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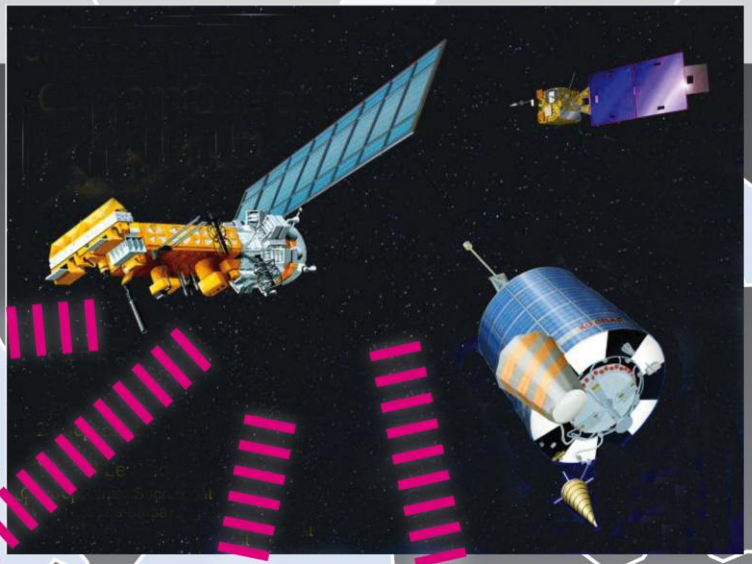
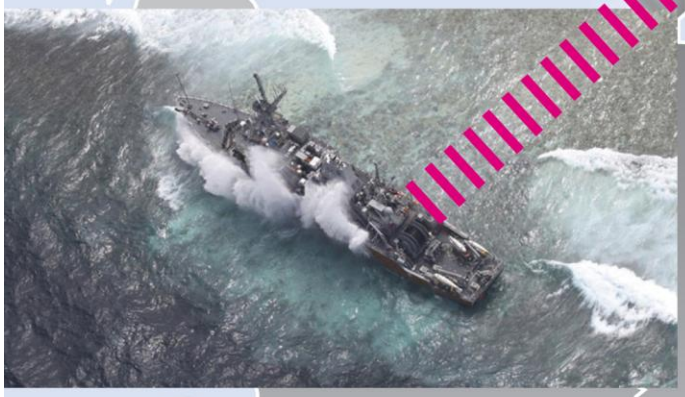
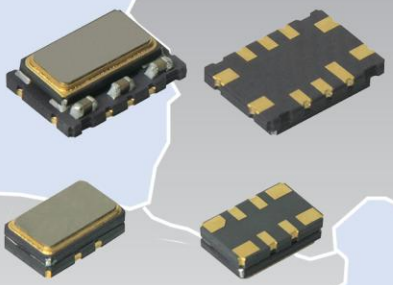
TCXO Temperature Compensated Crystal Oscillators
for COSPAS-SARSAT emergency beacon







TCXO

Temperature Compensated Crystal Oscillators

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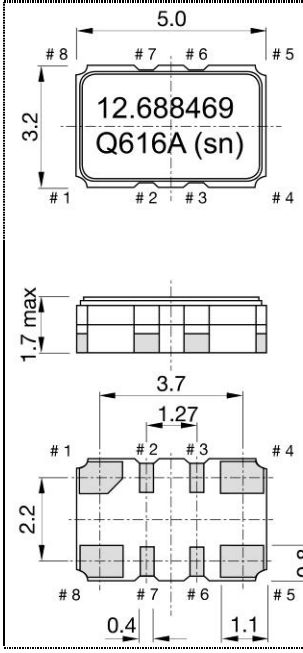
for COSPAS-SARSAT emergency beacon

TX7-503CM-SQ-CoSa **(5.0 x 3.2 mm)**	**10.0, 12.678303, 12.688469, 12.688750, 12.80 14.40, 16.3840, 20.0, 25.0 & 26.0 MHz**	
Frequency stability:		
vs. temperature reference to (FMAX+FMIN)/2	≤ ±0.2 ppm ≤ ±0.2 ppm	-40 ~ +55 °C Class 1 beacon -20 ~ +55 °C Class 2 beacon
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 ≤ ±3.0 ppm	1st year 10 years
Frequency tolerance @ +25 °C	≤ ±0.5 ppm	
Frequency tolerance after reflow	≤ ±1.0 ppm	
Allan variance (ADEV)	< 1 x 10^{-10}	τ = 1 s
Medium-term stability: Mean slope ΔF/dt after 15 min power-up: steady state during temperature ramp Residual ΔF (rms) from slope	IAW C/S T.007 and C/S IP TCXO ≤ ±0.7 ppb/min ≤ ±1.7 ppb/min ≤ 2.0 ppb	 T = constant ΔT/dt = ± 5 °C/h over 18 points
Supply voltage (Vdc)	+3.3 V	±5 %
Supply current	4 mA	Max.
Output signal	CMOS	V_{OH} > 2.1 V V_{OL} < 0.3 V
Output load	15 pF	Max.
Symmetry (duty cycle)	45 % ~ 55 %	@ ½ Vcc
Tri-state function	Input ≥ 2.3 V or open Input ≤ 0.9 V or GND	Output ➔ oscillation Output ➔ high impedance
Operating temperature range	-40 ~ +55 °C -20 ~ +55 °C	Class 1 beacon Class 2 beacon
Storage temperature range	-55 ~ +125 °C	
Packing units	tape & reel	500 or 1'000 pieces



