addition to high performance, discrete VCOs offer advantages such as superior performance, tremendous design flexibility and versatility, faster time-to-market, low cost, and reduced risk.

The discrete-device approach was used in the development of the DCFO and DCMO series oscillators. The sources employ a novel oscillator topology (for which a patent has been applied) based on an evanescent-mode dynamic coupled resonator **(Fig. 1)**.[2] The design approach has resulted in wideband VCOs capable of delivering stable, low-noise output signals **(Figs. 2 and 3)** over temperature ranges as wide as –40 to +85°C with extremely linear tuning response **(Fig. 4)**. The **table** offers a brief overview of some of the new VCOs. As the table shows, the new VCOs offer tuning ranges as wide as 2400 MHz, but without sacrificing phase-noise performance. Using a dynamic tracking filter at the output, harmonics can be suppressed by better than –30 dBc.

The wideband VCOs at a glance

SERIES/SIZE	FREQUENCY RANGE (MHz)	TYPICAL PHASE NOISE OFFSET 10 kHz FROM CARRIER	TYPICAL PHASE NOISE OFFSET 100 kHz FROM CARRIER
DCFO	350 to 1100	-112 dBc/Hz	-132dBc/Hz
DCMO	500 to 1700	-99 dBc/Hz	-120dBc/Hz
DCMO	1500 to 3500	-92 dBc/Hz	-112 dBc/Hz
DCMODCFO	1500 to 3500	-90 dBc/Hz	-110 dBc/Hz

As an example of the DCFO series, model DCFO-35105 accepts tuning voltages from 0 to +25 VDC to cover a total range of 350 to 1050 MHz (700 MHz). The bias requirements are no more than 35 mA at +5 VDC. The tuning sensitivity is typically 20 to 48 MHz/V. With output power of +1 dBm **(Fig. 5)**, the VCO exhibits typical phase noise of –112 dBc/Hz offset 10 kHz from the carrier and –132 dBc/Hz offset 100 kHz from the carrier. Harmonic suppression for this model is specified at –10 dBc, although typical performance is much better **(Fig. 6)**. Maximum frequency pulling is 4 MHz for a 1.75:1 VSWR load while maximum frequency pushing is 2 MHz/V. The VCO is supplied in a surface-mount package with slotted metal cover measuring just 0.91 × 0.91 × 0.305 in.

As an example of the higher-frequency DCMO series VCOs, the model DCMO-190410 covers a tuning range of 1900 to 4100 MHz by means of tuning voltages from 0.5 to 20.0 V. The typical bias requirements are 35 mA (maximum) and +5 VDC, and the typical tuning sensitivity is 100 to 200 MHz/V. With minimum output power of +3 dBm across this wide tuning range, the VCO delivers typical phase noise of –90 dBc/Hz offset 10 kHz from the