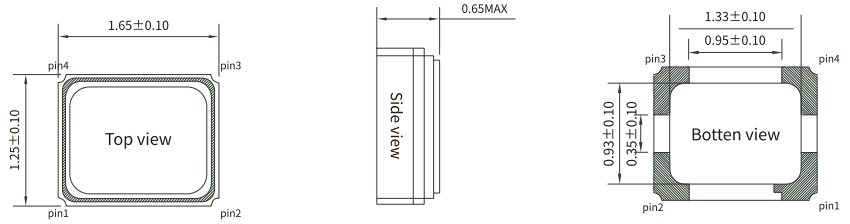
5.1 TC1612

1.6x1.2mm
Temperature Compensated
Crystal Oscillator

FEATURES AND APPLICATIONS

-External Dimensions:1.6×1.2×0.65m
-Small size, light weightiness,low power consumption
-Widely applied in consumer electronics
- H-structure
-Output Frequency Range:26MHz to 52MHz
-AEC-Q100&AEC-Q200 compliant

DIMENSIONS



ELECTRICAL SPECIFICATION

Specifications		3.3/3.0/2.8V		2.5V		1.8V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Operating Voltage(VDD)		2.66	3.465	2.375	2.625	1.71	1.89	V
Output Frequency		26	52	26	52	26	52	MHz
Nominal Frequency		26.0, 38.4, 52						
Frequency Accuracy (25°C)		—	±1.5	—	±1.5	—	±1.5	ppm
Frequency Stability	Vs Supply Voltage(±5%)	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	ppm
	Vs Load(±10%)	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	
	Vs Aging(@the first year)	—	±1.0	—	±1.0	—	±1.0	
Operating Current	26 MHz < F_o ≤ 52 MHz	—	2.0	—	2.0	—	2.0	
Output Level (Clipped sine wave)		0.8	—	0.8	—	0.8	—	Vp-p
Load		10KΩ // 10pF		10KΩ // 10pF		10KΩ // 10pF		
Voltage Control Range(VCTCXO)		0.5	2.5	0.4	2.4	0.3	1.5	V
Pull Range(VCTCXO)		±5.0	±17.0	±5.0	±17.0	±5.0	±17.0	ppm
Voltage Control Input Resistance(VCTCXO)		500	—	500	—	500	—	KΩ
Phase Noise @ 26 MHz	100 Hz	-110		-110		-110		dBc/Hz
	1 KHz	-130		-130		-130		
	10 KHz	-145		-145		-145		
Start-up time		—	2	—	2	—	2	mSec
Storage temperature range		-40	125	-40	125	-40	125	°C

FREQ. STABILITY vs. TEMP. RANGE

Temp.(°C) \ ppm	±0.5	±1.0	±1.5	±2.0	±2.5
-20 ~ +70	○	○	○	○	○
-30 ~ +85	○	○	○	○	○
-40 ~ +85	○	○	○	○	○

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.

*o: Available Δ: Condition X: Not available

Note: not all combination of options are available. Other specifications may be available upon request.
Specifications subject to change without notice.

5.2 TC2016

2.0 x 1.6 mm SMD Voltage Controlled Temperature Compensated Crystal Oscillator

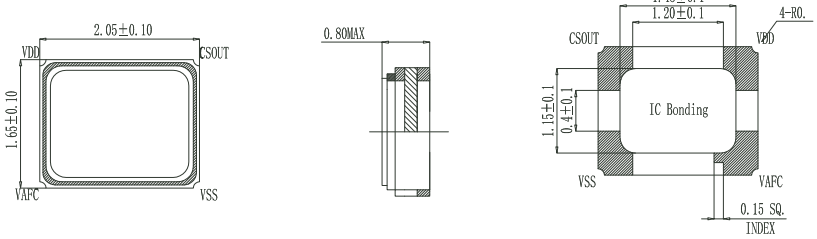
FEATURES

- Typical 2.0 x 1.6 x 0.8 mm ceramic SMD package
- H Type Package
- Compactness and lightweight
- VCTCXO available
- Miniature size and low profile

