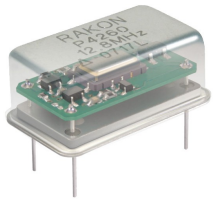
RFPO20

A family of leaded TC-OCXOs (Triton)



The world's first TC-OCXO (Temperature Compensated, Oven Controlled Crystal Oscillator), designed to deliver the high stability of an OCXO from a device with low power consumption, small size and light weight.

Product description

A high stability crystal oscillator, using a combination of a miniature oven and temperature compensation capable of sub 50ppb frequency stability. Rakon's proprietary ASIC 'Pluto™', a single chip oscillator with analogue compensation circuit is used to compensate the residual frequency error. The combination of these two functions result in an oscillator with the best stability / power consumption ratio and fast warm-up.

Applications

- Communications
- Other

Features

- Frequency stability over temperature as low as ±25ppb

Specifications

1.0 SPECIFICATION REFERENCES

Line	Parameter	Description
1.1	Model description	RFPO20
1.2	RoHS compliant	Yes (part numbers with suffix 'LF') non-RoHS available upon request.
1.3	Package size available	20.7 x 13.08 x 8.65 mm, industry standard, DIL 14/4 leaded package

2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Value	Unit
2.1	Frequency range	Frequency range available (note 1)	1.25 to 30	MHz
2.2	Frequency calibration	Initial calibration @ 25°C	±0.5 max	ppm
2.3	Frequency stability over temperature	(Fmax + Fmin)/2	±25 to 100	ppb
2.4	Temperature range	Standards options available are –20ºC to 70ºC or –40ºC to 85ºC	-40 to 85	°C
2.5	Supply voltage stability	±5% variation, reference to frequency at nominal supply voltage	±100	ppb
2.6	Load sensitivity	±5pF variation, reference to frequency at nominal load	±50	ppb
2.7	Long term stability	First year, frequency <20MHz	±1 max	ppm
2.8	Long term stability	First year, frequency ≥20MHz	±2 max	ppm
2.9	Long term stability	10 years, frequency <20MHz	±3 max	ppm
2.10	Long term stability	10 years, frequency ≥20MHz	±5 max	ppm
2.11	Warm-up time	Note 2, typically less than...	3	minutes

3.0 POWER SUPPLY

Line	Parameter	Test Condition	Value	Unit
3.1	Supply voltage	±5%	3.3	V
3.2	Steady state power consumption	In still air @ 25°C: -20°C to 70°C devices	300 max	mW
3.3	Steady state power consumption	In still air @ 25°C: -40°C to 85°C devices	380 max	mW
3.4	Power consumption	Warm-up: -20°C to 70°C devices	1 max	W
3.5	Power consumption	Warm-up: -40°C to 85°C devices	1.3 max	W

4.0 CONTROL VOLTAGE

Line	Parameter	Test Condition	Value	Unit
4.1	Control voltage range	Optional, for devices specified wih frequency adjustment, external voltage applied to pin 1	0.5 to 2.5	V
4.2	Frequency tuning	Frequency < 20MHz: ±5ppm, frequency ≥ 20MHz: ±7ppm	±5 min	ppm
4.3	Port input impedance		100 min	kΩ
4.4	Linearity		0.5 max	%
4.5	Slope	Positive		
4.6	Modulation bandwidth		2 min	khz

5.0 OSCILLATOR OUTPUT- HCMOS

Line	Parameter	Test Condition	Value	Unit
5.1	Output waveform	HCMOS, 15pF load		
5.2	Output voltage level low		0.1 max	Vs
5.3	Output voltage level high		0.9 min	Vs
5.4	Rise and fall times		8 max	ns
5.5	Duty cycle		45 to 55	%
5.6	Ouput load capacitance	Nominal	15	pF

