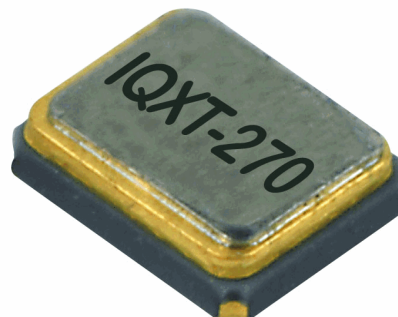


ISSUE 1; April 2016

### Description

- The IQXT-270 employs an analogue ASIC for the oscillator and a high order temperature compensation circuit in a 2.0 x 1.6mm size package. The device can be placed in power down mode through a single input pin. During standard operation, power consumption is minimised by operating down to a supply voltage of 1.8V. The IQXT-270's high stability, low power consumption, small footprint and powerful compensation method makes it a TCXO ideally suited for demanding GPS mobile applications.
- Applications:
  - GPS
  - Smartphone
  - Communications
  - Consumer
- Features:
  - Excellent phase noise performance
  - Low start up drift rate
  - Height less than 0.8mm
  - Operates at 1.8V supply
  - Power Down Mode
  - Standard temperature stability of  $\pm 0.5\text{ppm}$  over wide temperature ranges



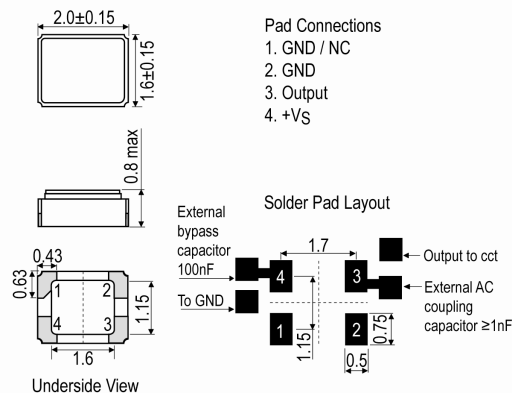
### Frequency Parameters

- Frequency: 13.0MHz to 52.0MHz
- Frequency Tolerance:  $\pm 2.00\text{ppm}$
- Frequency Stability:  $\pm 0.50\text{ppm}$  to  $\pm 2.00\text{ppm}$
- Frequency calibration + reflow: offset from nominal frequency measured at  $25^\circ\text{C} \pm 2^\circ\text{C}$ . Two consecutive reflows as per profile after 2 hours relaxation at  $25^\circ\text{C}$
- Frequency stability over temperature: 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 1 frequency reading every  $2^\circ\text{C}$ , over the operating temperature range (Note 1):  $0.05$  to  $0.1\text{ppm}/^\circ\text{C}$
- Static temperature hysteresis: frequency change after reciprocal temperature ramped over the operating range. Frequency measured before and after at  $25^\circ\text{C}$ :  $\pm 0.6\text{ppm}$  max
- Supply voltage variation ( $\pm 5\%$  change at  $25^\circ\text{C}$ ):  $\pm 0.1\text{ppm}$  max
- Load variation ( $\pm 10\%$  change, note 2):  $\pm 0.2\text{ppm}$  max
- Long term stability, frequency drift over 1 year at  $25^\circ\text{C}$ :  $\pm 1\text{ppm}$  max

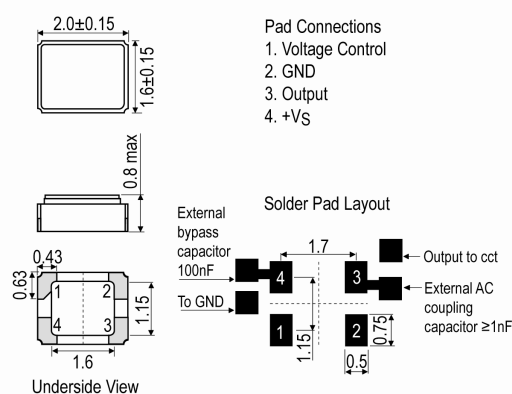
### Electrical Parameters

- Supply voltage range: 1.8 to 3.0V
- Supply current (see note 2)
- 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 the oscillator output section at  $25^\circ\text{C}$
- Note 3: External AC-Coupling capacitor required. 1nF or greater recommended.
- Note 4: Frequency shift  $\leq 1\text{ppm}$  after environmental conditions

### Outline (mm) Pad 1 GND/NC



### Outline (mm) = Pad 1 VC



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**Frequency Adjustment**

- Pulling  $\pm 6\text{ppm}$  to  $\pm 30\text{ppm}$
- Input Impedance  $500\text{k}\Omega$  min

**Operating Temperature Ranges**

- $-40$  to  $85^\circ\text{C}$

**Output Details**

- Output Compatibility Clipped Sine
- Drive Capability  $10\text{k}\Omega//10\text{pF} \pm 10\%$
- Output: DC coupled (see note 3)

**Output Control**

- 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.  
Supply voltage  $\leq 2.3\text{V}$ :  $0.3$  to  $1.5\text{V}$   
Supply voltage  $> 2.3\text{V}$ :  $0.4$  to  $2.4\text{V}$
- Linearity (deviation from straight line curve fit):  $10\%$  max
- Power Down Mode:  
Logic low ( $20\%V_s$  max) to E/D disables output.  
Logic high ( $80\%V_s$  min) to E/D enables output.
- Standby current:  $0.01\mu\text{A}$  max
- Start-Up Time (amplitude) within  $90\%$  of specified output:  $0.5\text{ms}$  max
- Start-Up Time (frequency) within  $\pm 0.5\text{ppm}$  of steady state:  $2\text{ms}$  max

