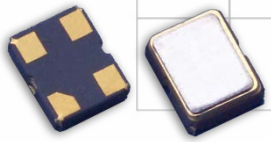
Model 625

HCMOS Clock Oscillator



Part Dimensions:
2.5 × 2.0 × 1.0mm • 15.001mg

Standard Frequencies

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

Features

- Ceramic Surface Mount Package
- Operating Temperature Range to -40°C to +105°C
- Fundamental and 3rd Overtone Crystal Designs
- Frequency Range 1.0 – 160MHz *
- +1.8V, +2.5V and +3.3V Operation
- Output Enable Standard
- Tape and Reel Packaging, EIA-418

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 625 is a low cost, ultra-low voltage clock oscillator supporting HCMOS output. Employing the latest IC technology, M625 has excellent stability and low phase jitter performance.

Ordering Information

Model	Supply Voltage	Frequency Stability	Temperature Range	Frequency Code [MHz]
625	L	3	C	XXXMXXXXX

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

Code	Temp. Range
A	-10°C to +60°C
C	-20°C to +70°C
I	-40°C to +85°C
G	-40°C to +105°C [2]

Code	Stability
6	±20ppm [1]
5	±25ppm
4	±30ppm
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 significant digits before and 5 significant digits [including zeroes] after the "M". [Ex. 003M57954 (3.579545MHz), 014M31818 (14.31818MHz), 125M00000 (125MHz)]

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

This product is specified for use only in standard commercial applications. Supplier disclaims all express and implied warranties and liability in connection with any use of this product in any non-commercial applications or in any application that may expose the product to conditions that are outside of the tolerances provided in its specification.

©2017 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

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}	±10%	1.620	1.8	1.980	V
			2.25	2.5	2.75	
			2.97	3.3	3.63	
Supply Current	I_{CC}	Typical @ Nominal Vcc, C_L = 15 pF, T_A = +25°C				
		@ +1.8V, 1.0MHz to <60MHz	-	2	4	mA
		@ +1.8V, 60MHz to <100MHz	-	5	15	
		@ +1.8V, 100MHz to 160MHz	-	8	25	
		@ +2.5V, 1.0MHz to <60MHz	-	3	10	mA
		@ +2.5V, 60MHz to <100MHz	-	8	20	
		@ +2.5V, 100MHz to 160MHz	-	12	30	
		@ +3.3V, 1.0MHz to <60MHz	-	3	15	mA
		@ +3.3V, 60MHz to <100MHz	-	9	25	
		@ +3.3V, 100MHz to 160MHz	-	16	35	
Output Load	C_L	-	-	-	15	pF
Operating Temperature	T_A	-	-10	+25	+60	°C
			-20		+70	
			-40		+85	
			-40		+105	
Storage Temperature	T_{STG}	-	-55	-	+125	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	-		1.0 - 160		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.

©2017 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

Electrical Specifications

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				
		@ +1.8V, 1.0MHz to <20MHz	-	-	3	ns
		@ +1.8V, 20MHz to <125MHz	-	-	3	
		@ +1.8V, 125MHz to 160MHz	-	-	3	
		@ +2.5V, 1.0MHz to <20MHz	-	-	4	ns
		@ +2.5V, 20MHz to <125MHz	-	-	3	
		@ +2.5V, 125MHz to 160MHz	-	-	3	
		@ +3.3V, 1.0MHz to <20MHz	-	-	5	ns
		@ +3.3V, 20MHz to <125MHz	-	-	4	
		@ +3.3V, 125MHz to 160MHz	-	-	3	
Start Up Time	T_S	Application of V_{CC}	-	2	5	ms
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	-	-	10	µA
Enable Time	T_{PLZ}	Pin 1 Logic '1'	-	-	5	ms
Phase Jitter, RMS [Note 3]	tjrms	Bandwidth 12kHz - 20MHz	-	0.5	<1	ps

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.

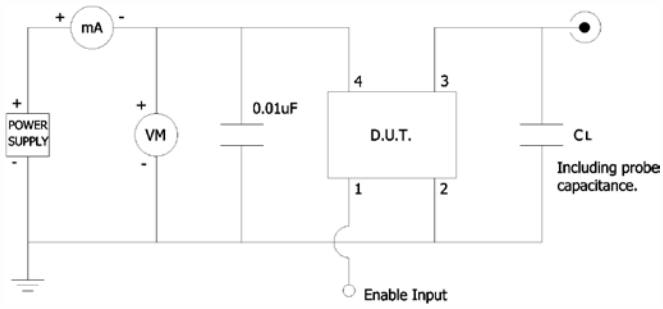
3.] For frequencies 10MHz - 40MHz, the measurement Bandwidth is 12kHz - 5MHz.

Enable Truth Table

Pin 1	Pin 4
Logic '1'	Output
Open	Output
Logic '0'	High Imp.

