

# 1X Series 2.0 x 1.6 mm SMD Crystal

1 : 2.0×1.6×0.45 mm | SMD2016-4P X : Crystal Resonator

## Feature

- AT-cut Crystal Construction
- Ultra miniature Seam sealed ceramic surface mount
- High temperature, high precision and reliability Characteristics
- Package Size:2.0 x 1.6 x 0.45mm
- Pb-free and RoHS/Green compliant

## Applications

- Audio Devices
- Portable devices
- Short-range Wireless module
- Computers, Modems, Microprocessors



## Electrical Specifications

| Item                      | Symb.            | Min.                 | Typ. | Max.     | Unit | Notes                           |
|---------------------------|------------------|----------------------|------|----------|------|---------------------------------|
| Frequency Range           | Freq.            | 16.000               |      | 54.000   | MHz  |                                 |
| Oscillation Mode          |                  | Fundamental (AT-cut) |      |          |      |                                 |
| Frequency Tolerance       | $\Delta f/f$     |                      |      | $\pm 10$ | ppm  | at 25°C $\pm 2^{\circ}\text{C}$ |
| Operating Temperature     | T <sub>use</sub> | -20                  |      | 70       | °C   |                                 |
|                           |                  | -40                  |      | 85       | °C   |                                 |
| Storage Temperature Range | T <sub>sta</sub> | -55                  |      | 125      | °C   |                                 |
| Shunt Capacitance         | C <sub>0</sub>   |                      |      | 3        | pF   |                                 |
| Drive Level               | DL               |                      | 10   | 100      | μW   |                                 |
| Load Capacitance          | CL               | 6                    |      | 20       | pF   |                                 |
| Insulation Resistance     | IR               |                      |      | 500      | MΩ   | at DC 100V                      |
| Aging                     | f <sub>age</sub> |                      |      | 3        | ppm  | 1st. Year at 25°C               |

## Frequency Stability & Operating Temperature Range

| Temp. \ FT     | $\pm 10\text{ppm}$ | $\pm 15\text{ppm}$ | $\pm 20\text{ppm}$ | $\pm 30\text{ppm}$ |
|----------------|--------------------|--------------------|--------------------|--------------------|
| -20°C to +70°C | $\triangle$        | ★                  | ★                  | ★                  |
| -40°C to +85°C |                    | $\triangle$        | ★                  | ★                  |

★: Available     $\triangle$ : Conditional

## Equivalent Series Resistance

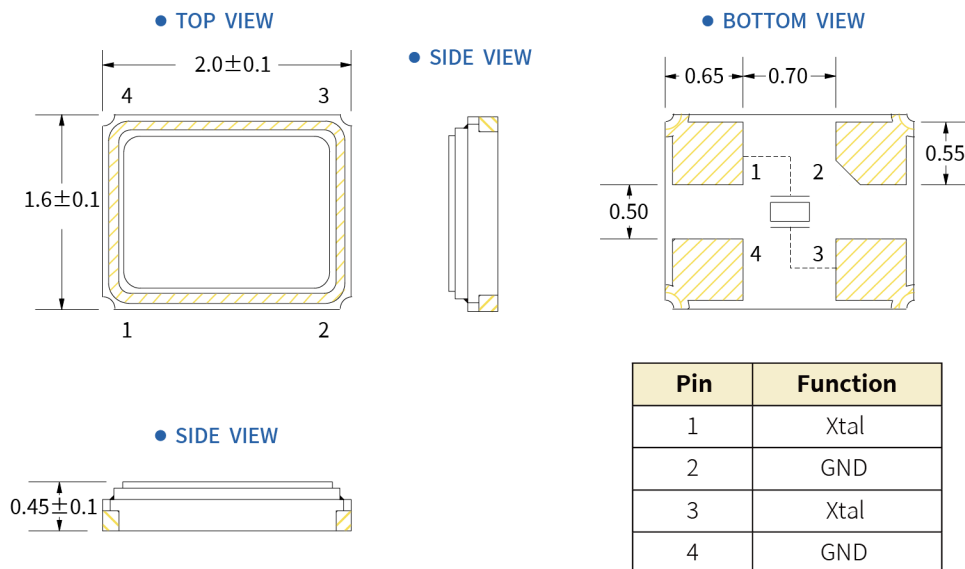
| Frequency Range                 | ESR(Max.)    |
|---------------------------------|--------------|
| 16MHz $\leq$ Freq. <24MHz       | 200 $\Omega$ |
| 24MHz $\leq$ Freq. <26MHz       | 80 $\Omega$  |
| 26MHz $\leq$ Freq. <40MHz       | 60 $\Omega$  |
| 40MHz $\leq$ Freq. $\leq$ 54MHz | 50 $\Omega$  |

