

## Epson Timing Devices

# CMOS CRYSTAL OSCILLATORS

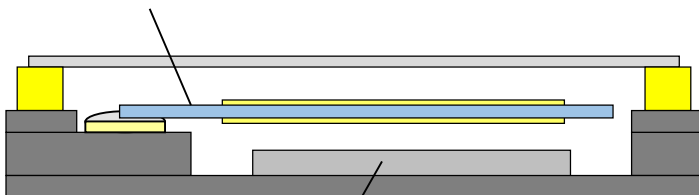
### Epson's Industry-Standard Fixed-Frequency CMOS Simple Packaged Crystal Oscillators (SPXOs)

#### Major features

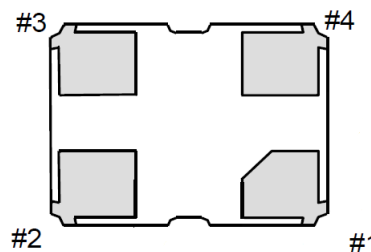
- **Frequency Ranges:** From 1 MHz up to 170 MHz
- **Temperature Ranges:** From -40 °C up to +105 °C
- **Tight Stability:** ±25 ppm, ±50 ppm, ±100 ppm
- **Supply Voltage:** 1.8V, 2.5V, 3.3V , 5.0V(SG5032/7050CCN)
- **Low Power:** as low as 3.0 mA maximum
- **Single-Ended Output:** CMOS
- **Function:** Standby (ST)
- **Five Package Sizes:** 7.0 x 5.0, 5.0 x 3.2, 3.2 x 2.5, 2.5 x 2.0, 2.0 x 1.6

Epson's CMOS Simple Packaged Crystal Oscillators (SPXO) contain a Quartz crystal and an oscillator integrated circuit. For quality, Epson uses only fundamental-mode crystals. Epson's CMOS SPXO's are available in sizes from 7.0 mm x 5.0 mm to 2.0 mm x 1.6 mm, cover temperature ranges up to -40 °C to +105 °C, and use an industry-standard pin out.

#### Quartz Crystal



Oscillator IC



Pin	Connection
1	ST
2	GND
3	OUT
4	Vcc



SG2016CAN (2.0 x 1.6 x 0.7)



SG-210STF & SG-210S\*H (2.5 x 2.0 x 0.8)



SG-310S\*F (3.2 x 2.5 x 1.05)



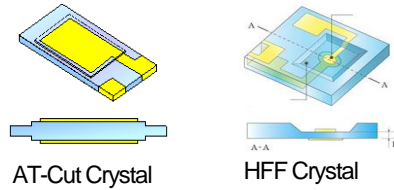
SG5032C\*N (5.0 x 3.2 x 1.1)



SG7050C\*N (7.0 x 5.0 x 1.3)

# Epson CMOS SPXOs

Epson's fixed-frequency CMOS output SPXOs provide high performance and low power consumption in a variety of industry-standard small surface mount packages and are suitable for all applications.



## ADVANTAGES

- Small Size
- Extended temperature range available
- Tighter stability available
- Low power
- CMOS output

### Fundamental Crystal

For quality, Epson CMOS SPXOs use only fundamental-mode crystals. Fundamental crystals do not suffer from mode jumping or cold start problems common to 3<sup>rd</sup> overtone designs. Compared to PLL-based oscillators, fundamental oscillators dissipate less power and do not generate reference and mixing spurs.

For frequencies below 75 MHz, Epson CMOS SPXOs use standard AT-cut (fundamental) crystal. Above 80 MHz, Epson CMOS SPXOs use HFF (high-frequency fundamental) crystals. To achieve high frequency, HFF crystals are etched using HydroFluoric acid (HF) to create an inverted mesa which has a thin resonant area. Using a photolithographic MEMS etching process for both AT-cut and HFF crystals, Epson achieves excellent process control and good mechanical characteristics across all frequencies.

### Complete Product Line

Epson has a complete CMOS SPXO product line covering 1-170 MHz and package sizes from 7x5 to 2x1.6.

Product	Size (mm)	Frequency (MHz)	V <sub>CC</sub> (V)	I <sub>CC,max</sub> (mA)
<b>AT Crystal SPXO</b>				
<b>SG2016CAN</b>	2.0 x 1.6 x 0.7	1.2 to 75	1.8 to 3.3	3.0
<b>SG-210STF</b>	2.5 x 2.0 x 0.8	1 to 75	1.8 to 3.3	3.0
<b>SG-310SEF</b>	3.2 x 2.5 x 1.05	2 to 48	1.8	4.5
<b>SG-310SDF</b>	3.2 x 2.5 x 1.05	2 to 48	2.5	4.5
<b>SG-310SCF</b>	3.2 x 2.5 x 1.05	2 to 48	3.3	4.5
<b>SG5032CAN</b>	5.0 x 3.2 x 1.1	1 to 75	1.8 to 3.3	3.0
<b>SG7050CAN</b>	7.0 x 5.0 x 1.3	1 to 75	1.8 to 3.3	3.0
<b>AT Crystal High Voltage (5V) SPXO</b>				
<b>SG5032CCN</b>	5.0 x 3.2 x 1.1	2.5 to 50	5.0	20.0
<b>SG7050CCN</b>	7.0 x 5.0 x 1.3	2.5 to 50	5.0	20.0
<b>HFF Crystal SPXO</b>				
<b>SG-210SEH</b>	2.5 x 2.0 x 0.8	80 to 170	1.8	8.0
<b>SG-210SDH</b>	2.5 x 2.0 x 0.8	80 to 170	2.5	9.0
<b>SG-210SCH</b>	2.5 x 2.0 x 0.8	80 to 170	3.3	11.0
<b>SG5032CBN</b>	5.0 x 3.2 x 1.1	80 to 170	1.8 to 3.3	11.0
<b>SG7050CBN</b>	7.0 x 5.0 x 1.3	80 to 170	1.8 to 3.3	11.0

Stability and operating temperature options are shown below.

<b>SG2016CAN</b> <b>SG5032C*N / SG7050C*N</b>
DB: ±25 ppm / -20°C to 70°C
JB: ±50 ppm / -20°C to 70°C
JG: ±50 ppm / -40°C to 85°C
JH: ±50 ppm / -40°C to 105°C
LG: ±100 ppm / -40°C to 85°C
LH: ±100 ppm / -40°C to 105°C

<b>SG-210STF</b>
S: ±25 ppm / -20°C to 70°C
L: ±50 ppm / -40°C to 85°C
Y: ±50 ppm / -40°C to 105°C
W: ±100 ppm / -40°C to 105°C

<b>SG-210S*H</b> <b>SG-310S*F</b>
B: ±50 ppm / -20°C to 70°C
C: ±100 ppm / -20°C to 70°C
L: ±50 ppm / -40°C to 85°C
M: ±100 ppm / -40°C to 85°C

**Note:** SG-310S\*N series options include ±20 ppm & ±25 ppm

### Programmable SPXOs

For fast prototyping, programmable oscillators can be programmed with similar specifications to fixed-frequency SPXOs with very short lead times. Epson offers a complete family of pin-compatible programmable oscillators. (See SG-8101 series & SG-8018 series)

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