






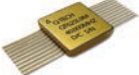
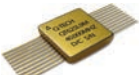




Q-Tech is the leading supplier of crystal controlled oscillators for space applications. Q-Tech has 40 years space heritage, is AS9100 certified, is the leading QPL supplier to MIL-PRF-55310 class B and S, and is continually innovating with new products. Space products include clock oscillators, VCXOs, TCXOs, OCXOs, SAWs, VCXOs, and others.

Image	Q-Tech Package	Dimensions	Product Type	Logic	Voltage	Frequency Range	Stability	Typical Phase Noise (100kHz)
	QT80(0)*	.790"x1.280" 24 Pin Double DIP	TCXO	CMOS Sine	3.3, 5.0, 12.0 or 15.0Vdc	3MHz to 90MHz (CMOS) 10MHz to 150MHz (Sine)	±0.5ppm to ±10ppm	-166dBc/Hz @ 50MHz
	QT81(0)*	.975"x1.275" 24 Pin FP	TCXO	CMOS Sine	3.3, 5.0, 12.0 or 15.0Vdc	3MHz to 90MHz (CMOS) 10MHz to 150MHz (Sine)	±0.5ppm to ±10ppm	-166dBc/Hz @ 50MHz
	QT82(0)*	1.015"x1.015" 24 Pin FP	TCXO	CMOS Sine	3.3, 5.0, 12.0 or 15.0Vdc	3MHz to 90MHz (CMOS) 10MHz to 150MHz (Sine)	±0.5ppm to ±10ppm	-166dBc/Hz @ 50MHz
	QT625LW	.625"x.625" 20 Pin FP	XO	LVDS (1 to 4 pairs)	3.3Vdc	15MHz to 200MHz	±50ppm to ±65ppm	Contact Q-Tech
	QT697LW	1.25"x1.65" 62 Pin FP	XO	LVDS (6, 8, or 12 pairs)	3.3Vdc	15MHz to 200MHz	±50ppm to ±65ppm	Contact Q-Tech
	QT4200	1"x2"x0.75"	OCXO	CMOS Sine	5.0, 12.0 or 15.0Vdc	1MHz to 125MHz	±10ppb to ±200ppb	-160dBc/Hz @ 80MHz
	QT625C & QT625L	.625"x.625" 20 Pin FP	XO	CMOS	3.3 & 5.0Vdc	750kHz to 150MHz	±5ppm to ±65ppm	Contact Q-Tech
	QT625S	.625"x.625" 20 Pin FP	SAW Oscillator	Sine	3.3 & 5.0Vdc	400MHz to 1.3GHz	-200ppm to +50ppm	-163dBc/Hz -170dBc/Hz (Floor) @ 500MHz
	QT725S	.625"x.625" 20 Pin FP	VCXO	Sine	3.3 & 5.0Vdc	400MHz to 1.3GHz	-200ppm to +50ppm	-155dBc/Hz -160dBc/Hz (Floor) @ 1GHz (x2 mult.)
	QT81F	5.00x7.00mm 4/6 Pin	XO	TTL CMOS	1.8, 2.5, 3.3, or 5.0Vdc	500kHz to 156.25MHz	±50ppm to ±100ppm	Contact Q-Tech
	QT2010**	1"x1" 10 Pin Thru Hole	MCXO	CMOS Sine	3.3Vdc	5MHz to 100MHz 32.768kHz 1PPS	±5ppb to ±30ppb	-160dBc/Hz @ 10MHz

* (0) is replaced by number code that determines logic and voltage. See Page 2 for full part number information.

** In process of being space qualified.

QT800 TCXOs and Multiple Output Low Noise Clocks

(Sample part number)

QT 801 AGRM - 50.00MHz

QT 8 0 1 A G R M - 50.000MHz

Package (**)	
0	= 24 Pin Double DIP
1	= 24 Pin Flatpack
2	= 32 Pin Flatpack

Frequency (**)	
3MHz to 350MHz	

Level	
B	= Breadboard Model
E	= Engineering Model
M	= Flight Model

External Tuning	
R	= External Resistor
V	= External Voltage
X	= No Tuning (*)

