

CFPO5



Miniature SC cut OCXO (CFPO5A) and a miniature AT cut OCXO (CFPO5B)

The lowest cost highly stable oscillator for telecom applications. Total stability down to less than 5.0×10^{-8} year all causes. Frequency range from 5MHz to 40MHz. 3.3V, 5V & 12V supply.



Product description

The CFPO5 series of oscillators are designed with direct heating on a single board. They are optimized designs for Stratum 3E & 3 levels.

Applications

- Basestation
- Communications
- Other

Features

- Option for AT-cut crystal or SC crystal
- Small size
- Standard frequencies: 10, 12.8, 13, 20, 26, 40MHz

Specifications

1.0 SPECIFICATION REFERENCES

| Line | Parameter | Test Condition |
|------|------------------------|--|
| 1.1 | Model description | CFPO5 |
| 1.2 | RoHS compliant | Yes. Part numbers with suffix 'LF' |
| 1.3 | Package size available | 36.0mm x 26.5mm. 2 heights: 19.0mm (package 36) and 12.7mm (package 36B) |

2.0 FREQUENCY CHARACTERISTICS

| Line | Parameter | Test Condition | Value | Unit |
|------|--------------------------------------|--|-----------|------|
| 2.1 | Frequency range | Refer to note 1 | 5 to 40 | MHz |
| 2.2 | Frequency stability over temperature | See part number builder for frequency stabilities vs temperature range and associated order codes | | ±ppb |
| 2.3 | Temperature range | | -10 to 70 | °C |
| 2.4 | Supply voltage stability | Frequency stability vs supply voltage change (±5%) and load change (1 to 2 HCMOS) | 2 max | ±ppb |
| 2.5 | Load sensitivity | Frequency stability vs supply voltage change (±5%) and load change (1 to 2 HCMOS) | 2 max | ±ppb |
| 2.6 | Long term stability | See part number builder for long term stability (30 days after operation) and associated order codes | | ±ppb |

3.0 POWER SUPPLY

| Line | Parameter | Test Condition | Value | Unit |
|------|-------------------|--|--------------|------|
| 3.1 | Supply voltage | Standard supply voltage (optional: 3.3V or 12V) | 4.75 to 5.25 | V |
| 3.2 | Power consumption | Warm-up | 5 max | W |
| 3.3 | Power consumption | 25°C (calm air) | 1.8 max | W |
| 3.4 | Warm-up time | ±0.05ppm after 5 minutes (typical with SC-cut crystal) | | |

4.0 CONTROL VOLTAGE

| Line | Parameter | Test Condition | Value | Unit |
|------|-----------------------|---|--------|------|
| 4.1 | Control voltage range | Min 0. Max Vref | | V |
| 4.2 | Frequency tuning | See part number builder for frequency adjustment and associated order codes | | ppm |
| 4.3 | Linearity | | 10 max | % |

5.0 OSCILLATOR OUTPUT-HCMOS

| Line | Parameter | Test Condition | Value | Unit |
|------|-----------------|---|-------|------|
| 5.1 | Output waveform | HCMOS (Option: sinewave≥3dBm on 50Ω load) | | dBm |

6.0 PHASE NOISE

| Line | Parameter | Test Condition | Value | Unit |
|------|---|---|-------|--------|
| 6.1 | SSB phase noise power density at 1Hz offset | Typical values for a 10MHz oscillator at 25°C | -97 | dBc/Hz |
| 6.2 | SSB phase noise power density at 10Hz offset | Typical values for a 10MHz oscillator at 25°C | -127 | dBc/Hz |
| 6.3 | SSB phase noise power density at 100Hz offset | Typical values for a 10MHz oscillator at 25°C | -147 | dBc/Hz |
| 6.4 | SSB phase noise power density at 1kHz offset | Typical values for a 10MHz oscillator at 25°C | -153 | dBc/Hz |
| 6.5 | SSB phase noise power density at 10kHz offset | Typical values for a 10MHz oscillator at 25°C | -155 | dBc/Hz |

7.0 OTHER FEATURES

| Line | Parameter | Test Condition | Value | Unit |
|------|-------------------------|-------------------------|---------|------|
| 7.1 | Reference voltage, Vref | with 3.3V supply = 2.8V | | |
| 7.2 | Reference voltage, Vref | with 5.0V supply = 4.0V | | |
| 7.3 | Reference voltage, Vref | with 12V supply = 5.0V | | |
| 7.4 | Harmonic distortion | Sub-harmonics at 10MHz | -90 max | dBc |
| 7.5 | Harmonic distortion | Non-harmonics at 10MHz | -90 max | dBc |

