

# 2CV Series 2.5 x 2.0 mm SMD Crystal Oscillator

2 : 2.5×2.0×0.81 mm | SMD2520-4P CV : Low Voltage Crystal Oscillator

## Feature

- Ceramic surface mount with Metal Lid
- CMOS compatible logic levels
- Tri-state function available
- Supply voltage range : 0.8V ~ 2.0V(1.2V typ.)
- RoHS Compliant / Pb Free

## Applications

- Wireless Devices
- Internet of Things (IoT) devices
- Fibre Channel
- Ethernet/Gigabit Ethernet
- Portable Electronics



## Electrical Specifications

| Item                         | Symb.                           | Min.   | Typ. | Max.   | Unit | Notes                                                                                     |
|------------------------------|---------------------------------|--------|------|--------|------|-------------------------------------------------------------------------------------------|
| Frequency Range              | Freq.                           | 0.75   |      | 50.000 | MHz  |                                                                                           |
| Operating Temperature        | T_use                           | -20    |      | +70    | °C   |                                                                                           |
|                              |                                 | -40    |      | +85    | °C   |                                                                                           |
| Storage Temperature Range    | T_stg                           | -55    |      | +125   | °C   |                                                                                           |
| Supply Voltage               | Vdd                             | 0.8    | 1.2  | 2.0    | V    |                                                                                           |
| Output Load                  | L_CMOS                          |        | 15   |        | pF   |                                                                                           |
| Current Consumption          | Icc                             |        |      | 1.5    | mA   | No load condition,Vdd=1.2V<br>0.75MHz ≤ Freq. < 12MHz                                     |
|                              |                                 |        |      | 1.7    |      | No load condition,Vdd=1.2V<br>12MHz ≤ Freq. < 24MHz                                       |
|                              |                                 |        |      | 2.0    |      | No load condition,Vdd=1.2V<br>24MHz ≤ Freq. < 50MHz                                       |
| Duty Cycle                   | SYM                             | 45     |      | 55     | %    | 50 % Vdd level, L_CMOS ≤ 15 pF                                                            |
| Rise / Fall Time             | T <sub>R</sub> / T <sub>F</sub> |        |      | 5      | nS   | 10% Vdd to 90% Level                                                                      |
| Start-up Time                | T_str                           |        |      | 5      | mS   | To 90% of Final Amplitude                                                                 |
| High output voltage          | V <sub>OH</sub>                 | 0.9Vdd |      |        | V    |                                                                                           |
| Low output voltage           | V <sub>OL</sub>                 |        |      | 0.1Vdd | V    |                                                                                           |
| Enable Voltage High(Logic 1) | V <sub>IH</sub>                 | 0.7Vdd |      |        | V    | Output will be disable if OE is Logic 0<br>Output will be enable if OE is Logic 1 or open |
| Enable Voltage Low(Logic 0)  | V <sub>IL</sub>                 |        |      | 0.3Vdd | V    |                                                                                           |
| Aging                        | f_age                           |        |      | 3      | ppm  | 1st. Year at 25°C                                                                         |

## Frequency Stability & Operating Temperature Range

| Temp. \ FT     | ±20ppm | ±25ppm | ±30ppm | ±50ppm |
|----------------|--------|--------|--------|--------|
| -20°C to +70°C | △      | ★      | ★      | ★      |
| -40°C to +85°C |        | △      | ★      | ★      |

