

# Model 406

# Surface Mount Quartz Crystal

## **FEATURES**

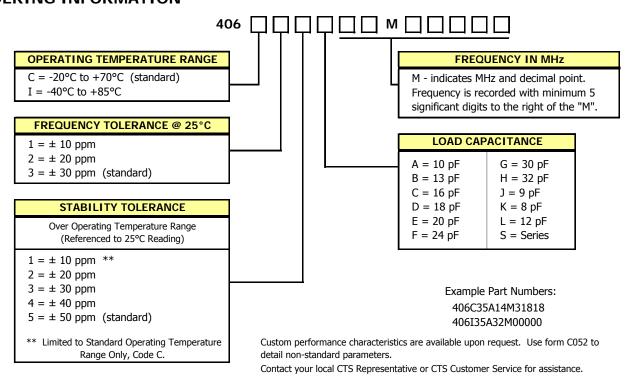
- Standard 6.0x3.5mm Surface Mount Footprint
- Stable Frequency Over Temperature and Drive Level
- Frequency Range 10 50 MHz
- Frequency Tolerance, ±30 ppm Standard (±10 ppm and ±20 ppm available)
- Frequency Stability, ±50 ppm Standard (±10,±20,±30 and ±40 ppm available)
- Operating Temperature to -40°C to +85°C
- Tape & Reel Packaging, EIA-481-2 Compliant
- RoHS/Green Compliant

## **DESCRIPTION**

The Model 406 is a ceramic packaged Crystal offering reduced size, ideal for high-density circuit board applications. The Model 406 offers reliable precision and excellent shock performance in wireless telecommunication devices.



# ORDERING INFORMATION



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# **ELECTRICAL CHARACTERISTICS**

	PARAMETER	VALUE	
Electrical Parameters	Operating Mode (Note 1)	Fundamental or 3 <sup>rd</sup> Overtone	
	Crystal Cut	AT-Cut	
	Frequency Range	10.0 MHz to 50.0 MHz	
	Frequency Tolerance @ 25°C	$\pm$ 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	

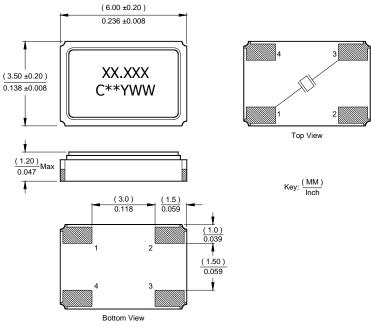
## **EQUIVALENT SERIES RESISTANCE TABLE**

FREQUENCY RANGE	MODE of OSCILLATION	<b>ESR Maximum</b>
10.000 MHz - 15.999 MHz	Fundamental	60 Ohms
16.000 MHz - 48.000 MHz	Fundamental	40 Ohms
48.001 MHz - 50.000 MHz	3 <sup>rd</sup> Overtone	80 Ohms

#### Notes:

# **MECHANICAL SPECIFICATIONS**

### PACKAGE DRAWING



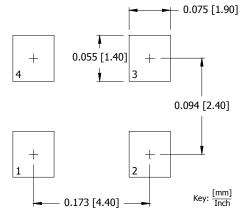
## Notes:

- 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.
- Complete CTS part number, frequency value and date code information must appear on reel and box labels.

## SUGGESTED SOLDER PAD GEOMETRY

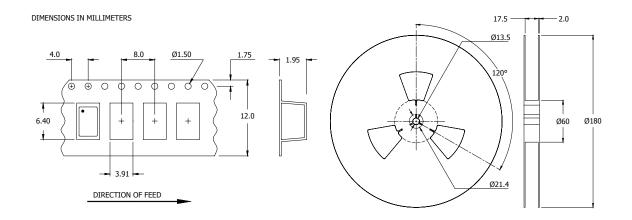


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<sup>1.</sup> Third overtones as low as 30.000 MHz are available upon request.



## 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 20q'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  $+85^{\circ}$ 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.

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