8.0 ENVIRONMENTAL INFORMATION

| Line | Parameter | Test Condition |
|------|---------------------|---|
| 8.1 | Shock | Half sine 50g 11ms / 3 per direction, IEC 68-2-27 test Ea. / severity 50A |
| 8.2 | Vibration | Vibration - 10g / 10 - 500Hz, IEC 68-2-06, test Fc. / severity 500 / 10 |
| 8.3 | Storage Temperature | -55°C to 90°C |

9.0 MARKING

| Line | Parameter | Test Condition |
|------|-----------|--|
| 9.1 | Type | Printed label on can (See marking diagram) |
| 9.2 | Line 1 | RAKON or customer logo |

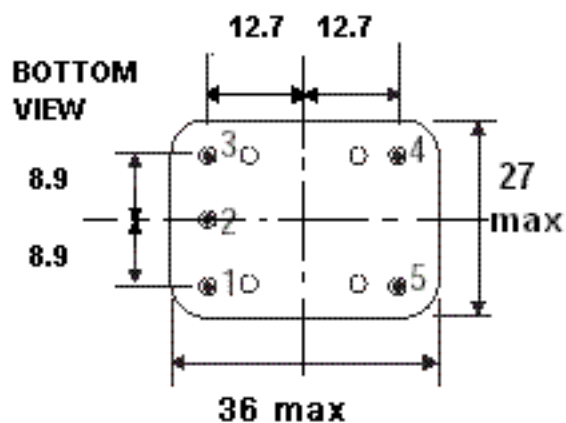
10.0 MANUFACTURING INFORMATION

| Line | Parameter | Test Condition |
|------|-----------------------|--|
| 10.1 | Reflow shift | No reflow soldering. Hand and wave soldering only |
| 10.2 | Packaging description | Parts supplied in carton boxes, protected by foam (12 or 24 parts per box) |

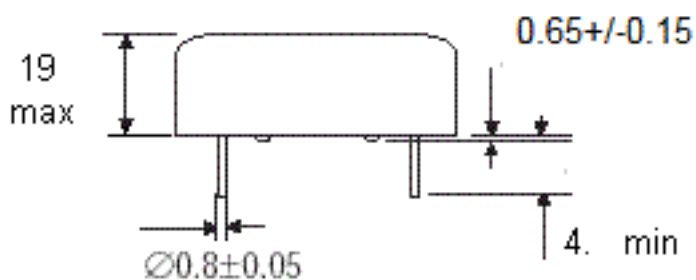
11.0 NOTES

| Line | Parameter | Test Condition |
|------|-----------|---|
| 11.1 | 1 | Standard frequencies available: 10, 12.8, 13, 20, 26, 40MHz |

Outline in mm - (scale 1:2) - Package 36

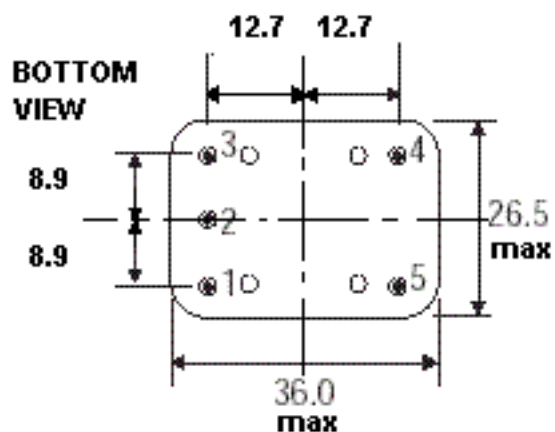


| Pin | Function |
|-----|------------------------------------|
| 1 | Input frequency control |
| 2 | Reference voltage |
| 3 | Input supply (+) |
| 4 | Output signal |
| 5 | Mechanical ground and (-) supply |

