

# Model 407



## Surface Mount Quartz Crystal

## **FEATURES**

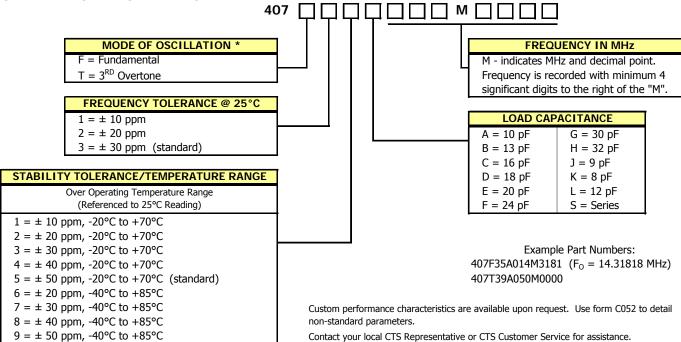
- Standard 7.0x5.0mm Surface Mount Footprint
- Stable Frequency Over Temperature and Drive Level
- Frequency Range 8 100 MHz
- Frequency Tolerance, ±30 ppm Standard (±10 ppm and ±20 ppm available)
- Frequency Stability, ±50 ppm Standard (±10,±20,±30 and ±40 ppm available)
- Operating Temperature to -40°C to +85°C
- Tape & Reel Packaging, EIA-481-2 Compliant
- RoHS/Green Compliant



The Model 407 is a ceramic packaged Crystal offering reduced size, ideal for high-density circuit board applications. The Model 407 offers reliable precision and excellent shock performance in wireless telecommunication devices.



#### ORDERING INFORMATION



<sup>\*</sup> Prior to 11/7/06 the part number format did not contain this designator. These "Old Format" numbers (008-0261-0 Rev. E) are still valid with frequencies less than or equal to 48.0000 MHz as Fundamental Mode designs. Frequencies above 48.0000 MHz will be Third Overtone designs. Refer to PCM-1211 for more details.

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## **ELECTRICAL CHARACTERISTICS**

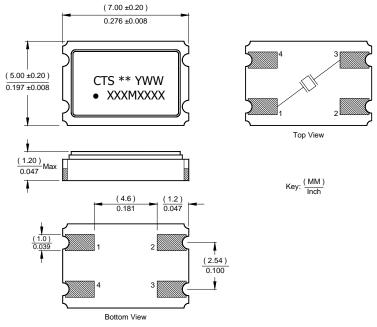
	PARAMETER	VALUE
ectrical Parameters	Operating Mode (Note 1)	Fundamental or 3 <sup>RD</sup> Overtone
	Crystal Cut	AT-Cut
	Frequency Range	8.0 MHz to 100.0 MHz
	Frequency Tolerance @ 25°C	± 30 ppm Standard
		( $\pm$ 10 ppm and $\pm$ 20 ppm Available)
	Frequency Stability Tolerance	± 50 ppm Standard
	(Operating Temperature Range, Referenced to 25°C Reading)	( $\pm$ 10 ppm, $\pm$ 20 ppm, $\pm$ 30 ppm and $\pm$ 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 <sub>0</sub> )	4.0 pF Maximum
		$(2.5 pF \pm 0.5 pF Typical)$
	Drive Level	25 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	<b>ESR Maximum</b>
8.000 MHz - 15.999 MHz	Fundamental	60 Ohms
16.000 MHz - 50.000 MHz	Fundamental	40 Ohms
30.001 MHz - 60.000 MHz	3 <sup>RD</sup> Overtone	100 Ohms
60.001 MHz - 100.000 MHz	3 <sup>RD</sup> Overtone	80 Ohms

## **MECHANICAL SPECIFICATIONS**

#### PACKAGE DRAWING



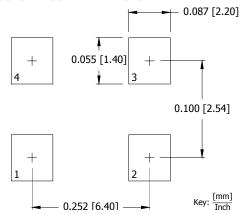
## Notes:

- 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

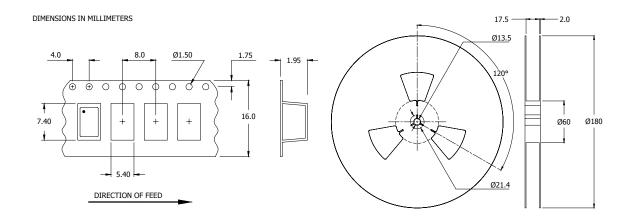
- 1. \*\* Manufacturing Site Code.
- 2. YWW Date Code, Y Last Digit of Year, WW Week.
- 3. XXXMXXXX Frequency marked with 4 significant digits after the 'M'.
- Complete CTS part number, frequency value and date code information must appear on reel and box labels.

#### SUGGESTED SOLDER PAD GEOMETRY





## TAPE AND REEL INFORMATION



Device quantity is 1,000 pieces per 180mm 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 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<sup>-8</sup> 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: Level 1 per JEDEC J-STD-020.

## **QUALITY AND RELIABILITY**

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