RFPO45

The RFPO45 is a small form factor and the first ASIC-based OCXO product family, utilising Rakon's patented Mercury™ ASIC technology. This Stratum 3 compliant oscillator delivers temperature stability as low as ±10 ppb (over -20 to 70°C) and is capable of short term ageing typically less than ±2 ppb/day.

With a highly integrated oven included, the RFPO45 ensures short warm-up times and consumes very low power – only 350 mW at room temperature. The ASIC architecture delivers a 1000x reliability improvement compared to traditional discrete OCXOs.

Features

- Small form factor
- Frequency stability over temperature as low as ±10 ppb over -20 to 70°C
- Low power consumption
- High reliability

Applications

- Stratum 3
- Small Cells
- Switches and Routers
- Time & Frequency References
- SyncE and IEEE 1588

9.7 x 7.5 x 4.1 mm

Pb FREE

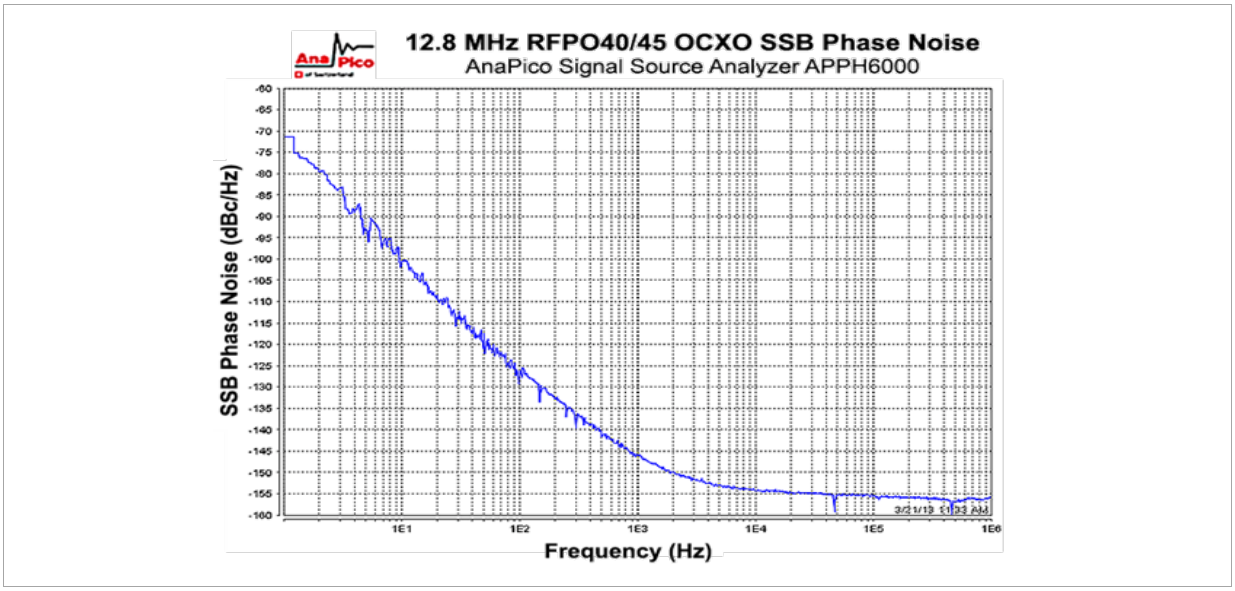
RoHS COMPLIANT

Standard Specifications

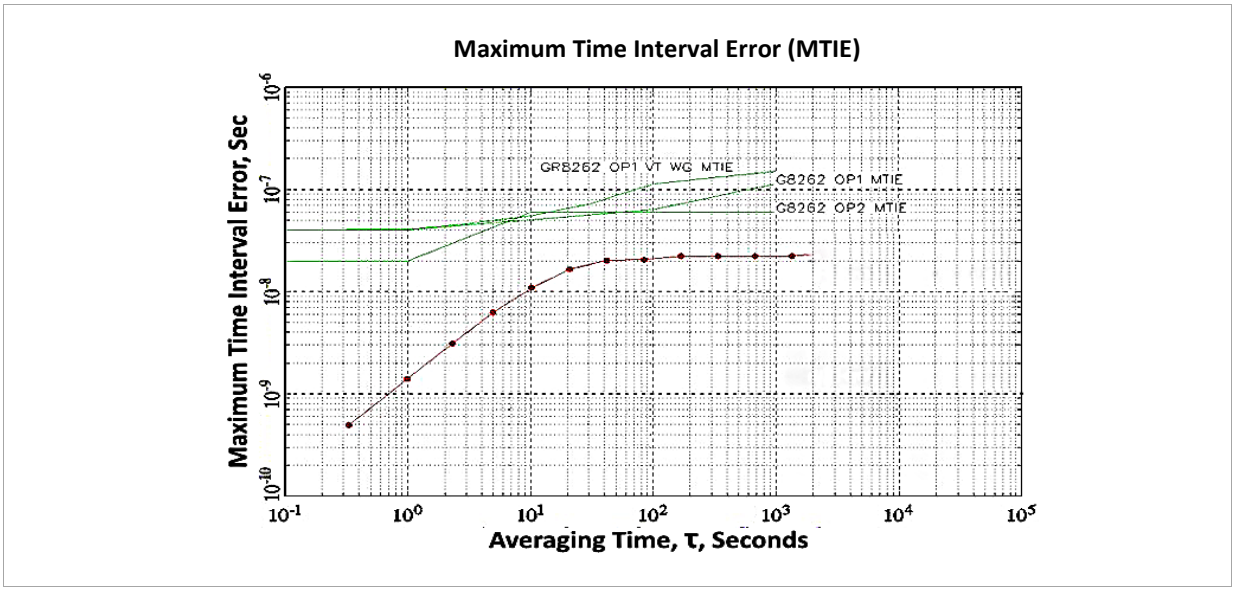
Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Nominal frequency		5 – 26		MHz	Standard frequencies: 10, 12.8, 19.2, 19.44, 20, 24.576, 25, 26MHz
Frequency calibration			±0.5	ppm	Initial accuracy at 25°C ±2°C
Reflow shift			±1	ppm	Pre to post reflow ΔF (measured ≥ 60 minutes after reflow)
Frequency stability over temperature in still air			±10 – ±50	ppb	Reference to (FMAX + FMIN)/2
Frequency slope ΔF/ΔT in still air			±0.5 – ±2	ppb/°C	Temperature ramp ≤ 1°C/minute
Operating temperature range	-40		85	°C	
Supply voltage stability		±10		ppb	±5% variation, frequency ≤ 26MHz
