



High Linearity Dual Downconverting Mixers Reduce Power Consumption & Size for 4G MIMO Receivers

MILPITAS, CA – April 26, 2011 – Linear Technology announces the [LTC559x](#) family of four high dynamic range dual downconverting mixers covering the 600MHz to 4.5GHz wireless infrastructure frequency range. The LTC559x dual mixers offer outstanding IIP3 (Input Third-Order Intercept) of more than 26dBm, low noise figures of less than 10dB and high conversion gain of 8.5dB, enabling excellent dynamic range performance for both MIMO (Multiple-Input, Multiple-Output) and diversity wideband receivers. The LTC559x family of dual mixers provides best-in-class capability to maintain a low noise figure in the presence of strong blocking interferers, significantly enhancing receiver sensitivity and robustness. Unlike other dual mixers in their class, the LTC559x family can operate on a single 3.3V supply without compromising performance, reducing power consumption by more than 24% compared to the closest competing solution.

The four dual mixers are optimized for performance within their frequency bands. All four parts are pin compatible to enable easy migration from one frequency band to another.

Part Number	RF Frequency Range	Applications
LTC5590	600MHz – 1.7GHz	700MHz LTE, 850MHz GSM / EDGE, CDMA
LTC5591	1.3GHz – 2.3GHz	LTE, W-CDMA, TD-SCDMA, CDMA2k, 1800GSM/EDGE
LTC5592	1.6GHz – 2.7GHz	W-CDMA, TD-SCDMA, CDMA2k, LTE, WiMAX
LTC5593	2.3GHz – 4.5GHz	LTE, WiMAX

The LTC559x dual mixers are designed to address the challenging implementations of high performance, multichannel receivers of next-generation 4G and other broadband wireless

networks. Their low power consumption eases the thermal challenge associated with implementation of RRH (Remote Radio Head), which can pack as many as 8 or 16 channels of receivers in weather-sealed housings. The dual mixers provide a highly compact solution footprint with their 5mm x 5mm QFN packages, requiring minimum external components. The LTC559x are specified for case operating temperature from -40°C to 105°C to meet the rugged environment to which such equipment is exposed. To further enhance performance under these conditions, the dual mixers offer best-in-class conversion gain variation to ensure consistent receiver performance over temperature.

Each channel of the LTC559x dual mixer contains an integrated IF amplifier, LO buffer and RF balun transformers on chip. Each mixer's RF input is single-ended, 50Ohm matched. A common LO input drives the two internally split LO buffers, affording excellent channel-to-channel isolation while preserving phase coherency between channels. The LO input is also single-ended, always 50Ohm matched regardless of whether the mixer is active or powered down to avoid disturbing or unlocking the PLL (phase-locked loop) driven VCO circuit. The LO input requires only 0dBm drive level. All of these features ensure a compact solution with minimal external components and enhanced ease of use.

The LTC559x dual mixers have identical pinouts, allowing designers to share PC board layouts across multiple platforms operating in different frequency bands. This helps users reduce total ownership costs and speed time to market.

The LTC559x dual mixers are powered by a single 3.3V supply, drawing a total supply current of 380mA with both channels on. Each mixer can be independently shut down with a separate enable control. When disabled, the IC consumes a maximum of 500μA standby current. In addition, a digital bias control pin allows systems to further reduce the power to about 800mW, enabling more efficient management of energy consumption during non-peak hours. In low power mode, the IIP3 reduces from 26.2dBm to a usable 21.4dBm (at 1.95GHz).

The LTC559x dual mixers are offered in a 24-lead 5mm x 5mm plastic QFN package. The LTC5591 is now available in production. It will be followed by the release of the LTC5590, LTC5592 and the LTC5593 in July, August and September, respectively. The LTC5591 is priced starting at \$9.50 each in 1,000-pieces quantities. Samples are available immediately. For more information, visit www.linear.com/product/LTC5591

Photo Caption: High Dynamic Range Dual Downconverting Mixers


Summary of Features: LTC559x

Parameters	LTC5590*	LTC5591	LTC5592*	LTC5593*
Operating Frequency	600MHz – 1.7GHz	1.3GHz – 2.3GHz	1.7GHz – 2.7GHz	2.3GHz – 4.5GHz
Output IP3	34.7dBm	34.7dBm	35.6dBm	36.2dBm
Input IP3	26dBm	26.2dBm	27.3dBm	27.8dBm
Conversion Gain	8.7dB	8.5dB	8.3dB	8.4dB
Noise Figure (NF)	9.7dB	9.9dB	9.8dB	9.5dB
NF @5dBm Blocking	15.5dB	15.5dB	16.4dB	15.9dB
Power Consumption	1.25W	1.26W	1.34W	1.31W

* Note: The LTC5590, LTC5592 and LTC5593 are scheduled for release in July, August and September 2011, respectively.

About Linear Technology

Linear Technology Corporation, a member of the S&P 500, has been designing, manufacturing and marketing a broad line of high performance analog integrated circuits for major companies worldwide for three decades. The Company's products provide an essential bridge between our analog world and the digital electronics in communications, networking, industrial, automotive, computer, medical, instrumentation, consumer, and military and aerospace systems. Linear Technology produces power management, data conversion, signal conditioning, RF and interface ICs, and μ Module[®] subsystems.

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