

# 5VA Series 5.0 x 3.2 mm SMD Crystal Oscillator

5 : 5.0×3.2×1.25 mm | SMD5032-6P

VA : VCXO Crystal Oscillator [6PAD]

## Feature

- Ceramic surface mount with Metal Lid
- Wide Absolute pulling range:  $\pm 50$ ppm min.
- CMOS compatible logic levels
- RoHS Compliant / Pb Free

## Applications

- Networking, SONET/SDH
- Direct Digital Synthesis (DDS)
- DSL/ADSL
- Base Terminal Stations



## Electrical Specifications

| Item                         | Symb.                           | Min.               | Typ. | Max.               | Unit | Notes                                                                                     |
|------------------------------|---------------------------------|--------------------|------|--------------------|------|-------------------------------------------------------------------------------------------|
| Frequency Range              | Freq.                           | 2.048              |      | 54.000             | MHz  |                                                                                           |
| Operating Temperature        | T <sub>use</sub>                | -20                |      | +70                | °C   |                                                                                           |
|                              |                                 | -40                |      | +85                | °C   |                                                                                           |
| Storage Temperature Range    | T <sub>stg</sub>                | -55                |      | +125               | °C   |                                                                                           |
| Supply Voltage               | V <sub>dd</sub>                 | 2.97               | 3.3  | 3.63               | V    |                                                                                           |
| Output Load                  | L <sub>CMOS</sub>               |                    | 15   |                    | pF   |                                                                                           |
| Current Consumption          | I <sub>cc</sub>                 |                    |      | 10                 | mA   | 2.048MHz ≤ Freq. < 36MHz                                                                  |
|                              |                                 |                    |      | 15                 |      | 36MHz ≤ Freq. < 54MHz                                                                     |
| Absolute Pull Range          | APR                             | ±50                |      |                    | ppm  |                                                                                           |
| Center Voltage               | V <sub>cont</sub>               |                    | 1.65 |                    | V    |                                                                                           |
| Control Voltage Range        | V <sub>c</sub>                  | 0.3                |      | 3.0                | V    |                                                                                           |
| Linearity                    | L                               |                    |      | 10                 | %    |                                                                                           |
| Modulation Band Width        | MBW                             | 15                 |      |                    | KHz  |                                                                                           |
| VC Input Impedance           | R <sub>in</sub>                 | 5                  |      |                    | MΩ   |                                                                                           |
| Duty Cycle                   | SYM                             | 45                 |      | 55                 | %    | 50 % V <sub>dd</sub> level, L <sub>CMOS</sub> ≤ 15 pF                                     |
| High output voltage          | V <sub>OH</sub>                 | 0.9V <sub>dd</sub> |      |                    | V    |                                                                                           |
| Low output voltage           | V <sub>OL</sub>                 |                    |      | 0.1V <sub>dd</sub> | V    |                                                                                           |
| Enable Voltage High(Logic 1) | V <sub>IH</sub>                 | 0.7V <sub>dd</sub> |      |                    | 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>                 |                    |      | 0.3V <sub>dd</sub> | V    |                                                                                           |
| Rise / Fall Time             | T <sub>R</sub> / T <sub>F</sub> |                    |      | 5                  | nS   | 10% V <sub>dd</sub> to 90% Level                                                          |
| Start-up Time                | T <sub>str</sub>                |                    |      | 2                  | mS   | To 90% of Final Amplitude                                                                 |
| Aging                        | f <sub>age</sub>                |                    |      | 3                  | ppm  | 1st. Year at 25°C                                                                         |

