

|                      |                   |         |                  |
|----------------------|-------------------|---------|------------------|
| <b>Specification</b> | <b>AXLE7050LG</b> | Rev.: 1 | Date: 2019-02-15 |
|----------------------|-------------------|---------|------------------|

**Oscillator type: High Stability SMD (VC)TCXO with Low G-Sensitivity in 7x5 mm package**

| Parameter                              | min.   | typ.       | max.         | Unit   | Condition                          |
|--|--|------------|--------------|--------|------------------------------------|
| <b>Frequency range</b>                 | 5  |            | 100          | MHz    |                                    |
| <b>Frequency stability</b>             |  |            |              |        |                                    |
| Initial tolerance @ +25°C (Note 2)     |  |            | ±1           | ppm    | @ V <sub>C</sub> = 1.5V            |
| vs. operating temperature range        | ±0.05 to ±2.0<br>Options 5 & 6<br>See tables 2~4 |            |              | ppm    |                                    |
| vs. supply voltage variation (pushing) |  |            | ±0.1         | ppm    | V <sub>S</sub> ±5 %                |
| vs. load change (pulling)              |  |            | ±0.1         | ppm    | Load ±5 %                          |
| Long term (aging) 1 <sup>st</sup> year |  |            | ±1           | ppm    | @ +40°C                            |
| Long term (aging) 10 years             |  |            | ±3.5         | ppm    | @ +40°C                            |
| <b>Frequency adjustment range</b>      |  |            |              |        |                                    |
| Electronic Frequency Control (EFC)     | ±5   |            | ±10          | ppm    | Option 2 = "V"                     |
| EFC voltage V <sub>C</sub>             | 0.5  | 1.5        | 2.5          | V      |                                    |
| EFC slope (Δf / ΔV <sub>C</sub> )      | Positive   |            |              |        |                                    |
| EFC input impedance                    | 100  |            |              | kΩ     |                                    |
| <b>RF output</b>                       |  |            |              |        |                                    |
| Signal waveform                        | Clipped Sine Wave<br>HCMOS                       |            |              |        | Option 4 = "C"<br>Option 4 = "H"   |
| Load                                   | 10 kΩ    10 pF<br>15 pF                          |            |              |        | Option 4 = "C"<br>Option 4 = "H"   |
| Amplitude (peak-peak)                  | 0.8  |            |              | V      | Option 4 = "C"                     |
| VOL                                    |  |            | 0.4          | V      | Option 4 = "H"                     |
| VOH                                    | 2.4  |            |              | V      |                                    |
| Duty cycle                             | 45   |            | 55           | %      |                                    |
| Rise/fall time                         |  |            | 5            | ns     |                                    |
| Phase noise                            | Consult factory<br>Typical values see table 5    |            |              |        |                                    |
| G-Sensitivity (Note 3)                 | See table 1                                      |            |              |        | Option 1                           |
| <b>Supply voltage V<sub>S</sub></b>    | 3.15<br>4.75                                     | 3.3<br>5.0 | 3.45<br>5.25 | V<br>V | Option 3 = "33"<br>Option 3 = "50" |
| <b>Current consumption</b>             |  |            | 10           | mA     |                                    |
| <b>Enclosure (see drawing) (LxWxH)</b> | 7.1x5.1x1.85                                     |            |              | mm     |                                    |
| <b>Weight</b>                          |  |            | 3            | g      |                                    |
| <b>Packing</b>                         | Tape & Reel                                      |            |              |        | IEC 60286-3                        |

**Notes:**

1. Terminology and test conditions are according to IEC60679-1 and MIL-PRF-55310, unless otherwise stated
2. Tolerance before reflow soldering
3. Measured with flat random vibration profile (0.01 g<sup>2</sup>/Hz, 20 Hz ~ 2000 Hz)
4. All combinations of options might not be available. Please consult factory

**Absolute Maximum Ratings**

| Parameter                      | min. | max.                 | Unit | Condition             |
|--------------------------------|------|----------------------|------|-----------------------|
| Supply Voltage V <sub>S</sub>  | -0.5 | V <sub>S</sub> + 10% | V    | V <sub>S</sub> to GND |
| Control Voltage V <sub>C</sub> | -0.5 | 6                    | V    | V <sub>C</sub> to GND |
| Storage Temperature            | -55  | +105                 | °C   |                       |

**G-Sensitivity:**

| Option 1 | G-Sensitivity worst axis | Unit  |
|----------|--------------------------|-------|
| A        | 0.8                      | ppb/g |
| B        | 0.5                      | ppb/g |
| C        | 0.4                      | ppb/g |
| D        | 0.3                      | ppb/g |
| E        | 0.25                     | ppb/g |

**Table 1**
**Frequency stability vs. temperature**

| Option 5 | Stability* [ppm] |
|----------|------------------|
| 005      | ±0.05            |
| 01       | ±0.1             |
| 02       | ±0.2             |
| 05       | ±0.5             |
| 10       | ±1.0             |
| 15       | ±1.5             |
| 20       | ±2.0             |

**Table 2**

| Lower Temperature |        | Upper Temperature |        |
|-------------------|--------|-------------------|--------|
| Option 6          | T [°C] | Option 6          | T [°C] |
| 0                 | 0      | A                 | +50    |
| 1                 | -10    | B                 | +60    |
| 2                 | -20    | C                 | +70    |
| 3                 | -30    | D                 | +75    |
| 4                 | -40    | E                 | +80    |
| 5                 | -50    | F                 | +85    |
| 6                 | -55    | G                 | +90    |
|                   |        | H                 | +95    |

