ISSUE 1; March 2016

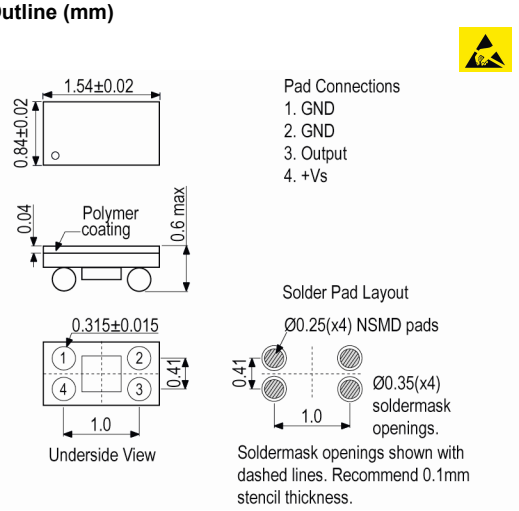
Description

- Smallest footprint chip scale package (CSP), ultra low power MEMS oscillator at 32.768kHz with CMOS output in a plastic package featuring a programmable drive strength feature to optimise specific clock applications. Factory programmable for a short lead time. Uses SiTime's MEMS First™ technology.
- APPLICATIONS:
  Mobile Phones
  Tablets
  Health and Wellness Monitors
  Fitness Watches
  Sport Video Cams
  Wireless Keypads
  Ultra-Small Notebook PC
  Pulse-per-Second (pps) Timekeeping
  RTC Reference Clock
  Battery Management Timekeeping

Frequency Parameters

- Frequency 32.768kHz
- Frequency Stability ±75.00ppm to ±250.00ppm
- Ageing ±1ppm max in 1st year @ 25°C
- Frequency Tolerance
  Measurement @ TA = 25°C, post reflow, Vs=1.5V to 3.63V: ±10ppm max
  Measurement @ TA = 25°C, post reflow with board-level underfill, Vs=1.5V to 3.63V: ±20ppm max
- Note: Frequency Stability is measured peak-to-peak. Inclusive of Frequency Tolerance @ 25°C and variations over operating temperature, supply voltage and load. Frequency Stability is specified for two operating voltage ranges. Stability progressively degrades with supply voltage below 1.5V.
- Note: Frequency Tolerance is measured peak-to-peak. Tested with an Agilent 53132A frequency counter. Due to the low operating frequency the gate time must be ≥100ms to ensure an accurate frequency measurement.

Outline (mm)



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Electrical Parameters

- Supply Voltage:
  1.2V to 3.63V @ -10°C to 70°C
  1.5V to 3.63V @ -40°C to 85°C
- Absolute Maximum Supply Voltage Rating: -0.5 to 3.63V
- Absolute Short Duration Supply Voltage (30mins max): 4.0V max
- Note: Operating beyond these limits may result in change or permanent damage to the oscillator.
- Core Operating Current:
  Measured with -
  TA=25°C, Vs=1.8V and no load: 0.90µA typ
  TA=-10°C to 70°C, Vs=3.63V max and no load: 1.3µA max
  TA=-40°C to 85°C, Vs=3.63V max and no load: 1.4µA max
- Output Stage Operating Current:
  Measured with TA=-40°C to 85°C, Vs=1.5V to 3.63V and no load): 0.065µA/Vpp typ, 0.125µA/Vpp max
- Note: Core Operating Current does not include output driver operating current or load current. To derive Total Operating Current (no load) add Core Operating Current + (0.065 µA/V) * (Output Voltage Swing).
- Power Supply Ramp (Vs ramp-up from 0 to 90%, TA=-40°C to 85°C): 100ms max
- Start Up Time @ Power Up:
  Measured with -
  TA=-40°C to 50°C, valid output: 180ms typ, 300ms max
  TA=50°C to 85°C, valid output: 450ms max
  (Note: Measured from the time Vs reaches 1.5V.)

Operating Temperature Ranges

- -10 to 70°C
- -40 to 85°C

Output Details

- Output Compatability CMOS
- Drive Capability 15pF
- Output Voltage Levels (Vs=1.5V to 3.63V):
  Output Low (VoL): 10%Vs max
  Output High (VoH): 90%Vs min
- Programmable Drive Strength: The IQMS-141 includes a programmable drive strength feature to provide a flexible tool to optimise the clock rise/fall time for specific applications.

Noise Parameters

- Period Jitter (10000 cycles):
  Measured with TA=25°C, Vs=1.5V to 3.63V: 35ns RMS typ

Environmental Parameters

- Absolute Operating Temperature (Vs=1.5V to 3.63V): 105°C max
- Absolute Short Duration Operating Temperature (30mins max, Vs=1.5V to 3.63V): 125°C max
- Junction Temperature: 150°C max
- ESD Levels:
  Human Body Model (JESD22-A114): 3000V max
  Charge Device Model (JESD22-C101): 750V max
  Machine Model (TA=25°C): 300V max
- Mechanical Shock: MIL-STD-883, Method 2002: 10000G max
- Vibration: MIL-STD-883, Method 2007: 70G max
- Latch Up Tolerance (JESD78): Compliant
- Note: Operating beyond these limits may result in change or permanent damage to the oscillator.

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Manufacturing Details

- Maximum Process Temperature: Reflow profile as per JESD22-A113D.
- Cleaning: Do not ultrasonic clean, this may cause permanent damage or long-term reliability issues to the oscillator.
- Applying board-level underfill (BLUF) to the oscillator is acceptable, but this will cause a shift in the Frequency Tolerance (as specified previously).

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: 1,000

Electrical Specification - maximum limiting values

Frequency	Temperature Range	Stability (Min)	Current (NoLoad)	Rise and Fall Time (90/10%)	Duty Cycle
	°C	ppm	mA	ns	%
32.768000kHz	-40 to 85	±100.00	-	200	48/52%
	-10 to 70	±75.00	-	200	48/52%

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