

**SMD QUARTZ CRYSTAL RESONATOR**



**4 Pad Version 8.0×3.8 mm**

- Tuning fork crystal in standard package
- 32.768 KHz standard
- ±10 ppm available
- Excellent Reliability Performance
- Reflow soldering temperature: 260°C max



RoHS compliant

★ **PARAMETERS**

| PARAMETERS               | SPECIFICATION                                    |
|--------------------------|--|
| Frequency Range          | 32.768KHz standard, 20.000~165.000KHz            |
| Loading Capacitance      | 12.5pF Std. 6 to 20pF Series available           |
| Drive Level              | 1.0 μ W Max                                      |
| Frequency Tolerance      | ±10ppm ~ ±30ppm ( at 25°C )                      |
| Equivalent Resistance    | 50KΩ Max   |
| Temperature coefficient  | -0.04×10 <sup>-6</sup> /°C <sup>2</sup> max      |
| Operating Temp. Range:   | -20 ~ +70°C / -40 ~ +85°C (-40~+125°C available) |
| Storage Temp. Range:     | -40~+85°C  |
| Aging (25°C, First Year) | ±3ppm Max  |

○ All specification subject change without notice.

★ **FREQUENCY STABILITY VS. TEMPERATURE**

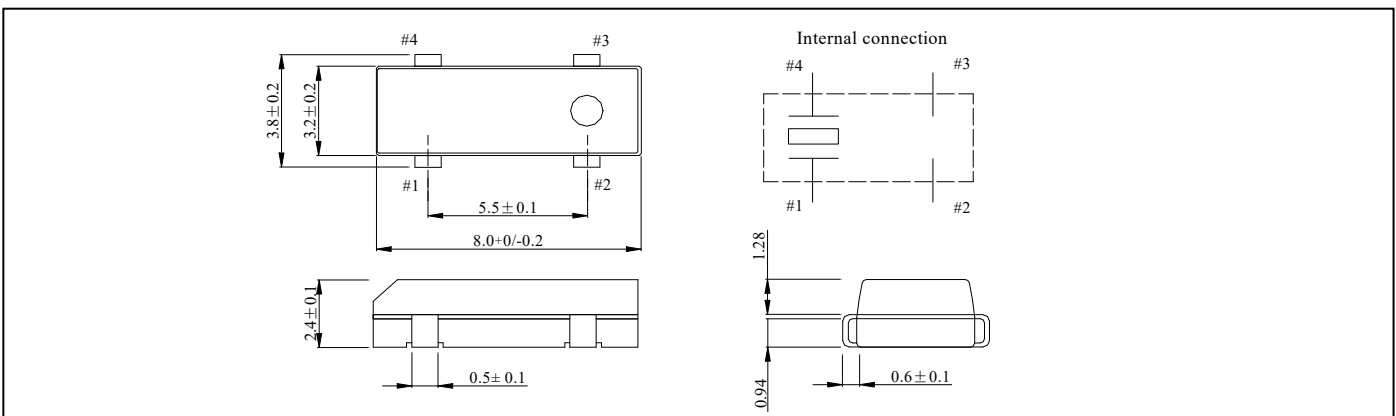
| Operation Temperature Range | Frequency Stability |         |
|-----------------------------|---------------------|---------|
|                             | -80ppm              | -160ppm |
| -20°C~+70°C                 | ●                   |         |
| -40°C~+85°C                 |                     | ●       |

● standard ○ available

★ **ESR (SERIES RESISTANCE RS)**

| Frequency | 20-30KHz | 30-40KHz | 40-70KHz | 70-165KHz |
|-----------|----------|----------|----------|-----------|
| ESR       | 50KΩ Max | 45KΩ Max | 20KΩ Max | 12KΩ Max  |

★ **DIMENSIONS & LAND PATTERN LAYOUT (Unit: mm)**

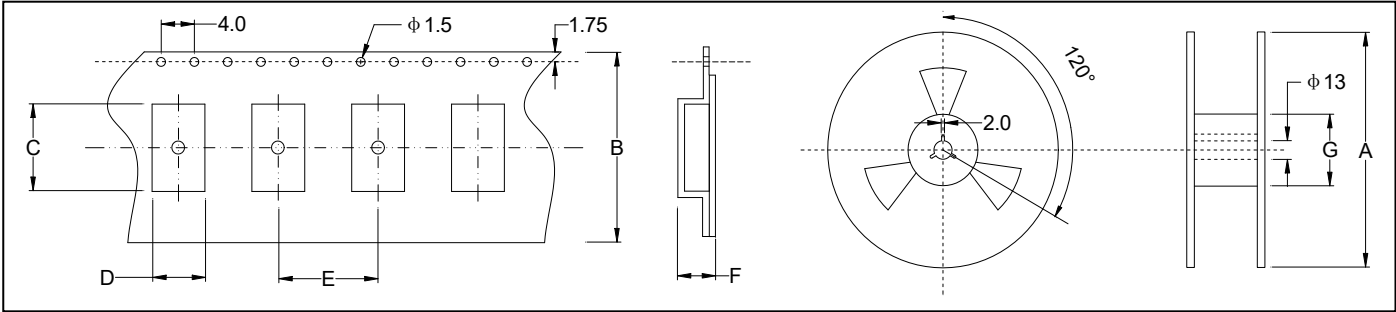


★ **PART NUMBER GUIDE** e.g. FTX32.768K12.5SM8-20D (\*SM8=8.0×3.8 SMD)

