RGX-3

rakon

SMD Communication Crystals

Acceleration tolerant SMD AT-cut quartz crystal in ceramic package with 6.0 mm x 3.5 mm footprint

Product description

Very small SMD AT-cut quartz crystal specifically designed to operate in vibration prone environments. Parts are able to survive acceleration 20,000G and higher with minimal parameter change. Vibration G-sensitivity significantly reduced. True SMD style, ceramic package with metal lid, seamed sealed. The product is supplied on tape and reel.

Applications

- GPS
- Agriculture
- Avionics
- Guidance
- Navigation
- Military
- Other

Features

- G-sensitivity down to 0.2ppb/G
- Low aging
- Up to 50,000G acceleration event survival
- Very good short term stability

Specifications

1.0 SPECIFICATION REFERENCES

Line	Parameter	Description
1.1	Model description	RGX-3
1.2	RoHS compliant	Yes
1.3	Reference number	
1.4	Rakon part number	

2.0 FREQUENCY CHARACTERISTICS

Line	Parameter	Test Condition	Value	Unit
2.1	Frequency		10 to 30	MHz
2.2	Calibration tolerance	Frequency at 25°C ±2°C and specified load capacitance	±10 to 20	ppm
2.3	Reflow shift	Two consecutive reflows as per attached profile after 4 hours recovery at 25°	±1 max	ppm
2.4	Frequency stability over temperature	Referenced to frequency reading at 25°C and the specified load capacitance	±4 to 40	ppm
2.5	Temperature range	Operating temperature	-55 to 95	°C
2.6	Frequency perturbations	Peak-to-peak deviation from the frequency vs. temperature 5th order curve fit. Minimum of 1 frequency reading every 3°C, over the operating temperature range	0.2 to 1	ppm
2.7	Short term stability	Root Allan Variance for 1 second Tau	1 max	ppb
2.8	Long term stability	Frequency drift over 1 year	±1 max	ppm
2.9	Long term stability	Frequency drift over 10 years	±5 max	ppm
2.10	G-Sensitivity	Gamma vector of all three axes from 30Hz to 1500Hz. Values as low as 0.2ppb/G available depending on design (Note 1)	0.2 to 0.8	ppb/g
2.11	Frequency offset after acceleration event	20,000G/2ms acceleration event in the z axis. Theoretical recovery time of 100ms (Note 1)	-3 to 0	ppm

3.0 ELECTRICAL

Line	Parameter	Test Condition	Value	Unit
3.1	Load capacitance (CL)	Frequency is calibrated at room temperature.	7 to 35	pF
3.2	Shunt capacitance (C0)	Operating specification	4 max	pF
3.3	Pullability		2 to 40	ppm/pF
3.4	Drive level	Operating specification	100 max	µW
3.5	Equivalent series resistance (ESR). Fundamental		50 max	Ω
3.6	Insulation resistance (IR)	100V ±15V at 25°C	500 min	MΩ

4.0 ENVIRONMENTAL

Line	Parameter	Description
4.1	Shock	Half sine-wave acceleration of 3,000G peak amplitude for 0.3ms duration, 3 cycles in each plane
4.2	Vibration	10G RMS 30Hz to 1500Hz duration of 2 hours in each axis
4.3	Humidity	After 48 hours at 85°C 85% relative humidity non-condensing
4.4	Thermal shock	Exposed at -40°C for 30 minutes then to 85°C for 30 minutes constantly for a period of 5 days
4.5	Storage temperature	-55 to 105°C

5.0 MANUFACTURING INFORMATION

Line	Parameter	Description
5.1	Reflow	Able to withstand solder reflow process. See reflow profile attached
5.2	Packaging description	Tape and Reel. Standard packing quantity is 2000 units per ø254mm reel, and 4000 units per ø330mm reel

