# HF/UHF SMD TCVCXO
# SG-XA3XXXX Series

## Description

The **SG-XA3XXXX Series** of SMD temperature compensated, voltage controlled crystal oscillators (TCVCXO) provides High and Ultra High Frequency with excellent temperature stability, extremely low phase noise and jitter with variety of different output types in a small surface mount FR4 based package.

## Applications and Features

- Ultra High Frequency - up to 1GHz
- Small, Low Profile SMD Package
- Very Low Phase Jitter and Phase Noise
- Excellent Frequency Stability
- CMOS, Sine-wave, Differential PECL or LVDS outputs available
- Stratum 3 available

**Creating a Part Number**

**SG - X A3 X X X X - FREQ**

**Package Code**
SG 7 pad 1.0"x0.87" SMD

**Input Voltage**
0 5.0V±5%
A 3.3V±5%

**TCXO/TCVCXO Option**
T No V. Control
V With V Control

**Output Type**
C CMOS
P PECL
S Sine-wave
L LVDS

**Temp Frequency Stability, ppm**
1 ±1.0
2 ±2.5
3 ±0.28

**Temperature Range, °C**
B 0 to 70
C -20 to 70
D -40 to 85
E -10 to 60
9 Customer specific

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**SG-XA3XXXX Series** Continued
**HF/UHF SMD TCVCXO**

**Rev.** A

## Absolute Maximum Ratings

| Parameter | Sym | Condition | Min | Typ | Max | Unit | Note |
|---|---|---|---|---|---|---|---|
| Input Break Down Voltage | Vcc | | -0.5 | | 5.5 | V | |
| Storage Temperature | Ts | | -40 | | 105 | ºC | |
| Control Voltage | Vc | | -1 | | 9 | V | |

## Electrical Parameters

| Parameter | Sym | Conditions | MIN | TYP | MAX | Unit | Note |
|---|---|---|---|---|---|---|---|
| Frequency Range | F | CMOS<br>Sine-wave<br>PECL,LVDS | 30<br>30<br>30 | | 200<br>1,000<br>1,000 | MHz | |
| Input Voltage | Vcc | Code 0<br>Code A | 4.75<br>3.135 | 5.0<br>3.3 | 5.25<br>3.465 | V | |
| Input current | Icc | CMOS,Sine<br>PECL, Sine,LVDS | | | 30<br>100 | mA | @100MHz, 3.3V<br>@622MHz, 3.3V |
| Frequency Stability | ΔF/F | Overall, available | | | ±4.6 | | 20 years |
| Frequency Stability | ΔF/F | vs Temperature<br>vs Vcc<br>Aging | | ±0.5<br>±0.1<br>±1<br>±3.5 | ±1 | ppm<br>ppm/V<br>ppm/year<br>ppm | See Chart<br><br>First Year<br>10 years |
| Calibration | ΔF/F | As shipped, 25°C | | ±0.5 | ±1 | ppm | |
| Load | | CMOS<br>Sinewave<br>PECL<br>LVDS | 15pf/10KOhmOhm<br>Internally AC-coupled 50 Ohm<br>50 Ohm to Vcc-2V or Thevenin equivalent<br>100 Ohm between the outputs, receiving end | | | | |
| Duty Cycle | | At 50 % | 45/55 | 50/50 | 55/45 | % | CMOS, PECL, LVDS |
| Rise/Fall Time | Tr/Tf | 20 to 80% | | 3<br>0.35 | | ns | CMOS<br>PECL, LVDS |
| Logic "1" level | Voh | CMOS | 0.9Vcc | | | V | |
| Logic "0" level | Vol | CMOS | | | 0.1Vcc | V | |
| Logic "1" level | Voh | PECL | Vcc-0.96 | | Vcc-0.81 | V | 100K available |
| Logic "0" level | Vol | PECL | Vcc-1.85 | | Vcc-1.65 | V | 100K available |
| Output Levels<br>LVDS | Vod | Differential amplitude | 247 | 330 | 454 | mV | |
| | | Amplitude error | | | 50 | mV | |
| | Vof | Offset Voltage | 1.125 | 1.25 | 1.375 | V | |
| | | Offset Voltage error | | | 50 | mV | |
| Output power | P | Sinewave Into 50 Ohm | 4 | 37 | | dBm | 3.3V<br>5.0V |
| Start up Time | Ts | | | 2 | 10 | ms | |
| Phase jitter | | 1 sigma | | 0.4<br>0.2 | 1<br>0.4 | ps | 100Hz to 20MHz<br>12kHz to 20MHz |
| Sub-harmonics | | PECL, LVDS, Sine<br>CMOS, Sine | | -45 | -40<br>none | dBc | F>250MHz<br>F<250MHz |
| Spurious | | | | | -60 | dBc | |
| Harmonics | | Sine-wave | | -30 | -25 | dBc | |
| SSB Phase Noise | | @10 Hz<br>@100 Hz<br>@1 KHz<br>@10KHz<br>@100KHz | | -80<br>-110<br>-140<br>-155<br>-160 | | dBc/Hz | @ 100 MHz |
| SSB Phase Noise | | @10 Hz<br>@100 Hz<br>@1 KHz<br>@10KHz<br>@100KHz | | -60/-60<br>-90/-90<br>-120/-120<br>-140/-145<br>-145/-150 | | dBc/Hz | @ 622 Mhz;<br>PECL,LVDS/Sine |
| Input Impedance | | | > 10 K Ohm | | | | |
| Control Voltage | Vc | | 0 | | 3.3 | V | |
| Modulation Bandwidth | MB | | 100Hz | | | | Contact Factory for wider MB |
| Deviation | | Vc=0V to 3.3V, 25°C | ±5 | ±7 | | ppm | |

