



## Features and Benefits

Fundamental operation at up to 150MHz  
High stability: up to  $\pm 5$ ppb from  $-40^{\circ}\text{C}$  to  $+85^{\circ}\text{C}$   
Very Low Power Consumption: up to 180mW at  $+25^{\circ}\text{C}$   
Low Phase Noise:  $-172\text{dBc/Hz}$  floor  
Fast Warm-up: up to 30s  
Low Aging: 0.1ppb/day, 0.015ppm/year  
Fundamental operation at up to 150MHz

## Typical Applications

Portable Wireless Communication  
Battery Powered Applications  
Mobile Test Equipment  
Beacons & Rescue Systems

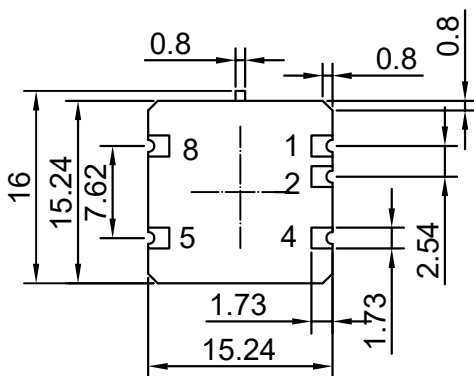
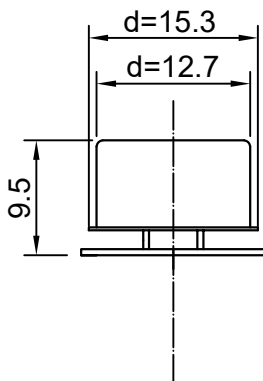
## Description

CXO1615C-SMD series utilizes special design which results in radical reduction of the OCXO sizes, power consumption and warm-up time. Despite its very small sizes and extremely low power consumption these oscillators exhibit excellent frequency stability and low phase-noise level comparable with that of the high-end conventional OCXO designs. The OCXO1615C-SMD is among the world smallest high stability OCXOs.

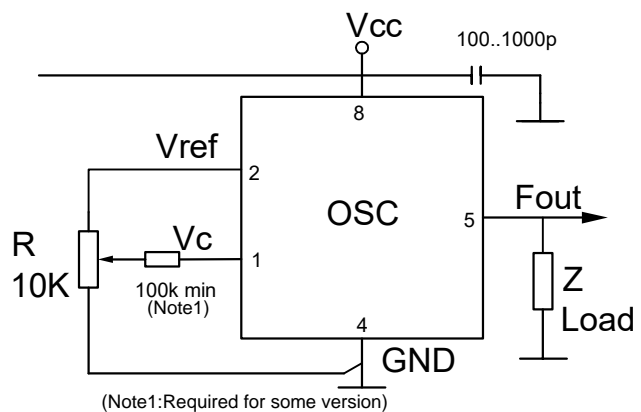
## Mechanical Drawing & Pin Connections

Drawing No: MD170017-1

### Physical dimensions



### Schematic connections



(Note1: Required for some version)