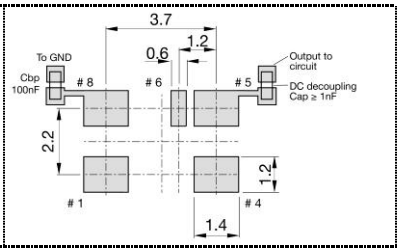
Pin function

# 1	GND
# 2	do not connect
# 3	do not connect
# 4	GND
# 5	OUTPUT
# 6	Tri-state or do not connect
# 7	do not connect optional 33 nF to the GND
# 8	Vcc

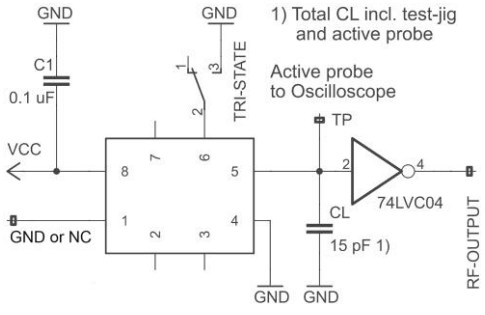
Phase noise reduction
(optional on request)

# 7	Phase noise filter (PhNF) With external capacitor Cap = 33 nF

Foot print



Test circuit

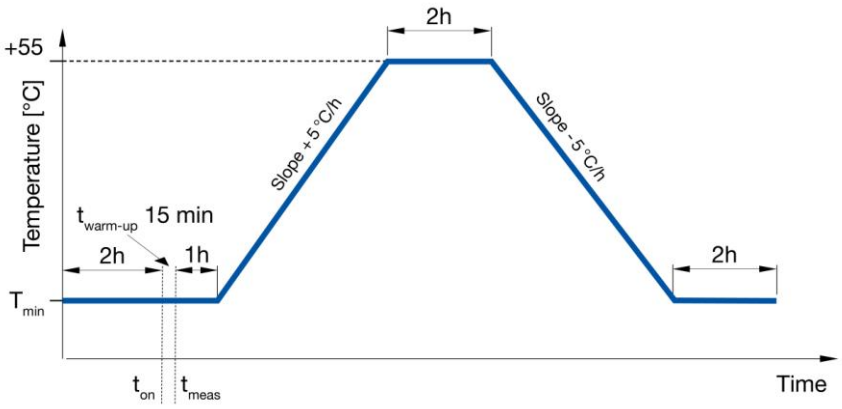


Additionally used components	• 406 MHz RF SAW filter • 121.50 MHz accurate, low power consumption clock oscillator

for COSPAS-SARSAT emergency beacon

Medium term stability

Frequency stability measurement procedure according the COSPAS/SARSAT T.001



Note #1:	Tmin	= -40 °C (Class 1 beacon)
	Tmin	= -20 °C (Class 2 beacon)
	TON	= beacon turn-ON time after 2 hours “cold soak”
	Tmeas	= start time of frequency stability measurement (TON + 15 min)

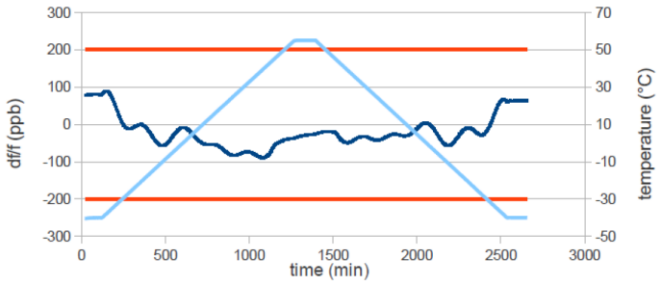
Note: #2 The 2 h and 1 h warm-up and stabilisation times are for type approval test of complete beacon. For testing of TCXO these times may be shortened accordingly.

