

Description

- The IQXT-316-9 uses ASIC technology and is designed to meet the short and medium term stability requirements of packet network synchronisation for Small Cells.
- Model IQXT-316-9
- Model Issue number 1

Frequency Parameters

- Frequency 30.720MHz
- Frequency Tolerance ± 1.00 ppm
- Tolerance Condition @ 25°C $\pm 1^\circ\text{C}$ & VC=1.5V
- Frequency Stability Max ± 0.25 ppm
- Operating Temperature Range -5.00 to 85.00°C
- In-service Short-term Frequency Stability (over any 24-hr timeslot @ fixed supply voltage and load):
 - 50 to 70°C: ± 80 ppb max
 - 15 to 85°C: ± 100 ppb max
 - 5 to 85°C: ± 250 ppb max
- Ageing:
 - ± 20 ppb max/day
 - ± 200 ppb max/month
 - ± 1 ppm max/year
 - ± 2 ppm max over 3yrs
- Temperature Rate of Change (maximum rate of change of temperature condition for guaranteed stability specifications): $1^\circ\text{C}/\text{min}$ max
- Acceleration Sensitivity (gamma vector of all 3 axes from 30 to 1500Hz): Typically 2ppb/G max
- Supply Voltage Variation ($\pm 2\%$ change @ 25°C, measurement referenced to frequency observed @ nominal Vs): ± 10 ppb typ
- Load Variation ($\pm 2\%$ change @ 25°C, measurement referenced to frequency observed @ nominal load): ± 10 ppb typ
- Reflow Variation (pre to post reflow ΔF , measured after 1hr recovery @ 25°C): ± 1 ppm max
- Note: The characteristics of the oscillator may be temporarily affected by the processes of assembly and soldering. The in-service short term frequency stability specification applies after 48hrs continuous operation and after the first excursion over the temperature range. Nominal conditions apply unless otherwise stated.

Electrical Parameters

- Supply Voltage 3.3V $\pm 5\%$
- Current Draw 4.500mA
- Absolute Maximum Ratings:
 - Supply Voltage (Vs): -0.5V to 7V
 - Control Voltage (VC): -0.5V to 9V
 - All other inputs: -0.5V to Vs+0.5V
 - Power Dissipation: 100mW max
 - Junction Temperature: 150°C max
- Note: Operating beyond these limits may result in change or permanent damage to the oscillator.


Outline (mm)

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Frequency Adjustment

- Pulling $\pm 7\text{ppm min to } \pm 12\text{ppm max}$
- Control Voltage $1.5\text{V } \pm 1.0\text{V}$
- Input Impedance $100\text{k}\Omega \text{ min}$
- Linearity (deviation from straight line curve fit): $1\% \text{ max}$
- Frequency Tuning Slope: Positive
- Modulation Bandwidth: 1Hz min
- Note: Pulling referenced to frequency @ $V_C=1.5\text{V}$

Output Details

- Output Compatibility Clipped Sine
- Drive Capability $10\text{k}\Omega//10\text{pF}$
- Output Voltage Level: $0.8\text{V pk-pk min, } 1.1\text{V pk-pk typ}$
- Start Up Time (amplitude within 90% of specified output level): 15ms max
- Output: DC coupled
- Temperature Sensor Output (pad 3):
 $V_{\text{temp}} (@ 25^\circ\text{C}): 1.76\text{V typ}$
Slope Option: $-2.1\text{mV}/^\circ\text{C typ}$
Resistive Load: $100\text{k}\Omega \text{ min}$
Capacitive Load: 30pF max
Output Impedance (@ 25°C): $1\text{k}\Omega \text{ typ}$
Sensor Linearity: $1.5\% \text{ typ}$

Output Control

- Tri-State Mode:
Logic '0' ($20\%V_s \text{ max}$) to pad 6 disables the oscillator output, the output goes to a high impedance state.
Logic '1' ($60\%V_s \text{ min}$) or no connection to pad 6 enables the oscillator output.
Note: The tri-state control (enable) input pad has an internal $100\text{k}\Omega$ pull up resistor which allows it to be left unconnected if not used. When in tri-state mode, the output stage is disabled, but the oscillator and compensation circuit are still active (Current Consumption: 2mA typ).
- Output Enable Time: $100\mu\text{s max}$

Noise Parameters

- Phase Noise @ 25°C (typ):
 $-65\text{dBc}/\text{Hz @ } 1\text{Hz}$
 $-95\text{dBc}/\text{Hz @ } 10\text{Hz}$
 $-125\text{dBc}/\text{Hz @ } 100\text{Hz}$
 $-143\text{dBc}/\text{Hz @ } 1\text{kHz}$
 $-149\text{dBc}/\text{Hz @ } 10\text{kHz}$
 $-152\text{dBc}/\text{Hz @ } 100\text{kHz}$
 $-155\text{dBc}/\text{Hz @ } 1\text{MHz}$
- Phase Jitter (12kHz to 5MHz): 300fs RMS typ

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Environmental Parameters

- Low Temperature Storage: IEC 60068-2-01, Test Ab: 1000hrs @ -55°C.
- High Temperature Storage: IEC 60068-2-02, Test Bb: 1000hrs @ 150°C.
- Mechanical Shock: JESD22-B104: 1500G, 0.5ms duration, 5 pulses in each of 6 directions.
- Vibration: JESD22-B103: 20G peak acceleration for 4hrs in each of the 3 orientations, tested from 60-2000Hz, 12hrs total.
- High Temperature Operating Life (HTOL): JESD22-A108: 1008hrs @ 125°C.
- Thermal Cycling: JESD22-A104: 500 temperature cycles, -55 to 125°C.
- Solderability: JESD22-B102, Method 1, Condition E: 260°C for 5secs (preconditioning: 150°C, 16hrs).
- Resistance to Soldering Heat: IPC/JEDEC J-STD-020: 3 reflow cycles (peak temperature 260°C).
- Humidity: JESD22-A101: After 1008hrs @ 85°C ±2°C, 85% RH non-condensing (preconditioning: 3 reflow cycles @ peak temperature 260°C).
- Ageing: MIL-PRF-55310: 1008hrs @ 85°C (preconditioning: 3 reflow cycles @ peak temperature 260°C).

Manufacturing Details

- Maximum Process Temperature: 260°C (30secs max)

Compliance

- RoHS Status (2011/65/EU) Compliant
- REACH Status Compliant
- MSL Rating (JDEC-STD-033): 1

Packaging Details

- Pack Style: Reel Tape & reel in accordance with EIA-481-D
Pack Size: 500
- *Alternative packing option available*

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