

## RST2016A

### 1.0 Specification References

Parameter	Description
a. Rakon part number	T6610
b. Description	52.0 MHz RST2016A TCXO
c. Package	L x W x H: 2.0 x 1.6 x 0.7 mm nom.



### 2.0 Absolute Maximum Rating <sup>1</sup>

Parameter	Min.	Max.	Unit
a. Power supply	-0.3	+4.6	V
b. Storage temperature	-40	85	°C

### 3.0 Frequency Characteristics

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Nominal frequency		52.0		MHz	
b. Frequency calibration			±1	ppm	Offset from nominal frequency measured at 25°C±2°C.
c. Reflow shift			±1	ppm	Two consecutive reflows as per attached profile after 2 hours relaxation at 25°C.
d. Temperature range	-40		85	°C	The operating temperature range over which the frequency stability is measured
e. Frequency stability over temperature			±0.5	ppm	Referenced to the midpoint between minimum and maximum frequency value over the specified temperature range <sup>2</sup>
f. Static temperature hysteresis			0.6	ppm	Frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at 25°C
g. Sensitivity to supply voltage variations			±0.1	ppm	Supply voltage varied ±5% at 25°C
h. Sensitivity to load variations			±0.2	ppm	±10% load change at 25°C <sup>3</sup>
i. Long term stability			±1 ±3 ±5	ppm	Frequency drift over 1 year at 25°C Frequency drift over 5 year at 25°C Frequency drift over 10 year at 25°C

### 4.0 Power Supply

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Supply voltage (V <sub>DD</sub> )	1.7		3.3	V	With a tolerance of ±5%.
b. Supply current			2.2	mA	At maximum V <sub>DD</sub> <sup>3</sup>

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

<sup>2</sup> Parts should be shielded from drafts causing unexpected thermal gradients. Temperature changes due to ambient air currents on the oscillator can lead to short term frequency drift.

<sup>3</sup> Specified for load stated in oscillator output section at 25°C.

## 5.0 Oscillator Output

Parameter	Min.	Typ.	Max.	Unit	Test Condition / Description
a. Output waveform					DC coupled clipped sinewave <sup>4</sup>
b. Output voltage level	0.8		1.2	Vpk-pk	At minimum supply voltage <sup>3</sup>
c. Output load	9	10	11	kΩ/OpF	(10kΩ // 10pF) ±10%
d. Start-up time (amplitude)			0.5	ms	Within 90% of the minimum specified output level.
e. Start-up time (frequency)			2	ms	Within ±0.5ppm of steady state frequency.

## 6.0 SSB Phase Noise (52.0 MHz, at 25°C)

Parameter	Typ.	Max.	Unit.	Test Condition / Description
a. 1Hz offset	-52		dBc/Hz	
b. 10Hz offset	-80		dBc/Hz	
c. 100Hz offset	-104		dBc/Hz	
d. 1kHz offset	-126		dBc/Hz	
e. 10kHz offset	-143		dBc/Hz	
f. 100kHz offset	-148		dBc/Hz	
g. 1MHz offset	-148		dBc/Hz	

