Q-TECH CORPORATION

AXTAL a Q-TECH Company

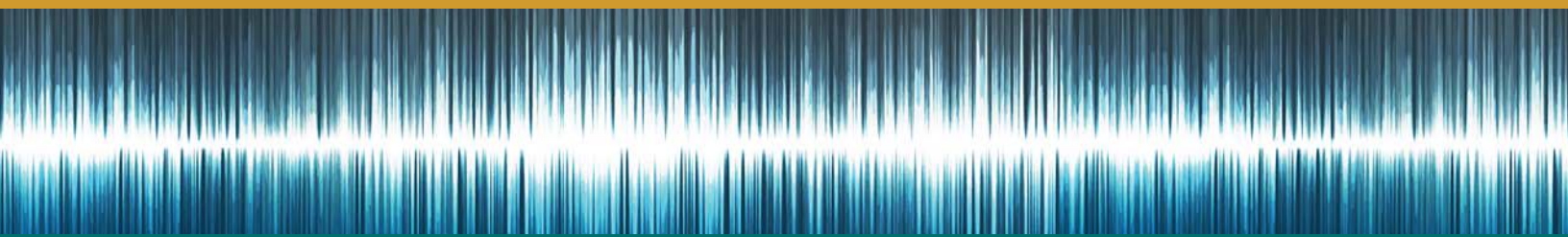
Timing and Frequency Control Products

Crystal Oscillators for New Space Applications

Crystal Oscillators for Full Space Applications

Crystal Oscillators for Military / Defense Applications

Crystal Oscillators for High Temperature Applications

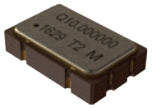
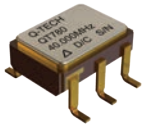
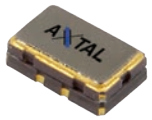
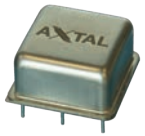
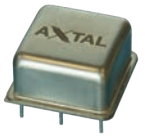
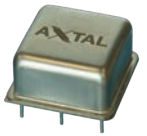


Frequency Sources and References

Q-TECH CORPORATION

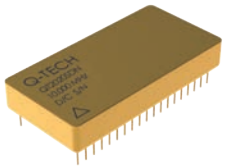
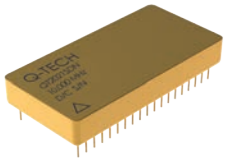
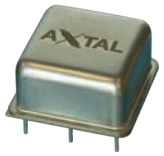
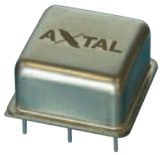
AXTAL a Q-TECH Company

New Space Components

	XO			TCXO		OCXO		
Product Line	 QT723 Series	 QT735 Series	 QT780 Series	 AXLE7050S Series	 AXLE5032S Series	 AXIOM70SL	 AXIOM75SL	 AXIOM75SH AXIOM75SHM
Frequency Range	1.5MHz - 133MHz	1MHz to 250MHz	225kHz to 250MHz	10 to 50MHz (CSW and HCMOS)		10MHz (HCMOS)	10MHz (sine)	80 - 400MHz (sine)
Stability Range	±25ppm (limited) ±50ppm	±25ppm (limited) ±50ppm	±25ppm (limited) ±50ppm	±1ppm	±1ppm	±10ppb	±10ppb	±50ppb
Voltage	1.8V - 3.3V	1.8V - 5.0V	1.8V - 5.0V	3.3 V	3.3 V	5V	12V	12V
Temperature Range	-55°C to +125°C	-55°C to +125°C	-55°C to +125°C	-40°C to +85°C	-40°C to +85°C	-30°C to +70°C	-30°C to +70°C	-30°C to +70°C
Radiation Hardness (TID)	50kRad(Si)	50kRad(Si)	50kRad(Si)	40kRad(Si) (50kRad(Si) tested)	40kRad(Si) (50kRad(Si) tested	10kRad(Si)	40kRad(Si) (50kRad(Si) tested	40kRad(Si) (50kRad(Si) tested)
Radiation Hardness (SEL)	75 MeV-cm^2/mg	75 MeV-cm^2/mg	75 MeV-cm^2/mg	120MeV-cm^2/mg	120MeV-cm^2/mg	Contact factory	SEL immune	SEL immune
Crystal	Non-Swept	Non-Swept	Non-Swept	Non-Swept	Non-Swept	Non-Swept	Swept on request	Swept on request
Crystal Mount	2-pt mount	2-pt mount	2-pt or 4-pt mount (package-dependent)	2-pt mount	2-pt mount	2-pt mount	2-pt mount	4-pt mount
Size/Package	2.5 x 3.2mm	3.2 x 5mm	5 x 7mm - 7 x 9mm	5 x 7mm	3.2 x 5mm	25 x 25 x 13mm	25 x 25 x 13mm	25 x 25 x 13m
Standard Screening	MIL-PRF-55310, Level B + PIND	MIL-PRF-55310, Level B + PIND	MIL-PRF-55310, Level B + PIND	MIL-PRF-55310, Level S Modified	MIL-PRF-55310, Level S Modified	MIL-PRF-55310, Level S Modified	MIL-PRF-55310, Level S Modified	MIL-PRF-55310, Level S Modified

