

U7772LF

1.0 Specification References

Parameter	Description
a. Rakon part number	U7772LF
b. Description	ROM9070PA 10.0MHz MERC+ 9x7 HOT CMOS 3.3V PULL
c. Version	B (2018-07-24) - PROVISIONAL
d. Package	L x W x H: 9.7 x 7.5 x 3.9 mm nom.



2.0 Absolute Maximum Ratings ¹

Parameter	Min.	Max.	Unit.
a. Storage temperature	-55	125	°C
b. Supply voltage (Vcc)	-0.5	6	V
c. Control voltage (Vc)	-0.5	Vcc + 0.5	V
d. Power dissipation		2	W
e. Load		50	pF

3.0 Frequency Characteristics ²

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency (Fn)		10.0		MHz	
b. Frequency calibration			±0.5	ppm	At 25°C ± 2°C, Vc=1.25V, at time of shipment, reference to nominal frequency
c. Reflow shift			±0.4	ppm	After 1 hour recovery at 25°C
d. Operating temperature range	-40		+85	°C	
e. Frequency stability over temperature in still air			±20	ppb	Reference to (FMAX + FMIN)/2
f. Frequency slope ΔF/ΔT in still air			±2	ppb/°C	Temperature ramp ≤ 1°C/minute
g. Supply voltage stability		±5		ppb	±2% variation, reference to frequency at 3.3V
h. Load sensitivity		±5		ppb	±10% variation, reference to frequency at 15pF
i. Warm-up time ³		< 3		minutes	
j. Acceleration sensitivity			1	ppb/g	Gamma vector 3-axes, 30-1500Hz
k. Long term stability (aging) ⁴			±2 ±0.5 ±1	ppb ppm	Per day First year 10 years

¹ Operating beyond this limit may result in change or permanent damage to the device.

² The characteristics of the component may be temporarily affected by the processes of assembly and soldering. The frequency specifications apply after 48 hours of continuous operation. Nominal conditions (T=25°C, Vcc=2.85V, Cload=15pF) apply unless otherwise stated.

³ Time needed for frequency to be within ±20 ppb reference to frequency after 1 hour, at 25°C. Parameter is frequency, assembly and operating history dependent.

⁴ After 30 days of continuous operation

4.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (Vcc)	3.135	3.3	3.465	V	
b. Input power (Warm up)		1600	1750	mW	At Vcc = 3.3V
c. Input power (Steady state in still air at 25°C)		400	440	mW	At Vcc = 3.3V

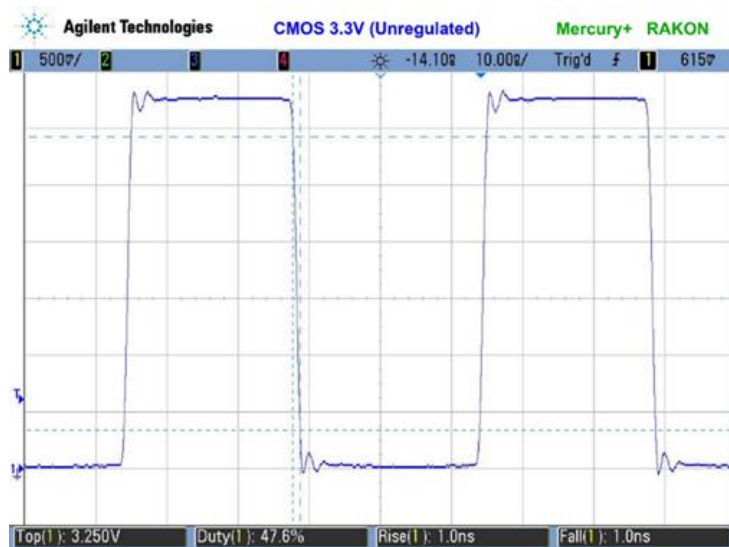
5.0 Control Voltage (Vc)

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Control voltage (Vc) ⁵	0.25	1.25	2.25	V	
b. Frequency tuning	±1.9		±3.3	ppm	Reference to frequency at Vc=1.25V
c. Slope		+2.5		ppm/V	
d. Linearity			1	%	Deviation from linear over control voltage range in accordance with MIL-PRF-55310
e. Port input impedance	80			kΩ	
f. Modulation bandwidth		3.5		Hz	

6.0 Output Waveform – CMOS

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output voltage level low (V _{OL})			10% Vcc	V	
b. Output voltage level high (V _{OH})	90% Vcc			V	
c. Rise and fall time			2	ns	10% to 90% level
d. Duty cycle	45		55	%	At 50% level
e. Load		15		pF	Nominal

f. Waveform screenshot
(Example at 20MHz)