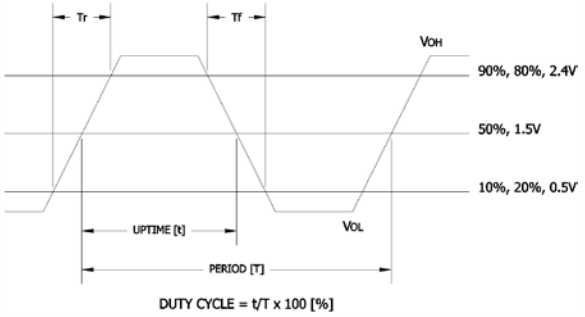
Test Circuit

HCMOS



Output Waveform

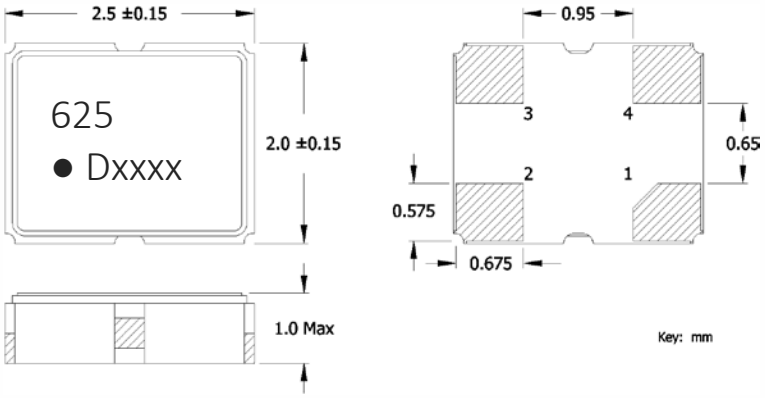
HCMOS



©2017 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

Mechanical Specifications

Package Drawing

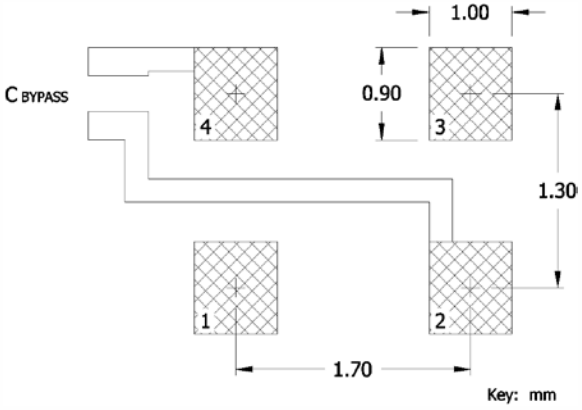


Marking Information

1. 625 – CTS Model.
2. D – Date Code. See Table I for codes.
3. 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

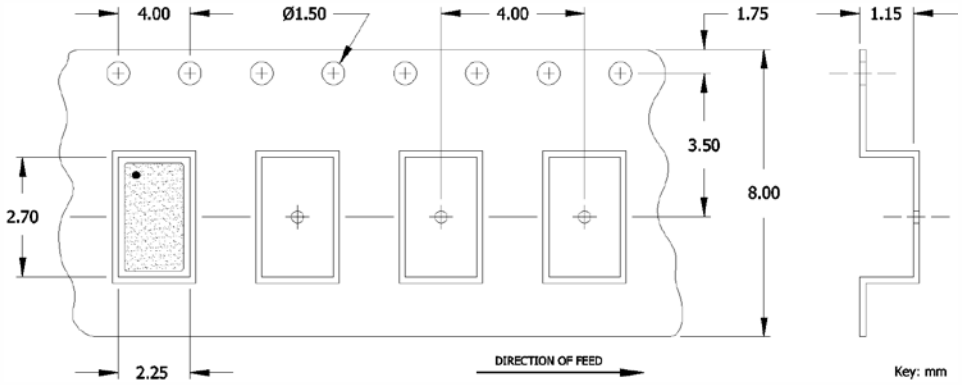
Table I - Date Code

MONTH / YEAR					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

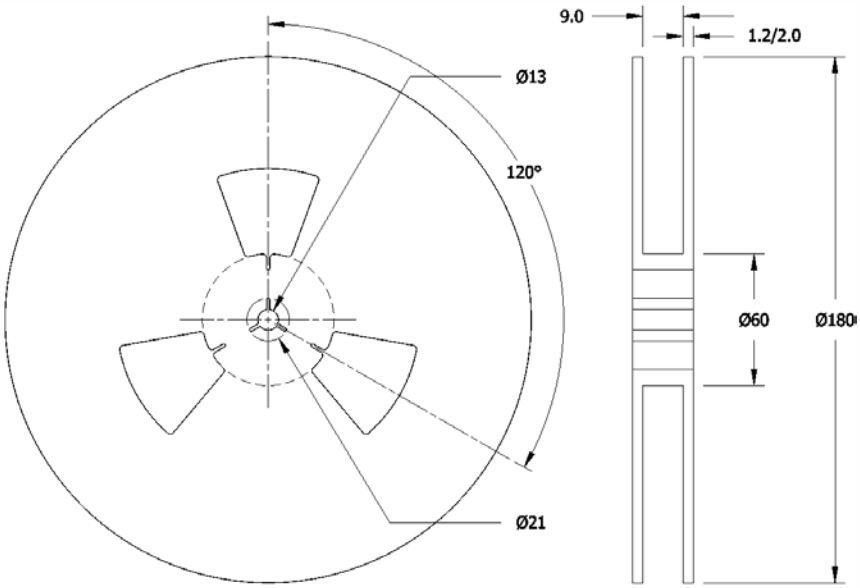
©2017 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

Packaging - Tape and Reel

Tape Drawing



Reel Drawing



Notes

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

©2017 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.

Addendum

Common Frequencies – MHz

FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE
1.544000	015	12.288000	122	26.000000	260	48.000000	480
3.072000	A30	13.000000	130	27.000000	270	50.000000	500
3.200000	A32	14.318180	143	28.636360	286	80.000000	800
3.686400	037	15.625000	156	29.491200	29B	100.000000	1000
4.000000	40	16.000000	160	30.000000	300	125.000000	1250
6.000000	060	19.200000	192	30.720000	307	160.000000	1600
7.372800	73	20.000000	200	32.000000	320		
8.000000	80	24.000000	240	33.000000	330		
10.000000	100	24.576000	24C	37.400000	374		
12.000000	120	25.000000	250	40.000000	400		

©2017 CTS® Corporation. Information/product(s) subject to change. No warranty that product(s) will meet the stated specifications for customer specific applications or test equipment. Visit www.ctscorp.com for list of applicable patent(s), more information, or to request a quote.