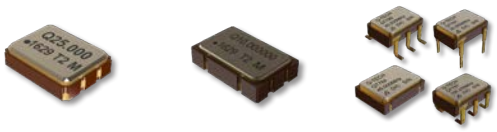
6161 Chip Ave, Cypress, CA 90630 (310) 836-7900 www.q-tech.com sales@q-tech.com

High-Stability Crystal Oscillators for New Space Applications

Parameter	Q-Tech		AXTAL		
	QT2020 MCXO	QT2021 MCXO	AXIOM70SL OCXO	AXIOM3838S OCXO	AXIOM75S(L/H/HM) OCXO
					
Frequency Range	5 to 100MHz	5 to 100MHz	10MHz (standard)	10MHz (standard) 50MHz available	10, 80 to 400MHz (standard) Other Frequencies Available
Operating Temperature Range	-40°C to +85°C	-40°C to +85°C	-30°C to +70°C	-30°C to +70°C	-30°C to +70°C
Stability (temp range dependent)	±10ppb to ±30ppb	±10ppb to ±30ppb	±10ppb to ±20ppb	±10ppb	±10ppb to ±50ppb
Voltage	3.3V	3.3V	5V	12V	12V
Power Consumption (max)	90mW	90mW	1.89W (Steady State) 3.78W (Warm-up)	2.52W (Steady State) 6.30W (Warm-up)	1.89W (Steady State) 3.78W (Warm-up)
Logic	CMOS, Sine Wave	CMOS, Sine Wave	HCMOS	Sine Wave	Sine Wave
Start-up Time	20 milliseconds	20 milliseconds	10 milliseconds	10 milliseconds	10 milliseconds
Stabilization Time to Full Performance	30 seconds max.	15 seconds max.	3 minutes	15 minutes	3 minutes
Radiation (TID)	50 kRad(Si)	50 kRad(Si)	10 kRad(Si)	40 kRad(Si)	40 kRad(Si)
Radiation (SEL)	29 MeV-cm²/mg	75 MeV-cm²/mg	Consult Factory	Immune	Immune
Crystal Type	Swept	Swept	Non-Swept or Swept	Non-Swept or Swept	Non-Swept or Swept
Crystal Mount	4-point/2-point	4-point/2-point	4-point	4-point	4-point
Package Size	50.8 x 25.4 x 8.38mm max.	50.8 x 25.4 x 8.38mm max.	25.8 x 25.8 x 12.7mm max.	38 x 38 x 19mm max.	25.8 x 25.8 x 12.7mm max.
Weight	50g typ.	50g typ.	20g max.	80g max.	20g max.
Phase Noise at 50MHz (typical) - Consult Factory for Improved Performance					
@ 10Hz offset	-90 dBc/Hz	-90 dBc/Hz	-105 dBc/Hz	-110 dBc/Hz	-110 dBc/Hz
@ 100Hz offset	-120 dBc/Hz	-120 dBc/Hz	-135 dBc/Hz	-140 dBc/Hz	-140 dBc/Hz
@ 1kHz offset	-142 dBc/Hz	-142 dBc/Hz	-155 dBc/Hz	-165 dBc/Hz	-165 dBc/Hz
@ 10kHz offset	-155 dBc/Hz	-155 dBc/Hz	-163 dBc/Hz	-177 dBc/Hz	-177 dBc/Hz
@ 100kHz offset	-162 dBc/Hz	-162 dBc/Hz	-165 dBc/Hz	-178 dBc/Hz	-178 dBc/Hz

Crystal Oscillators for New Space Applications

The low-earth orbit (LEO) satellite realm has spawned an entirely new class of devices requiring innovations in crystal oscillator products to meet performance and price benchmarks. Q-Tech and AXTAL have developed a range of devices (XOs, TCXOs, OCXOs and MCXOs) to provide optimized price and performance for new space applications.



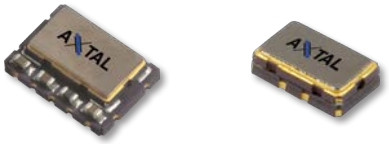
Crystal Oscillators (XOs)

A wide selection of XOs in small surface mount and standard leaded versions.

Key Features

- 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
- Voltage: 1.8, 2.5, 3.3, 5.0Vdc
- Output Waveform: CMOS, LVDS
- Crystal Type: Non-Swept

Product Line	QT723 Series	QT735 Series	QT780 Series
Frequency	1.5 - 133MHz	1 - 250MHZ	225kHz - 162.5MHz
Stability	±25ppm (limited) ±50ppm (standard)		
Temperature Range	-55°C to 125°C		
Radiation (TID)	50kRad(Si)		
SEL	Contact factory		
Phase Noise	Contact factory		
Crystal Mount	2-point		2-point and 3-point
Size	2.5 x 3.2 mm	3.2 x 5.0 mm	5 x 7 to 7 x 9 mm



Temperature Compensated Crystal Oscillators (TCXOs)

TCXOs deliver tighter frequency stability performance in small package options.

