

# 5C Series 5.0 x 3.2 mm SMD Crystal Oscillator

5 : 5.0×3.2×1.2 mm | SMD5032-4P

C : SPXO Crystal Oscillator

## Feature

- Ceramic surface mount with Metal Lid
- CMOS compatible logic levels
- Tri-state function available
- Supply voltage range : 1.62V ~ 5.5V(Compatible with 1.8V, 2.5V, 3.3V , 5.0V)
- RoHS Compliant / Pb Free

## Applications

- Wireless Devices
- Internet of Things (IoT) devices
- Ethernet/Gigabit Ethernet
- Audio, Video, Gaming products
- Micro base station



## Electrical Specifications

| Item                          | Symb.                           | Min.               | Typ.            | Max.               | Unit | Notes                                                                                     |
|-------------------------------|---------------------------------|--------------------|-----------------|--------------------|------|-------------------------------------------------------------------------------------------|
| Frequency Range               | Freq.                           | 1.000              |                 | 160.000            | 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>                 | 1.62               | 1.8/2.5/3.3/5.0 | 5.5                | V    |                                                                                           |
| Output Load                   | L <sub>CMOS</sub>               |                    | 15              |                    | pF   |                                                                                           |
| Current Consumption           | I <sub>cc</sub>                 |                    |                 | 10                 | mA   | 1MHz ≤ Freq. < 40MHz                                                                      |
|                               |                                 |                    |                 | 20                 |      | 40MHz ≤ Freq. < 80MHz                                                                     |
|                               |                                 |                    |                 | 40                 |      | 80MHz ≤ Freq. < 160MHz                                                                    |
| Duty Cycle                    | SYM                             | 45                 |                 | 55                 | %    | 50 % V <sub>dd</sub> level, L <sub>CMOS</sub> ≤ 15 pF                                     |
| 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>                |                    |                 | 5                  | mS   | To 90% of Final Amplitude                                                                 |
| 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    |                                                                                           |
| Aging                         | f <sub>age</sub>                |                    |                 | 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

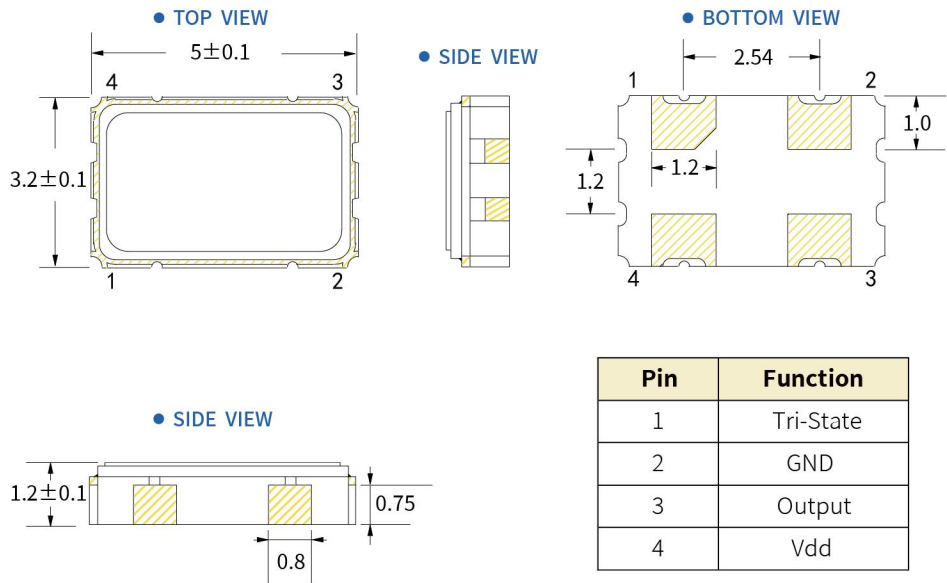
All condition: Include 25°C tolerance, operating temperature range , input voltage change, aging, load change.

