RTN5032A

1.0 Specification References

Parameter	Description
a. Rakon part number	N8828
b. Description	80.0MHz RTN5032A TCVCXO
c. Package	L x W x H: 5.0 x 3.2 x 1.75 mm nom. (10 pad)

2.0 Absolute Maximum Rating [1]

Parameter	Min.	Max.	Unit
a. Power supply	-0.6	5.5	V
b. Storage temperature	-55	125	°C

3.0 Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency		80.0		MHz	
b. Frequency calibration			±1	ppm	Initial accuracy at 25°C ±1°C, Vc=1.65V
c. Operating temperature range	-40		+85	°C	
d. Frequency stability over temperature			±0.28	ppm	Reference to $(F_{MAX} + F_{MIN})/2$
e. Frequency slope over temperature			±0.1	ppm/°C	
f. Load sensitivity		±0.1		ppm	±10% variation, reference to frequency at nominal load
g. Supply voltage stability		±0.1		ppm	±5% variation, reference to frequency at nominal supply voltage
h. Acceleration sensitivity			0.5	ppb/*g*	Gamma vector, 3-axes, 30-1500Hz
i. Start-up time			10	ms	90% amplitude
j. Long term stability (aging at 25°C)			±2	ppm	10 years

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

4.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (V_{DD})	3.135	3.3	3.465	V	
b. Supply current		20		mA	

5.0 Control Voltage (Vc)

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Control voltage range	0.3		3.0	V	
b. Frequency tuning	±5			ppm	Reference to frequency at Vc=1.65V, sufficient to bring the frequency back to nominal under all conditions over 10 years
c. Input impedance	100			kΩ	
d. Slope				ppm/V	Positive

6.0 Oscillator Output

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output waveform					CMOS
b. Output voltage level low (V_{OL})			10% V_{DD}	V	
c. Output voltage level high (V_{OH})	90% V_{DD}			V	
d. Rise and fall time		1	2	ns	10% to 90% level
e. Duty cycle	45		55	%	At 50% level
f. Load		5		pF	

7.0 SSB Phase Noise and Jitter [2]

Parameter	Typ.	Unit.	Test Condition / Description
a. 10Hz offset	-85	dBc/Hz	
b. 100Hz offset	-115	dBc/Hz	
c. 1kHz offset	-140	dBc/Hz	
d. 10kHz offset	-155	dBc/Hz	
e. 100kHz offset	-160	dBc/Hz	
f. 1MHz offset	-165	dBc/Hz	
g. Jitter, RMS	30	fs	12kHz to 5MHz

[2] Typical at 25°C

8.0 Marking

Parameter	Test Condition / Description
a. Type	Laser marked
b. Line 1	**[R FFFF YM]** Rakon identifier R, Frequency FFFF (M=MHz, e.g. 80M0=80.0MHz), Year Y (A=2010, B=2011, …), Month M (1=Jan, 2=Feb, …, A=Oct, B=Nov, C=Dec)
c. Line 2	**[• XXX LLL]** Pin 1 •, Internal code XXX, Lot code LLL

9.0 Manufacturing Information

Parameter	Test Condition / Description
a. Reflow	Reflow profile as per IPC/JEDEC J-STD-020E (see drawing)
b. Packaging description	Tape & Reel as per EIA-481-E (see drawing)

10.0 Environmental Specification [3]

Parameter	Description
a. RoHS	Parts are fully compliant with the European Union directives 2011/65/EU and 2015/863/EU (amending annex II to directive 2011/65/EU) on the restriction of the use of certain hazardous substances in electrical and electronic equipment
b. Temperature humidity bias	JESD22-A101D, +85°C/85%RH, at max. Vcc, 1000 hours
c. Pressure cooker test	JESD22A-102E, 121°C/100%RH/29.7PSIG, 96 hours
d. Temperature cycling	JESD22-A104F, -55°C to +125°C, 1000 cycles, 10 minute soak
e. High temperature storage	JESD22-A103E, +150°C, 1000 hours, unbiased
f. Low temperature storage	MIL-STD-883K, -55°C, 1000 hours, unbiased
g. High temperature operating life	JESD22-A108D, +125°C, 1008 hours, at max. Vcc
h. Mechanical shock	JESD22-B110B, 1500*g* peak, 0.5ms pulse duration, 5 pulses in each of 6 directions
i. Vibration	JESD22-B-103B, 20*g* peak acceleration, 10-2000Hz, 3 axis, 4 cycles per axis, 4 minutes per cycle
j. Solderability	J-STD-002D, condition E, precondition 4 hours dry bake at +155°C
k. Moisture resistance	JESD22-A113I, MSL = 1
l. Resistance to soldering heat	MIL-STD-202H M210, convection reflow, Tmax = +260°C, 3 reflow cycles
m. Long-term stability (frequency aging)	MIL-PRF-55310F / MIL-STD-883K Method 2019, 1000 hours at +85°C

