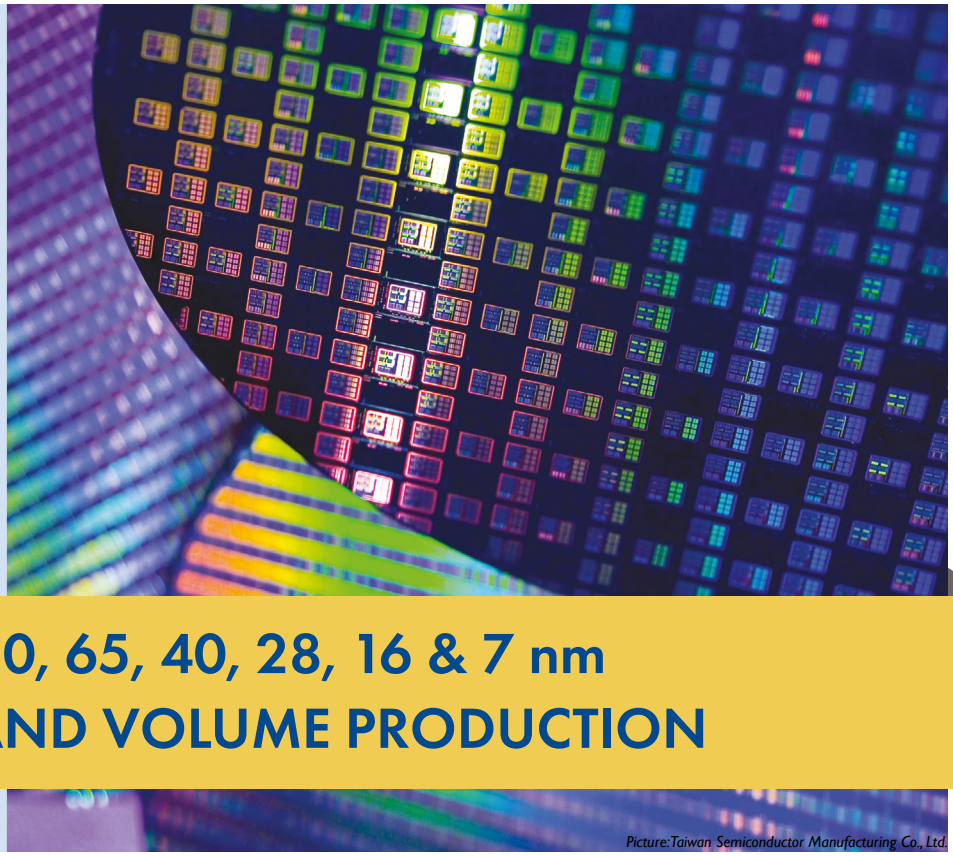

Picture: Taiwan Semiconductor Manufacturing Co., Ltd.

TSMC 0.13 µm - 90, 65, 40, 28, 16 & 7 nm PROTOTYPING AND VOLUME PRODUCTION

EUROPRACTICE-IC offers TSMC Multi-Project-Wafer and Volume Production services in deep submicron CMOS technologies to both academic and private sectors.

Why EUROPRACTICE?

- Affordable and easy access to Prototyping and Small Volume Production services for academia and industry.
- MPW (Multi-Project-Wafer) runs for various technologies, including ASICs, Photonics, MEMS and GaN.
- Advanced packaging, system integration solutions and test services.

Why TSMC?

- Semiconductor technology leader. Committed foundry providing record lead times for all technologies.
- Complete in-house library ecosystem together with a fully equipped and easy to install PDK.
- Flexible block sizes for MPW, including mini@sic solutions for particularly small designs in the 65nm, 40nm, 28nm and 16nm technologies.

TSMC University FinFET Program

EUROPRACTICE-member universities can now access the TSMC N16 FinFET technology at special pricing. Selected universities can also gain access to the cutting-edge TSMC N7 FinFET.

Find out more:

Technology Highlights

7 nm

TSMC 7nm provides highly competitive logic density and industry-leading power and performance. It enables a broad array of applications, ranging from high-to-mid end mobile, consumer applications, AI, networking, 5G infrastructure, GPU, and high-performance computing.

Since it is classified as a leading node technology, access to TSMC 7nm is subject to review and approval by TSMC.

16 nm

The 16nm technology is the first FinFET solution offered by TSMC. It provides superior performance and power consumption advantage for next generation high-end mobile computing, network communication, consumer and automotive electronic applications.