# 5C Series 5.0 x 3.2 mm SMD Crystal Oscillator

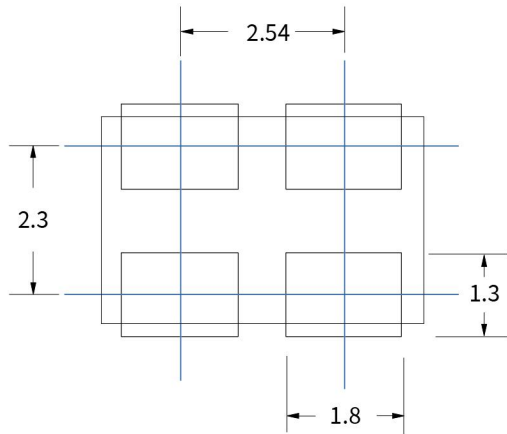
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## Dimensions (UNIT:mm)



## Solder pad layout (UNIT:mm)



## Options and Part Identification : Example SX5M1.000B20F30TNN

| Company | Ceramic Package           | Frequency Code [MHz] | Supply Voltage | Frequency Tolerance | Operating Temperature | Frequency Drift | Output    | Current Consumption | Phase Noise |
|---------|---------------------------|----------------------|----------------|---------------------|-----------------------|-----------------|-----------|---------------------|-------------|
| SX      | 5M                        | X.XXX                | B              | 20                  | F                     | 30              | T         | N                   | N           |
| Code    | Company                   | Frequency            | Code           | Frequency Tolerance | Code                  | Frequency Drift | Code      | Current             | Phase Noise |
| SX      | SCTF                      | 1.000                |                | 10 ±10ppm           |                       | 15 ±15ppm       |           | N Standard          |             |
|         |                           | 13.560               |                | 20 ±20ppm           |                       | 20 ±20ppm       |           |                     |             |
|         |                           | 19.200               |                |                     |                       | 30 ±30ppm       |           |                     |             |
|         |                           | 37.125               |                |                     |                       |                 |           |                     |             |
| Code    | Ceramic Package           | Code                 | Voltage        | Code                | Operating Temperature | Code            | Output    |                     |             |
| 1M      | 2.0×1.6×0.75mm            | D                    | 1.8V           | E                   | -20°C ~ +70°C         | T               | CMOS 15pF |                     |             |
| 2M      | 2.5×2.0×0.81mm            | H                    | 2.5V           | F                   | -40°C ~ +85°C         | H               | CMOS 30pF |                     |             |
| 3M      | 3.2×2.5×0.95mm            | B                    | 3.3V           |                     |                       | G               | CMOS 50pF |                     |             |
| 5M      | 5.0×3.2×1.2mm             | A                    | 5.0V           |                     |                       |                 |           |                     |             |
| 7M      | 7.0×5.0×1.3mm             |                      |                |                     |                       |                 |           |                     |             |
| OA      | 12.7×12.7×5.4 mm [PXO-8]  |                      |                |                     |                       |                 |           |                     |             |
| OB      | 20.4×12.8×4.9 mm [PXO-14] |                      |                |                     |                       |                 |           |                     |             |

