Connect

Model CHT50
HIGH TEMPERATURE HCMOS CLOCK

Features

- Ceramic Surface Mount Package
- Extended-Industrial Temperature Ranges
- Fundamental and 3rd Overtone Crystal Designs
- Frequency Range 1.25 – 156.25MHz *
- +1.8V, +2.5V, +3.3V Operation; +5.0V Limited Availability
- Output Enable Standard
- Tape and Reel Packaging, EIA-481
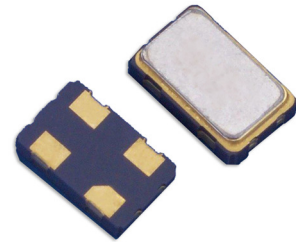
Part Dimensions:
5.0 × 3.2 × 1.3mm • 60.7734mg

Standard Frequencies

* See Page 6 for common frequencies.
Check with factory for availability of frequencies not listed and for +5.0V operation.

Applications

- Industrial IoT [IIoT]
- M2M Communication
- Industrial Controls
- Energy Industry
- Commercial Military & Aerospace
- Test and Measurement

Description

CTS Model CHT50 is a low cost, small size, Clock Oscillator [XO] that operates over extended-industrial temperature ranges. CHT50 has an HCMOS/TTL compatible output, offers excellent stability and low jitter/phase noise performance.

Ordering Information

Model	Output Type	Frequency Code [MHz]	Frequency Stability	Temperature Range	Supply Voltage	Packaging
CHT 50	C	XXX or XXXX	2	P	L	T

Code	Package Size
50	5.0x3.2mm [1]

Code	Frequency
Product Frequency Code [2]	

Code	Temp. Range
P	-55°C to +105°C
M	-55°C to +125°C

Code	Packing
T	1k pcs./reel

Code	Output
C	HCMOS

Code	Stability
3	±50ppm [3]
9	±75ppm
2	±100ppm

Code	Voltage
M	+1.8Vdc
N	+2.5Vdc
L	+3.3Vdc
S	+5.0Vdc

Notes:
1] The CHT50 platform is qualified and manufactured to commercial and industrial standards.
2] Refer to document 016-1454-0, Frequency Code Tables. 3-digits for frequencies <100MHz, 4-digits for frequencies 100MHz or greater.
3] Temperature Only. All other stabilities are "all inclusive". See Electrical Specifications.

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}	V_{CC} +1.8V to +3.3V	-0.5	-	4.0	V
Supply Voltage	V_{CC}	±5%	1.710	1.8	1.890	V
			2.375	2.5	2.665	
			3.135	3.3	3.465	
			4.750	5.0	5.250	
Supply Current	I_{CC}	Typical @ Nominal Vcc, C_L = 15 pF, T_A = +25°C				mA
		@ +1.8V	-	15	25	
		@ +2.5V	-	20	30	
		@ +3.3V	-	35	40	
		@ +5.0V	-	35	55	
Output Load	C_L	-	-	-	15	pF
Operating Temperature	T_A	-	-55	+25	+105	°C
			-55		+125	
Storage Temperature	T_{STG}	-	-55	-	+125	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	Temperature Range -55°C to +105°C		1.25 - 156.25		MHz
		Temperature Range -55°C to +125°C		40 - 135		
Frequency Stability [Note 1]	$\Delta f/f_O$	-		50, 75 or 100		±ppm
Aging	$\Delta f/f_{25}$	First Year @ +25°C, nominal V_{CC}	-5	-	5	ppm

1.] Inclusive of initial tolerance at time of shipment, changes in supply voltage, load, temperature and 1st year aging.
   Except ±50ppm which is temperature only.

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, 5.0V]	-	-	-4, -4, -8, -16	mA
	I_{OL}	V_{OL} = 10%V_{CC} [1.8V, 2.5V, 3.3V, 5.0V]	-	-	+4, +4, +8, +16	
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	-	4	5	
		@ +2.5V	-	4	5	
		@ +3.3V	-	7	10	
		@ +5.0V	-	7	10	
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 Parameters

