Low Noise Amplifier Series Designed for Next-Generation Cellular and LTE Base Stations

Avago Technologies announced the development of two next generation, low noise amplifiers (LNAs) for base station (BTS) RF front-end design. With the addition of these 1500 MHz to 2300 MHz and 2300 MHz to 4000 MHz LNAs, Avago will complete its next generation LNA series that covers all cellular bands for GSM, CDMA, UMTS, and WiMAX, as well as next generation LTE bands.

The two new LNAs target cellular infrastructure base station applications, such as transceiver radio cards, tower mounted amplifiers (TMAs), combiners, repeaters and remote/digital radio heads. They set new standards for low noise figure. Today the wireless infrastructure industry is challenged to provide optimum coverage with the best signal quality in crowded spectrum. Receiver sensitivity is one of the most critical requirements in a BTS receive path design. Proper LNA selection, in particular the first-stage LNA, greatly affects the BTS receiver sensitivity performance. Low noise figure is a key design goal. Avago will offer a best-in-class noise figure of 0.48 dB at 1900 MHz.

Another key design factor is linearity, which affects the receiver’s ability to distinguish between closely spaced wanted and spurious signals. Third order intercept, OIP3, is used to specify linearity. At 1900 MHz and typical operating condition of 5 V/51 mA, Avago’s proprietary GaAs Enhancement-mode pHEMT process technology gives a noise figure of 0.48 dB and an OIP3 of 35 dBm. At 2500 MHz and typical operating condition of 5 V/56 mA, the noise figure is 0.59 dB and OIP3 is 35 dBm. With a low NF and high OIP3, the new Avago LNAs offer more design margin for the BTS receiver path than previous amplifiers.

With built-in active bias circuitry, Avago’s LNA operating current is adjustable. This allows designers to make tradeoffs between operating current and output linearity, as measured by OIP3, while maintaining an optimum noise figure. BTS designers will have the flexibility to meet various design needs and regional requirements with the same Avago LNA.

Since more communication channels must now fit into a transmit/receive card, PCB real estate has become another key design challenge for BTS designers. Avago chose a QFN package with a small 4 mm2 footprint to meet market needs. The two new LNAs share the same package footprint, pinout and external matching network of the existing Avago 900 MHz, MGA-633P8 LNA. A common PCB design can therefore be used for all BTS RF front-end designs that operate in different frequency bands. This reduces the number of PCB designs needed to supply BTS solutions for different bands and geographic markets.

The two new LNAs will be offered in 2.0 mm x 2.0 mm x 0.85 mm, 8-lead, surface mount QFN packages that are RoHS compliant. All devices operate over a very wide

temperature range, -40°C to +85°C.

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