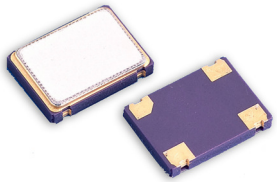
Model CB3 & CB3LV

HCMOS/TTL Clock Oscillator



Part Dimensions:
7.0 × 5.0 × 1.8mm • 171.497mg

Features

- Ceramic Surface Mount Package
- Fundamental and 3rd Overtone Crystal Designs
- Frequency Range 1.0 – 200MHz *
- +3.3V and +5.0V Operation
- Operating Temperature Range to -40°C to +85°C
- 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 CB3 and CB3LV are low cost, low voltage clock oscillators supporting HCMOS output. Employing the latest IC technology, CB3/CB3LV have excellent stability and low phase jitter performance.

Ordering Information

Model	Supply Voltage		Frequency Stability	Temperature Range		Frequency Code [MHz]
CB3	LV	-	3	C	-	XXXMXXXXXX

Code	Voltage
LV	+3.3Vdc
Blank	+5.0Vdc

Code	Temp. Range
C	-20°C to +70°C
D	-30°C to +85°C
I	-40°C to +85°C

Code	Stability	Code	Stability	Code	Stability
6	±20ppm [1]	4	±30ppm	3	±50ppm
5	±25ppm	7	±32ppm [2]	2	±100ppm [2]

Code	Frequency
	Product Frequency Code [3]

Notes:

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

2] These stabilities are not recommended for new designs.

3] Frequency is recorded with 1, 2 or 3 leading significant digits before and 6 significant digits [including zeroes] after the [Ex. 3.579545MHz = 3M579545, 14.31818MHz = 14M318180, 25MHz = 25M000000, 125MHz = 125M000000]

4] CTS Distributors may add a -T or -1 at the end of the part number to indicate Tape and Reel packaging.

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	-	7.0	V
Supply Voltage	V_{CC}	±10%	2.97 4.50	3.3 5.0	3.63 5.50	V
Supply Current		Frequency Range @ Tested load for typical values				
CB3	I_{CC}	1.0MHz to 20MHz @ C_L = 30pF	-	10	25	mA
		20.001MHz to 80MHz @ C_L = 30pF	-	30	50	
		80.001MHz to 107MHz @ C_L = 15pF	-	40	70	
CB3LV		1.0MHz to 20MHz @ C_L = 15pF	-	7	12	
		20.001MHz to 80MHz @ C_L = 15pF	-	20	35	
		80.001MHz to 200MHz @ C_L = 15pF	-	30	60	
Output Load	C_L	1.0MHz to 50MHz	-	15	30	pF
		50.001MHz to 80MHz	-	15	30	
		80.001MHz to 200MHz	-	-	15	
Operating Temperature	T_A	-	-20 -30 -40	 +25 	+70 +85 +85	°C
Storage Temperature	T_{STG}	-	-55	-	+125	°C

