



### Features and Benefits

Low phase noise (up to -166dBc/Hz @ 100 KHz offset)  
Superb integrated phase jitter level up to 48fsec (femto-seconds)

### Typical Applications

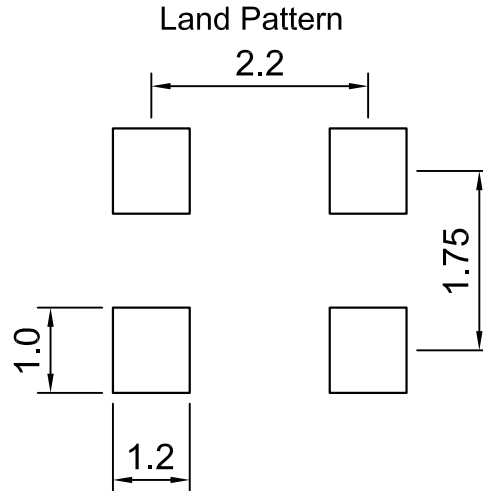
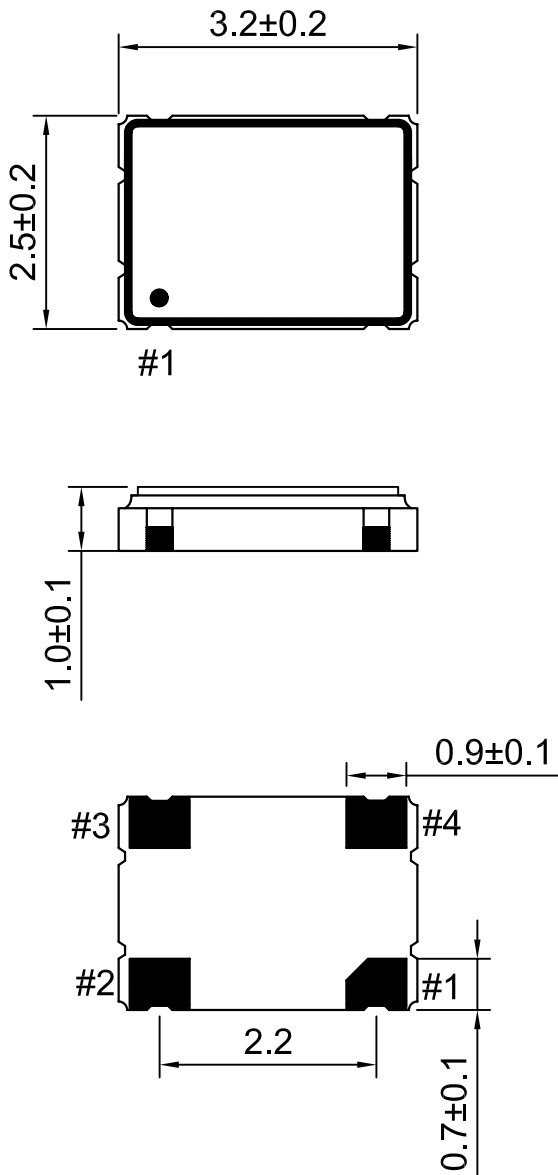
Digital-to-analog Converters (DAC's)  
High quality digital audio systems

### Description

XO3225AJSQ2 offers superb integrated phase jitter and low phase noise in a compact package suitable for high-quality digital audio systems that require extremely low jitter master clocks for high time-resolution (sample rates, conversion accuracy).

### Mechanical Drawing & Pin Connections

Drawing No: MD170036-1



### Pin Connection

| Pin | Function       |
|-----|----------------|
| #1  | Enable/Disable |
| #2  | GND            |
| #3  | Output         |
| #4  | Supply Voltage |