TYPICAL APPLICATION

- GPS/GNSS
- WiMAX, WLAN
- Mobile Phone
- IoT, wearable Electronics

DIMENSIONS



ELECTRICAL SPECIFICATION

Parameter		3.3/3.0/2.8V		2.5V		1.8V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Supply Voltage Variation (VDD)		2.66	3.465	2.375	2.625	1.71	1.89	V
Frequency Range		10	52	10	52	10	52	MHz
Standard Frequency		19.2, 26.0, 32.0, 38.4						
Frequency Tolerance (at 25°C)		—	±1.5	—	±1.5	—	±1.5	ppm
Frequency stability	Vs Supply Voltage (±5%) change	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	ppm
	Vs Load (±10%) change	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	
	Vs Aging (@1st year)	—	±1.0	—	±1.0	—	±1.0	
Supply Current	10 MHz ≤ F_o ≤ 26 MHz	—	1.5	—	1.5	—	1.5	mA
	26 MHz < F_o ≤ 52 MHz	—	2.0	—	2.0	—	2.0	
Output Level (Clipped sine wave)		0.8	—	0.8	—	0.8	—	Vp-p
Load		10KΩ // 10pF		10KΩ // 10pF		10KΩ // 10pF		
Control Voltage Range (VCTCXO)		0.5	2.5	0.4	2.4	0.3	1.5	V
Pulling Range (VCTCXO)		±5.0	±17.0	±5.0	±17.0	±5.0	±17.0	ppm
Vc Input Impedance (VCTCXO)		500	—	500	—	500	—	KΩ
Phase Noise @ 19.2 MHz	100 Hz	-115		-115		-115		dBc/Hz
	1 KHz	-135		-135		-135		
	10 KHz	-148		-148		-148		
Start time		—	2	—	2	—	2	mSec
Storage Temp. Range		-55	125	-55	125	-55	125	°C

FREQ. STABILITY vs. TEMP. RANGE

Temp.(°C) \ ppm	±0.5	±1.0	±1.5	±2.0	±2.5
-20 ~ +70	○	○	○	○	○
-30 ~ +85	○	○	○	○	○
-40 ~ +85	○	○	○	○	○

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.

*o: Available Δ: Condition X: Not available

Note: not all combination of options are available. Other specifications may be available upon request.
Specifications subject to change without notice.

5.3 TC2520

2.5 x 2.0 mm SMD Voltage Controlled Temperature Compensated Crystal Oscillator

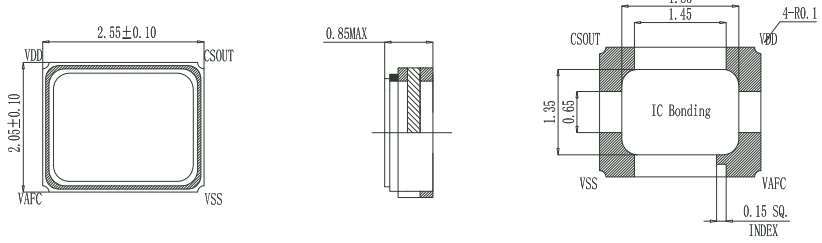
FEATURES

- Typical 2.5 x 2.0 x 0.85 mm ceramic SMD package
- H Type Package
- Compactness and lightweight
- VCTCXO available
- Low thickness