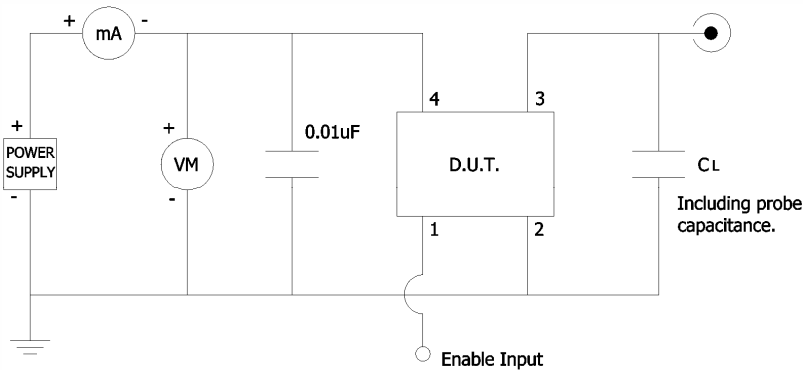| PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Enable Function		Standby				
Enable Input Voltage	V_{IH}	Pin 1 Logic '1', Output Enabled	$0.7V_{CC}$	-	-	V
Disable Input Voltage	V_{IL}	Pin 1 Logic '0', Output Standby	-	-	$0.3V_{CC}$	V
Enable Current	I_{STB}	Pin 1 Logic '0', Output Standby	-	-	10	µA
Enable Time	T_{PLZ}	Pin 1 Logic '1'	-	-	5	ms
Phase Jitter, RMS [Note 3]	tjrms	Bandwidth 12kHz - 20MHz	-	0.5	<1	ps

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

Enable Truth Table

Pin 1	Pin 3
Logic '1'	Output Enabled
Open	Output Enabled
Logic '0'	Output Disabled, High Impedance

Test Circuit
HCMOS

Output Waveform
HCMOS

DUTY CYCLE = t/T x 100 [%]
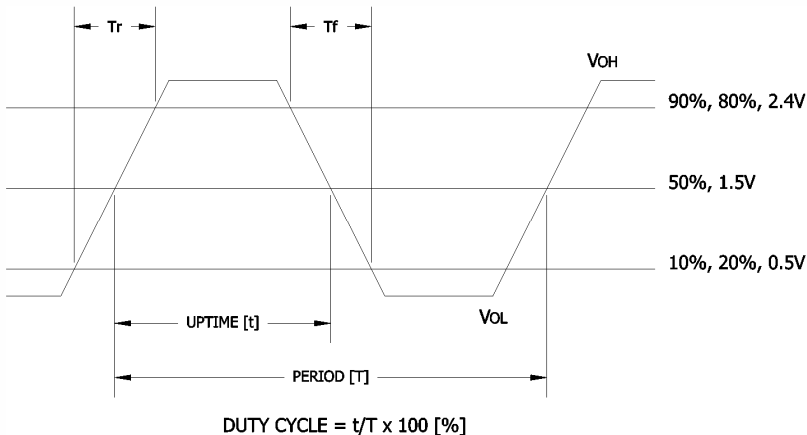
Mechanical Specifications

Package Drawing

Key: mm

Recommended Pad Layout

Key: mm

Pin Assignments

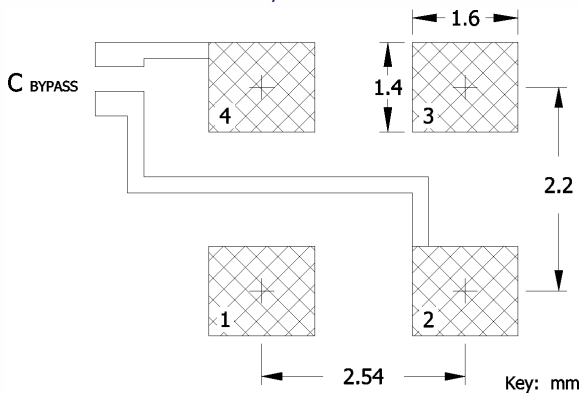| Pin	Symbol	Function
1	EOH	Enable
2	GND	Circuit & Package
3	Output	RF Output
4	V_CC	Supply Voltage
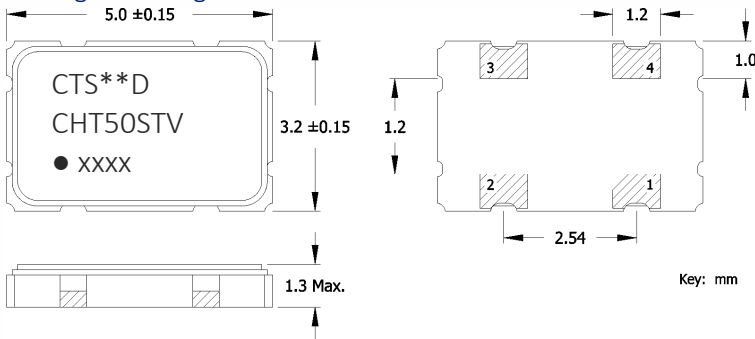
Marking Information

