

# TF2012 Series 2.0 x 1.2 mm TUNING FORK Crystal

TF : TUNING FORK Crystal

2016 : 2.0×1.2×0.6 mm | SMD2012-2P

## Feature

- Miniature Ceramic surface mount with Metal Lid
- Package Size: 2.05 x 1.2 x 0.6mm max.
- Low Aging, Low Power Consumption, high reliability characteristics
- RoHS Compliant / Pb Free

## Applications

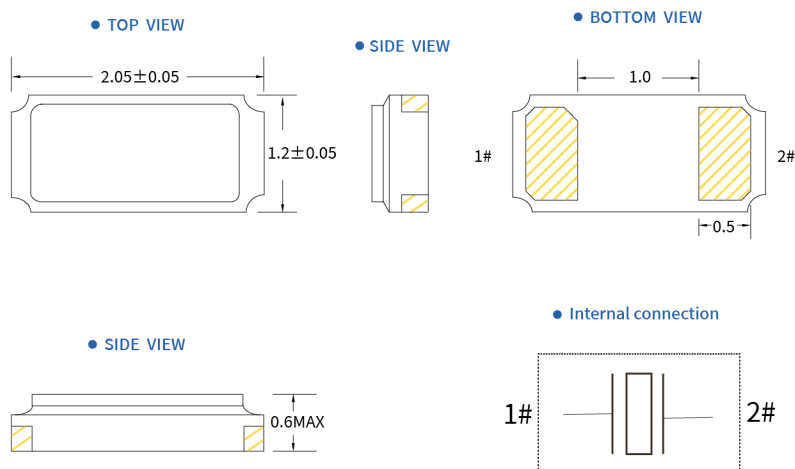
- Real Time Clock
- Portable Electronics
- Smart Meters
- Communication Electronics
- IoT Devices



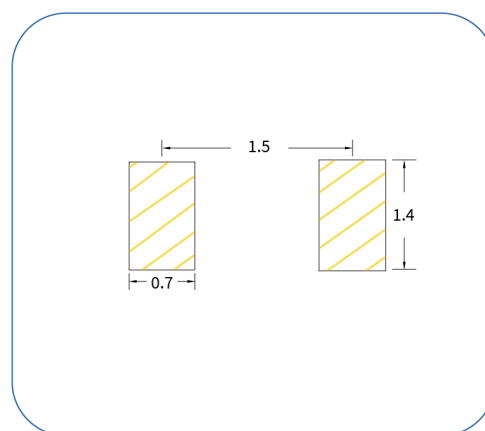
## Electrical Specifications

| Item                         | Symb. | Electrical spec.                  |           | Notes                                       |
|------------------------------|-------|-----------------------------------|-----------|---|
|                              |       | TF2012                            | TF2012R   |   |
| Nominal Frequency            | Freq. | 32.768KHz                         |           |   |
| Operating Temperature        | T_use | -40°C~+85°C                       |           |   |
| Storage Temperature Range    | T_stg | -55°C~+125°C                      |           |   |
| Oscillation Mode             |       | Fundamental                       |           |   |
| Frequency Tolerance          | f_tol | ±10ppm / ±20ppm                   |           | at 25°C ±3°C                                |
| Turnover Temperature         | Ti    | +25°C ±5°C                        |           |   |
| Parabolic curvature constant | B     | -0.042ppm/(Δ°C) <sup>2</sup> max. |           | Over Operating Temp. Range (Reference 25°C) |
| Drive Level                  | DL    | 0.5 μW Max.                       |           |   |
| Load Capacitance             | CL    | 6pF; 7pF; 9pF; 12.5pF             |           |   |
| Effective Resistance         | RR    | 80kΩ max.                         | 50kΩ max. |   |
| Aging                        | f_age | ±3 ppm Max.                       |           | 1st. Year at 25°C                           |

