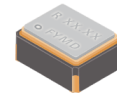


SMD Communication Crystal

Low profile SMD AT-cut quartz crystal with thermally coupled temperature sensor in a ceramic package with a 2.0 mm x 1.6 mm foot print.

**Product description**

Miniature low profile AT-cut quartz crystal with thermally coupled temperature sensor. True SMD style, ceramic package with nickel plated lid, seam welded. The product is supplied on tape and reel.

Applications

- Automotive
- Communications
- GPS
- Mobile phones
- Wi-Fi

Features

- Low aging
- Excellent shock and vibration performance
- Thermally coupled temperature sensor

Specifications**1.0 SPECIFICATION REFERENCE**

| Line | Parameter | Description |
|------|-------------------|-------------|
| 1.1 | Model description | RXT2016AT |
| 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 | | 19.2 to 52 | MHz |
| 2.2 | Calibration tolerance | Frequency at 25°C ±2°C and specified load capacitance | ±10 to 50 | ppm |
| 2.3 | Reflow shift | Frequency shift after reflow with 4 hours settling at 25°C | ±1 max | ppm |
| 2.4 | Frequency stability over temperature | Referenced to frequency reading at 25°C and the specified load capacitance | ±12 to 50 | ppm |
| 2.5 | Temperature range | Operating temperature | -40 to 85 | °C |
| 2.6 | Frequency perturbations | Residual error from the frequency versus temperature curve fit 5th order. Minimum of 1 frequency reading every 3°C over the operating temperature range | ±0.5 max | ppm |
| 2.7 | Long term stability | Frequency drift over 1 year at 25°C | ±1 to 2 | ppm |
| 2.8 | G sensitivity | Gamma vector of all three axes from 30Hz to 1500Hz at 10 RMS | 2 max | ppb/g |

3.0 ELECTRICAL

| Line | Parameter | Test Condition | Value | Unit |
|------|------------------------------------|---|----------|--------|
| 3.1 | Load capacitance (CL) | Frequency is calibrated at room temperature | 5 to 32 | pF |
| 3.2 | Shunt capacitance (C0) | Operating specification | 0.5 to 3 | pF |
| 3.3 | Pullability | Load and frequency dependent | 0.5 min | ppm/pF |
| 3.4 | Drive level | Operating specification | 100 max | μW |
| 3.5 | Equivalent series resistance (ESR) | | 85 max | Ω |
| 3.6 | Insulation resistance (IR) | 100V ±15V at 25°C | 500 min | MΩ |

4.0 FREQUENCY VS TEMPERATURE CURVE FIT COEFFICIENTS

| Line | Parameter | Test Condition | Value | Unit |
|------|-----------------------------|--|----------|------|
| 4.1 | Inflection temperature (T0) | Reference temperature for calculation of 3rd order coefficients | 28 to 32 | °C |
| 4.2 | First order coefficient | Typical value using third order curve fitting referenced to T0. Calculated over the operating temperature range. TBD | | |
| 4.3 | Second order coefficient | Typical value using third order curve fitting referenced to T0. Calculated over the operating temperature range. TBD | | |
| 4.4 | Third order coefficient | Typical value using third order curve fitting referenced to T0. Calculated over the operating temperature range. TBD | | |

5.0 TEMPERATURE SENSOR CHARACTERISTICS

| Line | Parameter | Test Condition | Value | Unit |
|------|---------------------------------|--|-----------|------|
| 5.1 | Resistance (Ro) | Resistance at 25°C (To) | 10 to 100 | kΩ |
| 5.2 | Resistance tolerance | | ±1 max | % |
| 5.3 | Beta constant (25 - 50°C) 10kΩ | Calculated between two specified temperatures points R and Ro. T and To are absolute temperature (K). $\text{Beta} = \ln(R/R_o) / (1/T - 1/T_o)$ | 3380 | K |
| 5.4 | Beta constant (25 - 50°C) 100kΩ | Calculated between two specified temperatures points R and Ro. T and To are absolute temperature (K). $\text{Beta} = \ln(R/R_o) / (1/T - 1/T_o)$ | 4250 | K |
| 5.5 | Beta tolerance | | ±1 max | % |
| 5.6 | Thermistor size | 0201 | | |