Key Features

- Screening per MIL-PRF-55310, Level S
- Voltage: 3.3Vdc
- Output: Clipped Sine Wave, CMOS on request
- Crystal: Non-Swept, Swept on request
- Crystal Mount: 2-point

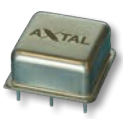
Product Line	AXLE7050S	AXLE5032S
Frequency	10 - 50MHz	
Stability	±1ppm	
Temperature Range	-40°C to 85°C	
Radiation (TID)	40kRad(Si)	
SEL	120MeV-cm^2/mg	
Phase Noise	Contact factory	
Size	7.0 x 5.0 x 1.8 mm	5.0 x 3.2 x 1.7 mm

Oven Controlled Crystal Oscillators (OCXOs)

OCXOs provide ppb stability for LEO applications.

Key Features

- Screening per MIL-PRF-55310, Level S
- Voltage: 5.0, 12Vdc
- Output Waveform: Sine Wave, CMOS



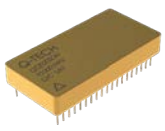
Product Line	AXIOM70SL	AXIOM75SL	AXIOM75SH	AXIOM3838S
Frequency	10MHz		80 - 125MHz	10MHz
Stability	±10ppb	±10ppb	±50ppb	±10ppb
Temperature Range	-20°C to 70°C			
Radiation	10kRad(Si) TID	40kRad(Si) TID		
SEL	Consult Factory	Immune		
Phase Noise (@>10kHz)	Consult factory			-160dBc/Hz
Crystal	Non-Swept	Swept on request		
Crystal Mount	2-point			4-point
Size	25 x 25 x 13 mm			38 x 38 x 19 mm

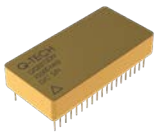
Microcomputer Compensated Crystal Oscillators (MCXOs)

RAD-tolerant OCXO performance with 90mW maximum power consumption with faster start-up and stabilization time.

Key Features

- Power Consumption: 90mW max.
- Maximum Aging: ±1.5ppm over 20 years
- Screening per MIL-PRF-55310, Level B (Modified)
- Voltage: 3.3Vdc
- Output Waveform: Sine wave, CMOS





Product Line	QT2020	QT2021
Frequency Range	5 - 100MHz	
Stability	±10ppb to ±30ppb	
Temperature Range	-40°C to 85°C	
Radiation (TID)	50kRad(Si)	
SEL	29MeV-cm²/mg	75MeV-cm²/mg
Phase Noise	Contact factory	
Crystal	Swept	
Crystal Mount	4-point	
Size	1.0 x 2.0 x 0.33 in	

High-Stability Crystal Oscillators for Full Space Applications

Parameter	Q-Tech			AXTAL
	QT4700 OCXO	QT4100 OCXO	QT4200 OCXO	AXIOM6060 OCXO
				
Frequency Range	10 to 100MHz	1 to 125MHz	1 to 125MHz	80 to 125MHz
Operating Temperature Range	-40°C to +85°C	-40°C to +85°C	-40°C to +85°C	-30°C to +75°C
Stability (temp range dependent)	±10ppb to ±200ppb	±10ppb to ±200ppb	±10ppb to ±200ppb	±50ppb
Voltage	5V, 12V (customizable)	5V to 12V (customizable)	5V to 12V (customizable)	12V
Power Consumption (max)	1W @ 25°C (Steady State) 2.5W (Warm-up)	2.7W @ 25°C (Steady State) 4.8W (Warm-up)	2.7W @ 25°C (Steady State) 4.8W (Warm-up)	2.52W @ 25°C (Steady State) 7.56W (Warm-up)
Logic	CMOS, Sine Wave	CMOS, Sine Wave	CMOS, Sine Wave	Sine Wave
Radiation (TID)	100 kRad(Si)	100 kRad(Si)	100 kRad(Si)	100 kRad(Si)
Stabilization Time to Full Performance	2 minutes	10 minutes	10 minutes	20 minutes
Crystal Type	Swept	Swept	Swept	Swept
Radiation (SEL)	75 MeV-cm²/mg	75 MeV-cm²/mg	75 MeV-cm²/mg	Immune
Package Size	25.4 x 25.4 x 19.05mm max.	50.8 x 65 x 40mm max.	50.8 x 65 x 40mm max.	60 x 60 x 30mm max.
Crystal Mount	4-point	4-point	4-point	4-point
Weight	50g typ.	165g typ.	100g typ.	80g max.
Phase Noise at 50MHz (typical) - Consult Factory for Improved Performance				
@ 10Hz offset	-114 dBc/Hz	-114 dBc/Hz	-114 dBc/Hz	-110 dBc/Hz
@ 100Hz offset	-140 dBc/Hz	-140 dBc/Hz	-140 dBc/Hz	-140 dBc/Hz
@ 1kHz offset	-150 dBc/Hz	-150 dBc/Hz	-150 dBc/Hz	-165 dBc/Hz
@ 10kHz offset	-155 dBc/Hz	-155 dBc/Hz	-155 dBc/Hz	-177 dBc/Hz
@ 100kHz offset	-158 dBc/Hz	-158 dBc/Hz	-158 dBc/Hz	-178 dBc/Hz