# 1X Series 2.0 x 1.6 mm SMD Crystal

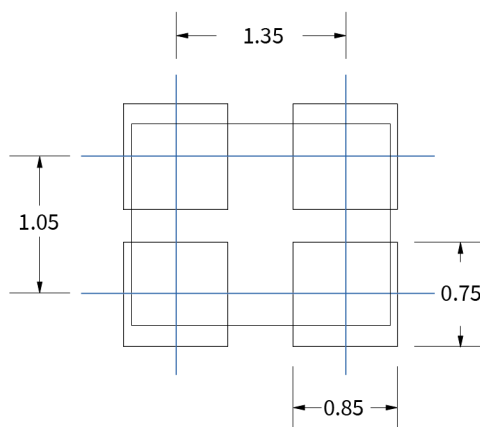
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## Dimensions (UNIT:mm)



## Solder pad layout (UNIT:mm)



## Options and Part Identification : Example SX1B16.000F1010F30

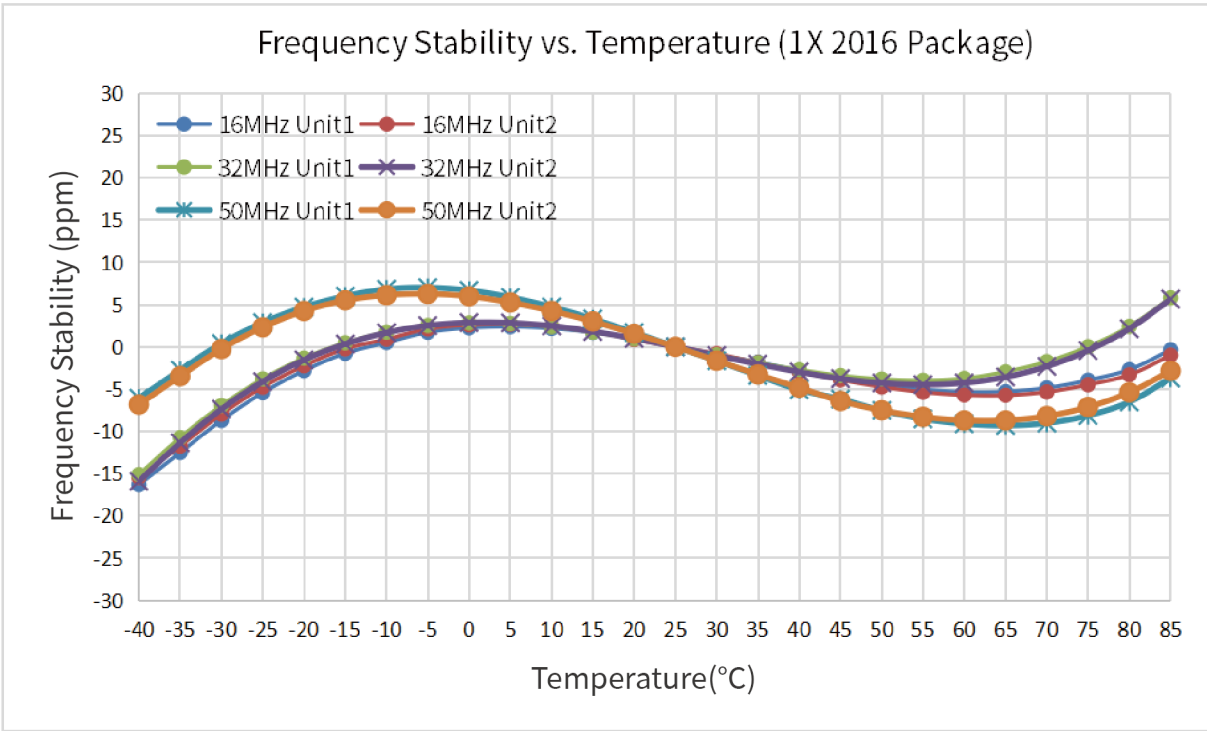
| Company | Ceramic Package           | Frequency Code [MHz] | Vibration Mode | Load Capacitance                        | Frequency Tolerance | Operating Temperature | Frequency Drift       |                 |
|---------|---------------------------|----------------------|----------------|-----------------------------------------|---------------------|-----------------------|-----------------------|-----------------|
| SX      | 1B                        | X.XXX                | F              | 10                                      | 10                  | F                     | 30                    |                 |
| Code    | Company                   | Frequency            | Code           | Vibration Mode                          | Code                | Frequency Tolerance   | Code                  | Frequency Drift |
| SX      | SCTF                      | 16.000               | F              | AT - Fundamental                        | 10                  | ±10ppm                | 10                    | ±10ppm          |
|         |                           |                      |                |                                         | 20                  | ±20ppm                | 15                    | ±15ppm          |
|         |                           |                      |                |                                         |                     |                       | 20                    | ±20ppm          |
|         |                           |                      |                |                                         |                     |                       | 30                    | ±30ppm          |
