Description

Q-Tech's surface-mount QTCC356 oscillators consist of an IC 3.3Vdc, 2.5Vdc, 1.8Vdc 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 25.000MHz to 250.000MHz
- Small footprint
- LVPECL, LVDS logic
- 1.8Vdc, 2.5Vdc, 3.3Vdc supply
- Operating temperature -55ºC to +125ºC available
- Differential Output
- 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
- Fiber Channel
- TELECOM
- Instrumentation
- Navigation
- Avionics
- Ethernet/SynchE
- SONET
- Microprocessor clock
- COTS

Ordering Information

Sample part number

QTCC356LPD12-156.250MHz

QTCC356	LP	D	12		-	156.250MHz

Logic & Supply Voltage:

LW	=	LVDS	+3.3V
NW	=	LVDS	+2.5V
RW	=	LVDS	+1.8V
LP	=	LVPECL	+3.3V
NP	=	LVPECL	+2.5V

Option

D	=	E/D on Pin 1
E	=	E/D on Pin 2

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

Not all codes are available for all frequencies. Please refer to Table II for frequency vs temperature stability availability.

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.

Other Options Available For An Additional Charge

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

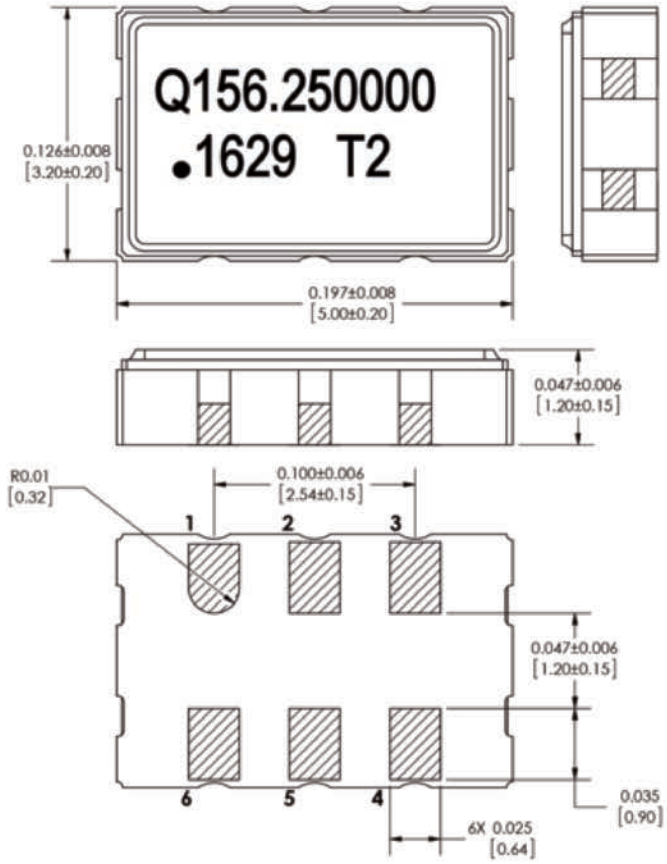
Specifications subject to change without prior notice.

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

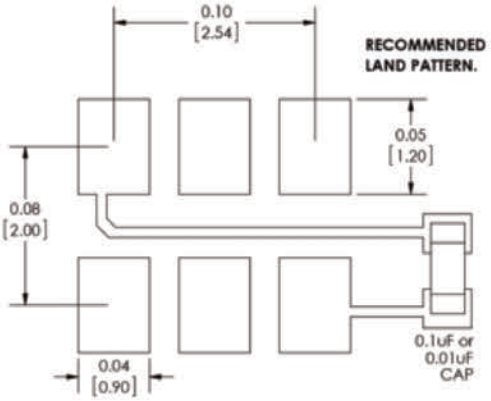
For Non-Standard requirements, contact Q-Tech Corporation at Sales@Q-Tech.com

Package Outline and Pin Connections

Dimensions are in inches (mm)



Pin No.	Function
1	ENABLE/DISABLE or NC
2	ENABLE/DISABLE or NC
3	GND/CASE
4	OUTPUT
5	COMP. OUTPUT
6	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.