6.0 PHASE NOISE

Line	Parameter	Test Condition	Value	Unit
6.1	SSB phase noise power density at 1Hz offset	Typical value for a 12.8MHz oscillator at 25°C	-69	dBc/Hz
6.2	SSB phase noise power density at 10Hz offset	Typical value for a 12.8MHz oscillator at 25°C	-98	dBc/Hz
6.3	SSB phase noise power density at 100Hz offset	Typical value for a 12.8MHz oscillator at 25°C	-120	dBc/Hz
6.4	SSB phase noise power density at 1kHz offset	Typical value for a 12.8MHz oscillator at 25°C	-132	dBc/Hz
6.5	SSB phase noise power density at 10kHz offset	Typical value for a 12.8MHz oscillator at 25°C	-140	dBc/Hz
6.6	SSB phase noise power density at 100kHz offset	Typical value for a 12.8MHz oscillator at 25°C	-143	dBc/Hz
6.7	SSB phase noise power density at 1MHz offset	Typical value for a 12.8MHz oscillator at 25°C	-145	dBc/Hz

7.0 JITTER

Line	Parameter	Test Condition	Value	Unit
7.1	RMS jitter	At 12.8MHz, 10Hz to 1MHz offset, typical...	1.3	ps

8.0 PIN CONNECTIONS

Line	Parameter	Description
8.1	Pin 1	Frequency Adjust (note 3)
8.2	Pin 7	GND
8.3	Pin 8	Output
8.4	Pin 14	Supply Voltage, Vs

9.0 ENVIRONMENTAL

Line	Parameter	Description
9.1	Shock	IEC 60068-2-27, test Ea; 1000m/s² (100gn) acceleration for 6ms, half sine pulse, 3 shocks in each direction along three mutually perpendicular axes (18 shocks total)
9.2	Vibration	IEC 60068-2-6, test Fc: 10-60Hz 0.75mm displacement, 60-2000Hz 100m/s² (10gn) acceleration, 4 hours in each of three mutually perpendicular axes at 1 octave per minute
9.3	Storage temperature	-55°C to 125°C

10.0 MARKING

Line	Parameter	Description
10.1	Type	Laser marked
10.2	Text	Includes: Rakon, part number (Pxxxx), frequency MHz, pin 1 / static sensitivity identifier (∆), device date / location code (YYWWL)

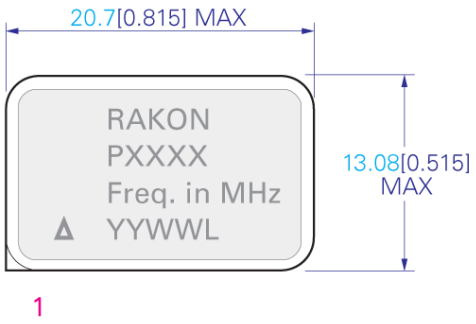
11.0 MANUFACTURING INFORMATION

Line	Parameter	Description
11.1	Reflow shift	Part cannot be reflow soldered
11.2	Packaging description	Parts are supplied in boxes

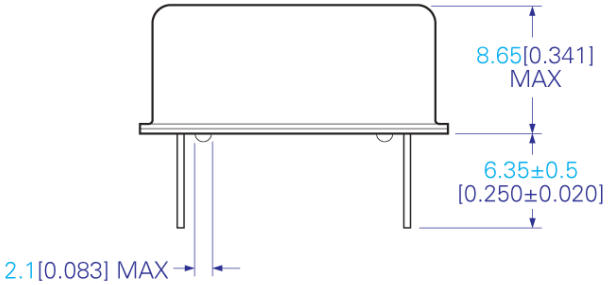
12.0 NOTES

Line	Parameter	Description
12.1	1	Frequency range available dependent on output type. Standard frequencies available: 10, 12.8 16.384, 19.2, 20, and 26MHz. Please contact the sales office to discuss the availability of other frequencies
12.2	2	Warm-up time = time for frequency to be within 20ppb of final frequency (frequency after 1 hour) at 25°C
12.3	3	The ground of the control voltage needs to be connected directly to pin 7 as ground lead impedance may cause performance degradation

