VTX5S

High reliable, accurate,
analogue temperature compensated (VC)TCXO

QuartzCom
the communications company

Generic specification

Frequency range	5.0000 ~ 60.0000 MHz		
Standard frequencies (fundamental)	5, 10, 12, 12.8, 13, 14.4, 16, 16.384, 16.36766, 19.2, 19.44, 20, 24, 25, 26, 32, 32.768, 38.88, 40, 50, 60(Δ) MHz		
Frequency stability:			
vs. temperature referenced to ($F_{MAX}+F_{MIN}$)/2	≤ ±0.50 ppm	over -40 to +85 °C	(∗)
vs. supply voltage changes referenced to frequency at nominal supply	≤ ±0.1 ppm	±5 %	
vs. load changes referenced to frequency at nominal load	≤ ±0.1 ppm	±5 %	
vs. aging @ +40 °C	≤ ±1.0 ppm	1st year	
G-sensitivity	< 2.0 ppb/g	per axis	
Frequency tolerance ex. factory	0 ~ +1.0 ppm	@ +25 °C	
Supply voltage	+2.5 V, +3.0 V or +3.3 V		(∗)
Output signal	**Clipped sine wave**	**CMOS**	**(∗)**
Output level	> 0.8 Vp-p	V_{OH} > 0.9∗Vcc / V_{OL} < 0.1∗Vcc	
Output load	10 kΩ // 10 pF	15 pF Max.	
Current consumption, depending on frequency	5 < mA	< 8 mA	
Electronic Frequency Control (EFC)	ΔF = ±5 to ±10 ppm	positive slope	(∗)
Control voltage (Vc)	+1.50 V ±1.0 V		(∗)
EFC input impedance	> 100 kΩ		
Tri-state function	pin #6 ➜ high or open pin #5 ➜ oscillation pin #6 ➜ low or GND pin #5 ➜ high impedance		
Phase noise (typical value for 40 MHz)	LN (Low phase noise)	Standard	Frequency offset
	-85 dBc/Hz -115 dBc/Hz -138 dBc/Hz -150 dBc/Hz -154 dBc/Hz	-83 dBc/Hz -110 dBc/Hz -135 dBc/Hz -148 dBc/Hz -152 dBc/Hz	@ 10 Hz @ 100 Hz @ 1 kHz @ 10 kHz @ 100 kHz
Operating temperature range	-40 ~ +85 °C		(∗)
Storage temperature range	-55 ~ +105 °C		
Reflow Profiles as per IPC/JEDEC J-STD-020C	≤ 260 °C over 10 sec. Max.		
Moisture sensitivity	Level 1 (unlimited)		

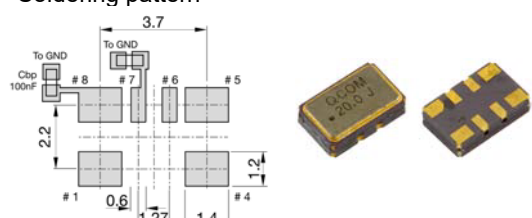**(∗) See available options on page #2**   Note: Unless otherwise specified conditions are @+25 °C
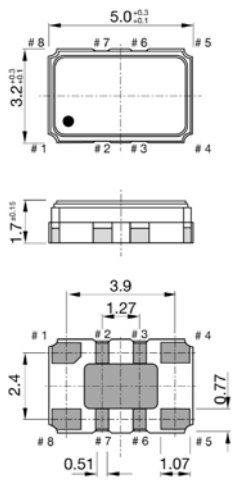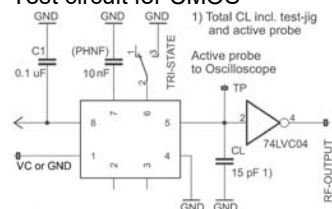

Pin function

\# 1   Vc (EFC) for VC-TCXO
        GND or NC for TCXO
\# 2   do not connect
\# 3   do not connect
\# 4   GND
\# 5   OUTPUT
\# 6   Tri-state or do not connect
\# 7   LN: 10 nF to the GND
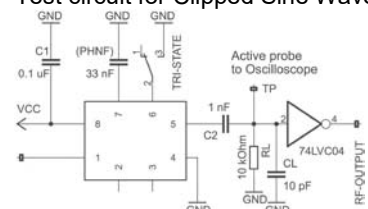   or do not connect
\# 8   Vcc

Soldering pattern

Test circuit for CMOS

Test circuit for Clipped Sine Wave

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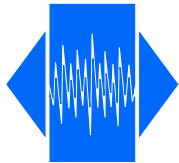
Generic specification

Ordering code

(0)5S-(1)(2)-(3)(4)-(5)(7)-40.000MHz   *Example:* **VT5S-C33-NNu50-V05LN-40.000MHz**

(0) Oscillator type	(1) Output signal	(2) Supply voltage	(7) Phase noise option
TX = TCXO VT = VC-TCXO	H = CMOS C= Clipped sine wave	25 = 2.5 V 30 = 3.0 V 33 = 3.3 V	LN = Low phase noise (-) = Standard
(3) Operating temperature	**(4) Frequency stability**	**(5) Pulling range** (VT only)	
JF = -20 to +50 °C JK = -20 to +70 °C NN = -40 to +85 °C NR = -40 to +105 °C QN = -55 to +85 °C	u25 = ± 0.25 ppm u50 = ± 0.50 ppm 1u0 = ± 1.00 ppm 1u5 = ± 1.50 ppm	V05 = 1.5 ± 1.0 V ±5 ppm V10 = 1.5 ± 1.0 V ±10 ppm Z = special spec	