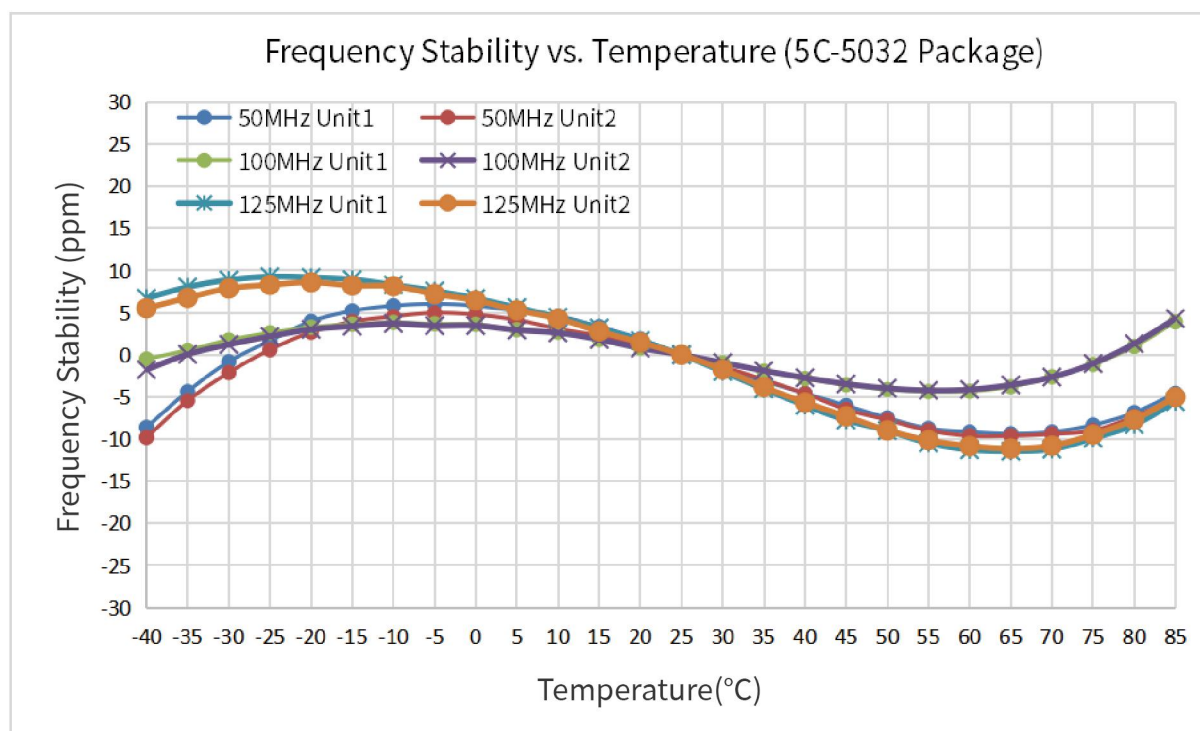
If you have other parameter requirements, you can contact **SCTF** at any time.

# 5C Series 5.0 x 3.2 mm SMD Crystal Oscillator

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## Frequency Temperature Characteristics



