	REVISION SUMMARY	Page
10690	B	Add Pin Out Description	2
		Add document number on footer of all pages	All
	C	Add Phase noise and temperature stability plots	4