| Code    | Ceramic Package           |                      | Code           | Load Capacitance                        |                     | Code                  | Operating Temperature |                 |
| 0B      | 1.6 x 1.2 x 0.35mm [4PAD] |                      | S              | Please specify CL in pF or S for series |                     | E                     | -20°C ~ +70°C         |                 |
| 1B      | 2.0 x 1.6 x 0.45mm [4PAD] |                      | 06             | 6pF                                     |                     | F                     | -40°C ~ +85°C         |                 |
| 2B      | 2.5 x 2.0 x 0.55mm [4PAD] |                      | 08             | 8pF                                     |                     |                       |                       |                 |
| 3B      | 3.2 x 2.5 x 0.7mm [4PAD]  |                      | 10             | 10pF                                    |                     |                       |                       |                 |
| 5B      | 5.0 x 3.2 x 0.8mm[4PAD]   |                      | 12             | 12pF                                    |                     |                       |                       |                 |
| 5A      | 5.0 x 3.2 x 0.8mm[2PAD]   |                      | 20             | 20pF                                    |                     |                       |                       |                 |
| 7B      | 7.0 x 5.0 x 1.0mm[4PAD]   |                      |                |                                         |                     |                       |                       |                 |

If you have other parameter requirements, you can contact **SCTF** at any time.

# 1X Series 2.0 x 1.6 mm SMD Crystal

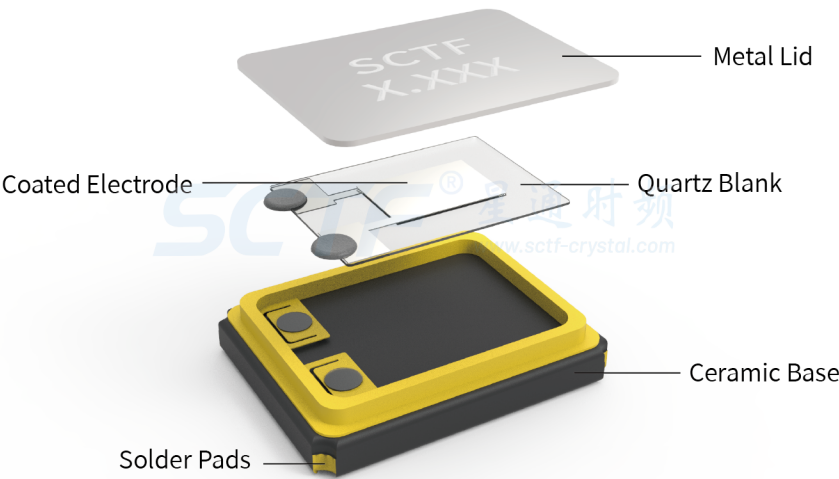
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## Frequency Temperature Characteristics

