



Features and Benefits

- Fundamental operation up to 150MHz
- High stability: As good as ± 10 ppb from -60°C to $+85^{\circ}\text{C}$ @ 10 MHz
- Very Low Power Consumption: 130mW at $+25^{\circ}\text{C}$ typ.
- Low Phase Noise: -172dBc/Hz floor
- Fast Warm-up: up to 30s
- Low Aging: As good as ± 0.1 ppb/day, ± 0.15 ppm/year
- Surface Mount Construction

Typical Applications

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

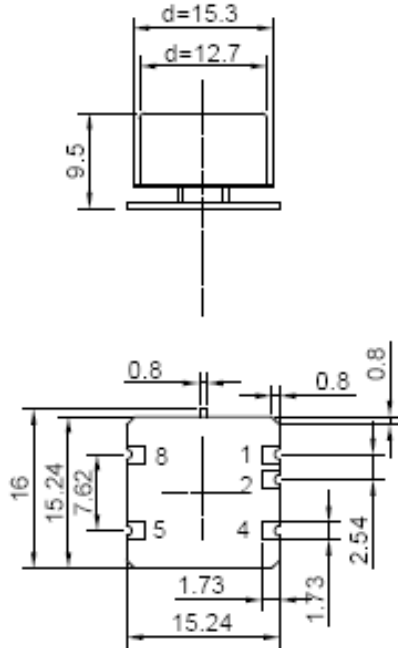
Description

The OCXO1615C-SMD series utilizes proprietary design technology which results in radical reduction of the oven control mechanical structure thus dramatically reducing power consumption and warm-up time. Even with miniature size this family of oscillators deliver excellent frequency stability and low phase-noise level comparable with much larger legacy OCXO design package configurations.

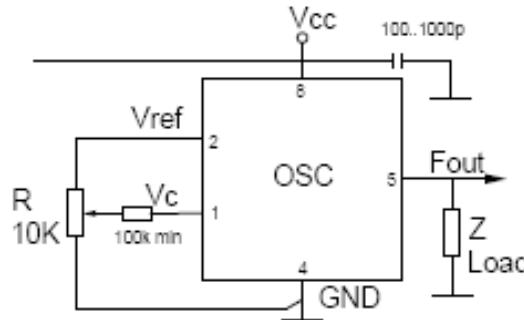
Mechanical Drawing & Pin Connections

Drawing No: MD170017-1

Physical dimensions



Schematic connections



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

Unit : mm
1mm=0.0394inch



Specifications

| Oscillator Specification | Sym | Condition | Value | | | Unit | Note | |
|----------------------------|------------------------------------|--|--|-------------|--------------|------------|--|------------|
| | | | Min. | Typ | Max. | | | |
| Frequency Range | F ₀ | | 8.000 | | 150.000 | MHz | | |
| RF Output | | | | | | | | |
| HCMOS (TTL) Option | Load | | 10 | | 15/5 | KOhm pF | 10/100 MHz | |
| | H-level voltage | V _H | V _{CC} = 5V V _{CC} = 3.3 | 3.8 2.4 | | V | | |
| | L-level voltage | V _L | | | 0.4 | V | | |
| | Duty cycle | | | 45 | | 55 | % | |
| | Rise / Fall time | | | | | 10/3 | ns | 10/100 MHz |
| Sine-Wave Option | Level | L | V _{CC} = 5V V _{CC} = 3.3V | +7 +4 | | dBm | | |
| | Load | R _L | | | 50 | Ohm | | |
| | Harmonics level | | | | | -25 | dBc | |
| Sub-Harmonics level | | | | none | | | | |
| Power Supply | | | | | | | | |
| Voltage | V _{CC} | | 4.75 3.15 | 5.00 3.3 | 5.25 3.45 | V | | |
| Power Consumption | | Warm-up state Steady-state, +25°C | 130 | 180 | 1200 | mW | 10 MHz -40°C to +85°C | |
| Warm-up time | t _{up} | @+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 _c | V _{CC} = 5V V _{CC} = 3.3V | 0 0 | | 4.3 2.8 | V | | |
| Tuning Voltage | | Compliance with 10 years of aging | ±300 | ±1000 | | ppb | positive slope | |
| Reference Voltage | V _{ref} | | 4.1 2.7 | 4.2 2.8 | 4.4 2.9 | V | | |
| Frequency Stability | | | | | | | | |
| Initial Tolerance | (f-f ₀)/f ₀ | +25°C, V _C =0.5*V _{ref} | | ±0.1 | | ppm | | |
| VS. Temperature | | Ref. +25°C | ±5 | | | ppb | See ordering codes | |
| VS. Supply voltage | | Ref V _{CC} typ | | ±2 | | ppb | | |
| VS. Acceleration | | Worst direction | ±0.3 | ±1.0 | | ppb/G | | |
| Retrace | | 24h work after 24h off | | | ±10 | ppb | 10 MHz | |
| Phase Noise | | | | | | | | |
| Phase noise | | 1Hz | -105/---- | | -90/---- | dBc/Hz | 10/100 MHz V _{CC} = 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 | | 40 | e-12 | 10 MHz | |
| Aging | Per day | After 30 days of operation | ±0.1 | | | ppb | 10 MHz see ordering code | |
| | First year | | ±0.15 | | | 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 |

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 |
| 2 | ±2.0 ppb | 1 to 2 | - |
| 3 | ±3.0 ppb | 1 to 5 | - |
| 5 | ±5.0 ppb | 1 to 6 | - |
| 10 | ±10 ppb | 1 to 8 | 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 | <=10MHz |
| 2 | 0.2/0.02 | |
| 3 | 0.3/0.03 | |
| 4 | 0.5/0.05 | <=20MHz |
| 5 | 1/0.1 | <=40MHz |
| 6 | 1.5/0.15 | <=50MHz |
| 7 | 2/0.2 | <=120MHz |
| 8 | 3/0.3 | <=120MHz |
| 9 | 5/0.5 | <=150MHz |

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

| 5 | Output |
|------|---------------|
| Code | Specification |
| 1 | HCMOS |
| 2 | Sine wave |



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OCXO1615C-SMD

High Performance Surface Mount OCXO