FEATURES
• Standard 3.2x2.5mm Surface Mount Footprint
• Stable Frequency Over Temperature and Drive Level
• Frequency Range 12 – 50 MHz
• Frequency Tolerance, ±30 ppm Standard
  (±10 ppm, ±15 ppm and ±20 ppm available)
• Frequency Stability, ±50 ppm Standard
  (±10,±15,±20,±30 and ±40 ppm available)
• Operating Temperature to –40°C to +85°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

ORDERING INFORMATION

Example Part Numbers:
403C35A14M31818
403I35A32M00000

C = -20°C to +70°C (standard)
I = -40°C to +85°C

FREQUENCY TOLERANCE @ 25°C
1 = ± 10 ppm
X = ± 15 ppm
2 = ± 20 ppm
3 = ± 30 ppm (standard)

LOAD CAPACITANCE
A = 10 pF
B = 13 pF
C = 16 pF
D = 18 pF
E = 20 pF
F = 24 pF
G = 30 pF
H = 32 pF
J = 9 pF
K = 8 pF
L = 12 pF
S = Series

STABILITY TOLERANCE
Over Operating Temperature Range (Referenced to 25°C Reading)

Example Part Numbers:
403C35A14M31818
403I35A32M00000

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

<table>
<thead>
<tr>
<th>PARAMETER</th>
<th>VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Mode</td>
<td>Fundamental</td>
</tr>
<tr>
<td>Crystal Cut</td>
<td>AT-Cut</td>
</tr>
<tr>
<td>Frequency Range</td>
<td>12.0 MHz to 50.0 MHz</td>
</tr>
<tr>
<td>Frequency Tolerance @ 25°C</td>
<td>± 30 ppm Standard</td>
</tr>
<tr>
<td>(± 10 ppm, ± 15 ppm and ± 20 ppm Available)</td>
<td></td>
</tr>
<tr>
<td>Frequency Stability Tolerance</td>
<td>± 50 ppm Standard</td>
</tr>
<tr>
<td>(Operating Temperature Range, Referenced to 25°C Reading)</td>
<td>(± 10 ppm, ± 15 ppm, ± 20 ppm, ± 30 ppm and ± 40 ppm Available)</td>
</tr>
<tr>
<td>Operating Temperature Range</td>
<td>-20°C to +70°C Standard</td>
</tr>
<tr>
<td>(−40°C to +85°C Available)</td>
<td></td>
</tr>
<tr>
<td>Storage Temperature Range</td>
<td>-55°C to +125°C</td>
</tr>
<tr>
<td>Aging</td>
<td>± 3 ppm/year Maximum</td>
</tr>
<tr>
<td>Load Capacitance or Resonance Mode</td>
<td>See Ordering Information</td>
</tr>
<tr>
<td>Shunt Capacitance (C₀)</td>
<td>5.0 pF Maximum</td>
</tr>
<tr>
<td>(3.0 pF Typical)</td>
<td></td>
</tr>
<tr>
<td>Drive Level</td>
<td>10 µW Typical, 100 µW Maximum</td>
</tr>
<tr>
<td>Reflow Condition, per JEDEC J-STD-020</td>
<td>+255°C ± 5°C, 10 Seconds Maximum</td>
</tr>
</tbody>
</table>

**EQUIVALENT SERIES RESISTANCE TABLE**

<table>
<thead>
<tr>
<th>FREQUENCY RANGE</th>
<th>MODE of OSCILLATION</th>
<th>ESR Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>12.00 MHz - 13.999 MHz</td>
<td>Fundamental</td>
<td>150 Ohms</td>
</tr>
<tr>
<td>14.00 MHz - 15.999 MHz</td>
<td>Fundamental</td>
<td>100 Ohms</td>
</tr>
<tr>
<td>16.00 MHz - 19.999 MHz</td>
<td>Fundamental</td>
<td>80 Ohms</td>
</tr>
<tr>
<td>20.00 MHz - 50.00 MHz</td>
<td>Fundamental</td>
<td>60 Ohms</td>
</tr>
</tbody>
</table>

**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

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, ½ sine wave, 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 2x10^-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 ±5 ppm shift.

Insulation Resistance: 500M Ohms @ 100VDC ±15VDC.

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.