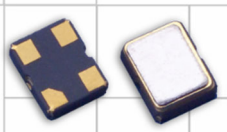
Model 620

HCMOS Clock Oscillator



Part Dimensions:
2.0 × 1.6 × 0.8mm • 8.29998mg

Features

- Ceramic Surface Mount Package
- Operating Temperature Range to -40°C to +105°C
- Fundamental and 3rd Overtone Crystal Designs
- Frequency Range 1.0 - 110MHz *
- +1.8V, +2.5V and +3.3V Operation
- Output Enable Standard
- Tape and Reel Packaging, EIA-481

Standard Frequencies

* See Page 6 for common frequencies.
Check with factory for availability of frequencies not listed.

Applications

- Internet of Things [IoT, IIoT]
- Microcontrollers and FPGAs
- Wireless Communication
- Networking Equipment
- Data Communications
- Computers and Peripherals
- Ethernet/GbE/SyncE
- Portable Devices
- Test and Measurement

Description

CTS Model 620 is a low cost, ultra-low voltage clock oscillator supporting HCMOS output. Employing the latest IC technology, M620 has excellent stability and low phase jitter performance.

Ordering Information

Model	Supply Voltage	Frequency Stability	Temperature Range	Frequency Code [MHz]	Packaging
620	L	3	C	XXXMXXXXX	R

Code	Voltage
M	+1.8Vdc
N	+2.5Vdc
L	+3.3Vdc

Code	Temp. Range
C	-20°C to +70°C
I	-40°C to +85°C
G	-40°C to +105°C [2]

Code	Packing
R	3k pcs./reel

Code	Stability	Code	Stability
6	±20ppm [1]	4	±30ppm
5	±25ppm	3	±50ppm

Code	Frequency
Product Frequency Code [3]	

Notes:

1] Consult factory for availability of 6I Stability/Temperature combination.

2] Available with stability codes 4 and 3.

3] Frequency is recorded with 3 leading digits before and 5 significant digits after the "M" [including zeroes].
[Ex. 3.579545MHz = 003M57954; 14.31818MHz = 014M31818; 25MHz = 025M00000; 125MHz = 125M00000]

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

Electrical Specifications

Operating Conditions

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Maximum Supply Voltage	V_{CC}	-	-0.5	-	4.0	V
Supply Voltage	V_{CC}	±5%	1.710 2.375 3.135	1.80 2.50 3.30	1.890 2.665 3.465	V
Supply Current	I_{CC}	Typical @ Nominal Vcc, C_L = 15 pF, T_A = +25°C				mA
		@ +1.8V, 1.0MHz to <50MHz	-	-	7	
		@ +1.8V, 50MHz to 110MHz	-	-	15	
		@ +2.5V, 1.0MHz to <50MHz	-	-	10	
		@ +2.5V, 50MHz to 110MHz	-	-	15	
		@ +3.3V, 1.0MHz to <50MHz	-	-	15	
		@ +3.3V, 50MHz to 110MHz	-	-	20	
Output Load	C_L	-	-	-	15	pF
Operating Temperature	T_A	-	-20 -40 -40		+70 +85 +105	°C
Storage Temperature	T_{STG}	-	-55	-	+125	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	-		1.0 - 110		MHz
Frequency Stability [Note 1]	$\Delta f/f_O$	-		20, 25, 30, or 50		±ppm
Aging	$\Delta f/f_{25}$	First Year @ +25°C, nominal V_{CC}	-3	-	3	ppm

1.] Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1st year aging.

Output Parameters

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Output Type	-	-		HCMOS		-
Output Voltage Levels	V_{OH}	Logic '1' Level, CMOS Load	0.9V_{CC}	-	-	V
	V_{OL}	Logic '0' Level, CMOS Load	-	-	0.1V_{CC}	
Output Current Levels	I_{OH}	V_{OH} = 90%V_{CC} [+1.8V, +2.5V, +3.3V]	-	-	-4, -4, -8	mA
	I_{OL}	V_{OL} = 10%V_{CC} [+1.8V, +2.5V, +3.3V]	-	-	+4, +4, +8	
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Rise and Fall Time [Note 2]	T_R, T_F	@ 10%/90% Levels, Nominal V_{CC}, C_L = 15pF				ns
		@ +1.8V, 1.0MHz to <50MHz	-	-	6	
		@ +1.8V, 50MHz to 110MHz	-	-	3	
		@ +2.5V, 1.0MHz to <50MHz	-	-	6	
		@ +2.5V, 50MHz to 110MHz	-	-	3	
		@ +3.3V, 1.0MHz to <50MHz	-	-	5	
		@ +3.3V, 50MHz to 110MHz	-	-	3	
Start Up Time	T_S	Application of V_{CC}	-	2	5	ms

2.] Parameters are worst case and account for comprehensive range of product specification. Performance may vary by application and must be validated by end user.

