



FEATURES

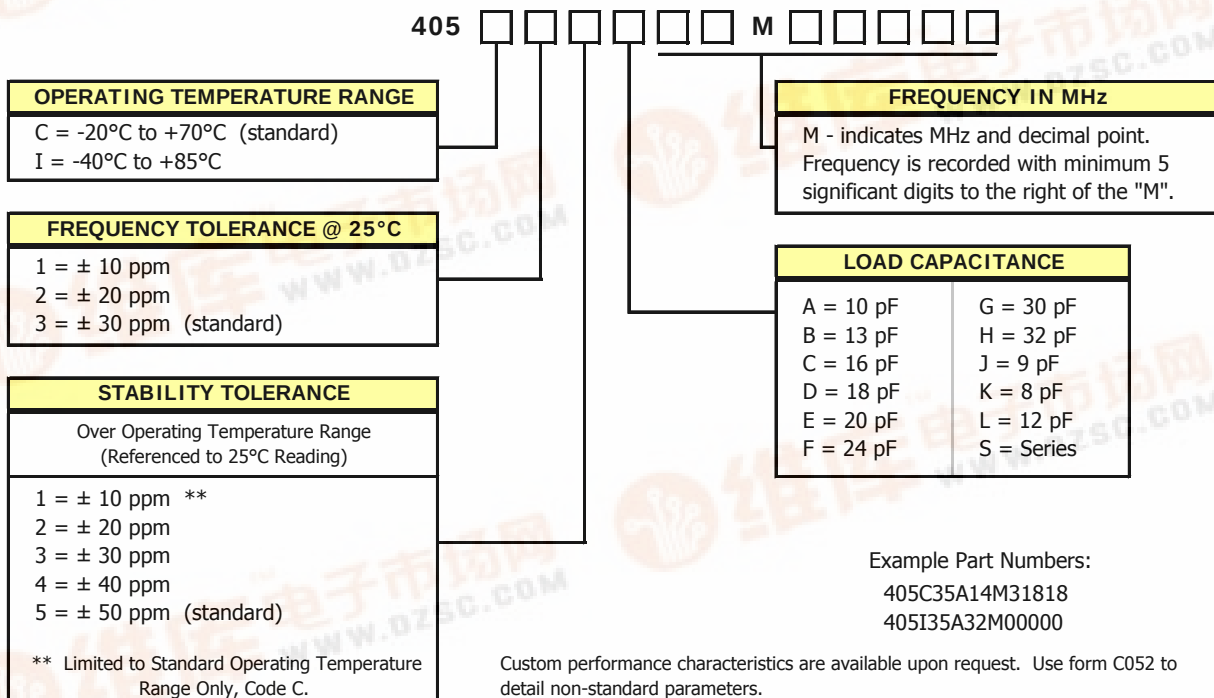
- Standard 5.0x3.2mm Surface Mount Footprint
- Stable Frequency Over Temperature and Drive Level
- Frequency Range 12 – 50 MHz
- Frequency Tolerance, ± 30 ppm Standard (± 10 ppm and ± 20 ppm available)
- Frequency Stability, ± 50 ppm Standard ($\pm 10, \pm 20, \pm 30$ and ± 40 ppm available)
- Operating Temperature to -40°C to $+85^{\circ}\text{C}$
- Tape & Reel Packaging, EIA-481-2 Compliant
- **RoHS/Green Compliant**

DESCRIPTION

The Model 405 is a ceramic packaged Crystal offering reduced size, ideal for high-density circuit board applications. The Model 405 offers reliable precision and excellent shock performance in wireless telecommunication devices.



ORDERING INFORMATION



Example Part Numbers:

405C35A14M31818
405I35A32M00000

Custom performance characteristics are available upon request. Use form C052 to detail non-standard parameters.
Contact your local CTS Representative or CTS Customer Service for assistance.