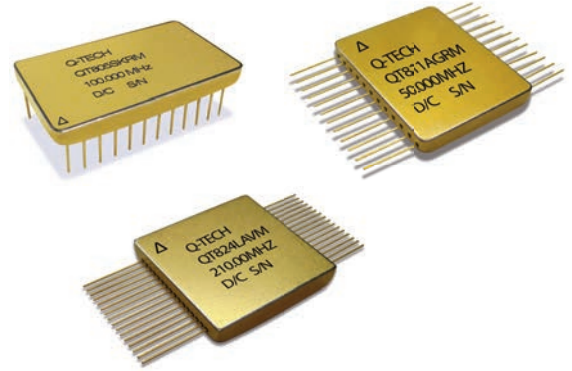
Output & Supply Voltage	
1	= CMOS at 5V
2	= CMOS at 3.3V
4	= Sine at 5V (0 dBm)
5	= Sine at 12V (+7 dBm)
6	= Sine at 15V (+7 dBm)

Duty Cycle (CMOS Only)	
A	= 60/40%
T	= 45/55%
Phase Noise (Sine Only)	
S	= Standard Noise
L	= Low Noise

Stability/Temperature Options	
A	= ±0.5ppm, 0°C to +50°C
G	= ±0.5ppm, 0°C to +70°C
H	= ±2ppm, -30°C to +70°C
K	= ±4ppm, -30°C to +70°C
N	= ±1ppm, 0°C to +50°C
P	= ±1ppm, 0°C to +70°C
Q	= ±2ppm, 0°C to +70°C
R	= ±5ppm, 0°C to +70°C
U	= ±1ppm, -20°C to +70°C
V	= ±2ppm, -20°C to +70°C
W	= ±5ppm, -20°C to +70°C
X	= ±4ppm, -40°C to +85°C
Y	= ±5ppm, -40°C to +85°C
Z	= ±10ppm, -40°C to +85°C

(*) 'No Tuning' option X is available only with Temperature Stability codes R, W, Y and Z.

(**) See Page 1 for packages and output logic frequency ranges.



QT800 Series

- Fully Space Qualified, Rivaling OCXO Level performance
- 0.2 Inch thick Flat package, 0.3 inch thick Double DIP
- Guaranteed ±3ppm Total Error Budget over 18 year satellite life
- 8 year flight heritage in more than a dozen programs
- Very low phase noise (figure)
- Multiple Output version under development

(Sample part number)

QT 6254 LWD 9 M - 125.00MHz

QT 6254 LW D 9 M - 125.000MHz

Terminal Finish	
QT	= Standard Gold Plated
QS	= Hot Solder Dip Sn60Pb40

Frequency	
15MHz to 200MHz	

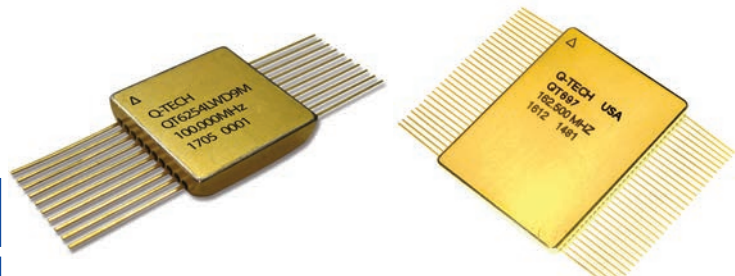
Level	
B	= Breadboard Model
E	= Engineering Model
M	= Flight Model

Part Number	
QT6251	= QT625 1 LVDS Pairs
QT6252	= QT625 2 LVDS Pairs
QT6253	= QT625 3 LVDS Pairs
QT6254	= QT625 4 LVDS Pairs
QT6976	= QT697 6 LVDS Pairs
QT6978	= QT697 8 LVDS Pairs
QT6972	= QT697 12 LVDS Pairs

Stability/Temperature Options	
2	= ±65ppm, -55°C to +125°C
9	= ±50ppm, -55°C to +125°C
6	= ±50ppm, -55°C to +105°C
11	= ±50ppm, -40°C to +85°C

Supply Voltage and Logic	
+3.3V±5% LVDS	

Tristate (Enable/Disable)	
Blank	= N/C
D	= Tristate E/D
Note: QT697LW has Tristate as a default option	



QT625LW & QT697LW Multiple Output LVDS

Q-Tech QT625LW & QT697LW series Space Qualified, 100kRad(Si) Tolerant Hybrid Oscillators are Class 2 hybrids per MIL-PRF-55310, Multiple-Output LVDS, hermetically sealed in a 20-pin Flat-Pack .625" SQR or 1.25" x 1.65" 62-pin custom Flat-Pack, and operate at 3.3Vdc over full military -55°C to +125°C temperature range.

