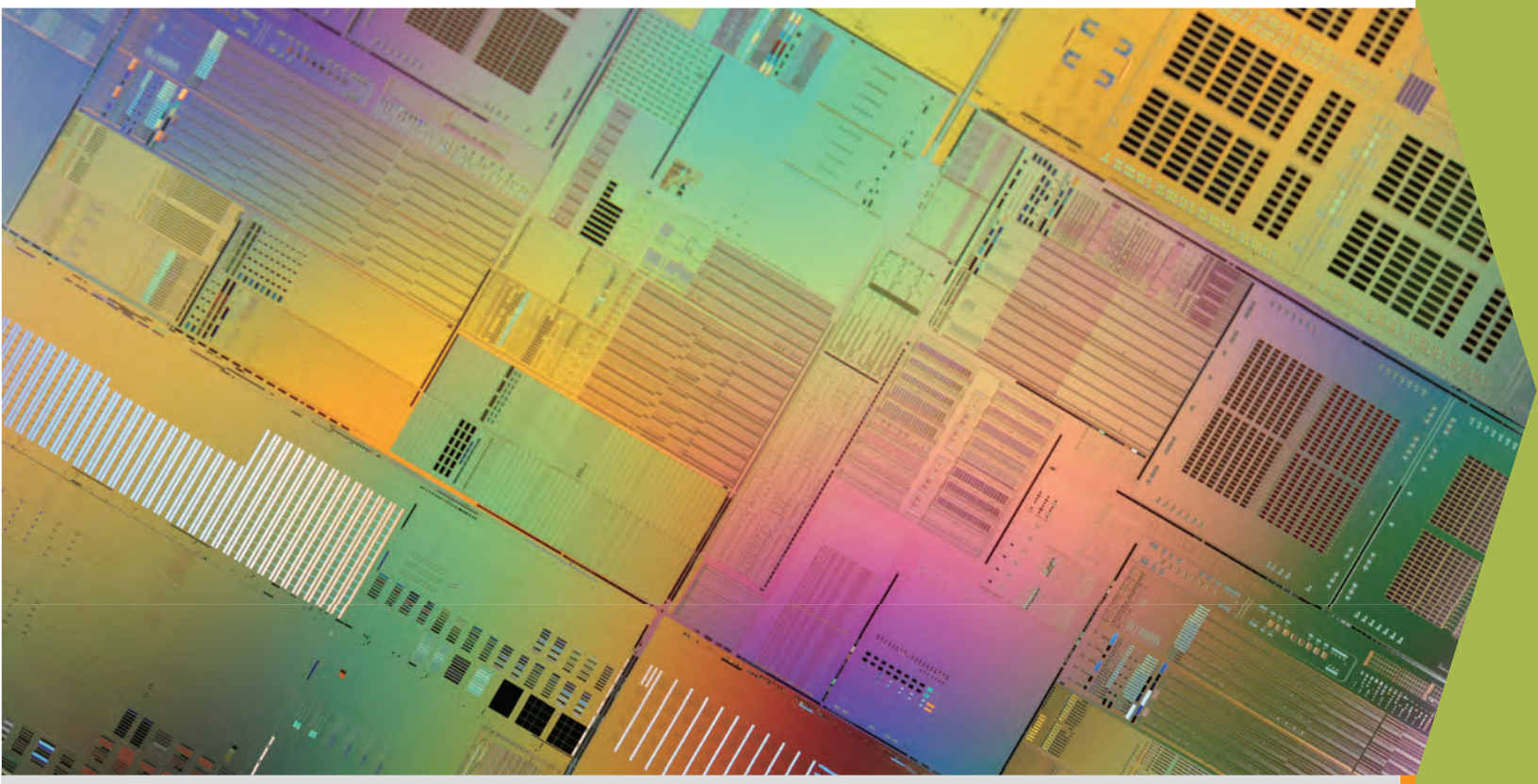
FOUNDRY LEADERSHIP FOR THE SoC GENERATION