ELECTRICAL CHARACTERISTICS

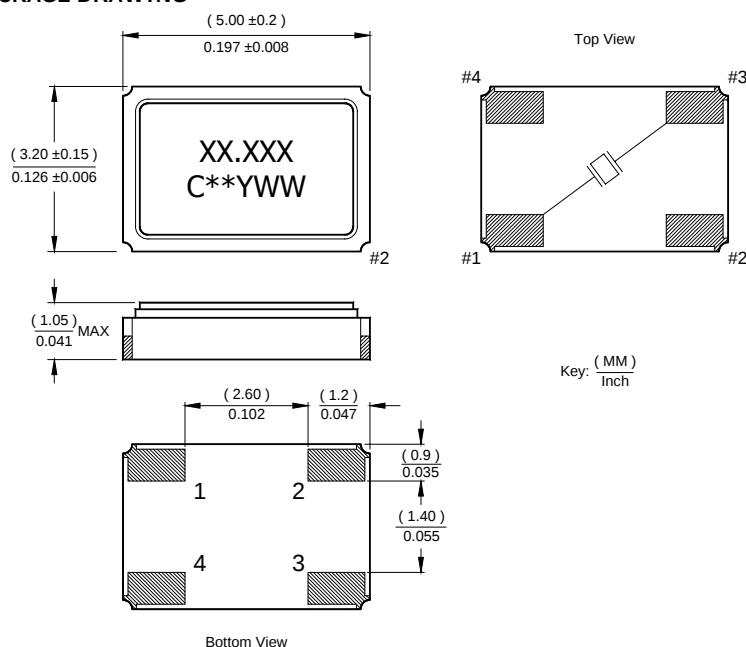
	PARAMETER	VALUE
Electrical Parameters	Operating Mode	Fundamental
	Crystal Cut	AT-Cut
	Frequency Range	12.0 MHz to 50.0 MHz
	Frequency Tolerance @ 25°C	± 30 ppm Standard (± 10 ppm and ± 20 ppm Available)
	Frequency Stability Tolerance (Operating Temperature Range, Referenced to 25°C Reading)	± 50 ppm Standard (± 10 ppm, ± 20 ppm, ± 30 ppm and ± 40 ppm Available)
	Operating Temperature Range	-20°C to +70°C Standard (-40°C to +85°C Available)
	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_0)	7.0 pF Maximum (3.0 pF Typical)
	Drive Level	25 μ W Typical, 100 μ W 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 - 50.00 MHz	Fundamental	50 Ohms

MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



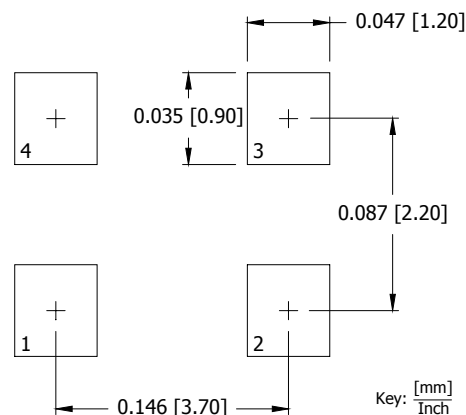
Notes:

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.

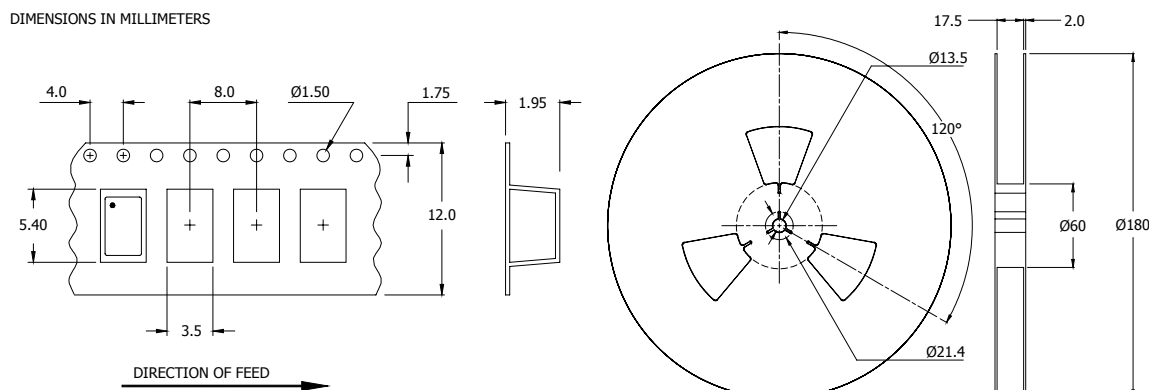
MARKING INFORMATION

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

SUGGESTED SOLDER PAD GEOMETRY



TAPE AND REEL INFORMATION



ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle:	400 cycles from -55°C to $+125^{\circ}\text{C}$, 10 minute dwell at each temperature, 1 minute transfer time between temperatures.
Mechanical Shock:	1,500g's, 0.5mS duration, $\frac{1}{2}$ 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 $+125^{\circ}\text{C}$ for 20 seconds.
Fine Leak:	Mass spectrometer leak rates less than 2×10^{-8} ATM cc/sec air equivalent.
Resistance to Solder Heat:	Product must survive 3 reflows of $+260^{\circ}\text{C}$ peak, 10 seconds maximum.
High Temperature Operating Bias:	2,000 hours at $+125^{\circ}\text{C}$, disregarding frequency shift.
Frequency Aging:	1,000 hours at $+85^{\circ}\text{C}$, maximum ± 5 ppm shift.
Insulation Resistance:	500M Ohms @ $100V_{\text{DC}} \pm 15V_{\text{DC}}$.
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.