The products combine good shock and vibration resistant with superior low phase noise.

(Sample part number)

QT4207SNM-60.000MHz

Q T 4 2 0 7 S N M - 60.000MHz

Output Power:

0 (**)	= +0 dBm
1	= +1 dBm
2	= +2 dBm
3	= +3 dBm
4	= +4 dBm
5	= +5 dBm
6	= +6 dBm
7	= +7 dBm
8	= +8 dBm
9	= +9 dBm

Supply Voltage:

5	= +5.0V
6	= +12.0V
7	= +15.0V

Logic:

C	= HCMOS (**)
S	= Sine Wave

Output Frequency

Screening Option:

Blank	= EM
M	= Per MIL-PRF-55310, Level S

Frequency vs. Temperature Code:

G	= ± 100PPB at -20°C to +70°C
H	= ± 10PPB at -20°C to +70°C
L	= ± 200PPB at -40°C to +75°C
N	= ± 20PPB at -40°C to +75°C



QT4200

Small size High Stability Oven Controlled Crystal Oscillator (OCXO) is a high reliability signal generator that provides Sine wave or HCMOS output. The OCXO is designed to be used in Aerospace applications.

It is designed to withstand radiation level up to 100kRad (*) (total dose), high shock and vibration. The OCXO has very low phase noise. Low G-Sensitivity SC-Cut Crystal utilized in the design guarantees 1PPB/G or better. The reliable construction of this design qualifies it for stringent environmental applications.

(*) Please contact factory for higher level of radiation hardness.

(**) If CMOS output option is selected, zero (0) should be used at the Output Power position and it is not amplitude selector in this case. OCXO output will have standard CMOS amplitude.

(Sample part number)

QT625CE1M-100MHz

Q T 6 2 5 C E 1 M - 100MHz

Supply Voltage:

C	= +5Vdc
L	= +3.3Vdc

Output Frequency
750kHz - 150MHz

Screening:

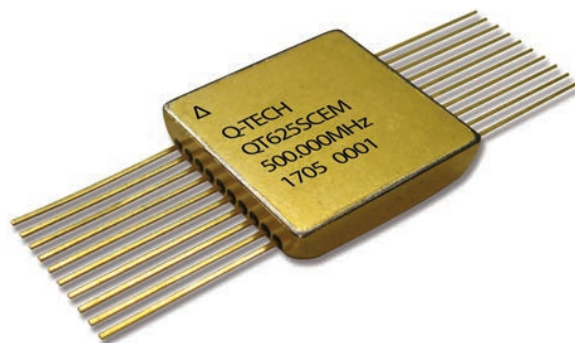
B	= Breadboard Model
E	= Engineering Model
M	= Flight Model

Duty Cycle

1	= 60/40%
2**	= 45/55%

Frequency vs. Temperature Code:

A	= ±65ppm at -55°C to +125°C
B	= ±50ppm at -55°C to +125°C
C	= ±50ppm at -55°C to +105°C
D	= ±40ppm at -55°C to +105°C
E	= ±30ppm at -40°C to +85°C
F	= ±50ppm at -20°C to +70°C
G	= ±25ppm at -20°C to +70°C
H*	= ±5ppm at -0°C to +55°C

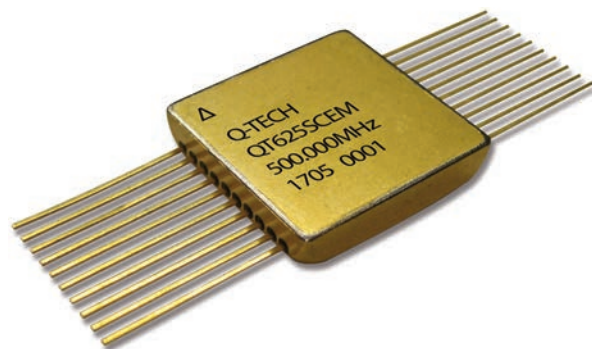


QT625

Q-Tech QT625 Space Qualified, 100kRad(Si) Tolerant Hybrid Oscillators are Class 2 hybrids per MIL-PRF-55310, CMOS XOs, hermetically sealed in a 20-pin Flat-Pack .625" SQR and operate at 3.3 or 5.0Vdc over full military -55°C to +125°C temperature range.

* Frequency/Temperature Stability (tolerance) shall be referenced to the specified nominal output frequency, except for temp code H, in which it is referenced to room temperature (T = 25°C ± 2°C). For temp code H, room temperature tolerance shall be ±15ppm.

