

# 10MHz Low Noise OCXO

## NJ-10M-6800 series

### NJ-10M-6800 Series in 25.4x22mm SMD package

NJ-10M-6800 series is a 10.000 MHz high performance (VC)OCXO with low phase noise(LPN). It has excellent temperature versus frequency stability with many available options. The part comes in a small SMD package which makes it suitable for reflow soldering during pick and place assembly



RoHS Compliant Standard

#### FEATURES

- **Low Phase Noise**
- Small SMD Package
- Tight Frequency Stability
- Low Power Consumption
- Fast Warm-up Time
- Electrical Frequency Tuning Input
- Reference Voltage Output
- RoHS-Compliant (lead-free)

#### APPLICATIONS

- Instrument Reference
- Microwave Communication
- Clock Reference for Microwave Signal Source
- Test & Measurement
- Telecom Systems
- Radar Systems

#### ELECTRICAL SPECIFICATIONS

**Test conditions: VDC = +12 V; VCO = +5 V; at +25 ± 3°C unless otherwise identified**

##### 1. OUTPUT (PIN = "R.F. OUTPUT")

|      | Parameter        | Min.      | Typ. | Max. | Unit | Test Condition                                          |
|------|------------------|-----------|------|------|------|---------------------------------------------------------|
| 1.1. | Frequency (Fo)   | 10.000000 |      |      | MHz  |                                                         |
| 1.2. | Initial Accuracy | -0.1      |      | +0.1 | ppm  | @ +25 ±1°C<br>after turn on power 60 minutes<br>Vco=+5V |
| 1.3. | Waveform         | Sine wave |      |      |      |                                                         |
| 1.4. | Level            | +8        | +10  | +12  | dBm  |                                                         |
| 1.5. | Load             |           | 50   |      | Ω    |                                                         |
| 1.6. | Harmonics        |           |      | -30  | dBc  |                                                         |
| 1.7. | Spurious         |           |      | -80  | dBc  | 10Hz to 1MHz from carrier                               |

## 2. FREQUENCY STABILITY

|      | Parameter          | Min.                           | Typ.     | Max.     | Unit   | Test Condition                          |                                         |  |
|------|--------------------|--------------------------------|----------|----------|--------|-----------------------------------------|-----------------------------------------|--|
| 2.1. | Ambient            | ±5, ±10, ±20, ±30, ±50, ±100   |          |          | ppb    | referenced to 25°C                      | Refer to Table 1 : Ordering Information |  |
|      |                    | -20°C ~ +70°C<br>-40°C ~ +85°C |          |          | °C     |                                         |                                         |  |
| 2.2. | Aging              |                                |          |          |        | after 30 days of continuous operation.  |                                         |  |
|      | Daily              | -0.5                           |          | +0.5     | ppb    |                                         |                                         |  |
|      | Yearly             | -50                            |          | +50      | ppb    |                                         |                                         |  |
|      | 10 Years           | -0.3                           |          | +0.3     | ppm    |                                         |                                         |  |
| 2.3. | Voltage            | -1                             |          | +1       | ppb    | ±5% change                              |                                         |  |
| 2.4. | Short term         |                                | 0.002    |          | ppb    | root Allan variance for τ=1 sec         |                                         |  |
| 2.5. | Load               | -1                             |          | +1       | ppb    | ±5% change                              |                                         |  |
| 2.6. | Warm-up            | -50                            |          | +50      | ppb    | in 5 minutes @ +25 ±1°C                 | referenced to 1 hour                    |  |
| 2.7. | Phase Noise (Max.) | Option A                       | Option B | Option C |        | Refer to Table 1 : Ordering Information |                                         |  |
|      |                    | -105                           | -110     | -115     | dBc/Hz | @ 1Hz                                   |                                         |  |
|      |                    | -135                           | -140     | -142     | dBc/Hz | @ 10Hz                                  |                                         |  |
|      |                    | -155                           | -155     | -155     | dBc/Hz | @ 100Hz                                 |                                         |  |
|      |                    | -165                           | -165     | -165     | dBc/Hz | @ 1KHz                                  |                                         |  |
|      |                    | -170                           | -170     | -170     | dBc/Hz | @ 10KHz                                 |                                         |  |
|      |                    | -170                           | -170     | -170     | dBc/Hz | @ 100KHz                                |                                         |  |
|      |                    | -170                           | -170     | -170     | dBc/Hz | @ 1MHz                                  |                                         |  |

