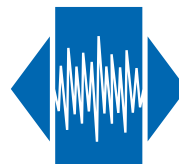


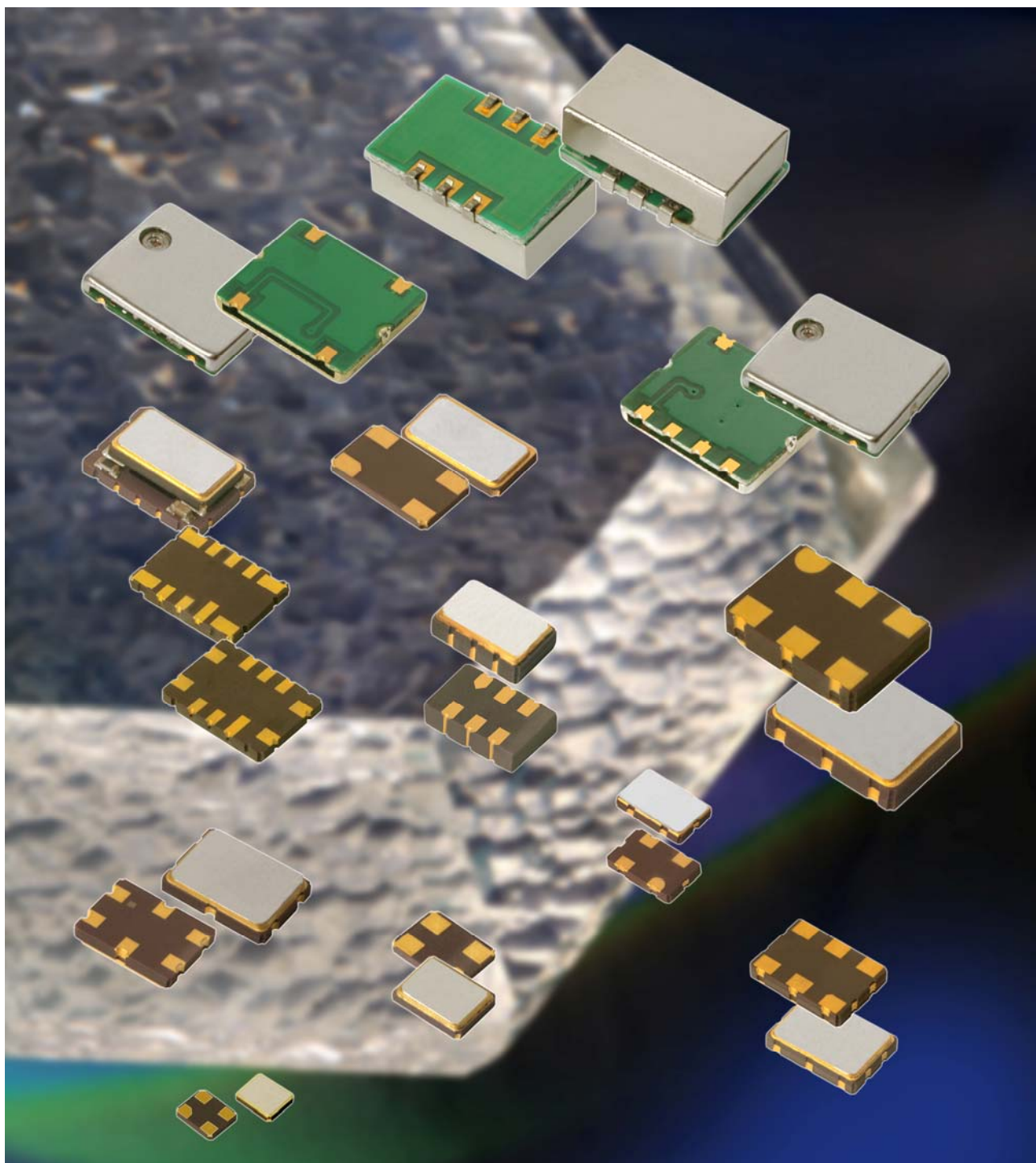
QuartzCom  
the communications company



# OCXO

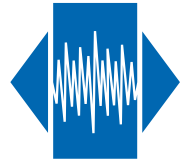
# MORE THAN FREQUENCY

Oven Controlled Crystal Oscillators



| Type                | Frequency Range     | Stability vs. temperature | Aging per year         | Supply Voltage           | Output Signal   | Package Size                           | Features                                                                                       |
|---------------------|---------------------|---------------------------|------------------------|--------------------------|-----------------|----------------------------------------|------------------------------------------------------------------------------------------------|
|                     | [MHz]               |                           |                        | [V]                      |                 | [mm]                                   |                                                                                                |
| <b>OCO-M14</b>      | 5 MHz to 128 MHz    | $\pm 5 \times 10^{-8}$    | $\pm 1 \times 10^{-7}$ | 3.3 V<br>5.0 V<br>12.0 V | HCMOS sine wave | DIL 14/4 pin                           | miniature packaged OCXO<br>wide frequency range<br>high reliability                            |
| <b>OCO-SM14 SMD</b> | 5 MHz to 60 MHz     | $\pm 5 \times 10^{-8}$    | $\pm 1 \times 10^{-7}$ | 3.3 V<br>5.0 V<br>12.0 V | HCMOS sine wave | DIL 14 Gullwing SMD                    | miniature packaged SMD OCXO<br>wide frequency range<br>high reliability                        |
| <b>OCO-M20A</b>     | 8.192 MHz to 20 MHz | $\pm 1 \times 10^{-9}$    | $\pm 3 \times 10^{-8}$ | 5.0 V<br>12.0 V          | HCMOS sine wave | 20x20x12.7                             | ultra miniature accurate OCXO<br>high stability vs. temperature<br>long term stability         |
| <b>OCO-M20B</b>     | 10 MHz to 25MHz     | $\pm 1 \times 10^{-8}$    | $\pm 3 \times 10^{-8}$ | 3.3 V<br>5.0 V           | HCMOS           | 20x20x10                               | ultra miniature OCXO<br>high stability vs. temperature<br>power supply 3.3 V or 5.0 V          |
| <b>OCO-M25A</b>     | 10 MHz to 30 MHz    | $\pm 5 \times 10^{-9}$    | $\pm 3 \times 10^{-8}$ | 3.3 V<br>5.0 V<br>12.0 V | HCMOS sine wave | 25x25x12.7                             | high stability vs. temperature<br>long term stability<br>low phase noise                       |