TYPICAL APPLICATION

- GPS/GNSS
- WiMAX, WLAN
- Mobile Phone

DIMENSIONS



ELECTRICAL SPECIFICATION

Parameter		3.3/3.0/2.8V		2.5V		1.8V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Supply Voltage Variation (VDD)		2.66	3.465	2.375	2.625	1.71	1.89	V
Frequency Range		10	52	10	52	10	52	MHz
Standard Frequency		19.2, 26.0, 32.0, 38.4						
Frequency Tolerance (at 25°C)		—	±1.5	—	±1.5	—	±1.5	ppm
Frequency stability	Vs Supply Voltage (±5%) change	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	ppm
	Vs Load (±10%) change	±0.1	±0.2	±0.1	±0.2	±0.1	±0.2	
	Vs Aging (@1st year)	—	±1.0	—	±1.0	—	±1.0	
Supply Current	10 MHz ≤ F_o ≤ 26 MHz	—	1.5	—	1.5	—	1.5	mA
	26 MHz < F_o ≤ 52 MHz	—	2.0	—	2.0	—	2.0	
Output Level (Clipped sine wave)		0.8	—	0.8	—	0.8	—	Vp-p
Load		10KΩ // 10pF		10KΩ // 10pF		10KΩ // 10pF		
Control Voltage Range (VCTCXO)		0.5	2.5	0.4	2.4	0.3	1.5	V
Pulling Range (VCTCXO)		±5.0	±17.0	±5.0	±17.0	±5.0	±17.0	ppm
Vc Input Impedance (VCTCXO)		500	—	500	—	500	—	KΩ
Phase Noise @ 19.2 MHz	100 Hz	-115		-115		-115		dBc/Hz
	1 KHz	-135		-135		-135		
	10 KHz	-148		-148		-148		
Start time		—	2	—	2	—	2	mSec
Storage Temp. Range		-55	125	-55	125	-55	125	°C

FREQ. STABILITY vs. TEMP. RANGE

Temp.(°C) \ ppm	±0.5	±1.0	±1.5	±2.0	±2.5
-20 ~ +70	○	○	○	○	○
-30 ~ +85	○	○	○	○	○
-40 ~ +85	○	○	○	○	○

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.

*o: Available Δ: Condition X: Not available

Note: not all combination of options are available. Other specifications may be available upon request.
Specifications subject to change without notice.

5.4 TC3225

3.2 x 2.5 mm SMD Voltage Controlled Temperature VCTCXO Compensated Crystal Oscillator

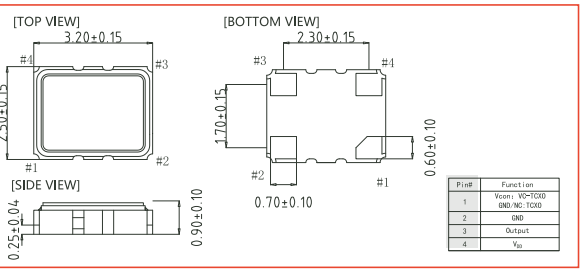
FEATURES

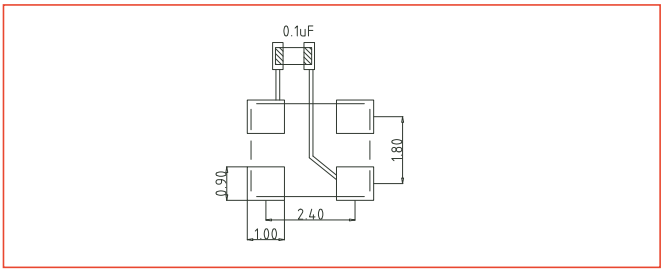
- Typical 3.2 x 2.5 x 0.9 mm SMD
- Compactness and lightweight
- VCTCXO available
- For automatic assembly
- Low power consumption
- Low thickness

TYPICAL APPLICATION

- GPS
- WiMAX, WLAN
- Mobile Phone

DIMENSIONS





ELECTRICAL SPECIFICATION

Parameter		3.3/3.0/2.8V		2.5V		1.8V		Unit
		Min.	Max.	Min.	Max.	Min.	Max.	
Supply Voltage Variation (VDD)		2.66	3.465	2.375	2.625	1.71	1.89	V
Frequency Range		10	52	10	52	10	52	MHz
Standard Frequency		10, 12.8, 13, 16.367667, 16.368, 16.369, 19.2 19.44, 20, 25, 26, 27, 30, 30.72, 32, 38.4						
Frequency Tolerance (at 25°C)		—	±2.0	—	±2.0	—	±2.0	ppm
Frequency stability	Vs Supply Voltage (±5%) change	—	±0.2	—	±0.2	—	±0.2	ppm
	Vs Load (±10%) change	—	±0.2	—	±0.2	—	±0.2	
	Vs Aging (@1st year)	—	±1.0	—	±1.0	—	±1.0	ppm
Supply Current	10 MHz ≤ F_o ≤ 26 MHz	—	1.5	—	1.5	—	1.5	mA
	26 MHz < F_o ≤ 52 MHz	—	2.0	—	2.0	—	2.0	
Output Level (Clipped sine wave)		0.8	—	0.8	—	0.8	—	Vp-p
Load		10KΩ // 10pF		10KΩ // 10pF		10KΩ // 10pF		
Control Voltage Range (VCTCXO)		0.5	2.5	0.4	2.4	0.3	1.5	V
Pulling Range (VCTCXO)		±5.0	—	±5.0	—	±5.0	—	ppm
Vc Input Impedance (VCTCXO)		500	—	500	—	500	—	KΩ
Phase Noise @ 19.2 MHz	100 Hz	-115		-115		-115		dBc/Hz
	1 KHz	-135		-135		-135		
	10 KHz	-148		-148		-148		
Start time		—	2	—	2	—	2	mSec
Storage Temp. Range		-40	85	-40	85	-40	85	°C

