


**Description**

- The IQXT-270-10 Temperature Compensated Crystal Oscillator (TCXO) employs an analogue ASIC for the oscillator and a high order temperature compensation circuit in a 2.0 x 1.6mm size package.
- Model IQXT-270-10
- Model Issue number 1

**Frequency Parameters**

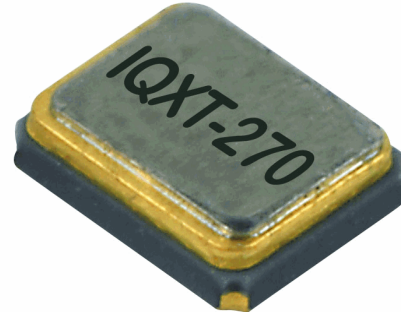
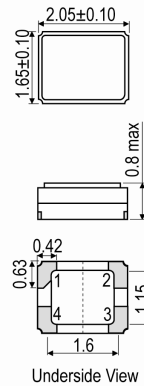
- Frequency 19.20MHz
- Frequency Tolerance  $\pm 1.00\text{ppm}$
- Frequency Stability  $\pm 0.50\text{ppm}$
- Operating Temperature Range  $-30.00$  to  $85.00^\circ\text{C}$
- Ageing  $\pm 0.7\text{ppm}$  max per year at  $25^\circ\text{C}$
- Frequency Tolerance: Offset from nominal frequency measured at  $25^\circ\text{C} \pm 2^\circ\text{C}$ .
- Reflow Shift (two consecutive reflows as per profile after 1 hour relaxation at  $25^\circ\text{C}$ ):  $\pm 1\text{ppm}$  max
- Frequency Stability: Referenced to the midpoint between minimum and maximum frequency value over the specified temperature range. Control voltage set to midpoint of control voltage (note 1).
- Frequency Slope (minimum of one frequency reading every  $2^\circ\text{C}$ , over  $-10$  to  $60^\circ\text{C}$ . Control voltage set to midpoint of control voltage, note 1):  $0.05\text{ppm}/^\circ\text{C}$  max
- Frequency drift (calculated from frequency slope with temperature varied at a maximum of  $1.92^\circ\text{C}/\text{min}$  ( $0.032^\circ\text{C}/\text{s}$ ) over  $-10^\circ\text{C}$  to  $60^\circ\text{C}$ , note 5):  $1.6\text{ppb}/\text{sec}$  max
- Frequency Slope (minimum of one frequency reading every  $2^\circ\text{C}$ , over  $-30^\circ\text{C}$  to  $-85^\circ\text{C}$ . Control voltage set to midpoint of control voltage, note 1):  $0.1\text{ppm}/^\circ\text{C}$  max
- Frequency drift (calculated from frequency slope with temperature varied at a maximum of  $0.96^\circ\text{C}/\text{min}$  ( $0.016^\circ\text{C}/\text{s}$ ) over  $-30^\circ\text{C}$  to  $85^\circ\text{C}$ , note 5):  $1.6\text{ppb}/\text{sec}$  max
- Small thermal cycle frequency slope (measured at  $0.5^\circ\text{C}$  intervals over any  $5^\circ\text{C}$  heating and  $5^\circ\text{C}$  cooling cycle, at a minimum rate of  $1^\circ\text{C}/\text{minute}$  within the operating temperature range, note 6):  $50\text{ppb}/^\circ\text{C}$  max
- Small thermal cycle hysteresis (difference in frequency measurements over any  $5^\circ\text{C}$  heating and  $5^\circ\text{C}$  cooling cycle, at a minimum rate of  $1^\circ\text{C}/\text{minute}$  within the operating temperature range):  $50\text{ppb}$  pk-pk max
- Supply Voltage Variation ( $\pm 5\%$  change at  $25^\circ\text{C}$ ):  $\pm 0.1\text{ppm}$  max
- Load Variation ( $\pm 10\%$  change at  $25^\circ\text{C}$ ):  $\pm 0.2\text{ppm}$  max