Q-TECH CORPORATION

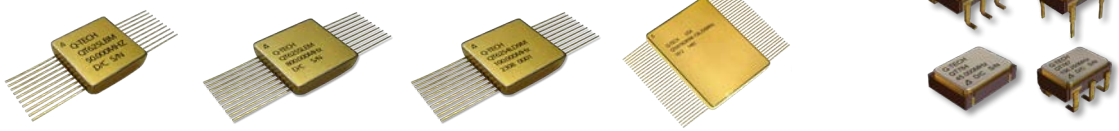
AXTAL a Q-TECH Company

Crystal Oscillators for Full Space Applications

The full space environment is particularly demanding on electronic components. Extending far beyond the emerging LEO environment, full space oscillators are exposed to harsher levels of radiation.

Crystal Oscillators (XOs)

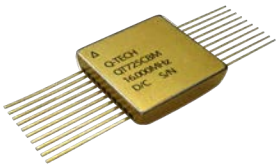
A wide selection of XOs in small surface mount and standard leaded packages.



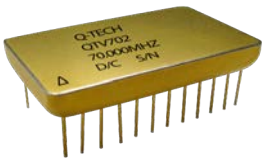
Product Line	QT625L/C	QT625xL/xN	QT625LW	QT697LW	Class B+
Frequency	750kHz - 150MHz	20 - 200MHz	15 - 200MHz		15kHz - 250MHz
Stability	±25ppm to ±50ppm				
Temperature Range	-55°C to 125°C				
Radiation (TID)	100kRad(Si)				
SEL (min)	93MeV-cm²/mg	117MeV-cm²/mg			110MeV-cm²/mg
Phase Noise (typ)	Consult Factory	-150dBc/Hz at 1MHz offset			Consult factory
Crystal Type	Swept				
Crystal Mount	3-point / 4-point				
Screening	MIL-PRF-38534, Class K				MIL-PRF-55310, Level S or MIL-PRF-38534, Class K
Supply Voltage (Vdc)	3.3, 5.0	2.5, 3.3	3.3		1.8, 2.5, 3.3, 5.0
Output	CMOS	Up to 4 CMOS	Up to 4 LVDS	6 to 12 LVDS	CMOS, TTL, LVDS, LVPECL
Size	0.625 x 0.625 x 0.150 in			1.25 x 1.648 x 0.20 in	Consult Factory
Special Notes		Multiple, low-skew outputs drive multiple FPGAs with one clock			See website for complete list

Voltage Controlled Crystal Oscillators (VCXOs)

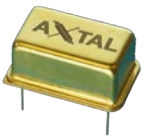
Product Line	QT725C	QTV700	AXIS45S
Frequency	3 - 100MHz	2 - 350MHz	10 - 100MHz
Frequency Pulling (min)	±110 ppm	±90 ppm	±15 ppm
Temperature Range	-55°C to 125°C	-40°C to 85°C	-20°C to 70°C
Radiation (TID)	100kRad(Si)		
SEL (min)	125MeV-cm²/mg		Insensitive
Phase Noise (typ)	Consult Factory		
Crystal Type	Swept		
Crystal Mount	3-point	4-point	2-point
Supply Voltage (Vdc)	5.0	3.3, 5.0, 12, 15	5.0
Output	CMOS	CMOS, Sine Wave	Sine Wave
Screening	MIL-PRF-38534, Class K	MIL-PRF-55310, Level S	
Size	0.625 x 0.625 x 0.150 in	1.28 x 0.78 x 0.3 in 0.975 x 1.275 x 0.21 in 1.105 x 1.105 x 0.20 in	13.1 x 20.7 x 7.5 mm



QT725C



QTV700

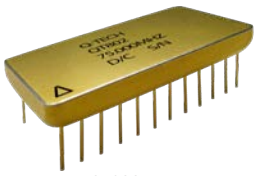


AXIS45S

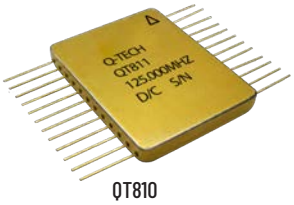
Temperature Compensated Crystal Oscillators (TCXOs)

TCXOs deliver tighter frequency stability performance in small package options.

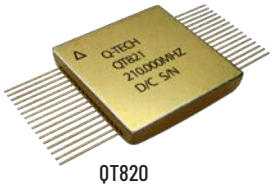
Product Line	QT800
Frequency	3 - 350MHz
Stability	As low as ±0.5 ppm
Temperature Range	-40°C to 85°C
Radiation (TID)	100kRad(Si)
SEL (min)	110MeV-cm²/mg
Phase Noise (typ)	-160dBc/Hz at 1MHz offset
Crystal Type	Swept
Crystal Mount	4-point
Supply Voltage (Vdc)	3.3, 5.0, 12, 15
Output	CMOS, Sine Wave
Screening	MIL-PRF-55310, Level S
Size	24-pin DIP: 1.280 x .790 x .300 in 24-pin Flat Pack: .975 x 1.275 x .210 in 32-pin Flat Pack: 1.015 x 1.015 x .200 in



