Q-TECH CORPORATION

QTCH HIGH TEMPERATURE MINIATURE SMD OSCILLATORS

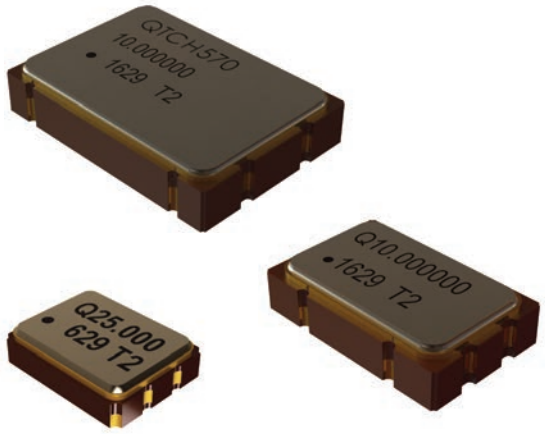
5 x 7mm, 3.2 x 5mm, 2.5 x 3.2mm, SMD UP TO 200°C

1.8Vdc, 2.5Vdc, 3.3Vdc and 5.0Vdc - 1MHz to 48MHz

Description

The QTCH series are miniature surface-mount (SMD) crystal oscillators supporting a frequency between 1MHz and 48MHz* fundamental mode operating in a wide supply voltage range from 1.8Vdc to 5.0Vdc, very low power consumption (<3mA) with a temperature range from -55ºC to +200ºC. Package offerings in three low profile ceramic packages, 2.5x3.2mm, 3.2x5.0mm and 5.0x7.0mm, which are hermetically sealed with gold plated contacts or hot solder dipped.

*** Consult factory for frequencies at 1MHz ~ 1.5MHz and >48MHz**



Features

- ECCN: EAR99
- Capable to work at multiple supply voltages
- Wide operating temperature -55ºC to +200ºC available
- Very low power consumption
- CMOS logic 1.8Vdc, 2.5Vdc, 3.3Vdc
- 5.0Vdc CMOS available for 5x7mm and 3.2x5mm packages
- Tri-State Output Standard
- Fundamental amode AT cut crystal
- High shock and vibration resistant
- Military screening tests per MIL-PRF-55310 available
- Tape and reel packaging
- Lead Free, RoHS Compliant

Applications

- Drilling, data logging tools
- Oil service industry
- High temperature applications

Stock List

See all QTCH products IN STOCK

Ordering is NOT limited to the IN STOCK list. Please consult with our sales managers to order custom frequencies.

Ordering Information

Sample part number

QTCH350UD92-20.000MHz									
Q	T	CH	350	U	D	92		-	20.000MHz

Lead Finish

T	=	Standard
S	=	Solder Dip (*)

Package

570	=	5.0 x 7.0mm
350	=	3.2 x 5.0mm
230	=	2.5 x 3.2mm

Supply Voltage:

HC	=	+5.0Vdc	at	15pF
U	=	+1.8Vdc to +3.3Vdc	at	15pF
L	=	+3.3Vdc	at	15pF
N	=	+2.5Vdc	at	15pF
R	=	+1.8Vdc	at	15pF

Tristate

D	=	Tristate

Output Frequency

Screening

Blank	=	Unscreened
M	=	Per MIL-PRF-55310, Level B

Frequency vs. Temperature Code:

87	=	±	150ppm	at	-20ºC	to +185ºC
88	=	±	200ppm	at	-20ºC	to +175ºC
89	=	±	250ppm	at	-40ºC	to +175ºC
90	=	±	200ppm	at	-40ºC	to +185ºC
91	=	±	250ppm	at	-40ºC	to +185ºC
92	=	±	250ppm	at	-55ºC	to +185ºC
93	=	±	200ppm	at	0ºC	to +200ºC
94	=	±	250ppm	at	0ºC	to +200ºC
95	=	±	250ppm	at	-20ºC	to +200ºC
96	=	±	250ppm	at	-40ºC	to +200ºC
97	=	±	250ppm	at	-55ºC	to +200ºC
98	=	±	250ppm	at	0ºC	to +185ºC
99	=	±	100ppm	at	-55ºC	to +150ºC