6.0 MARKING

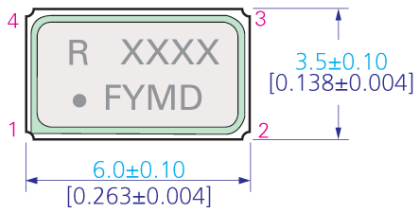
Line	Parameter	Description
6.1	Type	Laser engraved
6.2	Line 1	Rakon Logo and the last four characters of Rakon part number
6.3	Line 2	Pin 1 mark and Date Code

7.0 SPECIFICATION NOTES

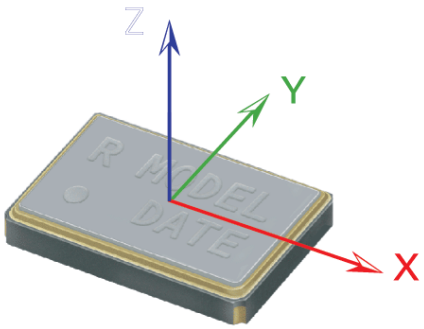
Line	Parameter	Description
7.1	Note 1	The min. G-Sensitivity and max. acceleration event survival specifications cannot be met at the same time. Please contact Rakon Sales with specific requirements

Drawing Name: RGX-3 Model Drawing

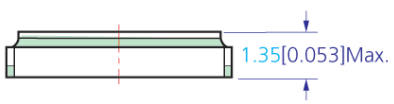
MODEL OUTLINE



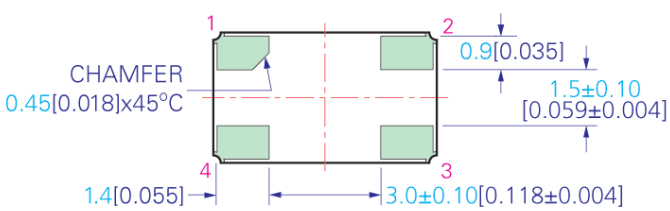
TOP VIEW



MODEL COORDINATE ORIENTATION



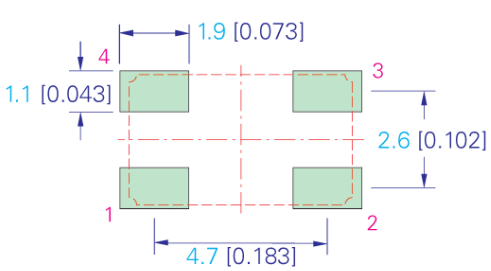
SIDE VIEW



BOTTOM VIEW

PIN CONNECTIONS	
1	CRYSTAL
2	GND
3	CRYSTAL
4	GND

RECOMMENDED PAD LAYOUT - TOP VIEW

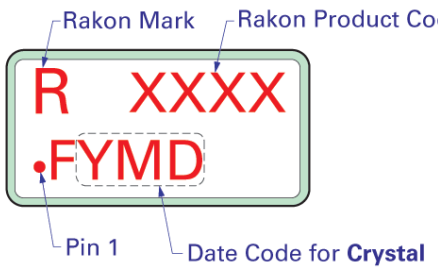


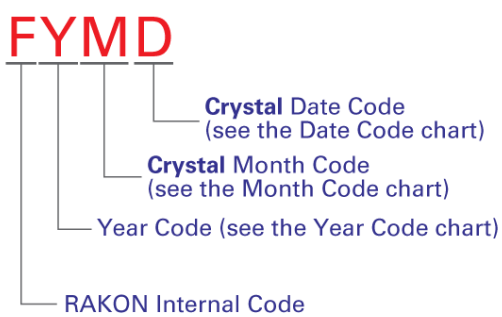
TITLE: RGX-3 MODEL	FILENAME: CAT351	Tolerance:
RELATED DRAWINGS:	REVISION: C	XX =±0.5
	DATE: 15-Oct-09	X.X =±0.2
	SCALE: 5 : 1	X.XX =±0.10
	Millimetres [inch]	X.XXX =±0.05
		X° =±1.0°
		Hole =±0.10

rakon

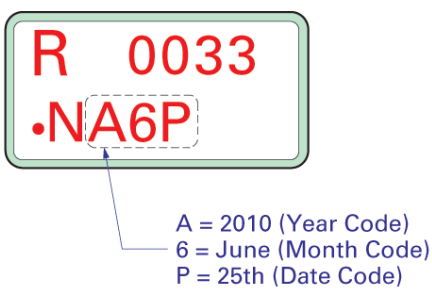
Drawing Name: RSX-6, RS(G)X-5, RS(G)X-3 Series Lid Marking

