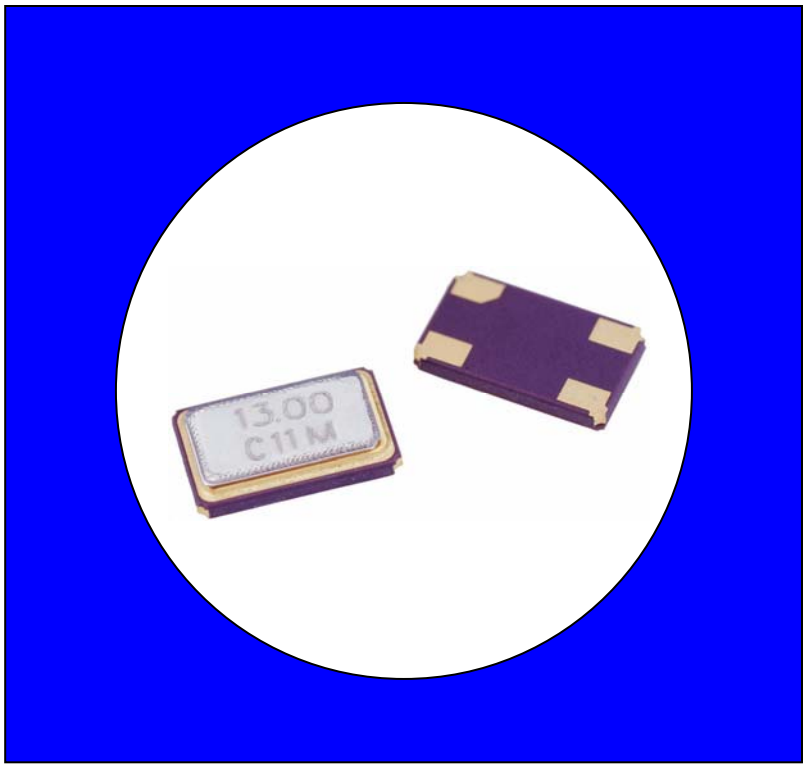
Model 632

HCMOS/TTL CLOCK OSCILLATOR

FEATURES

- Standard 3.2x2.5mm Surface Mount Footprint
- HCMOS/TTL Compatible
- **Fundamental and 3RD Overtone Crystals**
- Frequency Range 1.0 – 75 MHz
- Frequency Stability, ±50 ppm
- +1.8Vdc,+2.5Vdc,+2.8Vdc,+3.3Vdc Operation
- Operating Temperature to –10°C to +70°C
- Output Enable Standard
- Tape & Reel Packaging
- **RoHS/Green Compliant (6/6)**



DESCRIPTION

The Model 632 is a ceramic packaged Clock oscillator offering reduced size and enhanced stability. The small size means it is perfect for any application. The enhanced stability means it is the perfect choice for today's communications applications that require tight frequency control.

ORDERING INFORMATION

632 ☐☐☐☐☐☐ M ☐☐☐☐☐

SUPPLY VOLTAGE
M = +1.8Vdc
N = +2.5Vdc
T = +2.8Vdc
L = +3.3Vdc

FREQUENCY IN MHz *
M - indicates MHz and decimal point. Frequency is recorded with minimum 5 significant digits to the right of the "M".

FREQUENCY STABILITY
5 = ± 25 ppm *
3 = ± 50 ppm (standard)

OPERATING TEMPERATURE RANGE
C = -10°C to +70°C (standard)
I = -40°C to +85°C *

* Contact factory for availability.

