



(#8390) Intel SmartDie(TM) Products Backgrounder

Intel SmartDie™ Products

Enabling Next-Generation Designs

Intel Corporation
Die Products Operation

ADDRESSING THE NEEDS OF SMALL FORM-FACTOR COMPUTING

New applications in the computer industry are characterized by lightweight, highly integrated product which combine traditional desktop functions with communications capabilities. As application complexity increases in products like mobile and embedded computers, PCMCIA cards and cellular phones, so will the need for space-saving assembly techniques. These trends will lead manufacturers to work directly with die-on-board assembly techniques. Intel's SmartDie products address the current industry trend toward miniaturization for these applications.

Advances in cost-effective laminate substrates and chip-on-board (COB) assembly techniques are also helping to drive the demand for die level products. To address the issues of yields and cost, Intel is delivering quality and reliability with fully-tested SmartDie products.

Intel SmartDie™ Products
Fully Tested at Speed and Temperature
Fully Supported
Same Price as Packaged Counterparts
<i>Intel's Industry Standard Architectures in Die Form</i>

PRODUCT FEATURES

For customers who want to provide optimal functionality in their portable computing and communication devices, Intel's SmartDie deliver via industry standard architectures, like Intel486™ microprocessors, 1-8 Mbit Flash memories and microcontrollers. These products are selected with the requirements of portable electronics in mind: 3.3/5V, power management modes and the smallest form factor available-- die. Die level products can offer a significant real estate and height savings over packaged units, enabling smaller and lighter systems.

SYSTEM COSTS

Until now, many customers have rejected the idea of manufacturing with die because it's "too expensive", "the yields are unpredictable" or "it's not reliable." This situation has changed, as it is Intel's goal to deliver SmartDie product quality and reliability levels consistent with packaged devices.

Quality and Reliability

Intel's SmartDie products deliver quality and reliability to ensure high assembly yields and low system costs. Full electrical tests (AC timings and DC parametrics) are performed at the die level to ensure that Intel's SmartDie performs like our packaged units. This die-level testing ensures operation over a 0-80° C temperature range and include a 10,000 program/erase cycle reliability screen for Flash memory devices. To ensure long term reliability and infant mortality levels consistent with packaged devices, Intel can provide Die Level Burn-In where required.

Intel also provides full documentation for design and layout for SmartDie products. This documentation includes die size, bond diagrams, x-y coordinates, substrate bias, and other related die information.

Die-Capable Contract Manufacturers- TAP

For customers who would like to take advantage of the benefits of SmartDie products but do not have the necessary experience or equipment to handle unpackaged die, Intel offers manufacturing assistance through its unique Technical Alliance Program (TAP). Intel has evaluated several contract manufacturers that are technically capable in the design, assembly and final test of systems using unpackaged die. These manufacturers can utilize Chip-On-Board (COB) or other direct Chip Attach techniques to manufacture cost effective systems on laminate circuit boards. Several are also capable of building multi-chip packages which would deliver several die in one surface-mountable package.

PRODUCT SUPPORT

In addition to the above manufacturing support, Intel's SmartDie products are also fully supported from the field and factory:

- Standard Intel and Distributor Sales Channels
- Full Product Documentation
- Factory Applications Support
- Failure Analysis and Correlation Report (FACR)
- Return Material Authorization (RMA)
- Change Control Notification on any changes affecting die form, fit or function

INTEL'S SmartDie PRODUCTS ARE BREAKING THROUGH THE BARRIERS

"Old Barriers"	Requirements	Intel's SmartDie Product Solutions
Too Expensive	Manufacturing/Assembly Yields System Reliability Component Costs	Fully tested die Die Level Burn-In Priced At Parity with Package Units
Lack of Die Availability	The right architectures Low voltage/power consumption Smallest Form Factor	Intel's Industry-standard architectures 3.3/5V, power management modes Intel SmartDie products
Poor Product Support	Sales and applications support	Standard sales/distribution channels Die-specific factory support Change Control, FACR, RMA

Smaller, Lighter, Faster

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