

# RVX7050M VCXO

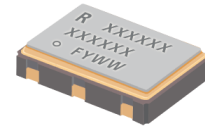


## SMD Voltage Controlled Crystal Oscillator

Ultra Low Noise VCXO in 7 x 5 mm Surface Mount Package.

### Product description

The RVX7050M is a very high performance VCXO delivering ultra low close-in phase noise for RF/Analog applications and ultra low RMS phase jitter optimised for high speed serial data and digital applications.



### Applications

- Communications
- Ethernet
- SONET/SDH
- DSL/ADSL
- Basestation
- WiFi
- WiMAX/WLAN

### Features

- Ultra Low Jitter 0.05 to 0.3 ps integrated 12 kHz to 20 MHz
- Excellent close-in phase noise performance
- LVCMOS, LVPECL, or LVDS Output options
- Wide frequency range

### Specifications

#### 1.0 SPECIFICATION REFERENCES

Line	Parameter	Description
1.1	Model Description	RVX7050M VCXO
1.2	Reference Number	
1.3	Rakon Part Number	

#### 2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Value	Unit
2.1	Frequency		1 to 800	MHz
2.2	Operating Temperature Range		-40 to 85	°C
2.3	Frequency Stability	Including Temperature range, Supply variation, Load variation and 15 years aging at 25°C	±30 to 50	ppm
2.4	Temperature Stability	Temperature range only	±10 to 20	ppm

#### 3.0 POWER SUPPLY

Line	Parameter	Test Condition	Value	Unit
3.1	Supply Voltage (VDD)	With a tolerance of ±10%	3.3	V
3.2	Supply Voltage (VDD)	With a tolerance of ±5% (availability advised at time of inquiry)	2.5	V
3.3	Supply Current	For LVCMOS	1 to 40	mA
3.4	Supply Current	For LVPECL	40 to 120	mA
3.5	Supply Current	For LVDS	30 to 80	mA

**4.0 CONTROL VOLTAGE (VCO)**

Line	Parameter	Test Condition	Value	Unit
4.1	Absolute Pull Range (APR)		±50 min	ppm
4.2	Total Pull Range	Frequency shift from minimum to maximum control voltage	100 to 250	ppm
4.3	Control Voltage	Nominal 1.65V	0 to 3.3	V
4.4	Linearity	Control voltage 0.3 to 3V	10 max	%
4.5	Slope	Positive only		
4.6	Modulation BW	Control voltage 0.3 to 3V	15 min	kHz
4.7	Input Impedance		0.1 to 10	MΩ

**5.0 OUTPUT CHARACTERISTICS - CMOS (UP TO 200 MHz)**

Line	Parameter	Test Condition	Value	Unit
5.1	Output Voltage (Vol)	10pF load	10 max	%VDD
5.2	Output Voltage (Voh)	10pF load	90 min	%VDD
5.3	Duty Cycle	@ 50% VDD	45 to 55	%
5.4	Rise Time/Fall Time	90%/10%	3 max	ns
5.5	RMS Phase Jitter	Typical integrated 12kHz to 20MHz	0.05 to 0.3	ps

**6.0 OUTPUT CHARACTERISTICS - LVPECL ONLY**

Line	Parameter	Test Condition	Value	Unit
6.1	Output Voltage (Vol)	50Ω nominal load. (VDD - 1.6V) max.		
6.2	Output Voltage (Voh)	50Ω nominal load. (VDD - 1.03V) min.		
6.3	Duty Cycle	@ VDD-1.3V	45 to 55	%
6.4	Rise Time/ Fall Time	80%/20%	0.6 max	ns
6.5	RMS Phase Jitter	Typical integrated 12kHz to 20MHz	0.05 to 0.3	ps

**7.0 OUTPUT CHARACTERISTICS - LVDS ONLY**

Line	Parameter	Test Condition	Value	Unit
7.1	Differential Output: Voltage Swing (Vod)		350	mV
7.2	Duty Cycle	Measured at 1.25 V	45 to 55	%
7.3	Rise Time/Fall Time	RL = 100 Ω / CL = 10 pF	0.6 max	ns
7.4	RMS Phase Jitter	Typical integrated 12kHz to 20MHz	0.05 to 0.3	ps