Frequency stability vs. temperature

ppm	≤± 0.20	≤± 0.25	≤± 0.50	≤± 1.00	≤± 1.50
-20 to +50 °C	O	O	O	O	O
-20 to +70 °C	Δ	O	O	O	O
-40 to +85 °C	Δ	Δ	O	O	O
-40 to +95 °C	X	Δ	Δ	Δ	O
-40 to +105 °C	X	X	X	Δ	Δ
-55 to +85 °C	X	X	X	X	Δ

Δ	Ask factory
O	Available
X	Not available

Environmental conditions

Test	IEC 60068 Part…	IEC 60679-1 Clause	MIL-STD-202G Method	MIL-STD-810F Method	MIL-PRF-55310D Clause	Test conditions (IEC)
Sealing tests (if applicable)	2-17	5.6.2	112E		3.6.1.2	Gross leak: Test Qc, Fine leak: Test Qk
Solderability Resistance to soldering heat	2-20 2-58	5.6.3	208H 210F		3.6.52 3.6.48	Test Ta method 1, Test Td$_1$ method 2, Test Td$_2$ method 2
Shock *	2-27	5.6.8	213B Cond C	516.4	3.6.40	Test Ea, 3 x per axis 100 g, 6 ms half-sine pulse
Vibration, sinusoidal*	2-6	5.6.7.1	204D Cond A	516.4-4	3.6.38.1 3.6.38.2	Test Fc, 30 min per axis, 10 Hz – 55 Hz 0,75 mm; 55 Hz – 2 kHz, 10 g
Vibration, random*	2-64	5.6.7.3	214A	514.5	3.6.38.3 3.6.38.4	Test Fdb
Endurance tests - ageing - extended ageing		5.7.1 5.7.2	108A		4.8.35	30 days @ 85 °C 1000 h, 2000 h, 8000 h @ 85 °C

Other environmental conditions on request   28 Dec. 20

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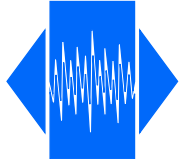
Handling Recommendation for
SMD Crystal & Crystal Oscillator

1. ESD Handling
    Crystal oscillators are electrostatic sensitive device. Therefore, direct touching of the terminals with
    fingers and without ESD precautions must be avoid.
    Proper handling must be made according to the established ESD handling rules
    IEC 61340-5-1 and EN 100015-1 to avoid degradations of the oscillator performance due to
    damages of the internal circuitry by electrostatic discharge.

2. Shocks & Vibrations
    Excessive mechanical shocks and or vibrations during handling as well as manual and automatic
   assembly must be avoided.
    If accidently, the component was dropped or subject to strong shock, component should be verified
    that the electrical function is still within the specification and still hermetically sealed.

3. Thermal Shocks
    Avoid steep temperature gradients. It might lead to breakage of the crystal blank
    Infrared reflow processes in general are safe.

4. Soldering & Cleaning

    ### Reflow Condition in accordance with JEDEC STD-020C
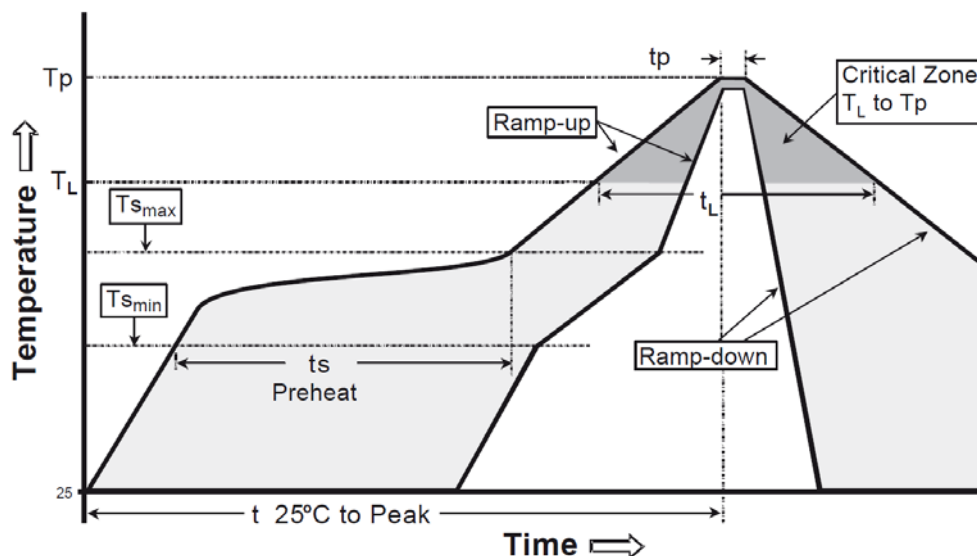
    Avoid washing or welding processes using Ultrasonic energy. These processes can damage the
    crystal due to mechanical resonance of the crystal blanks.

5. Coating
    Using resin may have an impact on the oscillator characteristics.
    If resin is used, please contact QuartzCom or our representative for more information.
    In situations where resin would be used without contacting us in advance,
    QuartzCom will not be responsible for any damages caused to the components or and injuries
    caused to people.