Table I - Electrical Characteristics

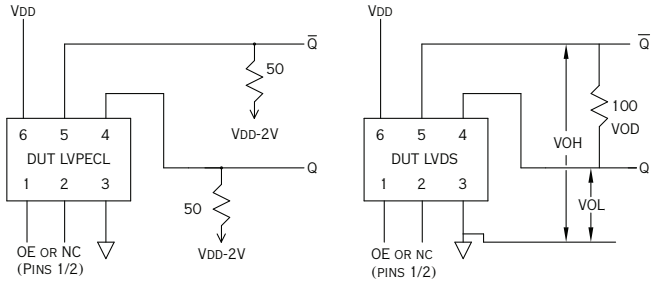
Parameters	QTCC356LP	QTCC356NP	QTCC356LW	QTCC356NW	QTCC356RW
Output frequency range (Fo)	**25.000MHz — 250.000MHz**		**80.000MHz — 250.000MHz**		**100.000MHz — 175.000MHz**
Supply voltage (Vdd)	3.3Vdc ± 5%	2.5Vdc ± 5%	3.3Vdc ± 5%	2.5Vdc ± 5%	1.8Vdc ± 5%
Maximum Applied Voltage (Vdd max.)	-0.5 to +5.0Vdc		-0.5 to +5.0Vdc		-0.3 to +4.0Vdc
Logic	LVPECL		LVDS		
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				
Output Logic Levels Output Logic High (Voh) Output Logic Low (Vol)	 Vdd-1.025 < Voh < Vdd-0.880 Vdd-1.810 < Voh < Vdd-1.620		 Voh < 1.6 V Vol > 0.9 V		
Differential Output Voltage (VOD)	N/A	N/A	330 mV typ.		
Offset Voltage (VOS)	N/A	N/A	1.25V typ.		
Duty Cycle	45/55%				
Rise and Fall times	600ps max.				500ps max.
Load	50Ω into Vdd-2V		100Ω Differential		
Start-up time (Tstup)	10ms max.				
Current (No Load)	50mA typ. | 75mA max.		60mA max.		25mA max.
Enable/Disable function Pin 1	VIH ≥ 0.7*Vdd Active				
	VIL ≤ 0.3*Vdd High Z				
Phase Jitter (12kHz - 20MHz BW)	0.3ps nom. | 0.7ps max.		0.35ps nom. | 0.8ps max.		0.5ps max
Period Jitter Typical RMS Pk-Pk	 2.6ps nom. 23ps nom.		 2.9ps nom. 25.1ps nom.		Not Available
Random Jitter Typical	2.6ps nom.				Not Available
Deterministic Jitter	<0.2ps				Not Available
Aging	± 5ppm/year				

Table II - Frequency vs. Temperature Stability Availability

Voltage	Temp Range	Frequency	Stability		
			±25ppm	±50ppm	±100ppm
1.8V LVDS Only	-40 to 85C	100MHz to 170MHz	X	X	X
	-55 to 125C	100MHz to 125MHz		X	X
		126MHz to 170MHz			X
2.5V/3.3V	-40 to 85C	50MHz to 220MHz	X	X	X
	-55 to 125C	50MHz to 125MHz		X	X
		126MHz to 220MHz			X

Contact factory if desired frequency is not listed within the ranges above.

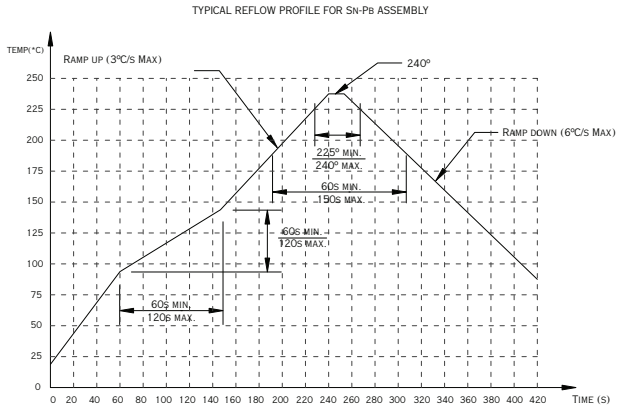
Test Circuit



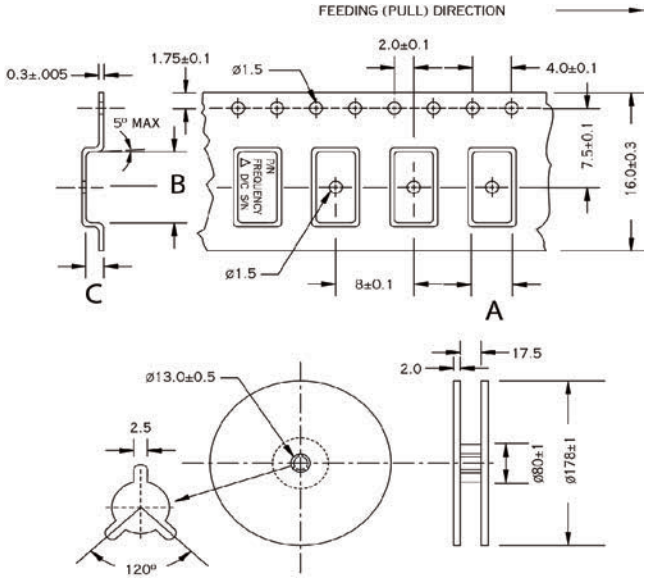
STANDARD TERMINATION LVPECL

LVDS TERMINATION

Reflow Profile



Embossed Tape and Reel Information



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

Package	A	B	C
QTCC 356	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
6164	A	Fix product name in description.	1	2/3/17
		Storage temp changed -55C to -62C	3	
		Add 'typical' to period and random jitter		
7794	B	Raise maximum frequency to 250MHz (was 212.500MHz)	All	02/05/2018
9830	C	Add Stock List link	1	03/23/2021
		Revise test circuit images to match pinout table of page 2	4	
13507	D	Update frequency vs temperature stability codes. Add Table II Add 1.8V LVDS option	1, 3	05/17/2021