Marking:





Example:



Y - Year Code

Code	Year	Code	Year	Code	Year
0	2000	A	2010	N	2023
1	2001	B	2011	O	2024
2	2002	C	2012	P	2025
3	2003	D	2013	Q	2026
4	2004	E	2014	R	2027
5	2005	F	2015	S	2028
6	2006	G	2016	T	2029
7	2007	H	2017	U	2030
8	2008	I	2018	V	2031
9	2009	J	2019	W	2032
		K	2020	X	2033
		L	2021	Y	2034
		M	2022	Z	2035

M - Month Code

Code	Month
1	January
2	February
3	March
4	April
5	May
6	June
7	July
8	August
9	September
A	October
B	November
C	December

D - Date Code

Code	Date	Code	Date	Code	Date
1	1st	E	14th	R	27th
2	2nd	F	15th	S	28th
3	3rd	G	16th	T	29th
4	4th	H	17th	U	30th
5	5th	I	18th	V	31th
6	6th	J	19th		
7	7th	K	20th		
8	8th	L	21st		
9	9th	M	22nd		
A	10th	N	23rd		
B	11th	O	24th		
C	12th	P	25th		
D	13th	Q	26th		

Note: 1 MUST BE DIFFERENT TO I.

TITLE: RSX-6, RS(G)X-5, RS(G)X-3 SERIES LID MARKING

FILENAME: CAT190

RELATED DRAWINGS:

REVISION: D

DATE: 02-Jul-10

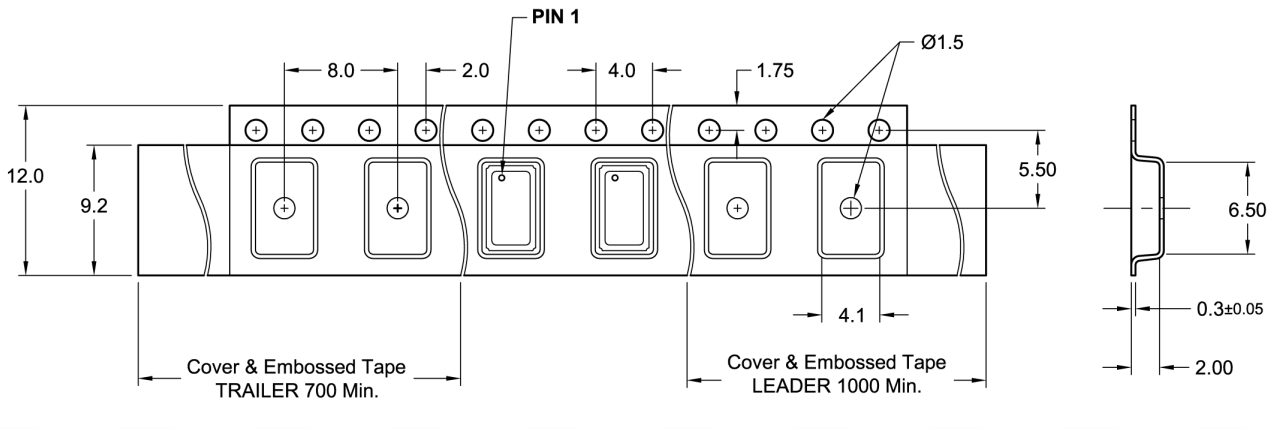
SCALE: NTS

Millimeters [inch]