## Frequency Stability & Operating Temperature Range

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

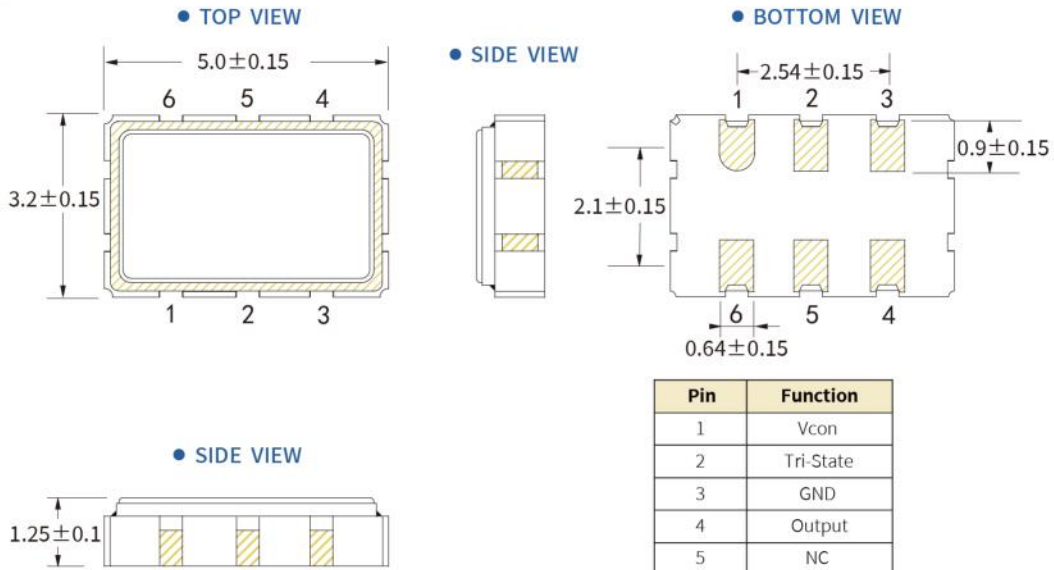
★: Available    △: Conditional

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

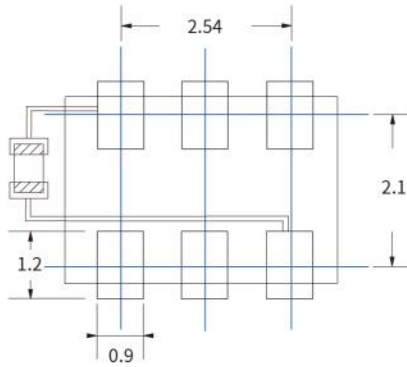
### 5.0 x 3.2 mm SMD Crystal Oscillator

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### Dimensions (UNIT:mm)



**Solder pad layout** (UNIT:mm)



To ensure optimal oscillator performance, place a by-pass capacitor of  $0.1\mu\text{F}$  as close to the part as possible between Vdd and GND pads.

### Options and Part Identification : Example SX5V10.000B20050F30TNS

| Company      | Ceramic Package                                           | Frequency Code [MHz] | Supply Voltage | Frequency Tolerance      | Pullability                                           | Operating Temperature              | Frequency Drift                     | Output      | Current Consumption | Phase Noise      | PAD      |
|--------------|-----------------------------------------------------------|----------------------|----------------|--------------------------|-------------------------------------------------------|------------------------------------|-------------------------------------|-------------|---------------------|------------------|----------|
| SX           | 5V                                                        | X.XXX                | B              | 20                       | 050                                                   | F                                  | 30                                  | T           | N                   | N                | S        |
| ↓            | ↓                                                         | ↓                    | ↓              | ↓                        | ↓                                                     | ↓                                  | ↓                                   | ↓           | ↓                   | ↓                | ↓        |
| Code Company |                                                           | Frequency            |                | Code Frequency Tolerance |                                                       |                                    | Code Frequency Drift                |             | Code Current        |                  | Code PAD |
| SX SCTF      |                                                           | 10.000               |                | 10 ±10ppm<br>20 ±20ppm   |                                                       |                                    | 15 ±15ppm<br>20 ±20ppm<br>30 ±30ppm |             | N Standard          |                  | S 6PAD   |
|              | ↓                                                         |                      | ↓              |                          | Code Pullability                                      |                                    |                                     | Code Output |                     | Code Phase Noise |          |
|              | Code Ceramic Package                                      |                      | Code Voltage   |                          | 050 ±50ppm<br>070 ±70ppm<br>085 ±85ppm<br>100 ±100ppm |                                    |                                     | T CMOS      |                     | N Standard       |          |
|              | 7V 7.0×5.0×1.6mm<br>5V 5.0×3.2×1.25mm<br>3V 3.2×2.5×0.9mm |                      | B 3.3V         |                          |                                                       | Code Operating Temperature         |                                     |             |                     |                  |          |
|              |                                                           |                      |                |                          |                                                       | E -20°C ~ +70°C<br>F -40°C ~ +85°C |                                     |             |                     |                  |          |