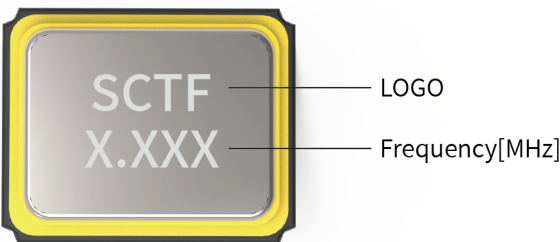


## Product Structure&Marking Information

### Product Structure



### Marking Information

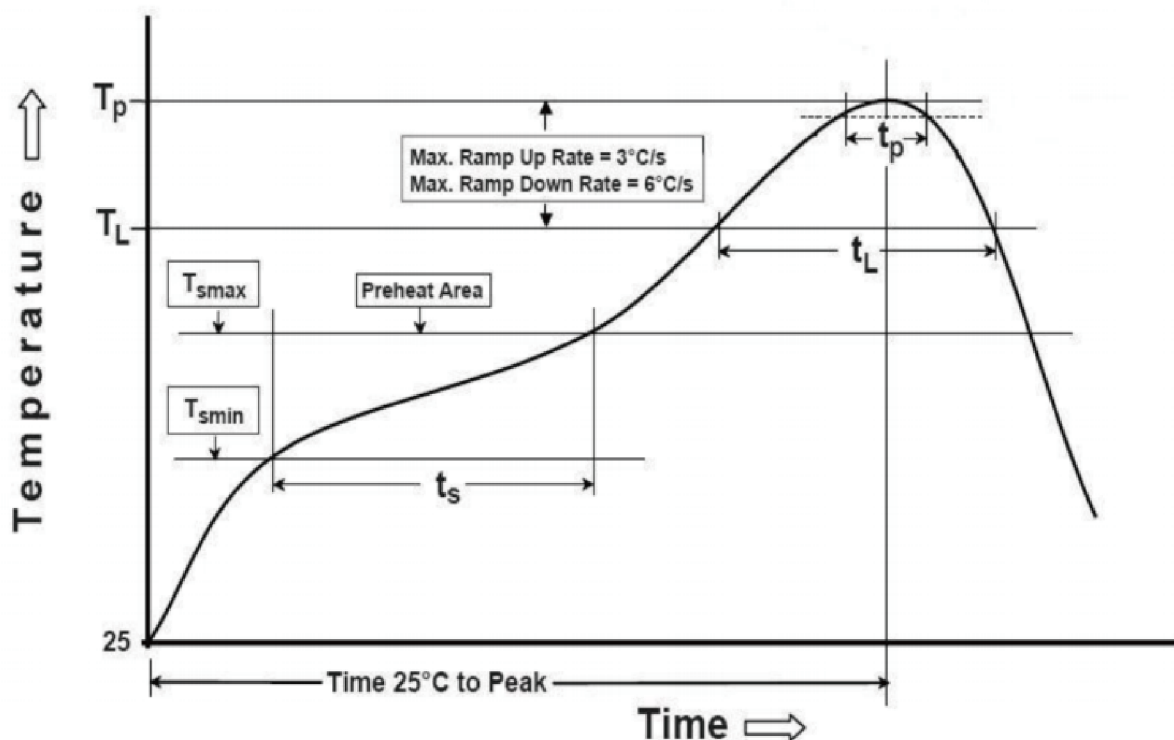


# 1X Series 2.0 x 1.6 mm SMD Crystal

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## Suggested Reflow Profile



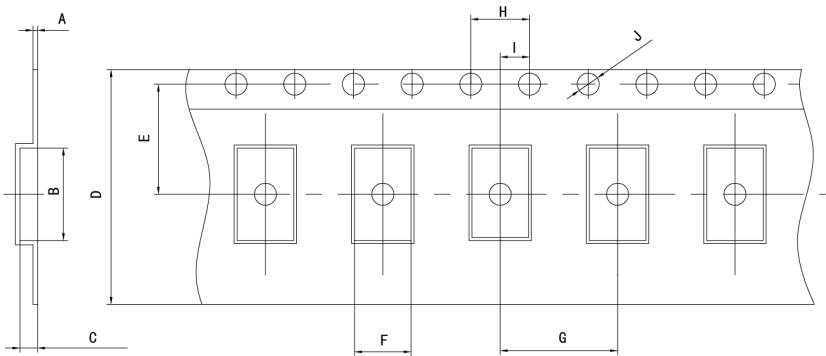
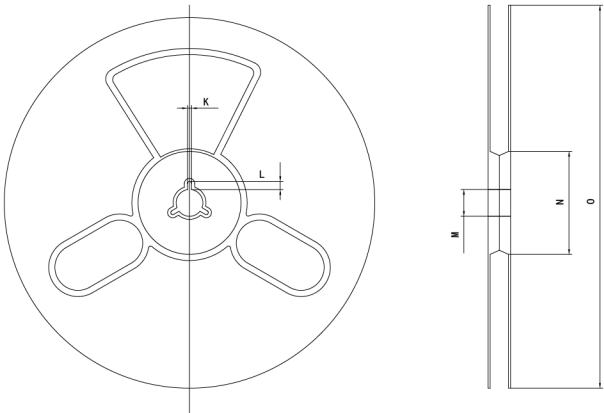
| Profile Feature                                                                                                                                                      | Sn - Pb Eutectic Assembly        | Preheat / Soak                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| Preheat / Soak <ul style="list-style-type: none"><li>● Temperature Min ( Ts min )</li><li>● Temperature Max ( Ts max )</li><li>● Time ( Ts min to Ts max )</li></ul> | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-120 seconds |
| Ramp - up rate ( TL to Tp )                                                                                                                                          | 3°C/ second max.                 | 3°C/ second max.                 |
| Time maintained above <ul style="list-style-type: none"><li>● Liquidous temperature ( TL )</li><li>● Time ( tL ) maintained above TL</li></ul>                       | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
| Peak package body temperature ( Tp )                                                                                                                                 | 235°C                            | 260°C                            |
| Time within 5° C of the specified classification temperature ( Tp )                                                                                                  | 20 seconds                       | 30 seconds                       |