|    | Quartz Crystal Resonator | Frequency Hz | Load Capacitance pF | Package | Frequency Tolerance ppm | Operating Temp. Range |
|----|--------------------------|--------------|---------------------|---------|-------------------------|-----------------------|
| FT | X                        | 32.768KHz    | 12.5                | SM8     | 20                      | D                     |

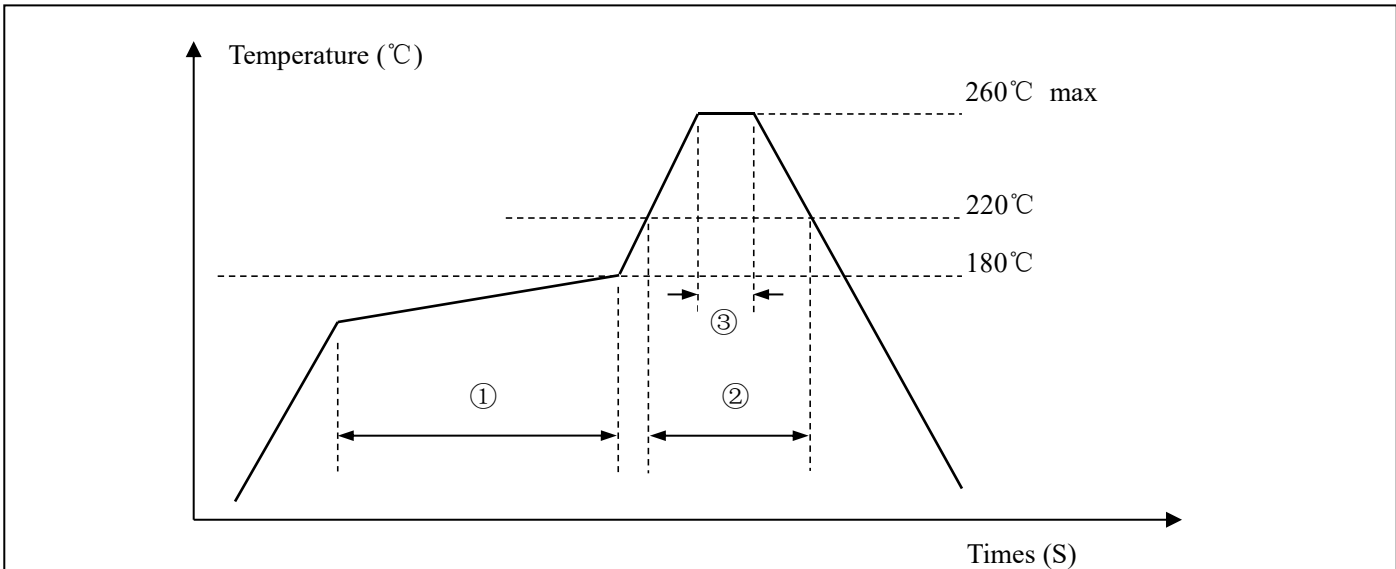
| Definition                  | Description          |                              |
|-----------------------------|----------------------|------------------------------|
| Operating Temperature Range | <b>A:</b> -10~+60°C  | <b>B:</b> -20~+70°C          |
|                             | <b>C:</b> -30~+80°C  | <b>D:</b> -40~+85°C          |
|                             | <b>E:</b> -30~+105°C | <b>F:</b> -40~+105°C         |
|                             | <b>G:</b> -40~+125°C | <b>S:</b> Customer specified |

★ TAPING SPECIFICATION (Unit: mm)



|                   | A   | B  | C   | D   | E   | F   | G   |
|-------------------|-----|----|-----|-----|-----|-----|-----|
| SMD8×3.8          | 330 | 16 | 8.4 | 4.0 | 8.0 | 2.8 | 100 |
| 2000 pcs per reel |     |    |     |     |     |     |     |

★ REFLOW SOLDERING PROFILE



|                     |   |              |           |             |
|---------------------|---|--------------|-----------|-------------|
| Pb free reflow<br>A | ① | Preheat      | 160~180°C | 100sec. max |
|                     | ② | Primary heat | 220°C     | 35sec. max  |
|                     | ③ | Peak         | 260°C     | 10sec. max  |