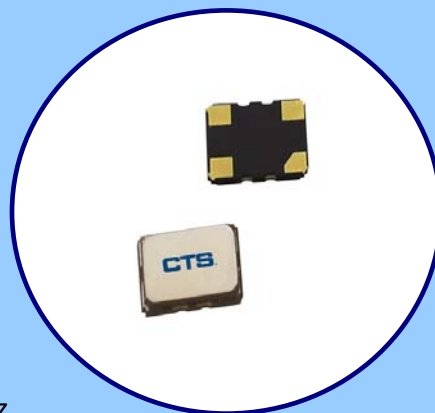




FEATURES

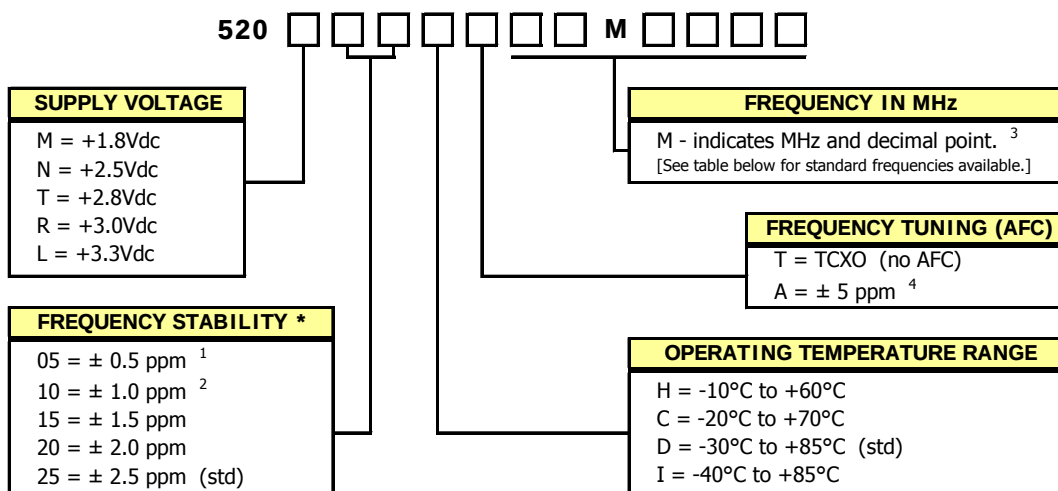
- **Clipped Sine Wave Output**
- **Optional Voltage Control for Frequency Tuning [VCTCXO]**
- 2.5mmx2.0mm Surface Mount Package
- Frequency Range 10 – 52 MHz [Standard Frequencies List Shown Below]
- Fundamental Crystal Design
- Frequency Stability, several options to choose from $\pm 0.5\text{ppm} \sim \pm 2.5\text{ppm}$
- Operating Voltage, +1.8Vdc $\sim$ +2.5Vdc
- Operating Temperature to -40°C to +85°C
- Tape & Reel Packaging Available
- **RoHS/Green Compliant (6/6)**



APPLICATIONS

The Model 520 Temperature Compensated Crystal Oscillator (TCXO) is a quartz based, clipped sine wave output, with optional frequency tuning, in a hermetically sealed ceramic package. M520 is suitable for wireless communications, broadband access, WLAN/WiMax/WIFI, portable equipment, test and measurement and mobile applications.