FREQ. STABILITY vs. TEMP. RANGE

Temp.(°C) \ ppm	±0.5	±1.0	±1.5	±2.0	±2.5
-20 ~ +70	○	○	○	○	○
-30 ~ +85	○	○	○	○	○
-40 ~ +85	○	○	○	○	○

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.

*o: Available Δ: Condition X: Not available

Note: not all combination of options are available. Other specifications may be available upon request.
Specifications subject to change without notice.

5.5 TC5032

5.0 x 3.2 mm SMD Voltage Controlled Temperature Compensated Crystal Oscillator VCTCXO

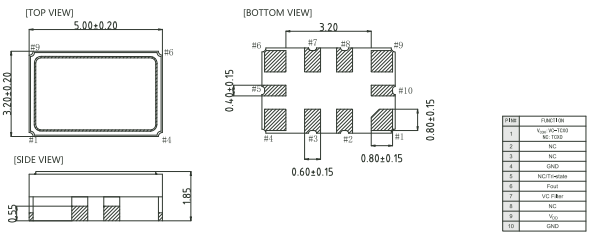
FEATURES

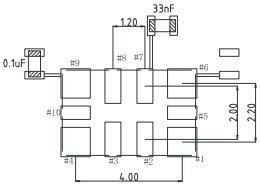
- Typical 5.0 x 3.2 x 1.85 mm ceramic SMD package
- High Stability for Stratum III
- High Precision for ±0.1ppm @ -40 ~ +85°C, ±0.2ppm @ -40 ~ +105°C
- Frequency support from 10MHz to 52MHz
- Wide temperature range
- Tri-state Enable/Disable function
- Pb-free/RoHS compliant

TYPICAL APPLICATION

- Time Synchronization
- Microwave Communication
- Test & Measurement
- Telecom Systems
- Satellite Communation

DIMENSIONS





ELECTRICAL SPECIFICATION

Parameter		3.3V		2.5V		Unit
		Min.	Max.	Min.	Max.	
Supply Voltage Variation (VDD)		Vdd-5%	Vdd+5%	Vdd-5%	Vdd+5%	V
Frequency Range		10	52	10	52	MHz
Frequency Tolerance (at 25°C)		—	±1.0	—	±1.0	ppm
Frequency stability	Vs Supply Voltage (±5%) change	—	±0.1	—	±0.1	ppm
	Vs Load (±10%) change	—	±0.05	—	±0.05	
	Vs Aging (@1st year)	—	±1.0	—	±1.0	
Output Waveform		CMOS				
Supply Current	10 MHz ≤ F_O ≤38 MHz	—	6.5	—	6.5	mA
	38 MHz < F_O ≤52 MHz	—	7.5	—	7.5	
Supply Current(Clipped Sine) 10 MHz ≤ F_O≤ 52 MHz		—	3.5	—	3.5	mA
Output Level	Output High	90%Vdd	—	90%Vdd	—	V
	Output Low	—	10%Vdd	—	10%Vdd	
Transition Time (10% ~ 90%)	Rise Time	—	6.5	—	6.5	nSec
	Fall Time	—	6.5	—	6.5	
Duty Cycle		45	55	45	55	%
Load		—	15	—	15	pF
Output Waveform		Clipped sine wave				
Supply Current	10 MHz ≤ F_O≤ 38 MHz	—	4.5	—	4.5	mA
	38 MHz < F_O≤ 52 MHz	—	5.0	—	5.0	
Output Level		0.8	—	0.8	—	Vp-p
Load		10KΩ // 10pF		10KΩ // 10pF		

