

ECOC-7050 LVC MOS SMD OCXO. The 7.0 x 5.0 x 3.3 mm package is ideal for 5G, Small Cells, SyncE and IEEE 1588 applications.

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### OPERATING CONDITIONS / ELECTRICAL CHARACTERISTICS

#### ECOC-7050



- LVC MOS OCXO
- 7.0 x 5.0 mm Footprint
- PbFree/RoHS Compliant
- Lead Finish Au

**Note 1:** Time needed for frequency to be within  $\pm 25$  ppb reference to frequency after 1 hour, at  $+25^{\circ}\text{C}$

**Note 2:** At time of shipment, reference to nominal frequency at  $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$

**Note 3:** After 1 hour recovery at  $+25^{\circ}\text{C}$

| *Aging                                |
|---------------------------------------|
| Daily $\pm 3$ ppb Typ                 |
| 1 <sup>st</sup> Year $\pm 1$ ppm Max. |
| 10 Years $\pm 2$ ppm Max.             |

\*After 30 days of operation

| ECOC-7050                                   |           |          |           |                         |                                                       |
|---------------------------------------------|-----------|----------|-----------|-------------------------|-------------------------------------------------------|
| Parameters                                  | MIN       | TYP      | MAX       | Units                   | Conditions                                            |
| Frequency Range                             | 10.000    |          | 50.000    | MHz                     |                                                       |
| Input Voltage                               | +3.135    | +3.3     | +3.465    | VDC                     |                                                       |
| Current Consumption @ $+25^{\circ}\text{C}$ |           |          | 750       | mA                      | During Warm up                                        |
|                                             |           |          | 200       | mA                      | At steady state                                       |
| Warm up Time                                |           |          | 1         | Min                     | Note 1:                                               |
| Initial Frequency Tolerance                 |           |          | $\pm 500$ | ppb                     | @ $+25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ Note 2: |
| Start-up Time                               |           |          | 200       | msec                    |                                                       |
| Reflow shift                                | -0.5      |          | +0.5      | ppm                     | Note 3:                                               |
| Frequency Stability                         |           |          | $\pm 50$  | ppb                     | Vs. Temp ( $-40 \sim +85^{\circ}\text{C}$ ) BN Opt    |
|                                             |           | $\pm 10$ |           | ppb                     | Vcc $\pm 2\%$                                         |
|                                             |           | $\pm 10$ |           | ppb                     | Vs. Load Change ( $\pm 5\%$ )                         |
| Frequency Slope (In still air)              |           |          | $\pm 3$   | Ppb/ $^{\circ}\text{C}$ | Temp ramp rate $1^{\circ}\text{C}/\text{Min}$ .       |
| Output Load                                 |           | 15       |           | pF                      | LVC MOS                                               |
| Output Voltage (VOH)                        | 90% Vcc   |          |           | V                       |                                                       |
| Output Voltage (VOL)                        |           |          | 10% Vcc   | V                       |                                                       |
| Rise/Fall Time                              |           |          | 2         | nS                      |                                                       |
| Duty Cycle                                  | 45        |          | 55        | %                       |                                                       |
| Phase Noise<br>@ 10.000 MHz                 |           | -76      |           | dBc/Hz                  | @ 1 Hz Offset                                         |
|                                             |           | -108     |           | dBc/Hz                  | @ 10 Hz Offset                                        |
|                                             |           | -131     |           | dBc/Hz                  | @ 100 Hz Offset                                       |
|                                             |           | -149     |           | dBc/Hz                  | @ 1 KHz Offset                                        |
|                                             |           | -155     |           | dBc/Hz                  | @ 10 KHz Offset                                       |
|                                             |           | -158     |           | dBc/Hz                  | @ 100 KHz Offset                                      |
|                                             |           | -159     |           | dBc/Hz                  | @ 1 MHz Offset                                        |
| Allan deviation (at $+25^{\circ}\text{C}$ ) |           | 2.0      | 7.0       | e-11                    | $\tau=1.0\text{s}$                                    |
| ECOC-9775-VC                                |           |          |           |                         | VC-OCXO Option                                        |
| Control Voltage                             | +0.0      | +1.65    | +3.3      | V                       | Input Impedance $100\text{k}\Omega$ Min               |
| Pulling Range                               | $\pm 3.6$ |          | $\pm 5$   | ppm                     | Positive Slope $\leq 3\%$ Linearity                   |
| Operating Temperature                       | -40       |          | +85       | $^{\circ}\text{C}$      | * N Option                                            |
| Storage Temperature                         | -55       |          | +95       | $^{\circ}\text{C}$      |                                                       |

### Part Numbering Guide: Example ECOC-7050-10.000-BN-TR

| Series | - | Frequency | - | Stability | - | Temperature | - | Packaging |
|--------|---|-----------|---|-----------|---|-------------|---|-----------|
|--------|---|-----------|---|-----------|---|-------------|---|-----------|

ECOC-7050 = OCXO  
ECOC-7050-VC = VC-OCXO

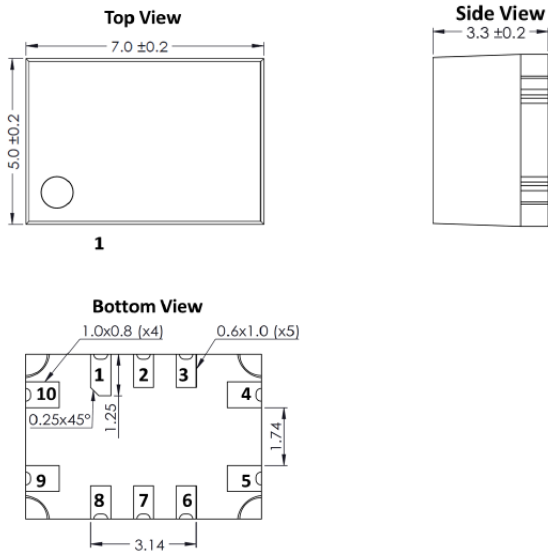
10.000 MHz  
See Page 2  
Developed  
Frequencies

