

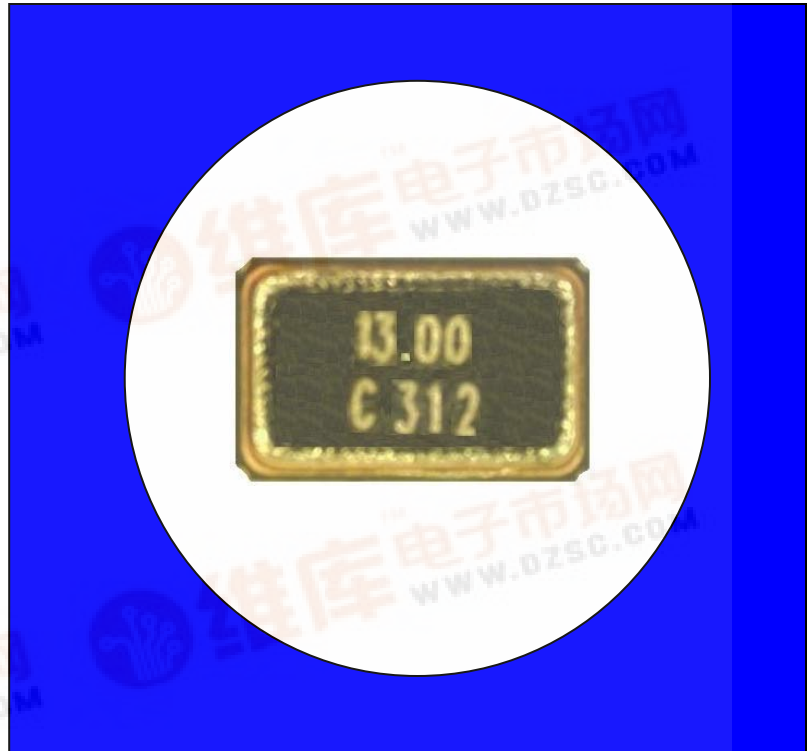


**FEATURES**

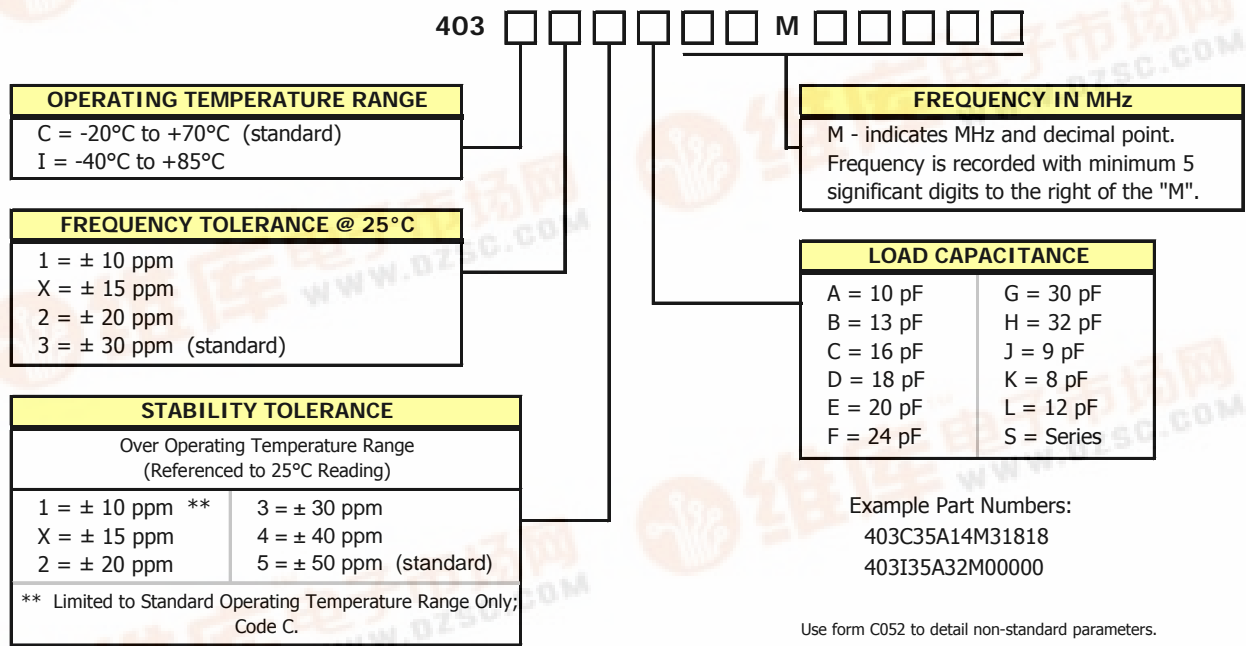
- Standard 3.2x2.5mm Surface Mount Footprint
- Stable Frequency Over Temperature and Drive Level
- Frequency Range 12 – 50 MHz
- Frequency Tolerance,  $\pm 30$  ppm Standard ( $\pm 10$  ppm,  $\pm 15$  ppm and  $\pm 20$  ppm available)
- Frequency Stability,  $\pm 50$  ppm Standard ( $\pm 10, \pm 15, \pm 20, \pm 30$  and  $\pm 40$  ppm available)
- Operating Temperature to  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Tape & Reel Packaging, EIA-481-2 Compliant
- **RoHS/Green Compliant (6/6)**