## Product Structure&Marking Information

### • Product Structure



### • Marking Information

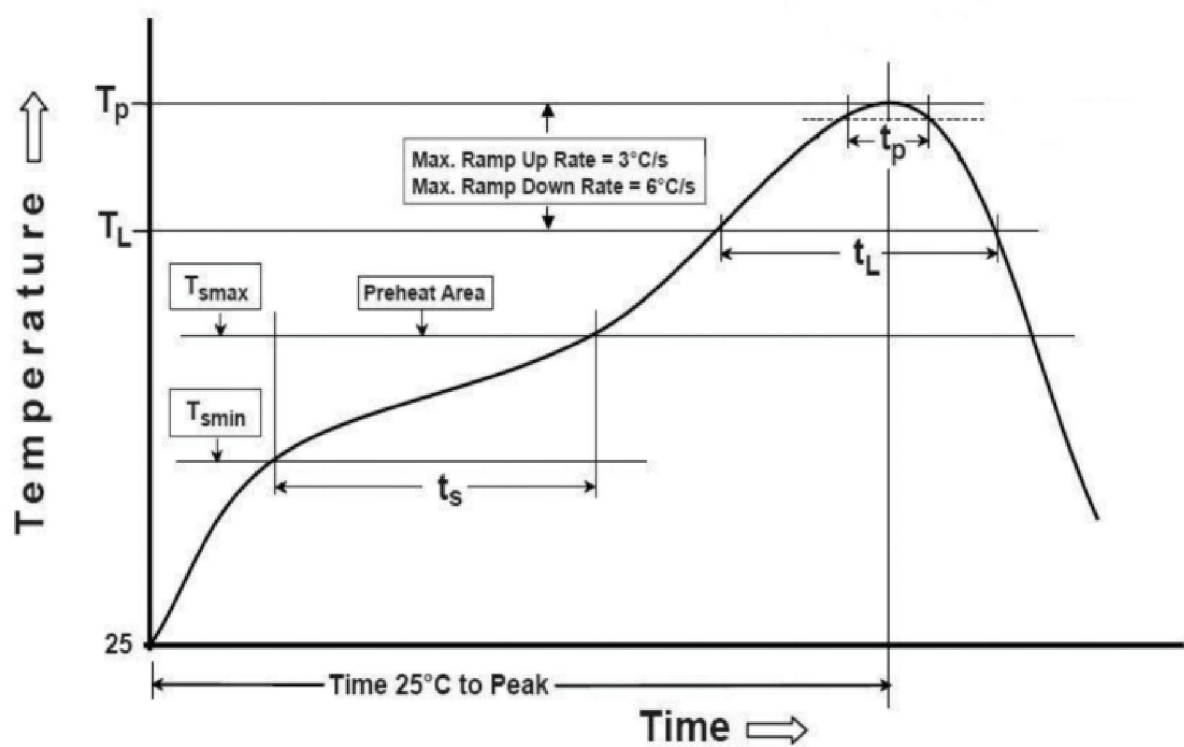


# 5C Series 5.0 x 3.2 mm SMD Crystal Oscillator

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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 ( <math>T_{smin}</math> )</li><li>● Temperature Max ( <math>T_{smax}</math> )</li><li>● Time ( <math>T_{smin}</math> to <math>T_{smax}</math> )</li></ul> | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-120 seconds |
| Ramp - up rate ( $T_L$ to $T_p$ )                                                                                                                                                                                                | 3°C/ second max.                 | 3°C/ second max.                 |
| Time maintained above <ul style="list-style-type: none"><li>● Liquidous temperature ( <math>T_L</math> )</li><li>● Time ( <math>t_L</math> ) maintained above <math>T_L</math></li></ul>                                         | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
| Peak package body temperature ( $T_p$ )                                                                                                                                                                                          | 235°C                            | 260°C                            |
| Time within 5° C of the specified classification temperature ( $T_p$ )                                                                                                                                                           | 20 seconds                       | 30 seconds                       |
| Ramp - down rate ( $T_p$ to $T_L$ )                                                                                                                                                                                              | 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.                     |                                  |

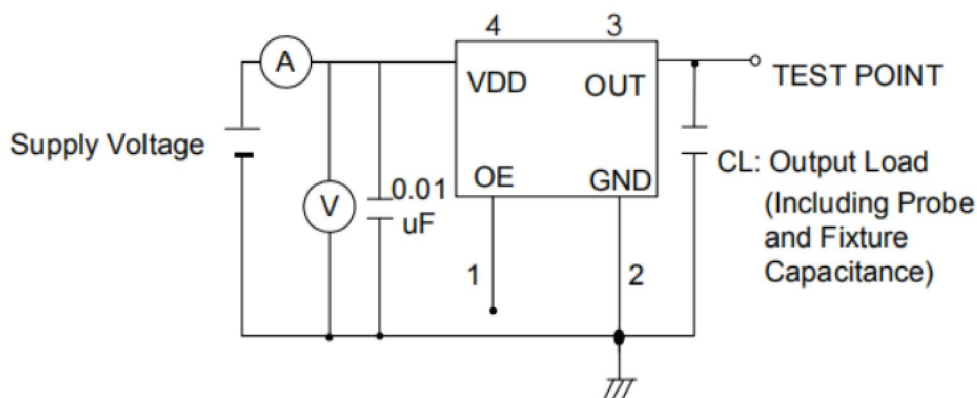


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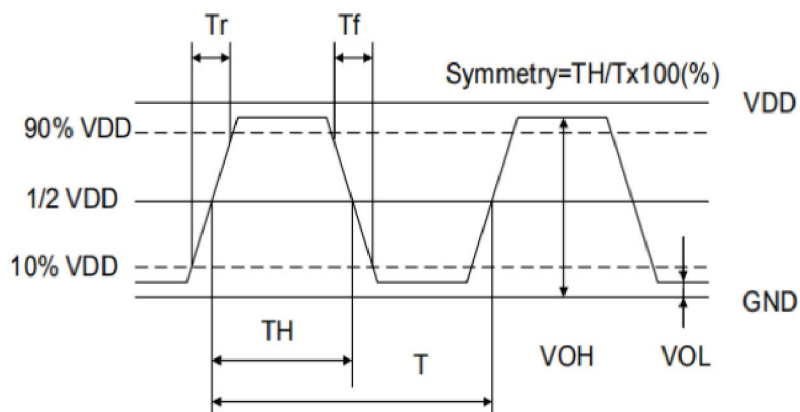
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## Testing Circuit