**8.0 SSB PHASE NOISE**

Line	Parameter	Test Condition	Value	Unit
8.1	SSB Phase Noise power density @ 10 Hz offset	Typical value for a 77.76 MHz VCXO @ 25 °C	-73	dBc/Hz
8.2	SSB Phase Noise power density @ 100 Hz offset	Typical value for a 77.76 MHz VCXO @ 25 °C	-100	dBc/Hz
8.3	SSB Phase Noise power density @ 1 kHz offset	Typical value for a 77.76 MHz VCXO @ 25 °C	-128	dBc/Hz
8.4	SSB Phase Noise power density @ 10 kHz offset	Typical value for a 77.76 MHz VCXO @ 25 °C	-137	dBc/Hz
8.5	SSB Phase Noise power density @ 100 kHz offset	Typical value for a 77.76 MHz VCXO @ 25 °C	-148	dBc/Hz

**9.0 SSB PHASE NOISE**

Line	Parameter	Test Condition	Value	Unit
9.1	SSB Phase Noise power density @ 10 Hz offset	Typical value for a 122.88 MHz VCXO @ 25 °C	-67	dBc/Hz
9.2	SSB Phase Noise power density @ 100 Hz offset	Typical value for a 122.88 MHz VCXO @ 25 °C	-98	dBc/Hz
9.3	SSB Phase Noise power density @ 1 kHz offset	Typical value for a 122.88 MHz VCXO @ 25 °C	-127	dBc/Hz
9.4	SSB Phase Noise power density @ 10 kHz offset	Typical value for a 122.88 MHz VCXO @ 25 °C	-147	dBc/Hz
9.5	SSB Phase Noise power density @ 100 kHz offset	Typical value for a 122.88 MHz VCXO @ 25 °C	-150	dBc/Hz

**10.0 PIN CONNECTIONS**

Line	Parameter	Description
10.1	Pin 1	VCO
10.2	Pin 2	E/D* or NC
10.3	Pin 3	GND
10.4	Pin 4	OUTPUT
10.5	Pin 5	COMPLIMENTARY OUTPUT (LVPECL/LVDS only) or NC
10.6	Pin 6	VDD
10.7	* Output Enabled	>70% of VDD on E/D pin, or E/D pin left open (connected to internal pull-up resistor)
10.8	* Output Disabled	<30% of VDD on E/D pin, or E/D pin to GND

**11.0 PACKAGE DETAIL**

Line	Parameter	Description
11.1	Package	A, B, C, GV, or J6
11.2	Top Line	[R #####] Part identifier
11.3	Middle Line	[#####] Part information
11.4	Bottom Line	[o FYWW] Pin 1, Manufacturing code, Year code* and Week code**
11.5	* Year Code	A = 2010, B = 2011, C = 2012, D = 2013, ... Z = 2035
11.6	** Week Code	WW = 01 = Week of first Monday of the year

**12.0 ENVIRONMENTAL SPECIFICATION**

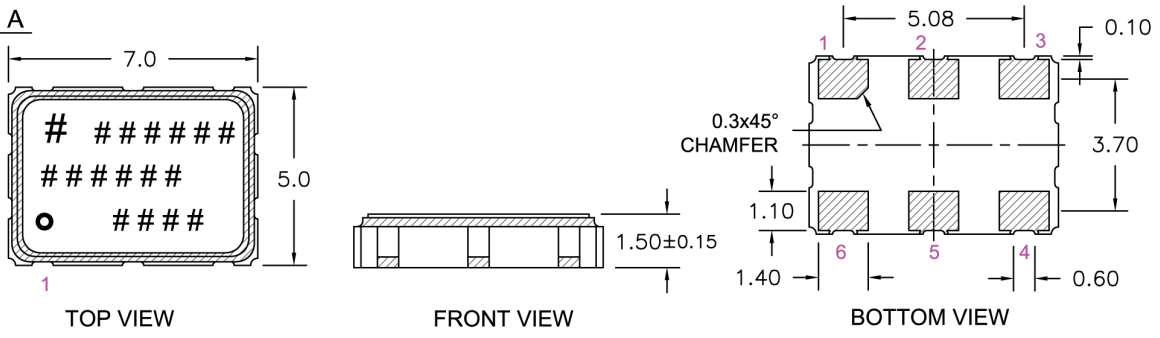
Line	Parameter	Description
12.1	Mechanical Shock	MIL-STD-883, Method 2002
12.2	Storage Temperature Range	-55 to 125°C
12.3	Humidity	After 48 hours at 85°C±2°C 85% humidity non-condensing
12.4	Thermal Shock	MIL-STD-883, Method 1011
12.5	Vibration	MIL-STD-883, Method 2007
12.6	Gross and Fine Leak	MIL-STD-883, Method 1014
12.7	RoHS Compliant	Yes

