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| Specification | AXPLO10 | Rev.: 3 | Date: 2021-11-10 |
|----------------------|----------------|---------|------------------|

**Oscillator type: Ultra-Low Noise Phase-Locked 10 MHz OCXO (PLOCXO)
for Clean-up of 10 MHz input reference signal**

| Parameter | min. | typ. | max. | Unit | Condition |
|---|-----------------|------|------|------|-------------------------|
| Nominal output frequency f_{OUT} | 10.000 | | | MHz | (Note 2) |
| Frequency stability (free running) | | | | | |
| frequency tolerance at delivery | | ±50 | ±100 | ppb | |
| vs. operating temperature range | | | ±10 | ppb | |
| vs. supply voltage variation (pushing) | | | ±2 | ppb | $V_s \pm 5\%$ |
| vs. load change (pulling) | | | ±2 | ppb | $R_L \pm 5\%$ |
| Long term (aging) per day | | ±0.1 | ±1 | ppb | after 30 days operation |
| Long term (aging) per year | | ±30 | ±50 | ppb | after 30 days operation |
| Reference input | | | | | |
| Input frequency f_{REF} | 10.000 | | | MHz | (Note 3) |
| Frequency accuracy | | | ±0.5 | ppm | |
| Signal waveform | Sine wave | | | | |
| Input level | 0 | | +13 | dBm | |
| Input impedance | 50 | | | Ω | |
| RF output | | | | | |
| Signal waveform | Sine wave | | | | |
| Load R_L | 50 | | | Ω | ±5% |
| Output level | +10 | +14 | | dBm | |
| Harmonics | | | -30 | dBc | |
| Spurious | | | -80 | dBc | Including PLL products |
| Phase noise (Note 4) | See table 1 & 2 | | | | Option 1 |
| Short-term Stability (ADEV) | See figure 2 | | | | |
| PLL Parameters (Note 4) | | | | | |
| Loop frequency f_{Loop} | 0.2 | | | Hz | |
| Channel spacing f_{Ch} | 100 | | | kHz | |
| Lock time | 10 | | | s | |
| Lock detect (LD) output | | 0 | 1.5 | V | Out of lock |
| | 3.5 | 5 | | V | Locked |
| Supply voltage V_s (Note 5) | 11.4 | 12.0 | 12.6 | V | |
| Current consumption (warm-up) | | | 450 | mA | |
| Current consumption (steady state) | | | 200 | mA | @ +25°C |
| Operating temperature range | -10 | | +60 | °C | |
| Enclosure (see drawing) (LxWxH) | 54x40x19 | | | mm | h = 2.0 |
| Weight | | | 60 | g | |
| Packing | Palette | | | | |

Notes:

1. Terminology and test conditions are according to IEC60679-1 and MIL-PRF-55310, unless otherwise stated
2. Other output frequency on request with $f_{OUT} = f_{REF} \cdot M$ or $f_{OUT} = f_{REF} \cdot M/N$
3. Other input frequency on request
4. Designed to guarantee phase noise clean-up above 1 Hz offset frequencies.
PLL performance can be tailored to specific application. Please consult factory.
5. Other supply voltage on request

Absolute Maximum Ratings

| Parameter | min. | max. | Unit | Condition |
|-----------------------|------|--------------|------|--------------|
| Supply Voltage V_s | -0.5 | $V_s + 10\%$ | V | V_s to GND |
| Reference Input Level | - | +15 | dBm | |
| Storage Temperature | -55 | +105 | °C | |

Phase Noise – Option 1:

| Offset | 10 MHz | | Unit |
|----------|--------|------|--------|
| | LN | ULN | |
| 1 Hz | -105 | -110 | dBc/Hz |
| 10 Hz | -135 | -140 | dBc/Hz |
| 100 Hz | -150 | -158 | dBc/Hz |
| 1 kHz | -155 | -165 | dBc/Hz |
| 10 kHz | -160 | -170 | dBc/Hz |
| ≥100 kHz | -160 | -170 | dBc/Hz |

Table 1 – Maximum values free-running

Note: Phase noise performance at 1 Hz offset in locked state depends on input reference, while phase noise ≥5 Hz is independent of reference noise. See table 2 for phase noise vs. reference performance. Please consult factory for your specific application.

