RFPT700 Low Acceleration Sensitivity TCXO / TCVCXO

A series of Temperature-Compensated (Voltage-Controlled) Crystal Oscillators with low acceleration (aka "*g*") sensitivity based on Rakon's proprietary ASIC "Pluto", a single chip oscillator with analogue compensation circuit and a patented crystal resonator design resulting in high stability over a wide temperature range paired with less than 0.5ppb/*g* acceleration sensitivity.

1.0 Specification References

Line	Parameter	Note
1.1	Model Description	RFPT700 Low Acceleration Sensitivity TCXO / TCVCXO
1.2	Specification Issue	D - 16th September 2010
1.3	Status	PROVISIONAL
1.4	Company	Rakon UK Limited

2.0 Frequency Characteristic

Line	Parameter	Note	Value	Units
2.1	Nominal Frequency	Standard frequency 20.0 MHz. Please contact the sales office to discuss the availability of other frequencies	10.0 to 30.0	MHz
2.2	Initial Calibration Tolerance	at 25°C, reference to nominal frequency	max ±1.0	ppm
2.3	Frequency Stability over Operating Temperature Range, note 1	frequency stability reference to $(F_{MAX}+F_{MIN})/2$ - Temperature range: -20°C to 70°C - Temperature range: -40°C to 85°C - Temperature range: -55°C to 105°C, note 2	 ±2.0 to ±0.2 ±2.0 to ±0.3 ±5.0 to ±1.0	ppm
2.4	Slope	temperature ramp 1°C/minute	±200 to ±20	ppb/°C
2.5	Supply voltage	±5% variation - HCMOS - Clipped Sinewave	 typ < ±0.2 typ < ±0.1	ppm
2.6	Load coefficient	- HCMOS, ±5pF variation - Clipped Sinewave, ±10% variation	typ < ±0.2 typ < ±0.1	ppm
2.7	Frequency aging (long-term stability)	in first year, frequency ≤ 26MHz in first year, frequency > 26MHz 10 years, frequency ≤ 26MHz 10 years, frequency > 26MHz	max ±1 max ±2 max ±3 max ±5	ppm
2.8	Acceleration Sensitivity	Gamma Vector over operating temperature range	max 0.5 typ 0.2	ppb/*g*

3.0 Power Supply

Line	Parameter	Note	Value	Units
3.1	Operating Supply Voltage Range, Vs	Standard supply voltages: 3.3 and 5.0V (±5%), other values available upon request.	2.5 to 6.0	V
3.2	Supply Current	HCMOS: typically ≈ 1+Frequency(MHz)*Supply(V)*{Load(pF)+15}*10^{-3} Clipped Sinewave: Typically ≈ 1+Frequency(MHz)*1.2*{Load(pF)+30}*10^{-3}		mA

4.0 Oscillator Output HCMOS (optional) – note 3

Line	Parameter	Note	Value	Units
4.1	Output Waveform	HCMOS		
4.2	High-level output voltage	V_{OH}	min 90%	V_S
4.3	Low-level output voltage	V_{OL}	max 10%	V_S
4.4	Output Load		15	pF
4.5	Rise and Fall Time	t_R, t_F	max 8	ns
4.6	Duty Cycle		45 to 55	%

5.0 Oscillator Output Clipped Sinewave (optional) – note 3

Line	Parameter	Note	Value	Units
5.1	Output Waveform	Clipped Sinewave, DC-coupled		
5.2	Output level		min 0.8	Vpp
5.3	Output Load Resistor		10	kΩ
5.4	Output Load Capacitor		10	pF

6.0 Frequency Adjustment (optional)

Line	Parameter	Note	Value	Units
6.1	Control Voltage Range	V_C	1.5± 1.0	V
6.2	Frequency Adjustment Range	frequency ≤ 26MHz frequency > 26MHz	min ±5 min ±7	ppm
6.3	Linearity		max 0.5	%
6.4	Slope		positive	
6.5	Input Resistance		min 100k	Ω
6.6	Modulation Bandwidth		min 2	kHz

