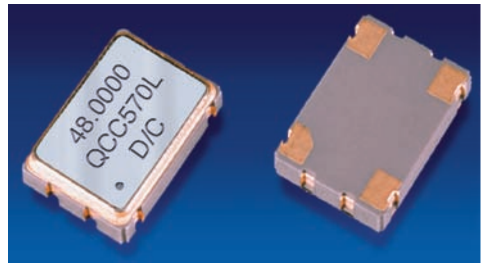
Q-TECH
CORPORATION

QCC570 SERIES

LOW PROFILE 5 x 7mm MINIATURE SMD CRYSTAL OSCILLATORS
1.8 to 5.0Vdc - 1MHz to 220.000MHz

Description

Q-Tech's surface-mount QCC570 oscillators consist of an IC 5Vdc, 3.3Vdc, 2.5Vdc, 1.8Vdc clock square wave generator and a miniature strip AT quartz crystal built in a low profile ceramic package with gold plated contact pads.



Features

- ECCN: EAR99
- Broad frequency range from 1MHz to 220.000MHz
- Small footprint
- LVHCMOS, HCMOS, and TTL compatible
- 5.0Vdc, 3.3Vdc, 2.5Vdc, 1.8Vdc supply
- Able to meet 36000G shock per ITOP 1-2-601
- Operating temperature -40ºC to +85ºC
- Tri-State Output Standard
- Hermetically sealed ceramic package
- Fundamental and 3rd Overtone designs
- Full or partial military screening tests available
- Tape and reel packaging
- RoHS compliant

Applications

- Designed to meet today's requirements for low voltage applications
- Gun launched munitions and systems
- Smart munitions
- Instrumentation
- Navigation
- Avionics
- Microprocessor clock

Ordering Information

Sample part number

QCC570L14-50.000MHz

QCC570	L	14	-	50.000MHz

L: Blank= 5.0Vdc, L= 3.3Vdc, N= 2.5Vdc, R= 1.8Vdc

50.000MHz: Output frequency

14:

N/A	=	±	50ppm	at	-40ºC	to	+85ºC
5	=	±	25ppm	at	-20ºC	to	+70ºC
12	=	±	100ppm	at	-40ºC	to	+85ºC
14	=	±	20ppm	at	-20ºC	to	+70ºC
15	=	±	25ppm	at	-40ºC	to	+85ºC

Frequency stability vs. temperature codes may not be available in all frequencies.

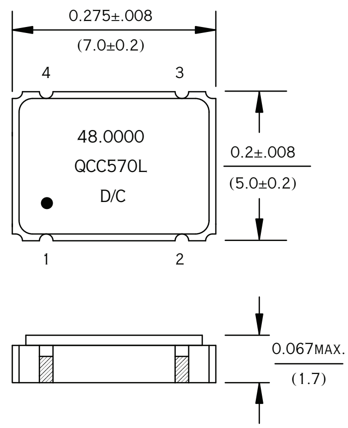
For Non-Standard requirements, contact Q-Tech Corporation at Sales@Q-Tech.com

Other Options Available For An Additional Charge

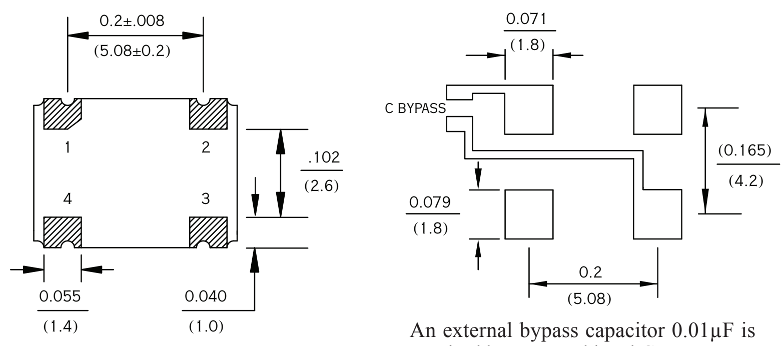
- Hot Solder Dip Sn60 per MIL-PRF 55310

Specifications subject to change without notice.

Package Specifications and Outline



Pin No.	Function
1	TRISTATE
2	GND/CASE
3	OUTPUT
4	VDD



An external bypass capacitor 0.01µF is required between Vdd and GND

Dimensions are in inches (mm)

Marking Information:
Line 1: XX.XXXX (Frequency in MHz)
Line 2: P/N (QCC570 or QCC570L)
Line 3: Dot + Stability code + Date code (Month Year)

Date Code Format:
A - L : Month Jan-Dec
0 : 2010
1 : 2011

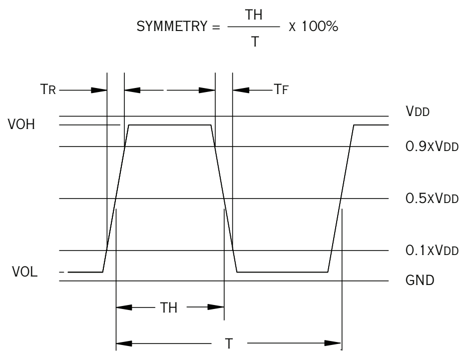
Package Information

- Package material: AL2O3
- Termination pads (4x), Electro nickel plating 1.27µm ~ 8.89µm typ., with gold 0.3µm ~ 1.0µm flash plate
- Weight: 0.15g typ., 2.0g max.

