

O-CDFEXYZXX-X-X-10MHz/100MHz Precision Ultra Low Phase Noise Dual Frequency OCXO Reference Module (DFRM)

The DFRM consists of 2 Ultra Low Phase Noise OCXO at 10 MHz and 100 MHz. The module is packaged in a very small hermetically sealed metal can (“Europack”) 36x27x25 mm. The unit at 100 MHz is phase/frequency locked to the 10 MHz one. (The module also provides capability of locking 100 MHz OCXO to the external reference 5*). Lower frequency OCXO provides for excellent frequency stability over temperature, time (aging), supply and load variations, as well as exceptionally low phase noise close to the carrier, and short-term stability (Allan Variance). 100 MHz OCXO provides for ultra low phase noise on the noise floor and high output power.

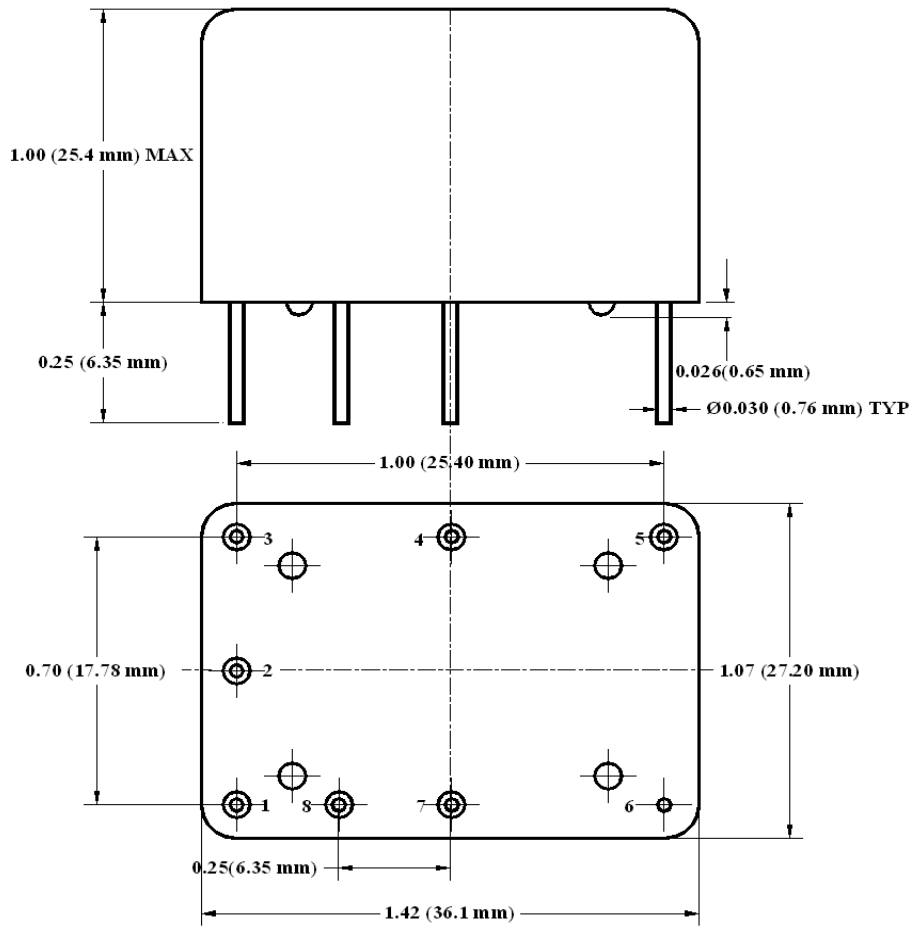
Features:

- Two frequency outputs 10.000 MHz and 100.000 MHz
- Ultra Low Phase Noise
 - -115 dBc/Hz at 1 Hz offset, -145 dBc/Hz at 10 Hz offset for 10 MHz
 - -123 dBc/Hz at 10 Hz offset, to -180 dBc/Hz at 100KHz for 100 MHz
- Excellent temperature stability from ± 2 ppb
- Low aging from 0.25 ppb/day
- Excellent short term stability $ADEV < 1E-12$ at 1 s
- Very small, hermetically sealed package