Test data:

(Example)

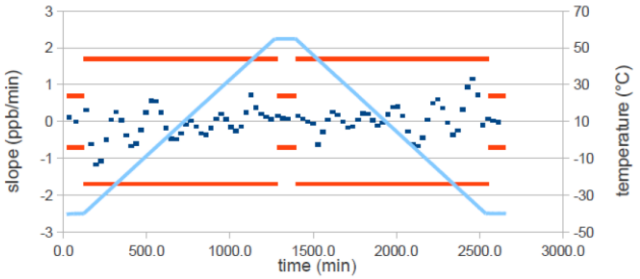
Frequency stability vs. temperature ≤ ±0.2 ppm:

over -40 ~ +55 °C for Class 1 beacon
over -20 ~ +55 °C for Class 2 beacon



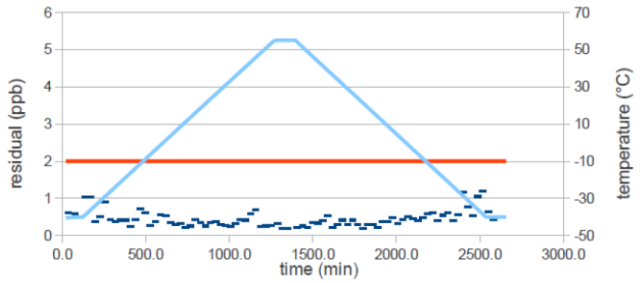
Mean slope ΔF/dt after 15 min power-up:

steady state: ≤ ±0.7 ppb/min by T = constant
during temp. ramp ≤ ±1.7 ppb/min for ΔT/dt = ± 5 °C/h



Residual ΔF (rms) from slope:

over 18 points ≤ 2.0 ppb



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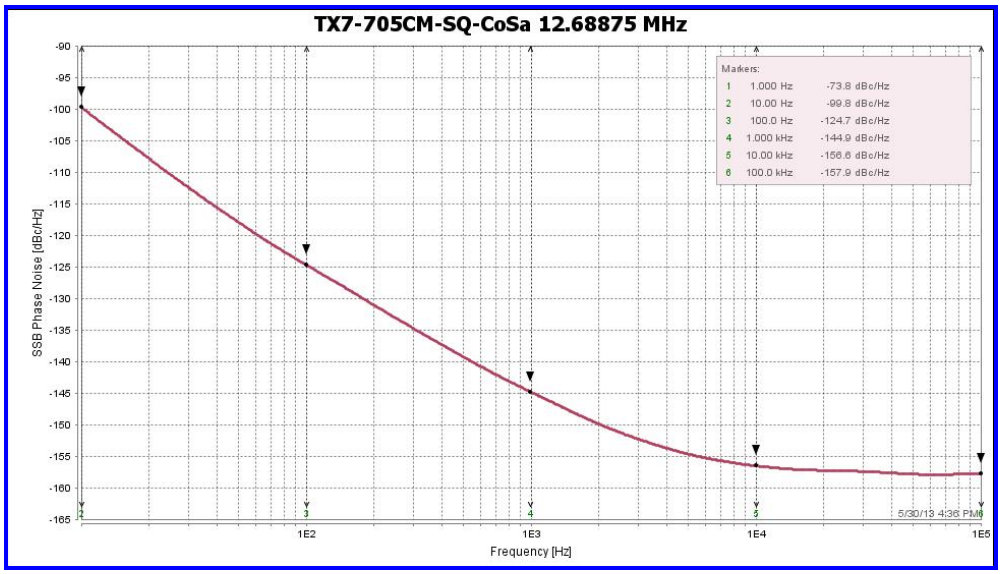
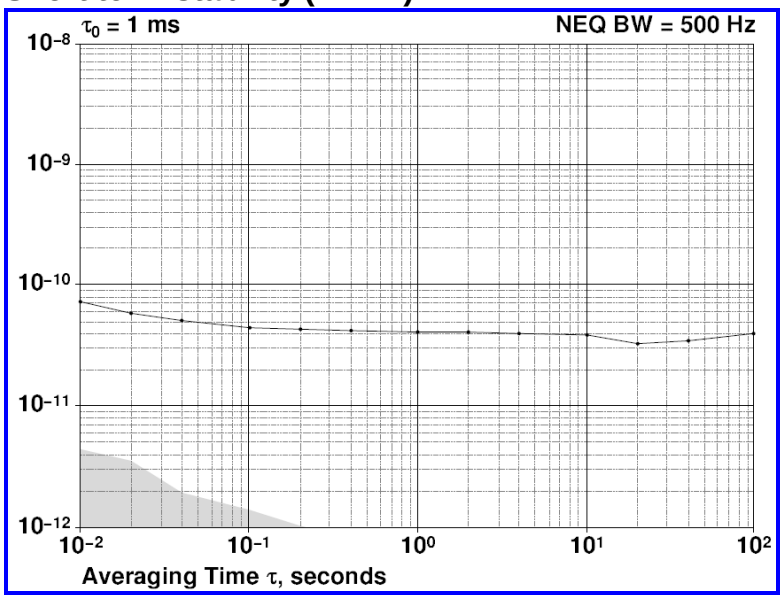
Phase noise



Short term stability (ADEV)



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
Solder ability	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

QuartzCom, more than frequency

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