**13.0 MANUFACTURING INFORMATION**

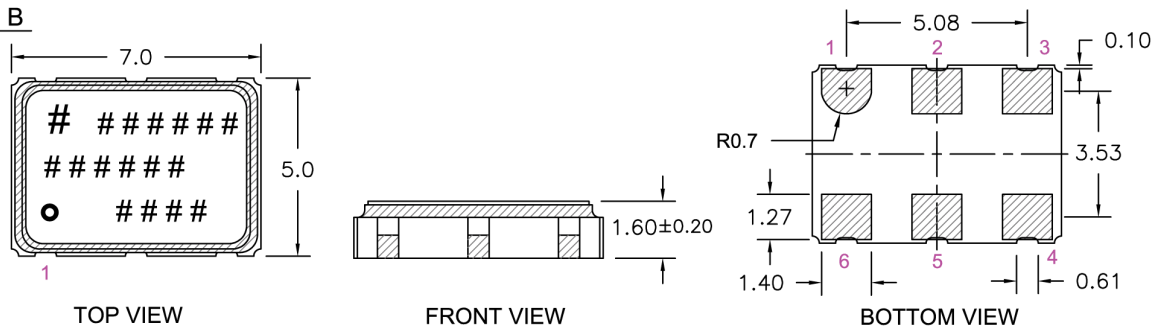
Line	Parameter	Description
13.1	Packaging Description	Tape and reel. Standard packing quantity is 2000 per reel (CAT032) or 1000 per reel (CAT617)
13.2	Reflow	Solder reflow process as per attached profile

**Drawing Name: XO/VCXO 7050 Model Drawing**

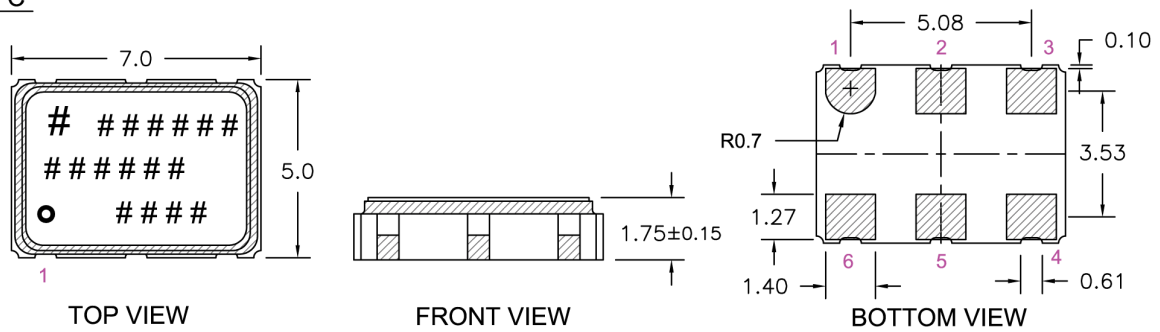
**PACKAGE A**



**PACKAGE B**

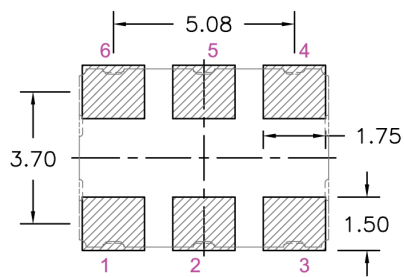


**PACKAGE C**



**RECOMMENDED PAD LAYOUT**

- TOP VIEW



**NOTE :**

1. PIN CONNECTIONS ARE DETAILED IN THE SPECIFICATION.
2. MARKING INFORMATION IS DETAILED IN THE SPECIFICATION.

TITLE: XO/VCXO 7050 SERIES MODEL

FILENAME: CAT207

TOLERANCES:

RELATED DRAWINGS:

REVISION: J

XX =

DATE: 03-Apr-12

X.X =  $\pm 0.15$

SCALE: 5 : 1

X.XX =  $\pm 0.10$

Millimetres

X.XXX =

X° =

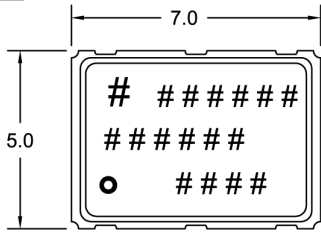
Hole =



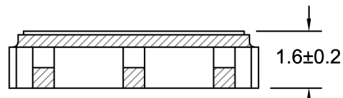
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**Drawing Name: XO/VCXO 7050 Alternate Model Drawing**

