

### Features

- 2.0 x 1.6 x 0.5mm ultra miniature package
- Seam sealed ceramic package with metal lid assures high precision and reliability

### Applications

- High density applications
- Modem, communication and test equipment
- PCMCIA, wireless applications
- Automotive applications

### General Specifications

|  |                                     |
|--|-------------------------------------|
| Frequency Range                            | 20.000 to 52.000MHz (Fundamental)   |
| Frequency Tolerance at 25°C                | ±10 to ±30ppm (±30ppm standard)     |
| Frequency Stability over Temperature Range | See Stability vs. Temperature Table |
| Storage Temperature                        | -40 to +85°C                        |
| Aging per Year                             | ±3ppm max.                          |
| Load Capacitance $C_L$                     | 7 to 32pF and Series Resonance      |
| Shunt Capacitance $C_0$                    | 7.0pF                               |
| Equivalent Series Resistance (ESR)         | See ESR Table                       |
| Drive Level                                | 50µW max.                           |
| Insulation Resistance (MΩ)                 | 500 at 100Vdc ±15Vdc                |

### Equivalent Series Resistance (ESR)

| Frequency Range - MHz | Ω max. | Mode of Operation |
|-----------------------|--------|-------------------|
| 20.000 to 40.000      | 100    | Fundamental       |
| 40.100 to 52.000      | 60     |                   |

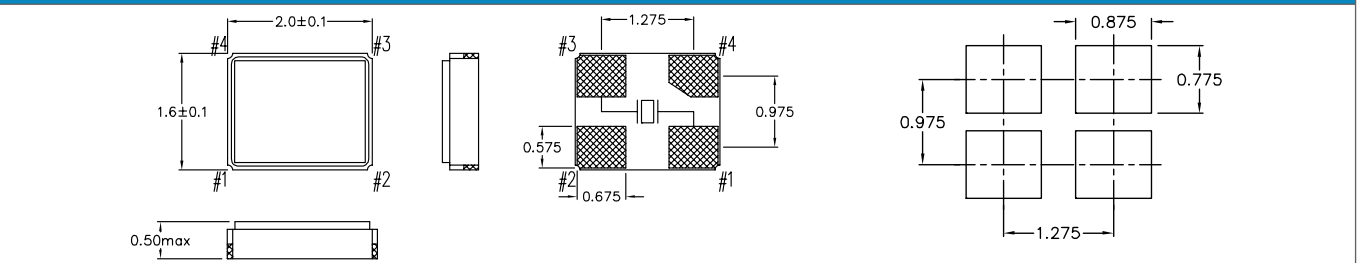
custom values available upon request

### Frequency Stability vs. Temperature

| Operating Temperature | ±10ppm | ±20ppm | ±30ppm | ±50ppm | ±100ppm |
|-----------------------|--------|--------|--------|--------|---------|
| -20 to +70°C          | ○      | ○      | ○      | ○      | ○       |
| -40 to +85°C          | -      | ○      | ●      | ○      | ○       |

● standard    ○ available

### Mechanical Dimensions



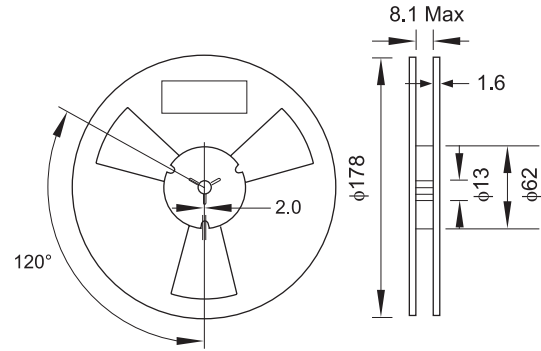
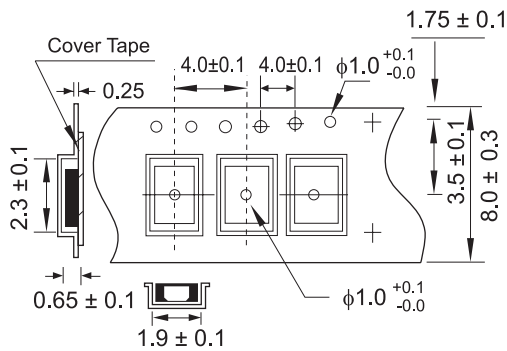
### Part Numbering Guide