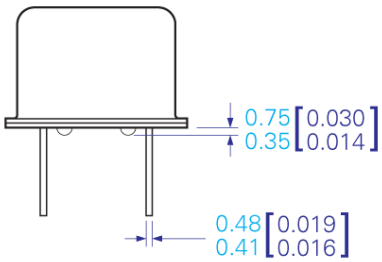
Drawing Name: RFPO20 Model Drawing



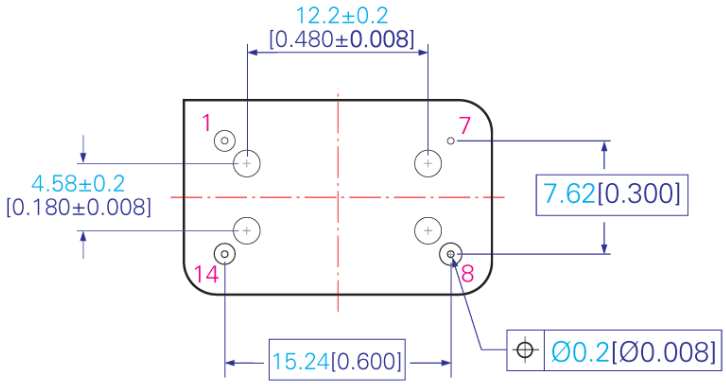
TOP VIEW



SIDE VIEW



END VIEW



BOTTOM VIEW

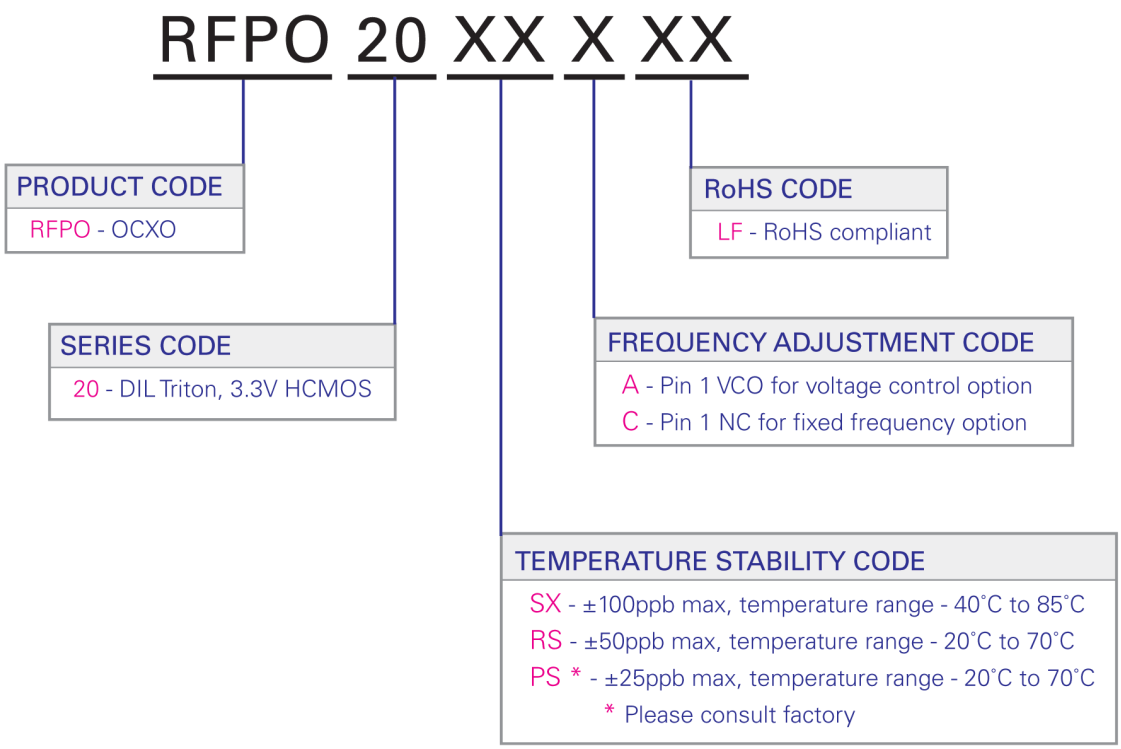
NOTE: Pin connections are detailed in the specification