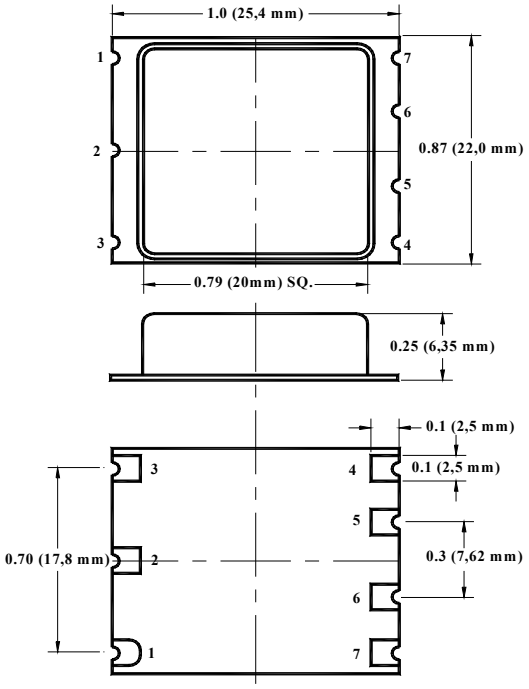
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### Electrical Connection

| Pin | Connection |
|---|---|
| 1 | Voltage Control |
| 2 | NC |
| 3 | $V_{CC}$ |
| 4 | Output, CMOS or Sine |
| 5 | Output, PECL/LVDS |
| 6 | Comp. Output, PECL/LVDS |
| 7 | Gnd |

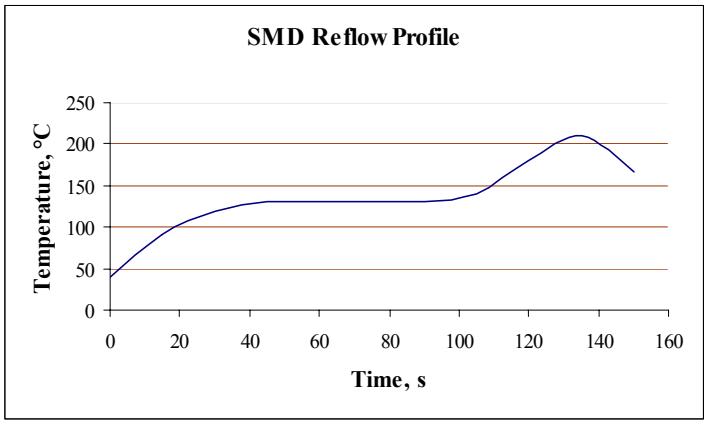
Note: For frequency stability over temperature ±1ppm and tighter, the package height may be 10mm or 12.5mm.




## Environmental and Mechanical Characteristics

| | |
|---|---|
| **Operating temp. range** | 0°C to 70°C, -40°C to 85°C, see chart page 1 |
| **Mechanical Shock** | Per MIL-STD-202, Method 213, Cond. E |
| **Thermal Shock** | Per MIL-STD-883, Method 1011, Cond. A |
| **Vibration** | Per MIL-STD-883, Method 2007, Cond. A |
| **Hermetic Seal** | Leak rate less than $1x10^{-8}$ atm.cc/s of helium (crystal only) |
| **Soldering conditions** | See MAX reflow profile below |

## Maximum Reflow Profile




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