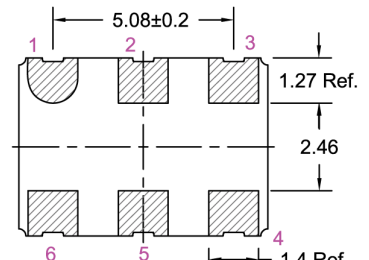
**PACKAGE GV**



TOP VIEW

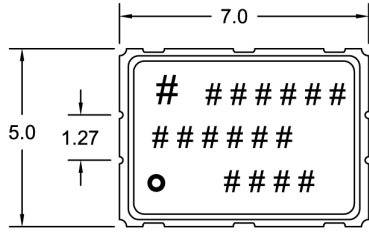


FRONT VIEW

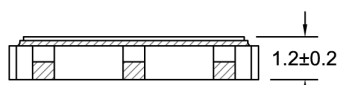


BOTTOM VIEW

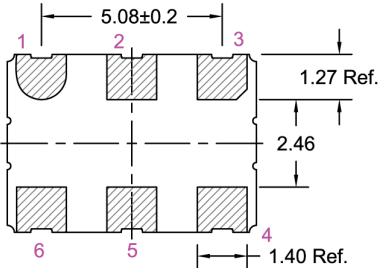
**PACKAGE G6**



TOP VIEW

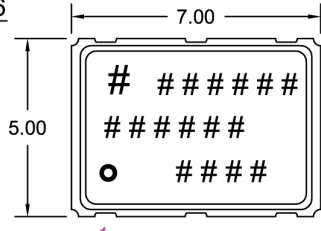


FRONT VIEW

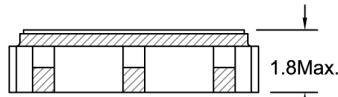


BOTTOM VIEW

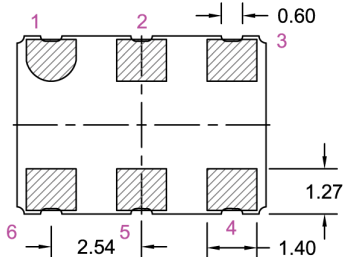
**PACKAGE J6**



TOP VIEW



FRONT VIEW

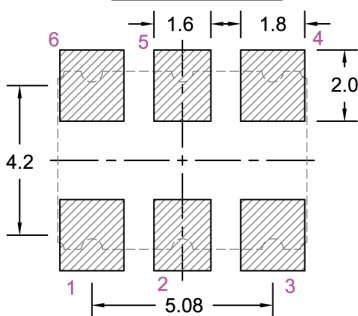


BOTTOM VIEW

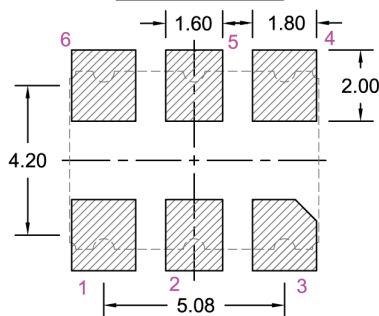
**NOTE:** 1. PIN CONNECTIONS ARE DETAILED IN THE SPECIFICATION.  
2. MARKING INFORMATION IS DETAILED IN THE SPECIFICATION.

**RECOMMENDED PAD LAYOUT - Top View**

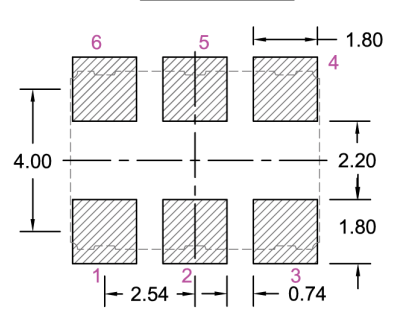
**PACKAGE GV**



**PACKAGE G6**



**PACKAGE J6**



TITLE: XO/VCXO 7050 ALTERNATE MODEL

RELATED DRAWINGS:

