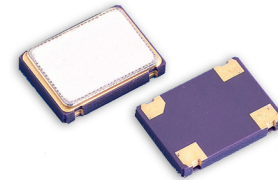


Model CB1V8

HCMOS/TTL Clock Oscillator

Features

- Ceramic Surface Mount Package
- Fundamental and 3rd Overtone Crystal Designs
- Frequency Range 1.0 – 160MHz *
- +1.8V Operation
- Operating Temperature Range to -40°C to +85°C
- Output Enable Standard
- Tape and Reel Packaging, EIA-481



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

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 CB1V8 is a low cost, low voltage clock oscillators supporting HCMOS output. Employing the latest IC technology, CB1V8 has excellent stability and low phase jitter performance.

Ordering Information

| Model | Supply Voltage | Frequency Stability | Temperature Range | Frequency Code [MHz] |
|-------|----------------|---------------------|-------------------|----------------------|
| CB | 1V8 | 3 | C | XXXMXXXX |

| Code | Voltage |
|------|---------|
| 1V8 | +1.8Vdc |

| 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 3 leading digits before and 4 significant digits after the "M" [including zeroes].
[Ex. 3.579545MHz = 003M5795; 14.31818MHz = 014M3181; 25MHz = 025M0000; 125MHz = 125M0000]

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.



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} | $\pm 10\%$ | 1.62 | 1.8 | 1.98 | V |
| Typical @ Nominal V_{CC} , $C_L = 15$ pF, $T_A = +25^\circ\text{C}$ | | | | | | |
| Supply Current | I_{CC} | @ +1.8V, 1.0MHz to <60MHz | - | 2 | 4 | mA |
| | | @ +1.8V, 60MHz to <100MHz | - | 5 | 15 | |
| | | @ +1.8V, 100MHz to 160MHz | - | 8 | 25 | |
| Output Load | C_L | - | - | - | 15 | pF |
| Operating Temperature | T_A | - | -20 | +25 | +70 | $^\circ\text{C}$ |
| | | | -30 | | +85 | |
| Storage Temperature | T_{STG} | - | -40 | - | +85 | $^\circ\text{C}$ |
| | | | -55 | | +125 | |

Frequency Stability

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT |
|------------------------------|-------------------|--|-----|-----------------------|-----|-----------|
| Frequency Range | f_0 | - | | 1.0 - 160 | | MHz |
| Frequency Stability [Note 1] | $\Delta f/f_0$ | - | | 20, 25, 30, 50 or 100 | | \pm ppm |
| Aging | $\Delta f/f_{25}$ | First Year @ +25 $^\circ\text{C}$, 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] | - | - | -4 | mA |
| | I_{OL} | $V_{OL} = 10\%V_{CC}$ [+1.8V] | - | - | +4 | |
| Output Duty Cycle | SYM | @ 50% Level | 45 | - | 55 | % |
| @ 10%/90% Levels, Nominal V_{CC} , $C_L = 15$ pF | | | | | | |
| Rise and Fall Time [Note 2] | T_R, T_F | @ +1.8V, 1.0MHz to <20MHz | - | - | 3 | ns |
| | | @ +1.8V, 20MHz to <125MHz | - | - | 3 | |
| | | @ +1.8V, 125MHz to 160MHz | - | - | 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 Parameters

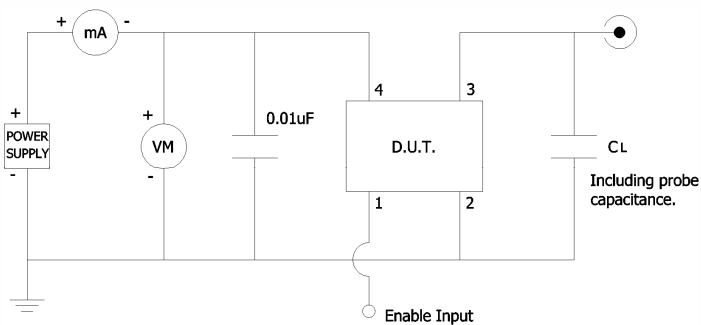
| Enable Function | | Standby | | | | |
|----------------------------|------------|---------------------------------|-------------|-----|-------------|---------|
| Enable Input Voltage | V_{IH} | Pin 1 Logic '1', Output Enabled | $0.7V_{CC}$ | - | - | V |
| Disable Input Voltage | V_{IL} | Pin 1 Logic '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', Output Enabled | - | - | 5 | ms |
| Phase Jitter, RMS [Note 3] | t_{jrms} | Bandwidth 12kHz - 20MHz | - | 0.5 | <1 | ps |

