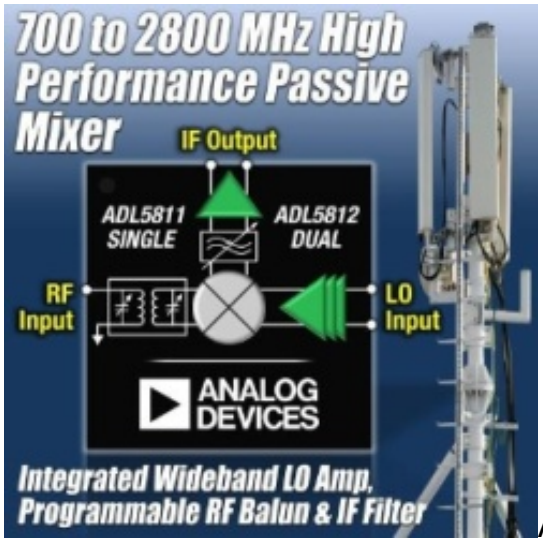
RF Mixers Boast High Level of Integration



Analog Devices, a world leader in high-performance semiconductors for signal processing applications and RF ICs (radio-frequency integrated circuits), today introduced the industry's most highly integrated wideband passive mixers for communications applications. The ADL5811 single-channel and ADL5812 dual-channel mixers deliver high linearity, low distortion and low noise combined with wideband frequency performance. The new devices enable multiband, single-board receiver designs by combining a wideband LO (local oscillator) amplifier, a programmable RF balun, a high-linearity mixer core, a programmable IF filter, and an IF amplifier. Watch video on the features of the new ADL5811 and ADL5812 RF mixers.

ADI's new passive mixers extend across a 700-MHz to 2800-MHz frequency range in a single device while delivering input IP3 (third order intercept) of 24 dBm, an 11 dB SSB noise figure and 7 dB of power conversion gain. These performance specifications are maintained across the full operating frequency range. The ADL5811 and ADL5812 passive mixers are designed for wideband wireless infrastructure applications and software-defined radio applications, including multi-band/multi-standard cellular base station receivers, wideband radio link down converters, multi-mode cellular repeaters, and picocells applications.

"Wireless receiver designers typically have had to choose between an active mixer, which offers excellent wideband operation and moderate spurious-free dynamic range, or a passive mixer, which has greater SFDR performance but much narrower operating bandwidth," said Peter Real, vice president, Linear and RF products, Analog Devices. "The ADL5811 and ADL5812 passive mixers eliminate the need for this trade off by giving engineers the linearity, distortion and noise performance they need while also supporting true wideband frequency operation.

To Download data sheet and see product pages: http://www.analog.com/ADL5811 or http://www.analog.com/ADL5812

Find application notes and technical articles about RF/wireless and communications solutions from ADI: http://communications.analog.com/en/segment/cmmn.html

The high performance across 700 MHz to 2800 MHz of the new passive mixers is the result of three technical advances, most significantly the development of a limiting LO amplifier capable of generating a high-voltage, fast-rise-time, square wave over a wide bandwidth with no DC current penalty compared to existing narrow band mixers.

The second technique involves the integration of a tuned, RF balun structure to ensure a well-balanced RF signal is applied to the FET mixer. Previously, narrowband mixers incorporated an RF balun consisting of a magnetic or transmission line transformer, which provided low loss but only moderate bandwidth.

A third technique addresses the potential for the passive mixer's structure to generate a composite signal that could result in the early compression of the IF amplifier. ADI reduced the amplitude of the unwanted sideband into a load by designing a tuned filter network to provide the proper sum termination as a function of the RF and LO frequencies.

The frequencies of the ADL5811 and ADL5812 can be easily changed using a three-wire SPI (serial port interface), which allows designers to tune the mixers with no need for external impedance matching components. Performance can be further optimized by digitally adjusting the DC bias voltage to the passive mixer gates. To minimize power dissipation, each channel of the dual-channel ADL5812 can be enabled or disabled independent of the other. For DPD (digital pre-distortion) transmit observation receivers or non-diversity applications, the single-channel ADL5811 can implement a single receiver chain in a multi-channel or multi-band platform.

As part of a complete wireless communications signal chain, the ADL5811 and ADL5812 passive mixers can be designed together with ADI's AD8375/6 IF DGA or ADL5561/2 differential amplifier and the ADF435X series of synthesizers for a complete receiver signal chain.

RF IC Portfolio Covers Entire RF Signal Chain
Using a unique combination of design skills, system understanding and process technologies, Analog Devices offers the broadest portfolio of RF products covering the entire RF signal chain from industry-leading high-performance discrete RF function blocks to highly-integrated multi-functional single-chip RF solutions. These products are also supported by a wide range of free design tools, evaluation boards and other design resources to ease the development of RF systems.

For more information, visit: www.analog.com/rf

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