

## 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

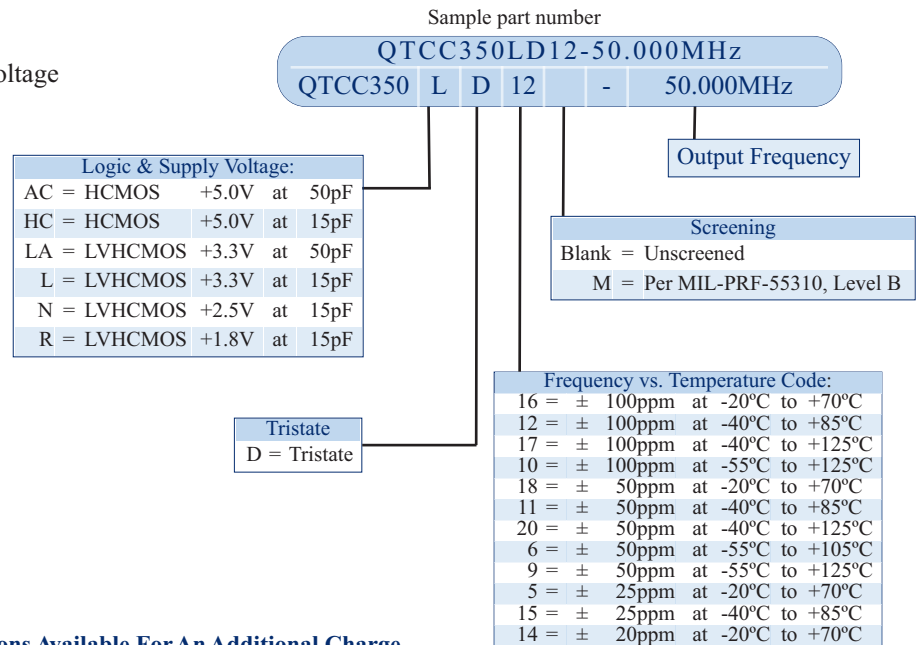
- ECCN: EAR99
- Broad frequency range from 32.768kHz to 125.000MHz
- Small footprint
- HCMOS logic
- 5.0Vdc, 3.3Vdc, 2.5Vdc, and 1.8Vdc supply
- Operating temperature -55°C to +125°C available
- Tri-State Output Standard
- Hermetically sealed ceramic package
- Fundamental and 3rd Overtone designs
- Military 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

## Ordering Information



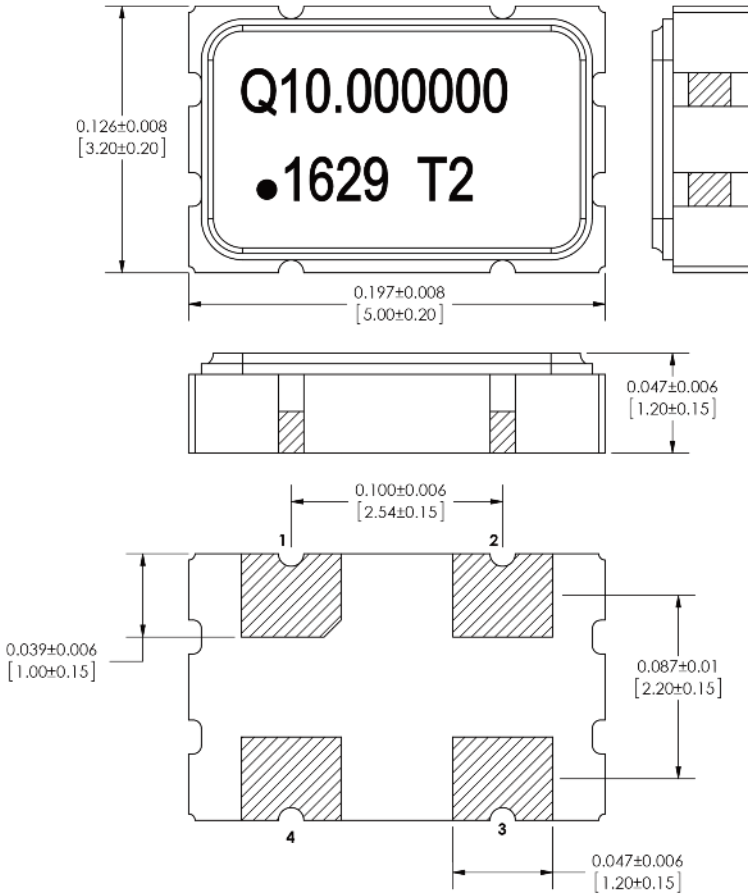
### Other Options Available For An Additional Charge

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

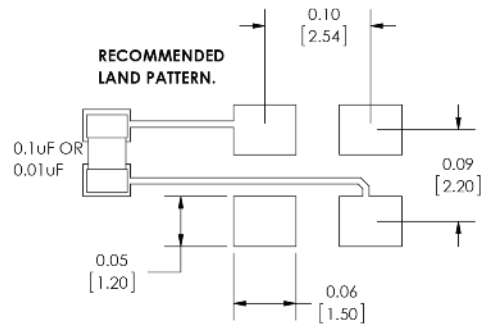
Specifications subject to change without prior notice.

