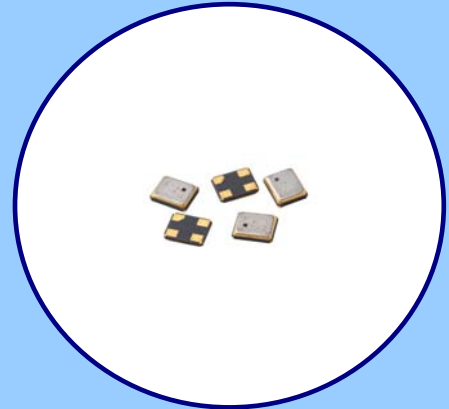


FEATURES

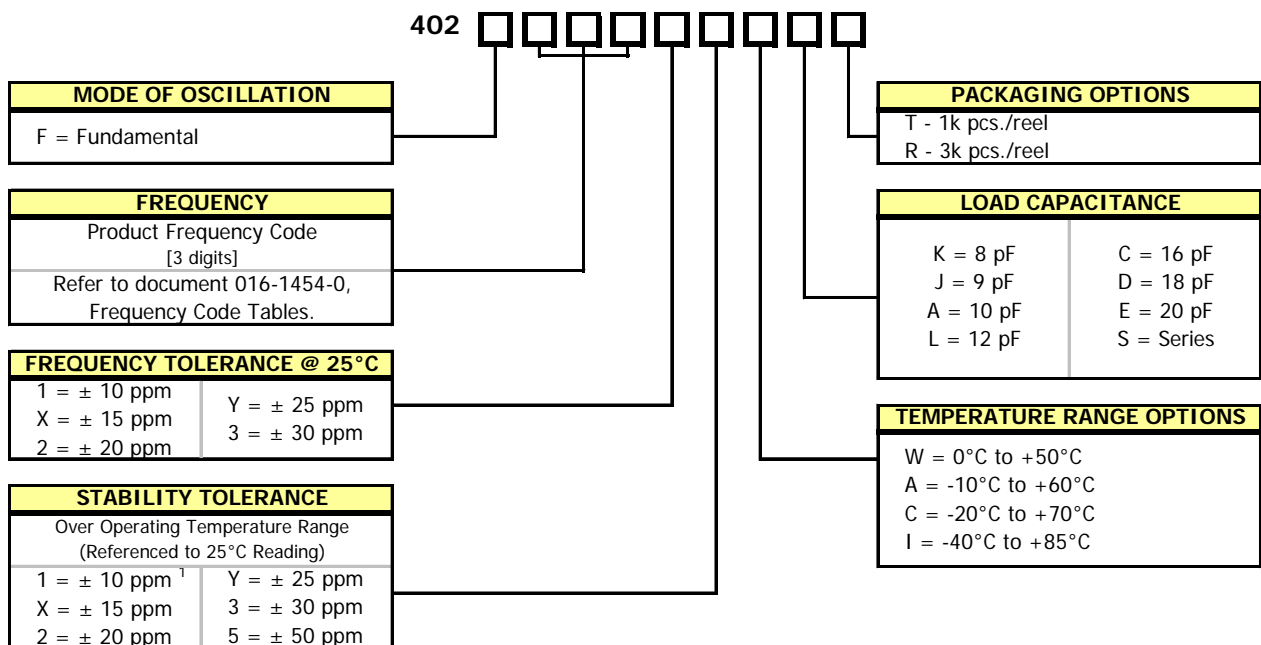
- **Standard 2.0mm x 1.6mm Seam Weld Package**
- **Fundamental Crystal Design**
- Frequency Range 16 – 60 MHz
- Frequency Tolerance, ± 20 ppm Standard [other tolerances available]
- Frequency Stability, ± 30 ppm Standard [other stabilities available]
- Operating Temperature to -40°C to $+85^{\circ}\text{C}$
- Tape & Reel Packaging Standard, EIA-481
- **RoHS/Green Compliant [6/6]**



APPLICATIONS

Model 402 is a low cost device used in a wide range of commercial applications including notebooks, computer peripherals, audio visual, Bluetooth and USB interfaces, PDAs, and automotive electronics.

