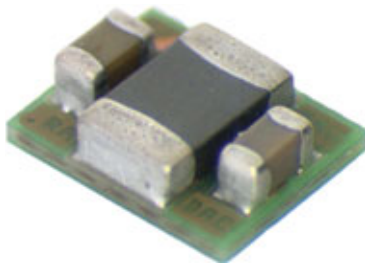


## TI MicroSiP™ Package - First high-volume embedded die packaging

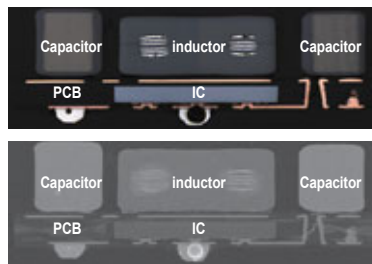
Die embedding into PCB laminated substrate has been developed for several years, but Texas Instruments is the first to use this packaging technology in high-volume production. TPS8267x are high-frequency synchronous step-down dc-dc converters optimized for battery-powered portable applications. They use a new package of TI, MicroSiP™, which integrates a silicon IC with passive components in a BGA-format.



TI MicroSiP™ Package  
(Courtesy of System Plus Consulting)

### Technology analysis

MicroSiP™ modules of TI use the Embedded Component Packaging (ECP®) process from AT&S. Most of the packaging assembly operations are done at the panel-scale level, and a fan-out area, with double side 3D interconnection routing path, is provided. This packaging technology extends the package size beyond the IC surface area and allows for mounting additional components such as discrete and passives on top of the laminate SiP module. The ball pitch is 1.0mm and features 8 pin-count IOs.

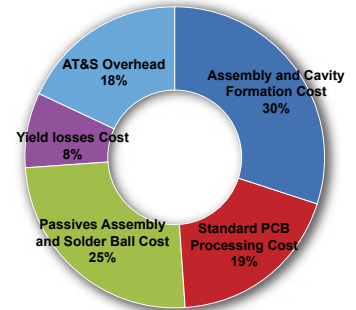


Package Cross-Section  
(Courtesy of System Plus Consulting)

### Cost analysis

The packaging is done on 18"x24" panels, allowing assembling more than 18,000 packages simultaneously. Specific steps of this packaging (like IC placement) represent the main part of the packaging cost. The full reverse costing report combining technological analysis of the devices and detailed manufacturing cost is already available.

2012 ECP packaging cost breakdown (Medium yield)



2012 ECP Packaging Cost Breakdown (Medium Yield)  
(Courtesy of System Plus Consulting)

### Recent reverse costing reports

- Wispry MEMS RF Antenna Tuner
- EPC2010: GaN Power Transistor
- ST LSM330DLC: MEMS IMU
- Invensense MPU-6000: MEMS IMU

System Plus Consulting develops Costing Tools and performs on demand Reverse Costing studies of Semiconductors (from Integrated Circuits to Power Devices, from Single Chip Packages to MEMS and MultiChip Modules) & of Electronic Boards and Systems.



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