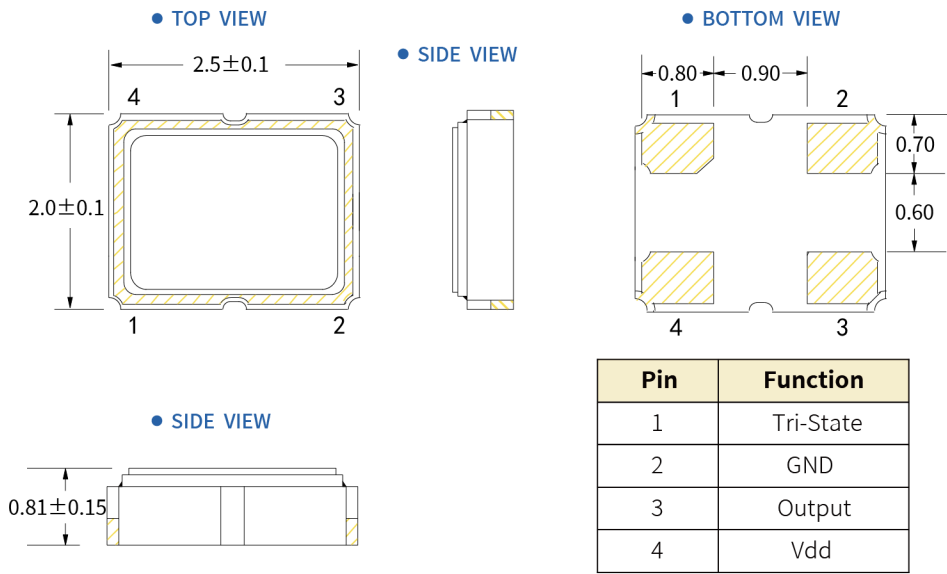
★: Available    △: Conditional

All condition: Include 25°C tolerance, operating temperature range , input voltage change, aging, load change.

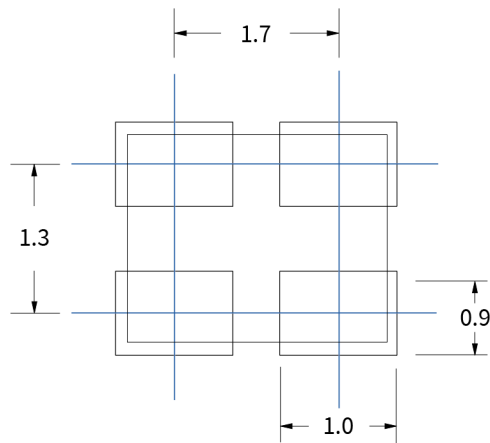
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## Dimensions (UNIT:mm)



## Solder pad layout (UNIT:mm)



## Options and Part Identification : Example SX2M25.000E20F30THN

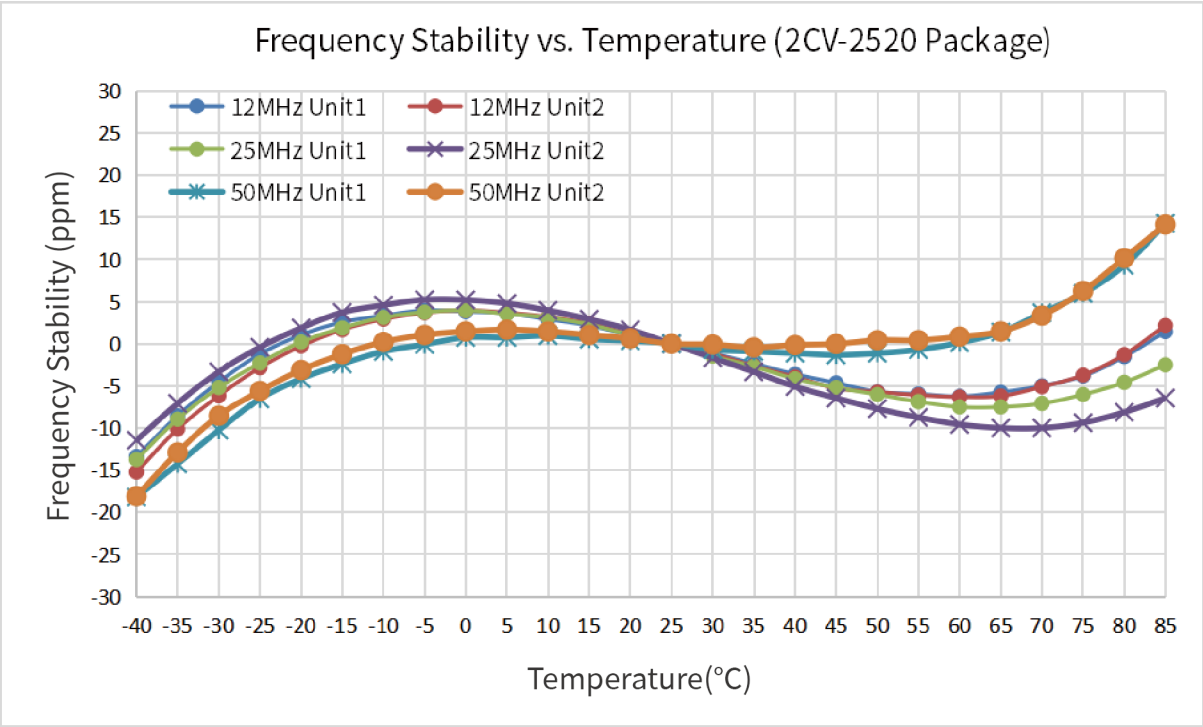
| Company      | Ceramic Package                                                                                     | Frequency Code [MHz] | Supply Voltage             | Frequency Tolerance      | Operating Temperature              | Frequency Drift                     | Output       | Current Consumption     | Phase Noise      |
|--------------|-----------------------------------------------------------------------------------------------------|----------------------|----------------------------|--------------------------|------------------------------------|-------------------------------------|--------------|-------------------------|------------------|
| SX           | 2M                                                                                                  | X.XXX                | E                          | 20                       | F                                  | 30                                  | T            | H                       | N                |
| Code Company |                                                                                                     | Frequency            |                            | Code Frequency Tolerance |                                    | Code Frequency Drift                |              | Code Current            |                  |
| SX SCTF      |                                                                                                     | 25.000<br>50.000     |                            | 10 ±10ppm<br>20 ±20ppm   |                                    | 15 ±15ppm<br>20 ±20ppm<br>30 ±30ppm |              | H 3mA<br>J 2mA<br>K 1mA |                  |
|              |                                                                                                     |                      | Code Voltage               |                          | Code Operating Temperature         |                                     | Code Output  |                         | Code Phase Noise |
|              | 7M 7.0×5.0×1.3mm<br>5M 5.0×3.2×1.2mm<br>3M 3.2×2.5×0.95mm<br>2M 2.5×2.0×0.81mm<br>1M 2.0×1.6×0.75mm |                      | G 0.8V<br>F 1.0V<br>E 1.2V |                          | E -20°C ~ +70°C<br>F -40°C ~ +85°C |                                     | T Squarewave |                         | N Standard       |