FILENAME: CAT675

REVISION: C

DATE: 13-Apr-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX =

X.X = ±0.15

X.XX = ±0.10

X.XXX =

X° =

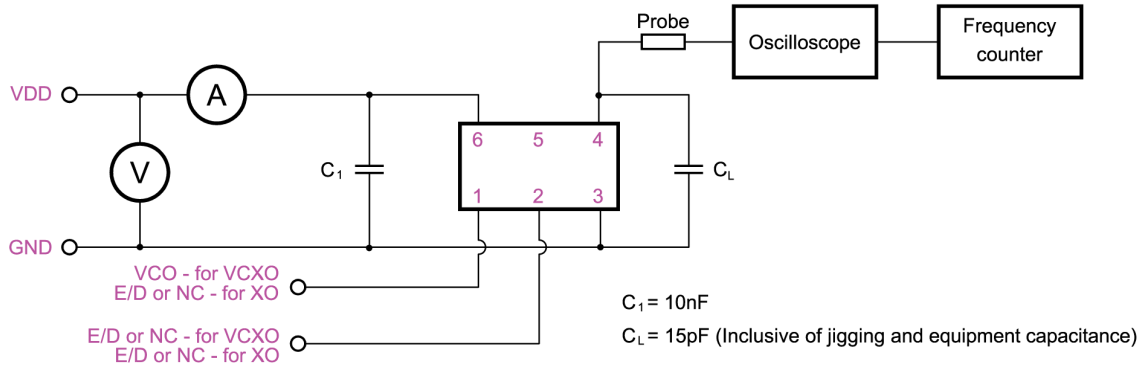
Hole =



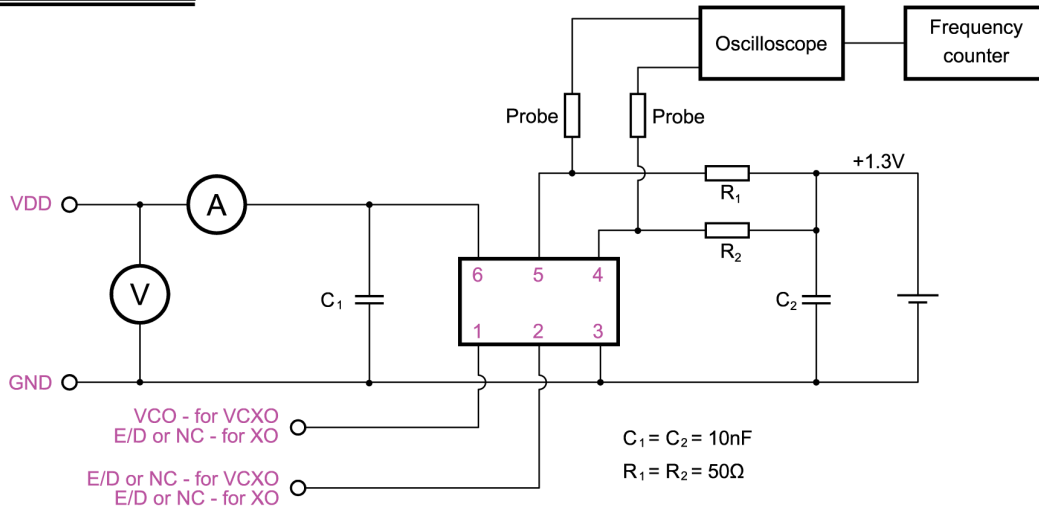
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**Drawing Name: XO/VCXO 6 Pin Series Test Circuit**

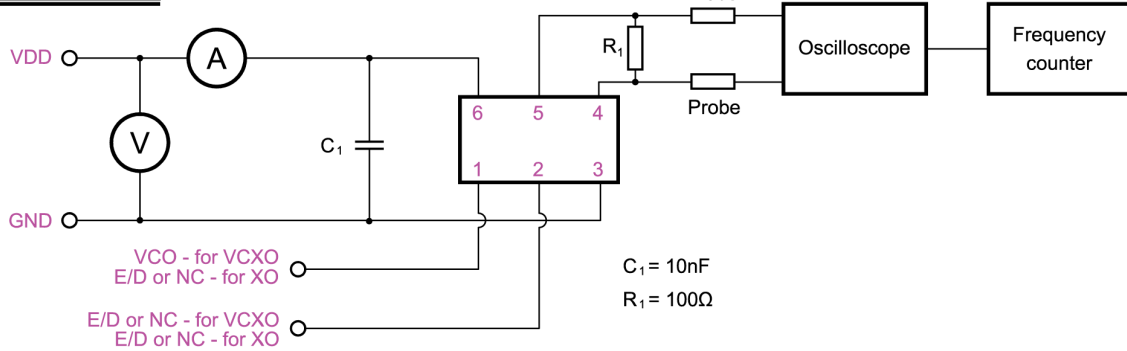
LVCMOS TEST CIRCUIT:



LVPECL TEST CIRCUIT:



LVDS TEST CIRCUIT:



TITLE: XO/VCXO 6 PIN SERIES TEST CIRCUIT

FILENAME: CAT088

RELATED DRAWINGS:

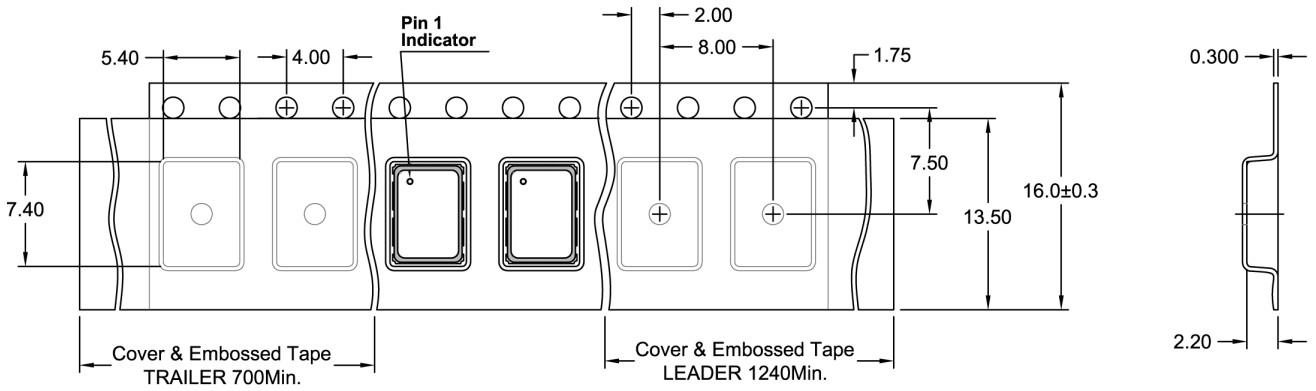
REVISION: F  
DATE: 03-May-12  
SCALE: 1 : 1  
Millimetres



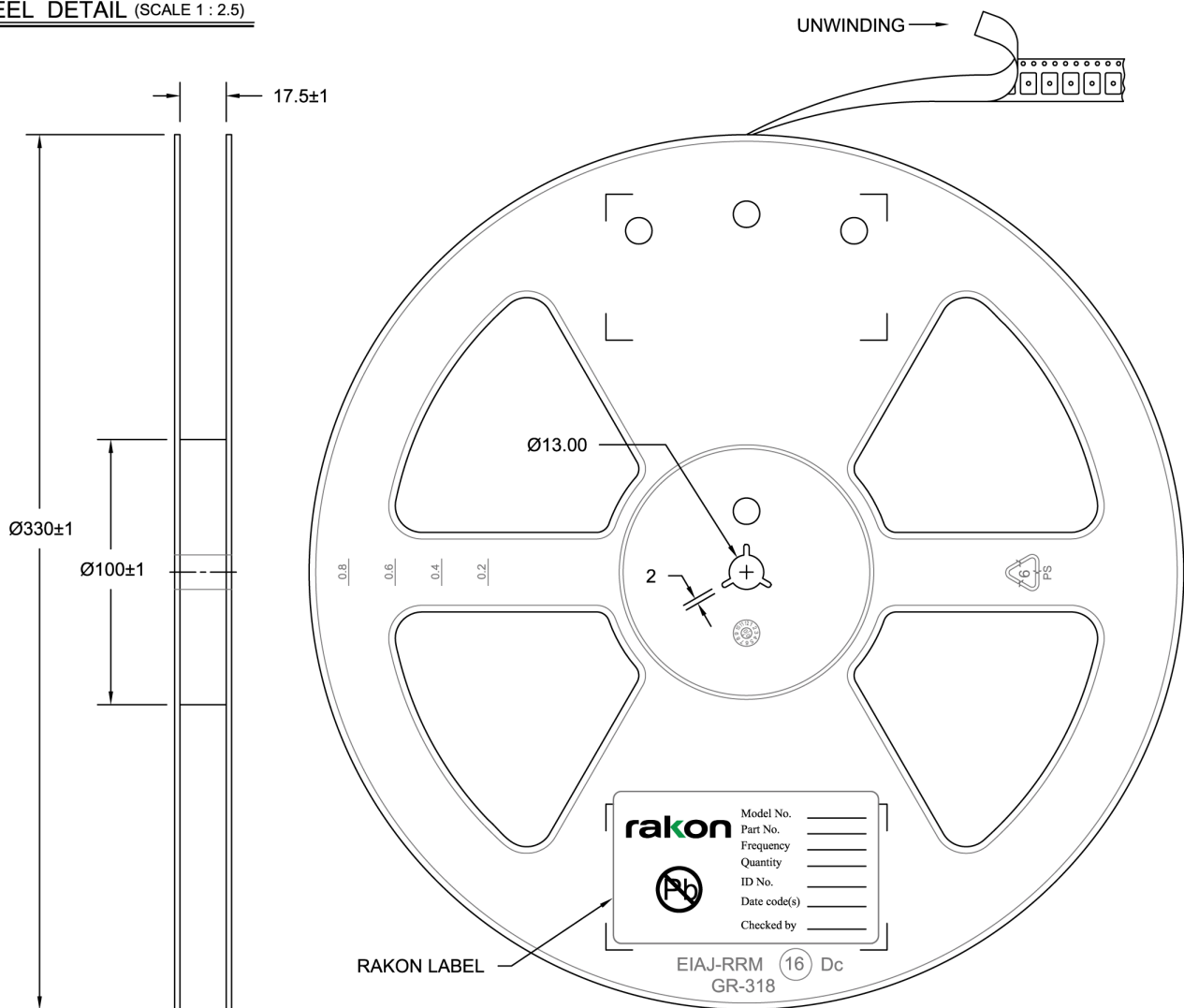
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**Drawing Name: XO/VCXO 7050 Series Tape & Reel**