Applications:

- Instrumentation
- High Performance Synthesizers
- Radar
- Telecommunication Equipment





PINOUT:
 Pin#1 – Vc10; Pin#2 – Vref;
 Pin#3 – Vcc;
 Pin#4 – RF OUT 10 MHz
 Pin#5 – RF OUT 100 MHz
 Pin#6 – GND; Pin#7 – EXT REF IN
 Pin#8 – REF Select

Specifications:

| Parameter | Symb | Condition | Min | Typ | Max | Unit | Note |
|---------------------------------|-----------------|------------|----------|-----|-----------|------|--------------------------------------|
| Absolute Maximum Ratings | | | | | | | |
| Input Break Down Voltage | V _{cc} | 5 V supply | -0.5 | | 5.5 | V | |
| Storage temper. | T _s | | -50 | | 90 | °C | |
| Control Voltage | V _c | | -1 -1 | | 5.5 11 | V | Slope option "P" Slope option "L" |

Electrical (6)

| | | | | | | | |
|---|---|---|------------------------|-------------------------|--|------------------------|---|
| Frequency | F10 | | | 10.000 | | MHz | Pin4 |
| | F100 | | | 100.000 | | | Pin5 |
| Frequency stability | $\Delta F/F$ | vs. Temp. 4* | | ± 20 | | ppb | See chart below |
| | | vs. Supply | | 0.2 | 0.3 | ppb/10%V _{cc} | |
| Aging | | per day per year, first year second year | | 5E-10 5E-8 2E-8 | | | after 30 days 5* |
| Allan Deviation | | 0.1s 1s 10s | | 5E-13 2E-12 5E-12 | | | 5* |
| SSB Phase Noise (achieved after 10 minutes warm-up) | $\xi(\Delta f)$ | 1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz | | | -115 -145 -157 -162 -167 -168 | dBc/Hz | 10 MHz output 5* |
| | | 1Hz 10 Hz 100 Hz 1 KHz 10 KHz 100 KHz | | -125 | -90 -123 -130 -160 -172 -180 | dBc/Hz | 100 MHz output, Grade "U" 5* |
| Retrace | | After 30 minutes | | | ± 10 | ppb | 24 Hours off 3* |
| G-sensitivity | | worst direction | | | ± 1.0 | ppb/G | |
| Input Voltage | V _{cc} | | 4.75 | 5.0 | 5.25 | V | |
| Power consumption, Still air | P | steady state, 25°C steady state, -30°C start-up @ -30°C | | 2.2 4.5 5.0 | 2.5 6.0 | W | |
| Spectral Purity | | Subharmonics 10 MHz Spurious Harmonics | | -70 -60 -35 | -60 -50 -30 | dBc | At 100 MHz output At 100 MHz output Either output |
| Load | Internally AC-coupled 50 Ohm both outputs | | | | | | |
| Warm-up time | τ | to 0.1ppm accuracy | | 3 | 5 | minutes | |
| Output Waveform | Sinewave | | | | | | |
| Output Power | | | +10 | +13 | | dBm | Both Outputs |
| Control voltage | V _c | | 0 0 | | V _{ref} 10.0 | V | Slope option "P" Slope option "L" |
| Input impedance | Z _{in} | At V _c pin | 10 | | | KOhm | |
| Modulation bandwidth | F _m | | DC | | 1 | KHz | |
| Reference Voltage | V _{ref} | | | 4.5 | | V | |
| Output Impedance | | At V _{ref} pin | | 100 | | Ohm | |
| Pull range | | from nominal F | ± 0.3 ± 0.4 | ± 0.5 ± 0.6 | | ppm | Slope option "P" Slope option "L" |
| Deviation slope | | Monotonic, positive Monotonic, positive | | 0.22 0.12 | | ppm/V | Slope option "P" Slope option "L" |



| | | | | | |
|--------------------------------------|-----|--|--|-----|---|
| Setability | Vc0 | @25°C, Fnom. No internal bias for slope option "L" | Vref/2 ± 0.5 5 ±0.5 | V | Slope option "P" 3* Slope option "L" |
| External Reference | | Sine Wave | +7 | dBm | 5* |
| Reference Select function | | Floating Logic "0" (GND) | Internal Reference External reference | | Pin8 5* |

