

**Description**

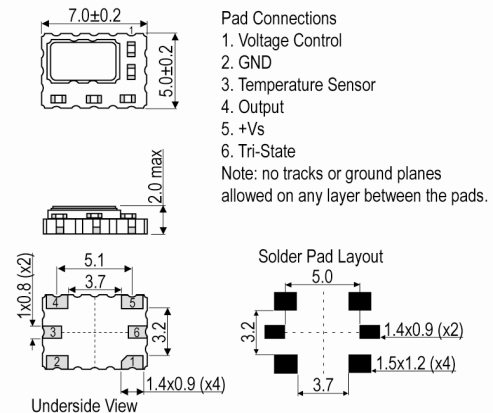
- The IQXT-316-9 uses ASIC technology and is designed to meet the short and medium term stability requirements of packet network synchronisation for Small Cells.
- Model IQXT-316-9
- Model Issue number 1

**Frequency Parameters**

- Frequency 30.720MHz
- Frequency Tolerance  $\pm 1.00$ ppm
- Tolerance Condition @ 25°C  $\pm 1^\circ\text{C}$  & VC=1.5V
- Frequency Stability Max  $\pm 0.25$ 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:  $\pm 80$ ppb max
  - 15 to 85°C:  $\pm 100$ ppb max
  - 5 to 85°C:  $\pm 250$ ppb max
- Ageing:
  - $\pm 20$ ppb max/day
  - $\pm 200$ ppb max/month
  - $\pm 1$ ppm max/year
  - $\pm 2$ 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):  $\pm 10$ ppb typ
- Load Variation ( $\pm 2\%$  change @ 25°C, measurement referenced to frequency observed @ nominal load):  $\pm 10$ ppb typ
- Reflow Variation (pre to post reflow  $\Delta F$ , measured after 1hr recovery @ 25°C):  $\pm 1$ 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:  $1\text{Hz min}$
- Note: Pulling referenced to frequency @  $V_C=1.5\text{V}$

**Output Details**

- Output Compatibility  $\text{Clipped Sine}$
- 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):  $15\text{ms max}$
- 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:  $30\text{pF max}$   
Output Impedance (@  $25^\circ\text{C}$ ):  $1\text{k}\Omega \text{ typ}$   
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:  $2\text{mA typ}$ ).
- Output Enable Time:  $100\mu\text{s max}$

**Noise Parameters**

- Phase Noise @  $25^\circ\text{C}$  (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):  $300\text{fs RMS typ}$

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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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