TAPE DETAIL (SCALE 2 : 1)



REEL DETAIL (SCALE 1 : 2.5)



TITLE: XO/VCXO 7050 SERIES TAPE & REEL

RELATED DRAWINGS:

FILENAME: CAT032

REVISION: D

DATE: 05-Sep-11

SCALE: 2 : 1

Millimetres

TOLERANCES:

XX = ±0.5

X.X = ±0.2

X.XX = ±0.10

X.XXX = ±0.05

X° =

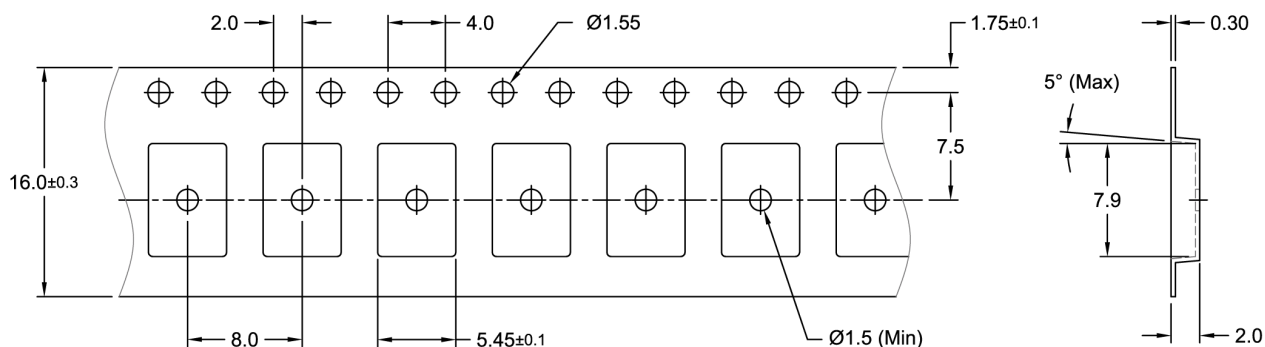
Hole =

**rakon**

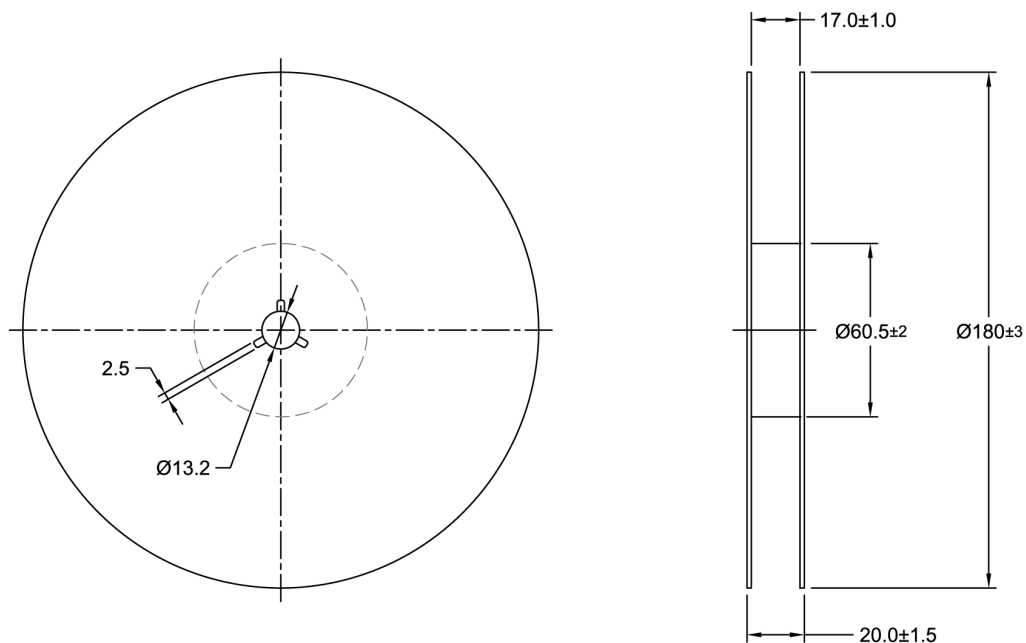
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**Drawing Name: RXO7050X G Tape & Reel**

**TAPE DETAIL** (SCALE 2:1)



**REEL DETAIL** (SCALE 1 : 2.5)



TITLE: RXO7050X G TAPE & REEL