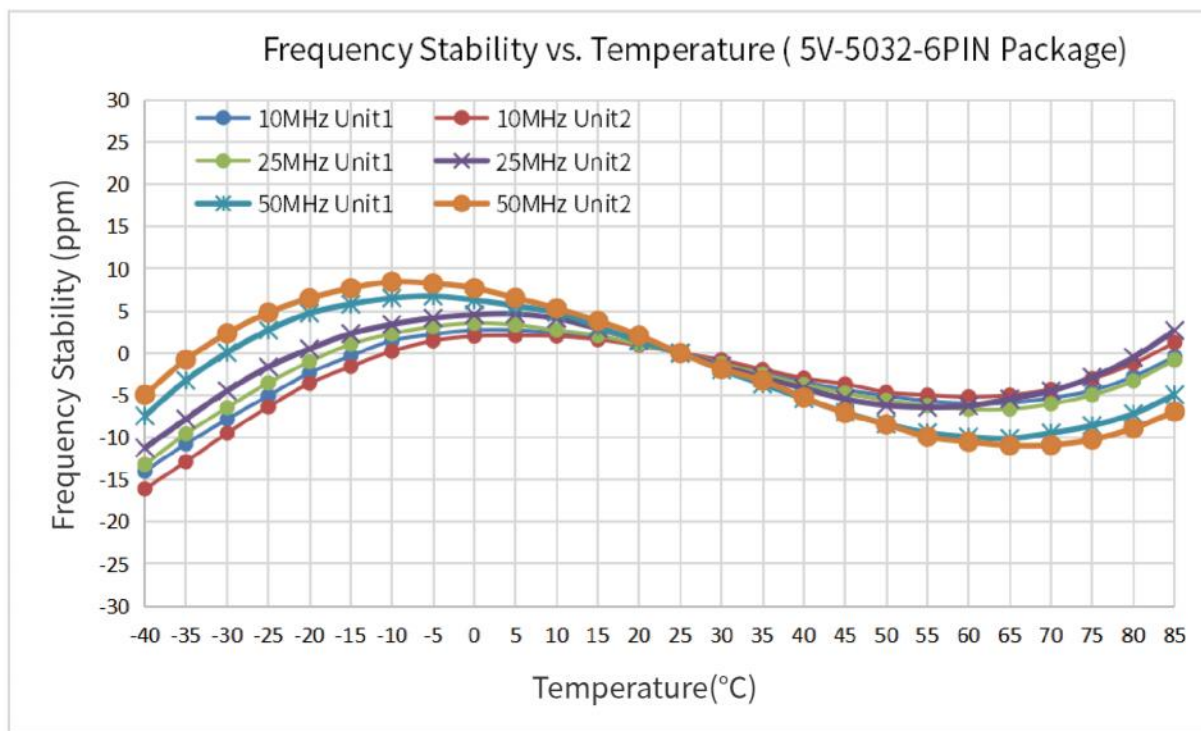
If you have other parameter requirements, you can contact **SCTF** at any time.

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## Frequency Temperature Characteristics