**Available up to 100MHz

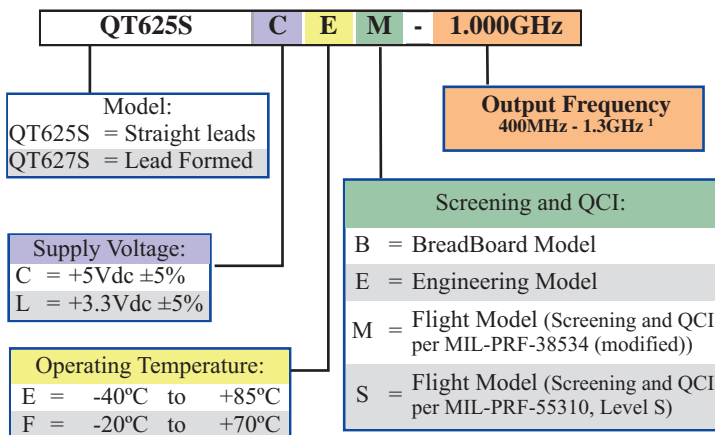


QT625S

Q-Tech QT625S low phase noise Space Qualified, 100kRad(Si) Tolerant Hybrid SAW Oscillators (SO) provide superior performance at operating frequencies from 400MHz to 1.3GHz. QT625S delivers low phase noise, -105 dBc/Hz at 1 kHz offset and -165 dBc/Hz noise floor. Typical vibration sensitivity is less than 2ppb/g.

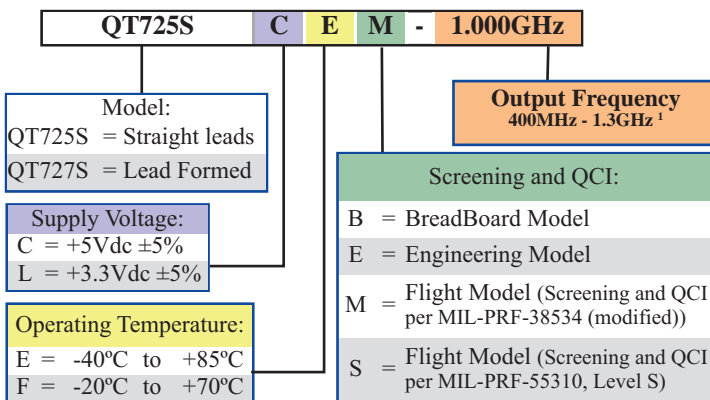
The QT625S SO is a Class 2 hybrid per MIL-PRF-55310, hermetically sealed, in a 20-pin Flat-Pack 0.625" square, and operated at maximum temperature range for -40°C to +85°C. The design can employ internal frequency multiplication to optimize noise performance.

(Sample part number)
QT625SLEM-1.000GHz

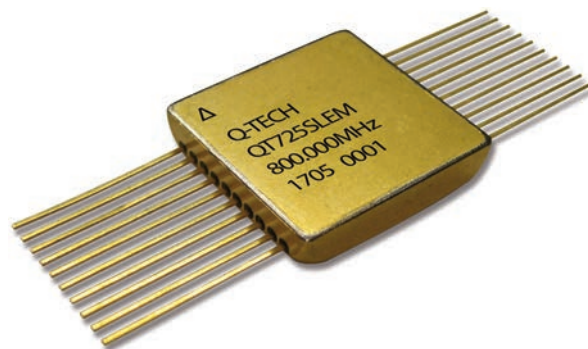


¹Please contact Q-Tech for higher frequencies

(Sample part number)
QT725SCEM-1.000GHz



¹Please contact Q-Tech for higher frequencies



QT725S

Q-Tech QT725S low noise Voltage Controlled SAW Oscillators provide superior performance at operating frequencies from 400 MHz to 1.3GHz. QT725S delivers low phase noise; 110dBc/Hz at 1 kHz offset and -170 dBc/Hz noise floor. Typical vibration sensitivity is 1ppb/g.

The QT725S VCSO is a Class 2 hybrid per MIL-PRF-55310, hermetically sealed, and operated from -40°C to +85°C. Absolute Pull range (APR) is ±20ppm min.

