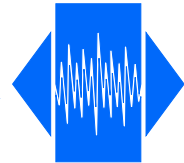


# VTO-P9-3MF-HPG

Low G-sensitivity, vibration resistant,  
temperature compensated CMOS VC-TCXO

**QuartzCom**  
the communications company



**Application:** Block Up Down converters

<b>Nominal frequency Fo</b>	<b>100.000 MHz</b>	
<b>Frequency stability:</b>		
vs. temperature reference to (F <sub>MAX</sub> +F <sub>MIN</sub> )/2	≤ ±0.5 ppm	over -40 to +85 °C
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	±10 %
vs. aging	≤ ±1.0 ppm	1 <sup>st</sup> year
G-sensitivity	≤ 0.3 ppb/g	Gamma Γ
Short term stability ADEV	< 1 x 10 <sup>-10</sup>	τ = 1.0 sec.
Frequency tolerance ex factory	0 ~ +1.0 ppm	@+25 °C
Supply voltage	+3.3 V	
Current consumption	< 15 mA	
Output waveform	CMOS	V <sub>OH</sub> ≥ 0.9 x V <sub>CC</sub> V <sub>OL</sub> ≤ 0.1 x V <sub>CC</sub>
Output load	10 pF	Max.
Electronic Frequency Control (EFC) range	ΔF > ±5 ppm	Linearity 5%
Control voltage Vc	+1.50 V ±1.0 V	positive slope
Phase noise @ 100 MHz	< -75 dBc/Hz < -100 dBc/Hz < -126 dBc/Hz < -146dBc/Hz < -165 dBc/Hz < -167 dBc/Hz	@ 10 Hz @ 100 Hz @ 1 kHz @ 10 kHz @ 100 kHz @ 1000 kHz
Operating temperature range	-40 ~ +85 °C	
Storage temperature range	-55 ~ +105 °C	
Reflow Profiles as per IPC/JEDEC J-STD-020C	≤ 245 °C over 10 sec. Max.	
Moisture sensitivity	Level 1 (unlimited)	

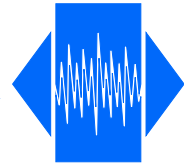
	<b>Pad function</b> # 1 Vc Voltage control # 2 not connected # 3 GND # 4 RF Output # 5 not connected # 6 Vcc	<b>Solder pattern</b> 
	<b>Test circuit</b> 	1) Total CL incl. test-jig and active probe Active probe to Oscilloscope



# VTO-P9-3MF-HPG

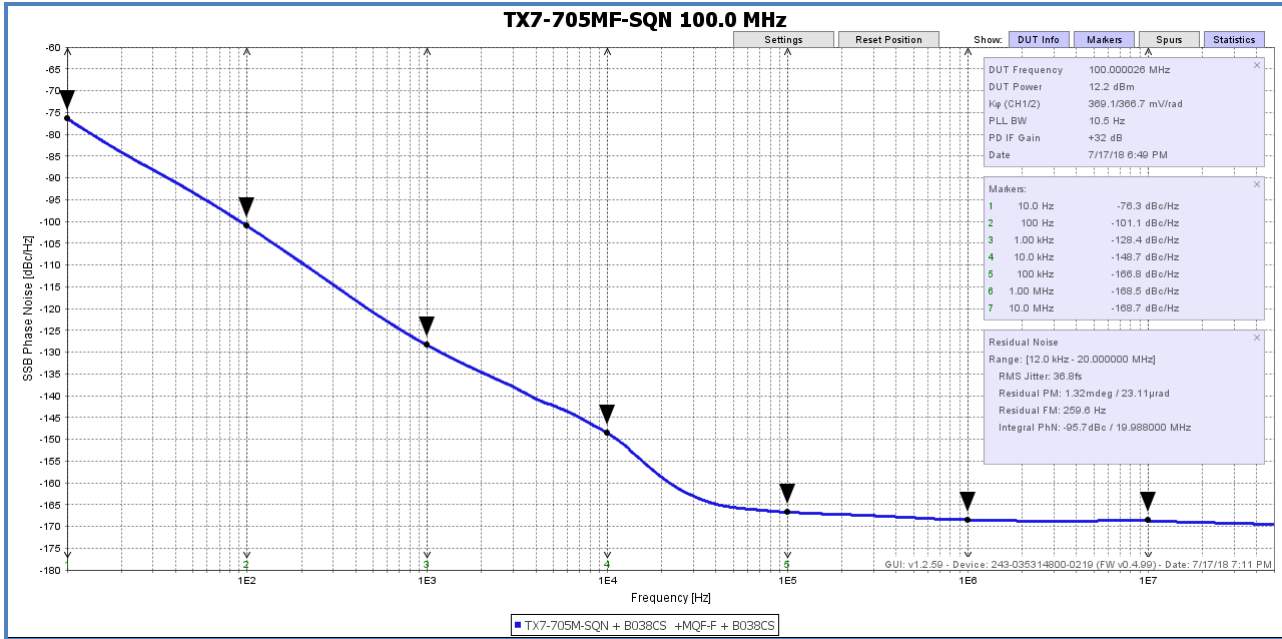
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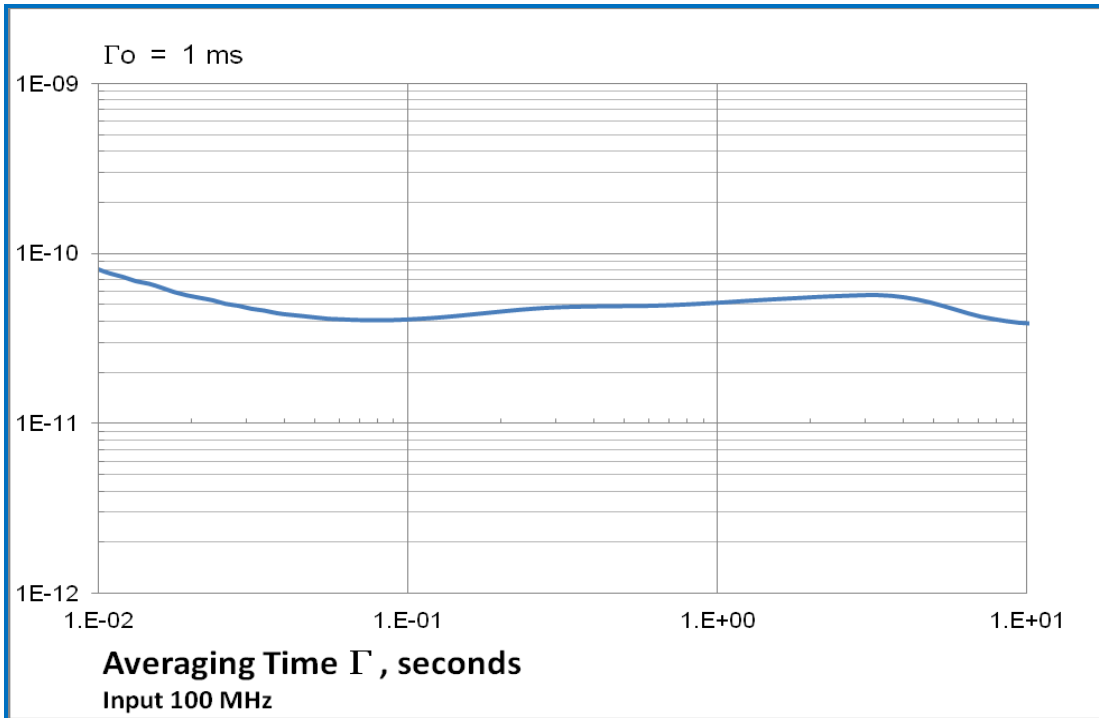