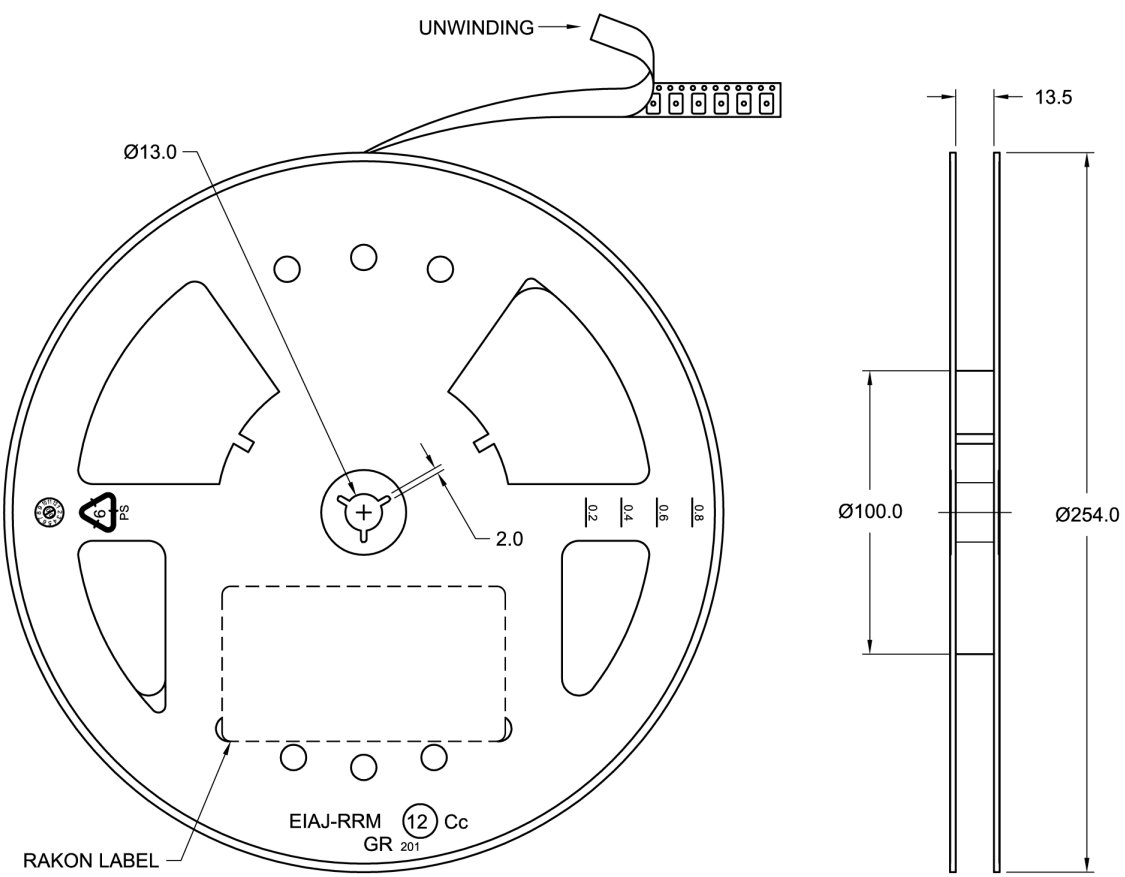
rakon

Drawing Name: RSX-3/RGX-3 Series Tape & Reel 254mm Dia

TAPE DETAIL (SCALE 2 : 1)



REEL DETAIL (SCALE 1 : 2.5)

