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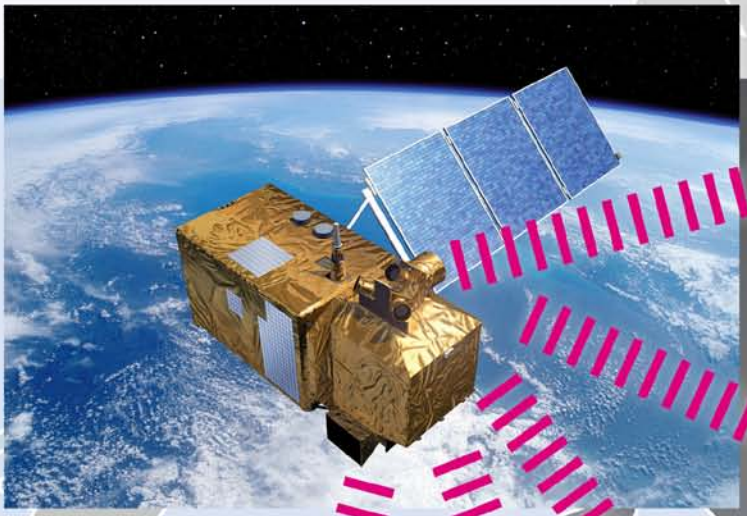
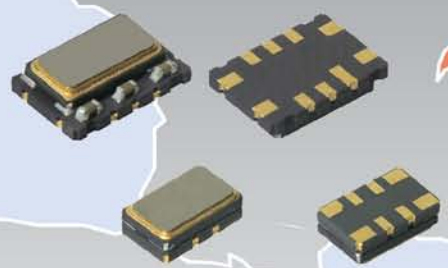
the communications company

TCXO High Precision Analogue Compensated Crystal Oscillators
for Location and Navigation

GPS, GALILEO, GLONASS, COMPASS, QZSS, MSAS and COSPAS-SARSAT





TCXO

Temperature Compensated Crystal Oscillators

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Applications	• GPS, GALILEO, GLONASS, BaiDou, MSAS & GNSS • COSPAS-SARSAT • Mobile radio, satellite communications

Features			
	• Tight stability:	±0.50 ppm over -40 to +85 °C	standard
		±0.15 ppm over -40 to +85 °C	on request
	• Low G-sensitivity:	1.5 ppb/g Gamma Γ	standard
		0.5 ppb/g Gamma Γ	on request
	• Short term stability:	$< 1 \times 10^{-10}$ @ $\tau = 1$ s	

Standard frequencies	**10.0, 12.2880, 15.36, 16.384, 16.368, 20.0, 25.0, 27.0, 32.5120, 33.60, 49.1520 & 50.0, 51.20 MHz**	
Frequency range	**5.0 ~ 52.0 MHz**	
Frequency stability vs. temperature reference to (FMAX+FMIN)/2	≤ ±0.5 ppm ≤ ±0.2 ppm ≤ ±1.0 ppm	over -40 to +85 °C standard over -40 to +85 °C on request over -55 to +95 °C on request
vs. supply voltage changes reference to frequency at nominal supply	≤ ±0.05 ppm	±5 %
vs. load changes reference to frequency at nominal load	≤ ±0.05 ppm	±5 %
vs. aging	≤ ±1.0 ppm	1st year
Frequency slope	≤ 0.05 ppm/°C	over operating temperature
G-sensitivity	< 1.5 ppb/g < 0.5 ppb/g	Gamma Γ standard Gamma Γ on request
Short term stability (ADEV)	$< 1 \times 10^{-10}$	$\tau = 1$ s
Supply voltage (Vdc)	+2.7 V to +5.0 V	nominal value needs to be defined, standard: 3.3 V and 5.0 V ±5 %
Supply current	< 3 mA < 8 mA	5 MHz ~ 25 MHz up to 52 MHz
Output signal	Clipped sine wave	CMOS
Output level	> 0.8 Vp-p	V_{OH} > 0.9 x Vdc / V_{OL} < 0.1 x Vdc
Output load	10 kΩ // 10 pF	12 pF standard, 15 pF Max.
Symmetry (duty cycle)		45 / 55 % @ ½ Vdc
Tri-state function	Input ≥ 0.7 x Vcc or open Input ≤ 0.3 x Vcc or GND	Output ➔ oscillation Output ➔ high impedance
Phase noise @ 20.0 MHz	< -95 dBc/Hz < -125 dBc/Hz < -145 dBc/Hz < -155 dBc/Hz < -155 dBc/Hz	@ 10 Hz @ 100 Hz @ 1 kHz @ 10 kHz @ 100 kHz
Operating temperature range	-20 ~ +70 °C -40 ~ +85 °C -60 ~ +105 °C	indoor outdoor (extended temperature range on request)
Storage temperature range	-55 ~ +125 °C	
Reflow Profiles as per IPC/JEDEC J-STD-020C	≤ 260 °C over 10 sec. Max.	
Moisture sensitivity	Level 1 (unlimited)	
Packing units	tape & reel	500 or 1000 pieces