Application: Block Up Down converters

## Phase noise



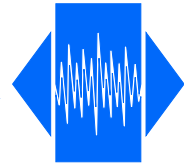
## Short term stability, Allan deviation



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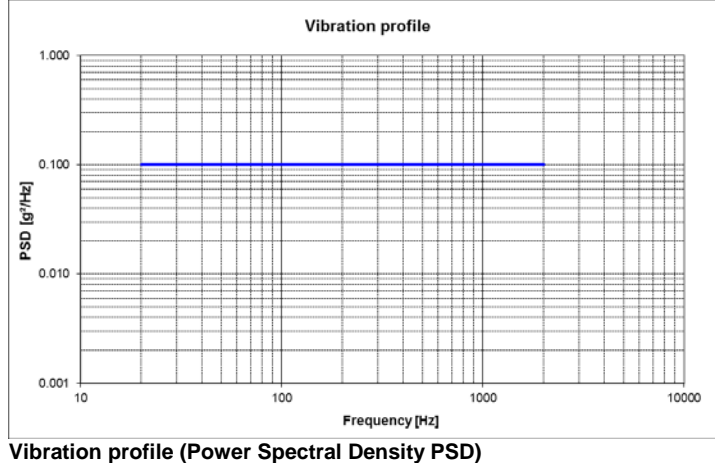
Application: Block Up Down converters

## Measurement of G-Sensitivity

Measurement of phase noise under random vibration and calculation of g-sensitivity, i.e. vibration sensitivity.

### Vibration profile Random for g-sensitivity determination

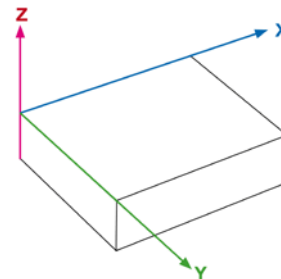
Random vibration 20-2000 Hz with  
PSD = 0.1 g<sup>2</sup>/Hz (G<sub>RMS</sub> = 14.07g).



### Test equipment

- Agilent Signal Source Analyzer E5052B (Phase noise test)
- Shaker TIRA TV5220-120
- m+p VibPilot VP-HW2 with m+p VibControl Software VC
- Power amplifier TIRA BAA 1000-E
- Vibration sensor crystal PCB-M353B03
- Test fixture for DIL14 package

### Definition of the axes



### 3 G-Sensitivity (averaged 20 Hz – 1000 Hz)

Osc-#	X-axis [1/g]	Y-axis [1/g]	Z-axis [1/g]	Gamma Γ [1/g]
1	6.43E-11	7.11E-11	1.69E-10	1.94E-10
2	6.48E-11	5.07E-11	8.22E-11	1.16E-10
3	3.63E-11	4.62E-11	2.58E-10	2.65E-10
4	5.31E-11	7.89E-11	7.68E-11	1.22E-10