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

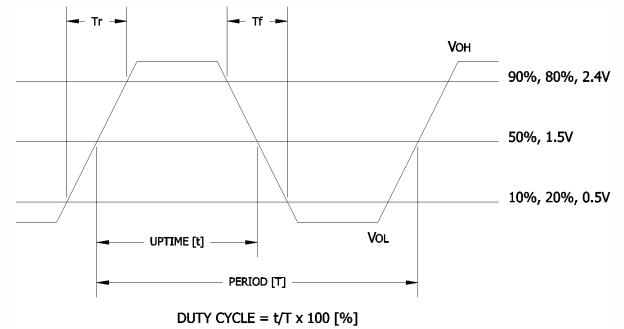
Enable Truth Table

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

Test Circuit HCMOS

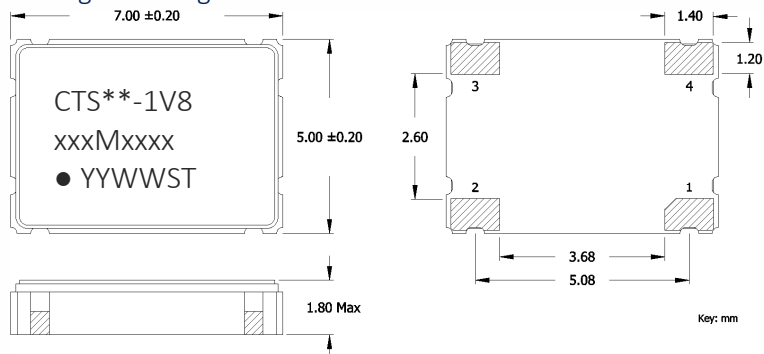


Output Waveform HCMOS



Mechanical Specifications

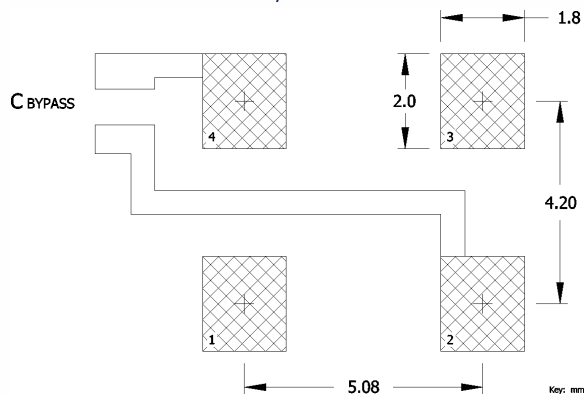
Package Drawing



Marking Information

- ** – Manufacturing Site Code.
- xxxMxxxx – Frequency is marked with 1,2 or 3 leading significant digits before the “M” and 4 digits after the “M” [including zeroes].
Ex. xMxxxx [3M5795]
xxMxxxx [14M3181]
xxMxxxx [25M0000]
xxxMxxxx[125M0000]
- YYWW – Date Code; YY = year, WW = week.
- ST – Frequency Stability/Temperature Code.
[Refer to ordering information for codes.]

Recommended Pad Layout



Notes

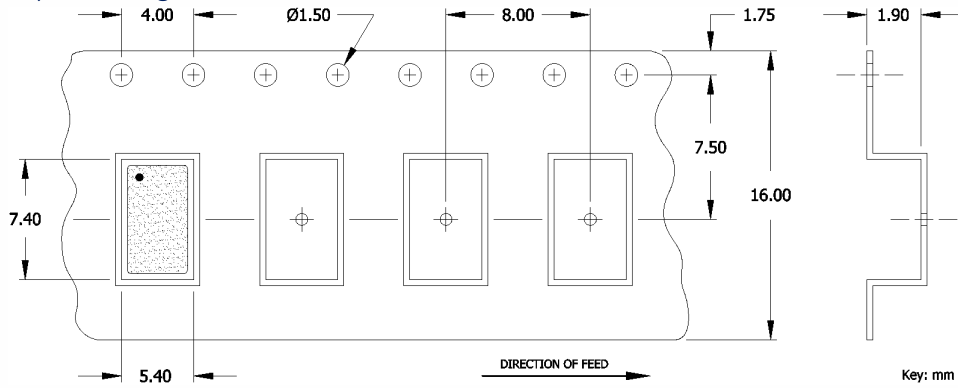
- JEDEC termination code (e4). Barrier-plating is nickel [Ni] with gold [Au] flash plate.
- Reflow conditions per JEDEC J-STD-020; +260°C maximum, 20 seconds.
- MSL = 1.

Pin Assignments

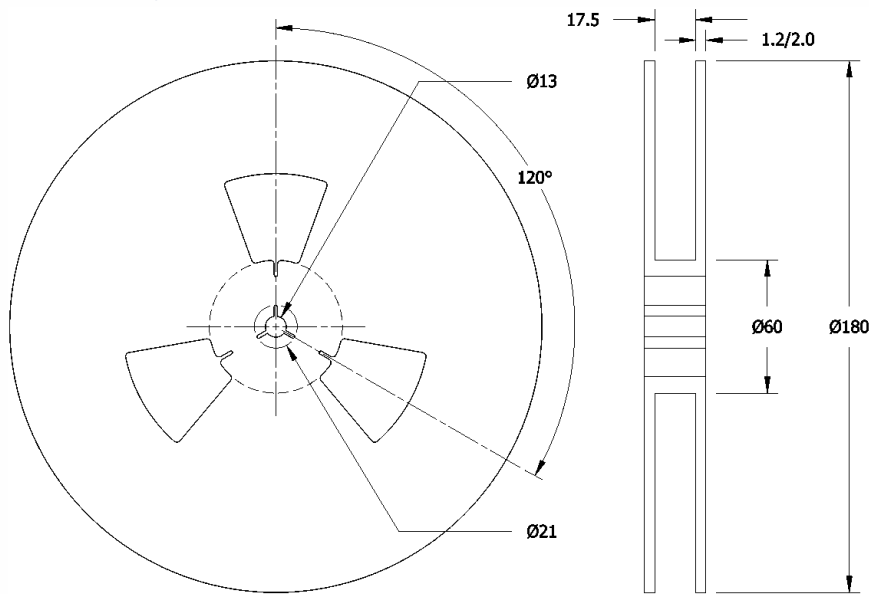
| Pin | Symbol | Function |
|-----|-----------------|--------------------------|
| 1 | EOH | Enable |
| 2 | GND | Circuit & Package Ground |
| 3 | Output | RF Output |
| 4 | V _{CC} | Supply Voltage |