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

# 2CV Series 2.5 x 2.0 mm SMD Crystal Oscillator

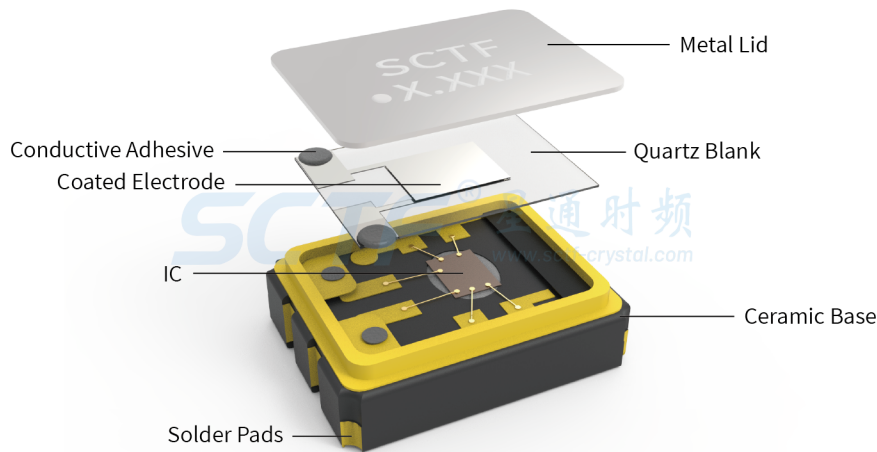
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## Frequency Temperature Characteristics