WWW.UMC.COM

eNVM

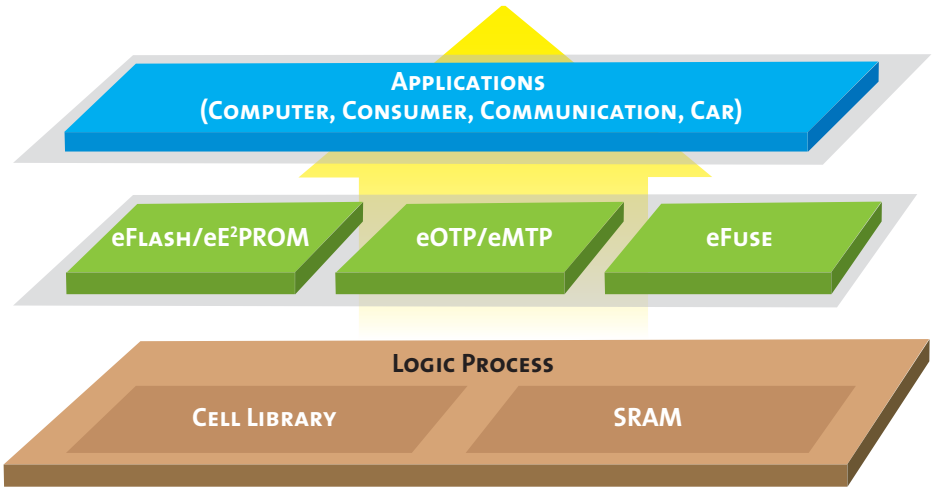
Embedded Non-volatile Memory



UMC

Embedded Non-volatile Memory

Embedded non-volatile memory (eNVM) has become an important and essential IP that adds flexibility to electronic products and helps accelerate time-to-market. UMC offers state-of-the-art embedded non-volatile solutions to meet a variety of embedded system applications. High quality embedded non-volatile memories (eFuse, eOTP, eMTP, eE^{2}PROM and eFlash) can be used for trimming, redundancy, data encryption, ID, coding and programming.



Comprehensive Embedded Non-volatile Memory

There are many types of eNVM available in the market, differentiated by their endurance. For example, eFlash, eE^{2}PROM and eMTP can be programmed multiple times, whereas eOTP and eFuse can only be programmed once. eE^{2}PROM has excellent endurance among these five solutions, but the trade-off is larger macro size within high density memory. To leverage density and cost, eFlash and eE^{2}PROM are recommended for those high density NVM applications such smart card, SIM card, MCU, etc. On the other hand, eMTP and eOTP can be recommended for medium density NVM applications such PMIC and display driver IC. For lower density eNVM requirements in general purpose applications, eFuse is suggested.

Wide Range of eNVM Solutions

Key Features	eFlash	eE^{2}PROM	MTP	OTP	eFuse
Erasability	Electrical			UV/X*	X
Endurance	10-100K	500K	1~2K	1	1
Program Voltage	Built-in Charge Pump			External/Built in	External Source
Density	~4M bits	~256K bits	~512K bits	512K bits/2M bits*	~4K bits
Extra Mask	~10	~10	0~1	1/0*	0

*Oxide rupture

Full Technology Node Coverage

Based on the demanding requirements for increased embedded memory density, higher logic circuitry and IP performance, UMC's eNVM technology has provided complete embedded memory solutions for 0.35um to 65nm and beyond. These memory offerings are based on a logic/MM process backbone for reliable and compatible eNVM IP integration for customer SoC designs. With UMC's logic embedded non-volatile memories, customers can adopt standard cell and I/O libraries easily and directly to help customers minimize design efforts. UMC is also developing next generation technology for customers' future migration needs.