## Dimensions (UNIT:mm)



## Solder pad layout (UNIT:mm)



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## Options and Part Identification : Example SXTF2012R32768A20F

| Company      | Ceramic Package      | Effective Resistance      | Frequency Code [KHZ] | Load Capacitance      | Frequency Tolerance      | Operating Temperature      |
|--------------|----------------------|---------------------------|----------------------|-----------------------|--------------------------|----------------------------|
| <b>SX</b>    | <b>TF2012</b>        | <b>R</b>                  | <b>32768</b>         | <b>A</b>              | <b>20</b>                | <b>F</b>                   |
| ↓            | ↓                    | ↓                         | ↓                    | ↓                     | ↓                        | ↓                          |
| Code Company |                      | Code Effective Resistance | Frequency            |                       | Code Frequency Tolerance |                            |
| SX SCTF      |                      | Blank Standard            | 32.768               |                       | 10 ±10ppm                |                            |
|              |                      | R 50kΩ max.               |                      |                       | 20 ±20ppm                |                            |
|              | Code Ceramic Package |                           |                      | Code Load Capacitance |                          |                            |
|              | TF1610 1.6×1.0×0.5mm |                           |                      | A 12.5pF              |                          |                            |
|              | TF2012 2.0×1.2×0.6mm |                           |                      | G 9pF                 |                          |                            |
|              | TF3215 3.2×1.5×0.8mm |                           |                      | C 7pF                 |                          |                            |
|              | TF7015 7.0×1.5×1.4mm |                           |                      | D 6pF                 |                          |                            |
|              |                      |                           |                      |                       |                          | Code Operating Temperature |
|              |                      |                           |                      |                       |                          | E -20°C ~ +70°C            |
|              |                      |                           |                      |                       |                          | F -40°C ~ +85°C            |

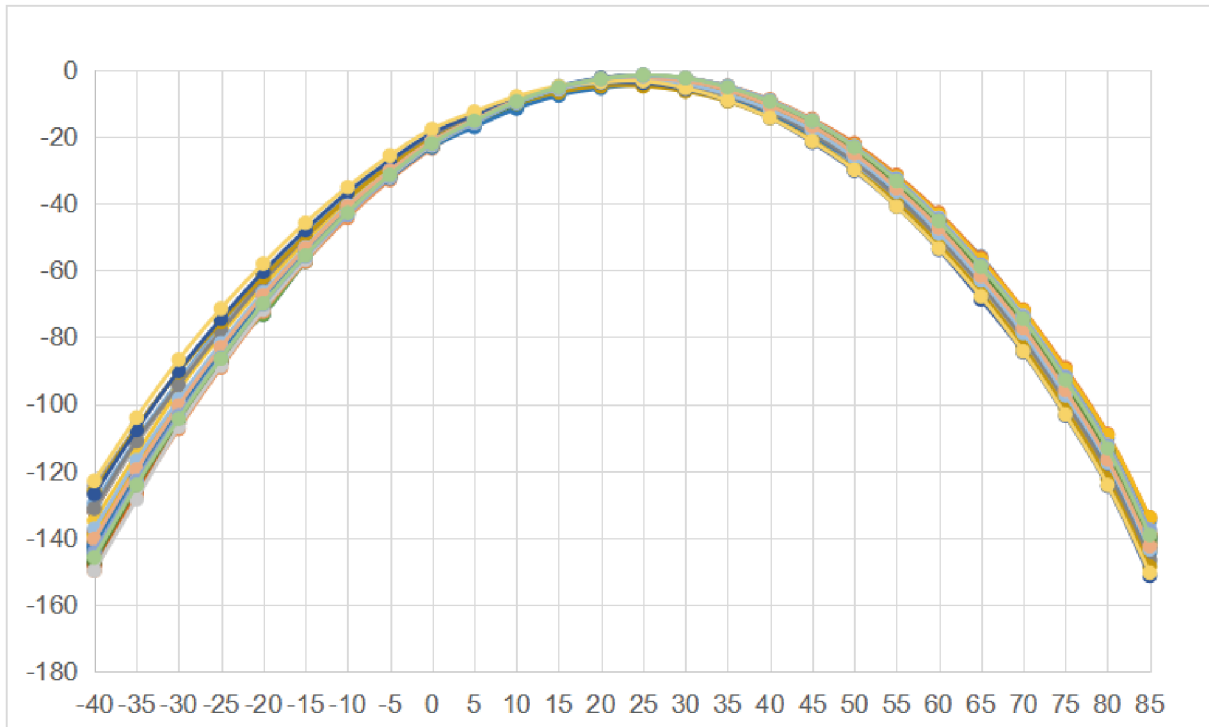
If you have other parameter requirements, you can contact **SCTF** at any time.

