Q-TECH CORPORATION

RoHS COMPLIANT

QTCC350 SERIES

LOW PROFILE 3.2 x 5mm MINIATURE SMD CRYSTAL OSCILLATORS

1.8, 2.5, 3.3 and 5.0Vdc - 32.768kHz, 1.000MHz to 125.000MHz

Description

Q-Tech's surface-mount QTCC350 oscillators consist of an IC 5Vdc, 3.3Vdc, 2.5Vdc, and 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 of 1.000MHz to 125.000MHz and 32.768kHz. (*)
- Small footprint
- HCMOS logic
- 5.0Vdc, 3.3Vdc, 2.5Vdc, and 1.8Vdc supply
- Operating temperature -55ºC to +125ºC available
- Tri-State Output Standard
- Hermetically sealed ceramic package
- Fundamental and 3rd Overtone designs
- Military screening tests per MIL-PRF-55310 available
- Tape and reel packaging
- Lead Free, RoHS Compliant

Applications

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

Stock List

See all Miniature Oscillator 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

QTCC350LD12-50.000MHz						
QTCC350	L	D	12		-	50.000MHz

Lead Finish

T	=	Standard
S	=	Solder Dip

(*) Logic & Supply Voltage:

AC	=	HCMOS	+5.0V	at	50pF
HC	=	HCMOS	+5.0V	at	15pF
LA	=	LVHCMOS	+3.3V	at	50pF
L	=	LVHCMOS	+3.3V	at	15pF
N	=	LVHCMOS	+2.5V	at	15pF
R	=	LVHCMOS	+1.8V	at	15pF

Tristate

D	=	Tristate

Output Frequency

Screening

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

(**) Frequency vs. Temperature Code:

16	=	±	100ppm	at	-20ºC	to +70ºC
12	=	±	100ppm	at	-40ºC	to +85ºC
17	=	±	100ppm	at	-40ºC	to +125ºC
10	=	±	100ppm	at	-55ºC	to +125ºC
18	=	±	50ppm	at	-20ºC	to +70ºC
11	=	±	50ppm	at	-40ºC	to +85ºC
20	=	±	50ppm	at	-40ºC	to +125ºC
6	=	±	50ppm	at	-55ºC	to +105ºC
9	=	±	50ppm	at	-55ºC	to +125ºC
5	=	±	25ppm	at	-20ºC	to +70ºC
15	=	±	25ppm	at	-40ºC	to +85ºC
14	=	±	20ppm	at	-20ºC	to +70ºC

(*) See page 3 for frequency ranges of each voltage option.

(**) For codes 9 and 10, max frequency for 5V is 40MHz

Other Options Available For An Additional Charge

- Hot Solder Dip Sn60/Pb40 per MIL-PRF 55310

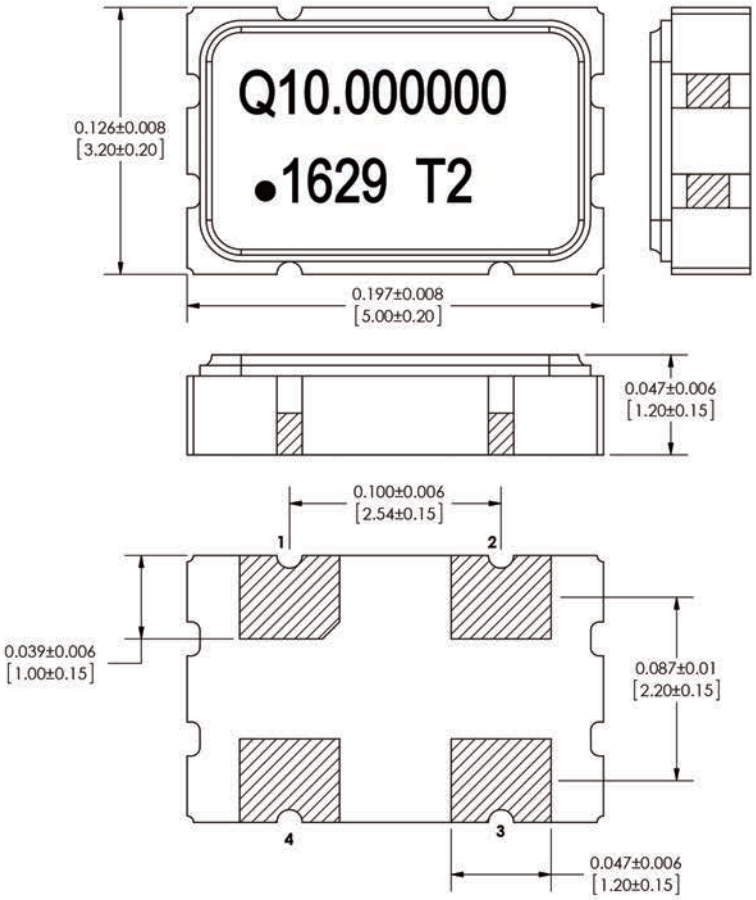
Specifications subject to change without prior notice.