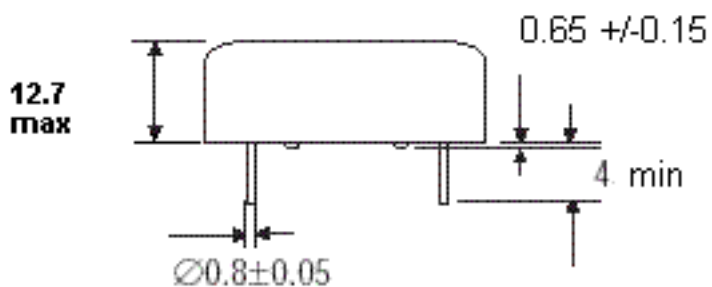


All tolerances $\pm 0.2\text{mm}$

Outline in mm - (scale 1:2) - Package 36B



| Pin | Function |
|-----|----------------------------------|
| 1 | Input frequency control |
| 2 | Output reference voltage |
| 3 | Input supply (+) |
| 4 | Output signal |
| 5 | Mechanical ground and (-) supply |



All tolerances ± 0.2 mm

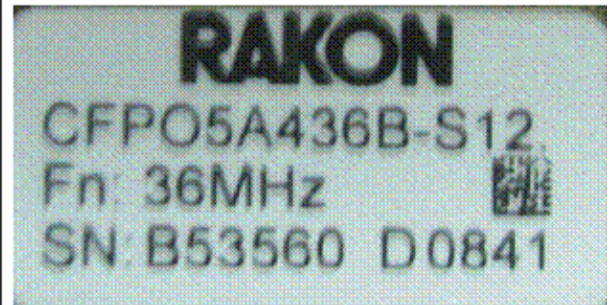
Line 1: RAKON or Customer's logo

Line 2: RAKON or Customer's part number

Line 3: Nominal Frequency (F0) in MHz

Line 4: Serial number (1 letter & 5 numbers)

Line 4: Date Code (4 digits for year and week)



| Operating temperature range | Stability within temperature range pk to pk | Long term stability (after 30 days operation) | | | | Frequency adjustment from 0V to V ref (pk-pk) | Standard package Type | Model Number | Supply options |
|-----------------------------|---|---|--------------------------|----------------------------|--------------------------|--|-----------------------|--------------|-----------------|
| | | Per day | Per Month | Per Year | For 10 Years | | | | |
| -10°C to 70°C | $\leq 3 \text{ E-9}$ | $\leq \pm 1 \text{ E-10}$ | $\leq \pm 3 \text{ E-9}$ | $\leq \pm 2 \text{ E-8}$ | $\leq \pm 1 \text{ E-7}$ | $\geq 7\text{E-7}$ | 36 | CFPO-5 A1 | 3.3V / 5V / 12V |
| | $\leq 6 \text{ E-9}$ | $\leq \pm 3 \text{ E-10}$ | $\leq \pm 1 \text{ E-8}$ | $\leq \pm 3 \text{ E-8}$ | $\leq \pm 2 \text{ E-7}$ | $\geq 7\text{E-7}$ | 36B | CFPO-5 A2 | 3.3V / 5V / 12V |
| | $\leq 1 \text{ E-8}$ | $\leq \pm 5 \text{ E-10}$ | $\leq \pm 2 \text{ E-8}$ | $\leq \pm 1 \text{ E-7}$ | $\leq \pm 5 \text{ E-7}$ | $\geq 2\text{E-6}$ | 36B | CFPO-5 A3 | 3.3V / 5V / 12V |
| | $\leq 2 \text{ E-8}$ | $\leq \pm 1 \text{ E-9}$ | $\leq \pm 3 \text{ E-8}$ | $\leq \pm 1.5 \text{ E-7}$ | $\leq \pm 1 \text{ E-6}$ | $\geq 2\text{E-6}$ | 36B | CFPO-5 A4 | 3.3V / 5V / 12V |
| -10°C to 70°C | $\leq 5 \text{ E-8}$ | $\leq \pm 1 \text{ E-9}$ | $\leq \pm 3 \text{ E-8}$ | $\leq \pm 1.5 \text{ E-7}$ | $\leq \pm 1 \text{ E-6}$ | $\geq 2\text{E-6}$ | 36B | CFPO-5 B1 | 3.3V / 5V / 12V |
| | $\leq 1 \text{ E-7}$ | $\leq \pm 2 \text{ E-9}$ | $\leq \pm 6 \text{ E-8}$ | $\leq \pm 3 \text{ E-7}$ | $\leq \pm 2 \text{ E-6}$ | $\geq 4\text{E-6}$ | 36B | CFPO-5 B2 | 3.3V / 5V / 12V |

Ordering Example