## 3. ELECTRICAL FREQUENCY ADJUSTMENT (PIN = "VCO INPUT")

|      | Parameter       | Min.     | Typ. | Max. | Unit | Test Condition                                    |  |
|------|-----------------|----------|------|------|------|---------------------------------------------------|--|
| 3.1. | Tuning Range    | ±0.4*    |      |      | ppm  | Referenced to frequency at nominal Center Voltage |  |
| 3.2. | Control Voltage | 0.5      |      | +9.5 | V    |                                                   |  |
| 3.3. | Slope           | Positive |      |      |      |                                                   |  |
| 3.4. | Center Voltage  |          | +5.0 |      | V    |                                                   |  |
| 3.5. | Linearity       | -10      |      | +10  | %    |                                                   |  |

\* Sufficient to adjust the oscillator to nominal frequency for 10 years. Some unit will have ±0.7ppm tuning range.

## 4. INPUT POWER (PIN = "+VDC")

|      | Parameter      | Min.  | Typ. | Max.  | Unit | Test Condition                   |                                            |
|------|----------------|-------|------|-------|------|----------------------------------|--------------------------------------------|
| 4.1. | Voltage        | +11.4 | +12  | +12.6 | V    |                                  |                                            |
| 4.2. | Current        |       |      |       |      |                                  |                                            |
|      | Steady State   |       |      | 2.0   | W    | @ +25°C, operating -20°C ~ +70°C | Refer to Table 1 :<br>Ordering Information |
|      |                |       |      | 2.3   |      | @ +25°C, operating -40°C ~ +85°C |                                            |
|      | During Warm-Up |       |      | 400   | mA   | @ +25°C, operating -20°C ~ +70°C |                                            |
|      |                |       |      | 500   |      | @ +25°C, operating -40°C ~ +85°C |                                            |

## 5. REFERENCE VOLTAGE (PIN = "REFERENCE VOLTAGE")

|      | Parameter         | Min.  | Typ. | Max.  | Units | Test Condition |  |
|------|-------------------|-------|------|-------|-------|----------------|--|
| 5.1. | Voltage           | +9.25 | +9.5 | +9.75 | V     |                |  |
| 5.2. | Source Resistance |       |      | 100   | Ohm   |                |  |
| 5.3. | Load Impedance    | 10    |      |       | Kohm  |                |  |