**DESCRIPTION**

The Model 403 is a ceramic packaged Crystal offering reduced size, ideal for high-density circuit board applications. The Model 403 offers reliable precision and excellent shock performance in wireless telecommunication devices.



**ORDERING INFORMATION**



Not all performance combinations and frequencies may be available.  
 Contact your local CTS Representative or CTS Customer Service for availability.



**ELECTRICAL CHARACTERISTICS**

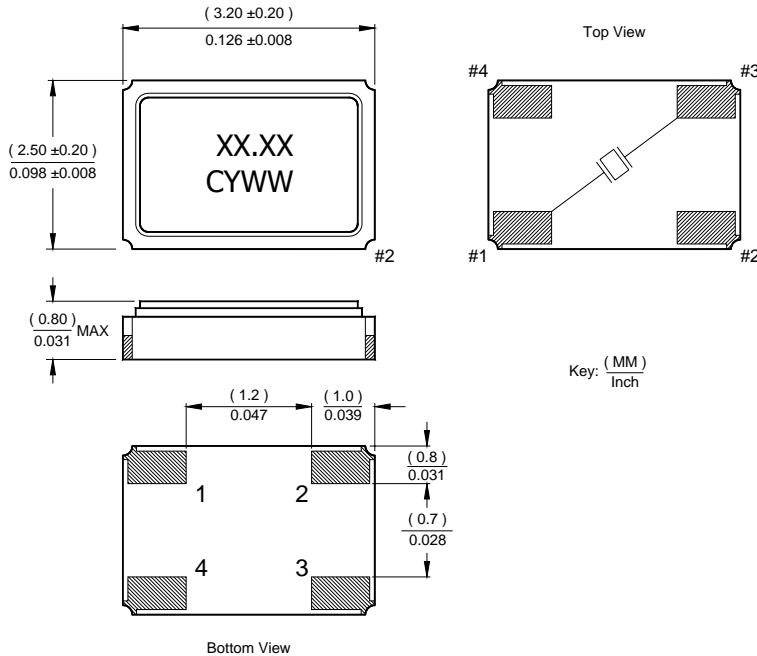
|                       | PARAMETER  | VALUE  |
|-----------------------|--|--|
| Electrical Parameters | Operating Mode   | Fundamental  |
|                       | Crystal Cut  | AT-Cut   |
|                       | Frequency Range  | 12.0 MHz to 50.0 MHz   |
|                       | Frequency Tolerance @ 25°C   | ± 30 ppm Standard<br>(± 10 ppm, ± 15 ppm and ± 20 ppm Available)                     |
|                       | Frequency Stability Tolerance<br>(Operating Temperature Range, Referenced to 25°C Reading) | ± 50 ppm Standard<br>(± 10 ppm, ± 15 ppm, ± 20 ppm, ± 30 ppm and ± 40 ppm Available) |
|                       | Operating Temperature Range  | -20°C to +70°C Standard<br>(-40°C to +85°C Available)                                |
|                       | Aging  | ± 3 ppm/year Maximum   |
|                       | Storage Temperature Range  | -55°C to +125°C  |
|                       | Equivalent Series Resistance   | See ESR Table  |
|                       | Load Capacitance or Resonance Mode   | See Ordering Information   |
|                       | Shunt Capacitance (C <sub>0</sub> )  | 5.0 pF Maximum<br>(3.0 pF Typical)   |
|                       | Drive Level  | 10 μW Typical, 100 μW Maximum  |
|                       | Reflow Condition, per JEDEC J-STD-020  | +255°C ± 5°C, 10 Seconds Maximum   |

