Ibero-America IC Design Contest (Silterra, Chipus & ISTEC)

Florida International University – April 25, 2013

Foundry Partnership For Success
2013 IC Design Contest

Background:
The IC Design Contest is a collaboration between Silterra Malaysia, a leading Malaysian foundry, Chipus Microelectronics, a Brazilian analog IP design house, and the Ibero-American Science & Technology Consortium, ISTEC.

The goals of this contest are:
- For Silterra, as an ISTEC partner, to help foster research and innovation in Ibero-America
- To introduce Silterra as a foundry of choice for Latin-American IC designers
- To allow designers in the region to have their designs validated in silicon

Details:
- The contest will be open to university, R&D Institutes and R&D company departments, with access to EDA tools compatible with Silterra PDKs
- The designs to be based on Silterra’s 0.18 micron technology
- Details about design categories will be disclosed soon

Continued
2013 IC Design Contest

Details (cont.):
- Contest to run throughout 2013
- The best design in each category will be chosen by using a figure-of-merit (FOM) to be announced later
- Access to Silterra’s PDKs/technology specs to be provided to the contestants
- The winner design in each category will be offered a free shuttle in a Silterra MPW for silicon verification

Preliminary information is provided at the contest website:

www.icdesigncontest.com

Further details on the IC design contest to be updated on the contest website.
SilTerra Overview

SilTerra headquarters located at Kulim Hi-Tech Industrial Park, Malaysia

- Worldwide reachable Sales offices in the U.S. and Taiwan
- Business Partners in China, Japan, Korea & Europe

Production started in Q1 2001

- Top Fab of 2002 (Semiconductor International)

Workforce Competency

- >1200 employees
Our Core Business

Offer Foundry Solutions for Advanced CMOS & Specialty Technologies

- Leading foundry-matched logic technologies (T-like & U-like)
- Mixed-signal and RF technologies
- Leading-edge high voltage technologies
- Advanced Analog technologies (BCD, V-Tr FET)
- MEMS
- Non-Volatile Memory (OTP, MTP and eFlash)
SilTerra’s Focused Strategies

Provide Leading Foundry Matched Processes
- Logic, mixed signal and RF
- High voltage technologies for display drivers
- BCD/PowerMOS technologies for Smart Power IC
- Embedded NVM tech for consumer applications

Offer Specialized Technologies
- Custom processes to meet special requirements

Deliver World-class Manufacturing Performance
- First time proto success
- 6 Sigma QC program for continuous improvement in yield, cycle-time & cost reduction

Leverage IP and Design Network for Complete Design Solution
- Application driven IP strategy
- Best-in-class IP blocks
SilTerra Market Positioning

Focus in high volume & high growth market applications

Digital Consumer Chipset
Display Drivers
Wireless Connectivity
Wired / Networking chipsets
PC Connectivity
& Others

Silterra Positioning

Mass Production
In Development
Our Target Market

**Wireless**
- Mobile TV Tuner
- WLAN / GPS
- RF Transceiver
- Bluetooth Link
- FM Tuner
- GPS

**Comms**
- Printer Fax Modem
- Router (xDSL)
- Switches
- Home Gateway
- USB Modem

**Computing**
- PCIe-SATA Bridge
- PCIe-USB Bridge
- SSD Controller
- ROM/RW Drive
- PC Audio

**Consumer**
- Display Driver
- Touch Controller
- DTV T-Con
- SD Memory Controller
- Digital Photo Frame
- USB Flash Drive
- MP3 / PMP
Logic Technology Leadership

- Leading foundry compatible processes
- High volume production with stable yield
- Intercept sweet spots of target application segments
- Offer cost effective migration path (0.18µm to 0.11µm)
- Offer 130nm and 110nm Aluminum BEOL
- Provide high quality design kits
- Supply application optimized IP blocks
RF CMOS Technology Leadership

- Advanced RF CMOS technologies
  - High performance, low noise processes
  - Triple-well, high value resistors, thick metal inductors, finger and MiM caps
  - Stacked MiM Caps (4fF/μm²)
  - Redistribution Layers
  - Offered 0.18, 0.16, 0.13μm & 0.11μm RFCMOS nodes
  - 0.13 & 0.11 RFCMOS Al BEOL in development

- Accurate analog models
  - MOSFET characterized to 20GHz
  - Support BSIM3, BSIM4 & PSP Models

- Comprehensive PDK
High Voltage Technology Leadership

- Advanced processes optimized for display drivers
  - 0.22µm to 0.11µm
  - Extremely low leakage
  - Industry leading aggressive SRAM cells (25% smaller) for high resolution displays
- Three HV modules available: 6V, 21V and 32V
- Industry first C13HV-1TSRAM in production
- Winner of 2009 Frost and Sullivan Industrial Technologies Award
- High volume production for top tier customers
- Customized design libraries
- OTP Macro & eFuse bitcell are available
- MTP and 90nm HV is in development
POWER MOSFET Value Propositions