Electrical Specifications

Output Enable

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Enable Function		Standby				
Enable Input Voltage	V_{IH}	Pin 1 Logic '1', Output Enabled	$0.7V_{CC}$	-	-	V
Disable Input Voltage	V_{IL}	Pin 1 Logic '0', Output Standby	-	-	$0.3V_{CC}$	V
Standby Current	I_{STB}	Pin 1 Logic '0', Output Standby	-	-	15	µA
Enable Time	T_{PLZ}	Pin 1 Logic '1'	-	-	5	ms
Phase Jitter, RMS [Note 3]	tjrms	Bandwidth 12kHz - 20MHz	-	0.5	<1.0	ps

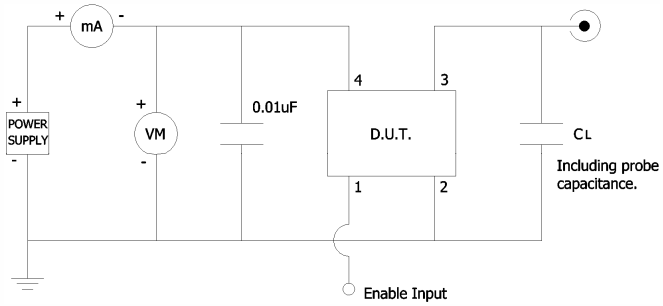
3.] For frequencies 40MHz or less, the measurement Bandwidth is 12kHz - 5MHz.

Enable Truth Table

Pin 1	Pin 4
Logic '1'	Output Enabled
Open	Output Enabled
Logic '0'	Output Disabled, High Impedance

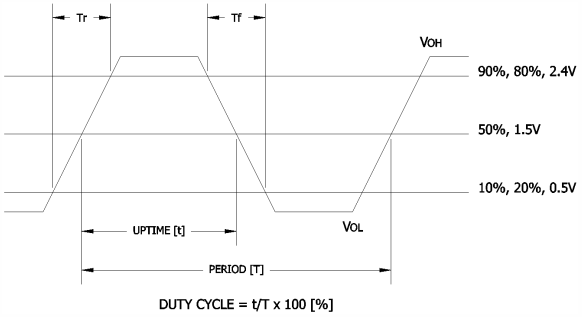
Test Circuit

HCMOS



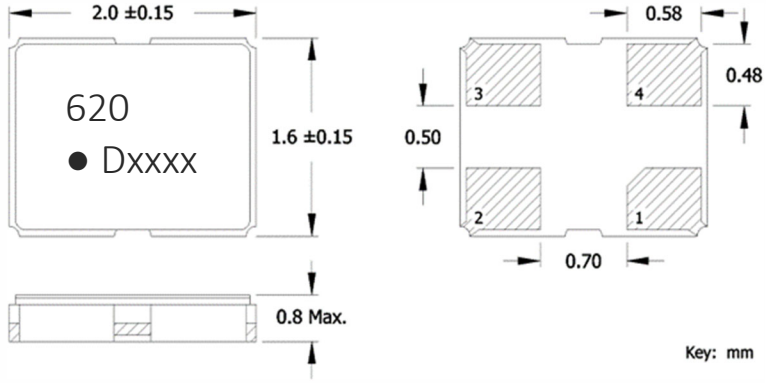
Output Waveform

HCMOS



Mechanical Specifications

Package Drawing

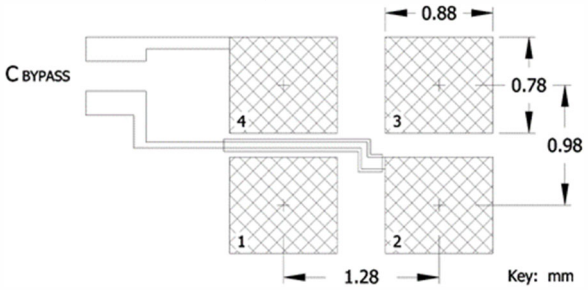


Marking Information

1. 620 – CTS Model.
2. D - Date Code. See Table I for codes.
3. ● - Pin 1 indicator
4. xxxx – Frequency Code.
   3-digits, frequencies below 100MHz
   4-digits, frequencies 100MHz or greater

[See document 016-1454-0, Frequency Code Tables.]