| Quartz-technik Code | Package                 | Nominal Frequency (in MHz)                            | Vibration Mode | Load Capacitance  | Frequency Tolerance   | Operating Temperature Range               | Frequency Stability  | Automotive Indicator | Packaging   |
|---------------------|-------------------------|---|----------------|---|---|---|--|----------------------|---|
| QT = Quartz-technik | C20 = 1.6x2.0 4-Pad SMD | 7 digits including the decimal point (f.i.e. 12.0000) | F = AT-Fund    | S = Series<br>A = 8pF<br><b>B = 12pF</b><br>C = 16pF<br>D = 18pF<br>E = 20 pF | T1 = ±10ppm<br>T2 = ±20ppm<br><b>T3 = ±30ppm</b><br>T5 = ±50ppm<br>T0 = ±100ppm | C = -20 - +70°C<br><b>I = -40 - +85°C</b> | 10 = ±10ppm<br>15 = ±15ppm<br>20 = ±20ppm<br><b>30 = ±30ppm</b><br>50 = ±50ppm<br>00 = ±100ppm | A = AEC-Q200         | M = 250pcs Tape&Reel<br>R = 1000pcs Tape&Reel<br>B = Bulk |

Example: QTC2012.0000FBT3I30R

bold letters = recommended standard specification

### Tape and Reel Dimensions



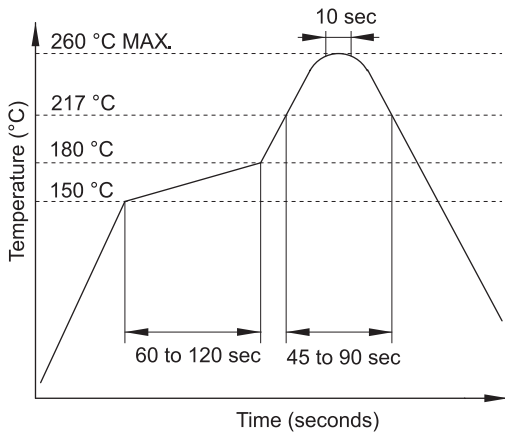
### Marking Code Guide

Contains frequency, Quarztechnik manufacturing code, production code (month and year) and load capacitance.

| Month Codes |   |           |   | Year Codes |   |      |   | Load Capacitance Code in pF |   |    |         |    |         |
|-------------|---|-----------|---|------------|---|------|---|-----------------------------|---|----|---------|----|---------|
| January     | A | July      | G | 2016       | 6 | 2017 | 7 | 2018                        | 8 | pF | PN Code | pF | PN Code |
| February    | B | August    | H | 2019       | 9 | 2020 | 0 | 2021                        | 1 | 12 | A       | 20 | F       |
| March       | C | September | I | 2022       | 2 | 2023 | 3 | 2024                        | 4 | 18 | B       | 22 | G       |
| April       | D | October   | J | 2025       | 5 | 2026 | 6 | 2027                        | 7 | 8  | C       | 30 | H       |
| May         | E | November  | K |            |   |      |   |                             |   | 10 | D       | 32 | I       |
| June        | F | December  | L |            |   |      |   |                             |   | 16 | E       | S  | S       |

Example: First Line: 12.0 (Frequency) Second Line: QA4A (Quarztechnik - January - 2014 - 12 pF)

### Solder Reflow Profile



### Environmental Specifications

|                  |                               |
|------------------|-------------------------------|
| Mechanical Shock | MIL-STD-202, Method 213, C    |
| Vibration        | MIL-STD-202, Method 201 & 204 |
| Thermal Cycle    | MIL-STD, Method 1010, B       |
| Gross Leak       | MIL-STD-202, Method 112       |
| Fine Leak        | MIL-STD-202, Method 112       |