Notes:

- 2*. For recommended phase noise test, contact factory. It's assumed that phase noise test is performed under static conditions (no vibration), in still air, and care is taken for minimizing EMI.
- 3*. Longer storage time, especially at low temperatures, may affect both retrace and setability parameters. It may require few days on power for re-stabilization.
- 4*. Temperature stability is specified as ± vs. frequency at 25°C.
- 5*. It is highly recommended (in case external reference must be used) for better performance, instead of switching to external reference, using an external PLL and lock internal 10 MHz reference to external reference with very narrow (< 1 Hz) loop bandwidth. In case of using external reference, the performance will be determined by its quality.
- 6. All parameters, unless otherwise specified, are at nominal conditions, i.e.: T=25°C, Nominal Vcc & Nominal Load.

Environmental and Mechanical

| | |
|------------------------------|--|
| Operating temp. range | -30°C to 70°C MAX, Other options – see chart below |
| Mechanical Shock | Per MIL-STD-202, 30G, 11ms |
| Vibration | Per MIL-STD-202, 5G to 2000 Hz |
| Soldering Conditions | 260°C for 10s Max leads only |

Electrical Connections

| | |
|----------------|--|
| Pin Out | Pin #1-Vc; Pin#2 – Vref; Pin #3 – Vcc; Pin #4- RF OUT 10 MHz ; Pin #5- RF OUT 100 MHz; Pin# 6 – GND, Pin#7 – EXT REF; Pin#8 – REF Select |
|----------------|--|



Creating a Part Number

Q - C DF E 0 YZ XX - X - X - 10MHz/100MHz

OCXO
Conventional Power
 DFRM
 Europack

Supply Voltage

| Code | Specification |
|------|---------------|
| 0 | 5V ± 5% |

Temperature Stability 4*

| Code | Specification |
|------|---------------------|
| 17 | ±1x10 ⁻⁷ |
| 58 | ±5x10 ⁻⁸ |
| 28 | ±2x10 ⁻⁸ |
| 18 | ±1x10 ⁻⁸ |
| YZ | ±Yx10 ^{-Z} |

Temperature Range

| Code | In 5°C steps 8* |
|---------------|-----------------------------------|
| First letter | Lowest temperature from A = -40°C |
| Second letter | Highest temperature to W = 70°C |
| Examples | |
| IS | 0°C to 50°C |
| GU | -10°C to 60°C |
| EW | -20°C to 70°C |

Not all combinations available, consult factory

8*Temperature Code Table

| Letter | Temp °C | Letter | Temp °C | Letter | Temp °C | Letter | Temp °C | Letter | Temp °C | Letter | Temp °C |
|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|--------|---------|
| A | -40 | F | -15 | K | 10 | P | 35 | U | 60 | Z | 85 |
| B | -35 | G | -10 | L | 15 | Q | 40 | V | 65 | | |
| C | -30 | H | -5 | M | 20 | R | 45 | W | 70 | | |
| D | -25 | I | 0 | N | 25 | S | 50 | X | 75 | | |
| E | -20 | J | 5 | O | 30 | T | 55 | Y | 80 | | |

Environmental

| Code | Specification |
|------|---|
| L | Contains a level of lead that is in excess of RoHS directive and is not designed for reflow |
| R | RoHS compliant, not designed for reflow |

Deviation slope

| Code | Specification |
|------|---------------------|
| P | Positive, 0 to Vref |
| L | Positive, 0 to 10 V |



Grade "U" Phase Noise

