

E7028LF

1.0 Specification References

Parameter	Description
a. Rakon part number	E7028LF
b. Description	98.304 MHz RHT1490A
c. Version	F (2016-12-12) – PROVISIONAL
d. Package	14.4 x 9.2 x 4.7 mm max.



2.0 Absolute Maximum Ratings ¹

Parameter	Min.	Max.	Unit.
a. Storage temperature	-40	85	°C
b. Supply voltage (VDD)	-0.6	4.6	V

3.0 Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency (Fn)		98.304		MHz	
b. Frequency calibration			±1	ppm	At 25°C ± 2°C, at time of shipment, reference to nominal frequency
c. Reflow shift			±1	ppm	Pre to post reflow ΔF (measured ≥ 60 minutes after reflow)
d. Operating temperature range	-40		85	°C	
e. Frequency stability over temperature			±0.28	ppm	Reference to (F _{MAX} + F _{MIN})/2
f. Supply voltage stability			±0.1	ppm	±5% variation, reference to frequency at 3.3V
g. Load sensitivity			±0.1	ppm	±5pF variation, reference to frequency at 5pF
h. Long term stability			±1 ±2	ppm ppm	1 year 3 years
i. Start-up time			1	ms	90% amplitude
j. Acceleration stability		2		ppb/g	Gamma vector 3-axes, 30 – 1500Hz

4.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (VDD)		3.3		V	±5%
b. Supply current			14	mA	Load 5pF//1kΩ

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

5.0 Oscillator Output – CMOS

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output voltage level low (V_{OL})			20%	VDD	Measured with a capacitive load of 5pF
b. Output voltage level high (V_{OH})	80%			VDD	Measured with a capacitive load of 5pF
c. Rise time		1.2	1.5	ns	Measured 20% to 80% VDD, 5pF load
d. Fall time		1.2	1.5	ns	Measured 80% to 20% VDD, 5pF load
e. Duty cycle	40		60	%	Measured at 50% VDD trigger level
f. Load		5	10	pF	

6.0 SSB Phase Noise and RMS Phase Jitter (98.304MHz, at 25°C)

Parameter	Typ.	Unit.	Test Condition / Description
a. 1Hz offset	-51	dBc/Hz	
b. 10Hz offset	-81	dBc/Hz	
c. 100Hz offset	-108	dBc/Hz	
d. 1kHz offset	-132	dBc/Hz	
e. 10kHz offset	-145	dBc/Hz	
f. 100kHz offset	-148	dBc/Hz	
g. 1MHz offset	-149	dBc/Hz	
h. 5MHz offset	-155	dBc/Hz	
i. 20MHz offset	-164	dBc/Hz	
j. RMS Phase Jitter	168	fs	12kHz to 20MHz

7.0 Marking

Parameter	Description
a. Line 1	rakon
b. Line 2	[R FFFF YM] Rakon identifier R, Frequency FFFF (M=MHz, e.g. 98M3=98.304MHz), Year Y (A=2010, B=2011, ...), Month M (1=Jan, 2=Feb, ..., A=Oct, B=Nov, C=Dec)
c. Line 3	[• LLL] Pin1 • and Lot code LLL

8.0 Manufacturing Information

Parameter	Description
a. Reflow soldering	IPJ/JEDEC J-STD-020, see Pb-free solder reflow profile attached
b. Packaging description	Tape and reel. 24 mm wide tape and Ø330 mm (Ø 13') reel

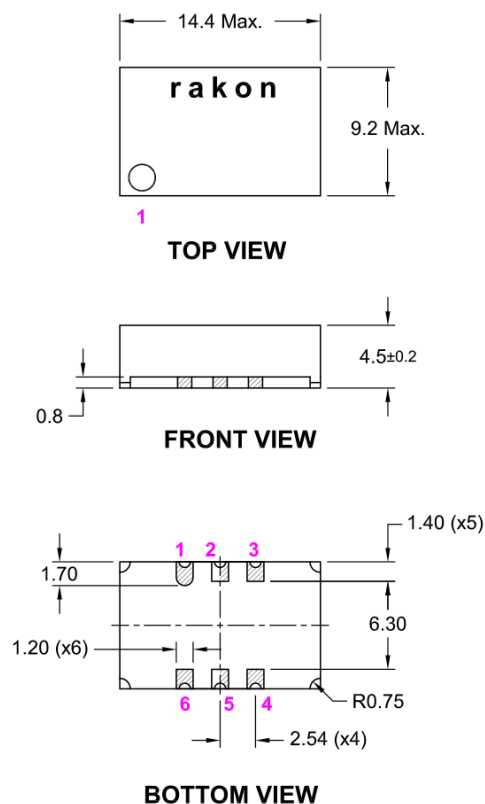
9.0 Environmental Specification

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
b. Vibration	IEC 60068-2-6 Test Fc, 10-60Hz, 1.5mm displacement, 60 –2000Hz at 98.1m/s^2 , 30 minutes in each of three mutually perpendicular axes at 1 octave per minute
c. Mechanical Shock	IEC 60068-2-27 Test Ea, 980m/s^2 acceleration for 6ms duration, 3 shocks in each direction along three mutually perpendicular axes
d. Solderability	MIL-STD-202, Method 208, Category 3