B=  $\pm 50$  ppb

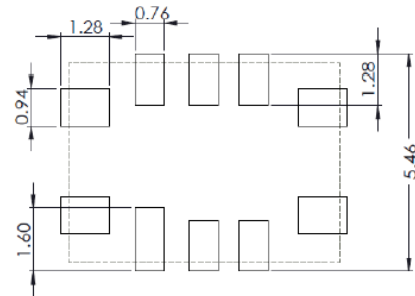
M=  $-20 \sim +70^{\circ}\text{C}$   
Y=  $-30 \sim +85^{\circ}\text{C}$   
N=  $-40 \sim +85^{\circ}\text{C}$

TR = Tape & Reel  
(500/Reel)

## Package Dimensions (mm)



**Figure 1)** Top, Side, and Bottom views



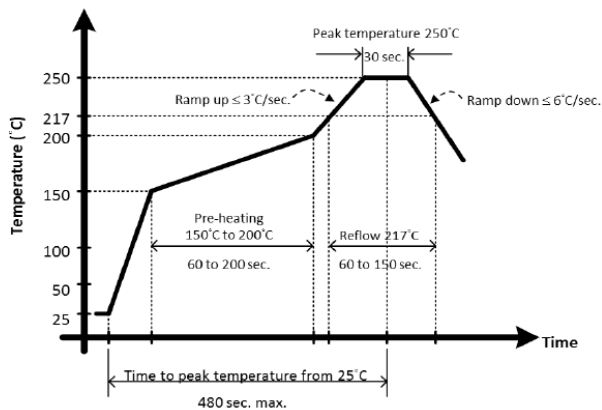
**Figure 2)** Land Pattern

| ECOC-7050       |        |
|-----------------|--------|
| Pin Connections |        |
| 1,2,3           | DNC    |
| 4               | GND    |
| 5               | Output |
| 6,7,8           | DNC    |
| 9               | Vcc    |
| 10              | DNC    |

| ECOC-7050-VC    |                 |
|-----------------|-----------------|
| Pin Connections |                 |
| 1               | Voltage Control |
| 2,3             | DNC             |
| 4               | GND             |
| 5               | Output          |
| 6,7,8           | DNC             |
| 9               | Vcc             |
| 10              | DNC             |

| Frequency (MHz) |
|-----------------|
| 10.000          |
| 19.440          |
| 20.000          |
| 38.880          |

Developed Frequencies



**Figure 3)** Suggested Reflow Profile

|            |         |      |        |
|------------|---------|------|--------|
| 10.000 Mhz | 1 Hz    | -76  | dBc/Hz |
|            | 10 Hz   | -108 | dBc/Hz |
|            | 100 Hz  | -131 | dBc/Hz |
|            | 1 kHz   | -149 | dBc/Hz |
|            | 10 kHz  | -155 | dBc/Hz |
|            | 100 kHz | -158 | dBc/Hz |
|            | 1 MHz   | -159 | dBc/Hz |
| 19.44 Mhz  | 1 Hz    | -73  | dBc/Hz |
|            | 10 Hz   | -104 | dBc/Hz |
|            | 100 Hz  | -126 | dBc/Hz |
|            | 1 kHz   | -142 | dBc/Hz |
|            | 10 kHz  | -155 | dBc/Hz |
|            | 100 kHz | -158 | dBc/Hz |
|            | 1 MHz   | -159 | dBc/Hz |
| 20.000 Mhz | 1 Hz    | -71  | dBc/Hz |
|            | 10 Hz   | -102 | dBc/Hz |
|            | 100 Hz  | -120 | dBc/Hz |
|            | 1 kHz   | -142 | dBc/Hz |
|            | 10 kHz  | -155 | dBc/Hz |
|            | 100 kHz | -158 | dBc/Hz |
|            | 1 MHz   | -159 | dBc/Hz |
| 38.88 Mhz  | 1 Hz    | -69  | dBc/Hz |
|            | 10 Hz   | -101 | dBc/Hz |
|            | 100 Hz  | -122 | dBc/Hz |
|            | 1 kHz   | -141 | dBc/Hz |
|            | 10 kHz  | -155 | dBc/Hz |
|            | 100 kHz | -158 | dBc/Hz |
|            | 1 MHz   | -159 | dBc/Hz |

Figure 4) Typical Phase Noise

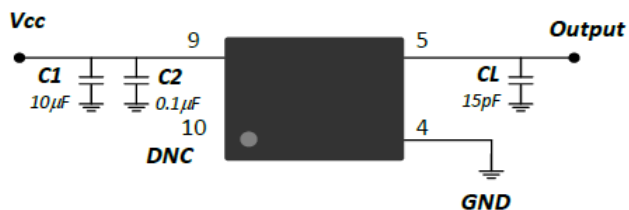


Figure 5) Test Circuit

External components:

| Name | Function                |
|------|-------------------------|
| C1   | AC Noise Bypass for Vcc |
| C2   | AC Noise Bypass for Vcc |
| CL   | Load Capacitance        |

Note: Bypass capacitor should be placed.