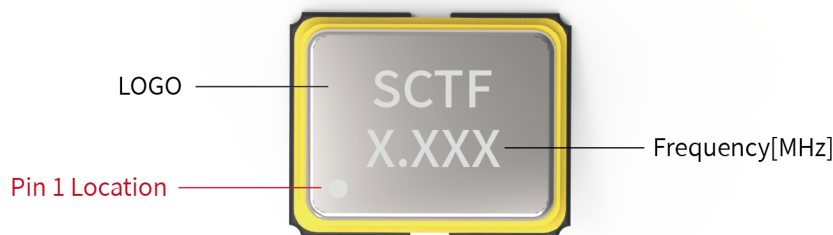


## Product Structure&Marking Information

### Product Structure



### Marking Information

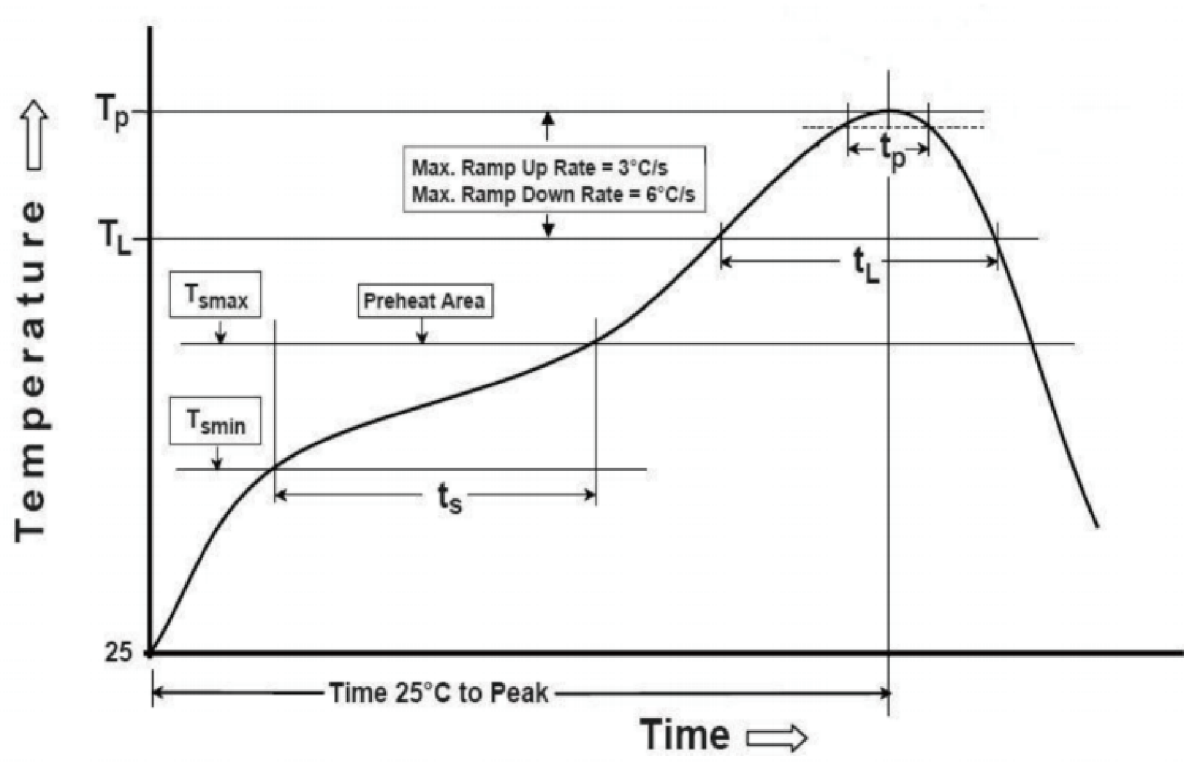


# 2CV Series 2.5 x 2.0 mm SMD Crystal Oscillator

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## Suggested Reflow Profile



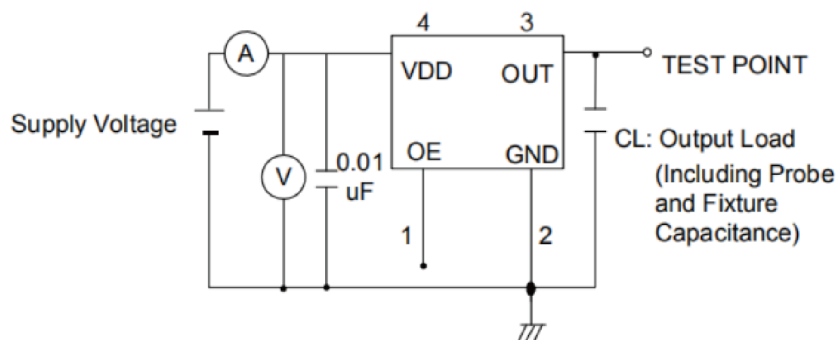
| Profile Feature                                                                                                                                                      | Sn - Pb Eutectic Assembly        | Preheat / Soak                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| 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.                   |
| Suggust reflow times                                                                                                                                                 | 2 Times max.                     |                                  |

