

**OC-X87XXXXX Series**

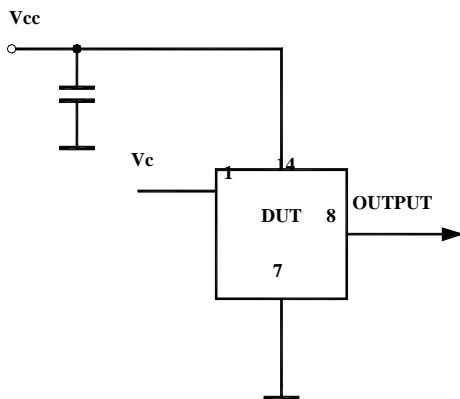
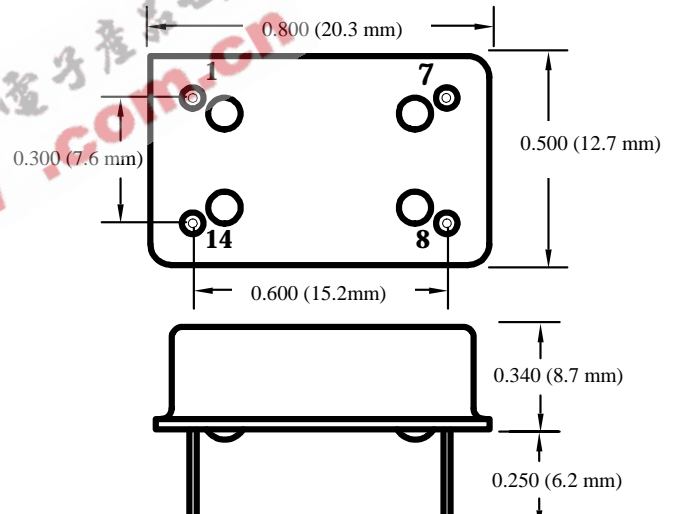
Micro-miniature OCXO

**Features**

- Low Cost DIL 14 package
- High Vacuum Sealed Crystal
- Low Power Consumption (500 mW)
- Fast Warm-up Time (2 minutes)
- Stratum3 or better Stability
- Low Aging < 3 ppm over life
- Very Low Phase Noise (-160dBc/Hz TYP)
- HCMOS/TTL or Sine-Wave output
- 8 MHz to 160 MHz Frequencies Available
- Voltage Control Optional

**Applications**

- Telecommunications
- Data Communications
- Instrumentation



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**Specifications:**

| Parameter                       | Symb            | Condition | Min  | Typ | Max | Unit | Note   |
|---------------------------------|-----------------|-----------|------|-----|-----|------|--|
| <b>Absolute Maximum Ratings</b> |                 |           |      |     |     |      |  |
| Input Break Down Voltage        | V <sub>cc</sub> |           | -0.5 |     | 5.5 | V    | 3.3V or 5V V <sub>cc</sub><br>12 V V <sub>cc</sub> |
| Storage temper.                 | T <sub>s</sub>  |           | -40  |     | 85  | °C   |  |
| Control Voltage                 | V <sub>c</sub>  |           | -1   |     | 6   | V    |  |

**Electrical**

|                             |                 |  |      |              |            |        |  |                           |
|-----------------------------|-----------------|--|------|--------------|------------|--------|--|---------------------------|
| Frequency                   | F               |  | 8    | 10.000       | 160        | MHz    | 1*   | All parameters for 10 MHz |
| Frequency stability         | ΔF/F            | vs. Temp.  |      | ±100         | ±280       | ppb    | See chart below  |                           |
|                             |                 | vs. Supply   |      | 10           | 50         | ppb/V  |  |                           |
| Aging                       |                 | per day<br>first year<br>15 years  |      | 5E-9<br>3E-7 |            |        | after 30 days  |                           |
| Allan Variance              |                 | .1s to 100s  |      | 5E-11        |            |        |  |                           |
| Calibration                 |                 | No voltage control   |      | ± 0.5        | ± 2        | ppm    |  |                           |
| V <sub>cc</sub> sensitivity |                 |  |      | 5E-8/V       |            |        |  |                           |
| Load sensitivity            |                 | For 10% change   |      |              | 5E-8       |        |  |                           |
| SSB Phase Noise             |                 | 10 Hz  |      | -100         |            | dBc/Hz | 2*   |                           |
|                             |                 | 100 Hz   |      | -130         |            |        |  |                           |
|                             |                 | 1 KHz  |      | -145         |            |        |  |                           |
|                             |                 | >10 KHz  |      | -160         |            |        |  |                           |
| Retrace                     |                 | After 30 minutes   |      |              | ±100       | ppb    |  |                           |
| G-sensitivity               |                 | worst direction  |      |              | ±2.0       | ppb/G  |  |                           |
| Input Voltage               | V <sub>cc</sub> |  | 4.75 | 5.0          | 5.25       | V      | See chart below  |                           |
|                             |                 |  | 3.15 | 3.3          | 3.45       |        |  |                           |
|                             |                 |  | 11.4 | 12.0         | 12.6       |        |  |                           |
| Power consumption           | P               | steady state, 25°C   |      | 0.5          | 0.7        | W      | Upper operating temperature < 70°C, add 20% for UOT 85°C |                           |
|                             |                 | steady state, -30°C start-up   |      |              | 1.5<br>2.5 |        |  |                           |
| Load                        |                 | 10KOhm//15pF<br>Internally AC coupled 50 Ohm   |      |              |            |        | CMOS Output<br>Sine-wave output                          |                           |
| Warm-up time                | τ               | to 0.3 ppm accuracy  |      | 2            | 3          | min    |  |                           |
| Sub-Harmonics               |                 |  |      | -50          | -40        | dBc    | At higher F 1*   |                           |
| Output Waveform             |                 | 3.3V HCMOS/TTL compatible, 4 ns Tr/Tf, 40/60% duty cycle<br>Sine-wave, + 7 dBm ±3 dBm into 50 Ohm, -30 dBc harmonics |      |              |            |        | See chart below  |                           |
| Control voltage             | V <sub>c</sub>  |  | 0    |              | 4.0        | V      |  |                           |
| Pull range                  |                 | from nominal F   | ±5   | ±10          |            | ppm    | Customer specified                                       |                           |
| Deviation slope             |                 | Monotonic, posit   |      | 5            |            | ppm/V  | Customer specified                                       |                           |
| Setability                  | V <sub>c0</sub> | @25°C, F <sub>nom.</sub>   | 1.0  | 2.0          | 3.0        | V      | 5V/3.3 supply  |                           |