6.0 ENVIRONMENTAL

| Line | Parameter | Description |
|------|---------------------|---|
| 6.1 | Shock | Half sine-wave acceleration of 3000g peak amplitude. Duration: 0.3ms, Velocity: 12.3 ft/s [MIL-STD-202 M213] |
| 6.2 | Moisture resistance | 1000 hours at 85°C, 85% Relative Humidity. Biased. [MIL-STD-202 M106G] |
| 6.3 | Temperature cycling | 1000 temperature cycles, where each cycle consists of a 25 minute soak time at -40°C followed by a 25 minute soak time at 85°C, with a 60 second maximum transition time between temperatures. Air to air transition. [JESD22 METHOD JA-104C] |
| 6.4 | Vibration | 5g for 20 minutes. 12 cycles in each of 3 orientations. Test from 10-2000Hz [JESD22-B103-B] |
| 6.5 | Storage temperature | -40 to 105°C |

7.0 MANUFACTURING INFORMATION

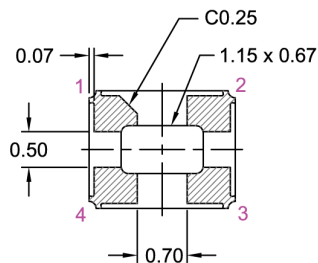
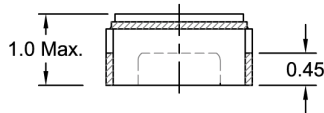
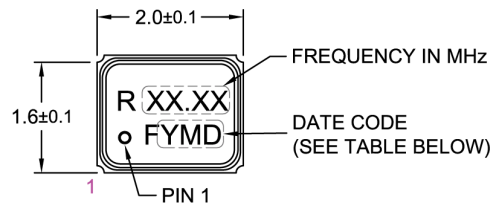
| Line | Parameter | Description |
|------|-----------------------|---|
| 7.1 | Washing | Able to withstand aqueous washing process |
| 7.2 | Reflow | Able to withstand reflow process |
| 7.3 | Packaging description | Tape and reel. Standard packing quantity is 3000 units per reel |

8.0 MARKING

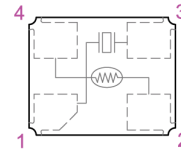
| Line | Parameter | Description |
|------|-----------|--------------------------------|
| 8.1 | Type | Laser engraved |
| 8.2 | Line 1 | R and frequency in MHz [XX.XX] |
| 8.3 | Line 2 | Pin 1 and date code |

Drawing Name: RXT2016 Model Drawing

MODEL OUTLINE



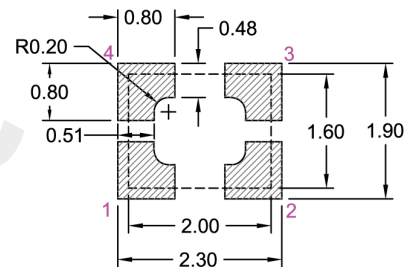
EQUIVALENT CIRCUIT - TOP VIEW



PIN CONNECTIONS

| | |
|---|---------|
| 1 | CRYSTAL |
| 2 | GND |
| 3 | CRYSTAL |
| 4 | THERM |

RECOMMENDED PAD LAYOUT - TOP VIEW



Y - Year Code

| Code | Year | Code | Year |
|------|------|------|------|
| A | 2010 | N | 2023 |
| B | 2011 | O | 2024 |
| C | 2012 | P | 2025 |
| D | 2013 | Q | 2026 |
| E | 2014 | R | 2027 |
| F | 2015 | S | 2028 |
| G | 2016 | T | 2029 |
| H | 2017 | U | 2030 |
| I | 2018 | V | 2031 |
| J | 2019 | W | 2032 |
| K | 2020 | X | 2033 |
| L | 2021 | Y | 2034 |
| M | 2022 | Z | 2035 |

M - Month Code

| Code | Month |
|------|-------|
| 1 | Jan |
| 2 | Feb |
| 3 | Mar |
| 4 | Apr |
| 5 | May |
| 6 | Jun |
| 7 | Jul |
| 8 | Aug |
| 9 | Sep |
| A | Oct |
| B | Nov |
| C | Dec |

D - Day Code

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

TITLE: RXT2016AT MODEL

RELATED DRAWINGS:

FILENAME: CAT681

REVISION: A

DATE: 18-Apr-12

SCALE: 10 : 1

Millimetres

TOLERANCES:

XX =

X.X =

X.XX = ±0.10

X.XXX = ±0.05

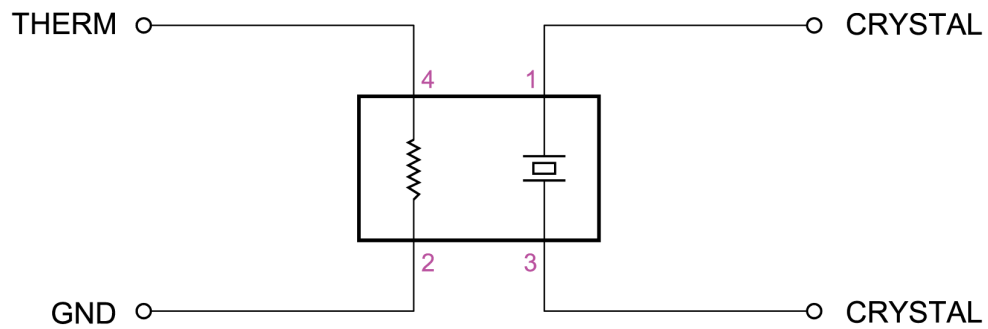
X° =

Hole =

rakon

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Drawing Name: RXT2520AT Series Electrical Circuit



TITLE: RXT-AT SERIES ELECTRICAL CIRCUIT

RELATED DRAWINGS:

FILENAME: CAT590

REVISION: D

DATE: 18-Apr-12

SCALE: NTS

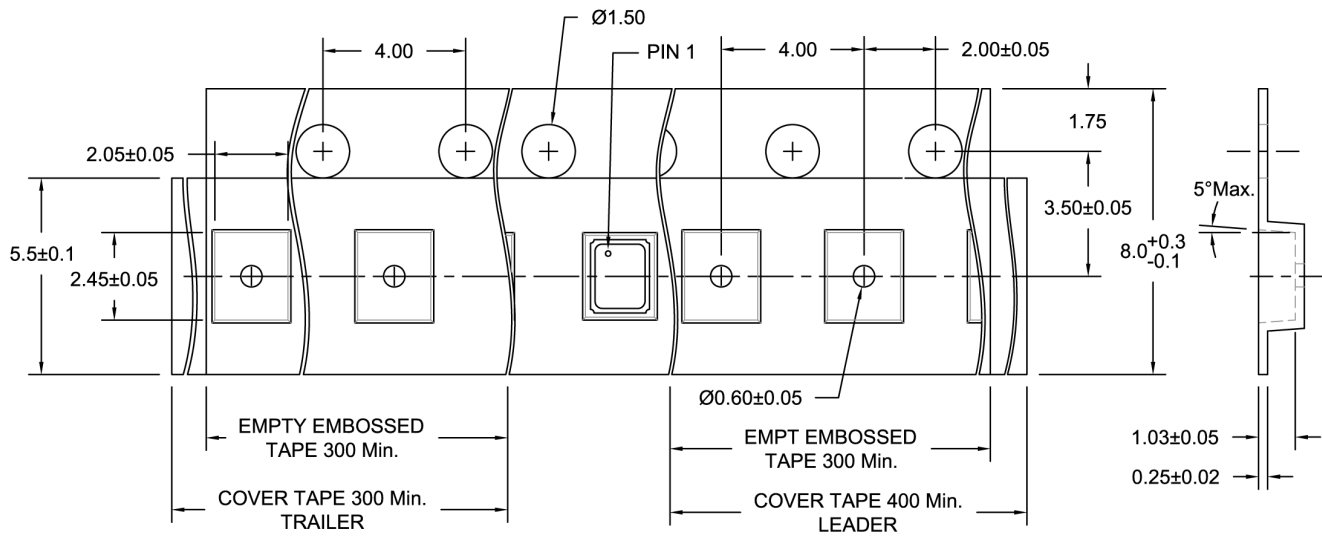
Millimetres

rakon

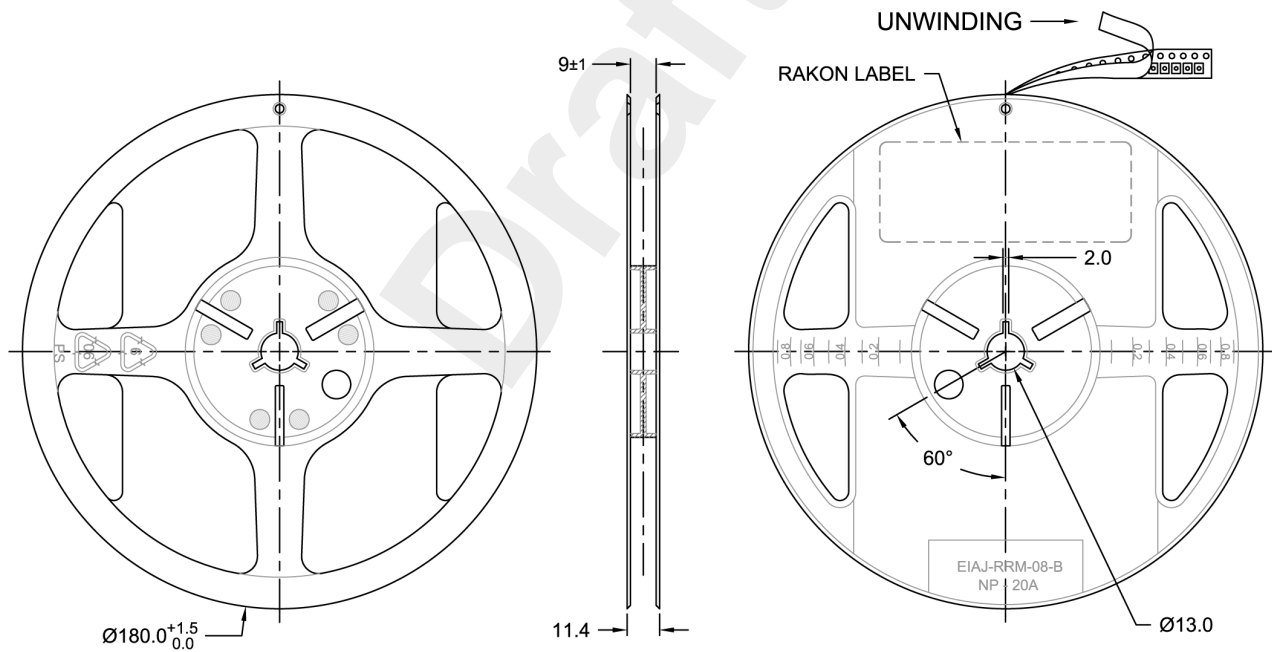
© 2009 Rakon Limited

Drawing Name: 2016 Series Crystal Tape & Reel

TAPE DETAIL (Scale 5 : 1)



REEL DETAIL (Scale 1 : 2.5)



TITLE: 2016 SERIES CRYSTAL TAPE & REEL

RELATED DRAWINGS:

FILENAME: CAT682

REVISION: A

DATE: 18-Apr-12

SCALE: 5 : 1

Millimetres

TOLERANCES:

XX =

X.X = ±0.2

X.XX = ±0.10

X.XXX =

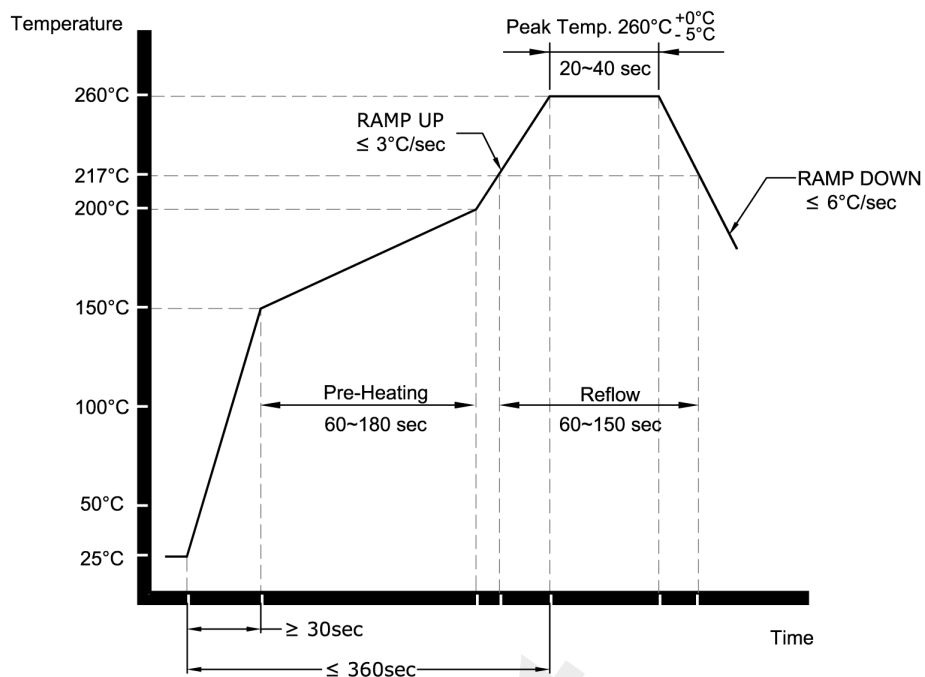
X° =

Hole =

rakon

© 2009 Rakon Limited

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

RELATED DRAWINGS:

FILENAME: CAT541

REVISION: B

DATE: 05-Sep-11

SCALE: NTS

Millimetres

rakon

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