

**Description**

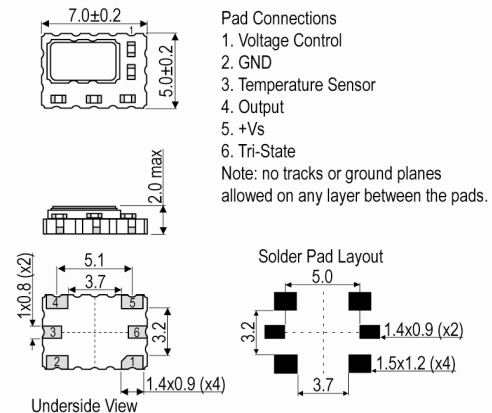
- The IQXT-316-1 uses ASIC technology and is designed to meet the short and medium term stability requirements of packet network synchronisation for Small Cells.
- Model IQXT-316-1
- Model Issue number 1

**Frequency Parameters**

- Frequency 19.20MHz
- Frequency Tolerance  $\pm 1.00\text{ppm}$
- Tolerance Condition @  $25^{\circ}\text{C} \pm 1^{\circ}\text{C}$  &  $\text{VC}=1.4\text{V}$
- Frequency Stability Max  $\pm 0.25\text{ppm}$
- Operating Temperature Range  $-5.00$  to  $85.00^{\circ}\text{C}$
- In-service Short-term Frequency Stability (over any 24-hr timeslot @ fixed supply voltage and load):
  - 50 to  $70^{\circ}\text{C}$ :  $\pm 80\text{ppb}$  max
  - 15 to  $85^{\circ}\text{C}$ :  $\pm 100\text{ppb}$  max
  - 5 to  $85^{\circ}\text{C}$ :  $\pm 250\text{ppb}$  max
- Ageing:
  - $\pm 20\text{ppb}$  max/day
  - $\pm 200\text{ppb}$  max/month
  - $\pm 1\text{ppm}$  max/year
  - $\pm 2\text{ppm}$  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
- Frequency Slope  $\Delta F/\Delta T$  (in still air):  $25\text{ppb}/^{\circ}\text{C}$  typ,  $50\text{ppb}/^{\circ}\text{C}$  max
- Acceleration Sensitivity (gamma vector of all 3 axes from 30 to  $1500\text{Hz}$ ): Typically  $2\text{ppb}/\text{G}$  max
- Supply Voltage Variation ( $\pm 2\%$  change @  $25^{\circ}\text{C}$ , measurement referenced to frequency observed @ nominal  $V_s$ ):  $\pm 10\text{ppb}$  max
- Load Variation ( $\pm 2\%$  change @  $25^{\circ}\text{C}$ , measurement referenced to frequency observed @ nominal load):  $\pm 5\text{ppb}$  max
- Reflow Variation (pre to post reflow  $\Delta F$ , measured after 1hr recovery @  $25^{\circ}\text{C}$ ):  $\pm 1\text{ppm}$  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  $2.85\text{V} \pm 5\%$
- Current Draw  $3.500\text{mA}$
- Absolute Maximum Ratings:
  - Supply Voltage ( $V_s$ ):  $-0.5\text{V}$  to  $7\text{V}$
  - Control Voltage ( $\text{VC}$ ):  $-0.5\text{V}$  to  $9\text{V}$
  - All other inputs:  $-0.5\text{V}$  to  $V_s+0.5\text{V}$
  - Power Dissipation:  $100\text{mW}$  max
  - Junction Temperature:  $150^{\circ}\text{C}$  max
  - Note: Operating beyond these limits may result in change or permanent damage to the oscillator.


**Outline (mm)**

**Sales Office Contact Details:**

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Email: [info@iqdfrequencyproducts.com](mailto:info@iqdfrequencyproducts.com)  
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**Frequency Adjustment**

- Pulling  $\pm 4.5\text{ppm min to } \pm 10\text{ppm max}$
- Control Voltage  $1.4\text{V } \pm 1.0\text{V}$
- Input Impedance  $100\text{k}\Omega \text{ min}$
- Linearity (deviation from straight line curve fit): 1% max
- Frequency Tuning Slope:  $+6\text{ppm/V typ}$
- Modulation Bandwidth: 1Hz min
- Note: Pulling referenced to frequency @  $\text{VC}=1.4\text{V}$

**Output Details**

- Output Compatibility Clipped Sine
- Drive Capability  $10\text{k}\Omega//10\text{pF}$
- Output Voltage Level: 0.8V pk-pk min, 1.1V pk-pk typ
- Start Up Time (amplitude within 90% of specified output level): 15ms max
- Output: AC coupled
- Temperature Sensor Output (pad 3):  
Vtemp (@  $25^\circ\text{C}$ ): 1.76V 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 (@  $25^\circ\text{C}$ ):  $1\text{k}\Omega \text{ typ}$   
Sensor Linearity: 1.5% typ

**Output Control**

- Tri-State Mode:  
Logic '0' (20%Vs max) to pad 6 disables the oscillator output, the output goes to a high impedance state.  
Logic '1' (60%Vs 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 @  $25^\circ\text{C}$  (typ):  
-65dBc/Hz @ 1Hz  
-98dBc/Hz @ 10Hz  
-130dBc/Hz @ 100Hz  
-145dBc/Hz @ 1kHz  
-153dBc/Hz @ 10kHz  
-157dBc/Hz @ 100kHz  
-158dBc/Hz @ 1MHz
- Phase Jitter (12kHz to 5MHz): 330fs 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: 245°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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