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

## Waveform Conditions



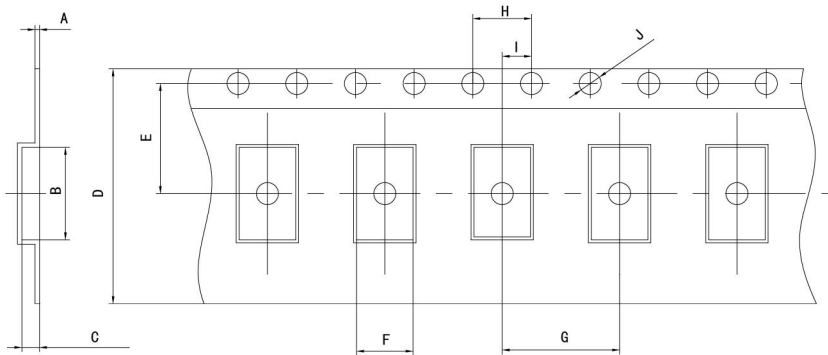
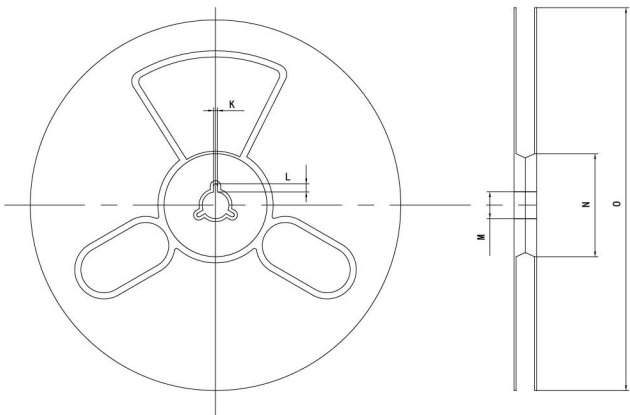
Waveform measurement system should have a min. bandwidth of 5 times the frequency being tested.

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## Packaging Information

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



Pocket Tape Dimensions(mm)

| Series | A        | B       | C        | D      | E       | F       | G       | H       | I       | J        | K       | L       | M       | N     | O      |
|--------|----------|---------|----------|--------|---------|---------|---------|---------|---------|----------|---------|---------|---------|-------|--------|
| 5C     | 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 |

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## Common Frequencies – MHz

| 5C Series |         |           |         |          |
|-----------|---------|-----------|---------|----------|
| 1.000     | 1.8432  | 2.000     | 2.048   | 2.4576   |
| 2.500     | 3.2768  | 3.579545  | 3.6864  | 4.000    |
| 4.096     | 4.9152  | 5.5296    | 6.000   | 6.144    |
| 7.3728    | 8.000   | 8.192     | 10.000  | 11.0592  |
| 11.2896   | 12.000  | 12.288    | 13.560  | 14.31818 |
| 14.7456   | 16.000  | 16.384    | 18.432  | 19.200   |
| 20.000    | 20.480  | 22.1184   | 22.5792 | 24.000   |
| 24.576    | 25.000  | 25.000625 | 25.175  | 26.000   |
| 27.000    | 27.120  | 28.63636  | 29.4912 | 30.000   |
| 32.000    | 32.768  | 33.000    | 33.330  | 33.333   |
| 33.3333   | 36.000  | 36.864    | 37.125  | 38.400   |
| 40.000    | 40.680  | 45.1584   | 48.000  | 49.152   |
| 50.000    | 54.000  | 60.000    | 64.000  | 65.536   |
| 66.000    | 66.666  | 72.000    | 75.000  | 80.000   |
| 96.000    | 100.000 | 125.000   | 133.000 | 148.500  |
| 156.250   |         |           |         |          |

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