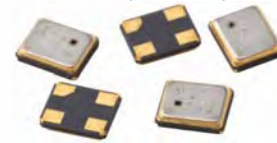


# Model 416

## Miniature Surface Mount Crystal

### Features

- Hermetic Ceramic Surface Mount Package
- Fundamental Crystal Design
- Frequency Range 24 – 80MHz
- Frequency Tolerance,  $\pm 20$ ppm Standard
- Frequency Stability,  $\pm 20$ ppm Standard
- Operating Temperature Range to  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$
- Tape and Reel Packaging, EIA-418



Part Dimensions:  
1.6 x 1.2 x 0.45mm • 2.51054mg

### Applications

- Wearable and Handheld Electronics
- Wireless Communications
- FPGA/Microcontrollers
- Computer Peripherals
- USB Interfaces
- Measuring Equipment
- Consumer Electronics
- High Density Board Layouts

### Description

CTS Model 416 incorporates a high Q quartz resonator and is ideal for supporting a wide range of commercial and industrial applications.

### Ordering Information

Model	Mode of Oscillation	Frequency Code [MHz]	Tolerance @ $+25^{\circ}\text{C}$	Temperature Stability	Temperature Range	Load Capacitance	Packaging
416	F	XXX	3	5	C	D	R
	Code   Mode		Code   Tolerance		Code   Temp. Range	Code   Capacitance	Code   Packing
	F   Fundamental		1   $\pm 10$ ppm X   $\pm 15$ ppm 2   $\pm 20$ ppm Y   $\pm 25$ ppm 3   $\pm 30$ ppm		A   $-10^{\circ}\text{C}$ to $+60^{\circ}\text{C}$ C   $-20^{\circ}\text{C}$ to $+70^{\circ}\text{C}$ D   $-30^{\circ}\text{C}$ to $+85^{\circ}\text{C}$ I   $-40^{\circ}\text{C}$ to $+85^{\circ}\text{C}$	W   5pF   L   12pF T   6pF   C   16pF V   7pF   D   18pF K   8pF   E   20pF J   9pF   S   Series A   10pF	R   3k pcs./reel
		Code   Frequency		Code   Stability			
		Product Frequency Code <sup>1</sup>		1   $\pm 10$ ppm <sup>2</sup> X   $\pm 15$ ppm 2   $\pm 20$ ppm Y   $\pm 25$ ppm 3   $\pm 30$ ppm 5   $\pm 50$ ppm			

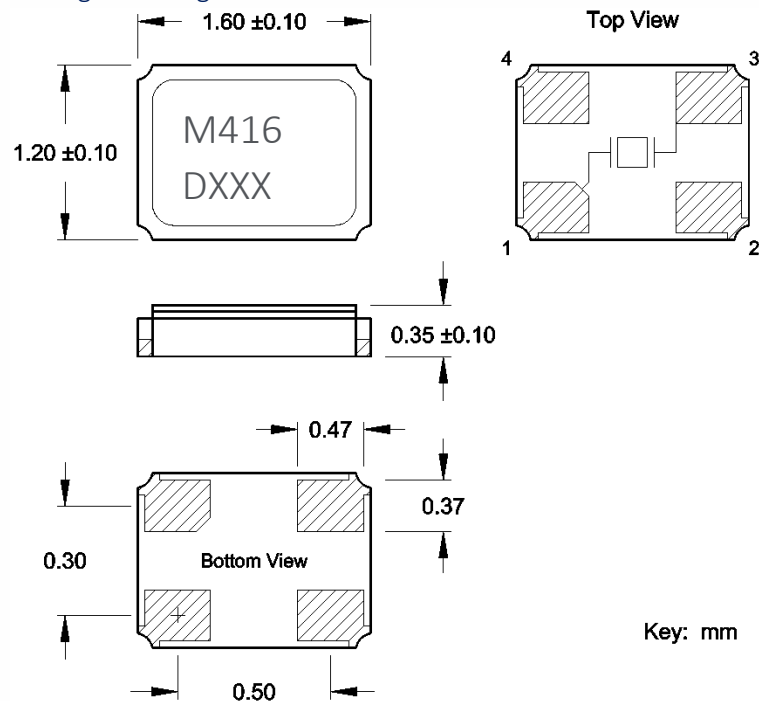
Notes:

- 1] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <math>100\text{MHz}</math>.
- 2] Check factory availability when combined with  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$  temperature range.

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

## Mechanical Specifications

### Package Drawing



Key: mm

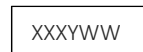
### Marking Information

#### Format A – 2 Lines [Preferred]



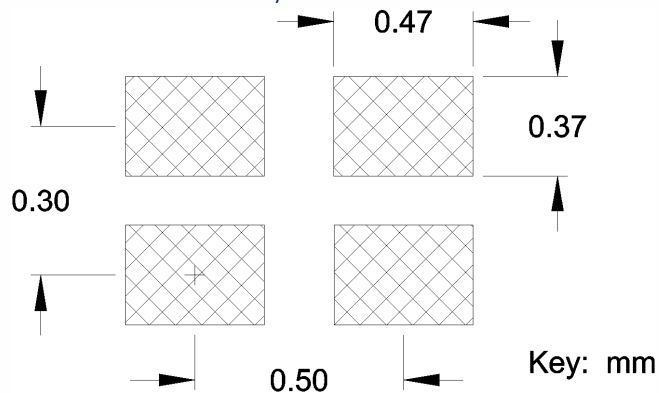
1. M416 – CTS Model series.
2. D – Date code. See Table I for codes.
3. XXX – Frequency code, 3-digits frequencies below 100MHz.  
[See document 016-1454-0, Frequency Code Tables].

#### Format B – 1 Line [Acceptable]



1. XXX – XXX – Frequency code, 3-digits frequencies below 100MHz.  
[See document 016-1454-0, Frequency Code Tables].
2. YWW – Date code; Y = year [last digit], WW = week.

### Recommended Pad Layout



### Notes

1. Terminations #2, #4 and metal lid are connected internally. End user may connect these pins to circuit ground for EMI suppression.
2. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.