**Electrical Parameters**

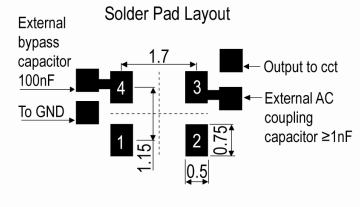
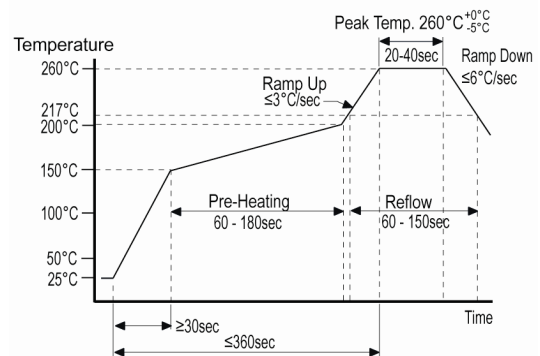
- Supply Voltage  $2.85\text{V} \pm 0.15\text{V}$
- Current Draw  $1.50\text{mA}$
- Supply Current (at  $V_s$  max - note 2)

**Frequency Adjustment**

- Pulling  $\pm 15.6\text{ppm}$  to  $\pm 24\text{ppm}$
- Control Voltage  $1.4\text{V} \pm 1.0\text{V}$
- Input Impedance  $500\text{k}\Omega$  min
- Control voltage range: the nominal control voltage value is midway between the minimum and maximum. Voltage control should not exceed the supply voltage  $+0.2\text{V}$  or GND.
- Linearity (deviation from straight line curve fit):  $10\%$  max


**Outline (mm)**

**Pad Connections**

1. Voltage Control
2. GND
3. Output
4. +Vs


**Pb-Free Reflow**

**Sales Office Contact Details:**

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**Output Details**

- Output Compatibility                      Clipped Sine
- Drive Capability                            10k $\Omega$ //10pF  $\pm$ 10%
- Output: DC coupled (note 3)
- Output Voltage Level (at Vs min - note 2): 0.8V pk-pk min

**Noise Parameters**

- Phase Noise (typ @ 25°C):
  - 64dBc/Hz @ 1Hz
  - 93dBc/Hz @ 10Hz
  - 118dBc/Hz @ 100Hz
  - 137dBc/Hz @ 1kHz
  - 149dBc/Hz @ 10kHz
  - 151dBc/Hz @ 100kHz
- Phase Noise (max @ 25°C):
  - 57dBc/Hz @ 1Hz
  - 86dBc/Hz @ 10Hz
  - 111dBc/Hz @ 100Hz
  - 133dBc/Hz @ 1kHz
  - 144dBc/Hz @ 10kHz
  - 148dBc/Hz @ 100kHz

**Environmental Parameters**

- Shock: MIL-STD-202 M213 (note 4): Half sine-wave acceleration of 3000G peak amplitude, duration 0.3ms, velocity 12.3ft/s.
- Moisture Resistance: MIL-STD-202 M106g (note 4): 1000 hours at 85°C, 85% relative humidity. Biased.
- Thermal Cycling: JESD22 Method JA-104C (note 4): 1000 temperature cycles, where each cycle consists of a 25 minutes soak time at -40°C followed by a 25 minute soak time at 85°C, with a 60 second maximum transition time between temperatures. Air to air transition.
- Vibration: JESD22-B103-B (also see note 4): 10G peak acceleration for 20 minutes 12 cycles in each of the 3 orientations, swept from 10-2000Hz.
- Storage Temperature Range: -40 to 85°C

**Manufacturing Details**

- Maximum Process Temperature: 260°C (40secs max)
- Note 1: Parts should be shielded from drafts causing unexpected thermal gradients. Temperature changes due to ambient air currents can lead to short term frequency drift.
- Note 2: Specified for the load stated in Output Details above, at 25°C.
- Note 3: External AC coupling capacitor required; 1nF or greater recommended.
- Note 4: Frequency shift of  $\pm$ 1ppm max after environmental conditions.
- Note 5: Frequency drift rate is calculated from the equation ppb/s= $^{\circ}$ C/s x ppb/ $^{\circ}$ C
- Note 6: Discard the first 0.5°C interval of each heating and cooling cycle.

**Compliance**

- RoHS Status (2011/65/EU)              Compliant
- REACH Status                                Compliant
- MSL Rating (JDEC-STD-033):          Not Applicable

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#### Packaging Details

- Pack Style: Reel      Tape & reel in accordance with EIA-481-D  
Pack Size: 4,000
- *Alternative packing option available*

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