

Model 405



Surface Mount Quartz Crystal

FEATURES

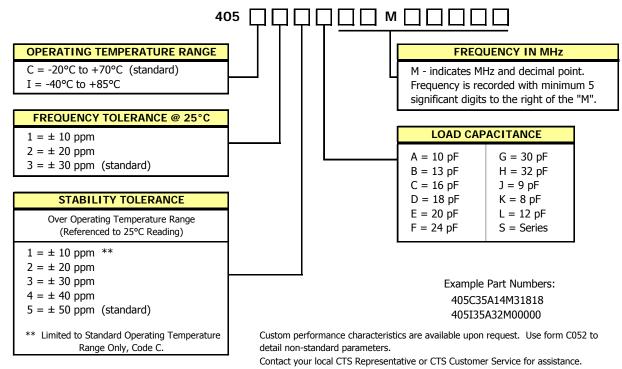
- Standard 5.0x3.2mm Surface Mount Footprint
- Stable Frequency Over Temperature and Drive Level
- Frequency Range 12 50 MHz
- Frequency Tolerance, ±30 ppm Standard (±10 ppm and ±20 ppm available)
- Frequency Stability, ±50 ppm Standard (±10,±20,±30 and ±40 ppm available)
- Operating Temperature to -40°C to +85°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



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• • • www.ctscorp.com • • •

Rev. F



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	± 50 ppm Standard
	(Operating Temperature Range, Referenced to 25°C Reading)	$(\pm 10 \text{ ppm}, \pm 20 \text{ ppm}, \pm 30 \text{ ppm} \text{ and } \pm 40 \text{ ppm} \text{ Available})$
	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 μW Typical, 100 μW Maximum
	Reflow Condition, per JEDEC J-STD-020	+255°C ± 5°C, 10 Seconds Maximum

#3

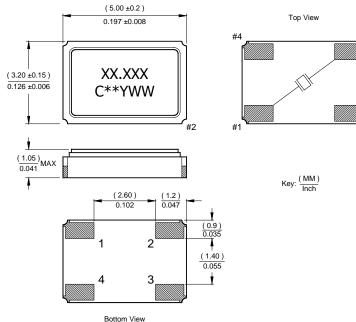
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EQUIVALENT SERIES RESISTANCE TABLE

FREQUENCY RANGE	MODE of OSCILLATION	ESR Maximum
12.00 MHz - 50.00 MHz	Fundamental	50 Ohms

MECHANICAL SPECIFICATIONS

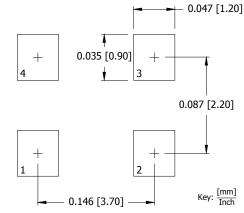
PACKAGE DRAWING



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.
- YWW Date Code, Y Last Digit of Year, WW – Week.
- Complete CTS part number, frequency value and date code information must appear on reel and box labels.

SUGGESTED SOLDER PAD GEOMETRY



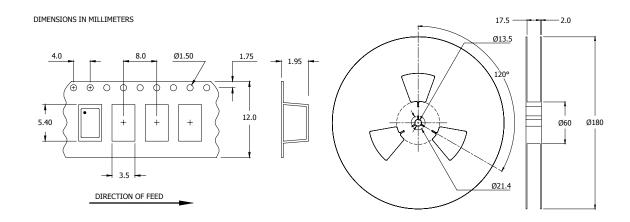
Notes:

- 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.

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TAPE AND REEL INFORMATION



Device quantity is 1,000 pieces per 180mm reel.

ENVIRONMENTAL SPECIFICATIONS

Temperature Cycle:	400 cycles from -55° C to $+125^{\circ}$ 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°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 @ $100V_{DC} \pm 15V_{DC}$.
Moisture Sensitivity Level:	

QUALITY AND RELIABILITY

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