Load sensitivity		±10		ppb	±5pF / ±10% variation, frequency ≤ 26MHz
Warm-up time		< 3		minutes	The time needed for the frequency to be within ±20ppb of the frequency after 1 hour, at 25°C. This parameter is frequency, assembly and operating history dependent
Acceleration sensitivity		< 2		ppb/*g*	Gamma vector of all 3 axes, 30 to 1500Hz
Holdover drift		< ±2.5 – 4		ppb	24 hours, temperature variation ≤ ±1°C. After 30 days of continuous operation
Free-run accuracy		±4.6		ppm	All causes, 20 years life, reference to nominal frequency
Loop bandwidth for wander generation compliance	3			mHz	MTIE compliant with GR-1244 Fig 5-5 & G.812 Type III Fig1 (≤ 100 ns), TDEV compliant with GR-1244 Fig 5-4 & G.812 Type III Fig2 (≤ 10 ns), oscillator stabilised 24 hours at Constant temperature (±1°C, still air), data collected over 100,000 seconds at 1 second intervals (-3dB cut-off, 2nd order high pass loop filter)
Long term stability (ageing)		< ±2 ±1 ±3		ppb ppm ppm	Per day (after 30 days of continuous operation) First year 10 years
Root Allan Variance (20MHz)		7.10^{-11}			tau = 1.0s
Supply voltage (Vcc)		2.7 – 5.5		V	±5%
Input power (warm up)		1000 800		mW mW	-40 to 85°C devices -20 to 70°C devices
Input power (steady state in still air, 25°C)			400	mW	-40 to 85°C devices

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
Oscillator output – HCMOS					
Output voltage level high (V_{OH})			10% Vcc	V	
Output voltage level high (V_{OL})	90% Vcc			V	
Duty cycle	45		55	%	At 50% level
Rise and fall times			4	ns	10 to 90%
Load	0	15	30	pF	

