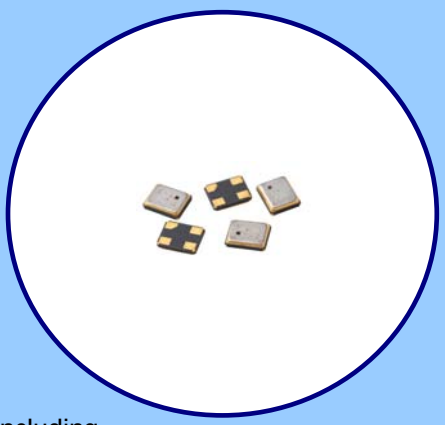
CTS ELECTRONIC COMPONENTS

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°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

402 ☐☐☐☐☐☐☐☐☐☐

MODE OF OSCILLATION
F = Fundamental

FREQUENCY
Product Frequency Code [3 digits]
Refer to document 016-1454-0, Frequency Code Tables.

FREQUENCY TOLERANCE @ 25°C

1 = ± 10 ppm	Y = ± 25 ppm
X = ± 15 ppm	3 = ± 30 ppm
2 = ± 20 ppm	

STABILITY TOLERANCE
Over Operating Temperature Range (Referenced to 25°C Reading)

1 = ± 10 ppm [1]	Y = ± 25 ppm
X = ± 15 ppm	3 = ± 30 ppm
2 = ± 20 ppm	5 = ± 50 ppm

PACKAGING OPTIONS
T - 1k pcs./reel
R - 3k pcs./reel

LOAD CAPACITANCE

K = 8 pF	C = 16 pF
J = 9 pF	D = 18 pF
A = 10 pF	E = 20 pF
L = 12 pF	S = Series

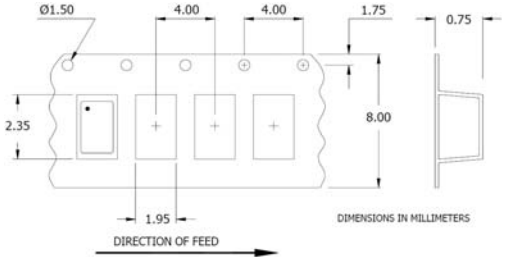
TEMPERATURE RANGE OPTIONS
W = 0°C to +50°C
A = -10°C to +60°C
C = -20°C to +70°C
I = -40°C to +85°C

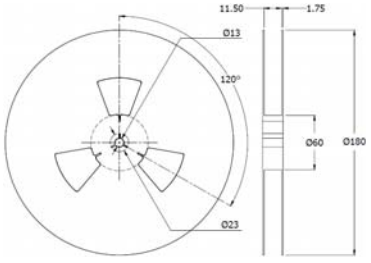
1] Only available with temperature range code "W, A & C".

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.



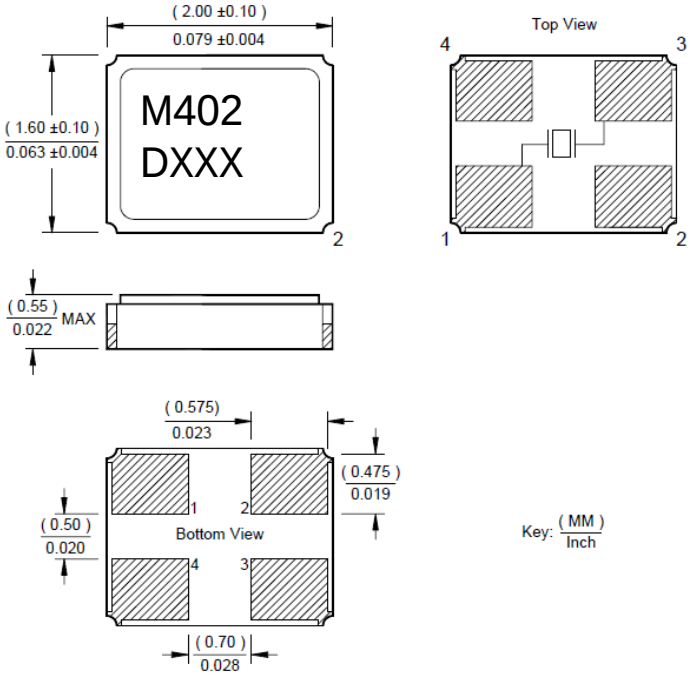


ELECTRICAL CHARACTERISTICS

	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 -20°C to +70°C	-10°C to +60°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

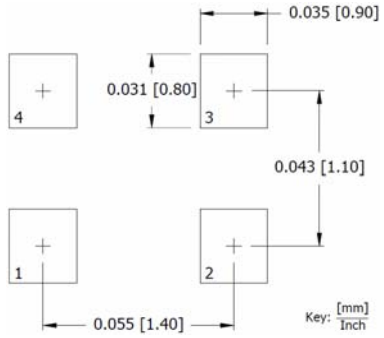


TABLE I – DATE CODE

YEAR \ MONTH					JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2001	2005	2009	2013	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