Recommended Pad Layout



Notes

1. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.

Pin Assignments

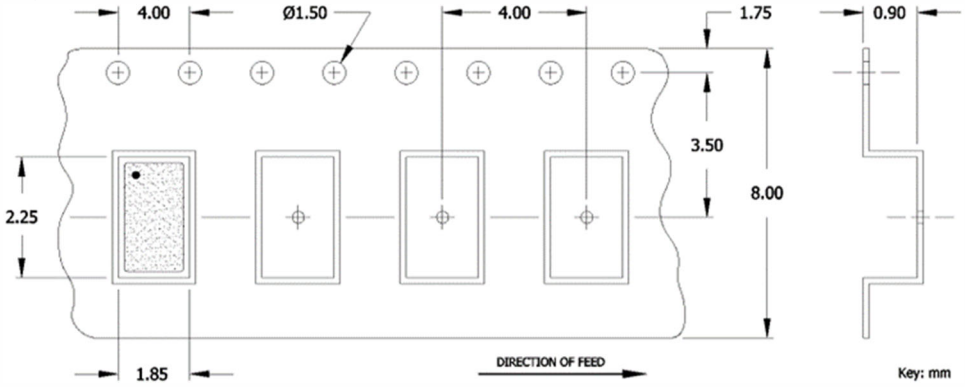
Pin	Symbol	Function
1	EOH	Enable
2	GND	Circuit & Package Ground
3	Output	RF Output
4	V_{CC}	Supply Voltage

Table I - Date Code, Beginning year 2021

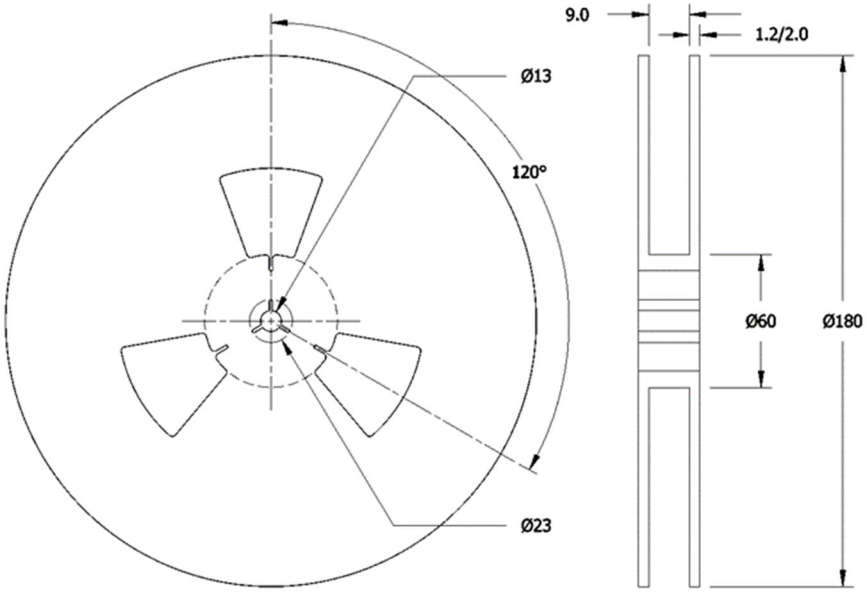
YEAR \ MONTH	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
2021 2025 2029 2033 2037	A	B	C	D	E	F	G	H	J	K	L	M
2022 2026 2030 2034 2038	N	P	Q	R	S	T	U	V	W	X	Y	Z
2023 2027 2031 2035 2039	a	b	c	d	e	f	g	h	j	k	l	m
2024 2028 2032 2036 2040	n	p	q	r	s	t	u	v	w	x	y	z

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

1. Device quantity is 3k pieces maximum per 180mm reel.
2. Complete CTS part number, frequency value and date code information must appear on reel and carton labels.

Addendum

Common Frequencies – MHz

FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE
4.000000	040	24.000000	240	40.000000	400		
8.000000	080	24.576000	24C	48.000000	480		
10.000000	100	25.000000	250	50.000000	500		
12.000000	120	26.000000	260	60.000000	600		
12.288000	122	27.000000	270	80.000000	800		
14.318180	143	30.000000	300	100.000000	1000		
14.745600	147	32.000000	320	110.000000	1100		
16.000000	160	33.333000	33E				
20.000000	200	37.400000	374				
22.118400	221	38.400000	384				