QT800



QT810



QT820

Product Line	QT8220
Frequency	3 - 350MHz
Stability	As low as ±0.5 ppm
Temperature Range	-40°C to 85°C
Radiation (TID)	300kRad(Si)
SEL (min)	110MeV-cm²/mg
Phase Noise (typ)	-160dBc/Hz at 1MHz offset
Crystal Type	Swept
Crystal Mount	4-point
Supply Voltage (Vdc)	3.3, 5.0
Outputs	From 2 to 4 CMOS
Screening	MIL-PRF-55310, Level S
Size	32-pin Flat Pack: 1.015 x 1.015 x .200 in

Multiple-Output Temperature Compensated Crystal Oscillators (TCXOs)

TCXOs deliver tighter frequency stability performance in small package options.

QT8220

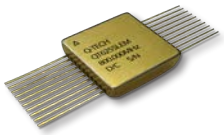
Oven Controlled Crystal Oscillators (OCXOs)

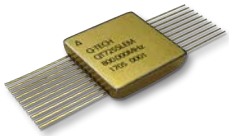
OCXOs provide ppb stability and low long term aging for the most stringent space applications.

Product Line	QT4100	QT4150	QT4200	AXIOM6060
Frequency	1 - 125MHz	10 - 100MHz	1 - 125MHz	80 - 125MHz
Stability	as low as ±10 ppb			±50 ppb
Temperature Range	-40°C to 85°C		-40°C to 75°C	-30°C to 70°C
Radiation (TID)	100kRad(Si)			
SEL (min)	Immune			
Phase Noise (typ)	-102dBc/Hz @ 10Hz offset -148dBc/Hz @ 1kHz offset -155dBc/Hz @ 100kHz offset	-102dBc/Hz @ 10Hz offset -165dBc/Hz @ 1kHz offset -165dBc/Hz @ 100kHz offset	-102dBc/Hz @ 10Hz offset -148dBc/Hz @ 1kHz offset -155dBc/Hz @ 100kHz offset	-105dBc/Hz @ 10Hz offset -170dBc/Hz @ 100kHz offset
Crystal Type	Swept			
Crystal Mount	4-point			
Supply Voltage (Vdc)	3.3, 5.0, 12, 15	12, 15	3.3, 5.0, 12, 15	12
Output	CMOS, Sine Wave	Sine Wave	CMOS, Sine Wave	Sine Wave
Screening	MIL-PRF-55310, Level S			
Size	2.56 x 2.00 x 1.56 in	2.56 x 2.00 x 1.45 in	2.00 x 1.00 x 0.75 in	60 x 60 x 30 mm

Surface Acoutic Wave Crystal Oscillators (SAWs)

SAWs provide a high-frequency solution in a small package





Product Line	QT625S	QT725S
Frequency	400MHz - 1.3GHz	
Stability / Absolute Pull Range (APR)	-200 to 50 ppm	±20 ppm
Temperature Range	-40°C to 85°C	
Radiation	300kRad(Si) TID	
SEL (min)	Immune	
Phase Noise (typ)	-135dBc/Hz, 10kHz offset -168dBc/Hz, 1MHz offset	
Supply Voltage (Vdc)	3.3, 5.0, 12	
Output	Sine Wave	
Screening	MIL-PRF-55310, Level S or MIL-PRF-38534, Class K	
Size	0.625 x 0.625 in	
Special Note		Voltage Controlled SAW Oscillator

Q-TECH CORPORATION

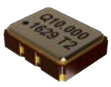
AXTAL a Q-TECH Company

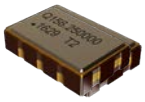
Crystal Oscillators for Military / Defense Applications

Crystal oscillators designed for use in critical military and defense applications where precise timing, reliability, durability and performance are a must. Oscillators may be screened to MIL-PRF-55310, Level B as required. Q-Tech and AXTAL offer an extensive selection of devices specifically for this application.

Crystal Oscillators (XOs)

Q-Tech's military crystal oscillators off superior cutting edge performance in a low profile, ceramic, surface-mount package. Parts have standard gold plated contact pads with optional solder-dipped terminations.



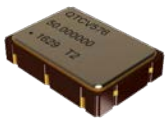


Product Line	QTCC230	QTCC350	QTCC356/58	QTCC353	QTCC570	QTCC576/78
Frequency	32.768kHz, 1.5 - 133MHz	32.768kHz, 1.5 - 133MHz	25 - 250MHz / 100 - 250MHz	25 - 250MHz	1.544 - 190MHz	25 - 250MHz / 100 - 250MHz
Stability	±25 to ±100ppm		±12 to ±100ppm			
Temperature Range	-55°C to 125°C					
Shock (G)	20,000			28,000	20,000	
Crystal Mount	2-point			3-point	2-point	2-point
Screening	MIL-PRF-53310, Level B available					
Supply Voltage (Vdc)	1.8, 2.5, 3.3	1.8, 2.5, 3.3, 5.0	1.8, 2.5, 3.3	1.8, 2.5, 3.3	1.8, 2.5, 3.3, 5.0	1.8, 2.5, 3.3
Output	CMOS	CMOS	LVPECL, LVDS		CMOS	LVPECL, LVDS
Size	2.5 x 3.2 x 1.15 mm	3.2 x 5.0 x 1.2 mm			5.0 x 7.0 x 1.4 mm	5.0 x 7.0 x 1.5 mm

Voltage Controlled Crystal Oscillators (VCXOs)

Our Surface-mount VCXOs provide tight stability using a control voltage to adjust the frequency over a narrow range. These surface-mount devices come in a low-profile ceramic package with gold-plated contact pads.