- 0.18μm Power MOSFET Technology
- Trench-type Gate electrode
- Low Rdson MOSFET devices (20V, 30V, 60V and 75V Vbd)
- Low mask count
- Superb yield and device performance
- Target for DC-DC Converter socket in Battery charger and Notebook
- Design Service supported
180nm BCDMOS Value Propositions

- Integrated with 0.18um logic CMOS 1.8/5V with HV LDMOS (20V/24V/40V). 50V/60V in development.
- Optimized for applications requiring high voltage CMOS with high digital gate counts with thick metal.
- Integrated with SilTerra 0.18um RFCMOS processing capability for complete power equipped wireless SoC.
- Skillful resurf technique allows wide range of breakdown voltage to be obtained thru layout optimization for HV transistors.
- TCAD calibrated for HV LDMOS allows Pre-defined HV LDMOS with various on-resistances optimized for BVDss and area.
- Analog and passive options (MiM, HRI, UTM, NPN/PNP, Zener, SBD) fasten the design.
- Cadence proven foundry design kit.
Platform-Based IP Strategy

- Best-of-breed application focused IP portfolio
  - Analog blocks, high speed I/Os, processor cores, memories
  - Foundation design libraries
- Silicon proven IP blocks
  - Enable fast design cycles and first-time-success
- Extensive partnership network to provide IP and design support
  - Custom IP to meet specific design requirements
  - Fast turn-around time
Complete Foundry Design Ecosystem

Foundry Design Kit (DR, Models etc.)

Foundation IPs (Std Cell, SRAM, I/O)

Design IPs (CPU Core, Hi Speed Interface, Conversion IP, Embedded Memory, Analog IP)

Process Design Kit (Cadence, Mentor Synopsys)
Enabling System on Chip

Pervasive SoC IP

Library Platform
- Standard Cells
- Embedded Memory
- I/O Functionality

High Speed Interfaces
- DDR
- Serial PHYs
  - USB 2.0 PHY
  - SSTL1.8
  - LVDS

Analog IP
- Voltage regulator
- Bandgap Reference
- Analog MUX

CPU
- ARM7
- ARM9
- MIPS 4Kc

ARM Core

DSP

USB PHY

ADC

Regulator

Signal Data Conversion
- Analog-Digital Converter
- Digital-Analog Converter
- Delay Locked Loop
- Phase Locked Loop

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Non-Volatile Memory Solutions

Partner Tech Applications

OTP eMemory
All Logic
All HV

MTP Synopsys
C18G/C16G
C13HV/C11HV

eFlash SST
C18G

ROM Code
Fuse Trim
Gamma Control
Analog Matching

Resistor

RFID
Touch Controller

Smart Card
MCU

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Design Solutions Partners

Design Tools
- Cadence
- Mentor Graphics
- Synopsys

Library
- Artisan
- INNOPower
- UNIVE
- Synopsys

IP
- ARM
- Keys ASIC
- IPGoal
- SST
- Moai

Design Service
- Essensium
- Goya
- UNIVE
- KeyASIC
- IPGoal

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Fab 1 Overview

- Wafer size: 200mm
- Equipment is capable down to 90nm
- Designed capacity: 40,000 WSPM
  Installed capacity: 38,000 WSPM
- 100,000 feet² Class 100 clean room
- SMIF Class 1 mini-environments
- 100% ASML scanners (I-Line, DUV & ArF)
Technology Portfolio

- **Main Stream**
  - Logic
  - HV
  - MX/RF
  - MTP/OTP
  - eFlash
  - BCD
  - Power MOS

- **More Than Moore**
  - MEMS

- **Technology Nodes**
  - 90nm
  - 110nm
  - 130nm
  - 153nm
  - 160nm
  - 180nm
  - >250nm

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Note: Left edge of box is start of pilot production
CL130MixVT is the combination of C13G and C13HVT.
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Silicon Verification Vehicle

- Multi-project design and IP verification service
- Typical test chip size (5mm x 5mm)

1Q12-4Q12 MPW SCHEDULE

Note:
- The above schedule is subject to change
- The final GDS database to be submitted before the shuttle closing date
- C13HV and C13AL MPW schedule is subject to foundry discretion
Why SilTerra?

- Proven Leading Foundry Matched Process
- Leader in HV CMOS Technology
- Complete Foundry Design Ecosystem
- First Time Proto Success
- High Yielding Wafers
- Cost Competitiveness
- Turnkey Service (Design to Backend)
Contact Information

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USA
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Taiwan Office
HsinChu City
Taiwan
T: 886.3.516.5577
Corporate Location

Corporate headquarters and manufacturing facility are strategically located in KHTP, Malaysia.

Kulim High Tech Park
- 30km from Penang
- No typhoons and geologically stable
- Access to highly educated technical labor force
- Current tenants include Intel, First Solar, BASF Infineon, Celestica, Fuji Electric, Hoya, MEMC, Toyo Memory, Asyst, Novellus and others
- High quality infrastructure
  - Reliable power supply
  - Malaysian Cybercity status
  - High capacity fiber optic network
  - Abundant water supply from 3 dedicated reservoirs