

# ***Start-Up Offers Way to 'Fingerprint' Chips***

***Method is said  
to be cheaper,  
more reliable  
than blowing  
fuses or putting  
barcodes on IC  
packages***

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As chips become more valuable and subject more often to the vagaries of gray-market distribution, if not outright theft, there is a crying need in the semiconductor market for better ways to mark individual ICs than the traditional barcodes on packaging or fuse trimming with laser equipment.

Enter Siidtech Inc. of Beaverton, Ore., with its Silicon Fingerprinting concept.

Siidtech ([www.siidtech.com](http://www.siidtech.com)) this week is introducing ICID, a product that has applications beyond security considerations. It could also make chips easier to trace in product recalls, and give semiconductor manufacturers more data in yield problems.

ICID is now available for any submicron CMOS process, with pricing starting at \$100,000. The on-chip circuitry can be inserted in the place-and-route process during physical IC design, or dropped into the IC design as a custom cell, according to Siidtech.

Silicon Fingerprinting, through ICID, indelibly marks each die or element of semiconductor intellectual property (SIP) with a unique identifying number, Siidtech stated. With this technology, the use of SIP in IC designs can more easily be shown or demonstrated, possibly making it easier to sort out license and royalty issues in chip design and manufacturing.

Steve Sapiro, vice president of marketing for Siidtech and a co-founder

of the company, said there are two main applications for ICID and Silicon Fingerprinting: use by semiconductor manufacturers, and end-user products.

On the security side of the equation, the chip business has seen instances where gray-market distributors have resold chips at higher specified operating speeds than the chip is capable of; a 200MHz microcontroller can be sold as a 350MHz MCU, and the buyer is none the wiser to the deception until the part is put into the system.

With ICID, Sapiro noted, a chip buyer can learn all he or she needs to know about the part through the ICID data, which can't be altered or changed after the part is fabricated and packaged - unlike barcodes on packages or serial numbers on parts.

And what Siidtech is emphasizing is the lower cost of implementing Silicon Fingerprinting, since it is a quick add-in to the design process, and not an extra manufacturing or assembly step.

Intel Corp. and some other chipmakers have implemented other schemes to ID individual ICs. What Siidtech hopes to do is convince such companies that "Our

method could save them some time and money," Sapiro said.

Kuntai Yeh, an investment banker with Dain Rauscher Inc. who has worked in the semiconductor industry, said of Silicon Fingerprinting, "It's an interesting technology. Companies mostly use in-house solutions, such as laser trimming. (Siidtech's) solution is obviously more elegant."

For Siidtech, "The issue is going to be convincing companies to devote a pin to this," Yeh added. "Pins are valuable." How Siidtech could work its way in is to share access on a package pin with such IC features as the JTAG testing element, he said.

"There should be a market for it," Yeh said. "It's just a few transistors; you can find a space (for it) between bond pads."

Sapiro said the silicon area needed to implement ICID and Silicon Fingerprinting is about 100 by 100 microns, "a typical bonding pad."

Siidtech said ICID doesn't require its own pin on the device, and can work with the JTAG circuitry on a chip.

"Using ICID is a low-cost, high-value

proposition," said Sapiro. "It is small, dissipates no power when it is not being used and low power when it is used. The product is self-testing, noise-tolerant and can run at voltages as low as one volt."

During wafer test, the Silicon Fingerprint is stored in a chipmaker's database, along with such information as x-y location of the die on the wafer, wafer number, lot number, process flow number and any other data, including pass or fail, generated by the tester.

During final test, after scribing and packaging the die, the tester reads the Silicon Fingerprint and data such as pass-or-fail data, frequency bin data and SIP signature data (if relevant for tracking and royalty purposes), and stores it in the company database, Siidtech stated. When the part ships, the vendor reads and stores the part ID, along with customer information.

After a failed part comes back from a customer, the vendor reads the ID of the part. When failure analysis is completed on the part, failure data is put back in the database. A complete history of the part now exists from inception (wafer fabrication) to its death (failure).

If more than one field failure is detected, the Silicon Fingerprints are used to find out if a pattern exists - for example, if all of the failed parts came from the same wafer. Now the vendor has enough information to limit a recall to parts from just the one bad wafer.

Siidtech was founded in 1998 and is privately funded. It has a patent pending on the Silicon Fingerprinting technology.

In addition to Sapiro, the founders of Siidtech are Chi-Song Horng, president, and Keith Lofstrom, chief technical officer. Horng was a co-founder of both Personal CAD Systems Inc. (P-CAD), a supplier of PC-based electronic design automation (EDA) software, and I-Cube Inc., a networking chip vendor. Lofstrom has been involved in the analog/mixed-signal IC field for more than 20 years. Sapiro was a founder of CAE Systems Inc., a computer-aided engineering (CAE) start-up that was acquired by Tektronix Inc. (which later sold its CAE business to Mentor Graphics Corp.).

ICID is the first product from Siidtech.