Other Options Available For An Additional Charge

Hot Solder Dip to your specifications

(*) Hot Solder Dip Sn60/Pb40 per MIL-PRF 55310 is optional for an additional cost

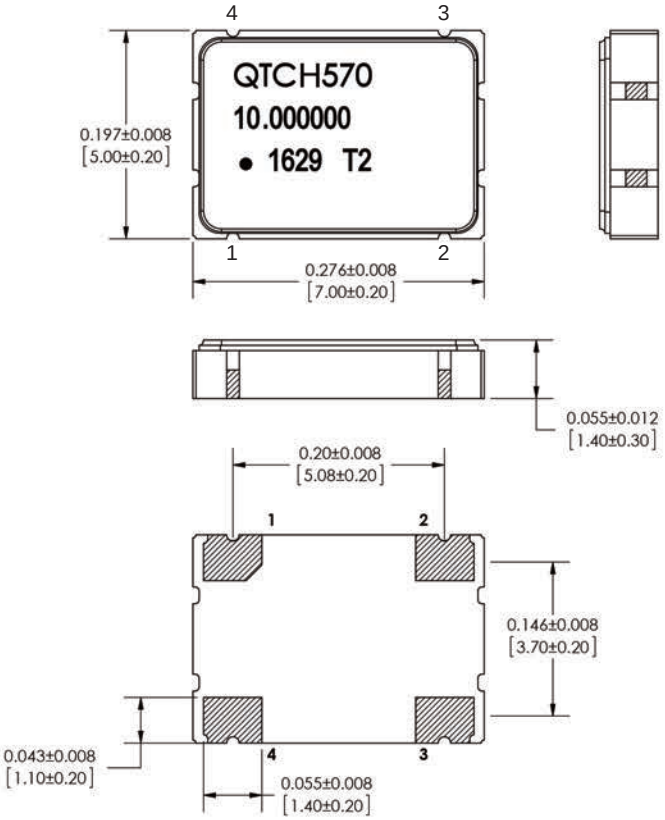
Specifications subject to change without prior notice.

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

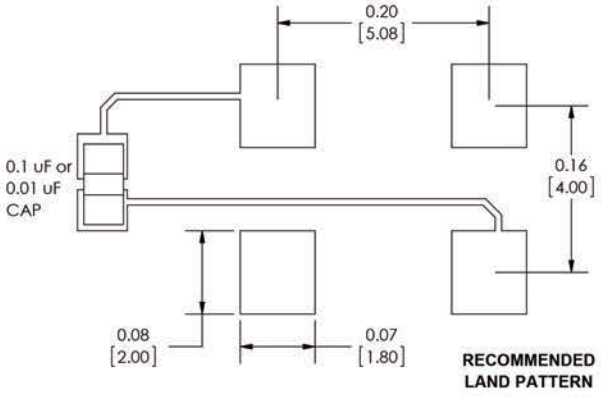
For Non-Standard requirements, contact Q-Tech Corporation at Sales@Q-Tech.com

QTCH570 Package Outline and Pin Connections

Dimensions are in inches (mm)



