National Semiconductor Puts Chips on Ultra-Thin Diet

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- No Thicker than Four Sheets of Paper, National Chips in the World's Thinnest Packages Enable Super-Slim Cell Phones, Flat-Panel Displays, PDAs, MP3 Players and Other Devices
- National Introduces New Amplifier Microphone Products in Ultra-Thin Packages

June 7, 2004 - National Semiconductor Corporation, a leader in advanced chip technologies, today announced the world's thinnest integrated circuit (IC) packages.

As thin as four sheets of office paper, National products in these new micro SMD (Surface-Mount Device) and LLP® (Leadless Leadframe Packages) enable original equipment manufacturers to build smaller, thinner and lighter cell phones, displays, MP3 players, PDAs and other

devices.

The new 0.4 mm ultra-thin packages are available today in National's analog amplifier products; they will be available in the second half of 2004 for National's wireless products. The company also plans to offer ultra-thin chip packages for its portable power products. National's new package types are available with traditional tin-lead or state-of-the-art lead-free interconnect options.

"National's ultra-thin package technologies provide immediate benefits for consumers," said Kamal Aggarwal, executive vice president, Central Technology and Manufacturing Group, National Semiconductor. "National products allow our OEM customers to differentiate their products by enabling the smallest, thinnest, most lightweight devices on the market."

"Using National Semiconductor's amplifier products in ultra-thin packages, BSE is able to create higher sensitivity microphones that significantly improve audio performance and reduce size," said Dan C. Song, chief technology officer (double check style book) with BSE Corporation, a leading Korean microphone manufacturer. "National's ultra-thin products are ideally suited for applications such as mobile phones and other communications devices."

National: A Track Record of Innovating Advanced IC Package Technologies
Developed by National engineers in Santa Clara, California, and Melaka, Malaysia, these latest ultra-thin packages may be used by OEMs with conventional surface-mount handling equipment. National's new packages use advanced manufacturing processes for making silicon, bumping technologies, back-grinding, leadframe design and wire-bond technology.

“Over the last four years, National has patented several innovative designs and processes that reduce the thickness of its packages by 60 percent,” said Sada Patil, director, Package Technology Group, National Semiconductor.

Packaging is a critical part of the semiconductor manufacturing process. National produces billions of chips per year and packages them in more than 70 different types of packages. National has more than 260 patents in package technologies, and receives approximately 30 new packaging patents per year. National has led the market in packaging innovations for years with the introduction of revolutionary micro SMD and LLP packaging technologies.

National’s micro SMD chip-scale package is available in 4-bump to 36-bump packages. National’s LLP packages are available in 6-lead to 80-lead package types. Micro SMD and LLP packages offer OEMs the advantages of small footprint, improved electrical, thermal and moisture sensitivity, reduced noise and easier board assembly. During 2004, National plans to introduce even thinner 0.3 and 0.2 mm package types, with bump counts up to 100.

Key Technical Specifications for National’s New Amplifiers in Ultra-Thin Packages
The LMV1032 is National’s new ultra-thin audio amplifier series for small form-factor electret microphones designed to replace the junction field effect transistor (JFET) preamp currently in use. The addition of a third pin in electret microphones that incorporate the LMV1032 allows for a dramatic reduction in supply current compared to JFET-equipped electret microphones. The LMV1032 series is ideal for extended battery life applications, such as digital cameras and MP3 players. Microphone supply current is reduced to 60 µA, assuring longer battery life.

The LMV1032 series is guaranteed for supply voltages from 1.7V to 5V

and has fixed voltage gains of 6 dB, 15 dB and 25 dB. It also offers low output impedance over the voice bandwidth, excellent power supply rejection (PSRR), and stability over temperature. The devices are offered in a space-saving 4-bump ultra-thin micro SMD lead- free package.

National also introduced the LMV1012UP, an ultra-thin version of its popular “Amp-in-a-mic” product. The new LMV1012UP is the market’s first amplifier in a microphone integrated directly inside 2- and 3-wire electret condenser microphones (ECMs). These amplifiers replace JFETs for longer battery life and greater noise immunity, resulting in better microphone performance. These products are ideal for use in microphones in mobile handsets, headset accessories and other portable microphone applications.

For more information about National’s advanced package technologies visit www.national.com/packaging/
or www.national.com/appinfo/amps/microphone.html

The original press release can be found here.