RELATED DRAWINGS:

FILENAME: CAT617

REVISION: B

DATE: 24-Jan-12

SCALE: 2 : 1

Millimetres [inch]

TOLERANCES:

X.X =  $\pm 0.1$

X.XX =  $\pm 0.05$

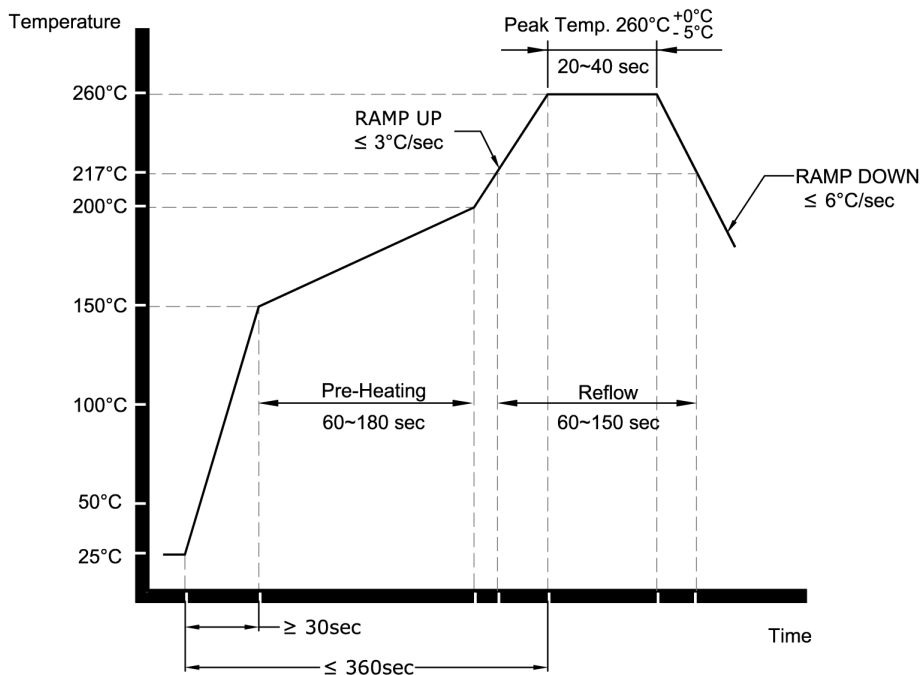
UNLESS OTHERWISE SPECIFIED

**rakon**

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**Drawing Name: Pb-Free 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 REFLOW

FILENAME: CAT541

RELATED DRAWINGS:

REVISION: B  
 DATE: 05-Sep-11  
 SCALE: NTS  
 Millimetres



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