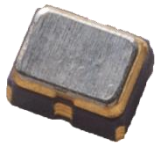
Epson Timing Devices

DIFFERENTIAL SPXOS



SG3225EEN & SG3225VEN
& SG3225EAN & SG3225VAN
& SG3225HBN (3.2 x 2.5 x 1.05)

SG5032EAN & SG5032VAN
(5.0 x 3.2 x 1.1)

SG7050EEN & SG7050VEN
(7.0 x 5.0 x 1.5)
& SG7050EAN & SG7050VAN
(7.0 x 5.0 x 1.4)

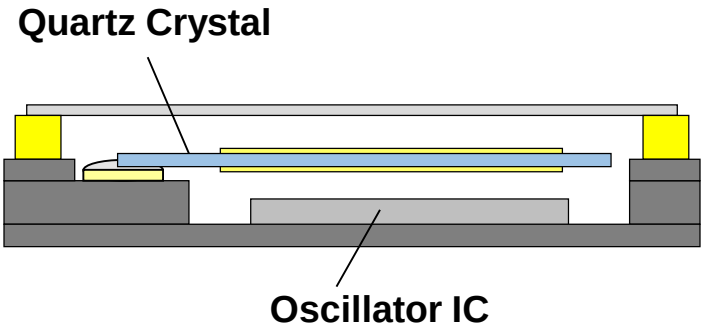
Epson's Industry-Standard, Fixed-Frequency, Differential Output Simple Packaged Crystal Oscillators (SPXO)

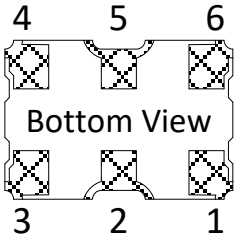
Major Features

- **Frequency Ranges:** From 25 MHz to 700 MHz
- **Temperature Ranges:** From -40 °C up to +105 °C
- **Tight Stability:** ±20 ppm, ±25 ppm, ±30 ppm, ±50 ppm, ±100ppm
- **Supply Voltage:** 2.5V and 3.3V (2.375 V - 3.6 V)
- **Low Power:** as low as 25 mA maximum (SG3225/7050VEN LVDS)
- **Differential Output:** LV-PECL, LVDS, and HCSL
- **Three Package Sizes:** 7 x 5, 5 x 3.2, 3.2 x 2.5

Epson offers a complete range of high-performance and cost-optimized differential SPXOs to match any application. Epson is the only supplier that designs and manufactures both the crystal and oscillator IC, and can therefore deliver higher performance products with the industry's best quality. Epson uses traditional AT-cut crystals and PLLs to provide mainstream solutions that balance performance and cost. Epson also uses High Frequency Fundamental (HFF) crystals to deliver the lowest-class jitter. All Epson's timing products use only fundamental-mode crystals for superior reliability.

Epson's differential output SPXO's are available in sizes from 3.2 mm x 2.5 mm to 7 mm x 5 mm, cover temperature ranges up to -40 °C to +105 °C, and use an industry-standard pin out with LV-PECL, LVDS, and HCSL output options.





Pin	Function
1	OE
2	N.C. (Open or Vcc)
3	GND
4	OUT
5	$\overline{\text{OUT}}$
6	Vcc

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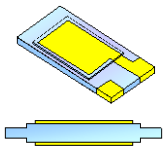
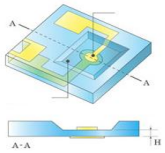
Epson Differential SPXOs

Epson's fixed-frequency differential 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.



AT-Cut Crystal



HFF Crystal

ADVANTAGES

- **Low Jitter**
- **Small Size**
- **Extended Temperature**
- **Tight Stability**
- **Low Power**
- **LV-PECL, LVDS, and HCSL Outputs**

Crystal Technology Enables Product Differentiation

For dependability, Epson differential-output SPXOs use only fundamental-mode crystals. Fundamental crystals do not suffer from mode jumping or cold start problems common to 3rd overtone designs. Using only fundamental crystals, Epson uses three architectures to provide the best solution for low jitter, low cost, and dependable operation over all frequencies:

- **HFF** –HFF crystals are etched using HydroFluoric (HF) acid to create an inverted mesa which has a thin resonant area. HFF crystals achieve high frequency and low jitter like 3rd overtone crystals with the dependability of fundamental crystals. Epson HFF oscillators achieve the industry's lowest jitter, as low as 50 fs at 156.25 MHz.
- **AT+PLL** – SG3225EAN/VAN, SG5032EAN/VAN, and SG7050EAN/VAN combine an AT crystal with a PLL IC to achieve high frequencies (up to 700 MHz) at low cost. Jitter is typically 300 fs, higher than HFF designs, but low enough for most applications.

Complete Product Line

Epson has a complete Differential Output SPXO product line covering 25 to 700 MHz and package sizes from 3.2 mm x 2.5 mm to 7 mm x 5 mm.

Product	Output	Architecture	Size (mm)	Frequency (MHz)	V_{CC} (V)	$I_{CC,max}$ (mA)
SG3225EEN	LV-PECL	HFF	3.2 x 2.5 x 1.05	25 to 200	2.5 V and 3.3 V	75
SG3225VEN	LVDS	HFF	3.2 x 2.5 x 1.05	25 to 200	2.5 V and 3.3 V	25
SG3225EAN	LV-PECL	AT+PLL	3.2 x 2.5 x 1.05	50 to 700	2.25 V to 3.63 V	65
SG3225VAN	LVDS	AT+PLL	3.2 x 2.5 x 1.05	73.5 to 700	2.25 V to 3.63 V	30
SG3225HBN	HCSL	HFF	3.2 x 2.5 x 1.05	100 to 325	3.3V	35
SG5032EAN	LV-PECL	AT+PLL	5.0 x 3.2 x 1.0	73.5 to 700	2.25 V to 3.63 V	65
SG5032VAN	LVDS	AT+PLL	5.0 x 3.2 x 1.0	73.5 to 700	2.25 V to 3.63 V	30
SG7050EEN	LV-PECL	HFF	7.0 x 5.0 x 1.5	25 to 200	2.5 V and 3.3 V	75
SG7050VEN	LVDS	HFF	7.0 x 5.0 x 1.5	25 to 200	2.5 V and 3.3 V	25
SG7050EAN	LV-PECL	AT+PLL	7.0 x 5.0 x 1.4	73.5 to 700	2.5 V and 3.3 V	65
SG7050VAN	LVDS	AT+PLL	7.0 x 5.0 x 1.4	73.5 to 700	2.5 V and 3.3 V	30

Stability and operating temperature options are shown below.

SG3225EAN/VAN & SG5032EAN/VAN & SG7050EAN/VAN
CB: ±20 ppm / -20°C to 70°C
EB: ±30 ppm / -20°C to 70°C
EG: ±30 ppm / -40°C to 85°C
JB: ±50 ppm / -20°C to 70°C
JG: ±50 ppm / -40°C to 85°C

SG3225HBN
LG: ±100 ppm / -40°C to 85°C
JG: ±50 ppm / -40°C to 85°C

SG3225EEN/VEN & SG7050EEN/VEN
DG: ±25 ppm / -40°C to 85°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

Programmable SPXOs

Epson's SG-8503 programmable oscillator is pin-compatible and has very short lead times for fast prototyping.