**EQUIVALENT SERIES RESISTANCE TABLE**

| FREQUENCY RANGE        | MODE of OSCILLATION | ESR Maximum |
|------------------------|---------------------|-------------|
| 12.00 MHz - 13.999 MHz | Fundamental         | 150 Ohms    |
| 14.00 MHz - 15.999 MHz | Fundamental         | 100 Ohms    |
| 16.00 MHz - 19.999 MHz | Fundamental         | 80 Ohms     |
| 20.00 MHz - 50.00 MHz  | Fundamental         | 60 Ohms     |

**MECHANICAL SPECIFICATIONS**

**PACKAGE DRAWING**



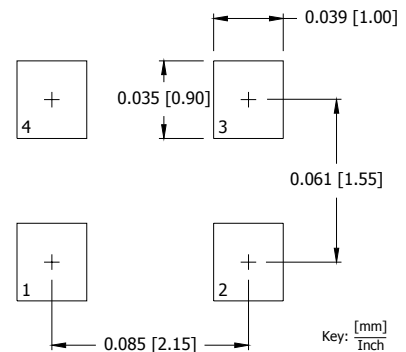
**MARKING INFORMATION**

1. XX.XX – Frequency marked with 2 significant digits after the decimal.
2. C – CTS and Pin 1 identifier.
3. YWW – Date Code, Y – Last Digit of Year, WW – Week.
4. Complete CTS part number, frequency value and date code information must appear on reel and box labels.

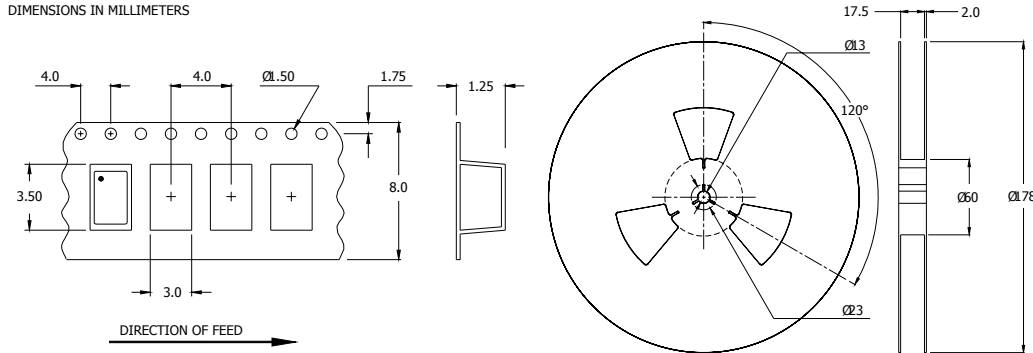
**NOTES**

1. Termination pads (e4), barrier-plating is nickel (Ni) with gold (Au) flash plate.
2. Terminations #2, #4 and the metal lid are connected internally. End user may connect these pins to circuit ground.

**SUGGESTED SOLDER PAD GEOMETRY**



**TAPE AND REEL INFORMATION**



Device quantity is 3,000 pieces minimum per 178mm reel.

**ENVIRONMENTAL SPECIFICATIONS**

- Temperature Cycle: 400 cycles from -55°C to +125°C, 10 minute dwell at each temperature, 1 minute transfer time between temperatures.
- Mechanical Shock: 1,500g's, 0.5mS duration, 1/2 sinewave, 3 shocks each direction along 3 mutually perpendicular planes (18 total shocks).
- Sinusoidal Vibration: 0.06 inches double amplitude, 10 to 55 Hz and 20g's, 55 to 2,000 Hz, 3 cycles each in 3 mutually perpendicular planes (9 times total).
- Gross Leak: No leak shall appear while immersed in an FC40 or equivalent liquid at +125°C for 20 seconds.
- Fine Leak: Mass spectrometer leak rates less than  $2 \times 10^{-8}$  ATM cc/sec air equivalent.
- Resistance to Solder Heat: Product must survive 3 reflows of +260°C peak, 10 seconds maximum.
- High Temperature Operating Bias: 2,000 hours at +125°C, disregarding frequency shift.
- Frequency Aging: 1,000 hours at +85°C, maximum  $\pm 5$  ppm shift.
- Insulation Resistance: 500M Ohms @  $100V_{DC} \pm 15V_{DC}$ .
- Moisture Sensitivity Level: Level 1 per JEDEC J-STD-020.

**QUALITY AND RELIABILITY**

Quality systems meet or exceed the requirements of ISO 9000:2000 standards.