10.0 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

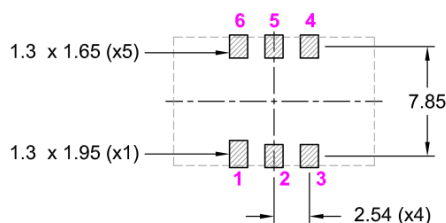
11.0 Model Outline: RHT1490A



Pin Connections

Pin	Connections
1	GND
2	Do not connect
3	GND
4	Output
5	Do not connect
6	Supply Voltage (VDD)

RECOMMENDED PAD LAYOUT (TOP VIEW)



TITLE: RHT1490 Series Model

FILENAME: CAT995

TOLERANCES:

RELATED DRAWINGS:

REVISION: C

DATE: 04-Oct-16

SCALE: 2 : 1

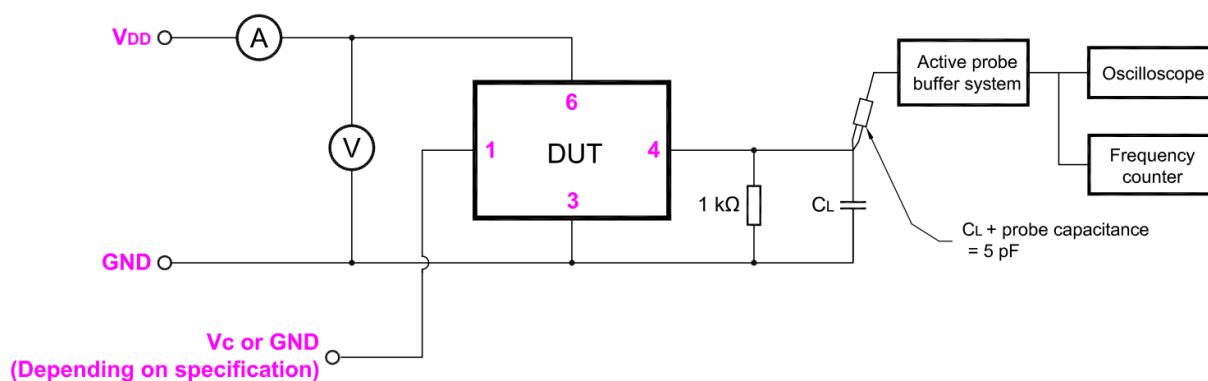
Millimetres

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

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12.0 Test Circuit: RHT1490A (CMOS Output)



TITLE: RHT1490 Series Test Circuit - CMOS Output

FILENAME: CAT1039

RELATED DRAWINGS:

REVISION: B

DATE: 07-Dec-2016

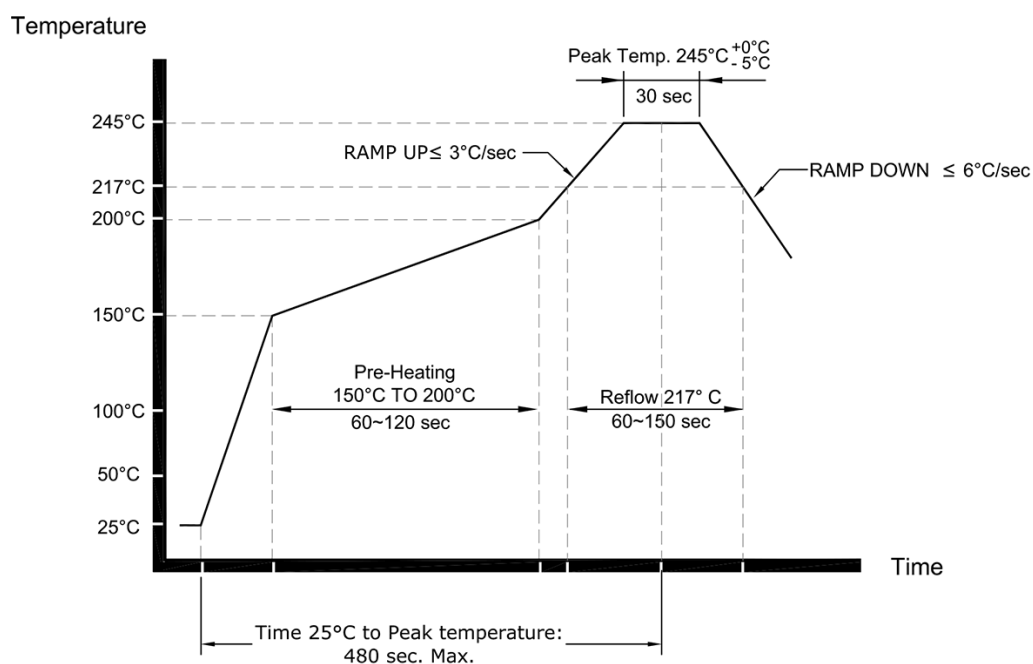
SCALE: NTS

Millimetres

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13.0 Reflow:



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.

14.0 Specification History

Version	User	Changes	Approver	Date
A.	TB/JO	Datasheet created	GT	2015-10-12
B.	TB	Change Phase noise and Jitter values (Section 6.0)	TB	2016-03-07
C.	JO	Marking corrected + minor typographical changes	TB	2016-07-20
D.	JO	Changed marking as per RSP072C	VC/SJ	2016-09-22
E.	JO	Changed marking as per RSP072D, used updated model image and outline drawing as per latest WCS template	DS/TB	2016-11-21
F.	JO	Pin 1 label changed to GND	DS/TB	2016-12-12