QTCV356



QTCV576

Product Line	QTCV356	QTCV576
Frequency	1 - 156.250MHz	
APR	±30 to ±100ppm	
Temperature Range	-40°C to 85°C	
Shock (G)	Per MIL-STD-202, Method 213, Cond. I	
Crystal Mount	2-point	
Screening	MIL-PRF-53310, Level B available	
Supply Voltage (Vdc)	3.3, 5.0	
Logic	CMOS, LVPECL	
Size	3.2 x 5 x 1.2 mm	5.0 x 7.0 x 1.5 mm

Temperature Compensated Crystal Oscillators (TCXOs)

Q-Tech's TCXOs deliver tighter stability performance by using temperature sensing to maintain the frequency within a narrow range. These surface-mount devices come standard in a low-profile ceramic package with gold-plated contact pads.

Product Line	QTCT220	QTCT230	QTCT236	QTCT350	QTCT570	AXLE5032	AXLE7050
Frequency	10 - 52MHz	10 - 45MHz	10 - 1500MHz	10 - 52MHz	5 - 52MHz	10 - 52MHz	
Stability	±0.5 to ±2.5ppm					±0.5 to ±2.0ppm	
Temperature Range	-40°C to 85°C						
Shock, non-operating	Per MIL-STD-202, Method 213, Cond. I						
Crystal Mount	2-point						
Screening	MIL-PRF-53310, Level B available						
Supply Voltage (Vdc)	2.8, 3.0, 3.3		2.5, 3.3	2.8, 3.0, 3.3		3.3	
Output	Clipped Sine Wave		CMOS, LVDS, LVPECL	CMOS, Clipped Sine Wave			
Size	2.0 x 2.5 x 0.7 mm	2.5 x 3.2x 0.9 mm	2.5 x 3.2 x 1.6 mm	3.2 x 5.0 x 1.1 mm	5.0 x 7.0 x 1.9 mm	5.0 x 3.2 x 1.7 mm	5.5 x 7.0 x 1.8 mm
Phase Noise @10Hz offset @1kHz offset @100kHz offset	(10MHz) -90dBc/Hz -134dBc/Hz -150dBc/Hz		(250MHz) -90dBc/Hz -107dBc/Hz -114Bc/Hz	(10MHz) -90dBc/Hz -134dBc/Hz -150dBc/Hz		(10MHz) -95dBc/Hz -140dBc/Hz -150dBc/Hz	

Oven Controlled Crystal Oscillators (OCXOs)

AXTAL OCXOs provide exceptional ppb stability by heating the crystal at a constant temperature with industry-leading phase noise performance.

Product Line	AXIOM70/75(ULN)	AXIOM5050(ULN)
Frequency	10 - 160MHz	50 - 160MHz
Stability	±10 to ±50ppb	±100ppb
Temperature Range	-40°C to 85°C	
Shock (G)	Per MIL-STD-202, Method 213, Cond. F	
Crystal Mount	4-point	
Screening	IEC60679-1 and MIL-PRF-55310	
Supply Voltage (Vdc)	5.0, 12	12
Output	HCMOS, Sine Wave	
Size	25.8 x 25.8 x 12.7 mm	50 x 50 x 21 mm
Phase Noise ULN Option - 80MHz	-100dBc/Hz @ 10 Hz offset -160dBc/Hz @ 1kHz offset -175dBc/Hz @ 100kHz offset	-100dBc/Hz @ 10 Hz offset -160dBc/Hz @ 1kHz offset -180dBc/Hz @ 100kHz offset

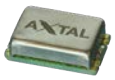
Microcomputer-Compensated Crystal Oscillators (MCXOs)

Q-Tech's innovative MCXO can replace bulkier and power-consuming oven-controlled crystal oscillators (OCXOs), while also providing comparable stability over a wide temperature range.

Product Line	QT2010
Frequency	5 - 100MHz
Stability	±5 to ±30ppb
Temperature Range	-40°C to 85°C
Crystal mount	4-point
Screening	MIL-PRF-55310
Supply Voltage (Vdc)	3.3
Output	Sine Wave
Size	1 x 2 x 0.33 in

Surface Acoustic Wave Oscillators (SAWs)

AXTAL SAWs provide very high frequency in robust, small packages that can tolerate high shock and vibration in harsh environments.



