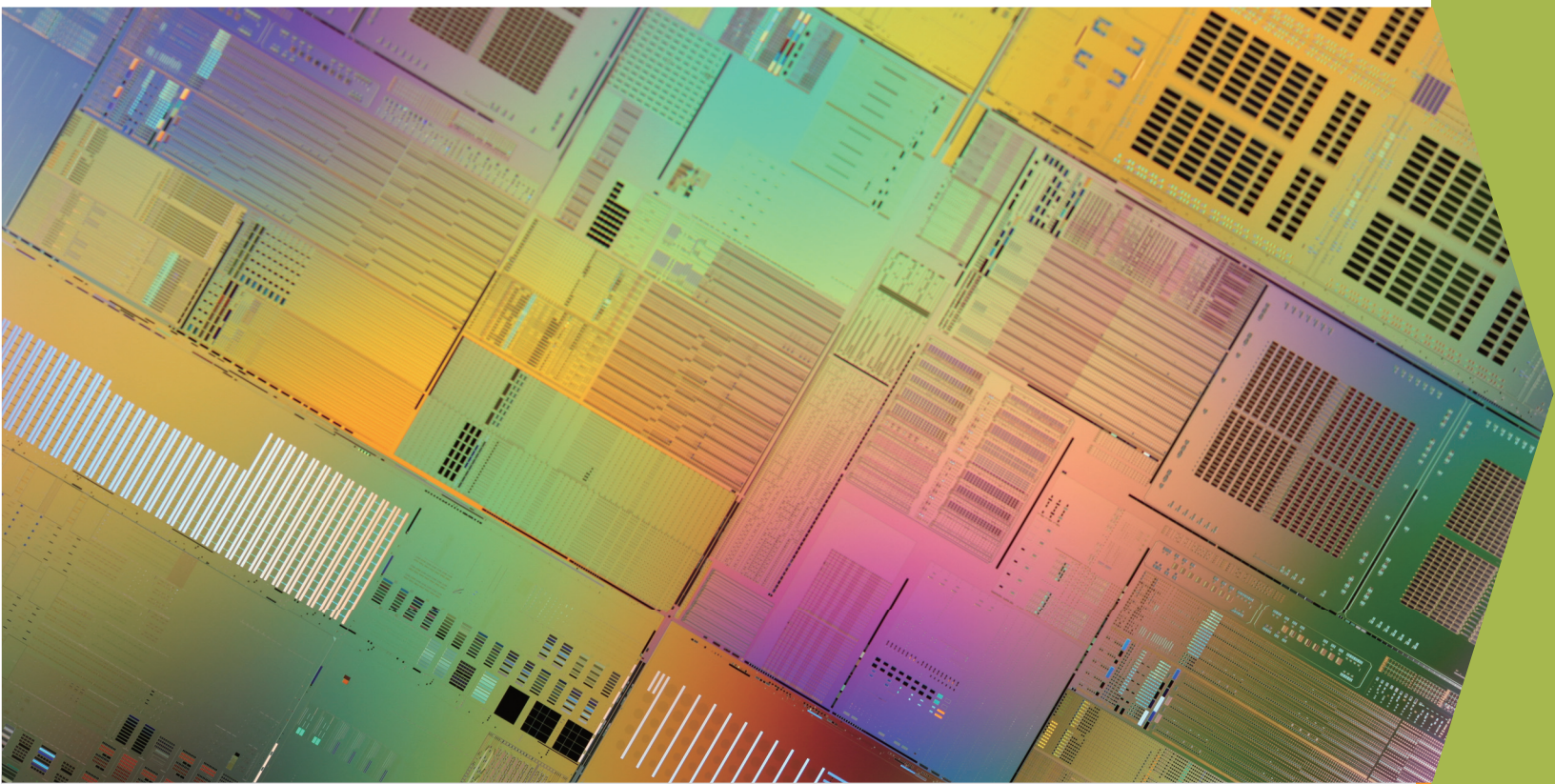


FOUNDRY LEADERSHIP FOR THE SoC GENERATION

WWW.UMC.COM

eNVM

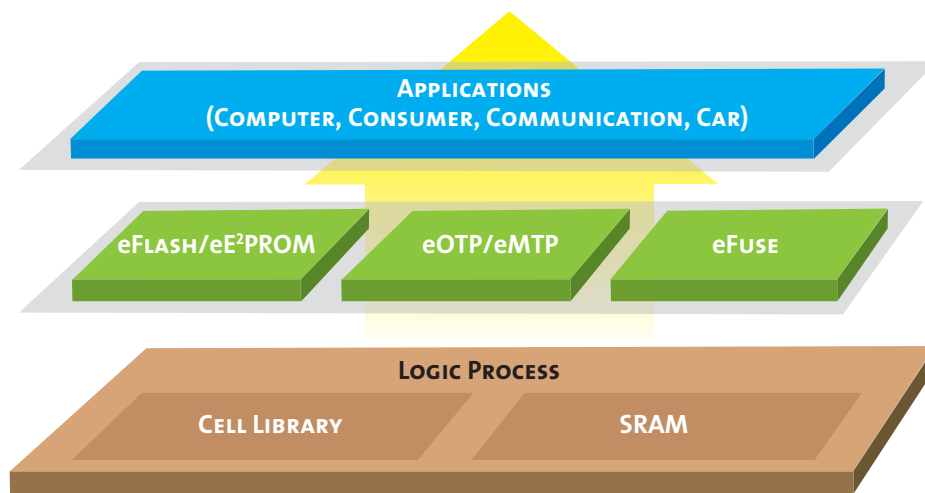
EMBEDDED NON-VOLATILE MEMORY



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, eE²PROM 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, eE²PROM and eMTP can be programmed multiple times, whereas eOTP and eFuse can only be programmed once. eE²PROM 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 eE²PROM 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 Voltare		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

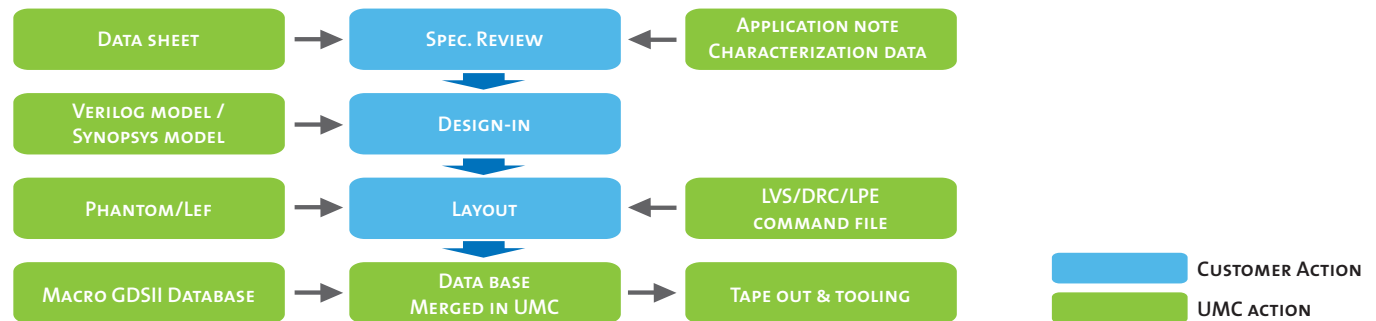
NODE/IP	0.35um	0.25um	0.18/0.162um	0.13um	0.11um	90nm	65/55nm	40nm	28nm
eFLASH	√	√	√	-	√	-	D	-	-
eE ² PROM	√	√	√	-	D	-	-	-	-
eMTP	-	√	√/D	D	D	-	-	-	-
eOTP	-	-	√	√	√	√	D	D	D
eFuse	-	-	√	√	√	√	√	√	D

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, 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.

To take advantage of today's most comprehensive SoC foundry solutions, please contact one of our worldwide sales offices.

North America:

UMC USA
488 De Guigne Drive,
Sunnyvale, CA 94085, USA
Tel: 1-408-523-7800
Fax: 1-408-733-8090
Email: sales@umc-usa.com

Asia:

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: sales@umc.com

Europe:

UMC Europe BV
De entree 77
1101 BH Amsterdam Zuidoost
The Netherlands
Tel: 31-(0)20-5640950
Fax: 31-(0)20-6977826
Email: europe@umc.com

Japan:

UMC 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
Email: foundry@umcj.com

Singapore:

UMC-SG
No. 3, Pasir Ris Drive 12,
Singapore 519528
Tel: +65-6213-0018
Fax: +65-6213-0008

The UMC logo is displayed in a large, bold, blue sans-serif font.