**Table 3**

Note: \*Stability referred to  $(f_{\max}+f_{\min})/2$

| Temperature range [°C] | Frequency stability [Option 5] |    |    |    |    |     |
|------------------------|--------------------------------|----|----|----|----|-----|
|                        | 005                            | 01 | 02 | 05 | 10 | >10 |
| -20 ~ +70              | O                              | X  | X  | X  | X  | X   |
| -40 ~ +85              | -                              | O  | X  | X  | X  | X   |
| -50 ~ +90              | -                              | -  | X  | X  | X  | X   |
| -55 ~ +95              | -                              | -  | -  | X  | X  | X   |

**Table 4 "Availability": X = available, O = available on request, - not available**
**Ordering Code**

| Model      | Option 1 [G-Sensitivity] | Option 2 [EFC] | Option 3 [Supply Voltage] | Option 4 [RF output] | Option 5 [Stability] |
|------------|--------------------------|----------------|---------------------------|----------------------|----------------------|
| AXLE7050LG | Table 1                  | _ or "V"       | 33 or 50                  | C or H               | Table 2              |

| Option 6 [Temperature range] | Revision | Frequency [MHz] |
|------------------------------|----------|-----------------|
| Table 3                      | Rev.1    | 10.000          |

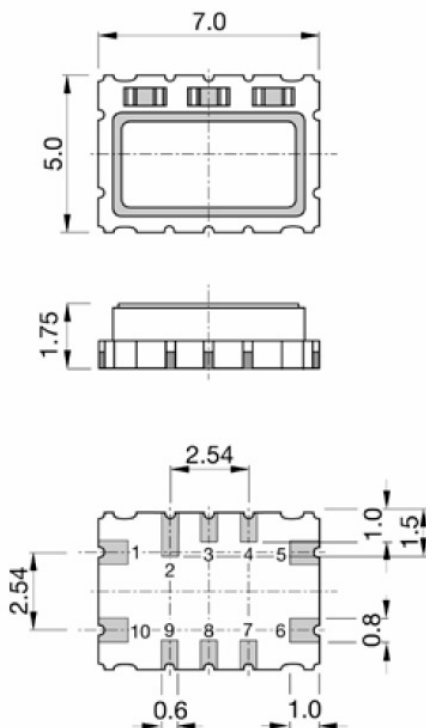
Example: AXLE7050LG-B-V-50-C-05-4F\_Rev.1 – 10.000 MHz

## Typical Phase Noise

| Offset    | 10 MHz | 20 MHz | 30 MHz | 40 MHz | 50 MHz | Unit   |
|-----------|--------|--------|--------|--------|--------|--------|
| @ 10 Hz   | -102   | -95    | -87    | -85    | -85    | dBc/Hz |
| @ 100 Hz  | -130   | -125   | -116   | -114   | -110   | dBc/Hz |
| @ 1 kHz   | -150   | -145   | -140   | -137   | -135   | dBc/Hz |
| @ 10 kHz  | -155   | -155   | -150   | -148   | -146   | dBc/Hz |
| @ 100 kHz | -157   | -157   | -154   | -152   | -152   | dBc/Hz |

Table 5: Typical phase noise (Please consult factory for specific requirements)

## Enclosure drawing



### Pin connections:

| Pin # | Symbol         | Function              |
|-------|----------------|-----------------------|
| 1     | V <sub>c</sub> | Control Voltage (EFC) |
| 2~4   | D.N.C.         | Do Not Connect        |
| 5     | GND            | Ground                |
| 6     | RF OUT         | RF Output             |
| 7~9   | D.N.C.         | Do Not Connect        |
| 10    | V <sub>s</sub> | Supply Voltage        |

**Notes:** - Pin 2 indicates correct TCXO orientation (top side may appear differently)

- For optimal vibration performance PCB footprint shall provide pads for all pins (leave D.N.C. pins floating)

## 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 |     |               |
| Reflow Profile                | ≤260°C max. 10 sec  |     | J-STD-020     |
| Moisture Sensitivity Level    | Level 1 (Unlimited)   |     | J-STD-020     |

### 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,<br>Fine leak: Test Qk   |
| Solderability<br>Resistance to soldering heat   | 2-20<br>2-58       | 5.6.3              | 208H<br>210F        |                     | 3.6.52<br>3.6.48      | Test Ta Method 1<br>Test Td <sub>1</sub> Method 2<br>Test Td <sub>2</sub> Method 2 |
| Shock*  | 2-27               | 5.6.8              | 213B                | 516.4               | 3.6.40                | Test Ea, 3 x per axes 100g,<br>6 ms half-sine pulse                                |
| Vibration, sinusoidal*                          | 2-6                | 5.6.7.1            | 201A<br>204D        | 516.4-4             | 3.6.38.1<br>3.6.38.2  | Test Fc, 30 min per axes,<br>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<br>3.6.38.4  | Test Fdb   |
| Endurance tests<br>- ageing<br>- extended aging |                    | 5.7.1<br>5.7.2     | 108A                |                     | 4.8.35                | 30 days @ 85°C, OCXO @25°C<br>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<br>[dd.mm.yyyy] | Remarks     | Author | Checked |
|------|---------|----------------------|-------------|--------|---------|
| 1    | D0      | 15.02.2019           | First issue | HH     | HH      |