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



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

Marking

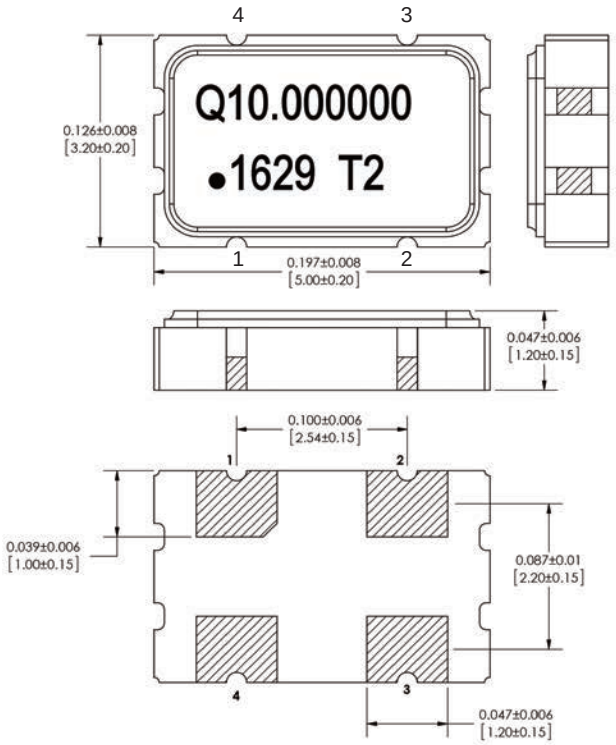
Line 1: QTCH570 (First 7 Characters of Description)
Line 2: XX.XXXXXX (9 Characters of Frequency in MHz including decimal)
Line 3: Dot (Pin 1 Indicator) + Date code (YY/WW), Internal Traceability Code

Package Information

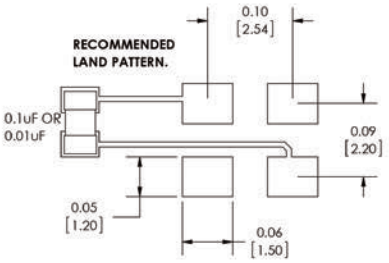
- Termination pads (4x), Electro nickel plating 1.27µm ~ 8.89µm typ., with gold 0.3µm ~ 1.0µm flash plate
- Weight: 0.15g typ., 2.0g max.

QTCH350 Package Outline and Pin Connections

Dimensions are in inches (mm)



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



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

Marking

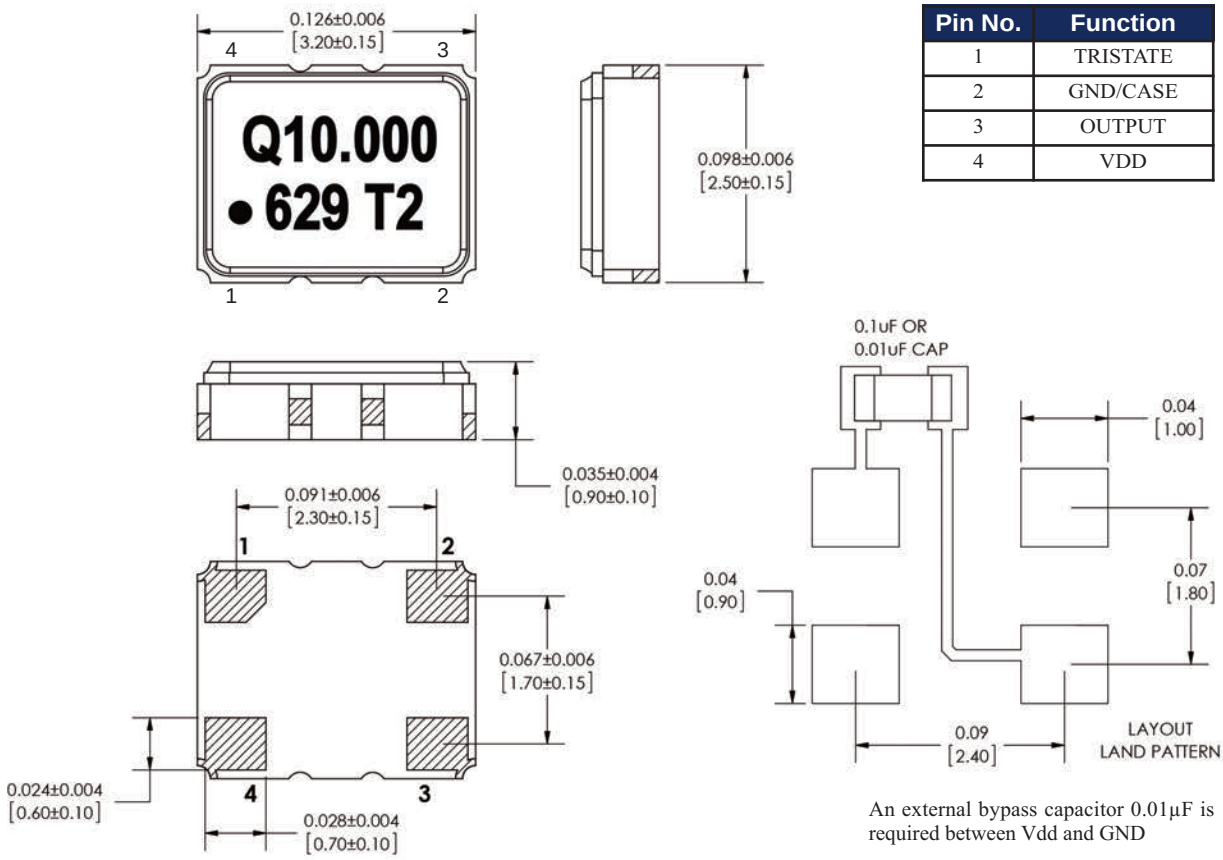
Line 1: QXXX.XXXXXX (Q for Q-Tech, no space 9 or 10 Characters of Frequency including decimal)
Line 2: Dot (Pin 1 Indicator) + Date code (YY/WW), Internal Traceability Code