## 7.0 Marking

Parameter	Test Condition / Description																																																																																																														
a. Type	Engraved																																																																																																														
b. Line 1	[R ##M# YM ] R = Rakon, ##M# = Frequency (M=MHz, e.g. 19M2=19.2MHz) <sup>5</sup> , YM = Date code*																																																																																																														
c. Line 2	[ • XXXX XXX ] • = Pin 1, XXXX = Internal Code, XXX = Lot Code																																																																																																														
d. Date code*	<table border="1" style="width: 100%; text-align: center;"> <thead> <tr> <th colspan="6">Y - Year Code</th> <th colspan="4">M - Month Code</th> </tr> <tr> <th>Code</th> <th>Year</th> <th>Code</th> <th>Year</th> <th>Code</th> <th>Year</th> <th>Code</th> <th>Month</th> <th>Code</th> <th>Month</th> </tr> </thead> <tbody> <tr> <td>A</td><td>2010</td><td>J</td><td>2019</td><td>S</td><td>2028</td><td>1</td><td>Jan</td><td>7</td><td>Jul</td> </tr> <tr> <td>B</td><td>2011</td><td>K</td><td>2020</td><td>T</td><td>2029</td><td>2</td><td>Feb</td><td>8</td><td>Aug</td> </tr> <tr> <td>C</td><td>2012</td><td>L</td><td>2021</td><td>U</td><td>2030</td><td>3</td><td>Mar</td><td>9</td><td>Sep</td> </tr> <tr> <td>D</td><td>2013</td><td>M</td><td>2022</td><td>V</td><td>2031</td><td>4</td><td>Apr</td><td>A</td><td>Oct</td> </tr> <tr> <td>E</td><td>2014</td><td>N</td><td>2023</td><td>W</td><td>2032</td><td>5</td><td>May</td><td>B</td><td>Nov</td> </tr> <tr> <td>F</td><td>2015</td><td>O</td><td>2024</td><td>X</td><td>2033</td><td>6</td><td>Jun</td><td>C</td><td>Dec</td> </tr> <tr> <td>G</td><td>2016</td><td>P</td><td>2025</td><td>Y</td><td>2034</td><td></td><td></td><td></td><td></td> </tr> <tr> <td>H</td><td>2017</td><td>Q</td><td>2026</td><td>Z</td><td>2035</td><td></td><td></td><td></td><td></td> </tr> <tr> <td>I</td><td>2018</td><td>R</td><td>2027</td><td></td><td></td><td></td><td></td><td></td><td></td> </tr> </tbody> </table>	Y - Year Code						M - Month Code				Code	Year	Code	Year	Code	Year	Code	Month	Code	Month	A	2010	J	2019	S	2028	1	Jan	7	Jul	B	2011	K	2020	T	2029	2	Feb	8	Aug	C	2012	L	2021	U	2030	3	Mar	9	Sep	D	2013	M	2022	V	2031	4	Apr	A	Oct	E	2014	N	2023	W	2032	5	May	B	Nov	F	2015	O	2024	X	2033	6	Jun	C	Dec	G	2016	P	2025	Y	2034					H	2017	Q	2026	Z	2035					I	2018	R	2027						
Y - Year Code						M - Month Code																																																																																																									
Code	Year	Code	Year	Code	Year	Code	Month	Code	Month																																																																																																						
A	2010	J	2019	S	2028	1	Jan	7	Jul																																																																																																						
B	2011	K	2020	T	2029	2	Feb	8	Aug																																																																																																						
C	2012	L	2021	U	2030	3	Mar	9	Sep																																																																																																						
D	2013	M	2022	V	2031	4	Apr	A	Oct																																																																																																						
E	2014	N	2023	W	2032	5	May	B	Nov																																																																																																						
F	2015	O	2024	X	2033	6	Jun	C	Dec																																																																																																						
G	2016	P	2025	Y	2034																																																																																																										
H	2017	Q	2026	Z	2035																																																																																																										
I	2018	R	2027																																																																																																												

## 8.0 Manufacturing Information

Parameter	Test Condition / Description
a. Reflow	Solder reflow processes as per profile attached
b. Packaging description	Tape and reel. Standard packing quantity (SPQ) is 3000 units/reel

<sup>4</sup> External AC-Coupling capacitor required. 1nF or greater recommended.

<sup>5</sup> Frequency marking is only represented by the first three significant digits. For example, on an RST2016N TCXO at 16.368MHz, its frequency code marking will be 16M3.

