

CMOS CRYSTAL OSCILLATORS

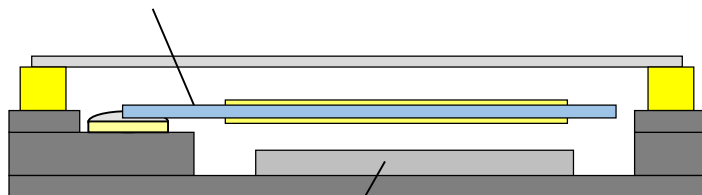
Epson's Industry-Standard Fixed-Frequency CMOS Simple Packaged Crystal Oscillators (SPXOs)

Major features

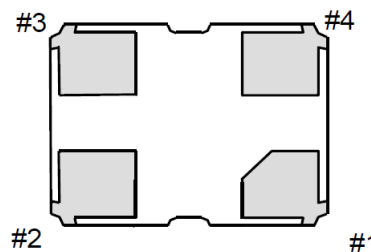
- **Frequency Ranges:** From 1 MHz up to 170 MHz
- **Temperature Ranges:** From -40 °C up to +105 °C
- **Tight Stability:** ±25 ppm, ±50 ppm, ±100 ppm
- **Supply Voltage:** 1.8V, 2.5V, 3.3V , 5.0V(SG5032/7050CCN)
- **Low Power:** as low as 3.0 mA maximum
- **Single-Ended Output:** CMOS
- **Function:**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



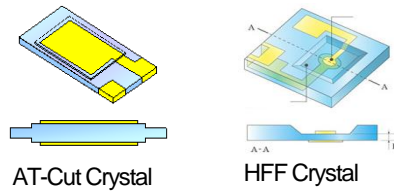
SG5032C*N (5.0 x 3.2 x 1.1)



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 3rd 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 _{CC} (V)	I _{CC,max} (mA)
AT Crystal SPXO				
SG2016CAN	2.0 x 1.6 x 0.7	1.2 to 75	1.8 to 3.3	3.0
SG-210STF	2.5 x 2.0 x 0.8	1 to 75	1.8 to 3.3	3.0
SG-310SEF	3.2 x 2.5 x 1.05	2 to 48	1.8	4.5
SG-310SDF	3.2 x 2.5 x 1.05	2 to 48	2.5	4.5
SG-310SCF	3.2 x 2.5 x 1.05	2 to 48	3.3	4.5
SG5032CAN	5.0 x 3.2 x 1.1	1 to 75	1.8 to 3.3	3.0
SG7050CAN	7.0 x 5.0 x 1.3	1 to 75	1.8 to 3.3	3.0
AT Crystal High Voltage (5V) SPXO				
SG5032CCN	5.0 x 3.2 x 1.1	2.5 to 50	5.0	20.0
SG7050CCN	7.0 x 5.0 x 1.3	2.5 to 50	5.0	20.0
HFF Crystal SPXO				
SG-210SEH	2.5 x 2.0 x 0.8	80 to 170	1.8	8.0
SG-210SDH	2.5 x 2.0 x 0.8	80 to 170	2.5	9.0
SG-210SCH	2.5 x 2.0 x 0.8	80 to 170	3.3	11.0
SG5032CBN	5.0 x 3.2 x 1.1	80 to 170	1.8 to 3.3	11.0
SG7050CBN	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.

SG2016CAN SG5032C*N / SG7050C*N
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

SG-210STF
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

SG-210S*H SG-310S*F
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)