

**Description**

- The IQXT-270-9 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-270-9
- Model Issue number 1

**Frequency Parameters**

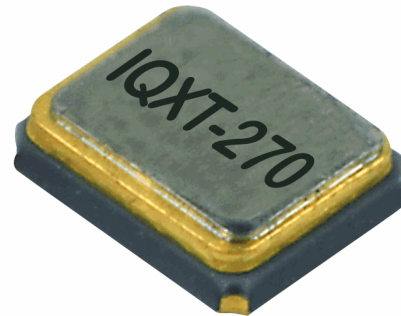
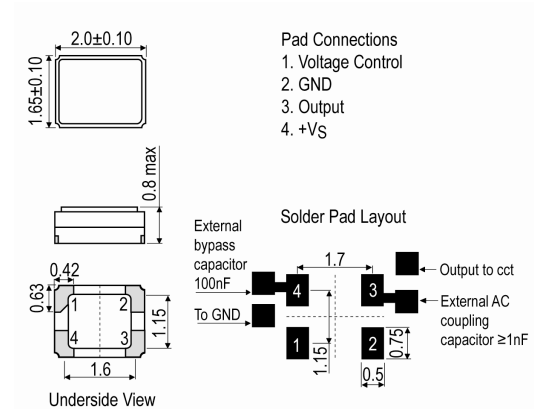
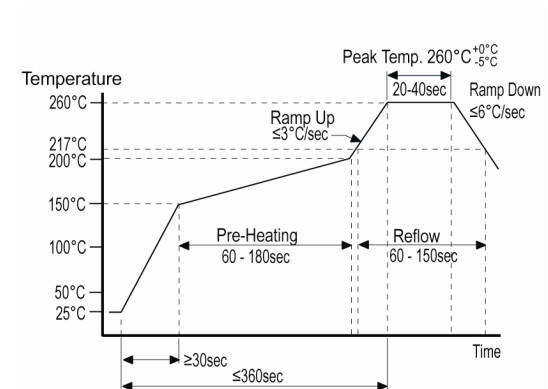
- Frequency 19.20MHz
- Frequency Tolerance  $\pm 1.00$ ppm
- Frequency Stability  $\pm 0.50$ ppm
- Operating Temperature Range -30.00 to 85.00°C
- Ageing  $\pm 1$ ppm max per year at 25°C
- Frequency Tolerance: Offset from nominal frequency measured at 25°C  $\pm 2$ °C.
- Reflow Shift (two consecutive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

**Electrical Parameters**

- Supply Voltage 1.8V  $\pm 5\%$
- Current Draw 2.00mA
- Supply Current (at Vs max - note 2)

**Frequency Adjustment**

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


**Outline (mm)**

**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: Cutt      In tape, cut from a reel  
Pack Size: 100
- *Alternative packing option available*

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