## Product Structure&Marking Information

### • Product Structure



### • Marking Information

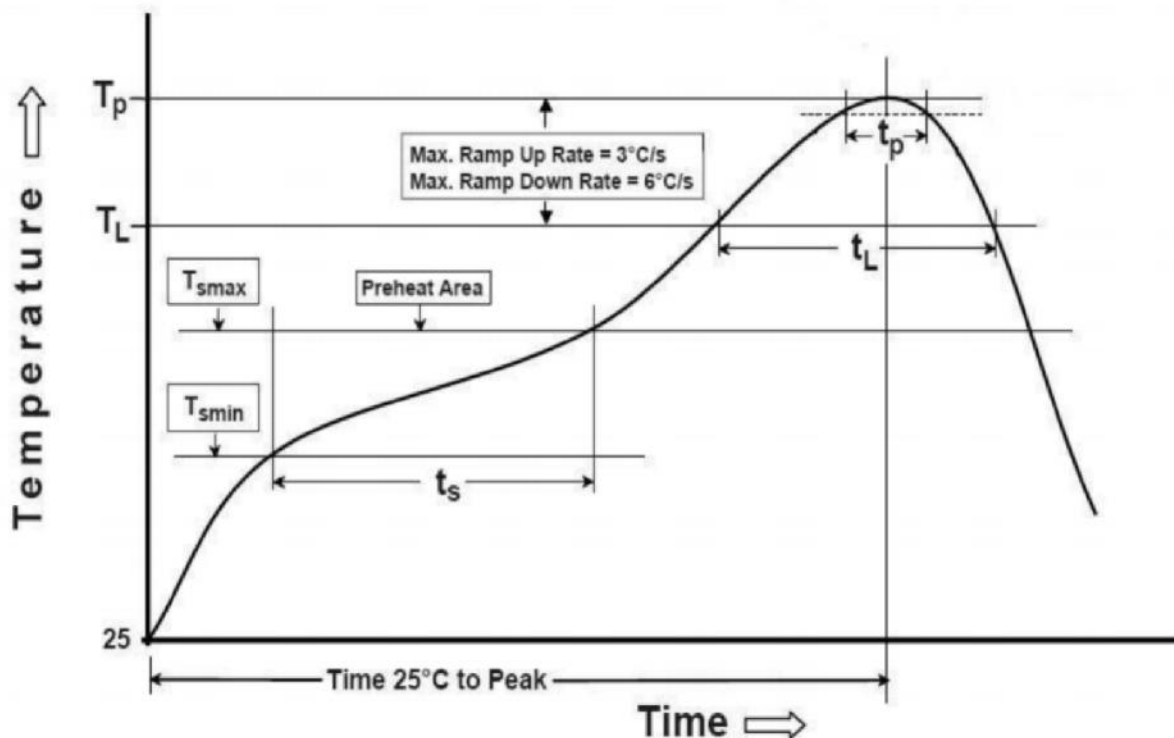


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## Suggested Reflow Profile



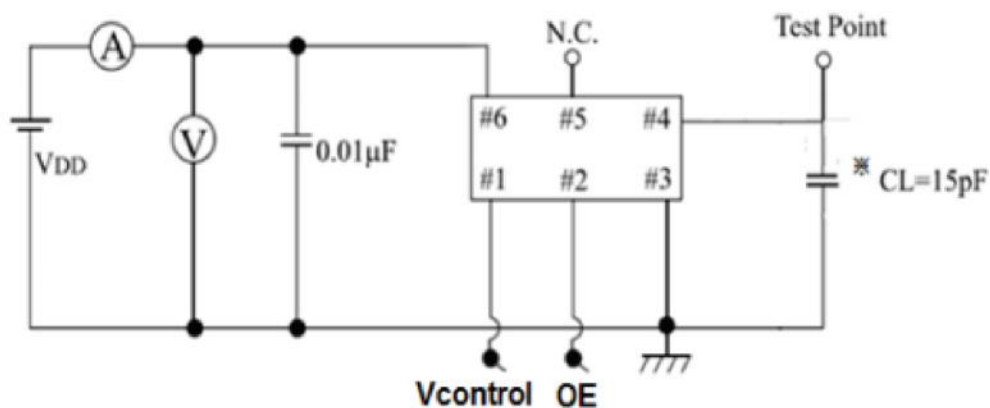
| Profile Feature                                                                                                                                                      | Sn - Pb Eutectic Assembly        | Preheat / Soak                   |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|----------------------------------|
| 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.                   |
| <b>Suggest reflow times</b>                                                                                                                                          | <b>2 Times max.</b>              |                                  |

