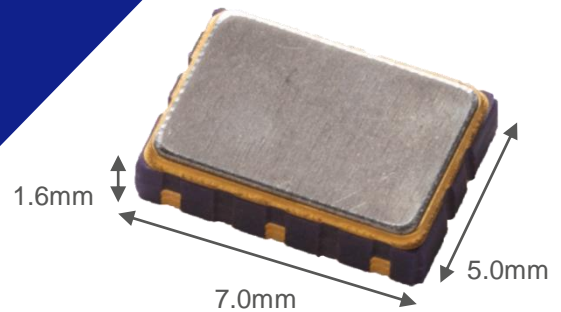


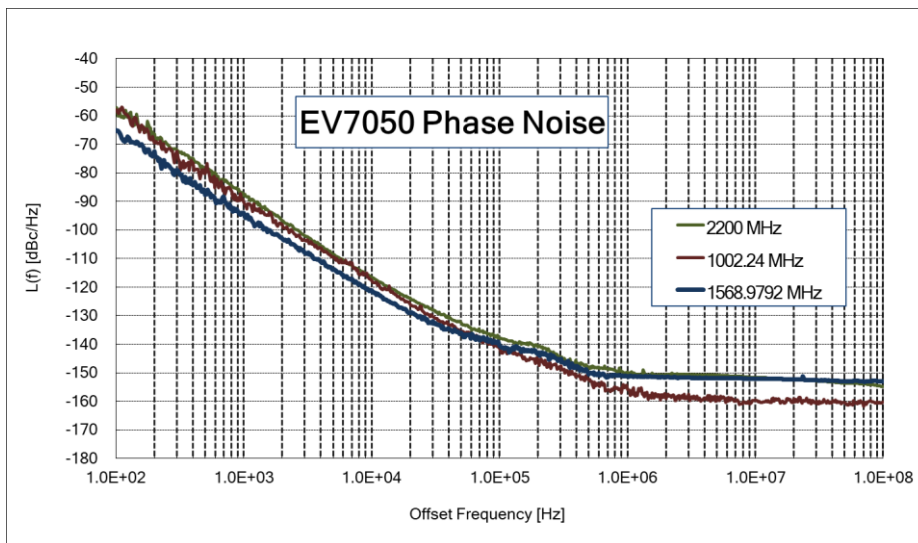
# ULTRA LOW JITTER EV7050EAN

High Frequency. Ultra Low Phase Noise.



## Epson EV7050EAN

- **Frequency Range:** 0.6 – 1.1GHz / 1.2 – 2.2 GHz
- **Ultra-Low Jitter:** 18 fs.typ 12 kHz – 20 MHz @ 2.2 GHz
- **Small Size:** 7.0 mm × 5.0 mm x 1.6 mm
- **Low Power Consumption:** 115mA.Max @0.6–1.1GHz / 175mA .Max@1.2–2.2 GHz



## Phase Noise Data

Offset Frequency	Carrier (Oscillator) Frequency		
	1.004 GHz	1.568 GHz	2.2 GHz
100 Hz	-66 dBc/Hz	-65 dBc/Hz	-57 dBc/Hz
1 kHz	-96 dBc/Hz	-94 dBc/Hz	-88 dBc/Hz
10 kHz	-121 dBc/Hz	-121 dBc/Hz	-117 dBc/Hz
100 kHz	-142 dBc/Hz	-140 dBc/Hz	-138 dBc/Hz
1 MHz	-158 dBc/Hz	-151 dBc/Hz	-150 dBc/Hz
10 MHz	-160 dBc/Hz	-152 dBc/Hz	-152 dBc/Hz
100 MHz	-161 dBc/Hz	-153 dBc/Hz	-155 dBc/Hz

Designed for high-speed optical links, EV7050EAN VCSO achieves extremely low phase jitter of 18fs.

Epson introduced the world's first SAW oscillators in 1999. With zero field failures in eighteen years of high-volume production, Epson's VCSOs are the most reliable frequency control product made.

With a smaller footprint, EV7050EAN offers a 72% space savings over the 1409 module, critical for applications with tight space requirements. Epson's EV7050EAN covers a wide frequency range with excellent phase noise over the entire range. Typical applications include coherent optical modules and base station remote radio heads.

# Epson EV7050EAN VCSO

## ADVANTAGES

- Low phase noise
- GHz frequency
- Small size
- High reliability, Zero field failures in 18 years
- Low power

Epson pioneered SAW technology, introducing the world's first SAW filters in 1984 and the world's first SAW oscillators in 1999. SAW oscillators provide high frequency, extremely low jitter, and excellent reliability. With zero field failures in 18 years of high-volume production, Epson's SAW oscillators are the most reliable frequency control product made.

### Low Phase Noise

To achieve very low phase noise, Epson's EV7050EAN VCSO uses a SAW resonator and a unique low-noise oscillator IC designed and fabricated by Epson. Their excellent jitter performance enables superior eye diagrams and I-Q constellations for high-speed electrical, optical, and RF interfaces. Epson VCSOs are used extensively in high-speed optical modules, and suitable for remote radio heads (RRHs), test & measurement, and any application requiring high-speed ADCs and/or DACs.

### SAW Technology

Unlike a crystal which resonates in bulk mode, typically thickness shear, a SAW resonator operates by launching an acoustic wave along the surface. To launch a surface acoustic wave requires an array of dipoles, called Inter-Digitated Transducers (IDTs), much like a highly directional antenna. To concentrate the wave, a SAW resonator uses reflectors on both sides, much like a laser uses a Bragg stack.



Epson SAW Technology

### SAW Oscillator Dependability

SAW resonators are fundamentally reliable because energy is tightly focused by the launch and not launched into the bulk. Weak modes are not excited. Therefore, SAW oscillators are completely immune to activity dip which is commonly seen in high-frequency overtone crystals. Furthermore, with more than 100 IDTs, the fingers are redundant protecting the resonator from failure of any one of them.

The one known failure mode of SAW resonators is shorting the electrodes. If a metallic particle contacts the fingers, the resonator will be short circuited. Epson's SAW resonators are protected by a proprietary protective coating. Epson's patents cover this protective coating and the frequency adjustment techniques necessary to achieve accurate frequency with this protection.

As a result, Epson SAW oscillators have achieved an excellent reliability record – zero field failures in 18 years of high-volume production, making Epson SAW oscillators the most reliable frequency control device ever made.

### Ordering Options

Epson's EV7050EAN VCSO can be ordered with these options:

- **Frequency:** 0.6 – 2.2 GHz
- **Temperature Range:** -40 to +85 °C ( $\pm 30$  ppm APR) or -10 to +85 °C ( $\pm 50$  ppm APR)

Product	Size (mm x mm x mm)	Outputs	I <sub>cc</sub>	Frequency
EV7050EAN	7.0 x 5.0 x 1.6	LVPECL	< 115 mA < 175 mA	0.6 to 1.1 GHz 1.2 to 2.2 GHz