28 nm

The TSMC 28nm process offers new design methodologies compared to the 40nm technology. It allows to deliver higher performance, save more energy and design eco-friendlier products. Using high-k metal gate and providing multi pitch libraries, the 28nm technology is the most performant planar mainstream solution that evolved through the years due to constant enhancements in the manufacturing process. It supports a wide range of applications, including CPUs, GPUs, high-speed networking chips, smart phones, APs, tablets, home entertainment, consumer electronics, automotive and IoT. Moreover, the 28nm RF (28HPC+ RF) technology provides support for 110GHz mmWave and for 5G mmWave RF. EUROPRACTICE offers its customers access to general MPW runs together with up to four mini@sic runs per year.

40 nm

The 40nm process integrates 193nm immersion lithography technology and ultra-low-k interconnection technology to increase chip performance, while simultaneously lowering power consumption. It is also a platform that has extensions such as HV and NVM. In addition, TSMC has a large standard cell library offer (multi VT and gate lengths) for power optimization.

The 40nm GP process technology aims for high performance applications, namely CPUs, GPUs, game consoles, networks, FPGAs and hard disk drives. At the same time, the 40nm LP process targets smartphones, digital television (DTV), Set-Top-Box, game and wireless connectivity applications.

65 nm

It is a very cost-effective mainstream technology that supports a wide range of applications, such as mobile devices, computers, automotive electronics, IoT and smart wearables. It is particularly suitable for RF applications with an FT of 160GHz. The 65nm process is well supported by MPW runs, including five mini@sic runs per year.

0.13 µm

TSMC's 0.13µm is a cost-effective technology with a copper backend. Today, it sees broad application in consumer electronics, computers, mobile computing, automotive electronics, IoT and smart wearables.

TSMC also offers 0.13µm BCD+ process. This is a new platform for the next generation high voltage technology. It is improving on 0.18µm due to its lower power and smaller footprint. It is also well validated for automotive applications.

Technology Details

0.13µ BCD Plus	0.13µ G MS/RF	90nm LP and G MS/RF	65nm LP and G MS/RF
SVT, LVT, native	SVT, HVT, LVT, native	SVT, HVT, LVT, ULVT, native	HVT, SVT, LVT, Native, M-Low VT
Hipo resistor	Hipo resistor	MIM Capacitor + MOM	Unsilicided PO resistors
MIM + MOM capacitors	MIM Capacitor	M3 - M9 Cu	MIM Capacitor
M4 - M6 Cu	M3 - M8 Cu	Triple Well	M3 - M9 Cu
NBL and wells	Triple Well	Ultra thick metal	Triple well
LP (core 1.5V)	Ultra thick metal	LP (core 1.2V) (2.5V or 3.3V I/O)	Ultra thick metal
LP (I/O 5V or 3.3V/5V)	Core 1.2V	G (core1.0V) (I/O 1.8V or 2.5V or 3.3V)	LP (core 1.2V) (I/O 2.5V or 3.3V)
HVMOS up to 36V	I/O 2.5V or 3.3V		G (core1.0V) (I/O 2.5V or 3.3V)

40nm LP and G MS/RF	28nm Logic/RF HPC (+)	16nm FinFET Compact	7nm FinFET
HVT, SVT, LVT, native	ULVT, LVT, SVT, HVT, UHVT, EHVT	Low NoiseVT,ULVT,LVT,SVT,HVT	ULVT,LVT,SVT
N-WELL, OD, Poly resistor	NW, OD, High-R resistor	NW,TiN High Resistor	NW,TiN High Resistor
MOM Capacitor	MOM capacitor	MOM capacitor	MOM capacitor
M3-M10 ELK Cu	M2-M10 ELK Cu	HD MIM decoupling capacitors	HD MIM decoupling capacitors
Triple well	Triple well, Deep N-Well in option	M6 to M13 ELK Cu	M9 to M15 ELK Cu
Ultra thick metal	Ultra thick AL RDL	Last metal level in Al pad	Last metal level in Al pad
LP (core 1.1V) (I/O 1.8V or 2.5V)	Core 0.9V	Triple well, Deep N-Well in option	Triple well, Deep N-Well in option
G (0.9V) (IO 1.8V or 2.5V)	I/O 1.8V or 2.5V	Core 0.8V	Core 0.75V
		I/O 1.8V	I/O 1.8V