| <b>OCO-M25B</b>     | 48 MHz to 500 MHz   | $\pm 5 \times 10^{-8}$    | $\pm 2 \times 10^{-7}$ | 12.0 V                   | sine wave       | 25x25x10                               | wide frequency range<br>low phase noise,<br>floor -167 dBc/Hz<br>available with SMA connectors |
| <b>OCO-SMH SMD</b>  | 10 MHz to 40 MHz    | $\pm 5 \times 10^{-9}$    | $\pm 3 \times 10^{-8}$ | 3.3 V<br>5.0 V           | HCMOS           | 25.4x22x14 SMD                         | SMD packaged OCXO<br>high stability vs. temperature<br>wide frequency range                    |
| <b>OCO-SMS SMD</b>  | 10 MHz to 20 MHz    | $\pm 5 \times 10^{-9}$    | $\pm 3 \times 10^{-8}$ | 5.0 V                    | sine wave       | 25.4x22x12.5<br>25.4x22x14.0 SMD       | SMD packaged OCXO<br>oven alarm & oscillator on/off<br>high stability vs. temperature          |
| <b>OCO-M36AD</b>    | 5 MHz to 10 MHz     | $\pm 2 \times 10^{-10}$   | $\pm 2 \times 10^{-8}$ | 12.0 V                   | sine wave       | 36x27x19                               | high stability double oven<br>for STRATUM 2 & 3E<br>base station & GPS/GALILEO                 |
| <b>OCO-M36A</b>     | 10 MHz to 20 MHz    | $\pm 5 \times 10^{-10}$   | $\pm 2 \times 10^{-8}$ | 5.0 V<br>12.0 V          | HCMOS sine wave | 36x27x10.0<br>36x27x12.7<br>36x27x16.0 | high stability low case height<br>fast warming up<br>for -40 to +85 °C ask factory             |
| <b>OCO-M36B</b>     | 48 MHz to 120 MHz   | $\pm 5 \times 10^{-8}$    | $\pm 3 \times 10^{-7}$ | 5.0 V<br>12.0 V          | sine wave       | 36x27x16                               | high frequency, low phase noise<br>small case size<br>for PLL, VSAT & synthesizer              |
| <b>OCO-M36C</b>     | 5 MHz to 10 MHz     | $\pm 5 \times 10^{-9}$    | $\pm 2 \times 10^{-8}$ | 3.3 V<br>5.0 V           | HCMOS           | 36x27x15                               | high stability low case height<br>power supply 3.3 V or 5.0 V<br>available for -40 to +85 °C   |
| <b>OCO-M36CE</b>    | 10 MHz to 40 MHz    | $\pm 7.5 \times 10^{-9}$  | $\pm 3 \times 10^{-8}$ | 5.0 V<br>12.0 V          | HCMOS sine wave | 36x27x16                               | high stability vs. temperature<br>low aging<br>available for -40 to +85 °C                     |