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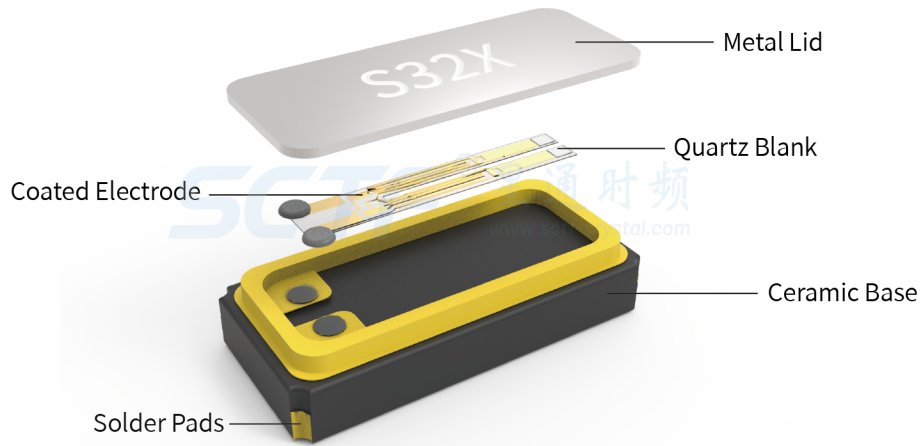
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## Frequency Temperature Characteristics