7.0 SSB Phase Noise (20MHz, Clipped Sinewave)

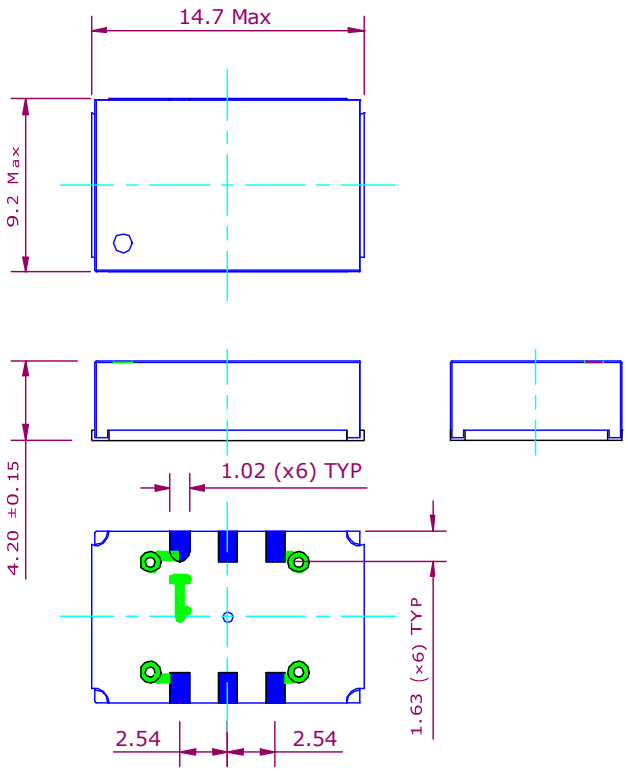
Line	Parameter	Note	Value	Units
7.1	SSB PSD	at 1Hz frequency offset from carrier	typ -63	dBc/Hz
7.2	SSB PSD	at 10Hz frequency offset from carrier	typ -93	dBc/Hz
7.3	SSB PSD	at 100Hz frequency offset from carrier	typ -104	dBc/Hz
7.4	SSB PSD	at 1kHz frequency offset from carrier	typ -128	dBc/Hz
7.5	SSB PSD	at 10kHz frequency offset from carrier	typ -136	dBc/Hz
7.6	SSB PSD	at 100kHz frequency offset from carrier	typ -140	dBc/Hz
7.7	SSB PSD	At 1MHz frequency offset from carrier	typ -143	dBc/Hz

8.0 Environmental Specification

Line	Parameter	Note	Value	Units
8.1	Storage Temperature		-55 to 125	°C
8.2	Acceleration Steady State	IEC 60068-2-7 test Ga, 5000*g*, 10s (at peak acceleration), Y-axis only		
8.3	Vibration	IEC 60068-2-6, test Fc: 10-60Hz 0.75mm displacement, 60-500Hz 200m/s^2 (20*gn*) acceleration, 1.5 hours in each of three mutually perpendicular axes at 1 octave per minute.		
8.4	Mechanical Shock	IEC 60068-2-27, test Ea; 1000 m/s^2 (100*gn*) acceleration for 6ms, half sine pulse, 3 shocks in each direction along three mutually perpendicular axes (18 shocks total)		
8.5	RoHS	Parts are fully compliant with the European Union directive 2002/95/EC on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Note parts are suitable for assembly using both Lead-free solders and Tin/Lead solders. Non-RoHS version available on request.		
8.6	Marking	Laser Marked		

9.0 Pad Functions and Package Dimensions (in mm)

Pad	Function	Comment
1	Control Voltage, V_C OR Do not connect	Frequency Adjustment Option (Voltage Control) Fixed Frequency Option
2	Not Connected	
3	GND	
4	Output	
5	Not Connected	
6	Supply Voltage, V_S	It is recommended to decouple the supply voltage with a 0.1 to 1.0 µF capacitor close to the oscillator.



Construction: FR4 base, plastic lid & hermetically sealed crystal

10.0 Marking

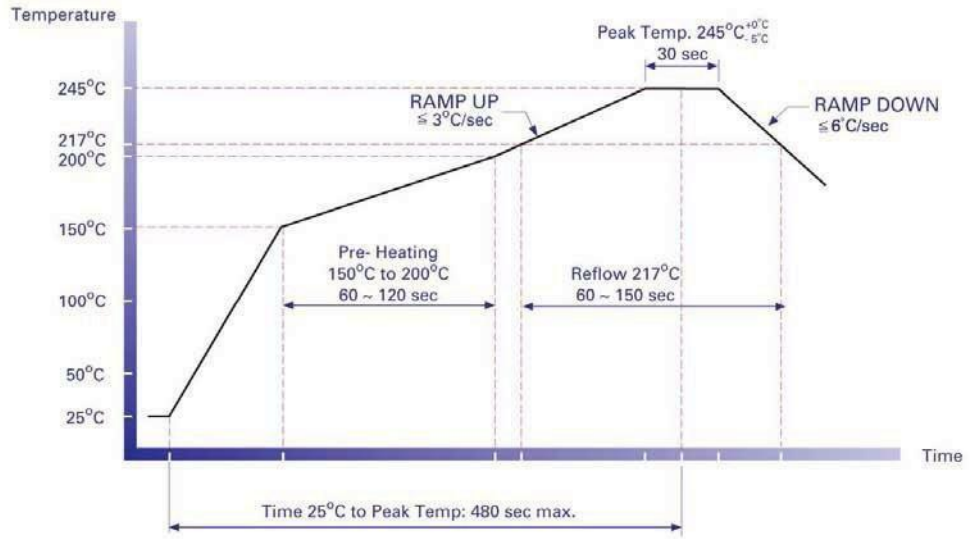
includes
RAKON
Part Number (Exxxx)
Frequency (MHz)
Pad 1 / Static sensitivity identifier (indent)
Device date / location code (YYWWL)