Frequency Stability

PARAMETER	SYMBOL	CONDITIONS	MIN	TYP	MAX	UNIT
Frequency Range	f_O	CB3		1.0 - 107		MHz
		CB3LV		1.0 - 200		
Frequency Stability [Note 1]	$\Delta f/f_O$	-		20, 25, 30, 32, 50 or 100		±ppm
Aging	$\Delta f/f_{25}$	First Year @ +25°C, nominal V_{CC}	-5	±3	5	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
		Logic '1' Level, TTL Load	V_{CC} - 0.6V	-	-	
	V_{OL}	Logic '0' Level, CMOS Load	-	-	$0.1V_{CC}$	
		Logic '0' Level, TTL Load	-	-	0.4	
Output Current Levels	I_{OH}	V_{OH} = +2.2V/+3.9V V_{CC} = +3.0V/+4.5V	-	-	-8, -16	mA
	I_{OL}	V_{OL} = 0.4V V_{CC} = +3.0V, +4.5V	-	-	+8, +16	
Output Duty Cycle	SYM	@ 50% Level	45	-	55	%
Rise and Fall Time [Note 2]		@ 10%/90% Levels, Frequency Range @ Tested load for typical values				
CB3	T_R, T_F	1.0MHz to 20MHz @ C_L = 30pF	-	8	10	ns
		20.001MHz to 80MHz @ C_L = 30pF	-	5	8	
		80.001MHz to 107MHz @ C_L = 15pF	-	2.5	5	
CB3LV		1.0MHz to 20MHz @ CL = 15pF	-	6	8	
		20.001MHz to 80MHz @ CL = 15pF	-	3	5	
		80.001MHz to 200MHz @ CL = 15pF	-	1.5	3	
Start Up Time	T_S	Application of V_{CC}	-	5	10	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		Tri-State				
Enable Input Voltage	V_{IH}	Pin 1 Logic '1', Output Enabled	2.0	-	-	V
Disable Input Voltage	V_{IL}	Pin 1 Logic '0', Output Disabled	-	-	0.8	V
Disable Current	I_{STB}	Pin 1 Logic '0', Output Disabled	-	-	10	µA
Enable Time	T_{PLZ}	Pin 1 Logic '1', Output Enabled	-	-	10	ms
Phase Jitter, RMS [Note 3]	tjrms	Bandwidth 12 kHz - 20 MHz	-	0.5	< 1	ps

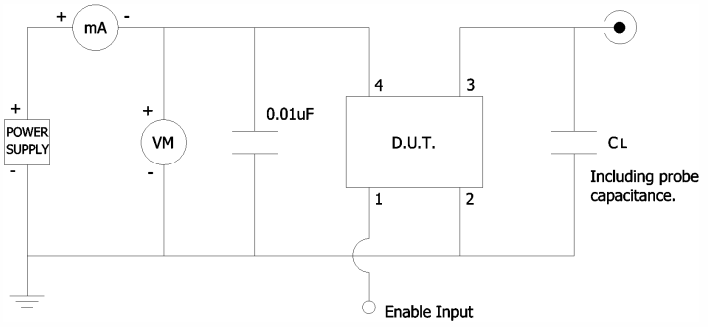
3.] For frequencies 10MHz - 40MHz, the measurement Bandwidth is 12kHz - 5MHz.