Environmental	**Reference STD.**		**Test condition**
Vibration sinusoidal	IEC 60028-2-6	IEC 60679-1-5.6.7	Test Fc, 30 min per axis 10 Hz – 55 Hz with 0.75 mm, 55 Hz – 2 kHz with 10 g
Shock	IEC 60028-2-27	IEC 60679-1-5.6.8	Test Ea, 3 x per axis, 100 g, 6 ms half sine pulse
Solderability	IEC 60028-2-20 IEC 60028-2-58	IEC 60679-5.6.3	Test Ta (235 ±2) °C Method 1 Test Tb Method 1A, 5 s

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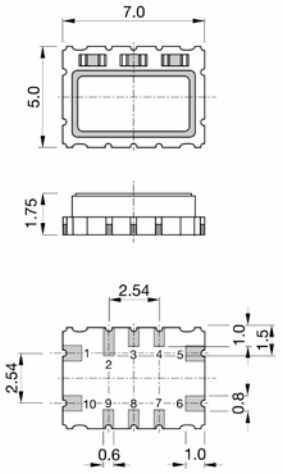
Package outline and recommended solder pattern

TX7-705CM-SQ-HP



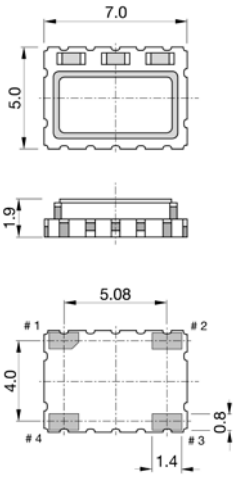
Pin function

# 1	GND or NC for TCXO Vc for VC-TCXO
# 5	GND
# 6	Output
# 9	Tri-state
# 10	Vcc

Do not connect: #2, #3, #4, #7 & #8

