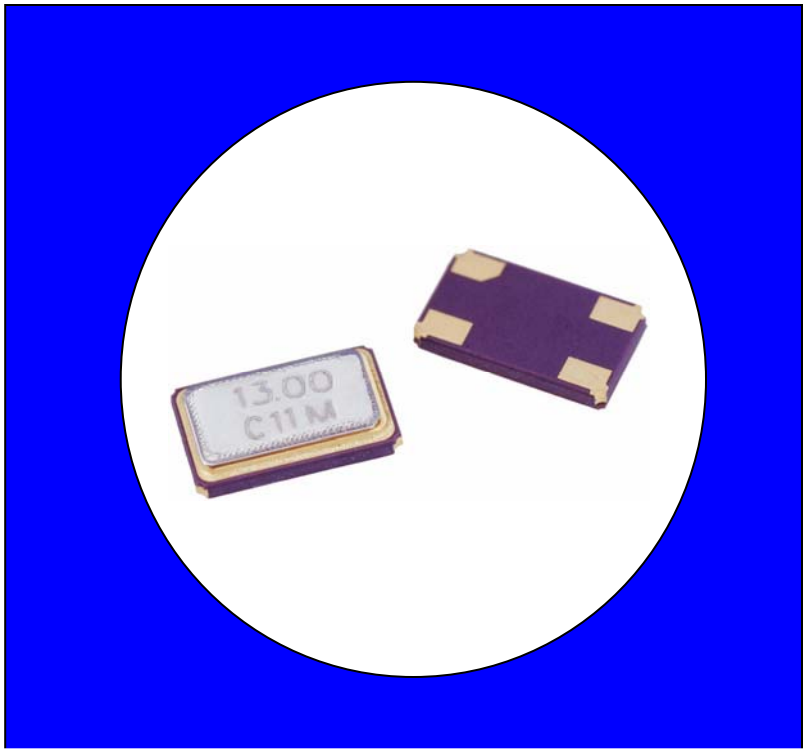
Model 425

Surface Mount Quartz Crystal

FEATURES

- Standard 2.5x2.0mm Surface Mount Footprint
- Stable Frequency Over Temperature and Drive Level
- **Fundamental Crystal Design**
- Frequency Range 16 – 54 MHz
- Frequency Tolerance, ±30 ppm Standard (±10 ppm, ±15 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 (6/6)**



DESCRIPTION

The Model 425 is a ceramic packaged Crystal offering reduced size, ideal for high-density circuit board applications. The Model 425 offers reliable precision and excellent shock performance in wireless telecommunication devices.

ORDERING INFORMATION

425 ☐☐☐☐☐☐☐ M ☐☐☐☐

MODE OF OSCILLATION

F = Fundamental

FREQUENCY TOLERANCE @ 25°C

1 = ± 10 ppm
2 = ± 20 ppm
3 = ± 30 ppm (standard)
X = ± 15 ppm

STABILITY TOLERANCE/TEMPERATURE RANGE

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

1 = ± 10 ppm, -20°C to +70°C
2 = ± 20 ppm, -20°C to +70°C
3 = ± 30 ppm, -20°C to +70°C
4 = ± 40 ppm, -20°C to +70°C
5 = ± 50 ppm, -20°C to +70°C (standard)
6 = ± 20 ppm, -40°C to +85°C
7 = ± 30 ppm, -40°C to +85°C
8 = ± 40 ppm, -40°C to +85°C
9 = ± 50 ppm, -40°C to +85°C

FREQUENCY IN MHz

M - indicates MHz and decimal point. Frequency is recorded with minimum 4 significant digits to the right of the "M".

LOAD CAPACITANCE

A = 10 pF	G = 30 pF
B = 13 pF	H = 32 pF
C = 16 pF	J = 9 pF
D = 18 pF	K = 8 pF
E = 20 pF	L = 12 pF
F = 24 pF	S = Series

Example Part Numbers:
425F35E014M3181
425FX9A050M0000

Custom performance characteristics are available upon request. Use form C052 to detail non-standard parameters.

Contact your local CTS Representative or CTS Customer Service for assistance.

• • • CTS Electronic Components, Inc. • 171 Covington Drive • Bloomingdale, IL 60108 • • •
• • • www.ctscorp.com • • •