Phase Noise vs. Reference Performance at 1 Hz

| Offset | Reference Phase Noise | AXPLO10-ULN Phase Noise | Unit |
|--------|-----------------------|-------------------------|--------|
| 1 Hz | 60 | -83 | dBc/Hz |
| | 70 | -93 | dBc/Hz |
| | 80 | -103 | dBc/Hz |
| | 85 | -106 | dBc/Hz |
| | 90 | -108 | dBc/Hz |
| | < -95 | -110 | dBc/Hz |

Table 2 – Output vs. input phase noise at 1 Hz offset

Ordering Code

| Model | Option 1 [Phase noise] | Revision | Frequency [MHz] |
|---------|------------------------|----------|-----------------|
| AXPLO10 | Table 1 | Rev.3 | 10.000 |

Example: AXPLO10-LN_Rev.3 – 10.000 MHz

Typical Phase Performance – Option 1 “ULN”

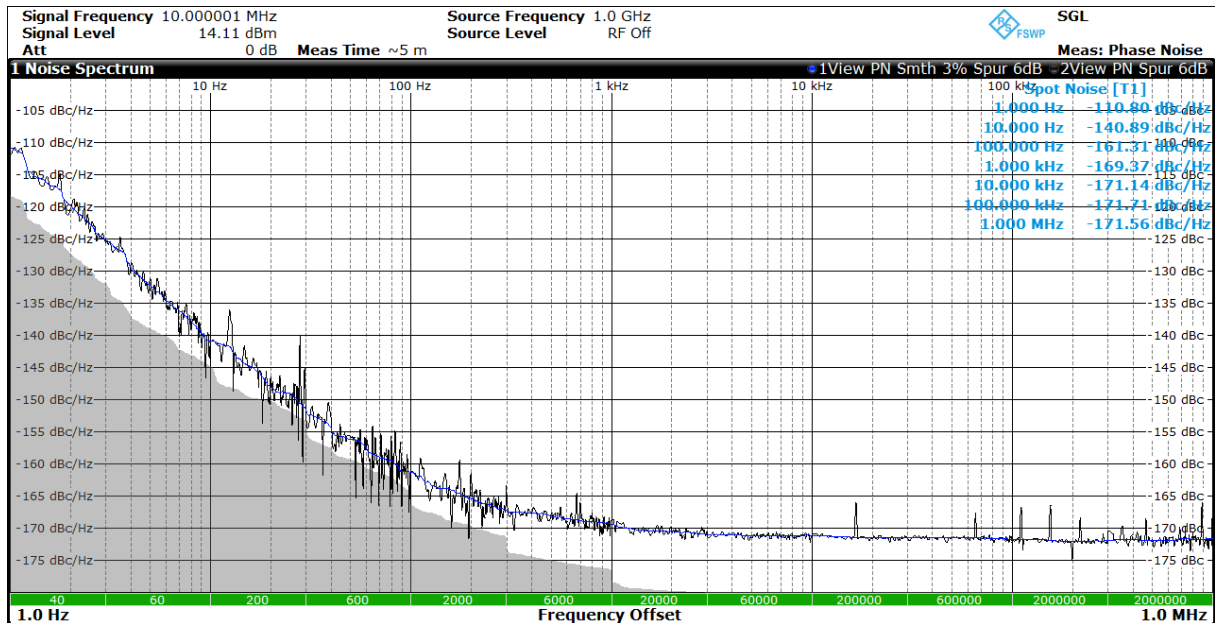


Figure 1 – Typical phase noise performance free-running or locked to reference with ≤ 95 dBc/Hz at 1 Hz

Typical Stability Performance (ADEV) – Option 1 “ULN”

