

## Description

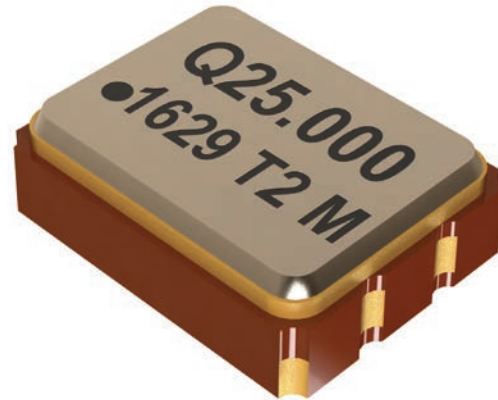
Q-Tech's low profile extreme high shock hybrid oscillators consist of an IC operating at various supply voltages from 1.8V, 2.5V and 3.3V and a miniature strip quartz crystal. The series is offered in Surface-Mount SMT ceramic package. This is a small footprint package offered with a 50kRad(Si) TID for Low Earth Orbit (LEO) with high shock and high reliability space applications.

## Features

- ECCN: EAR99
- 50kRad(Si) Total Dose Ionization
- Broad Frequency Range, 1.500MHz to 250MHz
- Small footprint, 2.5 x 3.2mm surface mount package
- CMOS Logic
- Various Supply Voltages, 1.8Vdc to 3.3Vdc
- Wide Operating Temperature Range, -55°C to 125°C
- Tri-State Output
- Hermetically sealed package
- Fundamental and 3rd Overtone Designs
- Screening per MIL-PRF-55310, Level B, with PIND
- High Shock Resistant, tested up to 20,000g Mechanical Shock, Half-Sine, 0.3ms, All Axes
- Tape and Reel Packaging is available for an additional cost
- Optional Hot Solder Dip, Sn60Pb40
- RoHS Compliant
- Screening and test data is not serialized.

## Applications

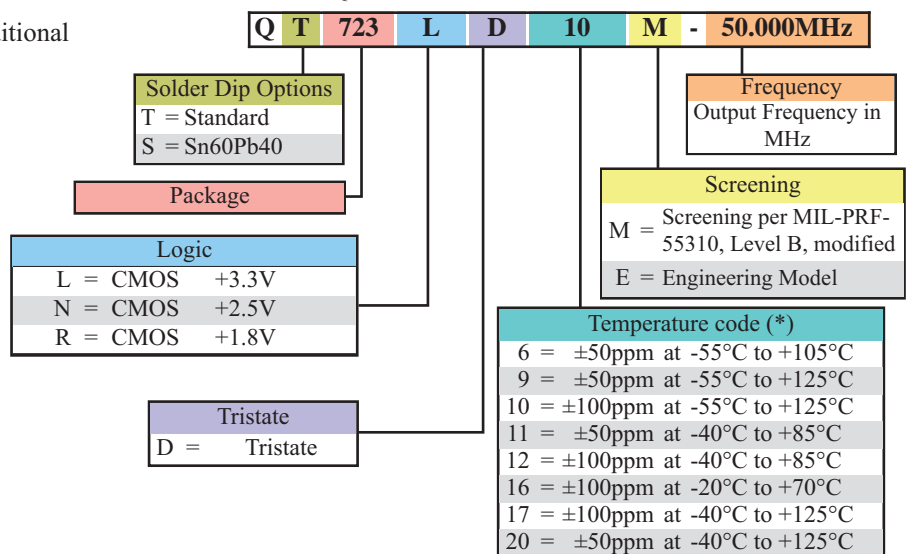
- Commercial satellites
- Low Earth Orbit
- New Space



## Ordering Information

(Sample part number)

Q T 723 L D 10 M - 50.000MHz



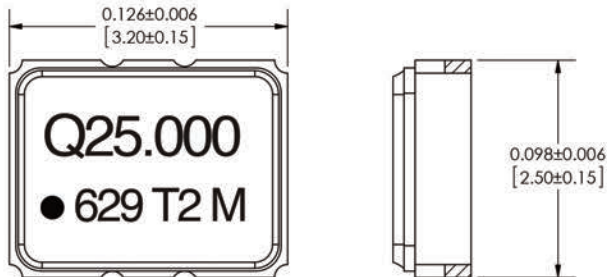
(\*) Frequency stability vs. temperature codes may not be available in all frequencies.