⁵ The GND of the control voltage needs to be connected directly to pin 2 as ground lead impedance may cause performance degradation

7.0 SSB Phase Noise & Jitter (at 25°C)

Parameter	Typ.	Unit.	Test Condition / Description
a. 1Hz offset	-85	dBc/Hz	
b. 10Hz offset	-115	dBc/Hz	
c. 100Hz offset	-138	dBc/Hz	
d. 1kHz offset	-157	dBc/Hz	
e. 10kHz offset	-158	dBc/Hz	
f. 100kHz offset	-158	dBc/Hz	
g. 1MHz offset	-160	dBc/Hz	
h. Jitter, RMS	0.5	ps	12kHz to 5MHz

8.0 Marking

Parameter	Description
a. Type	Laser marked
b. Line 1	[R FFFF YM] Rakon identifier R, Frequency FFFF (M=MHz, e.g. 10M0=10.0MHz), Year Y (A=2010, B=2011, ...), Month M (1=Jan, 2=Feb, ..., A=Oct, B=Nov, C=Dec)
c. Line 2	[• LLL] Pin 1 •, Lot code LLL

9.0 Manufacturing Information

Parameter	Description
a. Reflow soldering	IPC/JEDEC J-STD-020 (see Pb-free solder reflow profile)
b. Packaging description	Tape & Reel (see drawing)
c. Application note	For optimum performance follow the instructions in Mercury™ and Mercury+™ miniature OCXO application note

10.0 Environmental Specification

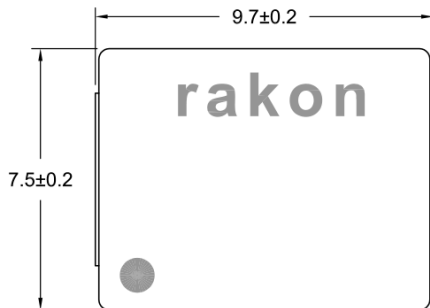
Parameter	Description
a. RoHS	Parts are fully compliant with the European Union directives 2002/95/EC and 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment. Note the RoHS compliant parts are suitable for assembly using both Lead-free solders and Tin / Lead solders
b. Acceleration steady state	IEC 60068-2-7 test Ga, 5000g, 10s (at peak acceleration), Y-axis only
c. Moisture sensitivity	IPC/JEDEC J-STD-020, Class 1
d. Temperature cycle	IEC 60068-2-14 test Na, 400 cycles, -40°C to +125°C
e. Solderability	JESD 22-B102, Method 2, precondition 150°C, 16 hours
f. Humidity	EIA/JEDEC 22-A101, 85°C/85%R.H., 1000 hours
g. Shock	IEC 60068-2-27, test Ea; 1500g, 0.5ms, 18 shocks total
h. Vibration	IEC 60068-2-6, test Fc: 20g, 60 to 2000Hz 12 hours total

11.0 Disclaimer

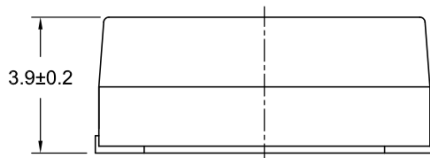
Parameter	Description
a. Disclaimer	"Samples supplied according to this specification are supplied from our development or pre-production programme and as such are not qualification approved products. No condition, warranty or representation regarding quality, suitability, performance, life or continuation 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 Limited