Package Information

- Termination pads (4x), Electro nickel plating 1.27µm ~ 8.89µm typ., with gold 0.3µm ~ 1.0µm flash plate
- Weight: 0.057g typ.

QTCH230 Package Outline and Pin Connections

Dimensions are in inches (mm)



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

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

Marking

Line 1: QXX.XXX (Q for Q-Tech, no space 7 Characters of Frequency including decimal)
Line 2: Dot (Pin 1 Indicator) + Date code (Y/WW), Internal Traceability Code

Package Information

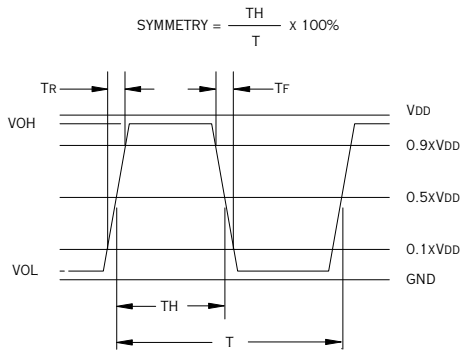
- Termination pads (4x), Electro nickel plating 1.27µm ~ 8.89µm typ., with gold 0.3µm ~ 1.0µm flash plate
- Weight: 0.025g typ.

Electrical Characteristics

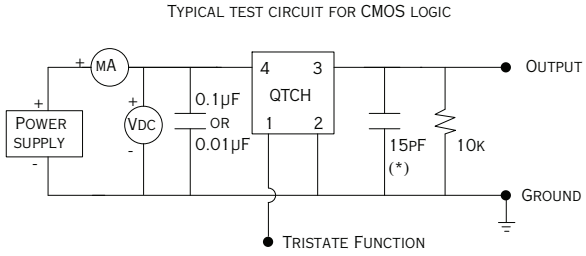
Parameters	QTCH-RD	QTCH-ND	QTCH-LD	QTCH-HCD
Output frequency range (Fo) 1/	**1.000MHz - 48.000MHz**			**2.5MHz - 40.000MHz**
Supply voltage (Vdd) 2/	1.8Vdc ± 10%	2.5Vdc ± 10%	3.3Vdc ± 10%	5.0Vdc ± 10%
Maximum Applied Voltage (Vdd max.)	-0.3 to +4.0Vdc			-0.3 to +7.0Vdc
Frequency stability (ΔF/ΔT)	See Part Number on Page 1			
Operating temperature (Topr)	See Part Number on Page 1			
Storage temperature (Tsto)	-62ºC to + 125ºC			
Operating supply current (No Load)	1mA max.	1.5mA max.	2mA max.	7mA max.
Symmetry (50% of ouput waveform)	45/55%			
Rise and Fall times	6ns max.			11ns max.
Output Load	15pF max.			
Start-up time (Tstup)	10ms max.			5ms max.
High Output Voltage (Voh)	0.9*Vdd min.			
Low Output Voltage (Vol)	0.1*Vdd max.			
Enable VIH Pin 1	VIH ≥ 0.7*Vdd (Active)			
Disable VIL Pin 1	VIL ≤ 0.3*Vdd (High Impedance)			
Aging	±5ppm/first year			