TCXO

Parameter		3.3V		2.5V		Unit
		Min.	Max.	Min.	Max.	
Tri-State Control	Enable	80%Vdd	—	80%Vdd	—	V
	Disable	—	20%Vdd	—	20%Vdd	
Startup time		—	5	—	5	mS ec
Control Voltage Range(VCTCXO)		0.5	2.5	0.5	2.5	V
Pulling Range(VCTCXO)		±5.0	—	±5.0	—	ppm
Vc Input Impedance		100	—	100	—	KΩ
Phase Noise @TCXO VDD=3.3 V, Fout=20 MHz	100 Hz	-122		-122		dBc/Hz
	1 kHz	-142		-142		
	10 kHz	-154		-154		
	100 kHz	-157		-157		
	1 MHz	-159		-159		

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	±0.2	±0.28	±0.5
-10 ~ +60	○	○	○	○	○
-20 ~ +70	○	○	○	○	○
-40 ~ +85	△	○	○	○	○
-40 ~ +95	△	△	○	○	○
-40 ~ +105	×	△	○	○	○

*○: Available Δ: Condition X: Not available

Note: not all combination of options are available. Other specifications may be available upon request.
Specifications subject to change without notice.

5.6 TC7050

7.0 x 5.0 mm SMD Voltage Controlled Temperature Compensated Crystal Oscillator

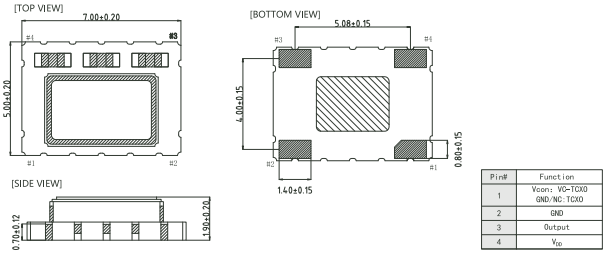
FEATURES

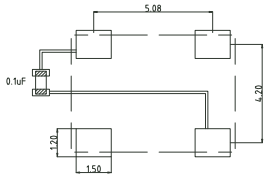
- Typical 7.0 x 5.0 x 1.9 mm ceramic SMD package
- High Precision for -40 ~ +85°C, ±0.28ppm, -40 ~ +105°C, ±2ppm
- CMOS and Clipped Sine wave (without DC-cut capacitor) output optional

TYPICAL APPLICATION

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

DIMENSIONS





ELECTRICAL SPECIFICATION

Parameter		5.0V		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(for COMS)		10, 12.8, 16.384, 19.2, 19.44, 20, 25, 26				
Frequency Tolerance (at 25°C)		—	±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	ppm
Supply Current(CMOS output)		—	6	—	6	mA
Output Level (Clipped sine wave)		—	3.5	—	3.5	
Output Level(CMOS)	Output High	90%Vdd	—	90%Vdd	—	V
	Output Low	—	10%Vdd	—	10%Vdd	
CMOS	Duty	45	55	45	55	%
Output Level(Clipped sine)		0.8	—	0.8	—	Vp-p
Load(CMOS)		15pF		15pF		pF
Load(Clipped sine)		10KΩ // 10pF		10KΩ // 10pF		
Control Voltage Range(VCTCXO)		0.5	2.5	0.5	2.5	V
Pulling Range(VCTCXO)		±5.0	—	±5.0	—	ppm
Vc Input Impedance		100	—	100	—	KΩ
Phase Noise @ 19.2 MHz	100 Hz	-130		-130		dBc/Hz
	1 KHz	-145		-145		
	10 KHz	-154		-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.

TCXO

FREQ. STABILITY vs. TEMP. RANGE

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

*o: Available Δ: Condition X: Not available

Note: not all combination of options are available. Other specifications may be available upon request.
Specifications subject to change without notice.