Available and Developing

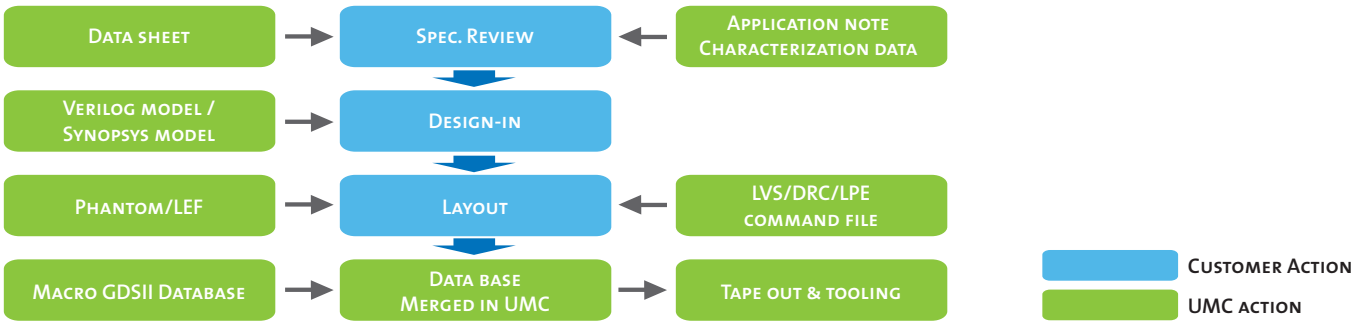
Node/IP	0.35um	0.25um	0.18/0.162um	0.13um	0.11um	90nm	65/55nm	40nm	28nm	22nm
eFlash	√	√	√	-	√	-	√	√	D	D
eE²PROM	√	√	√	-	√	-	-	-	-	-
eMTP	-	√	√	√	√	-	-	-	-	-
eOTP	-	-	√	√	√	√	√	√	√	D
eFuse	-	-	√	√	√	√	√	√	√	D

Note: "D" means Developing

Easy-to-use Reference Design Flow

UMC's comprehensive design and tape out kits help streamline product development as well as speed time-to-market for Customer SoC designs.

Design Support Flow



The Best Foundry Choice for eNVM

Embedded non-volatile memories are the key IP to modern embedded systems. Leveraging our in-house, dedicated eNVM design team, UMC provides customers with flexible, robust and competitive embedded non-volatile memories. With UMC's comprehensive, seamless and logic compatible solutions including fundament IP (Std Cell, IO, SRAM memory complier and eFuse) customers are able to deliver different products to market in a timely and efficient manner. In addition, UMC is continuously refining our state-of-the-art eNVM solutions, which allows customers to stay on top of today's dynamic market.

New Customers
For new customer inquiries, please direct all questions to **sales@umc.com**

Worldwide Contacts

Headquarters:
UMC
No. 3, Li-Hsin 2nd Road,
Hsinchu Science Park,
Hsinchu, Taiwan, R.O.C.
Tel: 886-3-578-2258
Fax: 886-3-577-9392
Email: foundry@umc.com

In China:
HeJian Technology (Suzhou)
No. 333, Xinghua Street, Suzhou
Industrial Park, Suzhou, Jiangsu
Province 215025, China
Tel: 86-512-65931299
Fax: 86-512-62530172

United Semiconductor (Xiamen)
No. 899, Wan Jia Chun Road,
Xiang An, Xiamen,
Fujian 361101, China
Tel: 86-592-7687888

In Japan:
UMC Group Japan
15F Akihabara Centerplace Bldg.,
1 Kanda Aioi-Cho Chiyoda-Ku
Tokyo 101-0029 Japan
Tel : 81-3-5294-2701
Fax: 81-3-5294-2707

In Singapore:
UMC-SG
No. 3, Pasir Ris Drive 12,
Singapore 519528
Tel: 65-6213-0018
Fax: 65-6213-0005

In Korea:
UMC Korea
1117, Hanshin Intervally24, 322,
Teheran-ro, Gangnam-gu,
Seoul, Korea
Tel: 82-2-2183-1790
Fax: 82-2-2183-1794
Email:korea@umc.com

In North America:
UMC USA
488 De Guigne Drive,
Sunnyvale, CA 94085, USA
Tel: 1-408-523-7800
Fax: 1-408-733-8090

In Europe:
UMC Europe BV
De entree 77
1101 BH Amsterdam Zuidoost
The Netherlands
Tel: 31-(0)20-5640950
Fax: 31-(0)20-6977826

UMC

FOR MORE INFORMATION: VISIT **WWW.UMC.COM** OR E-MAIL **SALES@UMC.COM**