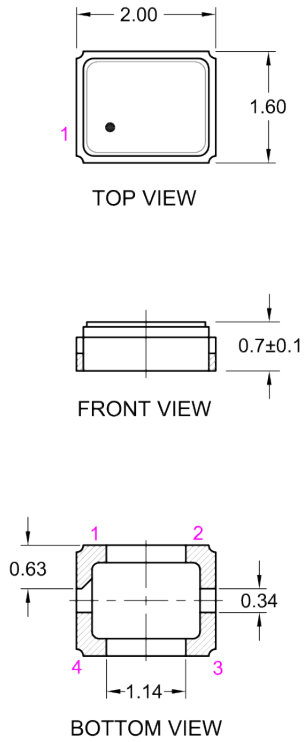
## 9.0 Environmental Specification

Parameter	Test Condition / Description										
a. RoHS compliant	Yes										
b. Shock	Free dropping from 150 cm height 5 times on a hard wooden board										
c. Moisture resistance	500 ±12 hours at 60°C ±3°C, 85% relative humidity <sup>6</sup>										
d. Thermal cycling	The unit shall be subjected to 100 successive change of temperature cycles, then 25 ±2°C over 2 hours before testing, each cycle as below: <table><thead><tr><th>Temperature</th><th>Duration:</th></tr></thead><tbody><tr><td>1. -40 +0/-6°C</td><td>30 ±3 minutes</td></tr><tr><td>2. 25°C ±2°C</td><td>2 – 3 minutes</td></tr><tr><td>3. 85 +4/-0°C</td><td>30 ±3 minutes</td></tr><tr><td>4. 25°C ±2°C</td><td>2 – 3 minutes</td></tr></tbody></table>	Temperature	Duration:	1. -40 +0/-6°C	30 ±3 minutes	2. 25°C ±2°C	2 – 3 minutes	3. 85 +4/-0°C	30 ±3 minutes	4. 25°C ±2°C	2 – 3 minutes
Temperature	Duration:										
1. -40 +0/-6°C	30 ±3 minutes										
2. 25°C ±2°C	2 – 3 minutes										
3. 85 +4/-0°C	30 ±3 minutes										
4. 25°C ±2°C	2 – 3 minutes										
e. Vibration	Frequency: 10 – 200 Hz Amplitude (total excursion): 1.5 mm (10 – 36 Hz), 4G (36 – 200 Hz) Sweep time: 1 oct/min 3 direction time: 2 hours for each X, Y, Z axis										

<sup>6</sup> Frequency shift ≤2ppm after environmental conditions.

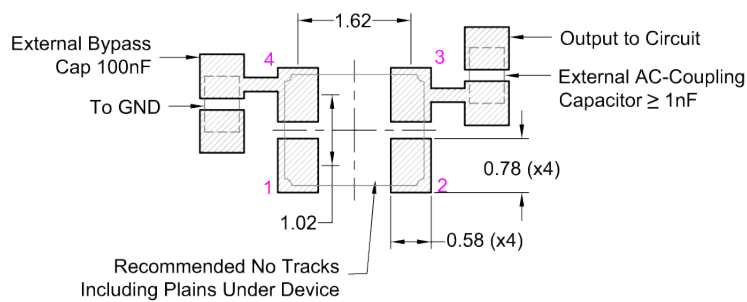
### 10.0 Model Outline

#### MODEL OUTLINE



Pin	Connections
1	GND / NC
2	GND
3	OUTPUT
4	Supply Voltage (VDD)

#### RECOMMENDED PAD LAYOUT - TOP VIEW



TITLE: RIT/RST2016 SERIES MODEL (Package A)

FILENAME: CAT1559

TOLERANCES:

RELATED DRAWINGS:

REVISION: A

XX =

DATE: 25-Nov-2020

X.X =  $\pm 0.20$

SCALE: 10 : 1

X.XX =  $\pm 0.15$

Millimetres

X.XXX =

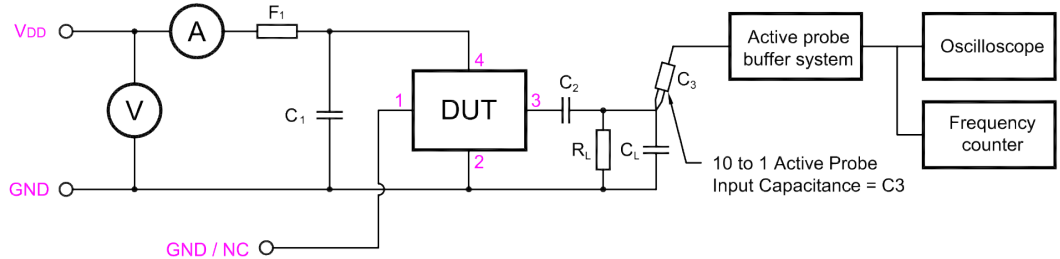
X° =

Hole =

© 2020 Rakon Limited

11.0 Test Circuit

CLIPPED SINEWAVE:



$C_1$ : 100nF	$C_T = C_L + C_3$ ( $C_3$ - Oscilloscope probe capacitance)
$C_2$ : $\geq 1$ nF	$C_T$ as stated in OSCILLATOR OUTPUT section
$R_L$ : 10K	$F_1$ : A ferrite bead or a resistor between 22 $\Omega$ ~ 47 $\Omega$ recommended.

