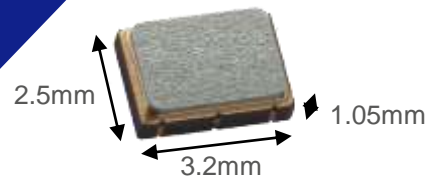
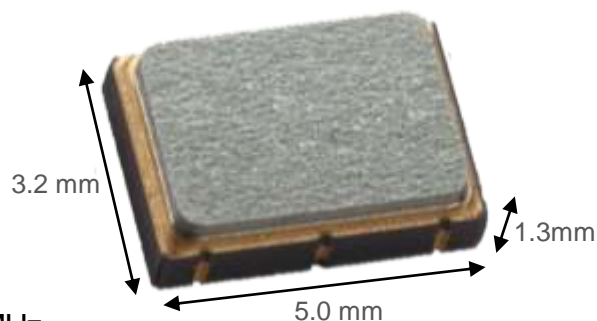


ULTRA LOW-NOISE F-SERIES VCXO

VG3225EFN
VG3225VEN



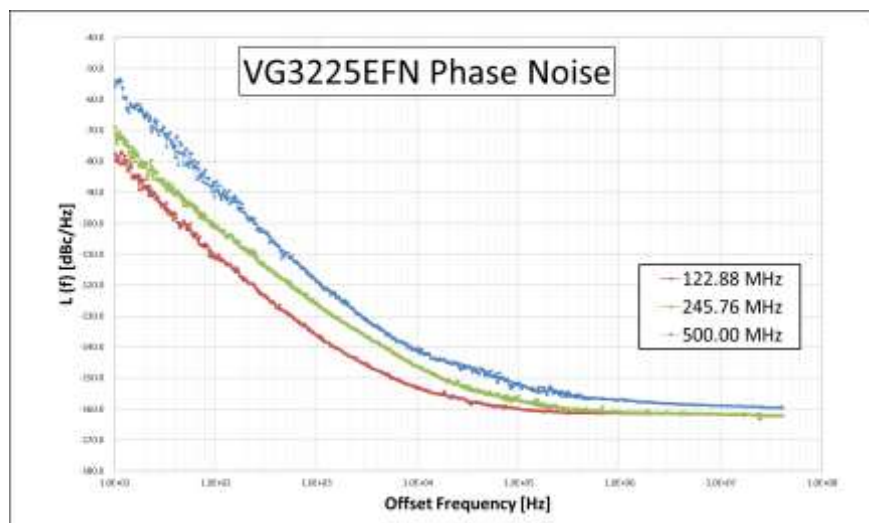
VG5032EFN
VG5032VFN



EPSON F-Series VCXO

Major features

- **Frequency Range:** 25-500 MHz
- **Ultra Low-Jitter:** 80 fs rms. Max 12 kHz – 20 MHz @ 245.76 MHz
- **Excellent Vibration Resistance:** 2.0 ppb/G 20-200 Hz
- **Integrated LDO for Superior PSNR**
- **Available in Two Sizes:** 5 x 3.2 and 3.2 x 2.5



Phase Noise Data

Offset Frequency	Carrier (Oscillator) Frequency		
	122.88 MHz	245.76 MHz	500.00 MHz*1
10 Hz	-77 dBc/Hz	-69 dBc/Hz	-56 dBc/Hz
100 Hz	-111 dBc/Hz	-101 dBc/Hz	-88 dBc/Hz
1 kHz	-136 dBc/Hz	-126 dBc/Hz	-119 dBc/Hz
10 kHz	-154 dBc/Hz	-146 dBc/Hz	-142 dBc/Hz
100 kHz	-160 dBc/Hz	-157 dBc/Hz	-152 dBc/Hz
1 MHz	-162 dBc/Hz	-161 dBc/Hz	-157 dBc/Hz
10 MHz	-162 dBc/Hz	-162 dBc/Hz	-159 dBc/Hz
40 MHz	-162 dBc/Hz	-162 dBc/Hz	-160 dBc/Hz

*1 250MHz-500MHz is in development

Designed for 5G wireless infrastructure and high-performance networking applications, Epson's VG5032xFN and VG3225xFN VCXO family achieves the industry's best phase noise in a very small package. Epson's F-Series includes a next-generation integrated LDO, allowing engineers to save power, space, and cost. The F-Series continues to leverage Epson's photolithographic crystal shaping technology to deliver superior vibration resistance and telecom-quality dependability.