| Specification example for OCO-M36A 10.000 MHz |                         |                                               |             |
|-----------------------------------------------|-------------------------|-----------------------------------------------|-------------|
| frequency stability from -40 to +70 °C        | $\pm 5 \times 10^{-10}$ | supply voltage                                | +5.0 V      |
| long term stability, aging per year           | $\pm 3 \times 10^{-8}$  | current consumption @ +25 °C                  | < 400 mA    |
| short term stability, aging per day           | $\pm 1 \times 10^{-10}$ | warming up time for $< \pm 2 \times 10^{-8}$  | < 3 min     |
| short term stability, Allan deviation         | $5 \times 10^{-12}$     |                                               |             |
| frequency deviation vs. load change           | $\pm 5 \times 10^{-10}$ | <b>ultra low phase noise @ 10 MHz carrier</b> |             |
| frequency deviation vs. supply change         | $\pm 5 \times 10^{-10}$ | < -103 dBc/Hz                                 | @ 1 Hz      |
| frequency pulling (adjustment)                | $\pm 4 \times 10^{-7}$  | < -133 dBc/Hz                                 | @ 10 Hz     |
| output sine wave                              | > 300 mV                | < -155 dBc/Hz                                 | @ 100 Hz    |
| output load                                   | 50 $\Omega$             | < -160 dBc/Hz                                 | @ 1'000 Hz  |
| harmonic suppression                          | > 30 dBc                | < -165 dBc/Hz                                 | @ 10'000 Hz |



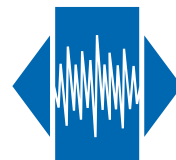
| Type                            | Frequency Range     | Stability vs. temperature | Aging per year         | Supply Voltage  | Output Signal   | Package Size         | Features                                                                                                                                        |
|---------------------------------|---------------------|---------------------------|------------------------|-----------------|-----------------|----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
|                                 | [MHz]               |                           |                        | [V]             |                 | [mm]                 |                                                                                                                                                 |
| <b>OCO-M40A</b>                 | 5 MHz to 10 MHz     | $\pm 5 \times 10^{-10}$   | $\pm 2 \times 10^{-8}$ | 12.0 V          | HCMOS sine wave | 51x41x19<br>51x41x25 | very high precision ( $\pm 5 \times 10^{-10}$ )<br>low aging, low phase noise for GPS, CDMA and 3G                                              |
| <b>OCO-M40C</b>                 | 9.5 MHz to 10.5 MHz | $\pm 1 \times 10^{-8}$    | $\pm 1 \times 10^{-7}$ | 5.0 V<br>12.0 V | HCMOS sine wave | 51x41x25             | high stability, low phase noise<br>fast warming up < 45 s<br>low power consumption                                                              |
| <b>OCO-M40B</b>                 | 4.6 MHz to 20 MHz   | $\pm 7.5 \times 10^{-9}$  | $\pm 3 \times 10^{-8}$ | 12.0            | sine wave       | 51x41x25             | high frequency stability<br>low power consumption<br>low phase noise                                                                            |
| <b>OCO-M50DL</b>                | 5 MHz to 16 MHz     | $\pm 1 \times 10^{-10}$   | $\pm 1 \times 10^{-8}$ | 5.0 V<br>12.0 V | sine wave       | 51x51x17<br>51x51x19 | double oven, low profile<br>ultra high frequency stability<br>low aging                                                                         |
| <b>OCO-M50AA</b>                | 4.096 MHz to 20 MHz | $\pm 5 \times 10^{-10}$   | $\pm 1 \times 10^{-8}$ | 5.0 V<br>12.0 V | HCMOS sine wave | 51x51x19<br>51x51x25 | high stability vs. temperature<br>low aging<br>low phase noise                                                                                  |
| <b>OCO-M50AB</b>                | 5 MHz to 40 MHz     | $\pm 2 \times 10^{-10}$   | $\pm 2 \times 10^{-8}$ | 5.0 V<br>12.0 V | HCMOS sine wave | 51x51x10<br>51x51x19 | low profile, high accuracy<br>high stability, low aging<br>very low phase noise                                                                 |
| <b>OCO-M50B</b>                 | 5 MHz to 10 MHz     | $\pm 5 \times 10^{-9}$    | $\pm 3 \times 10^{-8}$ | 12.0 V          | sine wave       | 51x51x25             | excellent short term stability of<br>< $5 \times 10^{-13}$ per 1 s<br>low power consumption<br>extremely low phase noise                        |
| <b>OCO-M50A</b>                 | 90 MHz to 100 MHz   | $\pm 1 \times 10^{-9}$    | $\pm 3 \times 10^{-8}$ | 12.0 V          | sine wave       | 51x51x16<br>51x51x19 | high frequency, high stability<br>low phase noise < -165 dBc/Hz<br>designed for VSAT                                                            |
| <b>OCO-M50C</b>                 | 48 MHz to 700 MHz   | $\pm 5 \times 10^{-8}$    | $\pm 3 \times 10^{-7}$ | 12.0 V          | sine wave       | 51x51x12.7           | high frequency, high stability<br>low phase noise < -165 dBc/Hz<br>designed for VSAT<br>available with SMA connectors                           |
| <b>OCO-M50AD</b><br>Double oven | 5 MHz & 10 MHz      | $\pm 5 \times 10^{-11}$   | $\pm 5 \times 10^{-9}$ | 12 V            | sine wave       | 51x51x38             | ultra high stability double oven<br>10 years over all stability of<br>< $\pm 3 \times 10^{-8}$<br>for 3G telecom system<br>rubidium replacement |

