



## Avago Technologies Expands Family of World's Smallest RF Amplifiers

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### New Positive Gain Slope LNA, Wideband LNA, VGA and Four Directional Detectors Add to Functionality of Miniature Chip Scale Package Amplifiers

SAN JOSE, Calif. & SINGAPORE, May 12, 2011 (BUSINESS WIRE) -- Avago Technologies (NASDAQ:[AVGO](#)), a leading supplier of analog interface components for communications, industrial and consumer applications, today announced additions to its family of the market's smallest RF amplifiers. The new [VMMK-3xxx](#) amplifiers leverage Avago [WaferCap](#) chip scale packaging (CSP) technology to offer an ultra-small footprint of 1.0 by 0.5 by 0.25 mm. The amplifiers bring a host of new functionality to the existing Avago [VMMK-1xxx](#) and [VMMK-2xxx](#) families, including a positive gain slope low-noise amplifier (LNA), a wideband LNA, a variable gain amplifier (VGA), and four directional detectors.

With miniature 0402 package dimensions and no wirebonds, the VMMK-3xxx amplifiers experience almost no signal loss and minimal parasitics. The devices take up 5 percent of the volume and uses only 10 percent of the board area of solutions using a standard SOT-343 package. In some cases, the miniature amplifiers can effectively reduce PCB area by more than 50 percent. The ultra-small package size and fully-matched surface mount design are optimized for 500 MHz to 12 GHz frequencies, making the high-performance devices ideal for a variety of radio architectures and space-constrained applications. The VMMK-3xxx LNAs and VGA can be used in UWB, WLAN, WiMAX, generic IF amp and gain block applications, while the new detectors can be used in base stations, point-to-point radios and generic power control loop detectors, as well as for monitoring power amplifier output.

The VMMK-3xxx family supports full surface mount capability, requiring no special tooling for assembly. The amplifiers have all I/Os routed to the backside of the device wafer through via-holes, resulting in RF transitions suffering almost no signal loss and minimal parasitics. This is a significant improvement over conventional plastic packages where bond-wires exhibit substantial parasitics that limit the operating frequency. The miniature amplifier family provides high gain, a high third-order intercept point (IP3) for good linearity, low noise figure (NF) and integrated 50-ohm input and output matching networks to simplify system design.

The VMMK-3xxx family includes:

- [VMMK-3503](#): 0.5-18 GHz VGA - This broadband, wide-dynamic-range VGA features 12 dB maximum gain, 1.5 dB NF, 8 dBm IIP3 and 23 dB gain control range, and it consumes only 300 mW.
- [VMMK-3603](#): 1-6 GHz Positive Gain Slope LNA - This high-gain, self-biasing LNA features 17 dB gain, 1.5 dB NF and good linearity of 25 dBm OIP3, and it consumes only 180 mW. With its positive gain slope, the LNA enables flat overall system gain.
- [VMMK-3803](#): 3-11 GHz LNA - This high-gain, self-biasing LNA features 20 dB flat gain, 1.5 dB NF and good linearity of 0.5 dBm IIP3, and it consumes only 60 mW.
- [VMMK-3113](#): 2-6 GHz Directional Detector - This detector features 0.25 dB insertion, greater than 45 dB dynamic range, low input and output return losses (< 20 dB) and 10 dB directivity. This detector requires 1.5V with 0.18 mA for DC biasing.
- [VMMK-3213](#): 6-18 GHz Directional Detector - This detector features 0.4 dB insertion, greater than 40 dB dynamic range, low input and output return losses (< 20 dB) and 15 dB directivity. This detector requires 1.5V with 0.18 mA for DC biasing.
- [VMMK-3313](#): 15-33 GHz Directional Detector - This detector features 0.5 dB insertion, greater than 37 dB dynamic range, low input and output return losses (< 20 dB) and 12 dB directivity. This detector requires 1.5 V with 0.18 mA for DC biasing.
- [VMMK-3413](#): 25-45 GHz Directional Detector - This detector features 0.8 dB insertion, greater than 35 dB dynamic range, low input and output return losses (< 20 dB) and 10 dB directivity. This detector requires 1.5 V with 0.18 mA for DC biasing.

#### U.S. Pricing and Availability

The VMMK-3xxx amplifiers are priced starting at \$2.00 each in 1,000 piece quantities. Samples and production quantities are available now through the Avago direct sales channel and via worldwide distribution partners.

#### About Avago Technologies

Avago Technologies is a leading supplier of analog interface components for communications, industrial and consumer applications. By leveraging its core competencies in III-V compound and silicon semiconductor design and processing, the company provides an extensive range of analog, mixed signal and optoelectronics components and subsystems to approximately 40,000 end customers. Backed by strong customer service support, the company's products serve four diverse end markets: wireless communications, wired infrastructure, industrial and automotive electronics, and consumer and computing peripherals. Avago has a global employee presence and heritage of technical innovation dating back nearly 50 years to its Hewlett-Packard roots. Information about Avago is available on the Web at [www.avagotech.com](http://www.avagotech.com).

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