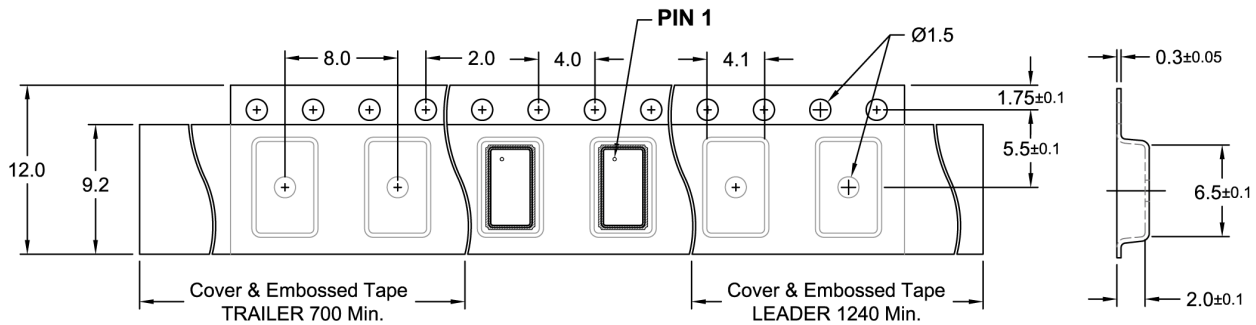


TITLE: RSX-3/RGX-3 SERIES TAPE & REEL	FILENAME: CAT566	TOLERANCES:	
RELATED DRAWINGS:	REVISION: B	XX =	
	DATE: 29-Sep-11	X.X = ±0.2	
	SCALE: 2 : 1	X.XX = ±0.10	
	Millimetres	X.XXX =	
		X° =	
		Hole =	