Solder pattern

TX7-705CM-TQ-HP

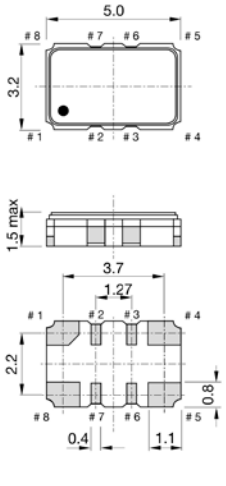


Pin function

# 1	GND or NC for TCXO Vc for VC-TCXO
# 2	GND
# 3	Output
# 4	Vcc

Solder pattern

TX7-503CM-SQ-HP



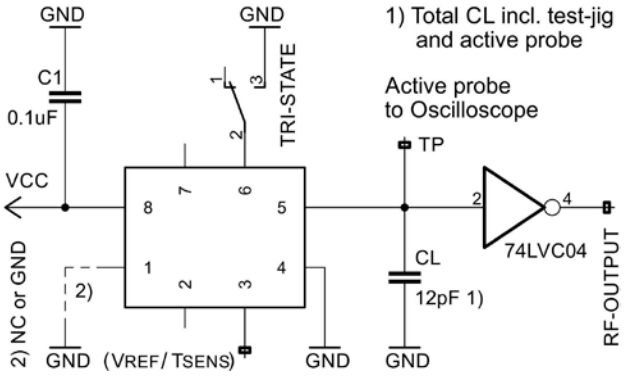
Pin function

# 1	GND or NC for TCXO Vc for VC-TCXO
# 4	GND
# 5	Output
# 6	Tri-state (Enable high)
# 8	Vcc

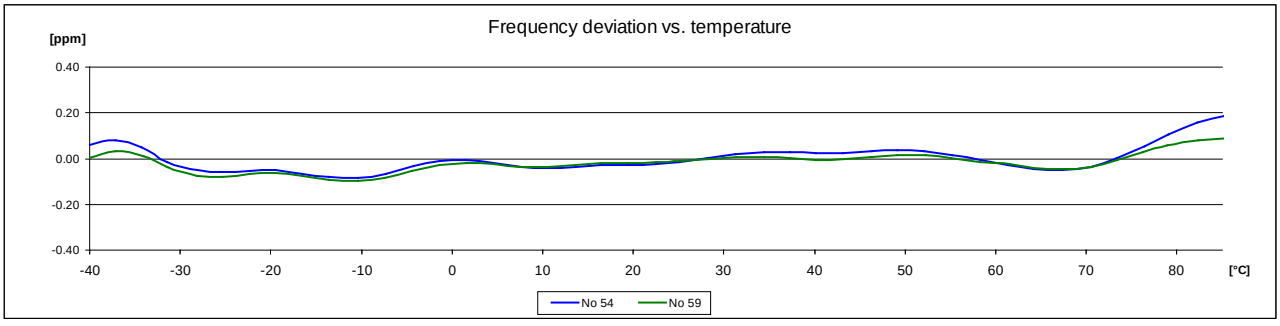
Do not connect: #2, #3 & #7

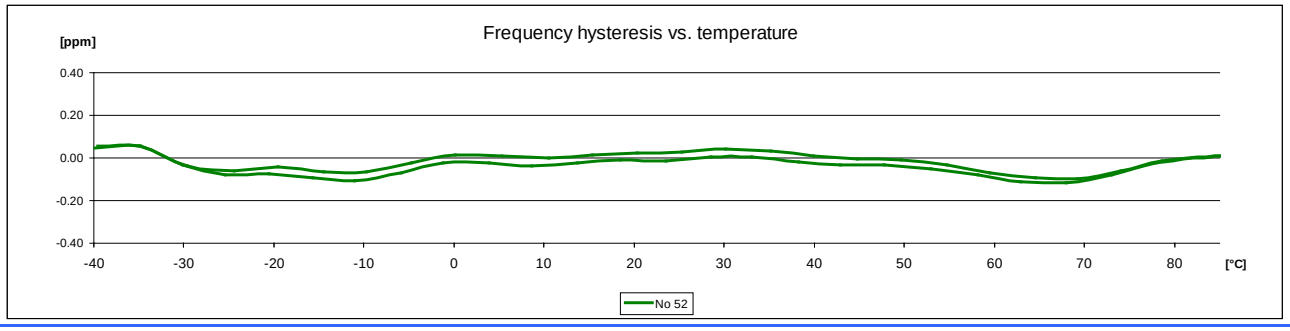
Solder pattern

Test circuit of the TX7-503CM-SQ-HP



Frequency deviation vs. temperature





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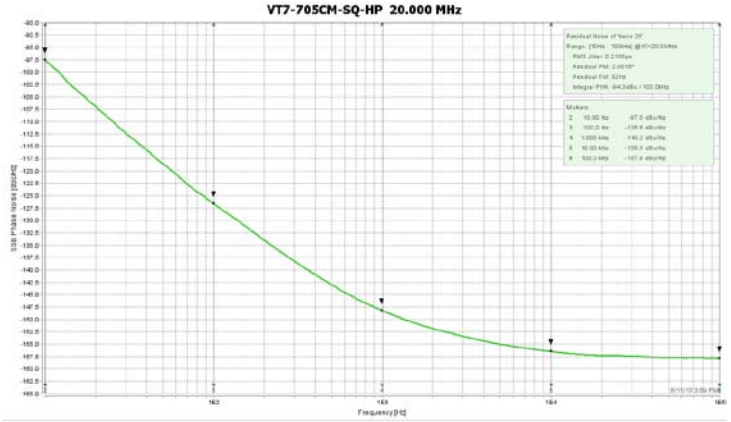
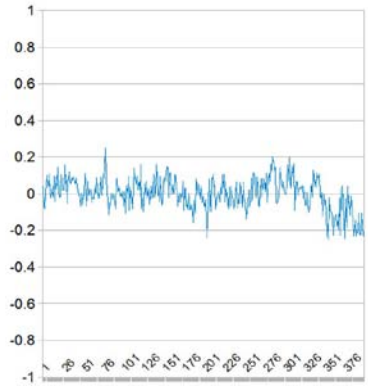
Phase noise



