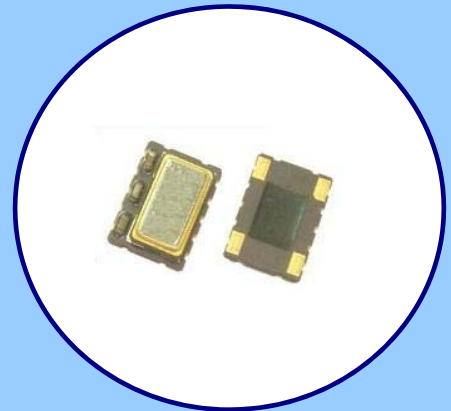


FEATURES

- **Clipped Sine Wave Output**
- **Optional Voltage Control for Frequency Tuning [VCTCXO]**
- 7.0mm x 5.0mm Surface Mount Package
- Frequency Range 5 – 52 MHz
- Fundamental Crystal Design
- Operating Voltage, +3.0Vdc, +3.3Vdc or +5.0Vdc
- Overall Frequency Stability ± 4.6 ppm
- Operating Temperature to -40°C to $+85^{\circ}\text{C}$
- Tape & Reel Packaging Standard, EIA-418
- **RoHS/Green Compliant [6/6]**



APPLICATIONS

The Model 588, a quartz based analog TCXO with Clipped Sine output and optional frequency tuning, is suitable for applications requiring Stratum 3 performance such as base stations, Microcells, Femtocells, 1588 and Synchronous Ethernet timing, wireless communications, test and measurement.

ORDERING INFORMATION



* Frequency vs. Temperature Only

1] Only available with temperature range code "C".

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

ELECTRICAL CHARACTERISTICS

| PARAMETER | SYMBOL | CONDITIONS | MIN | TYP | MAX | UNIT | |
|---|----------------------------------|--|--|-------|---------------------|--------|------|
| Maximum Supply Voltage | V _{CC} | - | -0.6 | - | 6.0 | V | |
| Maximum Control Voltage | V _C | - | -0.5 | - | V _{CC} | V | |
| Storage Temperature | T _{STG} | - | -40 | - | +100 | °C | |
| Operating Temperature | T _A | - | -20 | +25 | +70 | °C | |
| Order Code 'C' | | | -40 | | +85 | | |
| Order Code 'I' | | | | | | | |
| Frequency Range | f ₀ | - | 5 | - | 52 | MHz | |
| Supply Voltage | V _{CC} | ±5% | 2.85 | 3.0 | 3.15 | V | |
| Order Code 'R' | | | 3.14 | 3.3 | 3.47 | | |
| Order Code 'L' | | | 4.75 | 5.0 | 5.25 | | |
| Order Code 'S' | | | | | | | |
| Supply Current | I _{CC} | - | - | - | 3.5 | mA | |
| Frequency Stability | Δf/f ₀ | Reference to f ₀ , Including 20 years aging @ +25°C, at time of shipment | - | - | 4.60 | ± ppm | |
| Overall Frequency Stability vs. Initial Calibration | | | - | - | 1.00 | | |
| vs. Operating Temperature | | [Fmax. - Fmin.]/2, over -40°C to +85°C | - | - | 0.28 | | |
| | | | [Fmax. - Fmin.]/2, over -20°C to +70°C | - | - | | 0.14 |
| vs. Supply Voltage | | Δf/f ₂₅ | ±5% change @ +25°C | - | - | | 0.40 |
| vs. Load | | | ±5% change | - | - | | 0.10 |
| vs. Aging | | 20 years @ +40°C | - | - | 2.80 | | |
| Holdover | Δf/f ₀ | [Fmax. - Fmin.]/2, over 24 hours | - | - | 0.32 | | |
| Control Voltage | V _C | - | 0.5 | 1.5 | 2.5 | V | |
| Frequency Tuning [VCTCXO Only] | - | V _C = 1.5V ±1.0V, monotonic positive | | 5 - 8 | | ± ppm | |
| V _C Input Impedance | Z _{V_C} | - | 100 | - | - | kOhm | |
| Output Waveform | | AC coupled Clipped Sinewave | | | | | |
| Output Voltage Levels | | | 0.8 | - | - | Vp-p | |
| Output Load | R _L // C _L | - | 10kOhm // 10pF | | | | |
| Output Duty Cycle | SYM | @ 50% Level | 45 | - | 55 | % | |
| Start Up Time | T _S | - | - | - | 2 | ms | |
| Enable Function | | | | | | | |
| Enable Input Voltage | V _{IH} | Pin 8 Logic '1', Output Enabled | 0.7*V _{CC} | - | - | V | |
| Disable Input Voltage | V _{IL} | Pin 8 Logic '0', Output Disabled [High Imp] | - | - | 0.3*V _{CC} | | |
| Phase Noise ¹ | - | - | | | | dBc/Hz | |

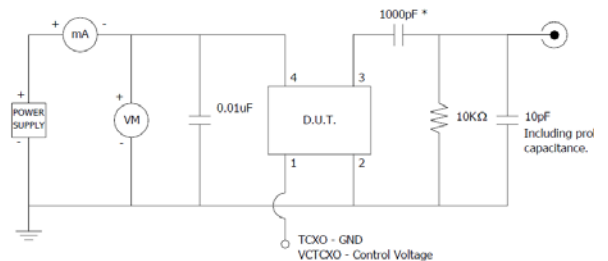
Notes:

1. Phase Noise performance may vary based on output frequency. See example plot at 10 MHz below.



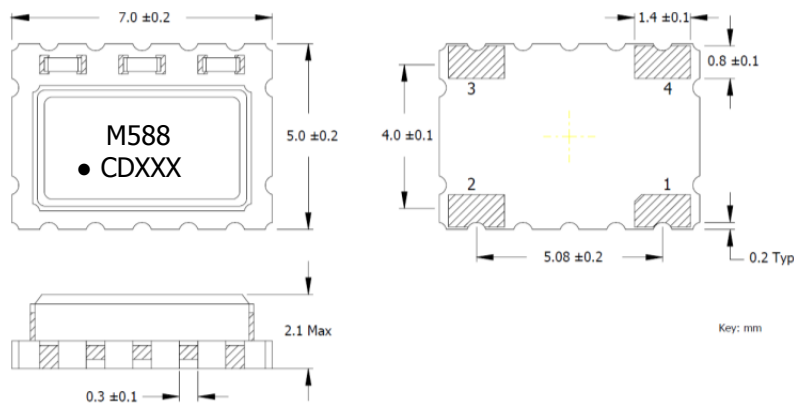
TEST CIRCUIT – Clipped Sine Load

* DC-Cut Capacitor: Add 1000pF capacitor between the TCXO output and input of load.



MECHANICAL SPECIFICATIONS

PACKAGE DRAWING



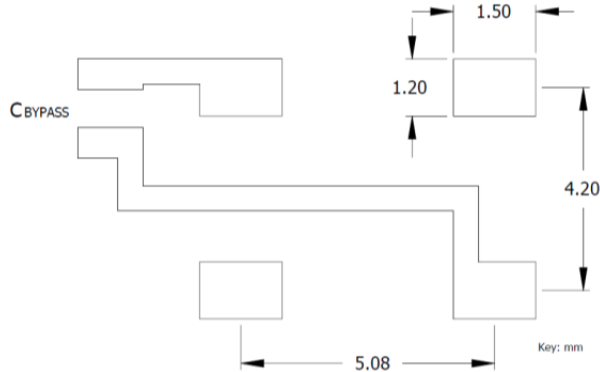
MARKING INFORMATION

1. M588 – CTS Model Series.
 2. ● – Pin 1 identifier.
 3. C – CTS identifier.
 4. D – Date code. See Table II for codes.
 6. xxx – Frequency Code.
- Refer to document 016-1454-0, Frequency Code Tables.

NOTES

1. DO NOT make connections to non-labeled pins or castellations as they may have internal connections used in the manufacturing process.
2. Termination pads (e4); barrier plating is nickel [Ni] with gold [Au] flash plate.
3. Reflow conditions per JEDEC J-STD-020, 260°C maximum.
4. MSL = 1.

SUGGESTED SOLDER PAD GEOMETRY



D.U.T. PIN ASSIGNMENTS

| PIN | SYMBOL | DESCRIPTION |
|-----|-----------------|---|
| 1 | V _C | Control Voltage – VCTCXO [Note 1] GND - TCXO |
| 2 | GND | Circuit & Package Ground |
| 3 | Output | Clipped Sine Wave Output |
| 4 | V _{CC} | Supply Voltage |

NOTES

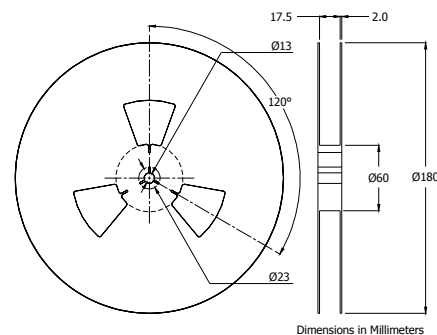
1. Connect to ground for TCXO [no AFC] option.
2. DC-Cut Capacitor Required.
Add 1000pF capacitor between TCXO output and input of load.

TABLE II – DATE CODE

| YEAR | | MONTH | | | | | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC |
|------|------|-------|------|------|------|------|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| | | 2001 | 2005 | 2009 | 2013 | 2017 | | | | | | | | | | | | |
| 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 | | |

PACKAGING INFORMATION [reference]

Device quantity is 1k pcs. maximum per 180mm reel.





Компания «ЭлектроПласт» предлагает заключение долгосрочных отношений при поставках импортных электронных компонентов на взаимовыгодных условиях!

Наши преимущества:

- Оперативные поставки широкого спектра электронных компонентов отечественного и импортного производства напрямую от производителей и с крупнейших мировых складов;
- Поставка более 17-ти миллионов наименований электронных компонентов;
- Поставка сложных, дефицитных, либо снятых с производства позиций;
- Оперативные сроки поставки под заказ (от 5 рабочих дней);
- Экспресс доставка в любую точку России;
- Техническая поддержка проекта, помощь в подборе аналогов, поставка прототипов;
- Система менеджмента качества сертифицирована по Международному стандарту ISO 9001;
- Лицензия ФСБ на осуществление работ с использованием сведений, составляющих государственную тайну;
- Поставка специализированных компонентов (Xilinx, Altera, Analog Devices, Intersil, Interpoint, Microsemi, Aeroflex, Peregrine, Syfer, Eurofarad, Texas Instrument, Miteq, Cobham, E2V, MA-COM, Hittite, Mini-Circuits, General Dynamics и др.);

Помимо этого, одним из направлений компании «ЭлектроПласт» является направление «Источники питания». Мы предлагаем Вам помощь Конструкторского отдела:

- Подбор оптимального решения, техническое обоснование при выборе компонента;
- Подбор аналогов;
- Консультации по применению компонента;
- Поставка образцов и прототипов;
- Техническая поддержка проекта;
- Защита от снятия компонента с производства.



Как с нами связаться

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