### Specification example for OCO-M50AB 10.00 MHz

|                                        |                         |  |
|----------------------------------------|-------------------------|--|
| frequency stability from -10 to +70 °C | $\pm 5 \times 10^{-10}$ |  |
| long term stability, aging per year    | $\pm 2 \times 10^{-8}$  |  |
| short term stability, Allan deviation  | $5 \times 10^{-12}$     |  |
| frequency deviation vs. load change    | $\pm 5 \times 10^{-10}$ |  |
| frequency deviation vs. supply change  | $\pm 5 \times 10^{-10}$ |  |
| current consumption @ +25 °C           | < 200 mA                |  |
| frequency pulling (adjustment)         | $\pm 4 \times 10^{-7}$  |  |
| output sine wave                       | > 300 mV                |  |
| output load                            | 50 $\Omega$             |  |
| harmonic suppression                   | > 30 dBc                |  |
| supply voltage                         | +12 V                   |  |

### Environmental test

|           |                                                                               |                                 |
|-----------|-------------------------------------------------------------------------------|---------------------------------|
| vibration | vibration: 10 g; 10 Hz up to 500 Hz and down to 10 Hz; all 3 axes, 4.5 h/axis |                                 |
| shock     | single shock of 100 g during 3 ms $\pm 1$ ms                                  | (3 shocks each, 6 directions)   |
|           | multiple shock of 40 g during 5 ms $\pm 1$ ms                                 | (400 shocks each, 6 directions) |
| humidity  | @ +35 °C, 98 %                                                                |                                 |



### Package Size (bottom view)

|                |                 |                |
|----------------|-----------------|----------------|
| <p>OCO-M14</p> | <p>OCO-SM14</p> | <p>OCO-M20</p> |
| <p>OCO-SM</p>  | <p>OCO-M25</p>  | <p>OCO-M36</p> |
| <p>OCO-M40</p> | <p>OCO-M50</p>  | <p>OCO-M60</p> |

| Required specification for quotation request |                        | Units    | Example                                                                                                                                                                                                                                                                                             |
|----------------------------------------------|------------------------|----------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Type                                         |                        |          | OCO-SMH                                                                                                                                                                                                                                                                                             |
| nominal frequency                            |                        | MHz      | 16.3840 MHz                                                                                                                                                                                                                                                                                         |
| frequency stability vs. temperature range    |                        | ppm      | $\pm 5 \times 10^{-9}$                                                                                                                                                                                                                                                                              |
| operating temperature range                  |                        | °C       | -20 ~ +70 °C                                                                                                                                                                                                                                                                                        |
| aging per year or per day                    |                        | V        | $\pm 3 \times 10^{-8}$ per year                                                                                                                                                                                                                                                                     |
| output signal                                | sine wave, HCMOS / TTL |          | HCMOS                                                                                                                                                                                                                                                                                               |
| output load                                  | sine wave 50 $\Omega$  | $\Omega$ |                                                                                                                                                                                                                                                                                                     |
| HCMOS / TTL                                  | 15pF                   | pF       | 15 pF                                                                                                                                                                                                                                                                                               |
| special output load on request               |                        |          |                                                                                                                                                                                                                                                                                                     |
| supply voltage                               |                        | V        | 5.0 V                                                                                                                                                                                                                                                                                               |
| phase noise                                  |                        | dBc/Hz   | <div> <div>&lt; -130 dBc/Hz</div> <div>@</div> <div>10 Hz</div> </div> <div> <div>&lt; -145 dBc/Hz</div> <div>@</div> <div>100 Hz</div> </div> <div> <div>&lt; -150 dBc/Hz</div> <div>@</div> <div>1'000 Hz</div> </div> <div> <div>&lt; -155 dBc/Hz</div> <div>@</div> <div>10'000 Hz</div> </div> |