Enable Truth Table

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

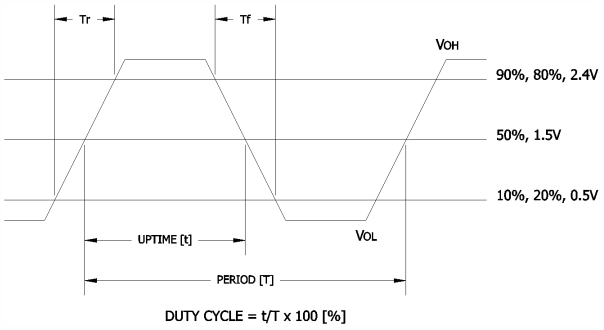
Test Circuit

HCMOS



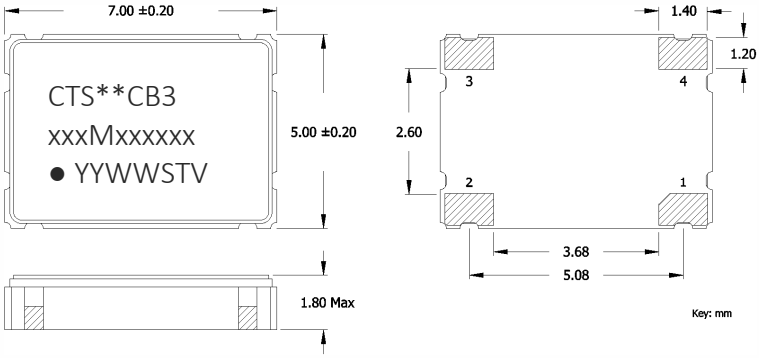
Output Waveform

HCMOS



Mechanical Specifications

Package Drawing



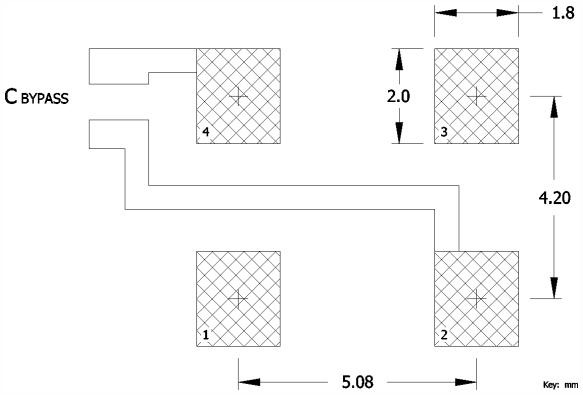
Marking Information

1. ** – Manufacturing Site Code.
   [Note a dash may follow the site code and is acceptable.]
2. xxxMxxxxxx – Frequency is marked with 1,2 or 3 leading significant digits before the "M" and 6 digits after the "M" [including zeroes].

Ex. xMxxxxxx [3M579545]
xxMxxxxxx [14M318180]
xxMxxxxxx [25M000000]
xxxMxxxxxx [125M000000]

3. YYWW – Date Code; YY = year, WW = week.
4. ST – Frequency Stability/Temperature Code.
   [Refer to ordering information for codes.]
5. V – Voltage Code; 3 = +3.3V, 5 = +5.0V.

Recommended Pad Layout



Notes

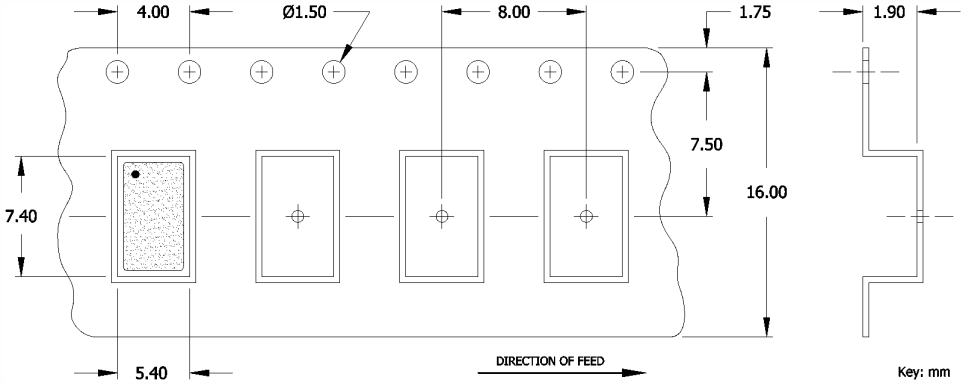
1. JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
2. Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
3. MSL = 1.

Pin Assignments

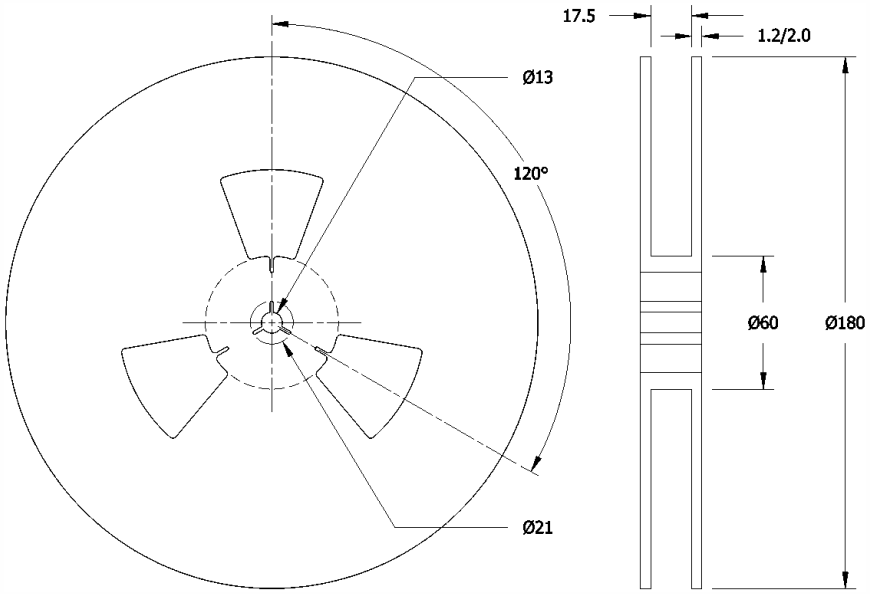
Pin	Symbol	Function
1	EOH	Enable
2	GND	Circuit & Package Ground
3	Output	RF Output
4	V_{CC}	Supply Voltage

