

E8299LF



1.0 Specification References

Parameter	Description
a. Rakon part number	E8299LF
b. Description	48.0MHz RPT5032A TCXO
c. Version	A (2020-09-29)
d. Package	L x W: 5.0 x 3.2 mm nom., H: 2.1 mm max (6 pad)

2.0 Absolute Maximum Ratings ¹

Parameter	Min.	Max.	Unit.
a. Junction temperature		150	°C
b. Supply voltage (Vcc)	-0.5	7	V
c. All other inputs	-0.5	Vcc + 0.5	V
d. Power dissipation		100	mW

3.0 Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency		48.0		MHz	
b. Frequency calibration			±1	ppm	Initial accuracy at 25°C ±1°C
c. Reflow shift, two consecutive reflows			±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. Slope over temperature			±0.1	ppm/°C	ΔF/ΔT
g. Supply voltage stability		±0.1		ppm	±5% variation, reference to frequency at nominal supply voltage
h. Load sensitivity		±0.2		ppm	±5pF variation, reference to frequency at nominal load
i. Long term stability			±2 ±5	ppm ppm	1 year 10 years
j. Acceleration stability		< 2		ppb/g	Gamma vector, 3-axes, 30-1500Hz
k. Start-up time			15	ms	90% amplitude

4.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (Vcc)	2.4	2.5	2.6	V	
b. Supply current		7	10	mA	

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

5.0 Oscillator Output – HCMOS

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output waveform					HCMOS (LVCMOS & LVTTTL compatible as per JESD8C)
b. Output voltage level low (V_{OL})			10% V_{CC}	V	
c. Output voltage level high (V_{OH})	90% V_{CC}			V	
d. Rise and fall time			8	ns	10% to 90% level
e. Duty cycle	45		55	%	At 50% level
f. Load		15		pF	

6.0 Tri-State Control ²

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Tri-state mode					The device features a tri-state mode which allows the output to be disabled and brought into a high impedance state
b. Tri-state control (pin 6), input level low (V_{IL})			20% V_{CC}	V	Device disabled (output in high impedance state)
c. Tri-state control (pin 6), input level high (V_{IH})	60% V_{CC}			V	Device enabled (operating)
d. Current when in tri-state mode		2		mA	
e. Output enable time			100	μ s	

7.0 SSB Phase Noise and RMS Jitter (at 25°C)

Parameter	Typ.	Unit.	Test Condition / Description
a. 1Hz offset	-55	dBc/Hz	
b. 10Hz offset	-85	dBc/Hz	
c. 100Hz offset	-116	dBc/Hz	
d. 1kHz offset	-138	dBc/Hz	
e. 10kHz offset	-148	dBc/Hz	
f. 100kHz offset	-151	dBc/Hz	
g. 1MHz offset	-153	dBc/Hz	
h. RMS Jitter	0.3	ps	12kHz ~ 5MHz

8.0 Root Allan Variance (at 25°C)

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Root Allan Variance		3×10^{-10}			$\tau = 1.0s$

² The tri-state control (enable) input pin has an internal 100k Ω pull up resistor which allows it to be left unconnected if not used. When in tri-state mode, the output stage is disabled, but the oscillator and compensation circuit are still active.

9.0 Marking

Parameter	Description
a. Type	Laser marked
b. Line 1	[R X XX] R = Rakon, XXX = manufacturing identifier
c. Line 2	[Δ nnnn YW] Δ = pin 1 mark, nnnn = abbreviated part number, YW = device date code

10.0 Manufacturing Information

Parameter	Description
a. Reflow soldering	Reflow profile as per IPC/JEDECJ-STD-020E (see drawing)
b. Packaging description	Tape & Reel as per EIA-481-E (see drawing)
c. Application note	For optimum performance follow the instructions in Guidelines for use of Pluto/Pluto+™ Ultra-Stable TCXOs