## Electrical Characteristics

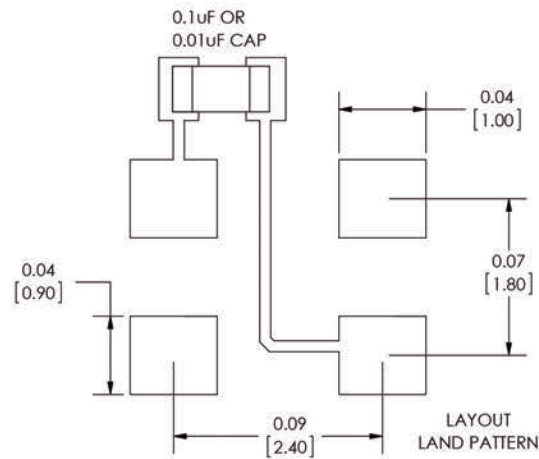
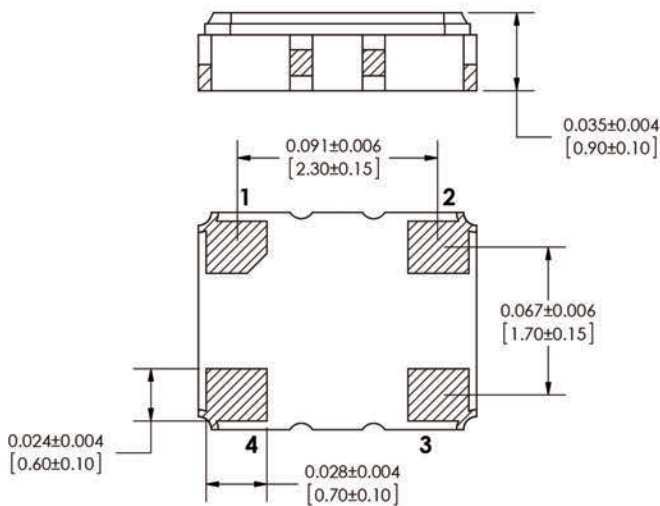
Parameters	QT723L	QT723N	QT723R
Output frequency range (Fo)	1.500MHz — 133.000MHz		1.500MHz — 125.000MHz
Supply voltage (Vdd)	3.3Vdc ± 10%	2.5Vdc ± 10%	1.8Vdc ± 10%
Maximum Applied Voltage (Vdd max.)	-0.5 to +5.0Vdc		-0.5 to +3.6Vdc
Frequency stability ( $\Delta F/\Delta T$ )	See Part Number on Page 1		
Operating temperature (Topr)	See Part Number on Page 1		
Storage temperature (Tsto)	-62°C to +125°C		
Operating supply current (No Load)	6 mA max. - < 20MHz 7 mA max. - 20MHz ~ < 40MHz 8 mA max. - 40MHz ~ < 50MHz 9 mA max. - 50MHz ~ < 80MHz 10 mA max. - 80MHz ~ < 100MHz 40 mA max. - 100MHz ~ 125MHz	4.5 mA max. - < 20MHz 5.5 mA max. - 20MHz ~ < 40MHz 7 mA max. - 40MHz ~ < 80MHz 7.5 mA max. - 80MHz ~ < 100MHz 30 mA max. - 100MHz ~ < 125MHz	2.5 mA max. - < 40MHz 3.5 mA max. - 40MHz ~ < 50MHz 6.5 mA max. - 50MHz ~ < 80MHz 7 mA max. - 80MHz ~ < 100MHz 20 mA max. - 100MHz ~ < 125MHz
Symmetry (50% of output waveform)	45/55%		
Rise and Fall times	4ns		5ns
Output Load	15pF max.		
Start-up time (Tstup)	5ms max.		
Output voltage (V <sub>OH</sub> /V <sub>OL</sub> )	0.9Vdd min. / 0.1Vdd max.		
Output Current (I <sub>OH</sub> /I <sub>OL</sub> )	± 4mA max. - <100MHz ± 8mA max. - ≥100MHz		± 2.8mA max. - <40MHz ± 4mA max. - ≥40MHz
Enable/Disable function Pin 1	VIH ≥ 0.7×Vdd (Active)		
	VIL ≤ 0.3×Vdd (High Z)		
Aging	±5ppm max. First Year ±2ppm max. Each Year Thereafter		

## 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

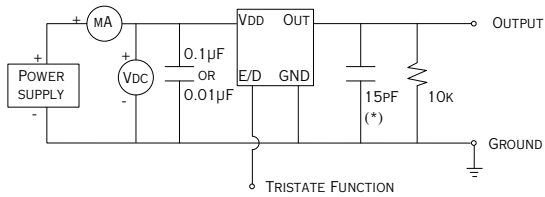
Line 1: QXX.XXX (Q for Q-Tech, no space 7 Characters of Frequency including decimal)  
Line 2: Dot (Pin 1 Indicator), Date code (Y/WW), Internal Traceability Code, Part Level (M or E)