Packaging - Tape and Reel

Tape Drawing



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 – MHz

FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE	FREQUENCY	FREQUENCY CODE
1.000000	1M000000	10.240000	10M240000	27.120000	27M120000	66.000000	66M000000
1.024000	1M024000	11.059200	11M059200	30.000000	30M000000	66.660000	66M660000
1.042000	1M042000	12.000000	12M000000	30.720000	30M720000	66.666000	66M666000
1.440000	1M440000	12.288000	12M288000	32.000000	32M000000	66.666600	66M666600
1.544000	1M544000	13.000000	13M000000	32.768000	32M768000	66.666660	66M666660
1.843200	1M843200	13.560000	13M560000	33.000000	33M000000	66.666700	66M666700
2.000000	2M000000	14.318180	14M318180	33.330000	33M330000	66.667000	66M667000
2.048000	2M048000	14.745600	14M745600	33.333000	33M333000	66.670000	66M670000
2.176000	2M176000	15.360000	15M360000	33.333300	33M333300	74.175800	74M175800
2.400000	2M400000	16.000000	16M000000	33.333330	33M333330	74.175824	74M175824
2.457600	2M457600	16.384000	16M384000	34.368000	34M368000	74.250000	74M250000
2.500000	2M500000	16.666700	16M666700	34.560000	34M560000	74.752800	74M752800
3.072000	3M072000	16.667000	16M667000	35.000000	35M000000	77.760000	77M760000
3.088000	3M088000	16.670000	16M670000	36.000000	36M000000	80.000000	80M000000
3.579545	3M579545	18.192000	18M192000	37.400000	37M400000	98.304000	98M304000
3.686400	3M686400	18.432000	18M432000	38.400000	38M400000	100.000000	100M000000
4.000000	4M000000	19.200000	19M200000	40.000000	40M000000	106.250000	106M250000
4.096000	4M096000	19.440000	19M440000	40.960000	40M960000	125.000000	125M000000
4.500000	4M500000	19.660800	19M660800	42.500000	42M500000	125.009375	125M009375
4.915200	4M915200	20.000000	20M000000	44.000000	44M000000	127.000000	127M000000
5.000000	5M000000	20.480000	20M480000	45.000000	45M000000	133.000000	133M000000
6.144000	6M144000	22.118400	22M118400	48.000000	48M000000	148.500000	148M500000
6.176000	6M176000	24.000000	24M000000	49.152000	49M152000	150.000000	150M000000
7.372800	7M372800	24.545454	24M545454	50.000000	50M000000	153.600000	153M600000
7.680000	7M680000	24.574600	24M574600	52.000000	52M000000	155.520000	155M520000
8.000000	8M000000	24.576000	24M576000	54.000000	54M000000	156.250000	156M250000
8.192000	8M192000	25.000000	25M000000	60.000000	60M000000	160.000000	160M000000
9.600000	9M600000	25.000625	25M000625	61.140000	61M140000	166.000000	166M000000
9.830400	9M830400	26.000000	26M000000	64.000000	64M000000		
10.000000	10M000000	27.000000	27M000000	65.536000	65M536000		