

■ FEATURES:

- Surface Mount Ceramic base Weld Metal lid Package with 4 pads
- Stable frequency characteristics over temperature and drive level
- Packed in Embossed Carrier Tape & Reel for Automatic Handling (Standard 1,000 piece/reel compliant with EIA-481-2)

■ APPLICATIONS:

Surface mount 3.5 x 6.0mm x 1.2mm Max. crystal is ideal for application to high-density circuit boards with reliable precision & excellent shock performance in wireless telecommunications devices.

■ ELECTRICAL SPECIFICATIONS:

CTS Crystal Model Number	406
Operating Mode of Oscillation & Cut	Fundamental/3 <sup>rd</sup> OT & AT-cut
Frequency Range	10.0 to 50.0 MHz
Frequency Calibration Tolerance @ 25°C	±30ppm Standard ( Other tighter tolerances are available; See P/N System ).
Frequency Stability Tolerance ( Ref. to 25°C readings over Operating Temperature Range )	±50ppm Standard. ( Other tighter tolerances are available; See P/N System ).
Operating Temperature Range	-20°C to +70°C Standard. ( Extended -40°C to +85°C is available; See P/N System ).
Storage Temperature Range	-55°C to +125°C in a non-operating condition
Drive Level	25 µw Typical & 100 µw Maximum
Equivalent Series Resistance Maximum (ESR Max.)	See ESR Table
Resonance Mode (To be specified by customer)	S for Series or Parallel with load capacitance 13Pf, 18Pf, 20Pf, Etc. ( See P/N System ).
Surface Mount Temperature Reflow Condition	255°C ±5°C & 10 Sec. Max.
Shunt Capacitance (C0)	4.0 pF Max. ( 2.5 ±0.5 pF Typ.)

■ ESR Table:

Frequency Range (MHz)	Mode of Oscillation	ESR Max. (Ohms)
10.000 ~ 15.999 MHz	Fundamental	60
16.000 ~ 42.000 MHz	Fundamental	40
30.000 ~ 50.000 MHz	3 <sup>rd</sup> OT	80

■ PART NUMBERING SYSTEM for Ordering Information:

Model Number: **406**     **ffMffffff**

Operating Temperature Range:  
C = -20°C to +70°C (Standard)  
I = -40°C to +85°C

Frequency Tolerance @ 25°C  
1 = ±10 ppm  
2 = ±20 ppm  
3 = ±30 ppm (Standard)

Stability Tolerance over Operating Temperature Range (Referenced to 25°C reading)  
1 = ±10 ppm \*\*  
2 = ±20 ppm  
3 = ±30 ppm  
4 = ±40 ppm  
5 = ±50 ppm (Standard)

\*\* Limited to Standard Operating Temperature Range only, code C.

Frequency in MHz  
M - Indicates decimal point.  
Frequency shall be recorded with 5 significant digits minimum to the right of the "M".

Load Capacitance  
A = 10 pF    F = 24 pF  
B = 13 pF    G = 30 pF  
C = 16 pF    H = 32 pF  
D = 18 pF    J = 9 pF  
E = 20 pF    S = Series

Part Number Examples: 406C35A14M31818, 406I33H24M00000

**MECHANICAL SPECIFICATIONS:** 4 Pad Terminations plated with 0.3 to 1.0 µm gold (Au).



■ **PRODUCT MARKING:**

- YWW = Date Code (last digit of year & week number)
- xxMxx = Frequency shall be marked with 2 significant digits to the right of the "M".  
(Customer specified codes maximum 6 characters can be marked instead of frequency)

■ **QUALITY AND RELIABILITY:**

- Quality Systems meet or exceed the requirements of ISO 9000: 2000 standards.
- Reliability Audits are performed on this or similar products with results available upon request.

■ **ENVIRONMENTAL SPECIFICATIONS:**

- Storage Temperature: -55°C to +125°C in a non-operating condition & no degradation of performance following such exposure
- Temperature Cycle: 400 cycles, -55°C to +125°C, 10 min dwell, 1 min transfer
- Mechanical Shock: 1,500g's, 0.5mS, ½ sine wave, 3 shocks each direction, in 3 planes
- Sinusoidal Vibration: 0.06" D.A., 10 to 55 Hz and 20g's, 55 to 2,000 Hz, 3 cycles per plane
- 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  $2 \times 10^{-8}$  atm. cc/sec of Helium
- Resistance to Soldering 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:  $\leq 5$  ppm shift in 1,000 hours at 85°C
- Insulation Resistance: 500 M $\Omega$  @ 100  $\pm$ 15VDC

■ **TAPE AND REEL PACKAGING INFORMATION:**

Standard packaging quantity shall be 1,000 pieces on a 180mm reel compliant with Standard EIA-481-2