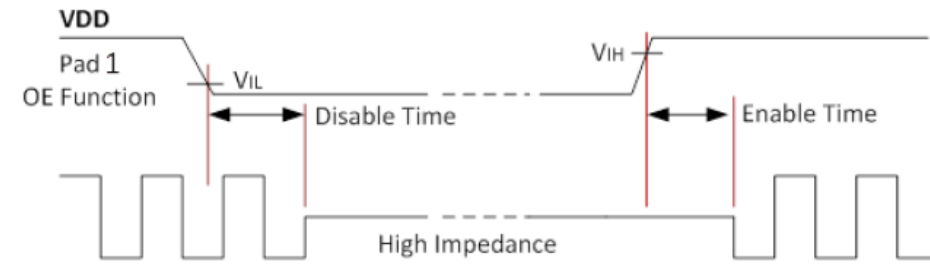
Unit in mm  
1mm = 0.0394 inches



Specifications

| Oscillator Specification        | Sym   | Condition                   | Value   |      |      | Unit | Note                    |
|---------------------------------|---|-----------------------------|---|------|------|------|-------------------------|
|                                 |   |                             | Min.  | Typ. | Max. |      |                         |
| Frequency Range                 | F   |                             | 10  |      | 50   | MHz  |                         |
| Output Waveform                 |   |                             | LVCMOS  |      |      |      |                         |
| Output Logic "High", "1"        |   | 90% of V <sub>DD</sub> min  | 2.25  |      |      | V    |                         |
| Output Logic "Low", "0"         |   | 10% of V <sub>DD</sub> max  | 0.25  |      |      | V    |                         |
| Duty Cycle                      |   | at 50% V <sub>DD</sub>      | 50  |      |      | %    | ±5%                     |
| Rise Time / Fall Time           | Tr / Tf   | 10% <-> 90% waveform        |   | 2.0  | 10.0 | ns   |                         |
| Output Load                     |   |                             | 15  |      |      | pF   |                         |
| Start-up Time                   |   |                             |   |      | 5.0  | ms   |                         |
| Tri-State Control on Pad 1      |   |                             | 0.9 of V <sub>DD</sub> minimum or no connection to enable output  |      |      |      |                         |
|                                 |   |                             | 0.1 of V <sub>DD</sub> maximum to disable output (high impedance) |      |      |      |                         |
| Output Enable Time              |   |                             |   |      | 1    | ms   |                         |
| Output Disable Time             |   |                             |   |      | 200  | ns   |                         |
| <b>Power Supply</b>             |   |                             |   |      |      |      |                         |
| Voltage                         | V <sub>DD</sub>   | ±10%                        |   | +2.5 |      | V    |                         |
| Current Consumption             |   | 25 MHz                      |   | 2.8  |      | mA   |                         |
|                                 |   | 49 MHz                      |   | 4.7  |      |      |                         |
| Supply Voltage Sensitivity      |   | At all V <sub>DD</sub> ±10% |   | ±1   |      | ppm  |                         |
| <b>Frequency Stability</b>      |   |                             |   |      |      |      |                         |
| Frequency Stability             |   | Over -40°C to +85°C         | ±25   |      | ±100 | ppm  | Refer to ordering codes |
| <b>Environmental Conditions</b> |   |                             |   |      |      |      |                         |
| Operating temperature range     | -40°C to +85°C  |                             |   |      |      |      |                         |
| Storage temperature range       | -55°C to +125°C   |                             |   |      |      |      |                         |
| Green Environment               | RoHS 3 (2015/863/EU) compliant, no exemptions, Pb (lead) free |                             |   |      |      |      |                         |
| Moisture Sensitivity Level      | Level 1 (infinite) according to IPC/JEDEC J-STD-020D.1        |                             |   |      |      |      |                         |
| Humidity                        | 85% RH, +85°C, 48 hours                                       |                             |   |      |      |      |                         |
| Fine Leak / Gross Leak          | MIL-STD-883, Method 1014, Condition A and Condition C         |                             |   |      |      |      |                         |
| Solderability                   | MIL-STD-202F method 208E                                      |                             |   |      |      |      |                         |
| Reflow                          | +260°C for 10 sec max. Two times                              |                             |   |      |      |      |                         |
| Vibration                       | MIL-STD-202F Method 204, 35G, 50 to 2000 Hz                   |                             |   |      |      |      |                         |
| Shock                           | MIL-STD-202F Method 213B, test condition E, 1000GG ½sine wave |                             |   |      |      |      |                         |
| Resistance to Solvent           | MIL-STD-202 Method 215  |                             |   |      |      |      |                         |
| Temperature Cycling             | MIL-STD-883, Method 1010                                      |                             |   |      |      |      |                         |
| ESD Rating                      | Human Body Model (HBM) 1500 V min                             |                             |   |      |      |      |                         |
| Pad Surface Finish              | Gold (0.3 µm to 1.0 µm) over nickel (1.27 µm to 8.89 µm)      |                             |   |      |      |      |                         |
| Weight                          | 0.045 grams (average)   |                             |   |      |      |      |                         |