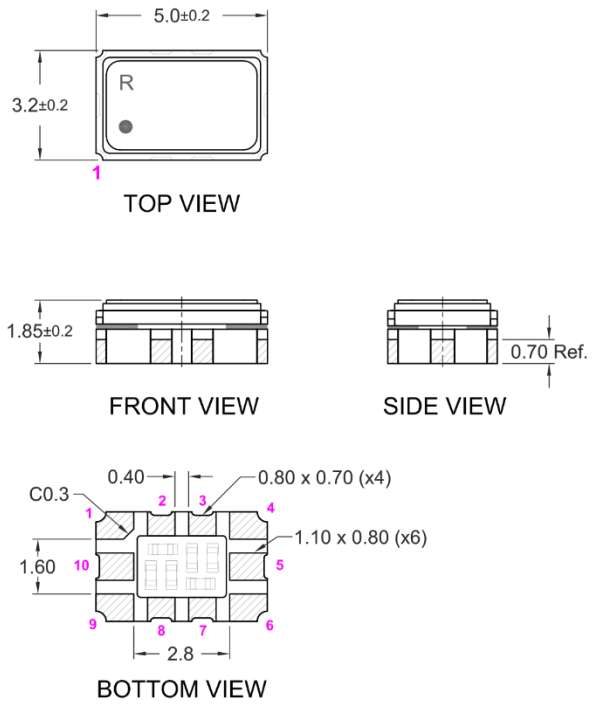
11.0 Disclaimer

Parameter	Test Condition / 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

[3] For relevant tests, parts have been preconditioned as per JESD22-A113I (bake for 24 hours at T = +125°C + moisture soak for 168 hours at +85°C/85%RH + 3x reflow at Tmax = +260°C)

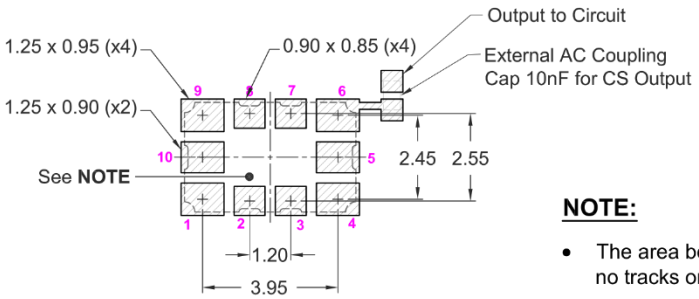
12.0 Model Outline:

MODEL DRAWING



Pin	Connections
1	Control Voltage (V_C)
4	GND
6	RF Output
9	Supply Voltage (Vcc)
Other pins:	Do not connect (solder to floating pads)

RECOMMENDED PAD LAYOUT - TOP VIEW



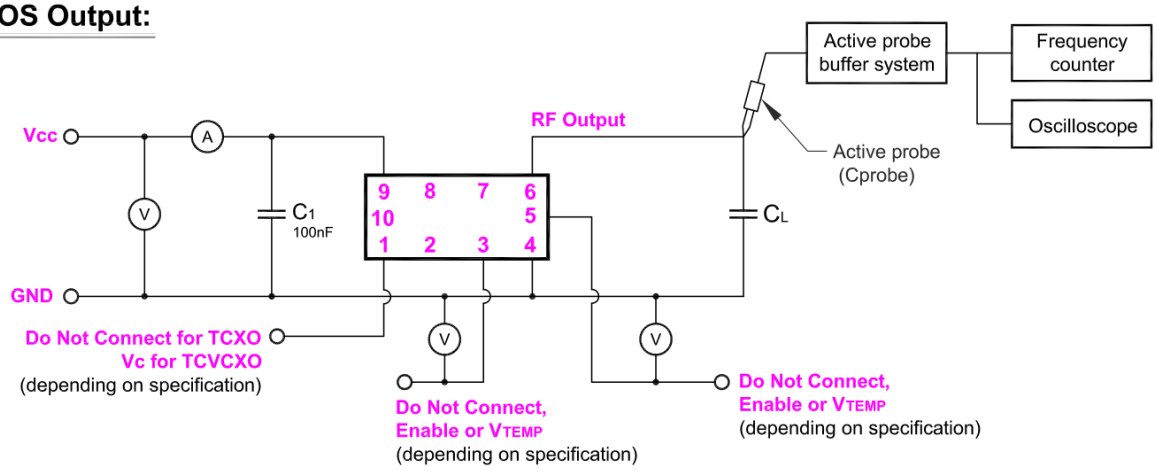
NOTE:

- The area between the pads is a keep-out area, no tracks or ground plane allowed on any layer.