Electrical Characteristics

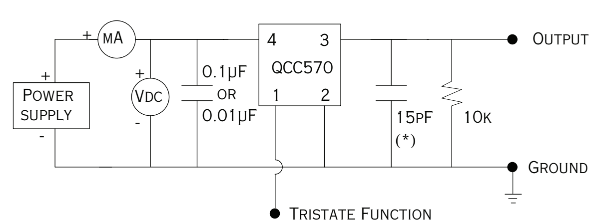
Parameters	QCC570	QCC570L	QCC570N	QCC570R
Output frequency range (Fo)	**1MHz — 106.250MHz**	**1MHz — 220.000MHz**	**1MHz — 220.000MHz**	**1MHz — 165.000MHz**
Supply voltage (Vdd)	5.0Vdc ± 10%	3.3Vdc ± 10%	2.5Vdc ± 10%	1.8Vdc ± 10%
Maximum Applied Voltage (Vdd max.)	-0.5 to +7.0Vdc	-0.5 to +5.0Vdc		
Frequency stability (ΔF/ΔT)	± 50ppm max.			
Operating temperature (Topr)	-40ºC to +85ºC			
Storage temperature (Tsto)	-55ºC to + 125ºC			
Operating supply current (No Load)	35 mA max. - 1MHz ~ < 32MHz 70 mA max. - 32MHz ~ < 70MHz 90 mA max. - 70MHz ~ 106.250MHz	20 mA max. - 1MHz ~ < 32MHz 45 mA max. - 32MHz ~ < 70MHz 100 mA max. - 70MHz ~ 220.000MHz	8 mA max. - 1MHz ~ < 30MHz 22 mA max. - 30MHz ~ < 60MHz 70 mA max. - 60MHz ~ 220.000MHz	7 mA max. - 1MHz ~ < 30MHz 18 mA max. - 30MHz ~ < 70MHz 61 mA max - 70MHz ~ 165MHz
Symmetry (50% of ouput waveform)	45/55%			
Rise and Fall times	10ns max. - 1MHz ~ < 20MHz 7ns max. - 20MHz ~ 106.250MHz (between 10% to 90%)	8ns max. - 1MHz ~ < 20MHz 5ns max. - 20MHz ~ 220.000MHz (between 10% to 90%)	6ns max. (between 20% to 80%)	
Output Load	30pF max. 1MHz ~ < 50MHz 15pF max. (50MHz ~ 106.250MHz)	15pF max.	15pF max.	
Start-up time (Tstup)	10ms max.			
Output voltage (Voh/Vol)	0.9Vdd min. / 0.1Vdd max.			
Output Current (Ioh/Iol)	± 16mA max.	± 8mA max.	± 6mA max.	
Enable/Disable function Pin 1	VIH ≥ 2.2V Active	VIH ≥ 2.2V Active (< 30MHz) VIH ≥ 0.7Vdd Active (≥ 30MHz)	VIH ≥ 0.7Vdd Active	
	VIL ≤ 0.8V High Z	VIL ≤ 0.8V High Z (< 30MHz) VIL ≤ 0.3Vdd High Z (≥ 30MHz)	VIL ≤ 0.3Vdd High Z	
Aging	± 5ppm/year max.			

Output Waveform (Typical)



Test Circuit

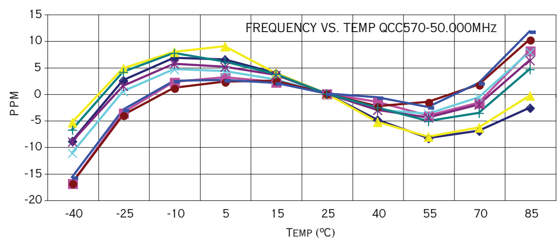
TYPICAL TEST CIRCUIT FOR CMOS LOGIC



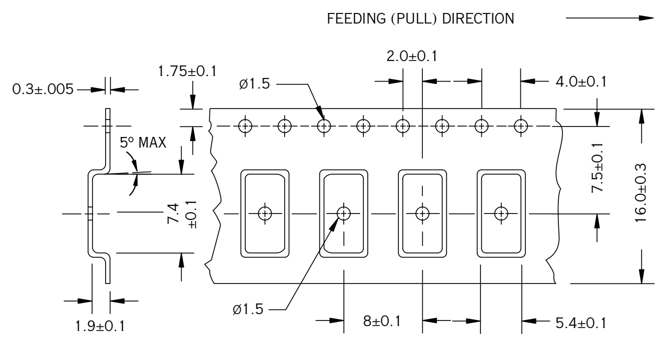
(*) CL INCLUDES PROBE AND JIG CAPACITANCE