ELECTRICAL CHARACTERISTICS

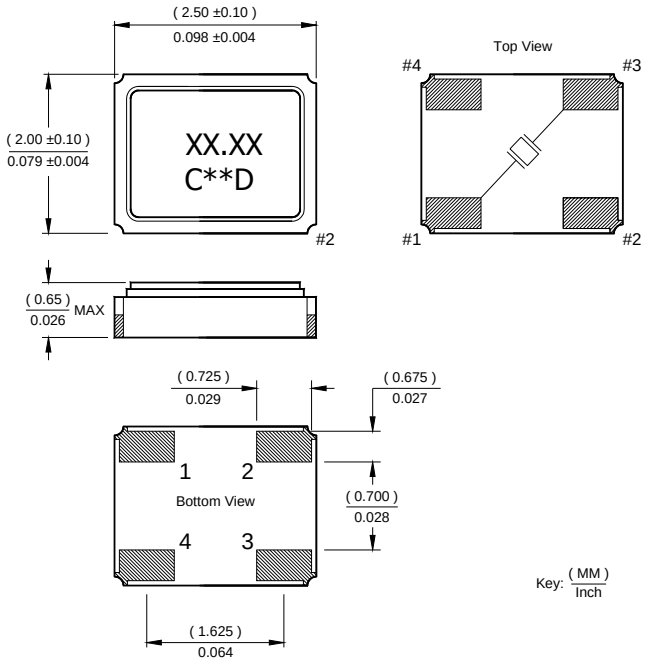
	PARAMETER	VALUE
Electrical Parameters	Operating Mode	Fundamental
	Crystal Cut	AT-Cut
	Frequency Range	16.0 MHz to 54.0 MHz
	Frequency Tolerance @ 25°C	± 30 ppm Standard (± 10 ppm, ±15 ppm and ± 20 ppm Available)
	Frequency Stability Tolerance (Operating Temperature Range, Referenced to 25°C Reading)	± 50 ppm Standard (± 10 ppm, ± 20 ppm, ± 30 ppm and ± 40 ppm Available)
	Operating Temperature Range	-20°C to +70°C Standard (-40°C to +85°C Available)
	Storage Temperature Range	-40°C to +85°C
	Equivalent Series Resistance	See ESR Table
	Load Capacitance or Resonance Mode	See Ordering Information
	Shunt Capacitance (C_0)	5.0 pF Maximum
	Drive Level	10 µW Typical, 100 µW Maximum
	Aging @ 25°C	± 3 ppm/year maximum
	Reflow Condition, per JEDEC J-STD-020	+255°C ± 5°C, 10 Seconds Maximum

EQUIVALENT SERIES RESISTANCE TABLE

FREQUENCY RANGE	MODE of OSCILLATION	ESR Maximum
16.00 MHz - 19.999 MHz	Fundamental	120 Ohms
20.00 MHz - 29.999 MHz	Fundamental	100 Ohms
30.00 MHz - 54.000 MHz	Fundamental	60 Ohms

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.XX – Frequency in MHz.
2. C – CTS and Pin 1 identifier.
3. ** – Manufacturing Site Code.
4. D – Manufactured Date Code. See Table I for codes.
5. Complete CTS part number, frequency value and date code information must appear on reel and box labels.

SUGGESTED SOLDER PAD GEOMETRY

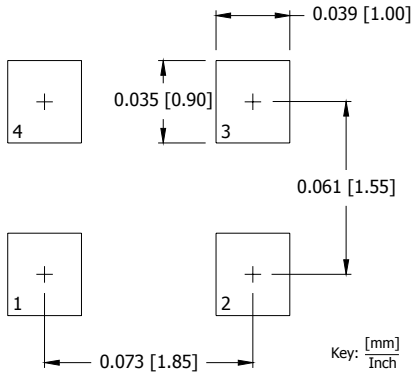
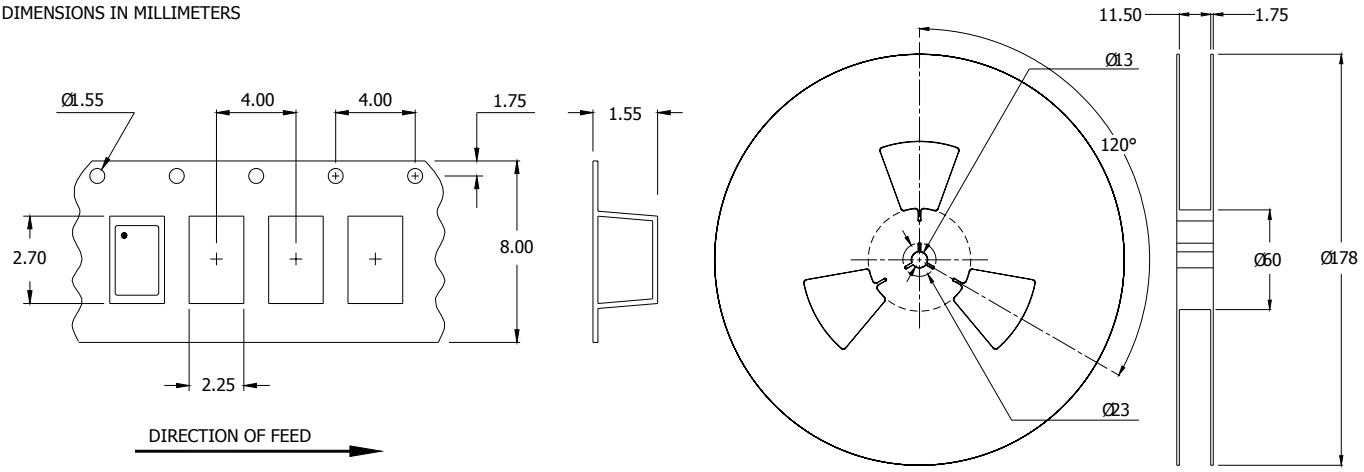


TABLE I

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

TAPE AND REEL INFORMATION

DIMENSIONS IN MILLIMETERS



Device quantity is 3,000 pieces mimimum per 178mm 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 20g'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 $2x10^{-8}$ 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°C, maximum ±5 ppm shift.
Insulation Resistance:	500M Ohms @ $100V_{DC}$ $\pm15V_{DC}$.
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.