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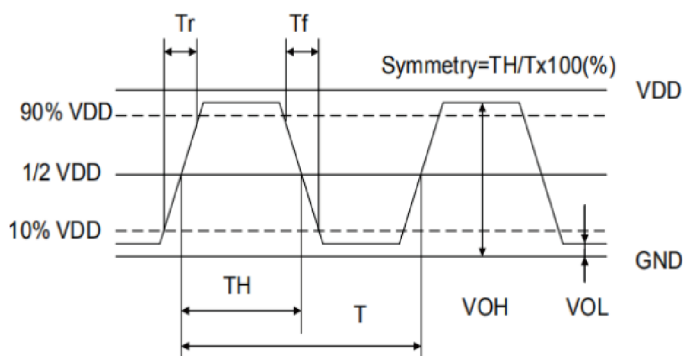
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## Testing Circuit



※ Notes: PIN 1 connected to Vdd or floating, the product is working properly; connected to GND, stops working.

## Waveform Conditions



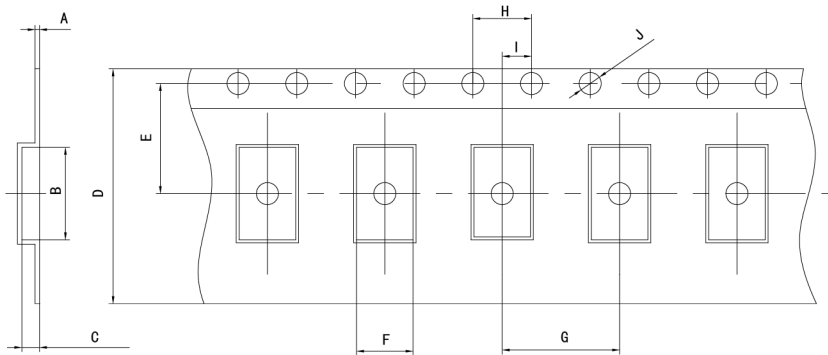
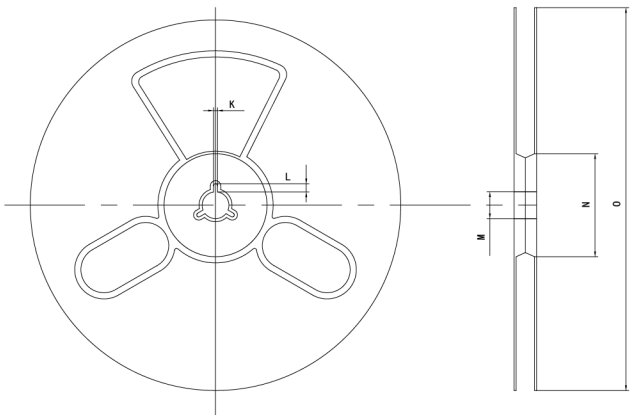
Waveform measurement system should have a min. bandwidth of 5 times the frequency being tested.

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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      |
|--------|-----------|---------|---------|---------|---------|----------|---------|---------|---------|----------|---------|---------|---------|-------|--------|
| 2CV    | 0.25±0.05 | 3.5±0.1 | 1.4±0.1 | 8.0±0.1 | 3.5±0.1 | 2.70±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

| 2CV Series |         |        |        |          |
|------------|---------|--------|--------|----------|
| 1.000      | 1.024   | 2.000  | 2.048  | 3.579545 |
| 3.6864     | 4.000   | 4.096  | 4.9152 | 6.000    |
| 6.144      | 7.3728  | 8.000  | 8.192  | 10.000   |
| 11.0592    | 11.2896 | 12.000 | 12.288 | 14.7456  |
| 16.000     | 16.384  | 18.432 | 20.000 | 22.1184  |
| 22.5792    | 24.000  | 24.576 | 25.000 | 26.000   |
| 27.000     | 30.000  | 32.000 | 32.768 | 33.000   |
| 33.3333    | 36.000  | 40.000 | 45.000 | 45.1584  |
| 49.152     | 50.000  |        |        |          |