| Ramp - down rate ( Tp to TL )                                                                                                                                        | 6°C/ second max.                 | 6°C/ second max.                 |
| Time 25° C to peak temperature                                                                                                                                       | 6 minutes max.                   | 8 minutes max.                   |
| Suggest reflow times                                                                                                                                                 | 2 Times max.                     |                                  |

# 1X Series 2.0 x 1.6 mm SMD Crystal

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## Packaging Information

T=Tape and reel (3,000pcs/reel)



Pocket Tape Dimensions(mm)

| Series | A         | B        | C       | D       | E       | F        | G       | H       | I       | J        | K       | L       | M       | N     | O      |
|--------|-----------|----------|---------|---------|---------|----------|---------|---------|---------|----------|---------|---------|---------|-------|--------|
| 1X     | 0.25±0.05 | 2.25±0.1 | 0.7±0.1 | 8.0±0.3 | 3.5±0.1 | 1.85±0.1 | 4.0±0.1 | 4.0±0.1 | 2.0±0.1 | φ1.5±0.1 | 2.0±0.2 | 4.0±1.0 | φ13±0.5 | φ60±1 | φ180±1 |

## Common Frequencies – MHz

| 1X Series |        |        |        |        |
|-----------|--------|--------|--------|--------|
| 16.000    | 19.200 | 20.000 | 24.000 | 24.305 |
| 24.576    | 25.000 | 26.000 | 27.000 | 27.120 |
| 30.000    | 32.000 | 32.768 | 36.000 | 37.400 |
| 38.400    | 40.000 | 48.000 | 50.000 | 52.000 |
| 54.000    |        |        |        |        |