Example Part Number: 632L3C032M76800

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

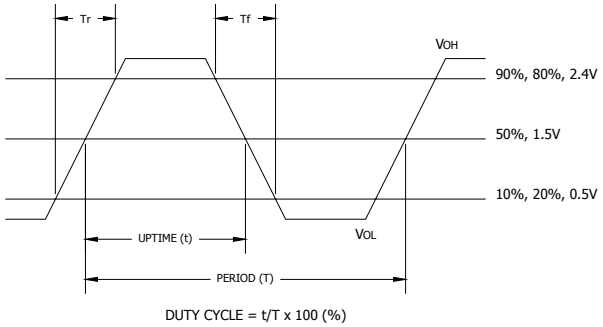
ELECTRICAL CHARACTERISTICS

	PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Absolute Maximums	Maximum Supply Voltage	V_{CC}	-	-0.5	-	4.0	V
	Storage Temperature	T_{STG}	-	-55	-	125	°C
	Frequency Range (See Note 1)	f_O	-	1.0	-	75	MHz
	Frequency Stability (See Note 2 and Ordering Information)	$\Delta f/f_O$	-	-	-	50	± ppm
	Aging	$\Delta f/f_O$	-	-	-	3	± ppm/yr
	Operating Temperature Commercial Industrial	T_A	-	 -10 -40	 25	 70 85	°C
Electrical and Waveform Parameters	Supply Voltage Model 632M Model 632N Model 632T Model 632L	V_{CC}	± 10 %	 1.62 2.25 2.52 2.97	 1.8 2.5 2.8 3.3	 1.98 2.75 3.08 3.63	V
	Supply Current Model 632M	I_{CC}	1.0 MHz to 20 MHz C_L=15pF 20.1 MHz to 40 MHz C_L=15pF 40.1 MHz to 75 MHz C_L=15pF	 - -	 - -	 6 7 10	mA
	Model 632N / Model 632T		1.0 MHz to 20 MHz C_L=15pF 20.1 MHz to 40 MHz C_L=15pF 40.1 MHz to 75 MHz C_L=15pF	- - -	- - -	8 10 10	
	Model 632L		1.0 MHz to 20 MHz C_L=15pF 20.1 MHz to 40 MHz C_L=15pF 40.1 MHz to 75 MHz C_L=15pF	- - -	- - -	10 15 15	
	Output Load	C_L				15	pF
	Output Voltage Levels Logic '1' Level Logic '0' Level	 V_{OH} V_{OL}	 CMOS Load CMOS Load	 90%V_{CC} -	 - -	 - 10%V_{CC}	V
	Output Current Logic '1' Level	 I_{OH}	 V_{OH} = 90%V_{CC} (1.8V, 2.5/2.8V, 3.3V)	 -	 -	 -2, -4, -8	mA
	Logic '0' Level	I_{OL}	V_{OL} = 10%V_{CC} (1.8V, 2.5/2.8V, 3.3V)	-	-	+2, +4, +8	
	Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
	Rise and Fall Time	T_R, T_F	@ 10% - 90% Levels, C_L = 15 pF			10	ns
	Start Up Time	T_S	Application of V_{CC}	-	-	10	ms
	Enable Function Enable Input Voltage	 V_{IH}	 Pin 1 Logic '1', Output Enabled	 0.7*V_{CC}	 -	 -	V
	Disable Input Voltage	V_{IL}	Pin 1 Logic '0', Output Disabled	-	-	0.3*V_{CC}	
	Enable Time	T_{PLZ}	Pin 1 Logic '1'	-	-	10	ms
	Standby Current	I_{ST}	Pin 1 Logic '0', Output Disabled	-	-	10	uA
	Period Jitter, Pk-Pk	-	-	-	-	100	ps
	Period Jitter, RMS	-	-	-	-	25	
	Phase Jitter, RMS	-	Bandwidth 12 kHz - 20 MHz	-	< 2	-	

Notes:

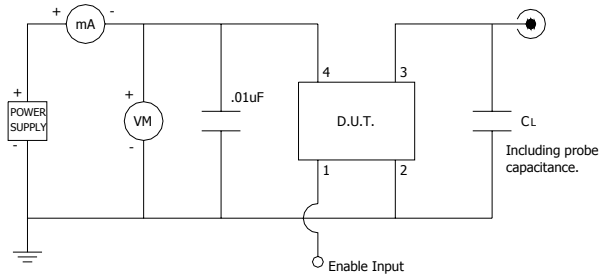
1. Contact factory for available frequencies.
2. Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and aging.