**Environmental and Mechanical**

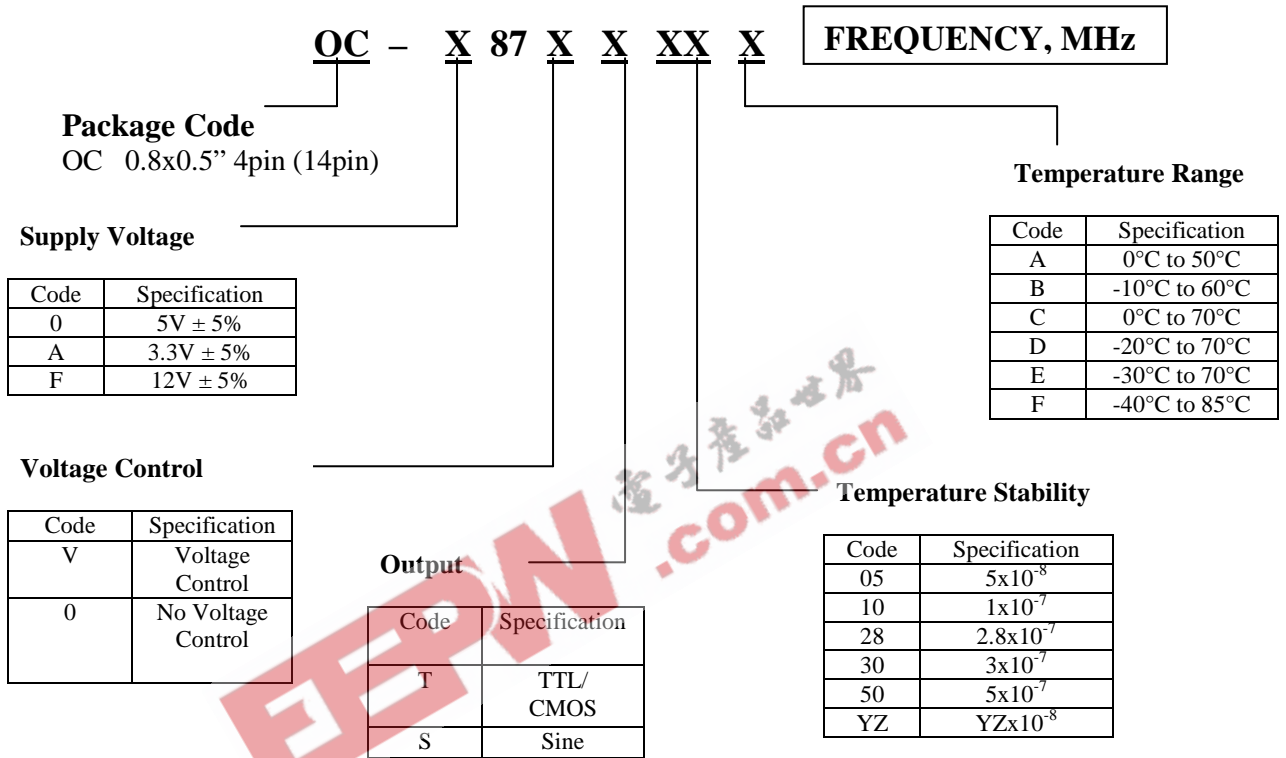
|                       |  |
|-----------------------|--|
| Operating temp. range | -30°C to 70°C Standard, Other options – see chart below    |
| Mechanical Shock      | Per MIL-STD-202, 30G, 11ms                                 |
| Vibration             | Per MIL-STD-202, 5G to 2000 Hz                             |
| Soldering Conditions  | Leads Temperature 260°C, for 10s, Max                      |
| Hermetic Seal         | Leak rate less than 1x10 <sup>-8</sup> atm.ccm/s of helium |

**Electrical Connections**

|         |   |
|---------|---|
| Pin Out | Pin 1- V <sub>c</sub> ; Pin 7- Case, GND; Pin8 – Output; Pin 14 - V <sub>cc</sub> |
|---------|---|

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**Creating a Part Number**



Not all combinations are available. Consult Factory.

Notes:

1\* Higher frequencies can be achieved either by using higher frequency crystals or by low noise analog harmonic multiplication. Both methods have advantages and drawbacks. If lowest possible phase noise on the noise floor is most important – high frequency crystal will be used. If phase noise close to the carrier and aging are more important – multiplication will be used. Please consult factory for your specific requirement.

2\* Phase noise deteriorates with frequencies going higher. If analog multiplication is used to achieve higher frequency the phase noise roughly follows the formula of additional 20LogN, where N is a multiplication factor across entire frequency offset range. If higher frequency is achieved by using higher frequency crystal phase noise close to the carrier deteriorates due to the lower Q of the crystal and is usually worse, compared to multiplied solution. On the noise floor, however it remains more or less the same.