Frequency stability in ppb

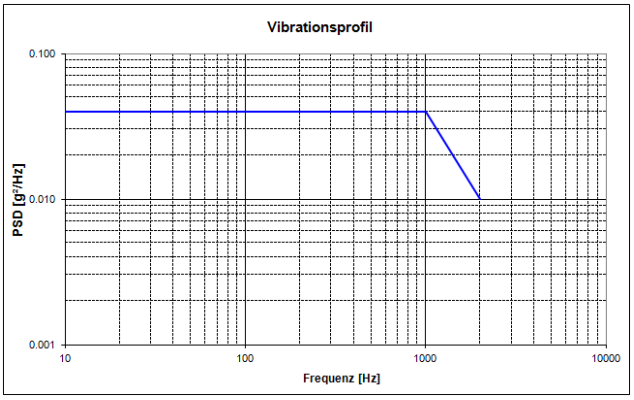


400 continuous measurements at 150ms gate time

G-sensitivity measurement

Random vibration profile

Noise Vibration:
20 – 1000 Hz with 0.04 g^2/Hz, -6 dB/octave to 2 kHz,
effective acceleration value (G_{RMS}) = 7.7 g

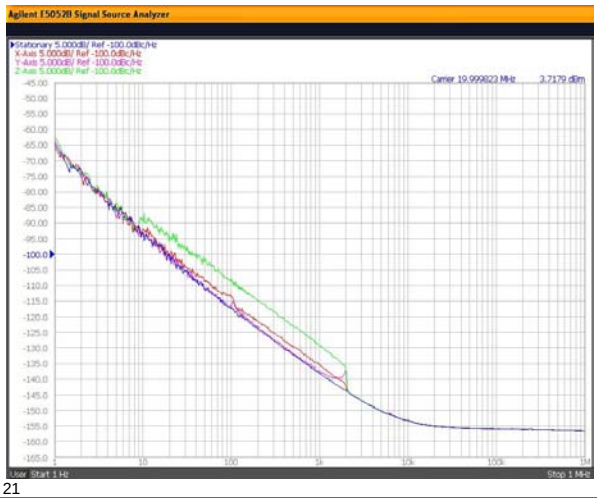


Vibration profile (power spectral density)

Gamma Γ G-sensitivity

Oscillator no.	X-Axis [ppb/g]	Y-Axis [ppb/g]	Z-Axis [ppb/g]	Gamma Γ [ppb/G]
# 21	0.13	0.10	0.26	0.31
# 22	0.13	0.11	0.17	0.25

Phase noise measurement under vibration



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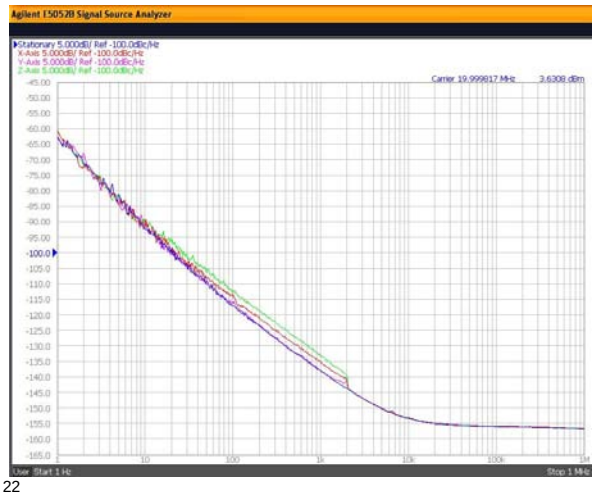

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QuartzCom, more than frequency

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