ORDERING INFORMATION



* Frequency vs. Temperature Only

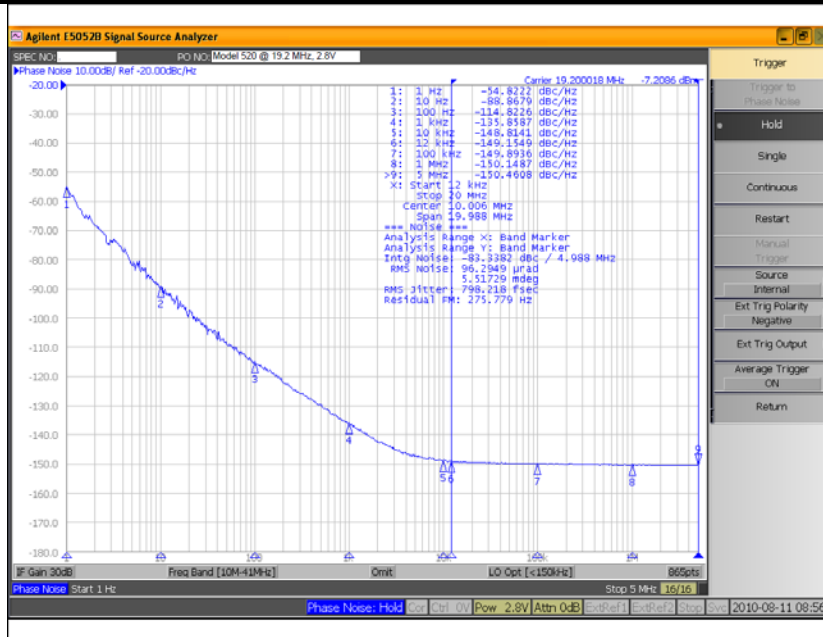
- 1] Only available with temperature range codes "H" and "C".
- 2] Only available with temperature range codes "H", "C" and "D".
- 3] Frequency is recorded with two leading digits before the 'M' and 4 significant digits after the 'M' (including zeros).
[Ex. XXMXXXX (10M0000), XXMXXXX (16M3840)]
- 4] See Electrical Characteristics for Control Voltage range per Supply Voltage selected.

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

M520 Standard Frequencies				
13.000000	16.368000	19.200000	26.000000	40.000000
16.367667	16.369000	20.000000	38.400000	

ELECTRICAL CHARACTERISTICS

ELECTRICAL PARAMETERS	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
	Maximum Supply Voltage	V_{CC}	-	-0.5	-	6.0	V
	Maximum Control Voltage	V_C	-	-0.5	-	V_{CC}	V
	Storage Temperature	T_{STG}	-	-40	-	85	°C
	Frequency Range	f_0	Std frequencies listed in Ordering Information	10	-	52	MHz
	Frequency Stability	$\Delta f/f_0$	Frequency vs. Temperature Only	0.5, 1.0, 1.5 2.0, 2.5			± ppm
	Frequency Stability vs. Initial Calibration vs. Supply Voltage vs. Load vs. Reflow Shift vs. Aging	-	@25°C ±5% change ±10% change After 2 reflows 1st year 10 year	-	-	2.0 0.2 0.2 2.0 1.0 10.0	± ppm
	Operating Temperature Order Code 'W' Order Code 'H' Order Code 'C' Order Code 'D' Order Code 'I'	T_A	-	0 -10 -20 -30 -40	25	55 60 70 85 85	°C
	Supply Voltage Order Code 'M' Order Code 'N' Order Code 'T' Order Code 'R' Order Code 'L'	V_{CC}	±5%	1.77 2.38 2.66 2.85 3.14	1.8 2.5 2.8 3.0 3.3	1.83 2.63 2.94 3.15 3.47	V
	Supply Current	I_{CC}	10.00 MHz - 25.99 MHz 26.00 MHz - 52.00 MHz	-	-	2 2.5	mA
	Control Voltage	V_C	2.5V, 2.8V, 3.0V, 3.3V 1.8V	0.4 0.3	1.5 0.9	2.4 1.5	V
	Frequency Tuning [VCTCXO Only]	-	Specified V_C Range	5.0	-	-	± ppm
	V_C Input Impedance	ZV_C	-	500	-	-	kOhm
	Output Waveform		AC coupled Clipped Sinewave				
	Output Voltage Levels	V_0		0.8	-	-	Vp-p
	Output Load	$R_L // C_L$	-	10 kOhm // 10 pF			
	Start Up Time	T_S	-	-	-	2	ms
	Phase Noise	-	Varies based on output frequency. See example plot @ 19.2 MHz below.				dBc/Hz



ELECTRICAL CHARACTERISTICS

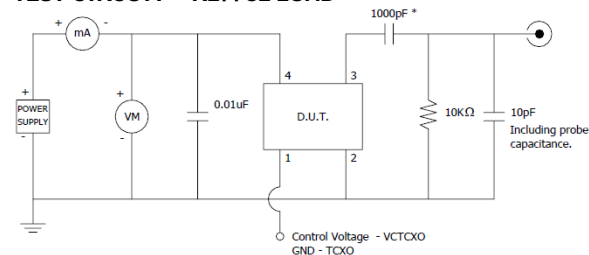
D.U.T. PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	V_C	GND – TCXO [Note 1] Control Voltage – VCTCXO
2	GND	Circuit & Package Ground
3	Output	Clipped Sine Wave Output [Note 2]
4	V_{CC}	Supply Voltage

NOTES

1. Connect to ground for TCXO (no AFC) option.
2. DC-Cut Capacitor Required.
Add 1000pF capacitor between TCXO output and input of load.