Frequency stability vs. temperature codes may not be available in all frequencies.
(Minimum Frequency for -55ºC to +125ºC is 1.250MHz and 32.768kHz)

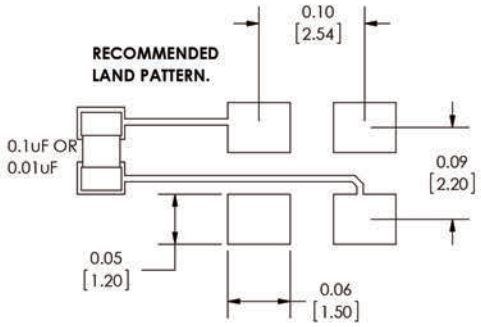
For Non-Standard requirements, contact Q-Tech Corporation at Sales@Q-Tech.com

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

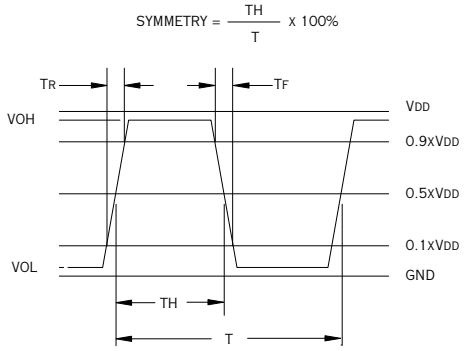
- Termination pads (4x), Electro nickel plating 1.27µm ~ 8.89µm typ., with gold 0.3µm ~ 1.0µm flash plate
- Weight: 0.057g typ.

Electrical Characteristics

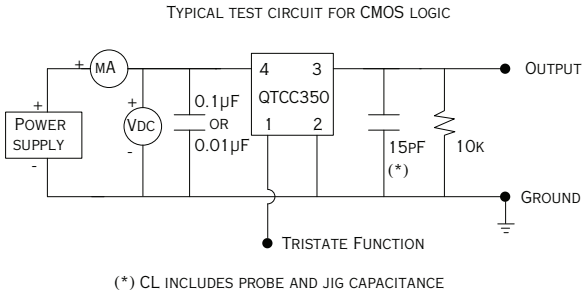
Parameters	QTCC350AC	QTCC350HC	QTCC350LA	QTCC350L	QTCC350N	QTCC350R
Output frequency range (Fo)	**1.544MHz — 75.000MHz**		**32.768kHz, 1.000MHz — 125.000MHz**			**1.544MHz — 125.000MHz**
Supply voltage (Vdd)	5.0Vdc ± 10%		3.3Vdc ± 10%		2.5Vdc ± 10%	1.8Vdc ± 10%
Maximum Applied Voltage (Vdd max.)	-0.7 to +7.0Vdc		-0.5 to +5.0Vdc			-0.5 to +3.6Vdc
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)	10 mA max. - ≤ 20MHz 30 mA max. - 20MHz ~ ≤ 50MHz 40 mA max. - 50MHz ~ ≤ 75MHz		5 mA max. - <1.5MHz 7 mA max. - 1.5MHz ~ ≤ 20MHz 20 mA max. - 20MHz ~ ≤ 50MHz 30 mA max. - 50MHz ~ ≤ 100MHz 40 mA max. - 100MHz ~ 125MHz		5 mA max. - <1.5MHz 7 mA max. - 1.5MHz ~ ≤ 20MHz 15 mA max. - 20MHz ~ ≤ 50MHz 20 mA max. - 50MHz ~ ≤ 75MHz 25 mA max. - 75MHz ~ ≤ 100MHz 30 mA max. - 100MHz ~ 125MHz	5 mA max. - 1.5MHz ~ ≤ 20MHz 15 mA max. - 20MHz ~ ≤ 70MHz 20 mA max. - 70MHz ~ ≤ 100MHz 25 mA max. - 100MHz ~ 125MHz
Symmetry (50% of ouput waveform)	45/55%					
Rise and Fall times	8 ns max. - ≤ 20MHz 5 ns max. - 20MHz ~ ≤ 50MHz 2 ns max. - 50MHz ~ 75MHz 7 ns max. - **50pF Load** (20 ~ 40MHz)		200ns max. - 32.768kHz 6 ns max. - 1.000MHz ~ ≤ 20MHz 4 ns max. - 20MHz ~ ≤ 50MHz 3 ns max. - 50MHz ~ ≤ 75MHz 2 ns max. - 75MHz ~ 125MHz 7 ns max. - **50pF Load** (<40MHz)		200ns max. - 32.768kHz 6 ns max. - 1.000MHz ~ ≤ 20MHz 5 ns max. - 20MHz ~ ≤ 50MHz 3 ns max. - 50MHz ~ ≤ 75MHz 2 ns max. - 75MHz ~ 125MHz	6 ns max. - ≤ 20MHz 5 ns max. - 20MHz ~ ≤ 50MHz 3 ns max. - 50MHz ~ 125MHz
Output Load (Note 1)	50pF max.	15pF max.	50pF max.	15pF max.		
Start-up time (Tstup)	8ms max.					
Output voltage (Voh/Vol)	0.9Vdd min. / 0.1Vdd max.					
Output Current (Ioh/Iol)	± 16mA max.		± 8mA max.			
Enable/Disable function Pin 1	VIH ≥ 4.0V Active		VIH ≥ 2.0V Active		VIH ≥ 1.75V Active	VIH ≥ 1.26V Active
	VIL ≤ 0.8V High Z		VIL ≤ 0.5V High Z			
Phase Noise typ. @20.000MHz	10Hz -90 dBc/Hz 100Hz -124 dBc/Hz 1kHz -140 dBc/Hz 10kHz -148 dBc/Hz 100kHz -155 dBc/Hz 1MHz -157 dBc/Hz 10MHz -158 dBc/Hz					
Aging	±5ppm max. First Year ±2ppm max. Each Year Thereafter					