Product Line	AXPS10	AXPS20
Frequency (MHz)	500MHz - 1.6GHz	
Stability	±350ppm	
Temperature Range	-40°C to 85°C	
Shock (G)	Per MIL-STD-202, Method 213, Cond. F	
Screening	IEC60679-1 and MIL-PRF-55310	
Supply Voltage (Vdc)	3.3, 5.0	
Output	Sine Wave	
Size	20.3 x 13 x 5.7 mm	20.7 x 13.1 x 5.2 mm

Q-TECH CORPORATION

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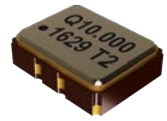
Crystal Oscillators for High Temperature Applications

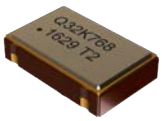
Downhole and other high temperature and high shock environments require crystal oscillators designed and packaged to perform reliably in harsh and inaccessible locations. Q-Tech's High Temperature XOs are an ideal choice for use in extreme applications.

Ultra-Miniature High Temperature XOs

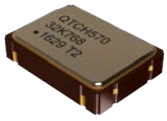
Q-Tech's ultra-miniature, high temperature XOs provide the combination of high performance and small packaging demanded in constrained space, harsh environments.



QTCH230



QTCH350

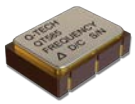


QTCH570

Product Line	QTCH230	QTCH350	QTCH570
Frequency	32.768kHz, 1 to 48MHz		
Stability	±150 to ±250ppm		
Temperature Range	-55°C to 200°C		
Crystal Mount	2-point		
Screening	MIL-PRF-55310, Level B available		
Supply Voltage (Vdc)	1.8, 2.5, 3.3	1.8, 2.5, 3.3, 5.0	
Output	CMOS		
Size	2.5 x 3.2 mm	3.2 x 5.0 mm	5.0 x 7.0 mm

Ultra Low Current, High Temperature XOs

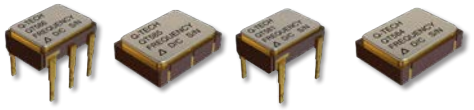
Q-Tech's ultra-low-current XOs offer the ideal solution in high-temperature applications with limited battery power.



Product Line	QT58x / QT59x
Frequency	32.768kHz
Stability	±150 to ±250ppm
Temperature Range	-55°C to 200°C
Current (max)	0.7mA
Crystal Mount	2-point or 4-point
Screening	MIL-PRF-55310, Level B available
Supply Voltage (Vdc)	2.5, 3.3
Output	CMOS
Size	SMT or Thru-Hole (see specs)

High Shock, High Temperature XOs

Q-Tech's high-shock XOs deliver reliable performance in demanding applications.



Product Line	Custom
Frequency	1 to 100MHz
Stability	±175 to ±450ppm
Temperature Range	-55°C to 225°C
Shock (half sine, 0.1ms)	10,000 G (standard) / 20,000 G (optional)
Crystal Mount	2-point (standard) / 4-point (optional)
Screening	MIL-PRF-55310, Level B available
Supply Voltage (Vdc)	1.8, 2.5, 3.3, 5.0
Output	CMOS, TTL
Size	SMT: 5x7, 7x9, 9x14 mm / Thru-Hole (see specs)

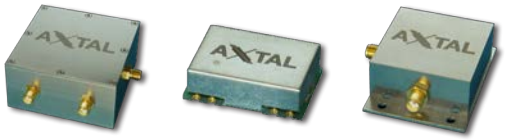
Q-TECH CORPORATION

AXTAL a Q-TECH Company

Specialty Products

Phase-Locked Oscillators

Output up to 10GHz
Input 5-100MHz
Ultra-low Phase Noise

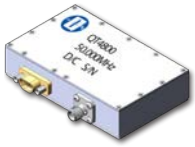


Vibration Isolated Oscillators

50MHz - 450MHz
±100 to ±300ppb stability
Ultra-low Phase Noise

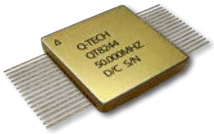
Single Board OCXO for Space

1MHz – 125MHz ±10 to ±20ppb stability
Radiation Hardened
Low Phase Noise and Jitter



Multiple Output XO/TCXO

15MHz - 200MHz 100kRad(Si) TID
Stability: ±50ppm (XO) ±0.5 to ±4ppm (TCXO)
Low Phase Noise and Jitter



Crystal Filters for Space

10-100MHz
Customer Specific Monolithic Filters
100KRad(Si) TID

GHz Frequency Sources

SPXO, VCXO, TCXO, OCXO
Ultra-Low Noise up to 10GHz

Frequency References and Distribution Units

OCXO, GPS Disciplined Oscillators, Atomic Clocks
1PPS and 10MHz Frequency Distribution

Standard Screening and QCI Options (Custom Requirements are also Supported)

