

# 3X Series    3.2 x 2.5 mm SMD Crystal

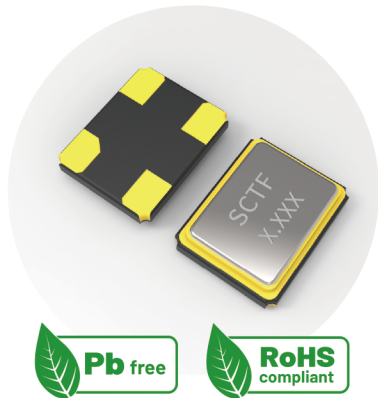
3 : 3.2×2.5×0.7 mm | SMD3225-4P                      X : Crystal Resonator

## Feature

- AT-cut Crystal Construction
- Ultra miniature ceramic surface mount with Metal Lid
- High temperature, high precision and reliability Characteristics
- Package Size: 3.2 x 2.5 x 0.7mm
- Pb-free and RoHS/Green compliant

## Applications

- Industrial applications
- Portable devices
- Short-range Wireless module
- Computers, Modems, Microprocessors



## Electrical Specifications

| Item                      | Symb.            | Min.                 | Typ. | Max.     | Unit          | Notes                         |
|---------------------------|------------------|----------------------|------|----------|---------------|-------------------------------|
| Frequency Range           | Freq.            | 8.000                |      | 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      | $\mu\text{W}$ |                               |
| Load Capacitance          | CL               | 6                    |      | 20       | pF            |                               |
| Insulation Resistance     | IR               |                      |      | 500      | M $\Omega$    | 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 |                    | $\triangle$        | ★                  | ★                  |

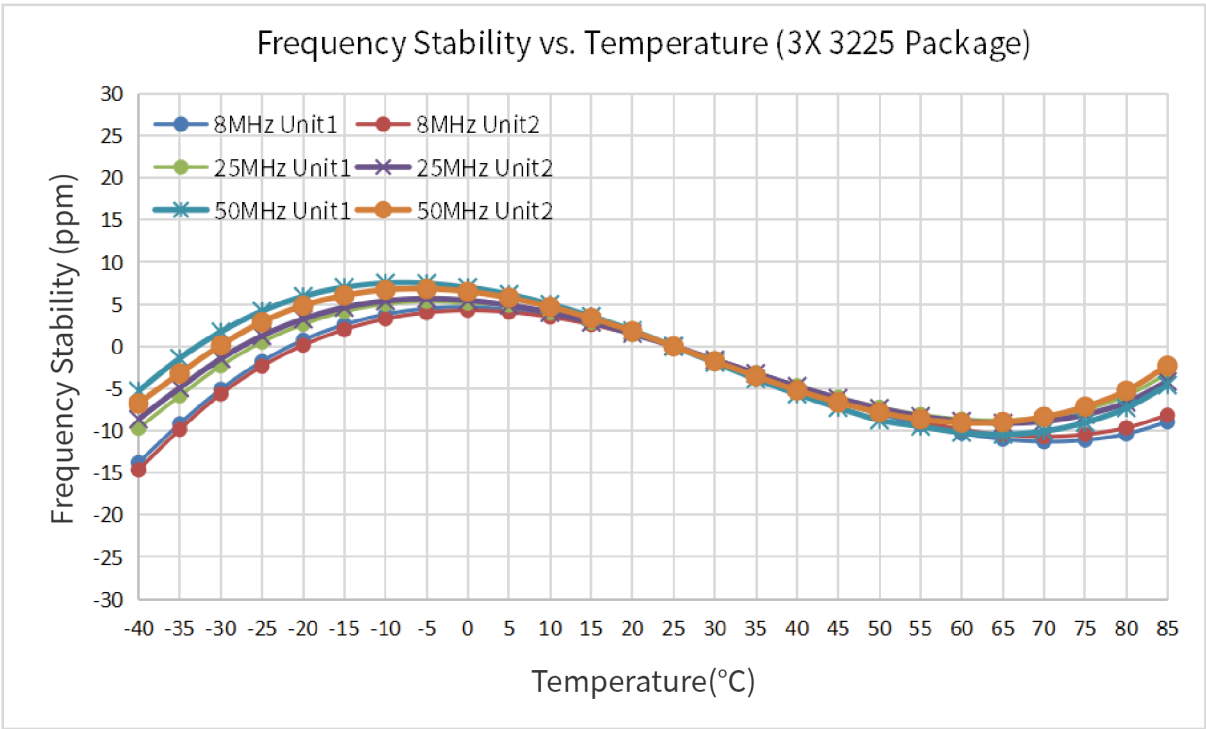
★: Available     $\triangle$ : Conditional

## Equivalent Series Resistance

| Frequency Range                 | ESR(Max.)    |
|---------------------------------|--------------|
| 8MHz $\leq$ Freq. < 10MHz       | 300 $\Omega$ |
| 10MHz $\leq$ Freq. < 16MHz      | 100 $\Omega$ |
| 16MHz $\leq$ Freq. < 20MHz      | 60 $\Omega$  |
| 20MHz $\leq$ Freq. $\leq$ 54MHz | 30 $\Omega$  |