TITLE: RTN5032A MODEL (10 Pad)	FILENAME: CAT1631	TOLERANCES:
RELATED DRAWINGS:	REVISION: A	XX =
	DATE: 10-Apr-2024	X.X = ±0.2
	SCALE: 5 : 1	X.XX = ±0.10
	Millimetres	X.XXX =
		X° =
		Hole =

13.0 Test Circuit:

CMOS Output:

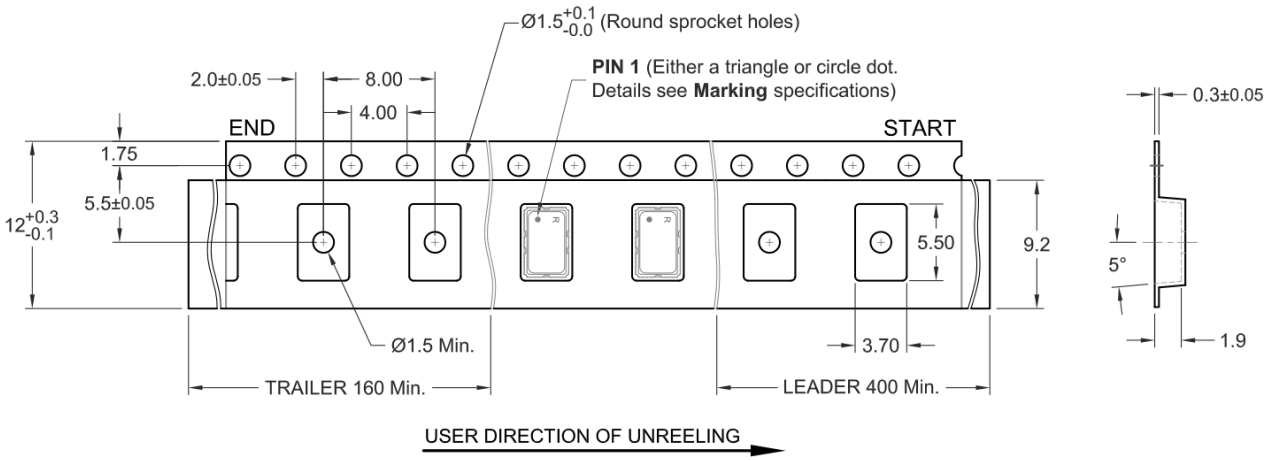


Output Load *	C_L	R_L
CMOS	15pF	∞
Clipped Sinewave	10pF	10kΩ
* Inclusive of probe impedance		

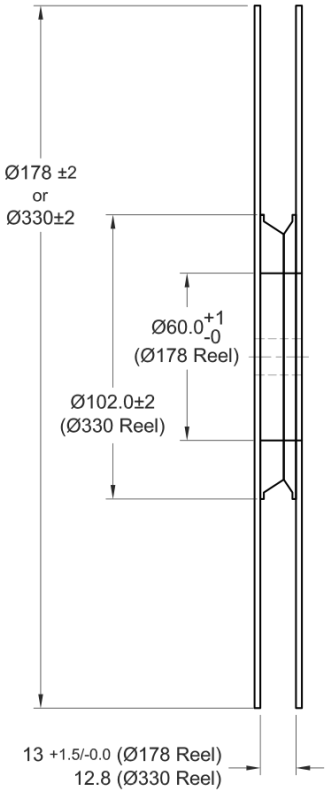
TITLE: NIKU™ TEST CIRCUIT (CS and CMOS, 10 Pad)	FILENAME: CAT1588	TOLERANCES:
RELATED DRAWINGS:	REVISION: A	XX =
	DATE: 08-Jun-2022	X.X =
	SCALE:	X.XX =
	Millimetres	X.XXX =
		X° =
		Hole =

