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## **ASE and MTBS to jointly develop next generation Large Silicon Flip Chip Package**

*Industry's first flip chip package designed for use in high I/O and large bandwidth applications*

**San Jose, California, April 08, 2002** - ASE Test Limited (NASDAQ: ASTSF) and MTBSolutions, Inc. (MTBS) announced that they have reached a cooperative working agreement in the development of the next generation of flip chip packages. Under the agreement, ASE Electronics Malaysia, a wholly owned subsidiary of ASE Test Limited, will manufacture flip chip packages according to the process and design requirements jointly developed by ASE and MTBS. This will be the first package designed for large silicon flip chip used in very high I/O and large bandwidth applications.

The new large silicon flip chip packages are designed specifically for die sizes of 20mm x 20mm or greater. These die sizes are usually in excess of 1000 I/O. The difficulty in packaging large silicon die in an organic substrate arises from the gross mismatch between the thermal coefficients of expansion (TCE) of the silicon (4ppm) and the organic substrate material (16ppm). Due to these mismatches, the flip chip interconnects are severely stressed and prone to failure when the device is temperature cycled.

"If we were to use the existing material sets and process methods for large silicon flip chip as we do for the smaller die sizes we would fail reliability - particularly in temperature cycling conditions," said Bob Hilton, CTO of MTBS. "These emerging high I/O and large silicon flip chip packaging demands are significantly more process critical than the previous generation of flip chip devices. We have spent the past three years developing, defining and qualifying these design features and process techniques." Both ASE and MTBS have applied for a variety of patents in regards to design and assembly of the new package.

"Industry forecasts suggest that the very high I/O and large bandwidth applications will represent a significant portion of all flip chip packaging demands and that the compounded annual growth rate for these package types are in excess of 60%, far outpacing all other advanced packaging opportunities," said BC Chong, Vice President of Technology and Business Development, ASE Electronics Malaysia. "ASE's design methodology and process technology will allow the industry to package large silicon die reliably into organic packages." ASE plans to offer

the newly developed large silicon flip chip package in body sizes from 27 mm x 27 mm up to 52.5 mm x 52.5 mm.

The new large silicon flip chip packages offered by ASE will utilize a high density, high-speed substrate provided by AMITEC. "We have researched a variety of substrate types and currently AMITEC is the only supplier capable of meeting the substrate specifications to ensure the reliable assembly of large silicon flip chip which includes a high glass transition temperature (T<sub>g</sub>) of 260°C," added Hilton. "The Amitec substrate provides the foundation from which we can build upon." The substrate technology offers line and space density of 10 microns, which greatly enables signal routability for high I/O devices. In addition, a low K dielectric of 2.55 between lines and layers ensure signal integrity and speed.

This joint development represents market synergy in which MTBS, an advanced package design and process development group works closely together with ASE, a leading subcontract packaging and test house to provide their customers with a complete and timely solution. With the increased demands placed on the package performance, it is MTBS's technology charter to design and develop packaging processes and methodologies that will enhance package and system performance. "We believe that we have a complimentary relationship in combining our developmental skills with ASE's manufacturing prowess," said Hilton.

#### **About MTBSolutions**

MTBSolutions, Inc. is a San Jose, California-based company and is the world leader in advanced microelectronic packaging technology for semiconductor, photonic and MEMS applications. MTBS clients include device makers, subcontractors and foundries. For more information, visit the website, <http://www.mtbsolutions.com>.

#### **About ASE Electronics Malaysia**

ASE Electronics Malaysia is a wholly owned subsidiary of ASE Test Limited (NASDAQ: ASTSF, [www.asetest.com](http://www.asetest.com)), the world's largest independent provider of semiconductor testing services, including front-end engineering testing, wafer probing, final production testing of packaged semiconductors and other test-related services. ASE Electronics Malaysia is located in Penang, Malaysia and provides a full range of IC packaging and testing services including 'turnkey' services. The company serves a large customer base in the communications, computing, industrial and automotive markets. Through highly automated manufacturing processes and state-of-the-art equipment, ASE Electronics Malaysia have the capabilities to assemble and test packages such as PDIPs, SOICs, SOJs, QFPs, TQFPs, BGAs, and Flip Chip. ASE Electronics Malaysia obtained ISO 9002 & QS 9000, certifications from NV Kema (Holland) in April 1993 & June 1998 respectively and ISO 14001 certification from SIRIM in October 1999. For more information, visit the website, <http://www.aseMAL.com.my>

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