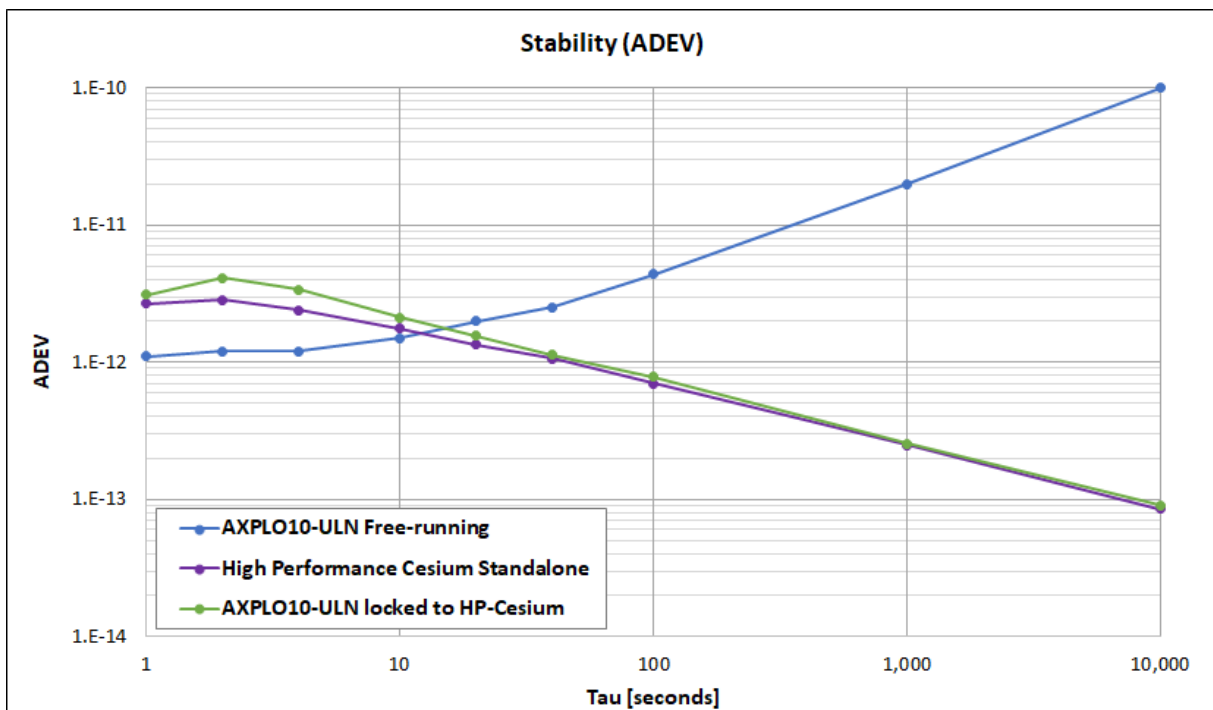
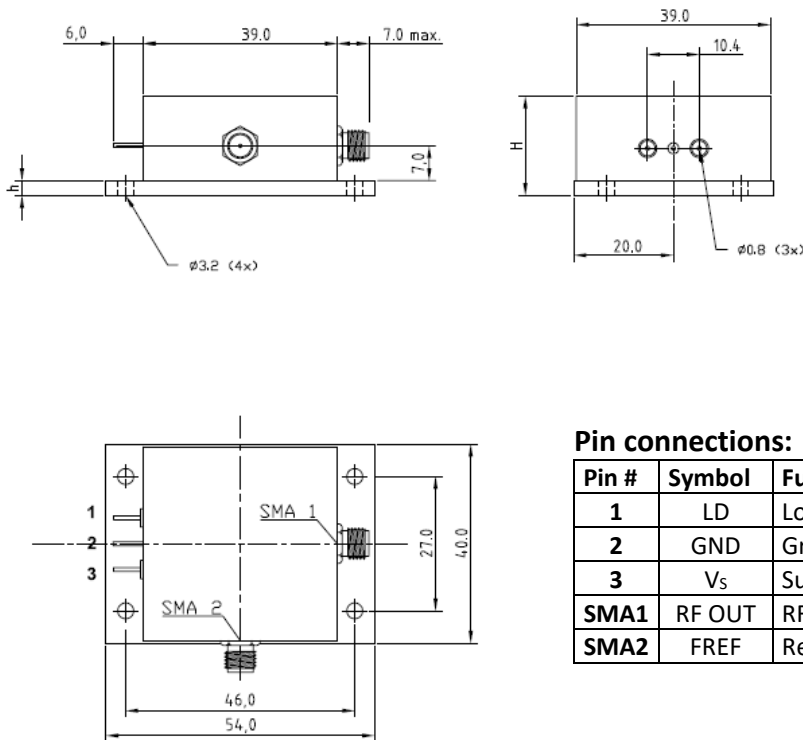
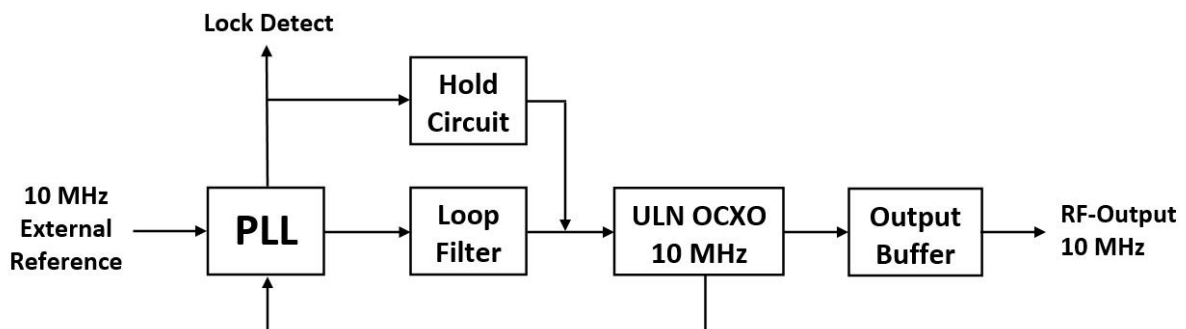