11.0 Environmental Specification

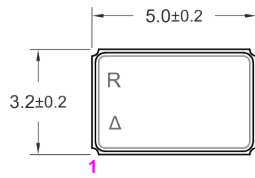
Parameter	Description
a. RoHS	Parts are fully compliant with the European Union directives 2011/65/EU and 2015/863/EU (amending annex II to directive 2011/65/EU) on the restriction of the use of certain hazardous substances in electrical and electronics equipment
b. Solderability	JESD22-B102, M1, condition E (IPC/EIA J-STD-002A), 245°C for 5s, precondition for 16 hours at +150°C
c. High Temperature Operating Life (HTOL)	JESD22-A108, 1008 hours at +125°C
d. Temperature cycle	JESD22-A104, 500 cycles, -55°C to +125°C
e. Low temperature storage	IEC 60068-2-1 test Ab, 1000 hours at -55°C
f. High temperature storage	IEC 60068-2-2 test Bb, 1000 hours at +150°C
g. Moisture resistance	JESD22-A113, MSL = 3
h. Temperature / Humidity bias	JESD22-A101, 1008 hours at +85°C / 85% R.H., precondition: 3 Reflow cycles (peak temperature 260°C)
i. Mechanical vibration	JESD22-B103, 20g, 60-2000Hz, 4 hours in each of three axes (12 hours total)
j. Mechanical shock	JESD22-B104, 1500g _n , 0.5ms, 5 pulses in each of 6 directions
k. Aging	MIL-PRF-55310, 1008 hours at +85°C, precondition: 3 Reflow cycles (peak temperature 260°C)
l. Resistance to soldering heat	IPC/JEDECJ-STD-020, 3 reflow cycles (peak temperature 260°C)

12.0 Disclaimer

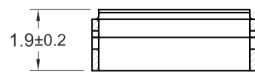
Parameter	Description
a. Disclaimer	"Samples supplied according to this specification are supplied from our development or pre-production programme and as such are not qualification approved products. No condition, warranty or representation regarding quality, suitability, performance, life or continuation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

13.0 Model Outline:

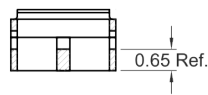
MODEL DRAWING



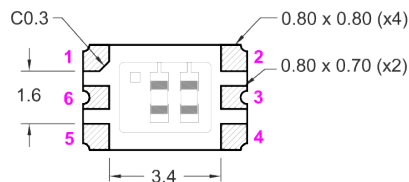
TOP VIEW



FRONT VIEW



SIDE VIEW

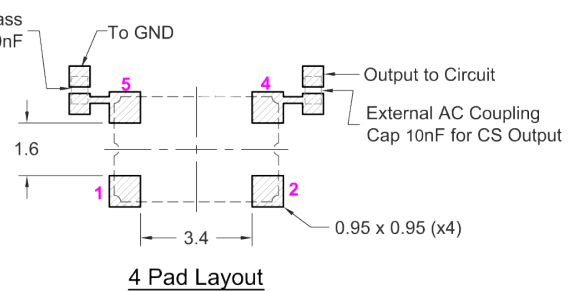
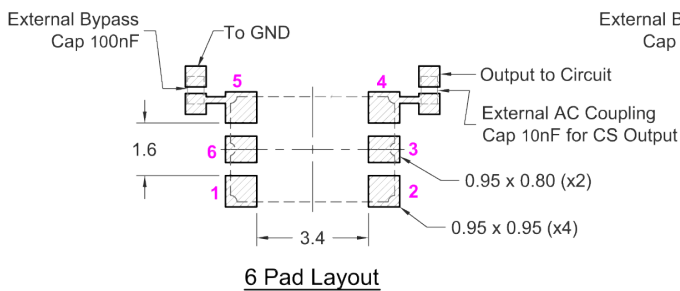


BOTTOM VIEW

Pin Connections

Pin	Connections
1	Do not connect (GND optional)
2	GND
3	Do not connect
4	RF Output
5	Supply Voltage (Vcc)
6	Tri-state Control (Enable) ²

RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: RPT5032 MODEL (6 Pad)

RELATED DRAWINGS:

FILENAME: CAT794

REVISION: E

DATE: 23-Jun-2020

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX =

X.X = ±0.2

X.XX = ±0.10

X.XXX =

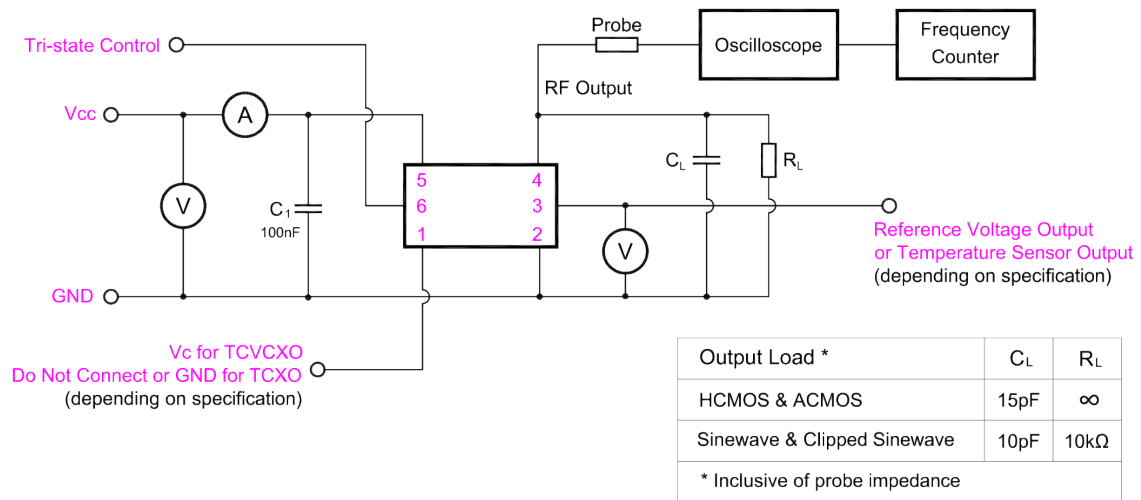
X° =

Hole =

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14.0 Test Circuit and Output Waveform:



TITLE: Pluto+ TCXO/TCVCXO TEST CIRCUIT

FILENAME: CAT781

RELATED DRAWINGS:

REVISION: A

DATE: 20-Mar-13

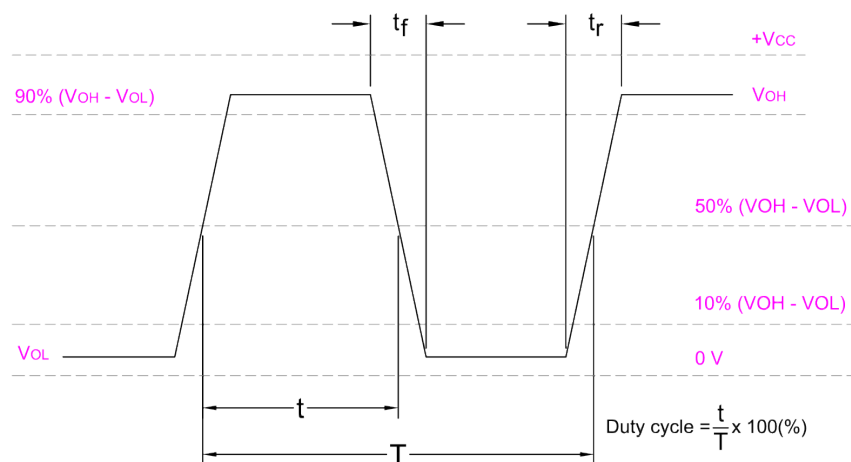
SCALE: NTS

Millimetres

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OUTPUT WAVEFORM - HCMOS & ACMOS:



TITLE: Pluto+ TCXO/TCVCXO OUTPUT WAVEFORM

FILENAME: CAT784

RELATED DRAWINGS:

REVISION: A

DATE: 15-Mar-13

SCALE: NTS

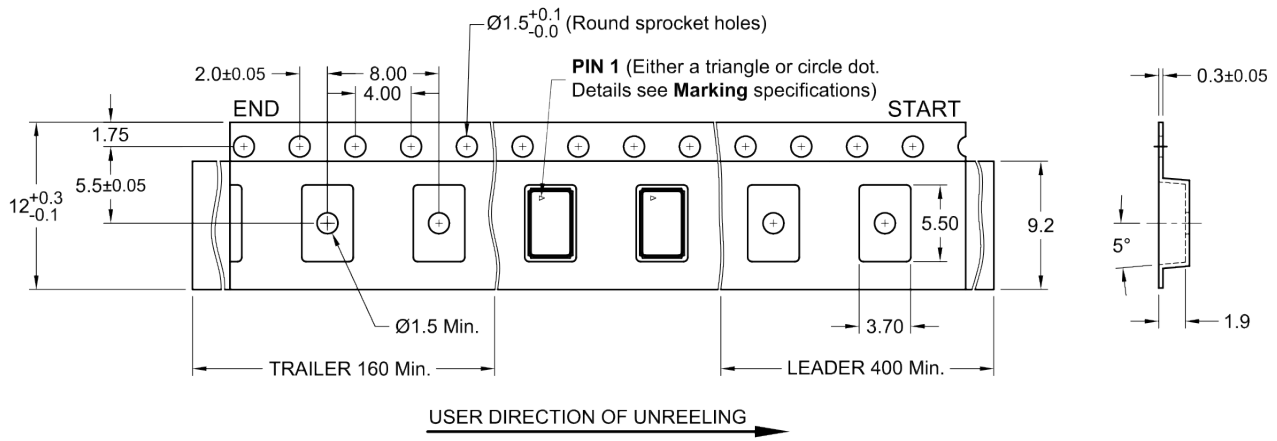
Millimetres

rakon

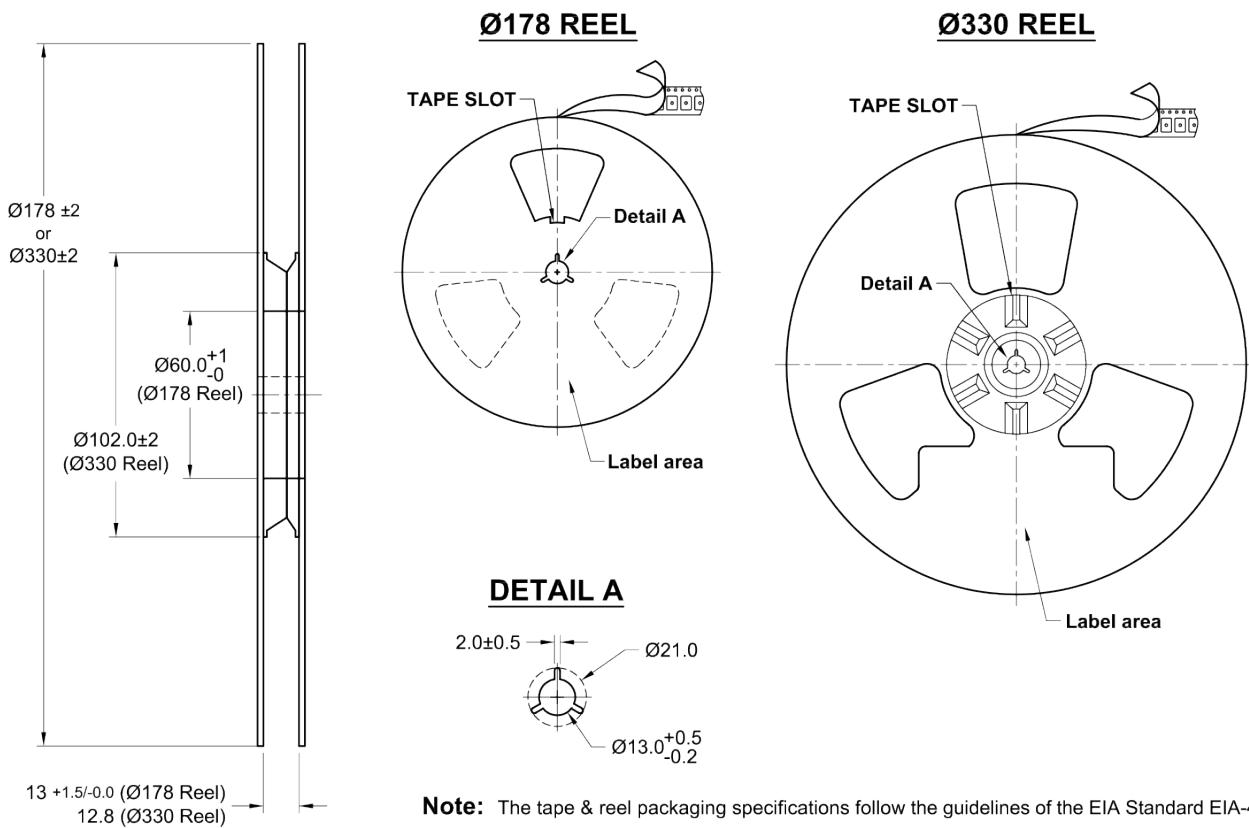
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15.0 Tape and Reel (Ø178mm / Ø330mm):