4 Point Mount 5x7mm Oscillators and Space MCXO

(Sample part number)

QT188ACD10S-100.000MHz

Q T 1 81 A C D 10 S - 100.000MHz

Lead Finish:
T = Standard (*)
S = Solder Dip (**)

Materials Level:
1 = 100kRad Tolerant Die, Swept Quartz Crystal
2 = 100kRad Tolerant Die, Cultured Quartz Crystal
3 = Class B Die, Swept Quartz Crystal

Package:
81, 86=Leaded
82, 87=Formed Leads
83, 80=Formed Leads
84, 85=SMT

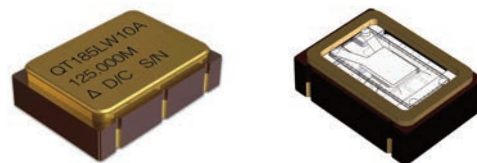
Logic & Supply Voltage:
AC = ACMOS (****) 5.0V
HC = HCMOS 5.0V
L = LVCMOS 3.3V
T = TTL 5.0V
N = LVCMOS 2.5V
LW = LVDS 3.3V
NW = LVDS 2.5V
LP = LVPECL 3.3V
NP = LVPECL 2.5V

Tristate Option:
(Standard offering in LW, NW, LP, NP)
Blank = No Tristate
D = Tristate

Output Frequency

Screening Option:
S = Per MIL-PRF-38534, Class K (modified)
A = Per MIL-PRF-55310, Level S
C = Per MIL-PRF-55310, Level S (modified)
B = Per MIL-PRF-55310, Level B (modified)
N = Per NASA EEE-INST-002, Level 1
E = Engineering Model
Note: If breadboard model is desired, refer to normal QT products or consult with Q-Tech.

Frequency vs. Temperature Code (*):**
2 = ± 65ppm at -55°C to +125°C
6 = ± 50ppm at -55°C to +105°C
7 = ± 75ppm at -55°C to +125°C
9 = ± 50ppm at -55°C to +125°C
10 = ± 100ppm at -55°C to +125°C
11 = ± 50ppm at -40°C to +85°C
12 = ± 100ppm at -40°C to +85°C
15 = ± 25ppm at -40°C to +85°C (Contact Q-Tech for availability)
16 = ± 100ppm at -55°C to +105°C
± 15ppm at 23°C ± 1°C
19 = ± 50ppm at -55°C to +125°C reference to F at 23°C



5x7 4 Point Mount

Q-Tech's 5x7mm low profile extreme high shock hybrid oscillators consist of an IC operating at various supply voltages from 1.8V, 2.5V, 3.3V, and 5.0Vdc and a miniature strip quartz crystal. The series is offered in various ceramic package configurations from true Surface-Mount SMT to straight leads and formed leads. This is the smallest package offered with a four-point mount for high shock and high reliability military applications.

- (*) Gold Plated: 50µ ~ 80µ inches typ.
- (**) Hot Solder Dip Sn60/Pb40 per MIL-PRF 55310 is optional for an additional cost
- (***) Frequency stability vs. temperature codes may not be available in all frequencies
- (****) HCMOS & TTL compatible

(Sample part number)

QT2010CBM-10.000MHz

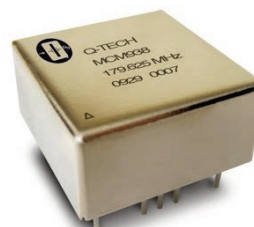
Q T 2 0 1 0 C B M - 10.000MHz

Logic:
C = CMOS
S = Sine Wave

Screening Option:
Blank=No Screening
M= Per MIL-PRF-55310, Level B

Frequency vs. Temperature Code:
A = ± 5ppb at 0°C to +50°C
B = ± 10ppb at 0°C to +70°C
C = ± 30ppb at -40°C to +85°C
D = ± 20ppb at -40°C to +85°C
E = ± 30ppb at -55°C to +105°C
F = ± 20ppb at -55°C to +105°C

Output Frequency



QT2010 (In process of being Space Qualified)

OCXO performance with less than 100 mW power consumption
Temperature Stability: < 20ppb for -40°C to +70°C
Aging: < 1ppb/day
Max power consumption: <105 mW (<90mW at 1pps)
Initialization Time: < 3 seconds to < 0.03ppm
Reduced size: 1''x1''x0.5''
Frequencies up to 100MHz (1pps also available)
G-Sensitivity of < 0.5ppb
Aging Correction for auto calibration in the field

Space Qualification of Radiation hardened version is underway.
- Digital core not space qualified
- Current uprocessor not Radiation hardened
- Have found radiation hardened replacement