## 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.

### Test Circuit

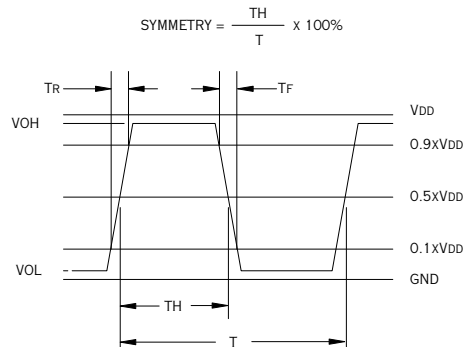
TYPICAL TEST CIRCUIT FOR CMOS LOGIC



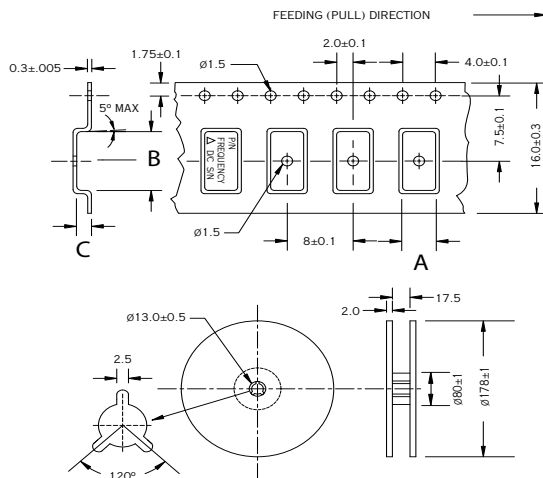
(\*) CL INCLUDES PROBE AND JIG CAPACITANCE

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.

### Output Waveform (Typical)



### Embossed Tape and Reel Information

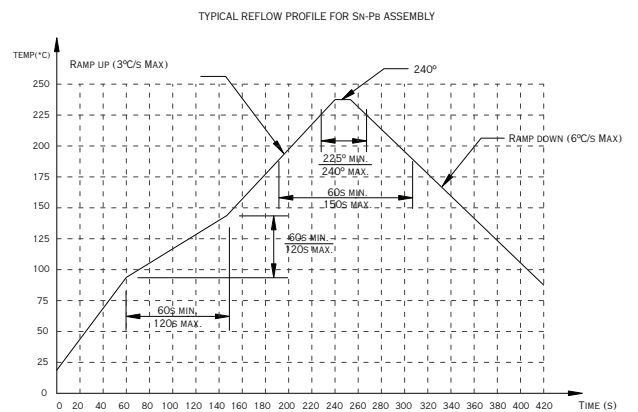


Dimensions are in mm. Tape is compliant to EIA-481-A.

Package	A	B	C
QT723	2.80 ±0.1	3.50 ±0.1	1.50 ±0.1

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

### Reflow Profile



**SCREENING PER MIL-PRF-55310, LEVEL B PLUS PIND TEST**

TEST	SPECIFICATION
Internal Visual	MIL-STD-883, Method 2017 and 2032
Stabilization Bake	MIL-STD-883, Method 1008, Condition C
Temperature Cycling	MIL-STD-883, Method 1010, Condition B
Constant Acceleration	MIL-STD-883, Method 2001, Test Condition A, Y1 axis only
Particle Impact Noise Detection	MIL-STD-883, Method 2020, Test Condition B
Fine Leak	MIL-STD-883, Method 1014, Condition A1 (See Note 1)
Gross Leak	MIL-STD-883, Method 1014, Condition C
Pre Burn-In	Electrical Test (Optional)
Burn-In (load)	Nominal Supply, +125°C for 160 hours minimum
Final Electrical Test	Electrical test at +25°C and over temperature
External Visual	MIL-STD-883, Method 2009

**NOTES:**

1. Condition A1 Fine Leak Rate is  $5 \times 10^{-8}$  atm-cm<sup>3</sup>/s Helium gas.

**QUALITY CONFORMANCE INSPECTION TESTS (OPTIONAL)**

GROUP	TEST METHOD	DESCRIPTION
A	MIL-PRF-55310, Level B, 100%	Electrical Tests (Supply voltage, Input Current, Output waveform, Rise and Fall times, Duty cycle, start-up time, overvoltage survivability, and 10 temperature frequency data points)
B	MIL-PRF-55310, Level B, 100%	Aging Test (Oscillator is energized in oven for a continuous period of 30 days at +70°C ± 3°C. The output frequency is measured within an interval of 72 hours maximum per MIL-PRF-55310)
C (Subgroups 1 to 4, excluding the "when specified" tests)	MIL-PRF-55310, Level B, sampling	4 (0)

**ADDITIONAL INFORMATION**

- 1) Design used a Class B integrated circuit, with Radiation features 50kRad(Si) Total Ionizing Dose and a high Q cultured quartz.
- 2) ESD HBM Class 1C.
- 3) Standard packaging in anti-static plastic tube.
- 4) Screening and QCI data shall not be serialized.



**QT723 SERIES**

*New Space Crystal Oscillator*

2.5 x 3.2mm | 1.8V, 2.5V, 3.3V | 1.500MHz to 133MHz

DCO	REV	REVISION SUMMARY	PAGE	DATE
10413	-	Initial Release		09/11/2019
10718	A	Revise package and package outline images to include product level code marking (M)	1, 3	02/21/2020
		Update marking format (Line 2)	3	
		Fix Temp Stability code 16	1	