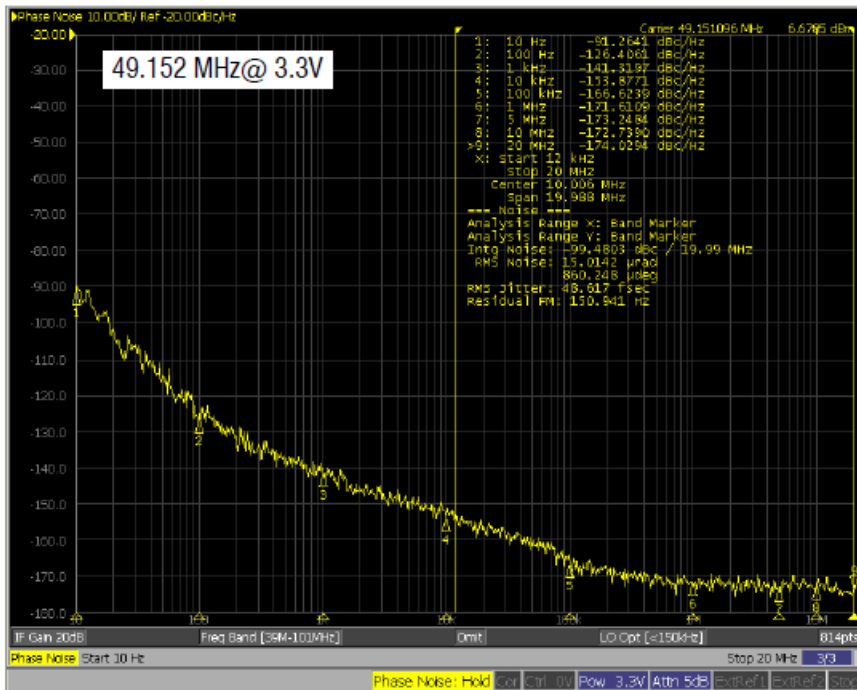
Tri-State Function on pad 1 – High Enable

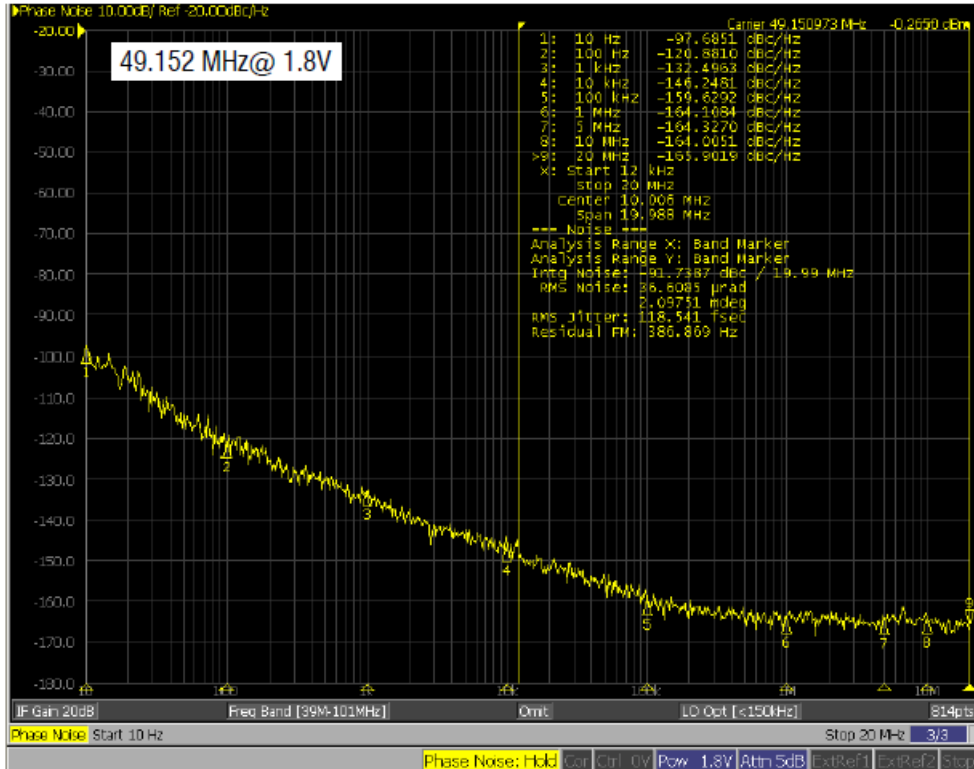




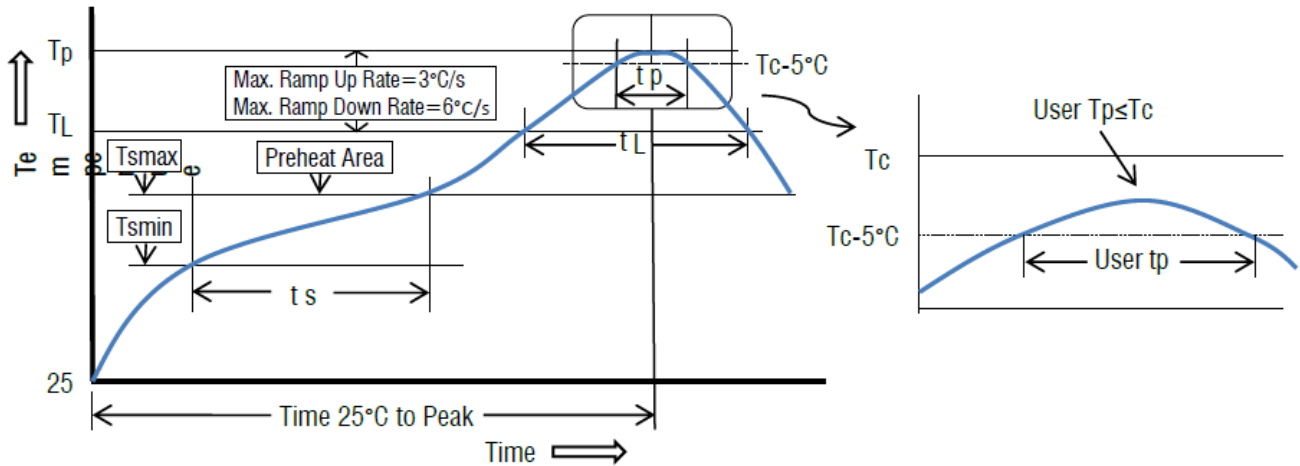
Phase Noise Plots and Phase Jitter Data (typical) +25°C