TITLE: RIT/RST N SERIES HS-TCXO TEST CIRCUIT (Package A)

FILENAME: CAT1563

RELATED DRAWINGS:

REVISION: A

DATE: 01-Dec-2020

SCALE: NTS

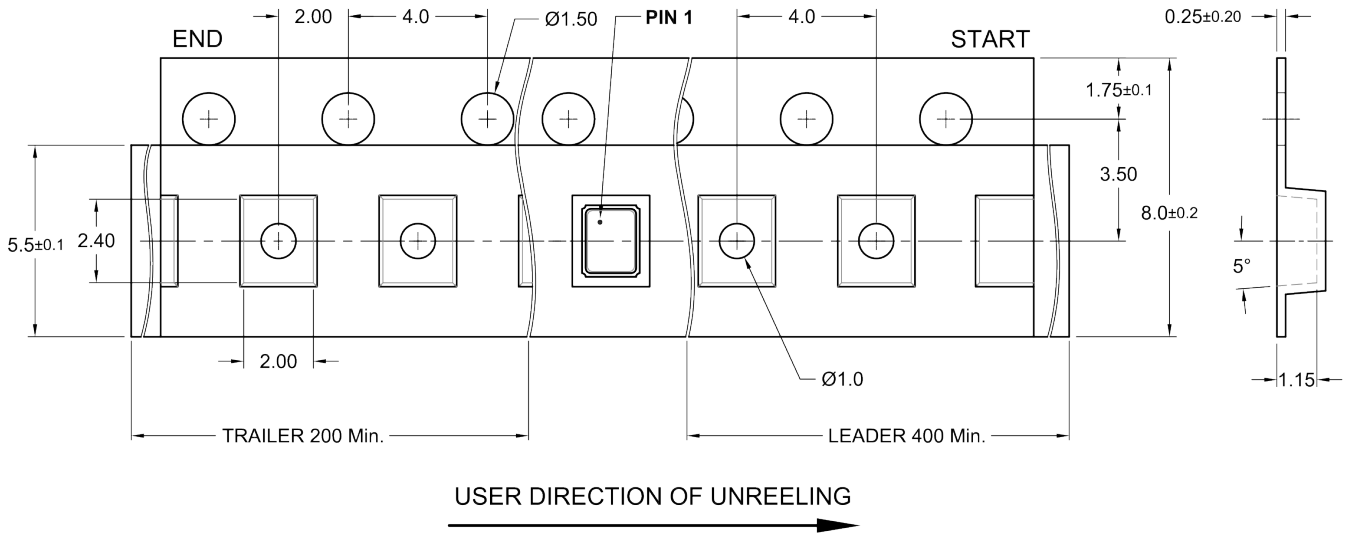
Millimetres



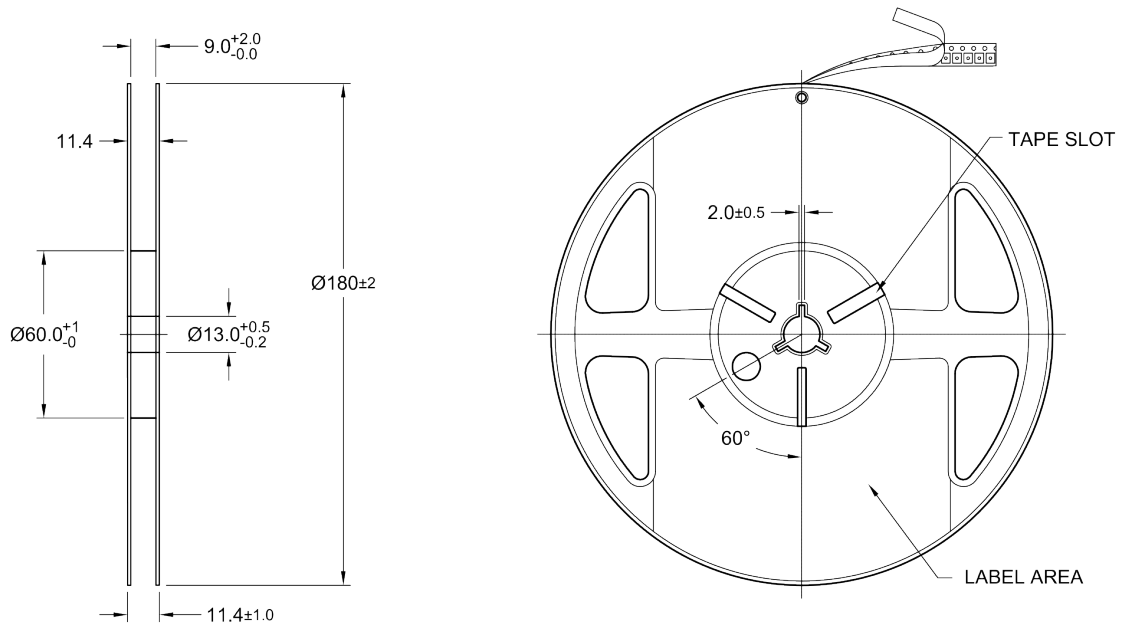
© 2020 Rakon Limited

## 12.0 Tape and Reel

### TAPE DETAILS



### REEL DETAILS



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

TITLE: RST/RIT/IT 2016 TAPE & REEL (Package A, N)

FILENAME: CAT1087

TOLERANCES:

RELATED DRAWINGS:

REVISION: C

XX =

DATE: 09-Jun-2020

X.X = ±0.2