**Output Levels**

- Output voltage level (at min supply voltage):  $0.8\text{V}$  min (Note 2)

**Noise Parameters**

- Phase Noise (typ @  $26\text{MHz}$ ):  
 $-65\text{dBc/Hz}$  @  $1\text{Hz}$   
 $-93\text{dBc/Hz}$  @  $10\text{Hz}$   
 $-117\text{dBc/Hz}$  @  $100\text{Hz}$   
 $-137\text{dBc/Hz}$  @  $1\text{kHz}$   
 $-149\text{dBc/Hz}$  @  $10\text{kHz}$   
 $-151\text{dBc/Hz}$  @  $100\text{kHz}$

**Environmental Parameters**

- Shock [MIL-STD-202 M213] (Note 4): Half sine-wave acceleration of  $3000\text{G}$  peak amplitude. Duration:  $0.3\text{ms}$ , Velocity:  $12.3\text{ft/s}$
- Moisture resistance [MIL-STD-202 M106g] (Note 4):  $1000$  hours at  $85^\circ\text{C}$ ,  $85\%$  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  $-40^\circ\text{C}$  followed by a  $25$  minute soak time at  $85^\circ\text{C}$ , with a  $60$  second maximum transition time between temperatures. Air to air transition.
- Vibration [JESD22-B103-B] (Note 4):  $10\text{G}$  peak acceleration for  $4$  minutes per sweep.  $4$  sweeps in each of the  $3$  orientations. Swept from  $20$ - $2000\text{Hz}$
- Storage Temperature Range:  $-40$  to  $85^\circ\text{C}$

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**Ordering Information**

- \*minimum information required
- Frequency\*
- Model\*
- Supply Voltage\*
- Pad 1 function\*
- Frequency Stability\*
- Operating Temperature Range\*

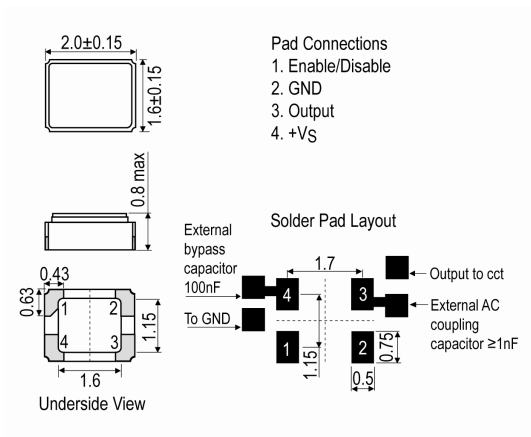
**Compliance**

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

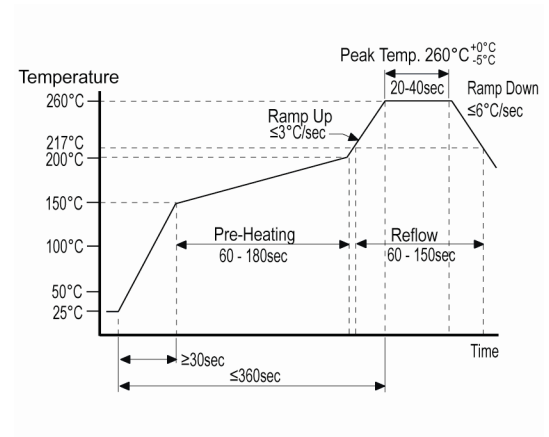
**Packaging Details**

- Pack Style: Bulk      Loose in bulk pack  
Pack Size: 1
- Pack Style: Reel      Tape & reel in accordance with EIA-481-D  
Pack Size: 4,000

**Outline (mm) = Pad 1 E/D**



**Pb-Free Reflow**



**Electrical Specification - maximum limiting values**

Frequency	Frequency Max	Temperature Range	Stability (Min)	Current Draw	Rise and Fall Time	Duty Cycle
		°C	ppm	mA	ns	%
13.0MHz	52.0MHz	-40 to 85	±0.5	2.2	-	-

*This document was correct at the time of printing; please contact your local sales office for the latest version.*

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**Chipset Approval Table**

IQD Model	Ref No.	Frequency	Chipset Type	IC Supplier	
IQXT-270-1	509430	26MHz	SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5)	CSR	
IQXT-270-2	512546	26MHz	SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5)	CSR	
IQXT-270-3	508200	16.369MHz	SirfStar 3 (SS3), SirfStar 4 (SS4), SirfStar 5 (SS5)	CSR	
IQXT-270-4	508205	19.2MHz	APQ Family, APQ8064	Qualcomm	
IQXT-270-5	508206	19.2MHz	APQ Family, APQ8064	Qualcomm	
IQXT-270-6	507869	26MHz	BCM2075, BCM2076, BCM4750, BCM4751, BCM47511, BCM4752, BCM47521, BCM4760	Broadcom	
IQXT-270-7	509764	26MHz	u-blox 6 (UBX-M6000, UBX-M6010), u-blox 7 (UBX-M7020), u-blox 8 (UBX-M8030)	uBlox	
IQXT-270-8	511891	26MHz	u-blox 6 (UBX-M6000, UBX-M6010), u-blox 7 (UBX-M7020), u-blox 8 (UBX-M8030)	uBlox	
IQXT-270-9	508222	19.2MHz	MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8227	Qualcomm	
IQXT-270-10	507867	19.2MHz	MDM Family, MDM6xxx, MDM7xxx, MDM8xxx, MDM6085, MDM6270,MDM6200, MDM6600, MDM8200A, MDM8220, MDM8215, MDM8228	Qualcomm	

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