INSIGHT SIP

Who Are We

What Do We Do

Why Us
• Overview
• LTE and Telephony
• Antenna Design & Antenna-in-Package
• Custom SIP
• Bluetooth Low Energy
• Summary
Established in 2005
- Founded by actual CEO and CTO
- Core team from National Semiconductor

Product Lines
- Turn-key design services and creative packaging solutions
- Standard modules for wireless electronic industry

Experts in RF System-in-Package (SiP) and Antenna-in-Package (AiP)
- Fabless company
- Design & industrialization expertise
- Design team: 9 PhD – 6 MSc
- 12 to 15 new projects per year

Locations
- Europe – HQ and Technical team in Sophia-Antipolis (France)
- North America – Subsidiary in Denver (USA) since 2008
- Asia – Sales office in Tokyo (Japan) since 2008
- Global network of distributors
Complete 3D RF System Including

- Multiple Semiconductors Dies, Systems-on-Chip (SOC), Analog Functions, Digital & RF Functions, Passive Functions, Clocking, Power Management, Interface to Application on PCB

- Made of Heterogeneous Technologies – CMOS, RF-CMOS, GaAs, SiGe, Quartz, Advanced Packaging Techniques, 3D packaging, IPD, Passive SMD, Organo-Metallic Substrates, Multilayer Ceramic Substrates, …

Benefits of SiP

- More Function in Less Space
- Optimized Cost and Reduced Design Cycles
Core Competence

- Any Wireless Connectivity to Fit Any Device Space
- System-in-Package (SIP) Or Module Design Approach
- Highly Integrated Antenna Design Expertise
- Unique Methods to Estimate Package Size and Performance
- Multiple Technologies: BT, FR4, LTCC, HTCC, Thick Film, PCB, IPD,…
- Multiple Assembly Methods: SMT, Wirebond, Flipchip, Embedded Dies…
- Track Record of Delivering Smallest Solutions

Technical Successes

2G, 3G, 4G/LTE, 60GHz, ANT, Bluetooth®, Bluetooth Smart®, GSM/W-CDMA, Glonass, GPS, ISM, NFC, RFID, TransferJet, UWB, WHDI™, WiFi, Zigbee®, ….

Benefits To Our Customers:
Smaller, Faster, Lower Cost
OUR VALUE PROPOSITION

DESIGN SERVICES
- Feasibility
- Design Implementation

BLE MODULE
- Design In-house
- Module Maker I/F

Manufacturing with Established Partners
Amkor, ASE, AT&S, Barry Ind, Kyocera, SPIL, Tong Hsing, ...

CUSTOM SiP/Module
BLF SiP Catalog, Licensed, or Custom

From Assessment to Production
Track record of Telephony based module/SiP designs

Customers:
- Tiers1 handset manufacturers
- Tiers1 chipset manufacturers
- Tiers1 sub-system manufacturers

Covered all generations – GSM/WCDMA/3G/LTE

Experience at multiple levels
- Miniature RF Front-End Module design
- Miniature PCB Antenna design and Antenna tuning modules
- Complete Data Card design
3G/LTE duplexers
- SAW or BAW
- LTCC and SMT matching

Legacy GSM filtering
- Rx filters (SAW)
- Tx Low Pass Filters (LTCC)

Multi-throw switch
- 12 or more throws
- MIPI or SPI interface
- Silicon on saphire
- Low loss and high intermodulation

Small size
- 4 x 5 x 1 mm for 4 dplx
- High Isolation (ca 55 dB)

LTCC Technology
5 Band GSM/W-CDMA Module

- RF SiP based on Silicon IPD with Laminate Substrate
- Transceiver
- Passives on IPD
- Co-Design with Substrate
- All Transmit Baluns are moved from PCB to BGA
  - 50% overall PCB Footprint Reduction
  - Reduces BOM
  - Eliminates messy Design Task on PCB

Application:

- Mobile Handsets
Antenna Technology for 2/3/4G Frequency Bands

Antenna Matching Module for Smartphone

- Interface between Antenna and RF Front End
- Improves return loss, thus allows lower power consumption
- Part of Dynamic tuning system

Integrated PCB Antenna for M2M Module

- Printed Structure
- Covers 820MHz – 2.2Ghz
- Extension to cover all LTE bands possible
- Replaces expensive ceramic/metal antenna
Antenna In Package (AiP)

- 3D stack SiP 8x12x1.5mm:
  - 4 layer substrate
  - MCU bare die
  - 2.4GHz Radio bare die
  - Side 2.4GHz PIFA Antenna

- Application:
  - Wireless USB
UWB ANTENNA

- 3D stack SiP 7x7x1.5mm:
  - 4 layer substrate
  - MCU bare die
  - UWB Radio bare die
  - Miniature Patch Antenna
- BW > 1 GHz at 7.5 GHz
- Application:
  - High Speed Data Transfer up to 500 Mb/s
SIP EXAMPLES

- LTCC WiFi Integrated Filter/Baluns
  - 5 x 5 x 0.8 mm
  - 7 x 7 x 1.5 mm

- WHDMI Transmit Display Mini Card
  - 44 x 27 x 5 mm

- 2 die SiP, Secure NFC Contact-less
  - 11 x 15 x 1 mm

- µSD 3D SiP Device, Smart Secure
  - 6 x 4 x 1 mm

- GPS Module, Baseband, Radio, SMD
  - 12 x 12 x 1 mm

- 4 die SiP, BT ASIC Memories
  - 44 x 27 x 5 mm
60GHz Antenna
- Low Cost Beam forming antenna
- Miniature Front-end-Module

Applications
- In-house High Speed Data
- Point to Point Radio Link

Advanced Design
60GHz Front End Module

- Substrate
  - Flip chip Si
  - Controlled Impedance Path
  - Antenna to 60 GHz PA or LNA

- Mother Board
  - Digital BB, control, power and ground
Insight SiP has a wide range of solutions based on existing design framework (eg AiP etc …) in order to offer extended capabilities in the BLE domain:

- « Own Brand » ready to use modules
- Licence of module design to customers
  - Replacement of chipset with different choice
  - « Combo » modules (BLE/WiFi, BLE + Sensor)
  - Different form factor or content
- Custom BLE integrated into body network device

**Values To Our Customers:**

- Relies on Insight SiP Unique Technology and Expertise
- Allows to Focus on Embedded Systems (eg SW development) rather than Design Implementation
- Enables Faster Time-to-Market
- Provides Faster ROI
LONG-TERM PARTNERSHIP WITH OUR CUSTOMERS

- Assist our customers from design early stage to volume production
- Multiple design projects

LEADER IN RF SiP DESIGN

- Extensive design track records
- Partnership with world class SiP & module manufacturers

**Benefits To Our Customers: Smaller, Faster, Lower Cost**
THANK YOU