11.0 Packaging

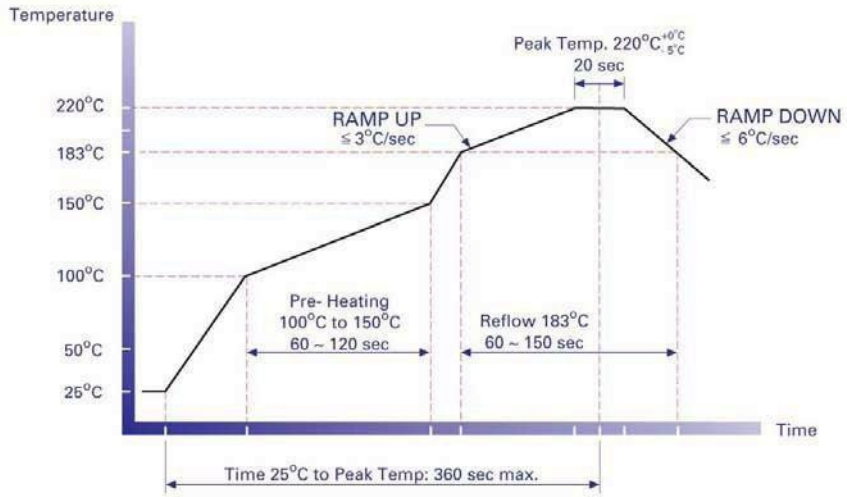
Parts are supplied on Tape & Reel (nominal quantity 500 pcs)

12.0 Reflow Soldering

Pb-Free Reflow Soldering Profile *

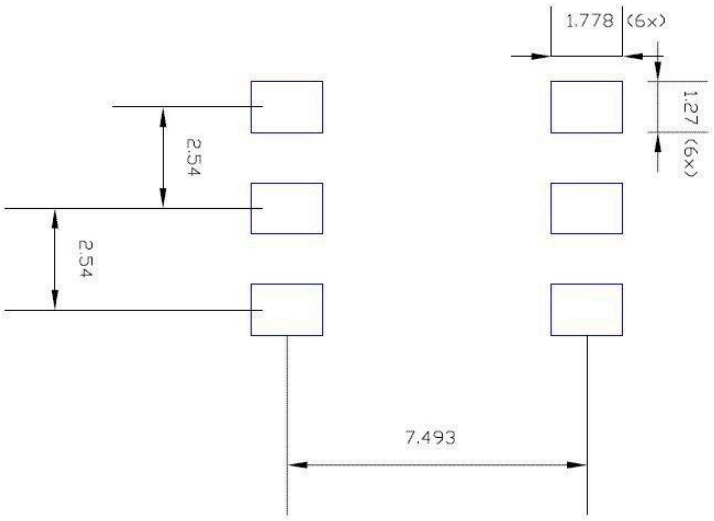


Sn-Pb Eutectic Reflow Soldering Profile *



*These profiles were used during the qualification testing of the product and therefore represent worst case conditions. They are not recommended for use by the customer in the actual assembly of these parts.

13.0 Solder Pad Layout



14.0 Notes

Note	
1	Stability / temperature range options other than listed here may be available upon request.
2	Availability of temperature range -55 to 105°C depends on nominal frequency – please check with our sales office.
3	ACMOS / pure sine wave output available upon request.

15.0 Disclaimer

"Samples supplied according to this specification are supplied from our development or pre-production programme and as such are not qualification approved products. No condition, warranty or representation regarding quality, suitability, performance, life or continuation of supply is given or implied and Guarantee in clause 6.1 of our standard Conditions of Sale is not applicable. The right is reserved to change the design or specification or cease supply without notice." RAKON UK Limited