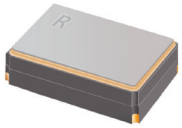
RFPT400

Low cost SMD Temperature Compensated Crystal Oscillator for indoor wireless infrasture applications e.g femtocells

The RFPT400 is a high stability SMD TCVCXO designed and specified specifically to meet the short-term stability requirements for indoor wireless infra-structure products, e.g femtocells.



Product description

The RFPT400 is a high stability SMD TCVCXO designed and specified specifically to meet the short-term stability requirements for indoor wireless infra-structure products at a fraction of the cost of oven-stabilised oscillators. Using Rakon's advanced fourth-order analogue frequency compensation system 'Pluto™', the TCVCXO achieves unrivalled control of frequency variation with respect to temperature over the critical indoor temperature range. The stability of the RFPT400 allows a local area Base Station (BS) to achieve the frequency accuracy requirements of ETSI TS 125 104 without the need for minute-by-minute monitoring and adjustment. The BS's reliance on external sources of frequency compensation is reduced to an approximately once-per-week rate with a corresponding significant reduction in network load and infrastructure cost.

Applications

- Femtocell
- Base stations

Features

- 0°C~70°C, stability≤±100pb

Specifications

1.0 SPECIFICATION REFERENCES

Line	Parameter	Description
1.1	Model description	RFPT400
1.2	RoHS compliant	Yes. Part numbers with suffix'LF'
1.3	Package size available	5.0mm x 3.2mm

2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Value	Unit
2.1	Frequency range	Frequency range available	10 to 30	MHz
2.2	Frequency calibration	Frequency offset at 25°C, sixty minutes after reflow	±2 max	ppm
2.3	Frequency stability over temperature	Over 0°C ~ 70°C (dF/dT ≤ 1°C/min) at fixed supply voltage and load	±0.08 to 0.25	ppm
2.4	Temperature range	Operating temperature range over which temperature stability is measured	0 to 70	°C
2.5	Supply voltage stability	±2% variation in supply voltage at 25°C	±10 max	ppb
2.6	Load sensitivity	±2% variation in magnitude from 10kΩ//10pF	±5 max	ppb
2.7	Long term stability	Ageing rate following reflow after day 1. (Typical)	±10 max	ppb/day
2.8	Long term stability	Ageing rate following reflow after day 7. (Typical)	±3 max	ppb/day
2.9	Long term stability	Ageing rate following reflow after day 30. (Typical)	±1 max	ppb/day
2.10	Long term stability	Long term stability after 1 year	±1000 max	ppb
2.11	Long term stability	Long term stability after 5 years	±1500 max	ppb

3.0 POWER SUPPLY

Line	Parameter	Test Condition	Value	Unit
3.1	Supply voltage	Typical:	3.3	V
3.2	Current	load 10kΩ//10pF	3 max	mA

4.0 CONTROL VOLTAGE

Line	Parameter	Test Condition	Value	Unit
4.1	Control voltage range	Customisable on request. Typical:	0.5 to 2.5	V
4.2	Frequency tuning		±4.5 to 10	ppm
4.3	Port input impedance		100	kΩ
4.4	Slope	Positive		
4.5	Linearity	In accordance with MIL-PRF-55310	0.2 max	%
4.6	Linearity	In accordance with MIL-PRF-55310. Typically 0.05%		%

5.0 OSCILLATOR OUTPUT-CLIPPED SINEWAVE

Line	Parameter	Test Condition	Value	Unit
5.1	Output waveform	Clipped sinewave, DC coupled		
5.2	Output voltage level		0.8 to 2	Vpp
5.3	Output load resistance		10	kΩ
5.4	Output load capacitance		10	pF

