Circuits Multi-Projet

MPW Services Center for IC / MEMS Prototyping and small volume productions

http://cmp.imag.fr

Grenoble - France
CMP is making **available and affordable world class advanced CMOS /MEMS technologies** as well as **mature and/or niche market technologies** to cover a wide range of possible applications.

To make **economically and technically affordable** the IC prototyping, CMP share the manufacturing cost of IC prototyping and small volumes.

It provides **access and supports for the use of Design Kits** and offers several **complementary services** for the packaging and tests.
1983–1984 : development of NMOS, launching CMOS
1984–1986 : development of CMOS
1987–1989 : abandon NMOS, increase the frequency of CMOS runs
1990–1994 : launching Bipolar, BiCMOS, MESFET GaAs, HEMT GaAs, advanced CMOS (.5 µ TLM)

1995–1997 : launching CMOS, BiCMOS and GaAs compatible MEMS, DOE, deep-submicron CMOS (.25 µ 6LM)
1998 : launching surface micromachined MEMS, abandon MESFET GaAs
1999 : launching SiGe, .18 µ CMOS
2001 : .35 µ HBT SiGe BiCMOS
2003 : 130 nm CMOS
2003 : PolyMUMPS, MetalMUMPS, SOIMUMPS
2004 : 90 nm CMOS
2005 : ASIMPS, SUMMIT/SANDIA

2006 : 65 nm CMOS GP
2008 : 45 nm CMOS, 65 nm SOI
2009 : 40 nm CMOS
2010 : 130 nm 3D-IC, TEZZARON/GLOBALFOUNDRIES, 20 nm FDSOI, LETI – CEA
2011 : 150 nm GaAs pHEMT, TRIQUINT, 180nm CMOS CIS, TOWERJAZZ

2011 : 28 nm CMOS, STMicroelectronics
2012 : 28 nm FD-SOI, STMicroelectronics, 0.18µ CMOS/HV-CMOS, ams
2013 : Analog 130nm H9A CMOS, THELMA MEMS, STMicroelectronics
2014 : 130nm SOI FEM ST / Blk micromachining ams / DALSA MEMS / PiezoMUMPS
2015 : BCD8SP ST/ Micralyne MEMS / Open 3D CEA
Coherent and complementary MPW services offer

- THELMA MEMS 2013
- PiezoMUMPS & MEMS DALSA 2014
- Techno MEMSCAP 2009
- Micralyne 2015
- ams Bulk micromachining 2014
- 0.18µm HV ams 2012
- 0.35 H-C ams 2012
- SiGe ams 2001
- 180nm BCD 2015
- 130nm B9MW 2011
- 65nm GP Bulk & SOI 2006 - 2008
- 28nm Bulk & FDSOI 2011 - 2013
- 55nm BiCMOS 2015
- 65nm 3D-IC 2015
- Open 3D 2015
- 14nm 2016

**Bold:** 2015 CMP portfolio

**200x:** first year of the techno release
Historic success story of ST advanced CMOS MPW services through CMP:

Manufacturing through CMP:
- 130nm: 562 since 2003
- 65nm: 548 since 2006
- 28nm: 96 since 2011

New price:
- 130nm: From 1.8k€/mm²
- 65nm: 9k€/mm²
- 28nm: 6k€/mm²

Cross section view - Bipolar HV transistor
Power Management.

A 55 million transistor many-core chip
Courtesy of B.BAAS et al, University of California, Davis

CMOS 65nm
Since 2006

28nm
Bulk/FDSOI
High Voltage / Power applications:
Amplifier, Smart Power, Sensors, ...

Attractive prices: 1k€/mm²
Robust/mature technologies

2015 New offer
2,6k€/mm²
MPW in June and Nov.

Fully compatible mixed signal design platform
Outstanding power devices generator/ratings
Attractive 10µm thick copper pads/areas
MEMS services / fructuous collaborations:

Based on two thick SOI structure layers and gold metallization on the top surface.

Frontside Bulk Micromachining on ams 0.35µ processes.

Backside Bulk Micromachining on ams 0.35µ processes.

PolyMUMPs

MetalMUMPs

PiezoMUMPs
Manufacturing share among CMOS technologies:
Design Kit diffusion and support:

- Data 2014
- N. America 69
- S. America 6
- Europe 156
- Asia 34
- Other 24
Wire bonding:
- Classic and custom packages
- Cabling plan check up
- Ceramic and plastic
- Wedge and ball bonding
CMP-CEA LETI Open 3D Tool Box:
- Objectives: open up heterogeneous integration and advanced packaging and stacking,
- Offered on 350/130/65/28nm CMP MPW services
- Rise access to advanced packaging at MPW level!
- Share silicon and post processing costs, supports users in their developments

Tools:
UBM, Bump, Copper Pillar, TSV

Assembly options:
Flip chip on substrate, interposer and die stacking
Tezzaron-GlobalFoundries 3D-IC offer:
A CMC-MOSIS-CMP collaboration!
CMP offered its expertise on PDK development to combine GF and Tezzaron tools

Regional offer exchanges:
For MPW completion and close user support
Ex: Collaboration with CMC: ams/ST-28nm ↔ MEMS

Advanced prototyping partnership (on 28nm FDSOI):
Regional offering and distribution for Asia and North America with VDEC and CMC partnerships
ams CMOS Bulk micro machining:
Mixed CMOS/MEMS processes

IC self power:
Photocell package cover

MIMOSA precise dicing technology:
Deep trench dicing

Open 3D tool-box: UBM/MicroBump/TSV/interposers:

(Courtesy AMS)
Silicon-Impulse
Your prototyping partner

Help COMPANIES LAUNCH innovative products powered by leading edge semi-conductor technologies
Silicon Impulse

Industrial needs
Idea

PRE-SERIES LINE
Single entry point along product maturation

28nmFDSOI design center initiative

ECO SYSTEM

SKILLS

R&D
IPs
Services

• INDUSTRIAL IC PLATFORM
• CUSTOM DESIGN SOLUTIONS
• INDUSTRIAL MPW SHUTTLE
• EXPERTISE & COMPETENCIES
• KNOW-HOW TRANSFER

FOUNDRIES

SILICON

DKs
Silicon
Manufacturing

ONE STOP SHOP

SILICON

Innovative products
Testchips
Production

Industrial needs
Ideas

• INDUSTRIAL IC PLATFORM
• CUSTOM DESIGN SOLUTIONS
• INDUSTRIAL MPW SHUTTLE
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ONE STOP SHOP

Single entry point along product maturation
To summarize

CMP offers a turnkey IC and MEMS MPW service

CMP opens up research developments

CMP transfers researches and developments to MPW services

CMP is a key partner/subcontractor for your research prototyping and small production needs.
Thank you ! Thank you ! Thank you ! Thank you !

UMS 3040 CNRS/G-INP/UJF

DATE Meeting

http://cmp.imag.fr