14.0 Tape and Reel (Ø178 mm or Ø330mm):

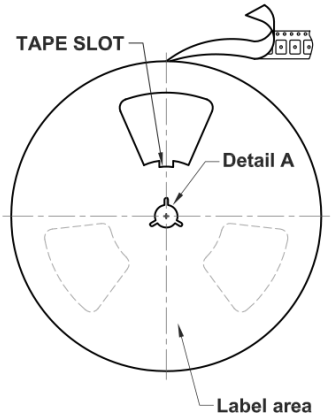
TAPE DETAILS



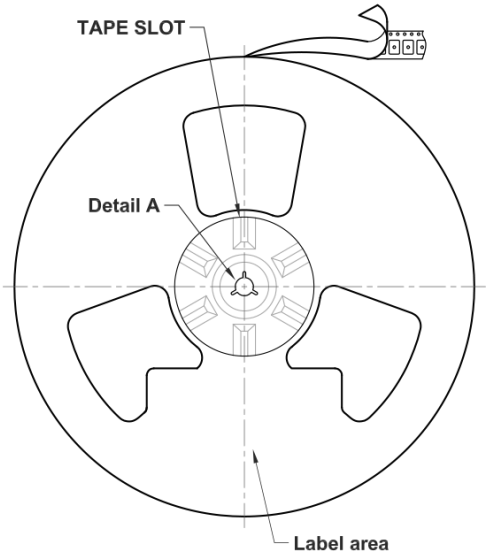
REEL DETAILS



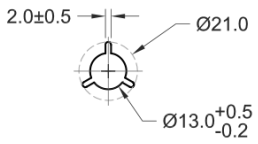
Ø178 REEL



Ø330 REEL



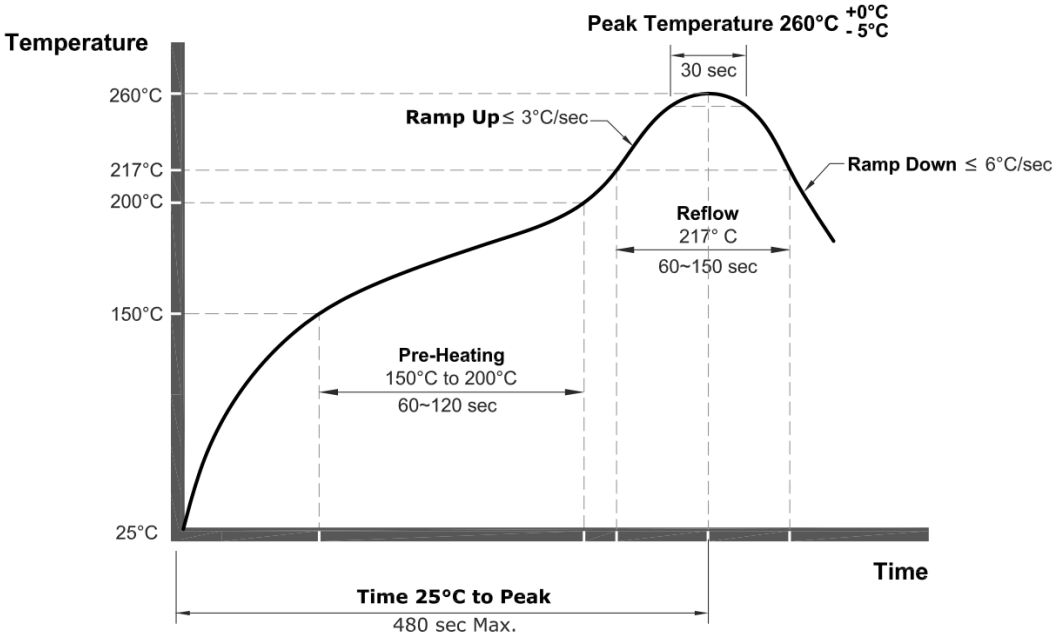
DETAIL A



Note: The tape & reel packaging specifications follow the guidelines of the EIA Standard EIA-481-E.

TITLE: RTN5032 SERIES TAPE & REEL	FILENAME: CAT1590	TOLERANCES:
RELATED DRAWINGS:	REVISION: A	XX = ±1
	DATE: 09-Jun-2022	X.X = ±0.2
	SCALE:	X.XX = ±0.1
	Millimetres	X.XXX =
		X° =
		Hole =

15.0 Reflow:



Note:

- The Pb-free Reflow follows the guidelines of IPC/JEDC J-STD-020E.
- 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 Crystal & Oscillator Reflow (Classification Temperature Tc = 260°C)	FILENAME: CAT541
RELATED DRAWINGS:	REVISION: C
	DATE: 16-May-2019
	SCALE: NTS
	Millimetres

16.0 Specification History

Version	User	Changes	Approver	Date
A	JO	Initial issue	MM/BC	2023-01-18
B	JO	Updated tuning range, added aging	AS/MM	2023-03-27
C	BC	Update the stability and PN requirement	RS/MM	2024-07-19
D	AR	12.0) Model drawing updated as per latest RTN5032A template	BC	2025-02-27