6.0 PHASE NOISE

Line	Parameter	Test Condition	Value	Unit
6.1	SSB phase noise power density at 1Hz offset	Typical values for a 19.2MHz oscillator at 25°C	-64	dBc/Hz
6.2	SSB phase noise power density at 10Hz offset	Typical values for a 19.2MHz oscillator at 25°C	-101	dBc/Hz
6.3	SSB phase noise power density at 100Hz offset	Typical values for a 19.2MHz oscillator at 25°C	-120	dBc/Hz
6.4	SSB phase noise power density at 1kHz offset	Typical values for a 19.2MHz oscillator at 25°C	-134	dBc/Hz
6.5	SSB phase noise power density at 10kHz offset	Typical values for a 19.2MHz oscillator at 25°C	-143	dBc/Hz
6.6	SSB phase noise power density at 100kHz offset	Typical values for a 19.2MHz oscillator at 25°C	-143	dBc/Hz

7.0 JITTER

Line	Parameter	Test Condition	Value	Unit
7.1	Jitter	Frequency offset from carrier 10Hz to 1MHz	1.7 max	ps

8.0 ENVIRONMENTAL

Line	Parameter	Description
8.1	Vibration	IEC 60068-2-6, test Fc. 10-60Hz 1.5 mm displacement, 60-2000Hz at 20gn, 4 hours in each of three mutually perpendicular axes at 1 octave per minute
8.2	Shock	IEC 60068-2-27, test Ea.: 1500gn acceleration for 0.5ms duration, half-sine pulse, 3 shocks in each direction along three mutually perpendicular axes
8.3	Soldering	SMD product suitable for reflow soldering. Peak temperature 260°C. Maximum time above 220 °C, 60s
8.4	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 these RoHS compliant parts are suitable for assembly using both lead-free solders and tin/lead solders
8.5	Storage temperature range	-55°C to 125°C
8.6	Humidity	85% for 48 hours at 85°C, non-condensing

9.0 PIN CONNECTIONS

Line	Parameter	Description
9.1	Pin 1	Control voltage, Vc
9.2	Pin 2	Ground
9.3	Pin 3	Output
9.4	Pin 4	Supply voltage, Vs
9.5	NOTE	For correct operation a 10nF supply de-coupling capacitor should be placed next to the device, see recommended PCB pattern. If an AC coupled output is required a 10nF should be placed in series with output pad 3

10.0 MARKING

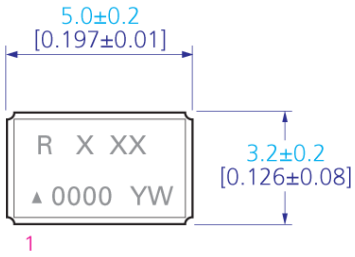
Line	Parameter	Description
10.1	Type	Laser marked
10.2	Line 1	R and manufacturing identifier (X XX) (see model drawing diagram)
10.3	Line 2	Pad 1/static sensitivity identifier (∆), abbreviated part number (0000), device date code (YW) (see model drawing diagram)

11.0 MANUFACTURING INFORMATION

Line	Parameter	Description
11.1	Reflow	Solder reflow processes as per profile attached (see reflow profile diagram). Solderability: MIL-STD-202, method 208, category 3
11.2	Packaging description	Part numbers with suffix 'T' will be supplied on tape and reel

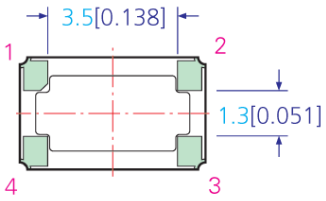
Drawing Name: RFPT400 Model Drawing

MODEL DRAWING



TOP VIEW

SIDE VIEW

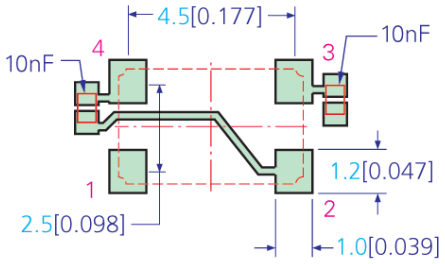


BOTTOM VIEW

NOTE:

1) Pin connections are detailed in the specification.
2) For correct operation a 10nF supply de-coupling capacitor should be placed next to the device, as shown above. If an AC coupled output is required a 10nF should be placed in series with output pad 3.