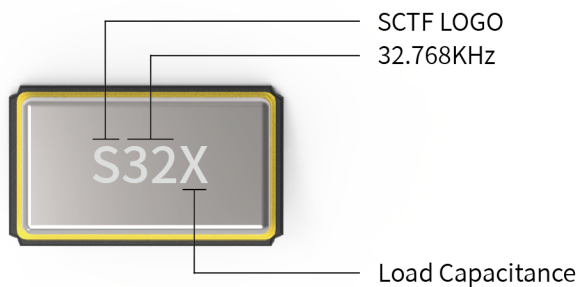


## Product Structure & Marking Information

### Product Structure

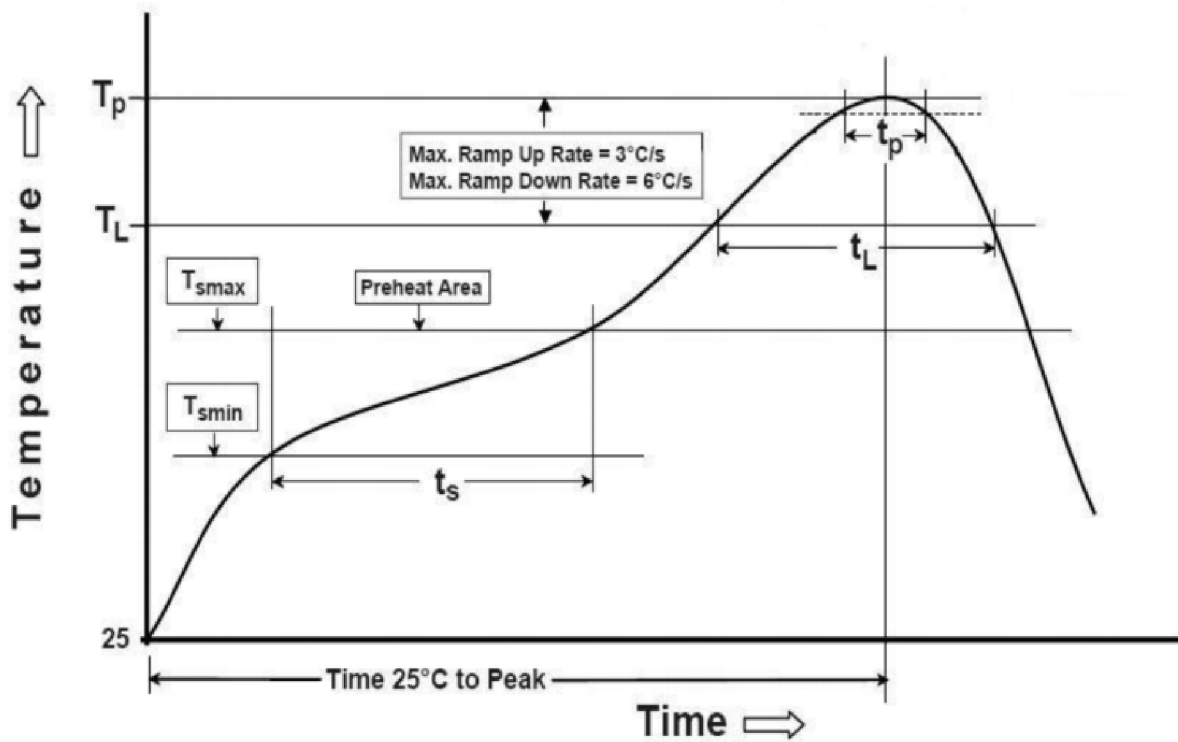


### Marking Information



| * | Load Capacitance(CL) |
|---|----------------------|
| A | 12.5pF               |
| C | 7pF                  |
| D | 6pF                  |
| G | 9pF                  |

## Suggested Reflow Profile



| Profile Feature  | Sn - Pb Eutectic Assembly        | Preheat / Soak                   |
|--|----------------------------------|----------------------------------|
| Preheat / Soak <ul style="list-style-type: none"> <li>● Temperature Min ( T<sub>s</sub> min )</li> <li>● Temperature Max ( T<sub>s</sub> max )</li> <li>● Time ( T<sub>s</sub> min to T<sub>s</sub> max )</li> </ul> | 100°C<br>150°C<br>60-120 seconds | 150°C<br>200°C<br>60-120 seconds |
| Ramp - up rate ( T <sub>L</sub> to T <sub>p</sub> )  | 3°C/ second max.                 | 3°C/ second max.                 |
| Time maintained above <ul style="list-style-type: none"> <li>● Liquidous temperature ( T<sub>L</sub> )</li> <li>● Time ( t<sub>L</sub> ) maintained above T<sub>L</sub></li> </ul>                                   | 183°C<br>60-150 seconds          | 217°C<br>60-150 seconds          |
| Peak package body temperature ( T <sub>p</sub> )   | 235°C                            | 260°C                            |
| Time within 5° C of the specified classification temperature ( T <sub>p</sub> )  | 20 seconds                       | 30 seconds                       |
| Ramp - down rate ( T <sub>p</sub> to T <sub>L</sub> )  | 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>              |                                  |

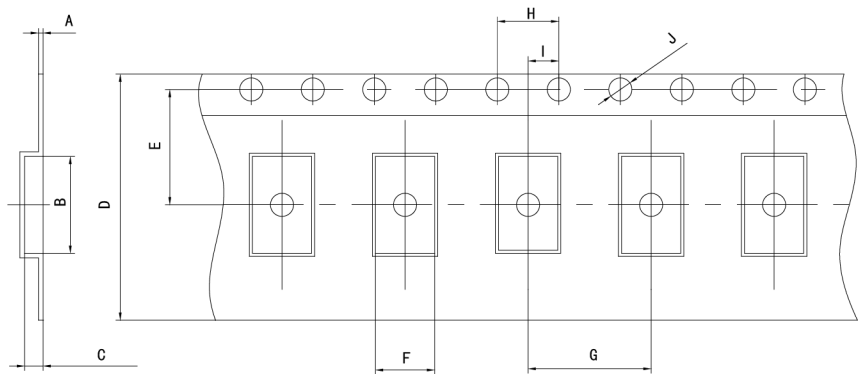
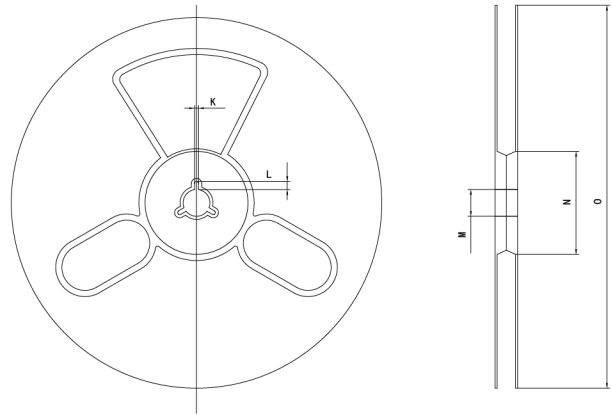
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## Packaging Information

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      |
|-------------------|-----------|---------|----------|---------|---------|----------|-------|---------|---------|----------|---------|---------|---------|-------|--------|
| TF2012<br>TF2012R | 0.20±0.05 | 2.3±0.1 | 0.75±0.1 | 8.0±0.3 | 3.5±0.1 | 1.40±0.1 | 4±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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