Epson's VG5032xFN and VG3225xFN VCXOs are ideal for cellular base stations, μ W & mmW radios, datacenter switches, optical interconnect, cable infrastructure, and test & measurement equipment.

Epson F-Series HFF VCXO

Epson's F-Series provides best-in-class phase noise by utilizing Epson's high-Q crystal manufacturing process and next-generation integrated LDO IC design.

High Frequency, Low Phase Noise

To achieve very low phase noise, Epson's F-series VCXOs use an HFF (high-frequency fundamental) crystal and a unique low-noise oscillator IC designed and fabricated by Epson. The fundamental crystal avoids problems caused by 3rd overtone designs.

Fundamental Crystal Dependability

Epson's HFF (high-frequency fundamental) crystal combines the dependable oscillation of fundamental crystals with the high frequency of 3rd overtones. Epson uses a photolithographic MEMS etching process to fabricate an inverted mesa with excellent process control and achieve high frequency with good mechanical characteristics.

Because Epson HFF crystals oscillate in the fundamental mode, they do not suffer from mode jumping, activity dip, and cold start problems common to 3rd overtone designs.

Excellent Vibration Resistance

Epson's HFF crystal is much thicker than a 3rd overtone crystal. The HFF frame acts as a stiffener, increasing the modulus of rigidity, which protects the resonant structure from low-frequency vibration. Epson's unique high shear modulus mount further protects the resonator from vibration.

Integrated LDO for Improved Power Supply Noise Rejection

Epson's F-Series VCXO includes an integrated LDO to improve power supply rejection across a wide range of frequencies, including those commonly used by switching regulators. This simplifies power supply design and saves board area.

Small Size

MIMO technology is demanding increasing numbers of channels per radio card. Epson's F-series VCXOs are offered in a 3.2 mm x 2.5 mm package to accommodate dense designs.

Extended Temperature Range

For outdoor equipment, designs without cooling fans, and very dense designs, Epson's F-series VCXOs support operating temperatures up to +105 °C.

Ordering Options

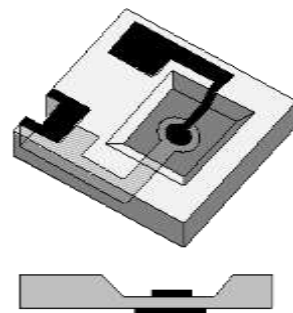
Epson's F Series VCXO can be ordered with five options:

- **Frequency:** 25-250 MHz
- **Output Type:** LV-PECL or LVDS
- **Package Size:** 5.0x3.2x1.4 or 3.2x2.5x1.05
- **Temperature Range:** -40 to +105 °C or -40 to +85 °C
- **APR (Absolute Pull Range):** ±20 ppm or ±50 ppm
- **OE (Output Enable) Polarity:** active high or active low

Product	Size (mm x mm x mm)	Outputs	I _{DD} @ 3.3V	Frequency	Vibration Resistance	Resonator Type
VG3225EFN	3.2 x 2.5 x 1.05	LV-PECL	60 mA max	25-250 MHz	2.0 ppb/G	High-Frequency Fundamental
VG5032EFN	5.0 x 3.2 x 1.3	LV-PECL	60 mA max	25-250 MHz	2.0 ppb/G	High-Frequency Fundamental
VG3225VFN	3.2 x 2.5 x 1.05	LVDS	25 mA max	25-250 MHz	2.0 ppb/G	High-Frequency Fundamental
VG5032VFN	5.0 x 3.2 x 1.3	LVDS	25 mA max	25-250 MHz	2.0 ppb/G	High-Frequency Fundamental

ADVANTAGES

- Low phase noise
- High frequency
- Small size
- Integrated LDO
- Supports 105 °C
- Low power



Epson HFF Technology