## 6. ENVIRONMENTAL

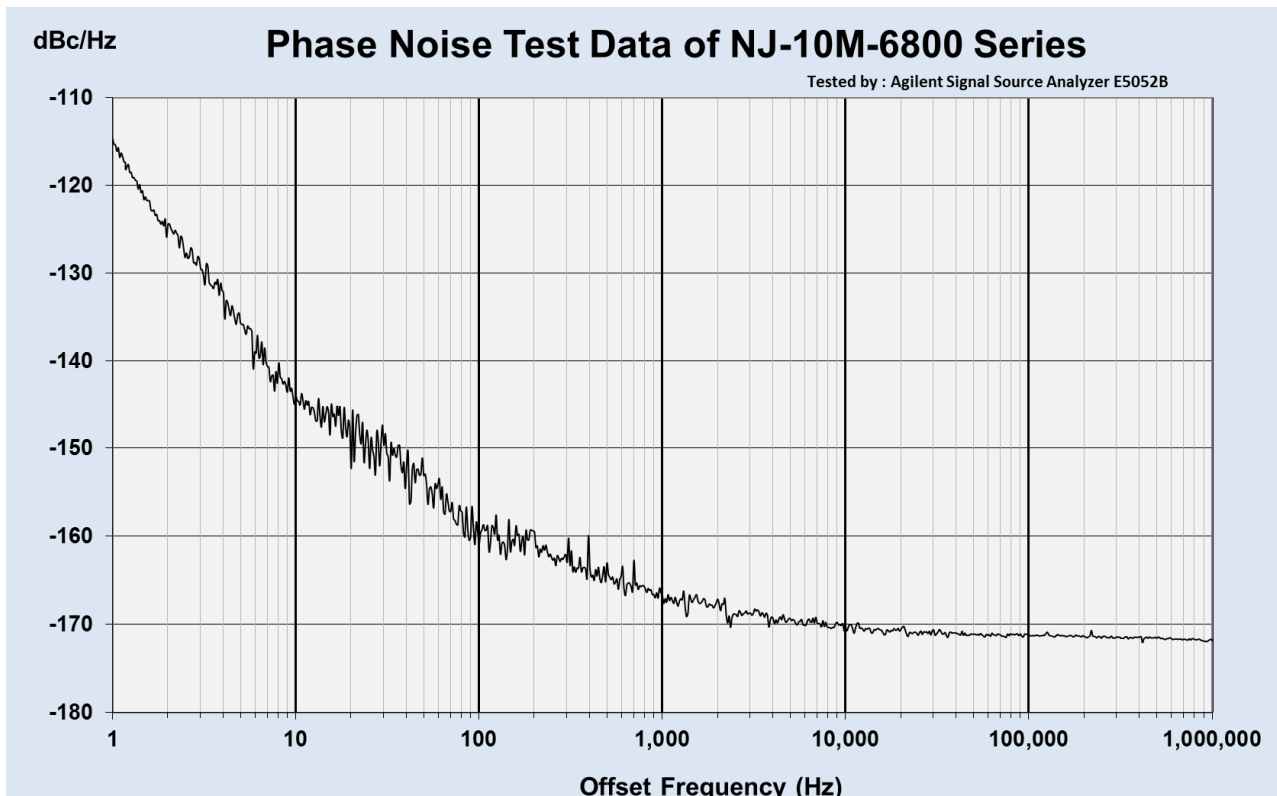
|      | Parameter                 | Reference Std.                               | Test Condition                            |
|------|---------------------------|----------------------------------------------|-------------------------------------------|
| 6.1. | Operable Temperature      | -45°C to +90°C                               | Note 1                                    |
| 6.2. | Storage Temperature       | -50°C to +95°C                               |                                           |
| 6.3. | Humidity                  | MIL-STD-202, Method 103<br>Test Condition A  | 95% RH @ +40°C, non-condensing, 240 hours |
| 6.4. | Vibration (non-operating) | MIL-STD-202, Method 201                      | 0.06" Total p-p, 10 to 55 Hz              |
| 6.5. | Shock (non-operating)     | MIL-STD-202, Method 213,<br>Test Condition J | 30g, 11ms, half-sine                      |

**Note 1 :** Output maintained over this temperature range. Other requirements of this specification may not be met when operating outside the temperature range in 2.1.

**Table 1 : ORDERING INFORMATION**

| Ambient<br>Temp. (°C) | Option   | Phase Noise Option |             |             |
|-----------------------|----------|--------------------|-------------|-------------|
|                       |          | A                  | B           | C           |
| -20°C ~ +70°C         | ±30 ppb  | NJ-10M-6815        | NJ-10M-6816 | NJ-10M-6817 |
|                       | ±20 ppb  | NJ-10M-6825        | NJ-10M-6826 | NJ-10M-6827 |
|                       | ±10 ppb  | NJ-10M-6835        | NJ-10M-6836 | NJ-10M-6837 |
|                       | ±5 ppb   | NJ-10M-6845        | NJ-10M-6846 | NJ-10M-6847 |
| -40°C ~ +85°C         | ±100 ppb | NJ-10M-6865        | NJ-10M-6866 | -           |
|                       | ±50 ppb  | NJ-10M-6875        | NJ-10M-6876 | -           |
|                       | ±30 ppb  | NJ-10M-6885        | NJ-10M-6886 | -           |
|                       | ±20 ppb  | NJ-10M-6895        | NJ-10M-6896 | -           |

## Phase Noise Test Data



## OUTLINE DRAWING