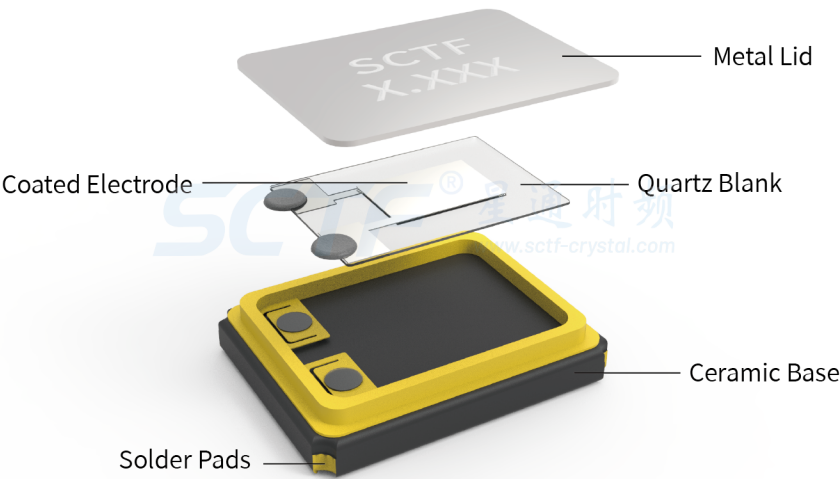
**X : Crystal Resonator**

Frequency Temperature Characteristics

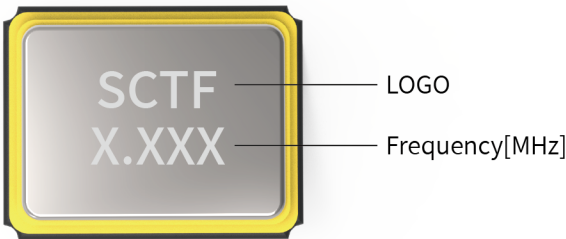


Product Structure&Marking Information

Product Structure



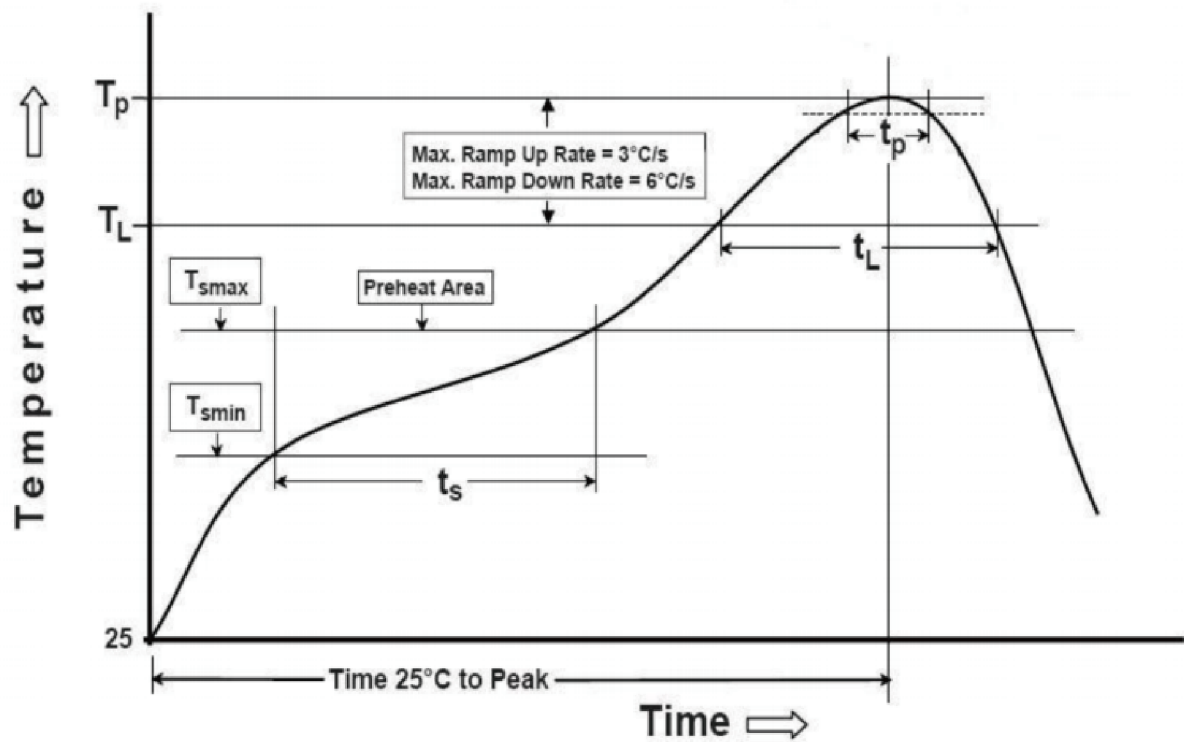
Marking Information



# 3X Series 3.2 x 2.5 mm SMD Crystal

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## Suggested Reflow Profile



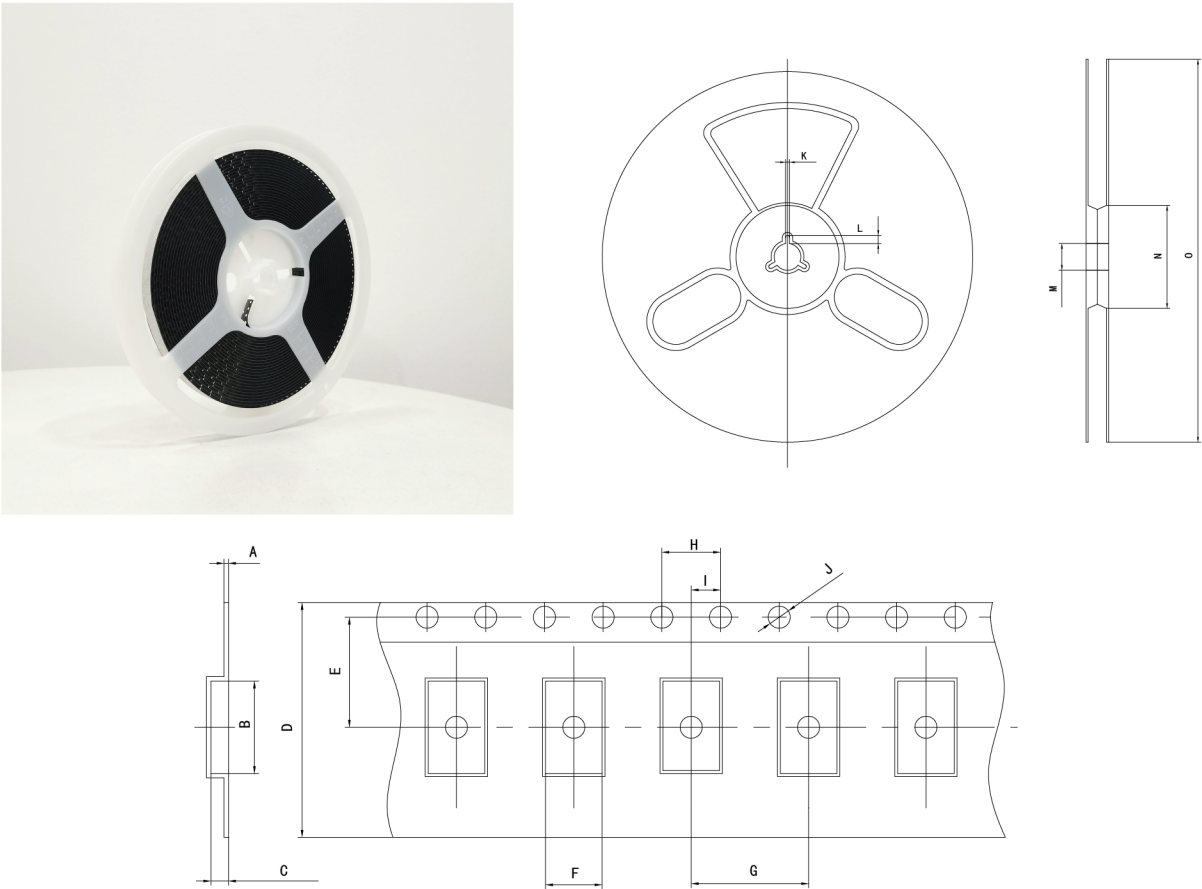
| Profile Feature                                                                                                                                                      | Sn - Pb Eutectic Assembly        | Preheat / Soak                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| 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.                     |                                  |

# 3X Series 3.2 x 2.5 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      |
|--------|-----------|---------|---------|---------|---------|----------|---------|---------|---------|----------|---------|---------|---------|-------|--------|
| 3X     | 0.25±0.05 | 3.5±0.1 | 1.0±0.1 | 8.0±0.1 | 3.5±0.1 | 2.75±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

| 3X Series |           |          |          |         |
|-----------|-----------|----------|----------|---------|
| 8.000     | 10.000    | 11.0592  | 12.000   | 12.288  |
| 12.800    | 13.000    | 13.52127 | 13.52313 | 13.560  |
| 13.598    | 13.824    | 14.31818 | 14.7456  | 16.000  |
| 16.384    | 16.9344   | 18.432   | 19.200   | 19.6608 |
| 20.000    | 22.1184   | 22.5792  | 24.000   | 24.305  |
| 24.576    | 25.000    | 26.000   | 27.000   | 27.120  |
| 27.1383   | 28.224    | 28.63636 | 29.4912  | 30.000  |
| 32.000    | 32.768    | 33.000   | 36.000   | 36.864  |
| 37.400    | 38.400    | 40.000   | 48.000   | 50.000  |
| 52.000    | 52.083333 | 54.000   |          |         |

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