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 | 001M0000 | 10.240000 | 010M2400 | 27.120000 | 027M1200 | 66.660000 | 066M6600 |
| 1.024000 | 001M0240 | 11.059200 | 011M0592 | 30.000000 | 030M0000 | 66.666000 | 066M6660 |
| 1.042000 | 001M0420 | 12.000000 | 012M0000 | 30.720000 | 030M7200 | 66.666600 | 066M6666 |
| 1.440000 | 001M4400 | 12.288000 | 12M2880 | 32.000000 | 032M0000 | 66.666700 | 066M6667 |
| 1.544000 | 001M5440 | 13.000000 | 013M0000 | 32.768000 | 032M7680 | 66.667000 | 066M6670 |
| 1.843200 | 001M8432 | 13.560000 | 013M5600 | 33.000000 | 033M0000 | 66.670000 | 066M6700 |
| 2.000000 | 002M0000 | 14.318180 | 014M3181 | 33.330000 | 033M3300 | 74.175800 | 074M1758 |
| 2.048000 | 002M0480 | 14.745600 | 014M7456 | 33.333000 | 033M3330 | 74.250000 | 074M2500 |
| 2.176000 | 002M1760 | 15.360000 | 015M3600 | 33.333300 | 033M3333 | 74.752800 | 074M7528 |
| 2.400000 | 002M4000 | 16.000000 | 016M0000 | 34.368000 | 034M3680 | 77.760000 | 077M7600 |
| 2.457600 | 002M4576 | 16.384000 | 016M3840 | 34.560000 | 034M5600 | 80.000000 | 080M0000 |
| 2.500000 | 002M5000 | 16.666700 | 016M6667 | 35.000000 | 035M0000 | 98.304000 | 098M3040 |
| 3.072000 | 003M0720 | 16.667000 | 016M6670 | 36.000000 | 036M0000 | 100.000000 | 100M0000 |
| 3.088000 | 003M0880 | 16.670000 | 016M6700 | 37.400000 | 037M4000 | 106.250000 | 106M2500 |
| 3.579545 | 003M5795 | 18.192000 | 018M1920 | 38.400000 | 038M4000 | 125.000000 | 125M0000 |
| 3.686400 | 003M6864 | 18.432000 | 018M4320 | 40.000000 | 040M0000 | 125.009375 | 125M0093 |
| 4.000000 | 004M0000 | 19.200000 | 019M2000 | 40.960000 | 040M9600 | 127.000000 | 127M0000 |
| 4.096000 | 004M0960 | 19.440000 | 019M4400 | 42.500000 | 042M5000 | 133.000000 | 133M0000 |
| 4.500000 | 004M5000 | 19.660800 | 019M6608 | 44.000000 | 044M0000 | 148.500000 | 148M5000 |
| 4.915200 | 004M9152 | 20.000000 | 020M0000 | 45.000000 | 045M0000 | 150.000000 | 150M0000 |
| 5.000000 | 005M0000 | 20.480000 | 020M4800 | 48.000000 | 048M0000 | 153.600000 | 153M6000 |
| 6.144000 | 006M1440 | 22.118400 | 022M1184 | 49.152000 | 049M1520 | 155.520000 | 155M5200 |
| 6.176000 | 006M1760 | 24.000000 | 024M0000 | 50.000000 | 050M0000 | 156.250000 | 156M2500 |
| 7.372800 | 007M3728 | 24.545454 | 024M5454 | 52.000000 | 052M0000 | 160.000000 | 160M0000 |
| 7.680000 | 007M6800 | 24.574600 | 024M5746 | 54.000000 | 054M0000 | | |
| 8.000000 | 008M0000 | 24.576000 | 024M5760 | 60.000000 | 060M0000 | | |
| 8.192000 | 008M1920 | 25.000000 | 025M0000 | 61.140000 | 061M1400 | | |
| 9.600000 | 009M6000 | 25.000625 | 025M0006 | 64.000000 | 064M0000 | | |
| 9.830400 | 009M8304 | 26.000000 | 026M0000 | 65.536000 | 065M5360 | | |
| 10.000000 | 010M0000 | 27.000000 | 027M0000 | 66.000000 | 066M0000 | | |