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

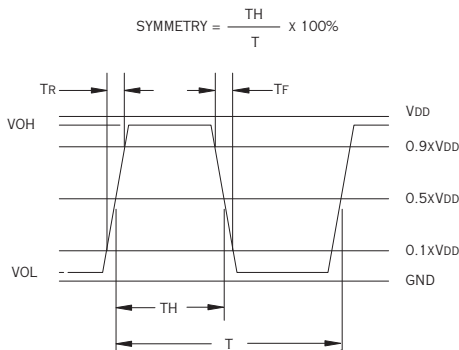
- Termination pads (4x), Electro nickel plating 1.27μm ~ 8.89μm typ., with gold 0.3μm ~ 1.0μm flash plate
- Weight: 0.057g typ.

### Electrical Characteristics

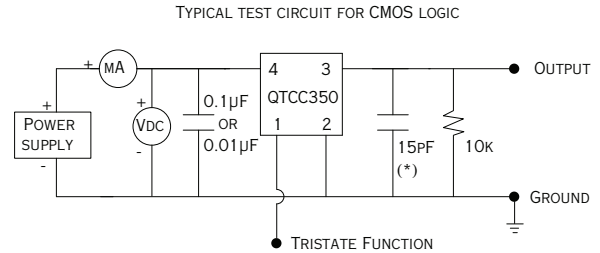
Parameters	QTCC350AC	QTCC350HC	QTCC350LA	QTCC350L	QTCC350N	QTCC350R	
Output frequency range (Fo)	1.544MHz — 75.000MHz		32.768kHz — 125.000MHz			1.544MHz — 125.000MHz	
Supply voltage (Vdd)	5.0Vdc ± 10%		3.3Vdc ± 10%		2.5Vdc ± 10%		
Maximum Applied Voltage (Vdd max.)	-0.7 to +7.0Vdc		-0.5 to +5.0Vdc			-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)	-62°C to + 125°C						
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 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 output waveform)	45/55%						
Rise and Fall times	8 ns max. - ≤ 20MHz 5 ns max. - 20MHz ~ ≤ 50MHz 2 ns max. - 50MHz ~ 75MHz  7 ns max. - <b>50pF Load</b> (20 ~ 50MHz)	200ns max. - 32.768kHz ~ ≤ 345.6kHz 6 ns max. - 345.6kHz ~ ≤ 20MHz 4 ns max. - 20MHz ~ ≤ 50MHz 3 ns max. - 50MHz ~ ≤ 75MHz 2 ns max. - 75MHz ~ 125MHz 7 ns max. - <b>50pF Load</b>	200ns max. - 32.768kHz ~ ≤ 345.6kHz 6 ns max. - 345.6kHz ~ ≤ 20MHz 5 ns max. - 20MHz ~ ≤ 50MHz 3 ns max. - 50MHz ~ ≤ 75MHz 2 ns max. - 75MHz ~ 125MHz	200ns max. - 32.768kHz ~ ≤ 345.6kHz 6 ns max. - 345.6kHz ~ ≤ 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 VIL ≤ 0.8V High Z		VIH ≥ 2.0V Active		VIH ≥ 1.75V Active 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)



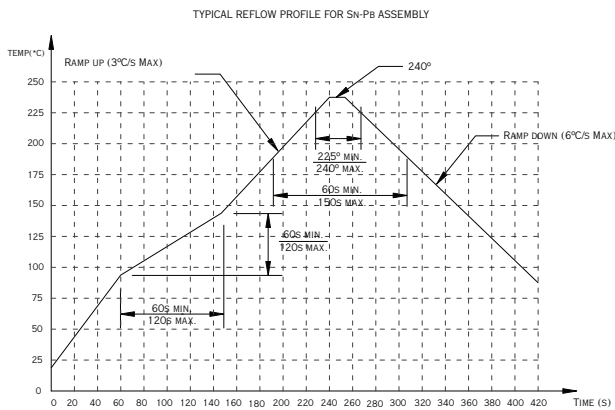
### Test Circuit



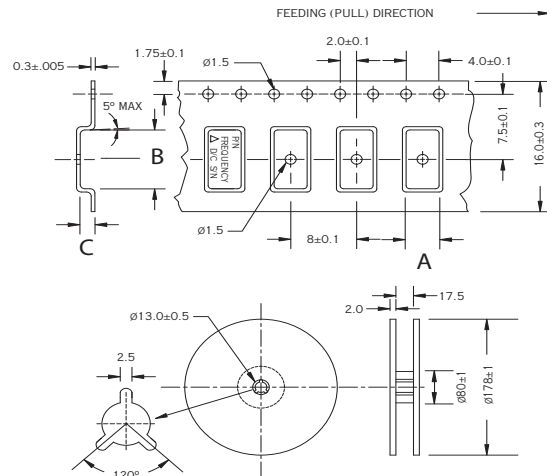
(\* CL INCLUDES PROBE AND JIG CAPACITANCE)

The Trisate 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		
		Jitter information added	3	
		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	