1. ** – Manufacturing Site Code.
2. D – Date Code. See Table I for codes.
3. CHT50 – CTS model.
4. ST – Frequency stability/temperature code.
   [Refer to Ordering Information]
5. V – Voltage code; M = 1.8V, N = 2.5V, L = 3.3V,
   S = 5.0V.
6. ● – Pin 1 identifier.
7. xxxx – Frequency Code.
   3-digits for frequencies <100MHz
   4-digits for frequencies 100MHz or greater

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

1. Termination pads (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.

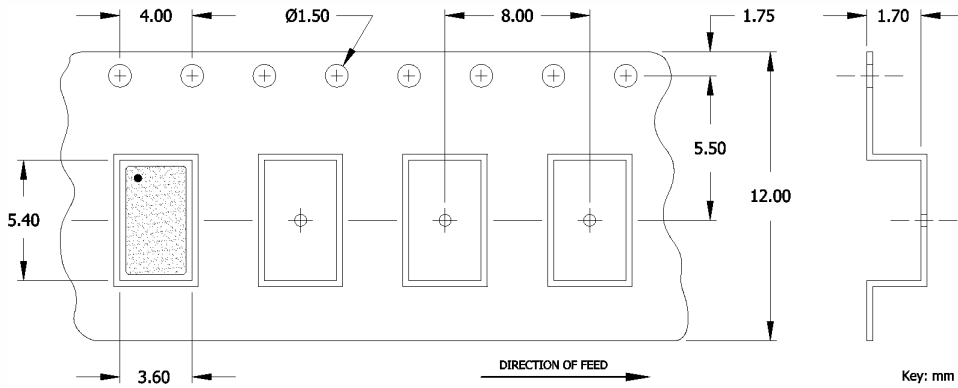## Table I - Date Code, Beginning year 2021

YEAR					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

DIRECTION OF FEED

Key: mm

Reel Drawing
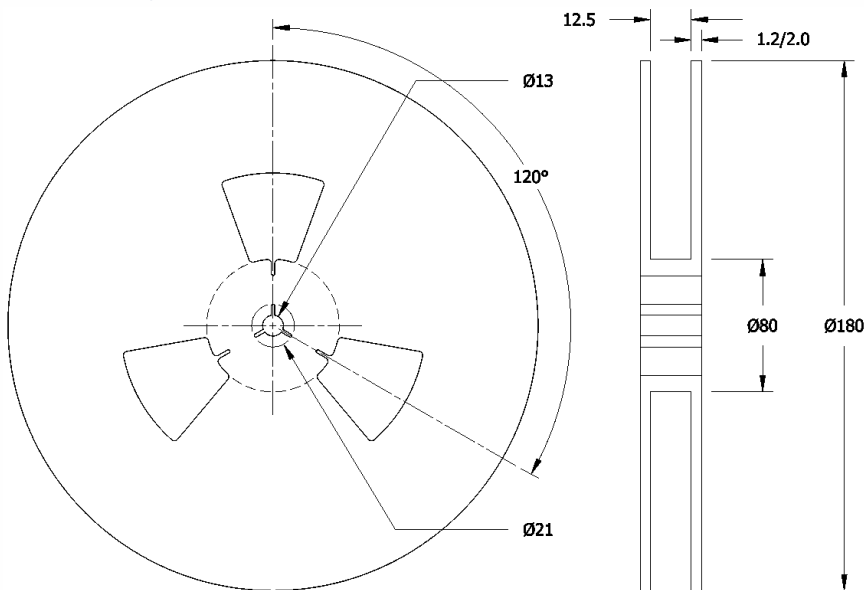
Notes

1. Device quantity is 1k 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 Available – 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	100.000000	1000		
12.288000	122	27.000000	270	125.000000	1250		
14.318180	143	30.000000	300	156.250000	1562		
14.745600	147	32.000000	320				
16.000000	160	33.333000	33E				
20.000000	200	37.400000	374				
22.118400	221	38.400000	384				