Pin	Signal
1	Electrical tuning
2	Reference voltage
4	GND
5	RF Out
8	+V Supply

Unit in mm

1mm = 0.0394 inches

**Specifications**

Oscillator Specification		Sym	Condition	Value			Unit	Note
				Min.	Typ	Max.		
Frequency Range		F <sub>0</sub>		8.000		150.000	MHz	
RF Output								
HCMOS (TTL) Option	Load			10		15/5	KOhm pF	10/100 MHz
	H-level voltage	V <sub>H</sub>	V <sub>CC</sub> = 5V V <sub>CC</sub> = 3.3	3.8 2.4			V	
	L-level voltage	V <sub>L</sub>				0.4	V	
	Duty cycle			45		55	%	
	Rise / Fall time					10/3	ns	10/100 MHz
Sine-Wave Option	Level	L	V <sub>CC</sub> = 5V V <sub>CC</sub> = 3.3V	+7 +4			dBm	
	Load	R <sub>L</sub>			50		Ohm	
	Harmonics level					-25	dBc	
Sub-Harmonics level				none				
Power Supply								
Voltage		V <sub>CC</sub>		4.75 3.15	5.00 3.3	5.25 3.45	V	
Power Consumption			Warm-up state Steady-state, +25°C		180	1200	mW	10 MHz -40°C to +85°C
Warm-up time		t <sub>up</sub>	@+25°C to Δf/f=10ppb @+25°C to Δf/f=100ppb	30	120 60		s	Ref. to freq. after 15 min. work
Frequency Control								
Control Voltage Range		V <sub>c</sub>	V <sub>CC</sub> = 5V V <sub>CC</sub> = 3.3V	0 0		4.2 2.8	V	
Tuning Voltage			Compliance with 10 years of aging	±300	±1000		ppb	positive slope
Reference Voltage		V <sub>ref</sub>	V <sub>CC</sub> = 5V V <sub>CC</sub> = 3.3V	4.1 2.7	4.2 2.8	4.3 2.9	V	
Frequency Stability								
Initial Tolerance		(f-f <sub>0</sub> )/f <sub>0</sub>	+25°C, V <sub>C</sub> =0.5*V <sub>ref</sub>		±0.1		ppm	
VS. Temperature			Ref. +25°C	±5			ppb	See ordering codes
VS Supply voltage			Ref V <sub>CC</sub> typ		±2		ppb	
VS. Acceleration			Worst direction	±0.2		±1.0	ppb/G	0-1KHz BW
Retrace			24h work after 24h off			±10	ppb	10 MHz
Phase Noise								
Phase noise			1Hz	-105/----		-90/----	dBc/Hz	10/100 MHz V <sub>CC</sub> = 5V
			10 Hz	-135/-100		-120/-90		
			100 Hz	-155/-130		-145/-120		
			1 kHz	-165/-155		-155/-150		
			10 kHz	-170/-170		-165/-165		
			100 kHz	-172/-172		-165/-165		
Allan Variance			1 s	5		30	e-12	10 MHz
Aging	Per day		After 30 days of operation	±0.1			ppb	10 MHz see ordering code
	First year			±0.015			ppm	

**Environmental Conditions**

Parameter	Reference Std.
Operating temperature range	Please refer to the ordering options information below
Storage temperature range	-60°C to +85°C
Power Voltage	-0.5V to $V_{CC} + 20\%$
Control Voltage	-0.5V to 6V
Humidity	Non-condensing 95%
Mechanical Shock	Per MIL-STD-202, 30G half sine pulse, 11ms
Vibration	Per MIL-STD-202, 10G swept sine 10 to 2000 Hz
Soldering Conditions	Hand solder only – not reflow compatible 260°C 10s (on pins)
Washing Conditions	Washing with water or alcohol based detergent allowed only with final enough drying stage

Note: Airflow velocity: 0.5m/s MAX.

**Ordering Information**

OCXO1615C-SMD	-	xxMHz	x	x	x	x	x
Group			1	2	3	4	5

For example, OCXO1615C-SMD-10MHz-2-10-2-1-1 denotes the OCXO has the following specifications:

Temperature Range	-10°C to +60°C
Stability Over Temperature	±10ppb
Aging per day / year	0.2ppb / 0.02ppm
Supply Voltage	5.0V ±5%
Output	HCMOS
Frequency	10MHz

1	Temperature Range
Code	Specification
1	0°C..+50°C
2	-10°C..+60°C
3	0°C..+70°C
4	-20°C..+70°C
5	-30°C..+70°C
6	-40°C..+85°C
7	-55°C..+85°C
8	-60°C..+85°C

2	Stability Over Temperature		
Code	Specification	Available temperature range code	
		10MHz	100MHz
-	-	-	-
3	±3.0 ppb	1 to 2	-
5	±5.0 ppb	1 to 6	-
10	±10 ppb	1 to 7	1 to 2
20	±20 ppb	1 to 8	1 to 5
30	±30 ppb	1 to 8	1 to 6
50	±50 ppb	1 to 8	1 to 7
100	±100 ppb	1 to 8	1 to 8

3	Aging per day/year, ppb/ppm
Code	Specification
1	0.1/0.015
2	0.2/0.02
3	0.3/0.03
4	0.5/0.05
5	1/0.1
6	1.5/0.15
7	2/0.2
8	3/0.3
9	5/0.5

4	Supply voltage
Code	Specification
1	+5V ±5%
2	+3.3V ±5%

5	Output
Code	Specification
1	HCMOS
2	Sine wave