Test Inspection	MIL-PRF-55310 PRODUCT LEVEL B	MIL-PRF-55310 PRODUCT LEVEL B (WITH PIND)	MIL-PRF-55310 PRODUCT LEVEL S	MIL-PRF-38534 CLASS K, MODIFIED (WITH AGING)	Engineering Model
Nondestructive Bond Pull	N/A	N/A	MIL-STD-883, Method 2023	MIL-STD-883, Method 2023	N/A
Internal Visual	MIL-STD-883, Method 2017 and Method 2032, Class H (Level B)	MIL-STD-883, Method 2017 and Method 2032, Class H (Level B)	MIL-STD-883, Method 2017 and Method 2032, Class K (Level S)	MIL-STD-883, Method 2017, Class K	MIL-STD-883, Method 2017 and Method 2032, Class H (Level B)
Stabilization Bake	MIL-STD-883, Method 1008, Condition C (+150°C), 24 hours minimum	MIL-STD-883, Method 1008, Condition C (+150°C), 48 hours minimum	MIL-STD-883, Method 1008, Condition C (+150°C), 48 hours minimum	MIL-STD-883, Method 1008, Condition C (+150°C), 48 hours minimum	MIL-STD-883, Method 1008, Condition C (+150°C), 24 hours minimum
Random Vibration	N/A	N/A	MIL-STD-883, Method 2026, Condition I-B	N/A	N/A
Thermal Shock	N/A	N/A	MIL-STD-883, Method 1011, Condition A	N/A	N/A
Temperature Cycling	MIL-STD-883, Method 1010, Condition B	MIL-STD-883, Method 1010, Condition B	MIL-STD-883, Method 1010, Condition C	MIL-STD-883, Method 1010, Condition C	N/A
Constant Acceleration	MIL-STD-883, Method 2001, Condition A, Y1 only (5000 g's)	MIL-STD-883, Method 2001, Condition A, Y1 only (5000 g's)	MIL-STD-883, Method 2001, Condition A, Y1 only (5000 g's)	MIL-STD-883, Method 2001, Condition A, Y1 only (5000 g's)	N/A
Seal (Fine Leak)	MIL-STD-883, Method 1014, Condition A1, A2, or B1	MIL-STD-883, Method 1014, Condition A1	MIL-STD-883, Method 1014, Condition A1, A2, or B1	MIL-STD-883, Method 1014, Condition A1 or B1	MIL-STD-883, Method 1014, Condition A1
Seal (Gross Leak)	MIL-STD-883, Method 1014, Condition C	MIL-STD-883, Method 1014, Condition C	MIL-STD-883, Method 1014, Condition B2 or B3	MIL-STD-883, Method 1014, Condition C, B2, or B3	MIL-STD-883, Method 1014, Condition C
Particle Impact Noise Detection (PIND)	N/A	MIL-STD-883, Method 2020, Condition B	MIL-STD-883, Method 2020, Condition A	MIL-STD-883, Method 2020, Condition A	N/A
Pre Burn-in Electrical Test	Current, Waveform, Voltage (optional)	Current, Waveform, Voltage (optional)	Current, Waveform, Voltage	Current, Waveform, Voltage	N/A
Burn-in #1	MIL-STD-883, Method 1015, +125°C, nominal supply voltage and burn-in load, 160 hours minimum	MIL-STD-883, Method 1015, +125°C, nominal supply voltage and burn-in load, 160 hours minimum	MIL-STD-883, Method 1015, +125°C, nominal supply voltage and burn-in load, 240 hours minimum	MIL-STD-883, Method 1015, 125°C for 160 hours	N/A
Interim Electrical Test	N/A	N/A	N/A	Current, Waveform, Voltage	N/A
Burn-in #2	N/A	N/A	N/A	MIL-STD-883, Method 1015, 125°C for 160 hours	N/A
Final Electrical Test	For Specified Parameters, Nominal and extreme supply voltages, specified load, +25°C and temperature extremes. PDA = 10% or 1 part	For Specified Parameters, Nominal and extreme supply voltages, specified load, +25°C and temperature extremes. PDA = 10% or 1 part	For Specified Parameters, Nominal and extreme supply voltages, specified load, +25°C and temperature extremes, record all test parameters by serial number. PDA = 2% or 1 part (Supply Current, VOH, VOL)	For Specified Parameters, Nominal and extreme supply voltages, specified load, +25°C and temperature extremes, record all test parameters by serial number. PDA = 2%, Supply Current Only	Frequency Tested over Temperature. Electrical Parameters tested at 25°C
Radiographic Inspection	N/A	N/A	MIL-STD-883, Method 2012	MIL-STD-883, Method 2012	N/A
Frequency Aging	N/A During Screening (Optionally performed as Part of Group B QCI)	N/A During Screening (Optionally performed as Part of Group B QCI)	N/A During Screening (Performed as Part of Group B QCI)	Aging for 30 Days up to 90 days. May be ceased at 15 days if value is less than half the 30 day limit.	N/A
External Visual	MIL-STD-883, Method 2009	MIL-STD-883, Method 2009	MIL-STD-883, Method 2009	MIL-STD-883, Method 2009	MIL-STD-883, Method 2009
Additional Testing/QCI	100% Group A Per MIL-PRF-55310 Level B Optional Group B and C perMIL-PRF-55310	100% Group A Per MIL-PRF-55310 Level B Optional Group B and C per MIL-PRF-55310	100% Group B Aging for 30 Days. (May be ceased at 15 days if value is less than half the 30 day limit.) Optional Group C per MIL-PRF-55310	100% Group A Per MIL-PRF-38534 Optional Groups B, C, and D per MIL-PRF-38534	N/A