

# TT Type High Precision 7.0 x 5.0 mm SMD Voltage Controlled Temperature Compensated Crystal Oscillator

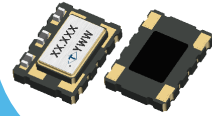
## FEATURE

- Typical 7.0 x 5.0 x 1.9 mm ceramic SMD package.
- High Precision for -40°C ~ +85°C,  $\pm 0.28\text{ppm}$ , -40°C ~ +105°C,  $\pm 2\text{ppm}$ .
- CMOS and Clipped Sine wave (without DC-cut capacitor) output optional.

## TYPICAL APPLICATION

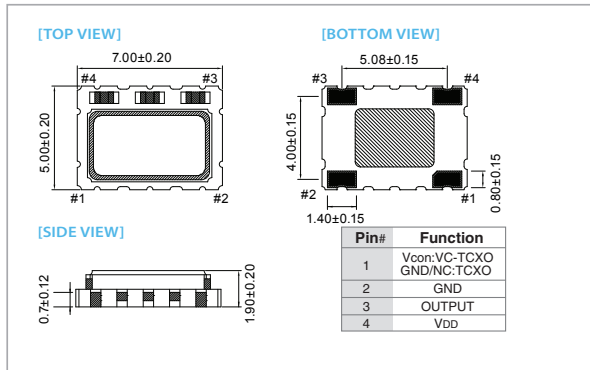
- Femtocell, Base Stations
- WLAN/WiMAX/WIFI, Wireless Communications

Actual Size

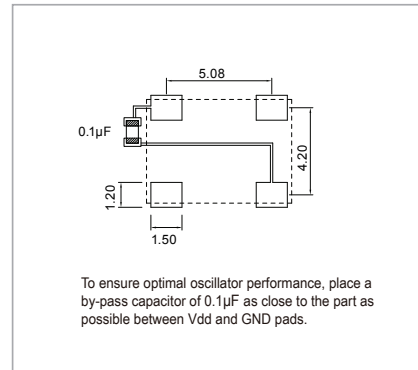


RoHS Compliant

## DIMENSION (mm)



## SOLDER PAD LAYOUT (mm)



## ELECTRICAL SPECIFICATION

| Parameter                          | 2.5V                                      |        | 3.3V          |        | Unit   |
|------------------------------------|-------------------------------------------|--------|---------------|--------|--------|
|                                    | Min.                                      | Max.   | Min.          | Max.   |        |
| Supply Voltage Variation (VDD)     | VDD-5%                                    | VDD+5% | VDD-5%        | VDD+5% | V      |
| Frequency Range                    | 5                                         | 52     | 5             | 52     | MHz    |
| Standard Frequency                 | 10, 12.8, 16.384, 19.2, 19.44, 20, 25, 26 |        |               |        |        |
| Frequency Tolerance*               | —                                         | ±2.0   | —             | ±2.0   | ppm    |
| Frequency Stability                |                                           |        |               |        |        |
| Vs Supply Voltage (±5%) change     | —                                         | ±0.1   | —             | ±0.05  | ppm    |
| Vs Load (±10%) change              | —                                         | ±0.05  | —             | ±0.05  |        |
| Vs Aging (@ 1st year)              | —                                         | ±1.0   | —             | ±1.0   |        |
| Supply Current (CMOS output)       | —                                         | 6      | —             | 6      | mA     |
| Supply Current (Clipped Sine Wave) | —                                         | 3.5    | —             | 3.5    |        |
| Output Level (CMOS)                | 90%VDD                                    | —      | 90%VDD        | —      |        |
| Output High (Logic "1")            | —                                         | 10%VDD | —             | 10%VDD | V      |
| Output Low (Logic "0")             | 45                                        | 55     | 45            | 55     | %      |
| Duty                               | 0.8                                       | —      | 0.8           | —      | Vp-p   |
| Output Level (Clipped Sine Wave)   | 15pF                                      |        | 15pF          |        |        |
| Load (CMOS)                        | 10 KΩ // 10pF                             |        | 10 KΩ // 10pF |        |        |
| Load (Clipped Sine Wave)           | 0.5                                       | 2.5    | 0.5           | 2.5    | V      |
| Control Voltage Range (VCTCXO)     | ±5.0                                      | —      | ±5.0          | —      | ppm    |
| Pulling Range (VCTCXO)             | 100                                       | —      | 100           | —      | kΩ     |
| Vc Input Impedance (VCTCXO)        | 100 Hz                                    | -130   |               |        | dBc/Hz |
| Phase Noise @ 10 MHz               | 1 kHz                                     | -145   |               |        |        |
|                                    | 10 kHz                                    | -154   |               |        |        |
| Start time                         | —                                         | 2      | —             | 2      | mSec   |
| Storage Temp. Range                | -55                                       | 125    | -55           | 125    | °C     |

Standard frequencies are frequencies which the crystal has been designed and does not imply a stock position.

\*Frequency at 25°C, 1 hour after reflow.

## FREQ. STABILITY vs. TEMP. RANGE

| Temp. (°C) | ppm | ±0.05 | ±0.1 | ±0.14 | ±0.2 | ±0.28 | ±0.5 | ±2 |
|------------|-----|-------|------|-------|------|-------|------|----|
| -10 ~ +70  | ○   | ○     | ○    | ○     | ○    | ○     | ○    | ○  |
| -20 ~ +70  | ×   | ○     | ○    | ○     | ○    | ○     | ○    | ○  |
| -40 ~ +85  | ×   | ×     | ×    | ×     | △    | ○     | ○    | ○  |
| -40 ~ +95  | ×   | ×     | ×    | ×     | ×    | △     | ○    | ○  |
| -40 ~ +105 | ×   | ×     | ×    | ×     | ×    | ×     | ×    | ○  |

\* ○: Available △: Conditional X: Not available

**Note: not all combination of options are available. Other specifications may be available upon request.**