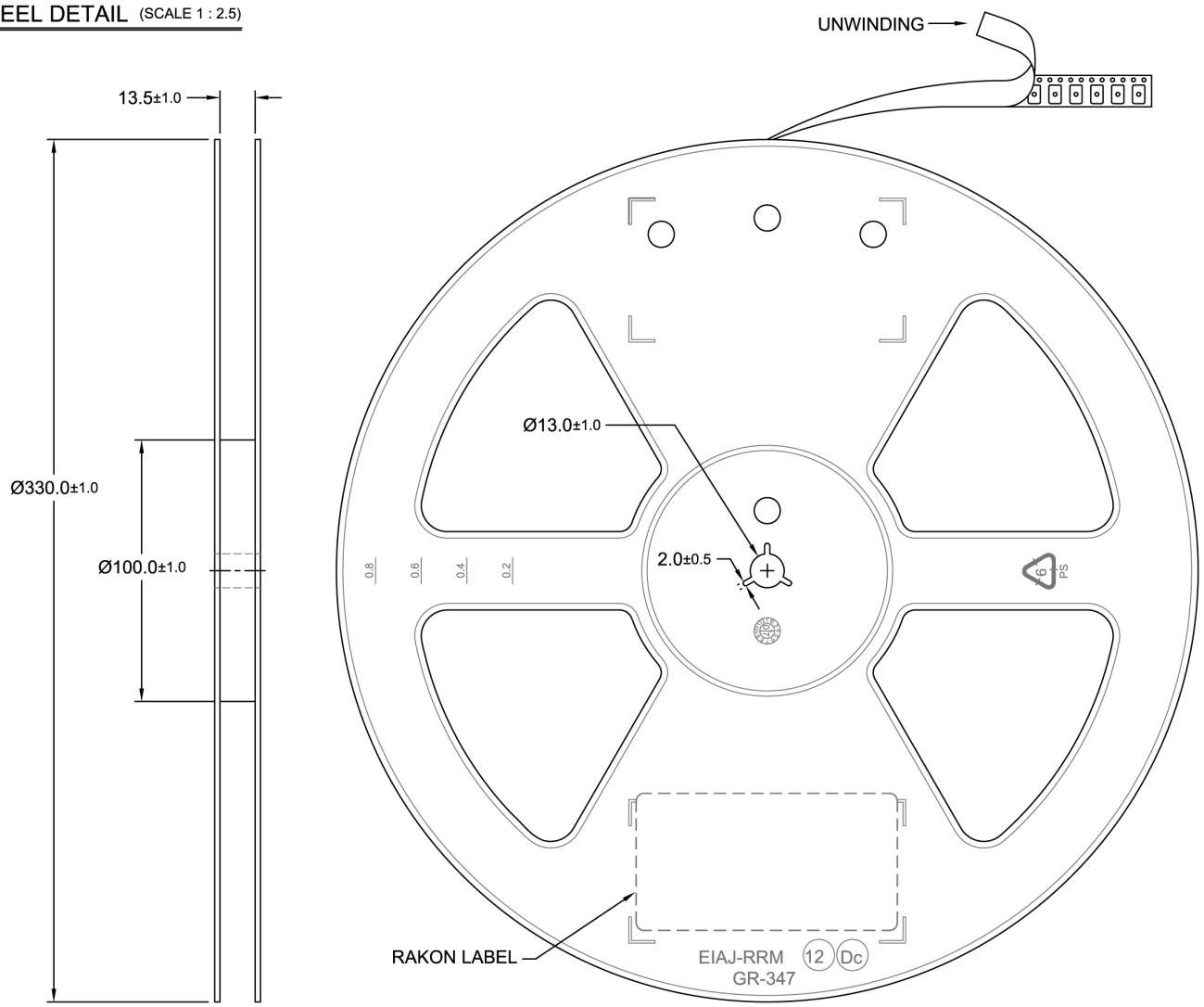
rakon

Drawing Name: RSX-3/RGX-3 Series Tape & Reel 330mm Dia

TAPE DETAIL (SCALE 2 : 1)



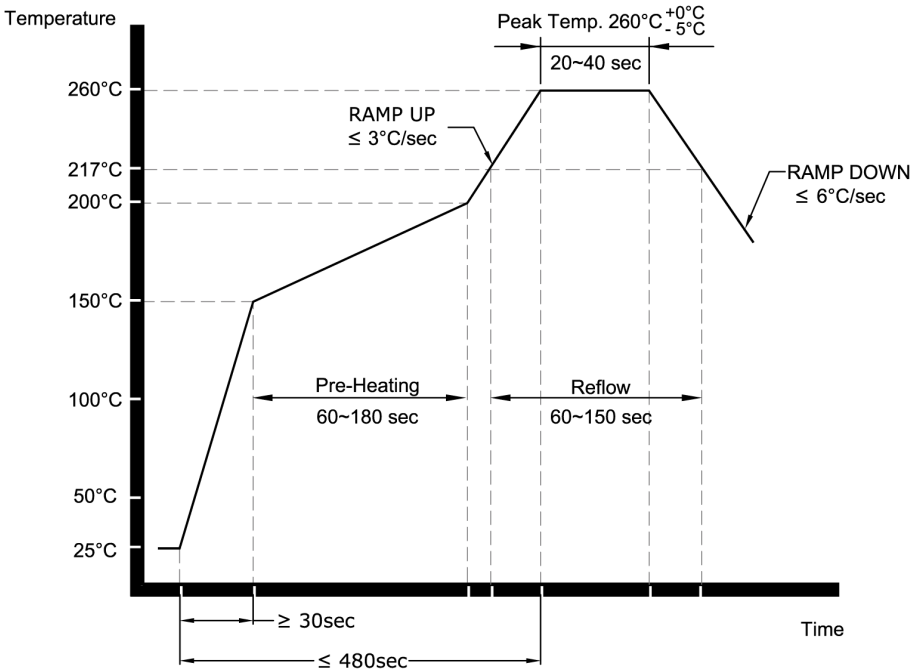
REEL DETAIL (SCALE 1 : 2.5)



TITLE: RSX-3/RGX-3 SERIES TAPE & REEL	FILENAME: CAT123	TOLERANCES: XX	
RELATED DRAWINGS:	REVISION: I	X.X = ±0.2	
	DATE: 20-Sep-11	X.XX = ±0.10	
	SCALE: 2 : 1	X.XXX	
	Millimetres	X°	
		Hole	

rakon

Drawing Name: RSX/RGX Crystals Pb-free Reflow



NOTE:
The product has been tested to withstand the Reflow Profile shown. The Reflow Profile used to solder Rakon RSX/RGX crystals are determined by the solder paste Manufacturer's specification. It is recommended that the Reflow Profile used does not exceed the one shown above.

TITLE: RSX/RGX CRYSTAL Pb-FREE REFLOW	FILENAME: CAT353
RELATED DRAWINGS:	REVISION: B
	DATE: 01-Feb-07
	SCALE: NTS
	Millimetres

rakon