TAPE DETAILS



REEL DETAILS



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

TITLE: PLUTO+ 5032 SERIES TAPE & REEL

FILENAME: CAT811

TOLERANCES:

RELATED DRAWINGS:

REVISION: C

$$XX = \pm 1$$

DATE: 24-Jul-2020

$$\begin{aligned} X.X &= \pm 0.2 \\ Y.YY &= \pm 0.1 \end{aligned}$$

SCALE:

X.XX = ± 0.1

Millimetres

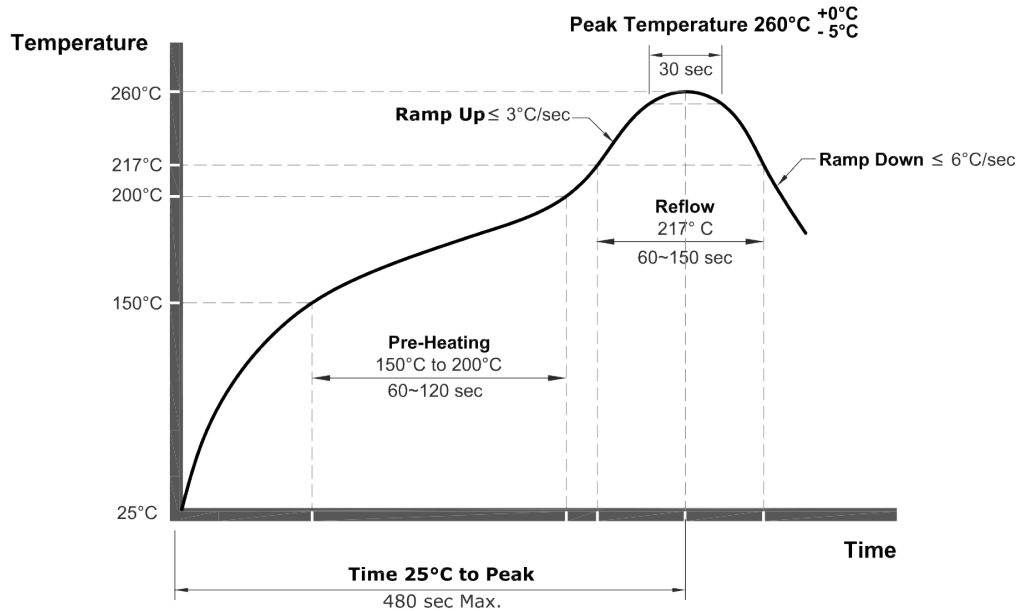
$$\frac{X.XXX}{Y^{\circ}} = \frac{\quad}{\quad}$$

\wedge =
 Hole =

rakon

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16.0 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 Oscillator Reflow (Classification Temperature $T_c = 260^{\circ}\text{C}$)

FILENAME: CAT541

RELATED DRAWINGS:

REVISION: C

DATE: 15-May-2019

SCALE: NTS

Millimetres

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17.0 Specification History

Version	User	Changes	Approver	Date
A	JO	Initial issue	NC/BC	2020-10-07