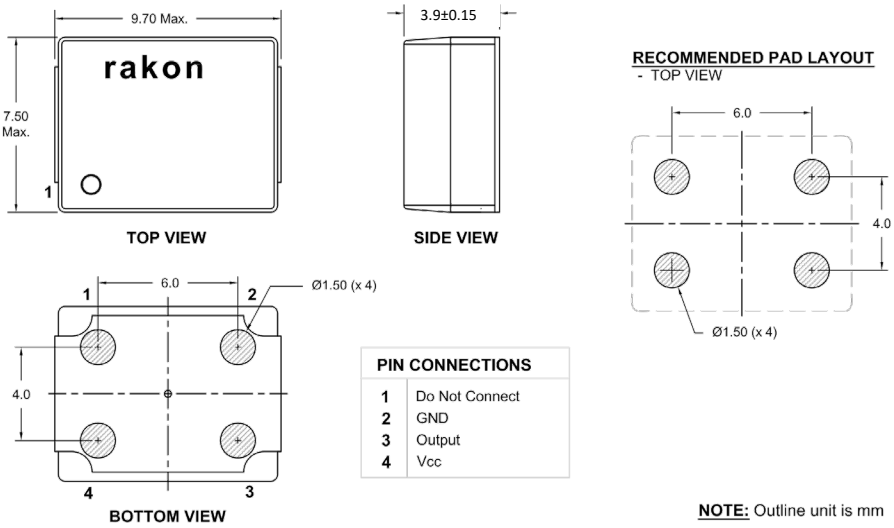
SSB Phase Noise (Typical Value at 25°C)



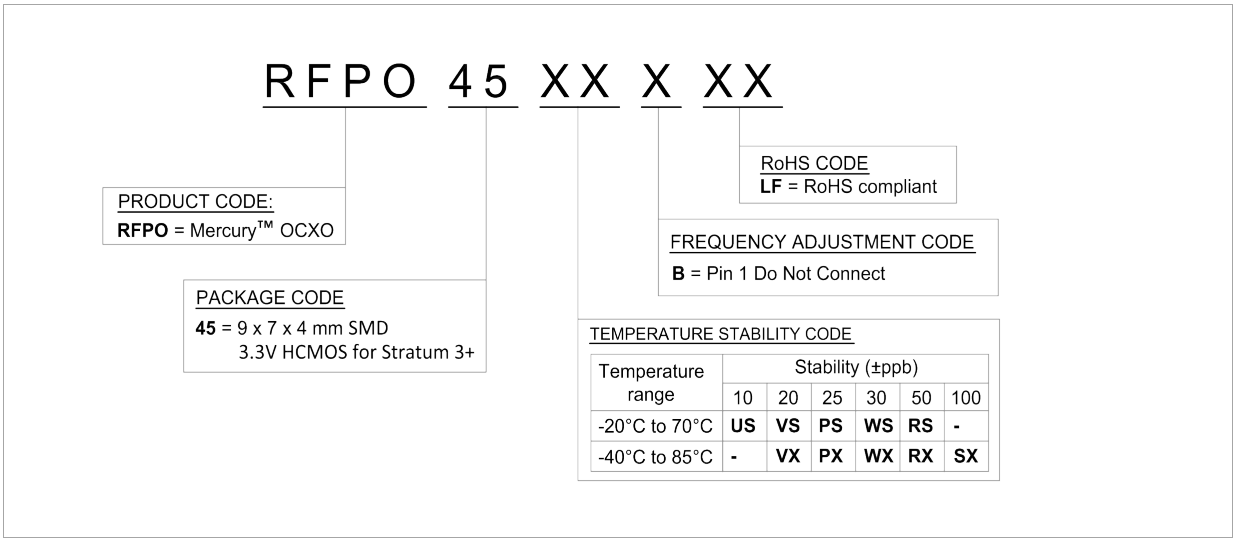
Maximum Time Interval Error (MTIE)



Model Outline and Recommended Pad Layout



Model Code Builder



Temperature range	Stability (±ppb)					
	10	20	25	30	50	100
-20°C to 70°C	**US**	**VS**	**PS**	**WS**	**RS**	**-**
-40°C to 85°C	**-**	**VX**	**PX**	**WX**	**RX**	**SX**