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: RFPT400 MODEL OUTLINE DRAWING

FILENAME: RFPT400_MD

RELATED DRAWINGS:

REVISION: A

DATE: 22-Jul-10

SCALE: 5 : 1

Millimeters [inch]

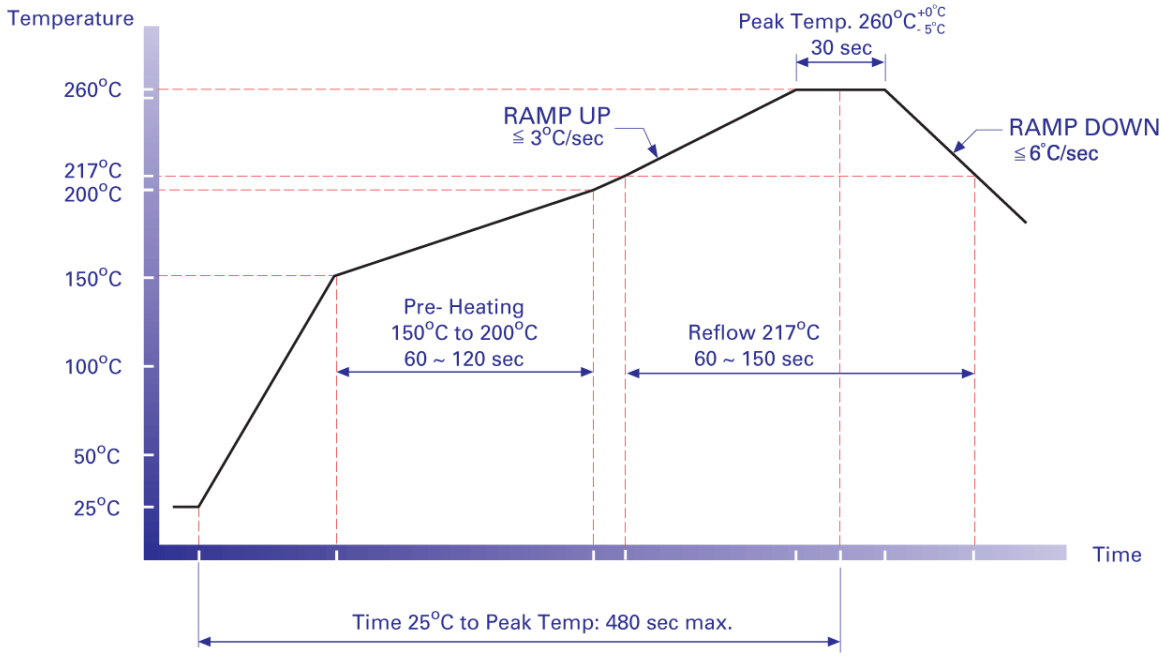
Tolerance:

XX	=±0.5
X.X	=±0.2
X.XX	=±0.10
X.XXX	=±0.05
X°	=±1.0°
Hole	=±0.10

rakon

Drawing Name: RFPT400 Series Reflow Profile

Pb-Free Reflow Soldering Profile *



* NOTE:
This profile was used during the qualification testing of the product and therefore represents worst case conditions. It is not recommended for use by the customer in the actual assembly of these parts.

TITLE: RFPT400 SERIES REFLOW PROFILE		
FILENAME: RFPT400_RF	REVISION:	B
RELATED DRAWINGS:	DATE:	09-Sep-10
	SCALE:	NTS
	Millimeters [inch]	

Tolerance:
XX =±0.5
X.X =±0.2
X.XX =±0.10
X.XXX =±0.05
X° =±1.0°
Hole =±0.10