12.0 Model Outline:

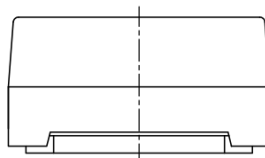
MODEL DRAWING



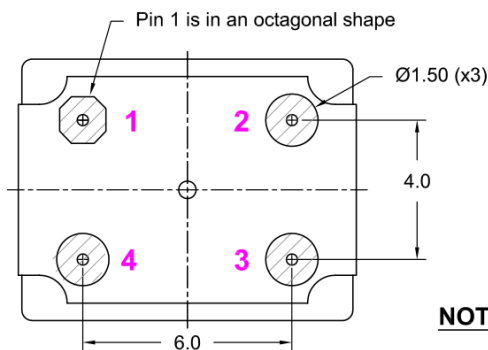
1
TOP VIEW



FRONT VIEW

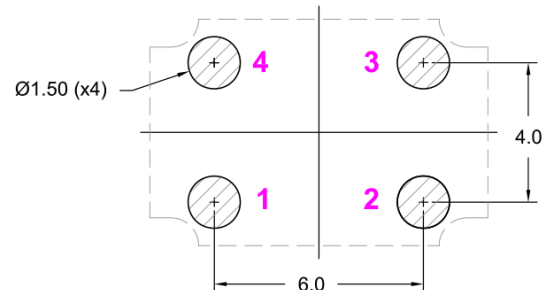


SIDE VIEW



BOTTOM VIEW

RECOMMENDED PAD LAYOUT - TOP VIEW

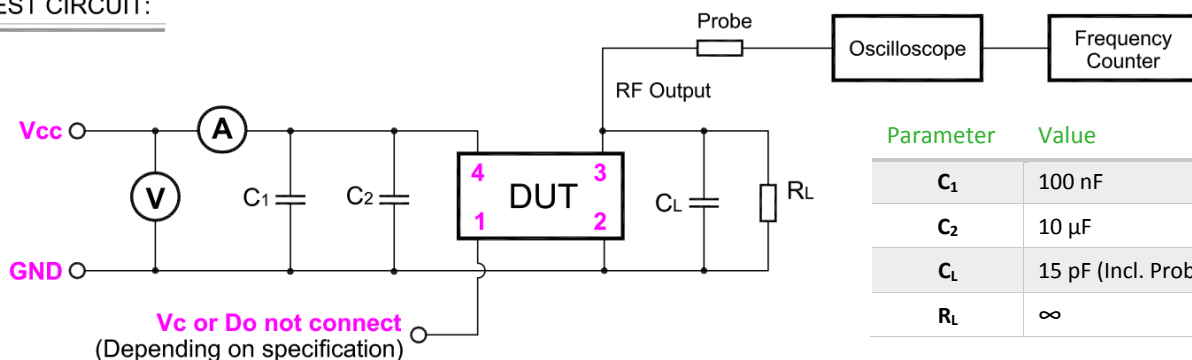


Pin Connections

1	Control Voltage (Vc)
2	GND
3	Output
4	Supply Voltage (Vcc) for correct operation decouple the supply voltage with a 10 µF capacitor close to the oscillator

- NOTE:**
- Cover: Plastic
 - Base: FR4
 - Finish: 0.05 ~ 0.13 µm Gold over 3 ~ 6 µm Nickel.

TEST CIRCUIT:



Parameter Value

C ₁	100 nF
C ₂	10 µF
C _L	15 pF (Incl. Probe)
R _L	∞

TITLE: ROM9070 Mercury+™ IC OCXO (Non-Hermetic)

FILENAME: CAT1054

TOLERANCES:

RELATED DRAWINGS:

REVISION: C

XX =

DATE: 09-Jan-2018

X.X = ±0.2

SCALE:

X.XX = ±0.10

Millimetres

X.XXX = ±0.05

X° =

Hole =

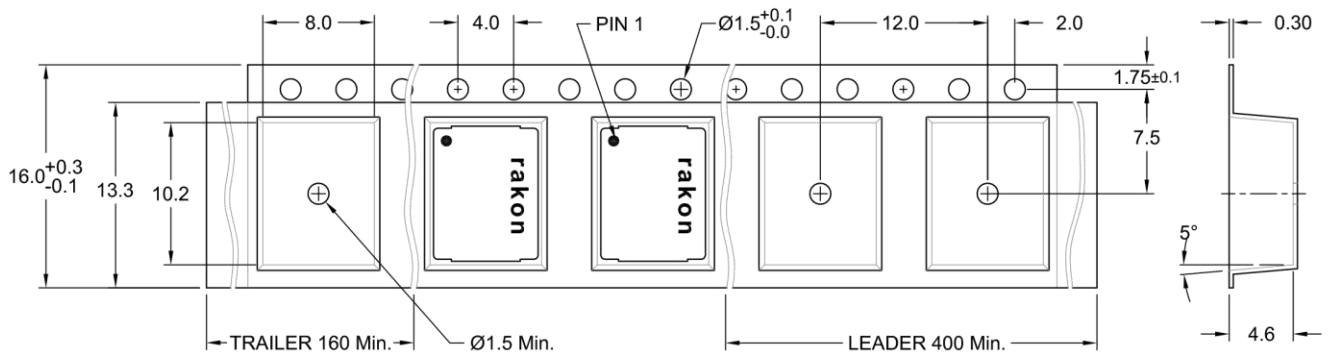
rakon

© 2018 Rakon Limited

13.0 Tape and Reel:

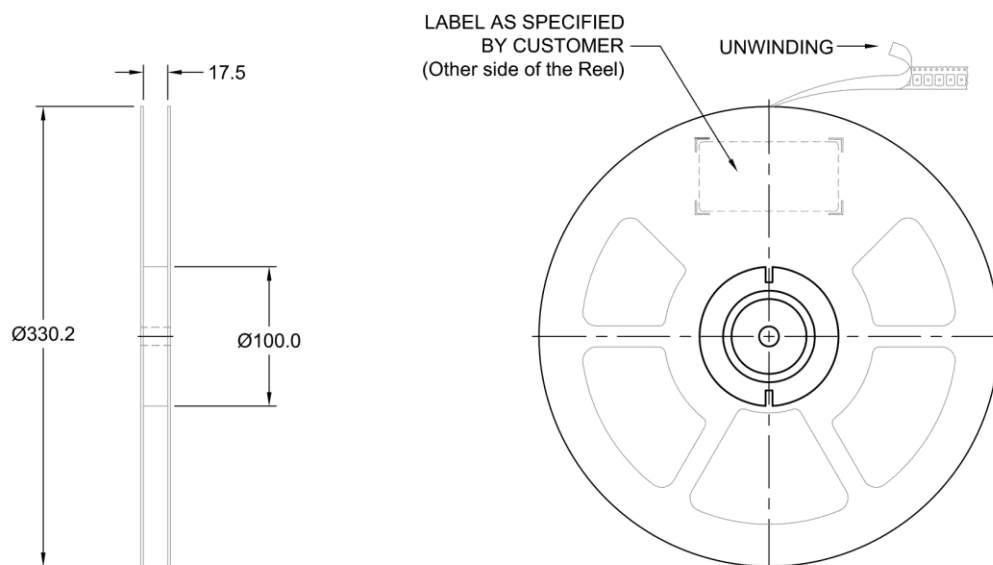
TAPE DETAILS

(Scale 2 : 1)



REEL DETAILS

(Scale 1 : 5)



TITLE: 9070 Series Oscillators Tape & Reel

RELATED DRAWINGS:

FILENAME: CAT886

REVISION: B

DATE: 01-Mar-2017

SCALE:

Millimetres

TOLERANCES:

XX =

$$X.X = \pm 0.1$$

X.XX = ± 0.05

X.XXX =

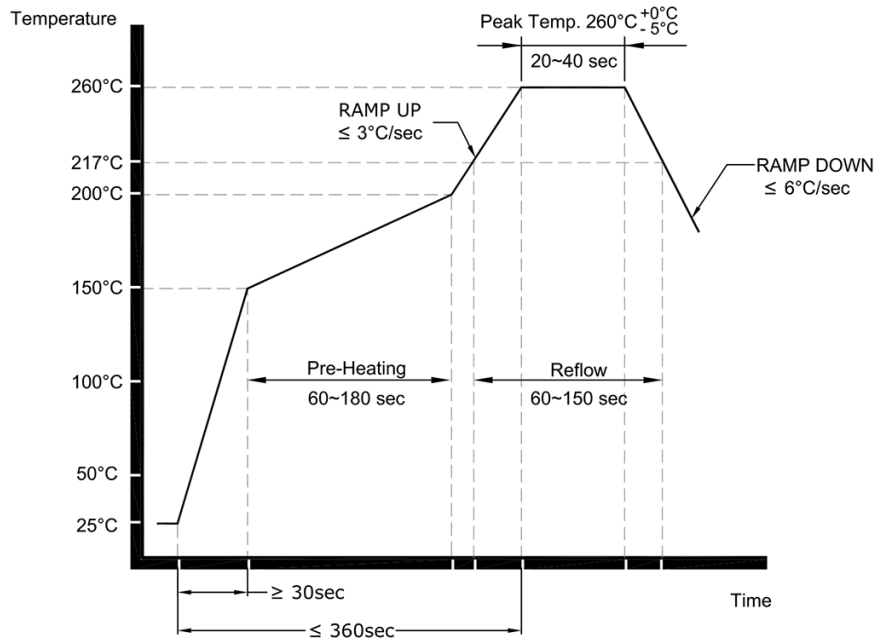
$$X^{\circ} =$$

Hole =

rakon

© 2017 Rakon Limited

14.0 Reflow:



NOTE:

The product has been tested to withstand the Reflow Profile shown. The Reflow Profile used to solder Rakon products is determined by the solder paste Manufacturer's specification. It is recommended that the Reflow Profile used does not exceed the one shown above.

TITLE: Pb-FREE SERIES OSCILLATORS REFLOW

FILENAME: CAT541

RELATED DRAWINGS:

REVISION: B

DATE: 05-Sep-11

SCALE: NTS

Millimetres

rakon

© 2013 Rakon Limited

15.0 Specification History

Version	User	Changes	Approver	Date
A	JO	Initial issue	ML/TB	2018-06-14
B	JO	Updated tagline, corrected various typos (incl. note 5), removed 'PRELIMINARY' stamp from outline drawing	ML	2018-07-24

<2020-03-18> Warm up時の消費電流値を訂正（記：多摩デバイス 営業技術部）。