Note 1: 50pF Load is only available up to 50MHz

Output Waveform (Typical)



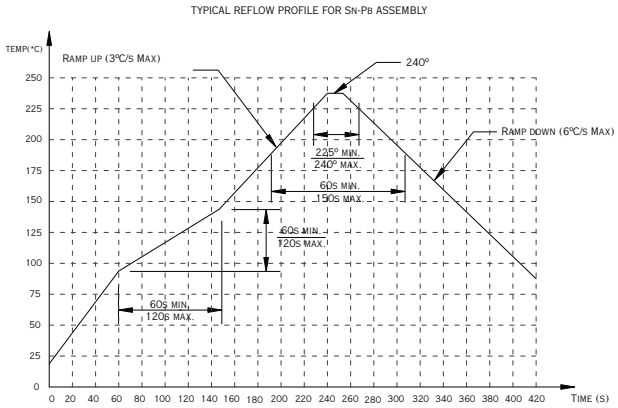
Test Circuit



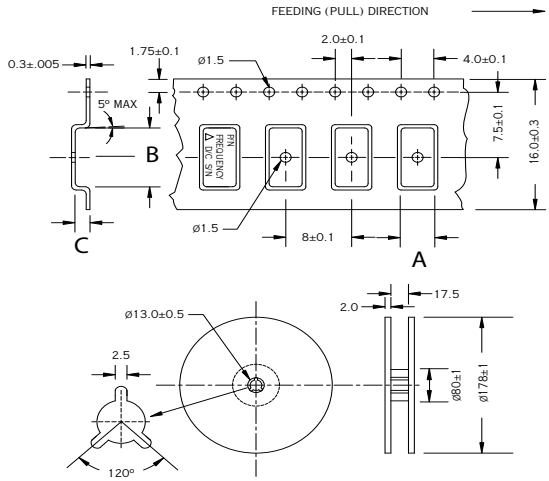
(*) CL INCLUDES PROBE AND JIG CAPACITANCE

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.

Reflow Profile



Embossed Tape and Reel Information



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

Package	A	B	C
QTCC 350	3.70 ±0.1	5.50 ±0.1	1.40 ±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
6161	A	Add N and R logic options	1	2/3/17
		Storage temp changed -55C to -62C	3	
		Jitter information added		
		Add N and R Electrical Characteristics		
6728	B	Revise Rise and Fall times for 50pF load	3	4/24/17
		Fix Tape/Reel dimensions	4	
		Revise Aging	3	
		Removed jitter information and add phase noise data	3	
9771	C	Raised lowest frequency range offered. Was previously **32.768kHz to 125.000MHz**, is now **32.768kHz, 1.000MHz to 125.000MHz**.	All	4/24/19
		Lower max frequency for 5.0V parts to 40.000MHz for temperatures of -55 to +125ºC	1	
		Revise frequency limits for 50pF load		