ORDERING INFORMATION

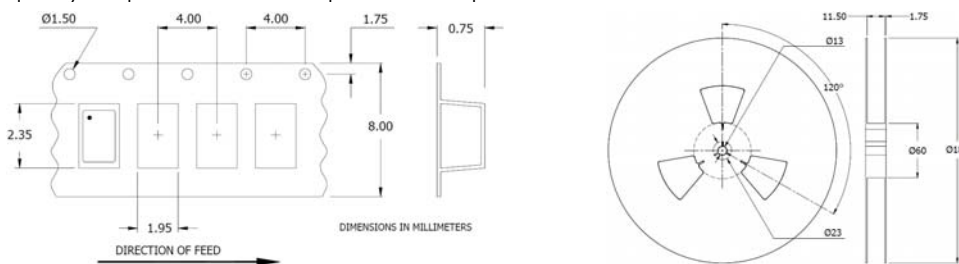


1] Only available with temperature range code "W, A & C".

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

PACKAGING INFORMATION [Reference]

Device quantity is 1k pieces minimum and 3k pieces maximum per 180mm reel.



ELECTRICAL CHARACTERISTICS

| PARAMETER | | VALUE | | |
|------------------------------|--|--------------------------------|----------------|--|
| ELECTRICAL PARAMETERS | Frequency Range | 16 MHz to 60 MHz | | |
| | Operating Mode | Fundamental | | |
| | Crystal Cut | AT-Cut | | |
| | Frequency Tolerance @ +25°C | ±20 ppm, Standard | | |
| | Frequency Stability Tolerance (Operating Temperature Range, Referenced to 25°C Reading) | ±30 ppm, Standard | | |
| | Operating Temperature Ranges | 0°C to +50°C | -10°C to +60°C | |
| | | -20°C to +70°C | -40°C to +85°C | |
| | Equivalent Series Resistance [Maximum] | 16 MHz - < 20 MHz | 300 Ohms | |
| | | 20 MHz - < 30 MHz | 200 Ohms | |
| | | 30 MHz - < 40 MHz | 100 Ohms | |
| | | 40 MHz - 60 MHz | 60 Ohms | |
| | Load Capacitance | See Ordering Information | | |
| | Shunt Capacitance (C ₀) | 3.0 pF Typical, 7.0 pF Maximum | | |
| | Drive Level | 10 μW Typ., 100 μW Max. | | |
| Aging @ +25°C | ±3 ppm/yr Typical | | | |
| Insulation Resistance | 500M Ohms @ DC 100V | | | |
| Storage Temperature Range | -40°C to +85°C | | | |

MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



MARKING INFORMATION

1. M402 - CTS Model Series.
2. D – Date code. See Table I for codes.
3. XXX – Frequency code. Reference CTS document 016-1454-01.

NOTES

1. Complete CTS part number, frequency value, date code and manufacturing site code information must appear on reel and carton labels.
2. Terminations #2, #4 and the metal lid are connected internally. End user may connect these pins to circuit ground.
3. Termination pads (e4); barrier plating is nickel [Ni] with gold [Au] flash plate.
4. Reflow conditions per JEDEC J-STD-020; 260°C maximum, 10 seconds.
5. MSL = 1.

SUGGESTED SOLDER PAD GEOMETRY



TABLE I – DATE CODE

| YEAR | | MONTH | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|------|-------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 2001 | 2005 | 2009 | 2013 | | | | | | | | | | | | |
| 2001 | 2005 | 2009 | 2013 | 2017 | A | B | C | D | E | F | G | H | J | K | L | M | |
| 2002 | 2006 | 2010 | 2014 | 2018 | N | P | Q | R | S | T | U | V | W | X | Y | Z | |
| 2003 | 2007 | 2011 | 2015 | 2019 | a | b | c | d | e | f | g | h | j | k | l | m | |
| 2004 | 2008 | 2012 | 2016 | 2020 | n | p | q | r | s | t | u | v | w | x | y | z | |