TITLE: RFPO20 MODEL OUTLINE DRAWING		
FILENAME: RFPO20_MD	REVISION:	A
RELATED DRAWINGS:	DATE:	20-Jul-10
	SCALE:	2 : 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

Drawing Name: RFPO20_MC

MODEL CODE BUILDER:



EXAMPLE:

TITLE: RFPO20 MODEL CODE BUILDER

FILENAME: RFPO20_MC

RELATED DRAWINGS:

REVISION: A

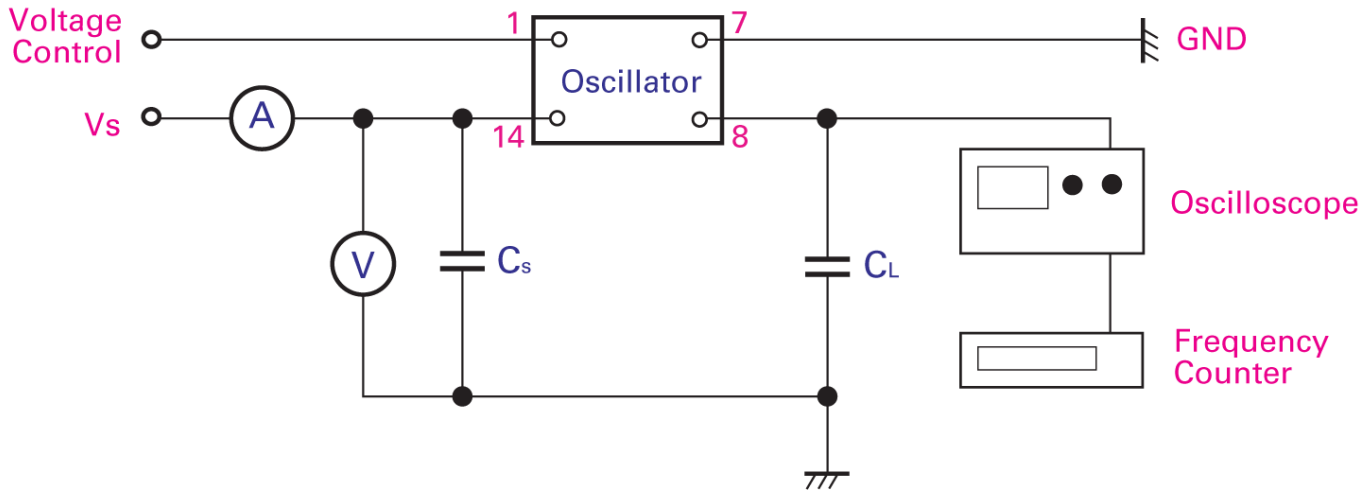
DATE: 04-Mar-11

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

Drawing Name: RFPO20 Test Circuit



C_L = Load 15pF inclusive of probe and jig capacitance.
C_S = 100nF

The GND of the control voltage needs to be connected directly to pin 7 as ground lead impedance may cause performance degredation.

TITLE: RFPO20 SERIES TEST CIRCUIT		Tolerance:
FILENAME: RFPO20_TC	REVISION: A	XX =±0.5
RELATED DRAWINGS:	DATE: 21-Jul-10	X.X =±0.2
	SCALE: NTS	X.XX =±0.10
	Millimeters [inch]	X.XXX =±0.05
		X° =±1.0°
		Hole =±0.10