Figure 2 – Typical ADEV performance free-running & locked to High Performance Cesium

Enclosure drawing



Block diagram & Functional description



- (1) Ultra-Low Noise OCXO is locked to external reference. Low frequency loop filter guarantees phase noise clean-up for offset frequencies above 1 Hz.
- (2) In free-running mode, the hold circuit sets the OCXO tuning voltage close to the nominal frequency
- (3) The high output level guarantees best performance, when used with **AXDA9000** Low Noise Frequency Distribution Amplifier

Handling and Testing

| Parameter | Procedure | | Source |
|-------------------------------|---|-----|---------------|
| Handling and Testing | Application Note AXAN-011 | | www.axtal.com |
| Processing | Application Note AXAN-012 | | www.axtal.com |
| Parameter | Procedure | | Condition |
| Electrostatic discharge (ESD) | | | |
| THD devices | IEC60749-26 | HBM | 2000 V |
| SMD devices | IEC60749-27 | MM | 200 V |
| Washable | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |
| RoHS- Compliant | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No | | |

Environmental conditions

| Test | IEC 60068 Part ... | IEC 60679-1 Clause | MIL-STD-202G Method | MIL-STD-810F Method | MIL-PRF-55310D Clause | Test conditions (IEC) |
|---|--------------------|--------------------|---------------------|---------------------|-----------------------|--|
| Sealing tests (if applicable) | 2-17 | 5.6.2 | 112E | | 3.6.1.2 | Gross leak: Test Qc, Fine leak: Test Qk |
| Solderability Resistance to soldering heat | 2-20 2-58 | 5.6.3 | 208H 210F | | 3.6.52 3.6.48 | Test Ta Method 1 Test Td ₁ Method 2 Test Td ₂ Method 2 |
| Shock | 2-27 | 5.6.8 | 213B | 516.4 | 3.6.40 | Test Ea, 3 x per axes 100g, 6 ms half-sine pulse |
| Vibration, sinusoidal | 2-6 | 5.6.7.1 | 201A 204D | 516.4-4 | 3.6.38.1 3.6.38.2 | Test Fc, 30 min per axes, 10 Hz - 55 Hz 0,75mm; 55 Hz - 2 kHz, 10g |
| Vibration, random | 2-64 | 5.6.7.3 | 214A | 514.5 | 3.6.38.3 3.6.38.4 | Test Fdb |
| Endurance tests - ageing - extended aging | | 5.7.1 5.7.2 | 108A | | 4.8.35 | 30 days @ 85°C, OCXO @25°C 1000h, 2000h, 8000h @85°C |

Other environmental conditions on request

Data sheet is for information purposes only and may be subject to modifications or may be discontinued without notice.

Revision History

| Rev. | Drawing | Date [dd.mm.yyyy] | Remarks | Author | Checked |
|------|---------|-------------------|--|--------|---------|
| 1 | D0 | 29.01.2011 | First issue | BN | BN |
| 1 | D1 | 01.10.2012 | Minor editorial changes | BN | BN |
| 2 | D0 | 20.06.2014 | Various parameters updated, environmental conditions updated, editorial changes | HH | HH |
| 3 | D0 | 05.02.2019 | Design update (various parameters updated), Phase noise options added | HH | HH |
| 3 | D1 | 02.04.2019 | Channel spacing corrected | HH | HH |
| 3 | D2 | 10.11.2021 | Various information/data for ADEV and Phase noise added. Editorial changes. | HH | ME |