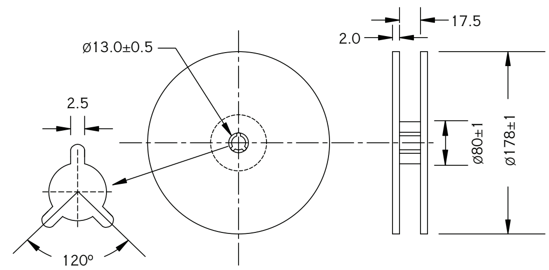
The Tristate function on pin 1 has a built-in pull-up resistor so it can be left floating or tied to Vdd without deteriorating the electrical performance.

Frequency vs. Temperature Curve



Embossed Tape and Reel Information



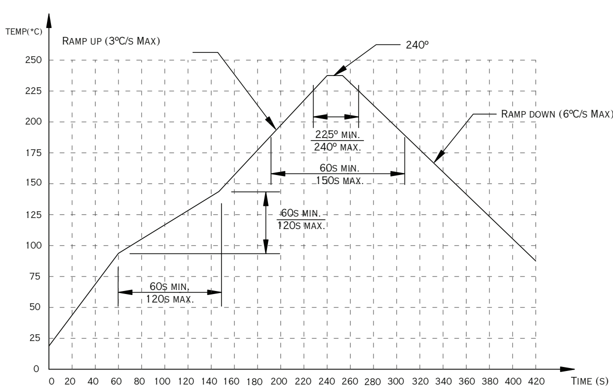


Dimensions are in mm. Tape is compliant to EIA-481-A.

Reel size (Diameter in mm)	Qty per reel (pcs)
178	1,000

Reflow Profile

TYPICAL REFLOW PROFILE FOR SN-PB ASSEMBLY



Environmental and Mechanical Specifications

Environmental Test	Test Conditions
Temperature cycling	MIL-STD-883, Method 1010, Cond. B
Constant acceleration	MIL-STD-883, Method 2001, Cond. A, Y1
Seal: Fine and Gross Leak	MIL-STD-883, Method 1014, Cond. A and C
Vibration sinusoidal	MIL-STD-202, Method 204, Cond. D
Shock, non operating	MIL-STD-202, Method 213, Cond. I
Resistance to solder heat	MIL-STD-202, Method 210, Cond. B
Resistance to solvents	MIL-STD-202, Method 215
Solderability	MIL-STD-202, Method 208
ESD Classification	MIL-STD-883, Method 3015, Class 1 HBM 0 to 1,999V
Moisture Sensitivity Level	J-STD-020, MSL=1

Phase Noise and Phase Jitter Integration

Phase noise is measured in the frequency domain, and is expressed as a ratio of signal power to noise power measured in a 1Hz bandwidth at an offset frequency from the carrier, e.g. 10Hz, 100Hz, 1kHz, 10kHz, 100kHz, etc. Phase noise measurement is made with an Agilent E5052A Signal Source Analyzer (SSA) with built-in outstanding low-noise DC power supply source. The DC source is floated from the ground and isolated from external noise to ensure accuracy and repeatability.

In order to determine the total noise power over a certain frequency range (bandwidth), the time domain must be analyzed in the frequency domain, and then reconstructed in the time domain into an rms value with the unwanted frequencies excluded. This may be done by converting L(f) back to Sφ(f) over the bandwidth of interest, integrating and performing some calculations.

Symbol	Definition
$\int\mathcal{L}(f)$	Integrated single side band phase noise (dBc)
$S\varphi\ (f)=(180/\Pi)x\sqrt{2\int\mathcal{L}(f)df}$	Spectral density of phase modulation, also known as RMS phase error (in degrees)
RMS jitter = Sφ (f)/(fosc.360°)	Jitter(in seconds) due to phase noise. Note Sφ (f) in degrees.

The value of RMS jitter over the bandwidth of interest, e.g. 10kHz to 20MHz, 10Hz to 20MHz, represents 1 standard deviation of phase jitter contributed by the noise in that defined bandwidth.

Figure below shows a typical Phase Noise/Phase jitter of a QCC570, 5.0Vdc, 16MHz clock at offset frequencies 1Hz to 1MHz, and phase jitter integrated over the bandwidth of 12kHz to 1MHz.