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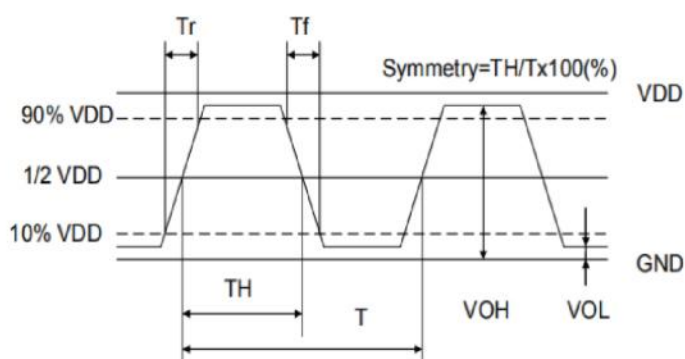
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## Testing Circuit



※ Notes: Test point load should include stray and probe capacitance.

## Waveform Conditions



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

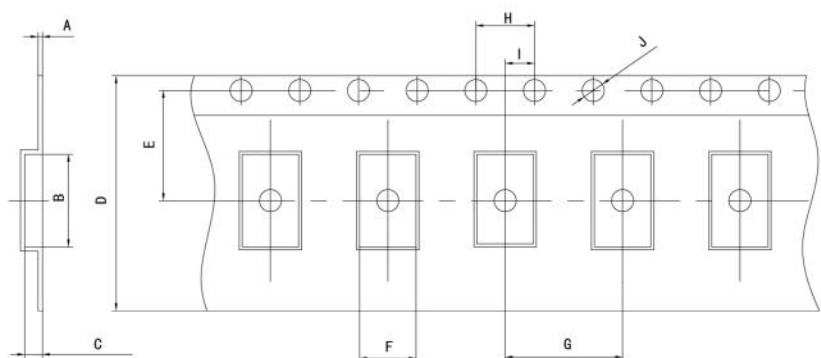
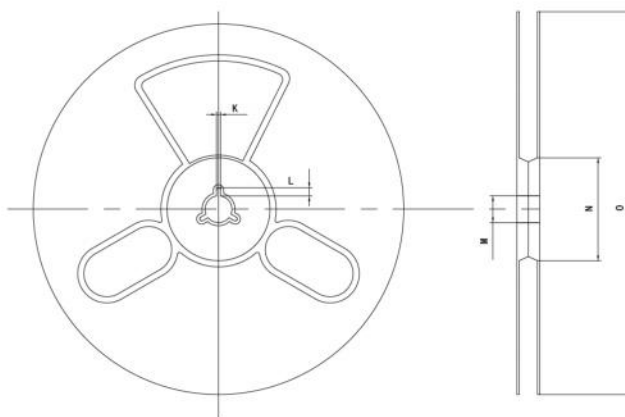
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## Packaging Information

T=Tape and reel (1,000pcs/reel)



Pocket Tape Dimensions(mm)

| Series | A        | B       | C        | D      | E       | F       | G       | H       | I       | J        | K       | L       | M       | N     | O      |
|--------|----------|---------|----------|--------|---------|---------|---------|---------|---------|----------|---------|---------|---------|-------|--------|
| 5VA    | 0.3±0.05 | 5.5±0.1 | 1.25±0.1 | 12±0.1 | 5.5±0.1 | 3.6±0.1 | 8.0±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

| 5VA Series |         |         |         |         |
|------------|---------|---------|---------|---------|
| 2.048      | 4.000   | 4.096   | 4.9152  | 6.000   |
| 7.3728     | 7.680   | 8.000   | 8.192   | 10.000  |
| 11.0592    | 11.2896 | 12.000  | 12.288  | 13.000  |
| 14.7456    | 16.000  | 16.384  | 18.432  | 19.200  |
| 19.440     | 20.000  | 22.5792 | 24.000  | 24.576  |
| 25.000     | 26.000  | 27.000  | 29.4912 | 30.000  |
| 32.000     | 32.768  | 33.000  | 40.000  | 45.1584 |
| 48.000     | 49.152  | 50.000  | 52.000  | 54.000  |