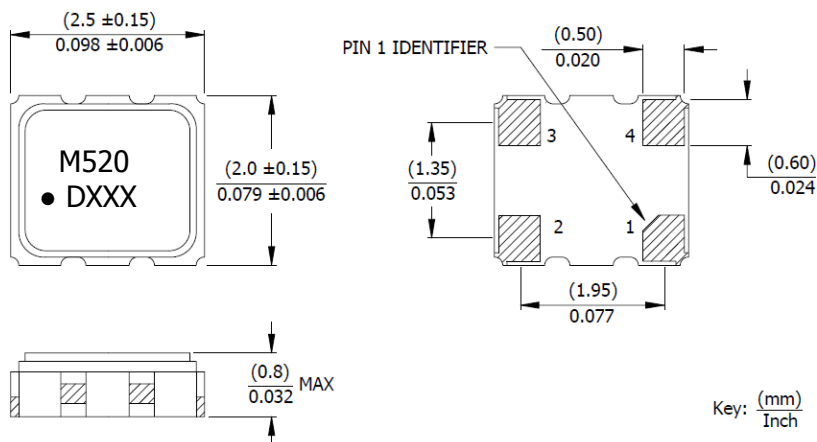
TEST CIRCUIT – RL // CL LOAD



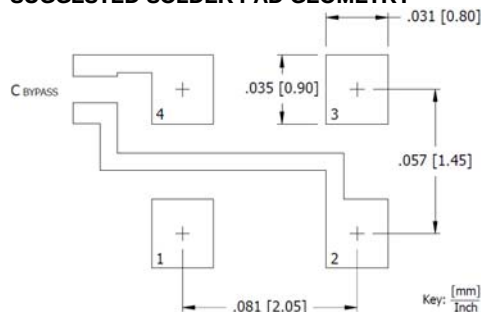
* DC-Cut Capacitor

MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



SUGGESTED SOLDER PAD GEOMETRY



C_{BYPASS} should be $\geq 0.01 \mu F$.

MARKING INFORMATION

1. M520 - CTS Model Series.
2. • – Pin 1 identifier.
3. D – Date code. See Table I for codes.
4. XXX – Frequency code. Reference CTS document 016-1454-01.

Complete CTS part number, frequency value and date code information must appear on reel and carton labels.

NOTES

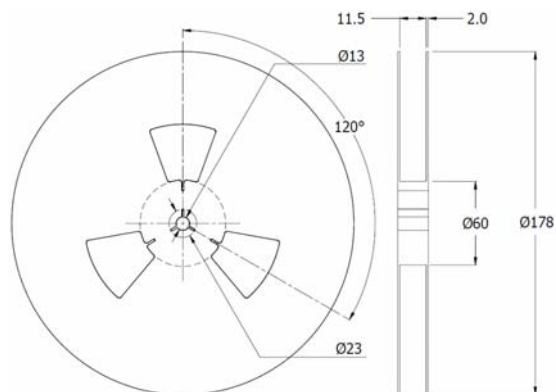
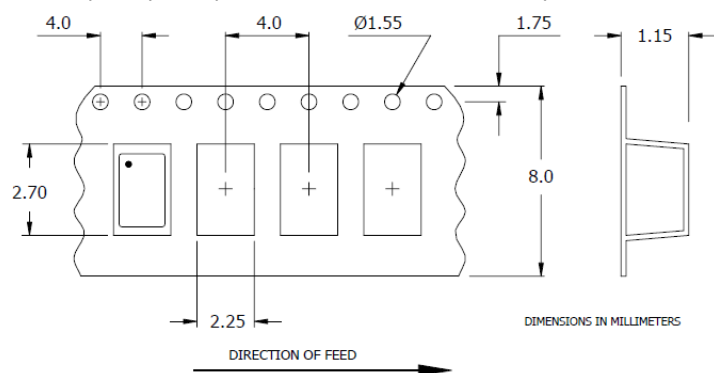
1. DO NOT make connections to non-labeled pins and castellations, as they may have internal connections used in the manufacturing process.
2. Termination pads (e4); barrier plating is nickel (Ni) with gold (Au) flash plate.
3. Reflow conditions per JEDEC J-STD-020, 260°C maximum.