| SSB Phase Noise Data (dBc / Hz) Phase Jitter (RMS, 12 KHz ~ 20 MHz) |                      |                      |                      |                      |
|---|----------------------|----------------------|----------------------|----------------------|
| Frequency (MHz)<br>Offset   | 49.152 MHz<br>@ 1.8V | 49.152 MHz<br>@ 2.5V | 49.152 MHz<br>@ 3.3V | 25.000 MHz<br>@ 3.3V |
| 100 Hz  | -120 dBc / Hz        | -125 dBc / Hz        | -126 dBc / Hz        | -115 dBc / Hz        |
| 1 KHz   | -132 dBc / Hz        | -140 dBc / Hz        | -141 dBc / Hz        | -141 dBc / Hz        |
| 10 KHz  | -146 dBc / Hz        | -149 dBc / Hz        | -153 dBc / Hz        | -156 dBc / Hz        |
| 100 KHz   | -159 dBc / Hz        | -164 dBc / Hz        | -166 dBc / Hz        | -169 dBc / Hz        |
| 1 MHz   | -164 dBc / Hz        | -165 dBc / Hz        | -171 dBc / Hz        | -171 dBc / Hz        |
| 5 MHz   | -169 dBc / Hz        | -164 dBc / Hz        | -173 dBc / Hz        | -171 dBc / Hz        |
| 10 MHz  | -164 dBc / Hz        | -168 dBc / Hz        | -172 dBc / Hz        | -171 dBc / Hz        |
| 20 MHz  | -165 dBc / Hz        | -171 dBc / Hz        | -174 dBc / Hz        | -171 dBc / Hz        |
| Phase Jitter  | 118 fs               | 66 fs                | 48 fs                | 54 fs                |





Recommended Solder Reflow Profile (per IPC/JEDEC J-STD-020D.1)



| Profile Feature  | Sn-Pb Eutectic Assembly | Pb-free Assembly  |
|--|-------------------------|-------------------|
| Preheat / Soak   |                         |                   |
| - Temperature min. (Ts min.)   | 100°C                   | 150°C             |
| - Temperature max. (Ts max)  | 150°C                   | 200°C             |
| - Time (ts) (Ts min. to Ts max)  | 60 to 120 seconds       | 60 to 180 seconds |
| Ramp-up rate (T <sub>L</sub> to T <sub>P</sub> )                                   | 3°C / sec. max          |                   |
| Liquidous Temperature (T <sub>L</sub> )  | 183°C                   | 217°C             |
| Time (t <sub>L</sub> ) maintained above T <sub>L</sub>                             | 60 to 150 seconds       |                   |
| Peak package body temperature (T <sub>P</sub> )                                    | 235°C                   | 260°C             |
| Time (T <sub>P</sub> ) within 5°C of the classification temperature T <sub>C</sub> | 10 to 30 seconds        | 20 to 40 seconds  |
| Ramp-down rate (T <sub>P</sub> to T <sub>L</sub> )                                 | 6°C / second max        |                   |
| Time +25°C to peak temperature   | 6 minutes max           | 8 minutes max.    |

All temperatures refer to topside of the package, measured on the package body surface



### Ordering Options: Frequency Stability

| Frequency Stability (w) |                 |
|-------------------------|-----------------|
| Code                    | Stability [ppm] |
| 1                       | ±25             |
| 2                       | ±50             |
| 3                       | ±100            |

### Ordering Codes

| Model       | Frequency in MHz (up to 4 digits) | Operating Temperature vs Frequency Stability |
|-------------|-----------------------------------|--|
| XO3225AJSQ2 | xx.yyyy                           | w  |

Example:XO3225AJSQ2-30.0000-2 has the following specifications

Operating Frequency = 30.0000 MHz  
 Operating Temperature = -40°C to +85°C  
 Frequency Stability = ±50 ppm