SCALE: As above

X.XX = ±0.10

Millimetres

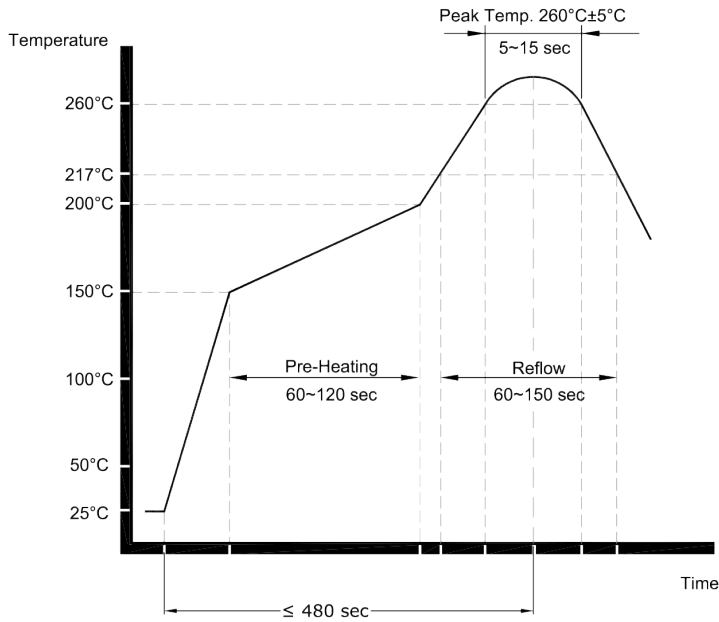
X.XXX =

X° =

Hole =

© 2017 Rakon Limited

13.0 Reflow



TITLE: Pb-FREE Reflow (Package A/AG)

FILENAME: CAT1036

TOLERANCES:

RELATED DRAWINGS:

REVISION: B

XX =

DATE: 03-Mar-2017

X.X =

SCALE: NTS

X.XX =

Millimetres

X.XXX =

X° =

Hole =



© 2017 Rakon Limited

#### 14.0 Specification History

Revision	User	Notes	Approver(s)	Date
A	RS	Specification created	CG/ TL	2022-03-28
B	RXP	Change TemesXpress to RakonXpress	CG	2022-12-05