Notes
1/ Full frequency range is not available in all packages. Consult factory for frequencies at 1MHz ~ 1.5MHz, and for frequencies greater than 48MHz.
2/ For options R, D, and L, the part is designed to work from 1.8Vdc to 3.3Vdc. Supply voltage code is used to test the part to specific nominal voltage specified in a Purchase Order.

Output Waveform (Typical)

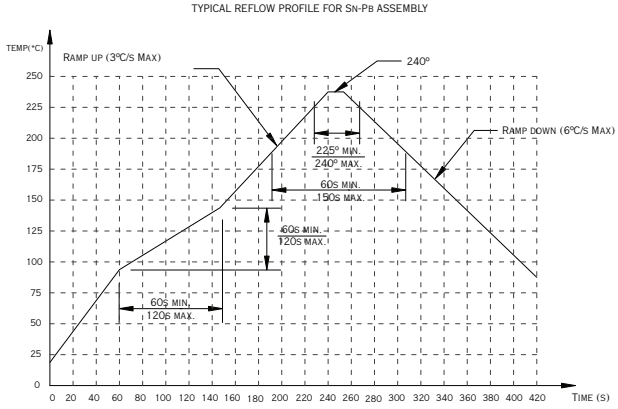


Test Circuit

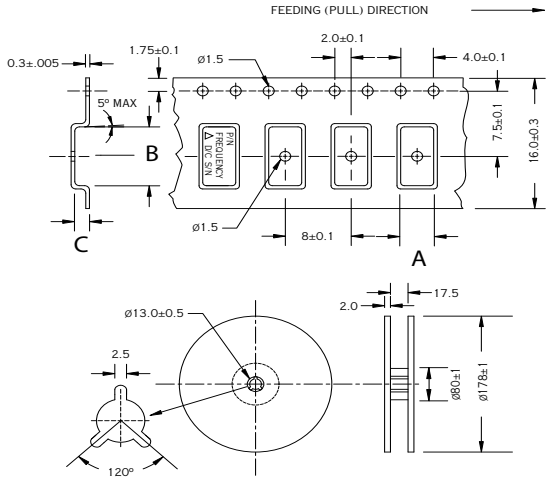


The Tristate function on pin 1 has a built-in pull-up resistor so it can be left floating or tied to Vdd without deteriorating the electrical performance.

Reflow Profile



Embossed Tape and Reel Information



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

Package	A	B	C
QTCH 570	5.35 ±0.1	7.75 ±0.1	1.85 ±0.1
QTCH 350	3.70 ±0.1	5.50 ±0.1	1.40 ±0.1
QTCH 230	2.80 ±0.1	3.50 ±0.1	1.50 ±0.1

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

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
Moisture Sensitivity Level	J-STD-020, MSL=1

DCO	REV	REVISION SUMMARY	PAGE	DATE
6434	A	Fix L and R voltages	1 and 5	2/14/17
8121	B	Add Temperature Code 99	1	5/8/18
8617	C	Revise Note for availability of oscillators at 1 ~ 1.5MHz	1 and 5	1/24/19
		Revise QTCH570 marking to reflect parameter limits of data sheet (marking was 100MHz)	1 and 2	
		Add Stock List Hyperlink	1	
		Revise Code 99 to increase Temperature Range to -55ºC to +150ºC (was -20ºC to +150ºC)	1	
		Revise Input Current values	5	
9768	D	Add HC - 5Vdc option	All	4/24/19