CMOS/TTL OUTPUT WAVEFORM



DUTY CYCLE = t/T x 100 (%)

TEST CIRCUIT, CMOS LOAD



ENABLE TRUTH TABLE

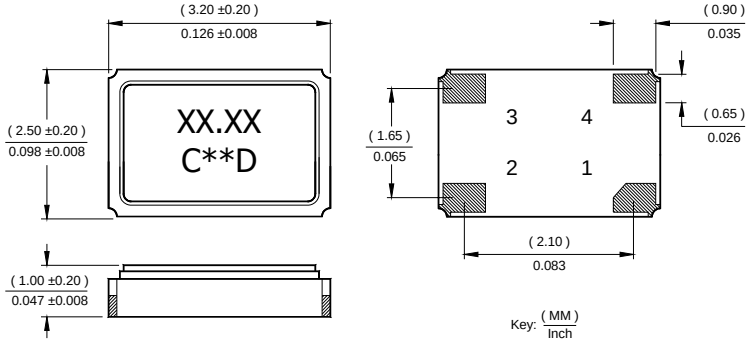
PIN 1	PIN 3
Logic '1'	Output
Open	Output
Logic '0'	High Imp.

D.U.T. PIN ASSIGNMENTS

PIN	SYMBOL	DESCRIPTION
1	EOH	Enable Input
2	GND	Circuit & Package Ground
3	Output	RF Output
4	V_{CC}	Supply Voltage

MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



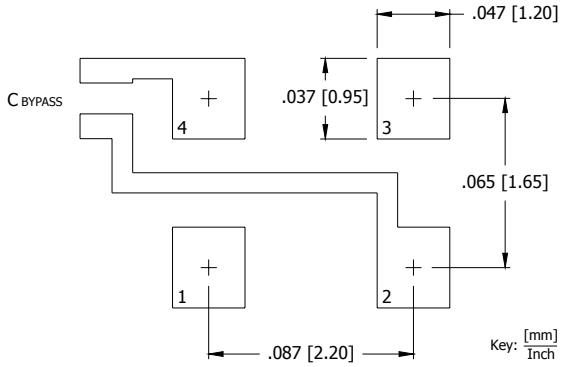
MARKING INFORMATION

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.

NOTES

1. Termination pads (e4), barrier-plating is nickel (Ni) with gold (Au) flash plate.
2. Reflow conditions per JEDEC J-STD-020.

SUGGESTED SOLDER PAD GEOMETRY

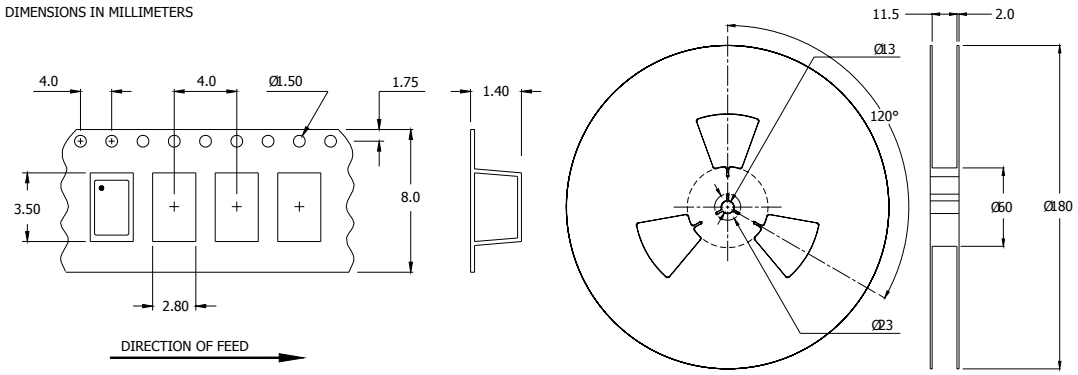


C_{BYPASS} should be ≥ 0.01 uF.

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



Device quantity is 3,000 pieces per 178mm reel minimum.

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, maximum bias, disregarding frequency shift.
Frequency Aging:	1,000 hours at +85°C, full bias, less than ±5 ppm shift.
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.