TABLE I – DATE CODE

YEAR					MONTH											
2001	2005	2009	2013	2017	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R	S
T	U	V	W	X	Y	Z	a	b	c	d	e	f	g	h	i	j
k	l	m	n	p	q	r	s	t	u	v	w	x	y	z		

PACKAGING INFORMATION [Reference]

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



Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

CTS:

<u>520R25HT40M0000</u>	<u>520L25HT16M3680</u>	<u>520T20IA16M3690</u>	<u>520M25IA38M4000</u>	<u>520M25IA40M0000</u>
<u>520N25IA26M0000</u>	<u>520R25IA13M0000</u>	<u>520R25IA16M3677</u>	<u>520L25IA16M3680</u>	<u>520L25IA16M3690</u>
<u>520T15DA13M0000</u>	<u>520T20DA13M0000</u>	<u>520T25DA26M0000</u>	<u>520R25DA26M0000</u>	<u>520T15CA40M0000</u>
<u>520L20CA13M0000</u>	<u>520T25CA19M2000</u>	<u>520T05HA13M0000</u>	<u>520L05HA26M0000</u>	<u>520R25HA13M0000</u>
<u>520M25HT16M3677</u>	<u>520N15IA16M3690</u>	<u>520L10DA16M3677</u>	<u>520T20DA16M3677</u>	<u>520R20DA16M3680</u>
<u>520T25DA19M2000</u>	<u>520R25DA40M0000</u>	<u>520L25DA26M0000</u>	<u>520L05CA38M4000</u>	<u>520M15CA16M3680</u>
<u>520M20CA13M0000</u>	<u>520T20CA20M0000</u>	<u>520R20CA40M0000</u>	<u>520L20CA16M3690</u>	<u>520N25CA16M3680</u>
<u>520N10HA16M3677</u>	<u>520R10HA16M3680</u>	<u>520N15HA40M0000</u>	<u>520M20HA16M3680</u>	<u>520R20HA13M0000</u>
<u>520L25HA19M2000</u>	<u>520R20IT19M2000</u>	<u>520L20IT13M0000</u>	<u>520M25IT16M3690</u>	<u>520N25IT13M0000</u>
<u>520T25IT16M3680</u>	<u>520M10DT38M4000</u>	<u>520R10DT26M0000</u>	<u>520M15DT16M3677</u>	<u>520L15DT26M0000</u>
<u>520L20DT16M3680</u>	<u>520L20DT20M0000</u>	<u>520N25DT16M3677</u>	<u>520R25DT38M4000</u>	<u>520M05CT16M3680</u>
<u>520M10CT16M3690</u>	<u>520T10CT16M3690</u>	<u>520L10CT40M0000</u>	<u>520M15CT20M0000</u>	<u>520N20CT38M4000</u>
<u>520L20CT16M3690</u>	<u>520R05HT16M3690</u>	<u>520N10HT16M3680</u>	<u>520L15HT16M3680</u>	<u>520M20HT26M0000</u>
<u>520R20HT19M2000</u>	<u>520N25HT16M3677</u>	<u>520N25HT38M4000</u>	<u>520L15IT16M3690</u>	<u>520L15IT20M0000</u>
<u>520R20IT40M0000</u>	<u>520R25IT16M3680</u>	<u>520N10DT20M0000</u>	<u>520R10DT20M0000</u>	<u>520L10DT26M0000</u>
<u>520N15DT19M2000</u>	<u>520M20DT40M0000</u>	<u>520L20DT16M3690</u>	<u>520L20DT40M0000</u>	<u>520M25DT13M0000</u>
<u>520L25DT26M0000</u>	<u>520T05CT13M0000</u>	<u>520L05CT19M2000</u>	<u>520M10CT16M3677</u>	<u>520N10CT16M3677</u>
<u>520L15CT38M4000</u>	<u>520L20CT16M3677</u>	<u>520T05HT20M0000</u>	<u>520T10HT40M0000</u>	<u>520R10HT38M4000</u>
<u>520N15HT13M0000</u>	<u>520N15HT38M4000</u>	<u>520T15HT16M3680</u>	<u>520L15HT13M0000</u>	<u>520L15HT16M3690</u>
<u>520L15HT19M2000</u>	<u>520T20HT20M0000</u>	<u>520M25HT16M3680</u>	<u>520M25HT16M3690</u>	<u>520N25HT16M3680</u>