



# eMemory

## **Investor Presentation**

**eMemory Technology Inc.**

**September, 2018**

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## ***eMemory – the Embedded IP Expert***

- **Key Summary**
- **Value Creations**
- **Financials**
- **Future Outlook**

# Company Overview

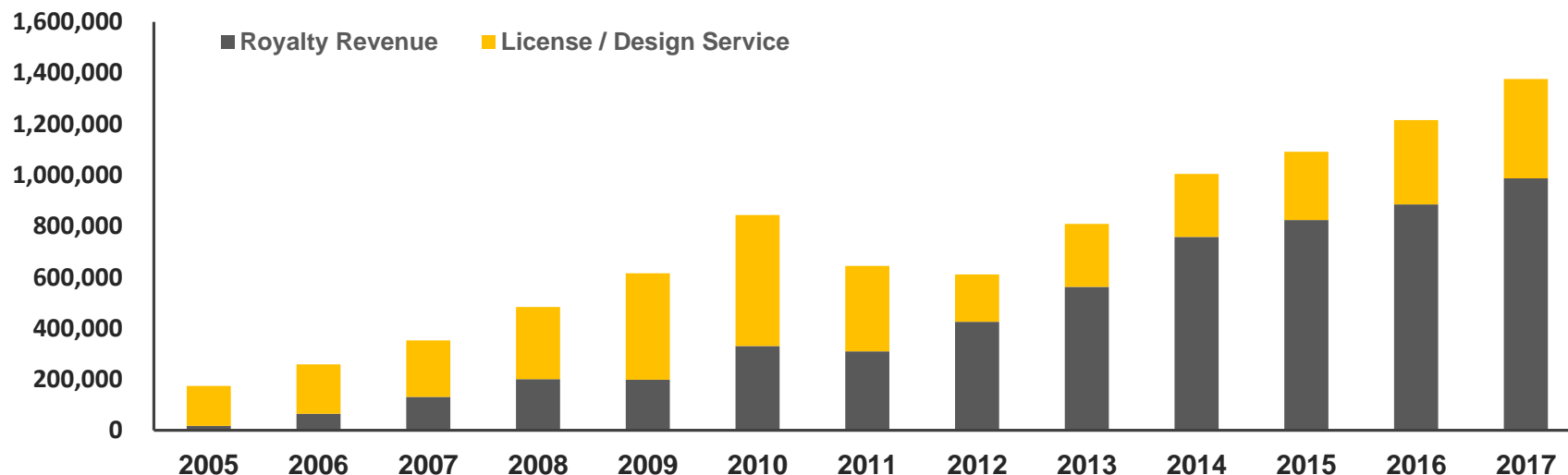
eMemory is the global leader of embedded non-volatile memory IP

## Key Facts

- Headquartered in Hsinchu (Taiwan), founded in 2000, IPO in 2011
- 100% gross margins, 39.2% OP margins
- Ranking no. 7 semiconductor IP vendor
- Over 21 mlns of wafers shipped.
- Over 555 patents Issued, another 222 pending
- 244 employees (70% R&D personnel)
- Largest embedded NVM IP vendor
- TSMC Best IP Partner Award since 2010

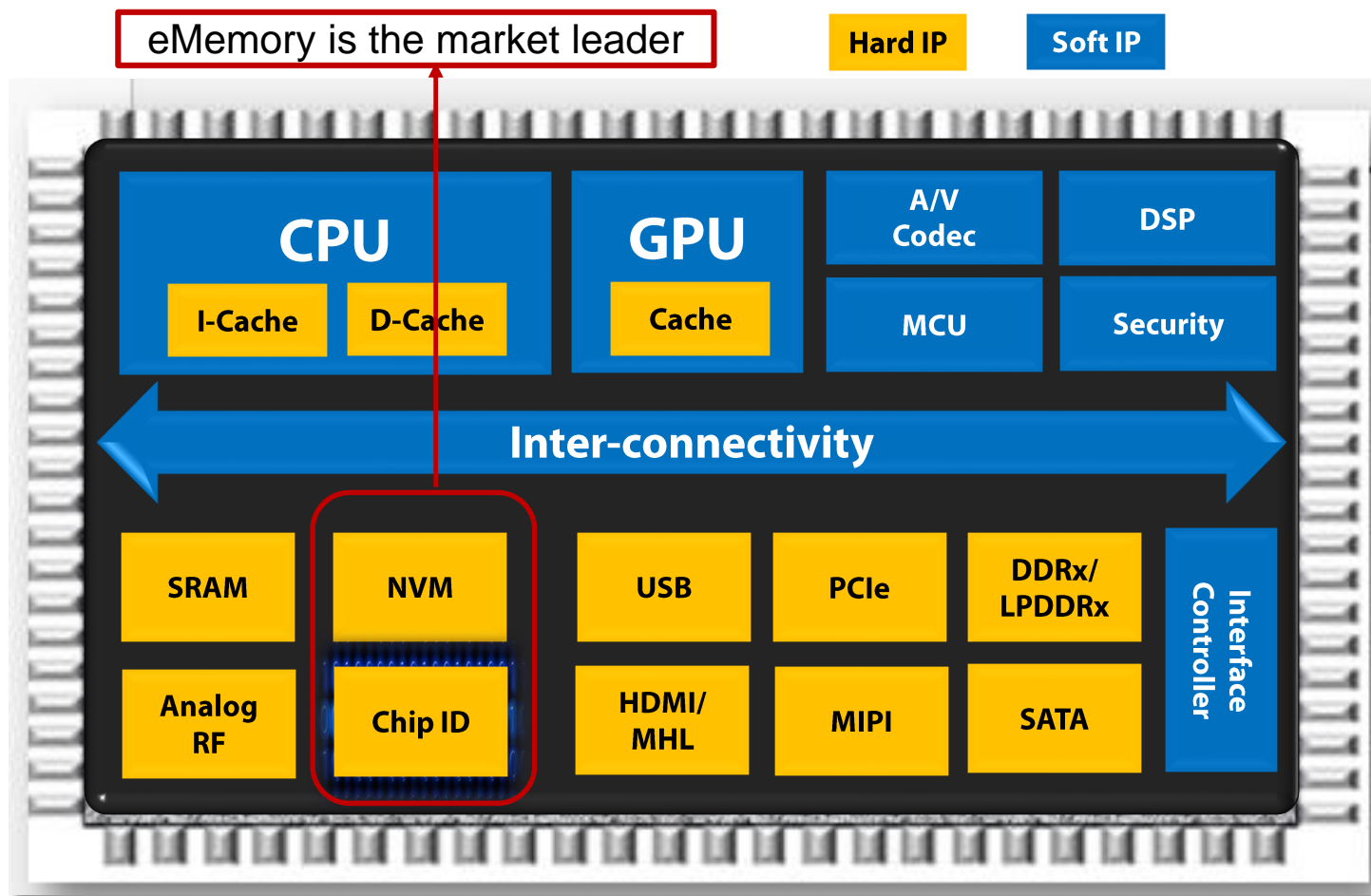
## Revenue Trend

(Unit: NT\$ 1,000)



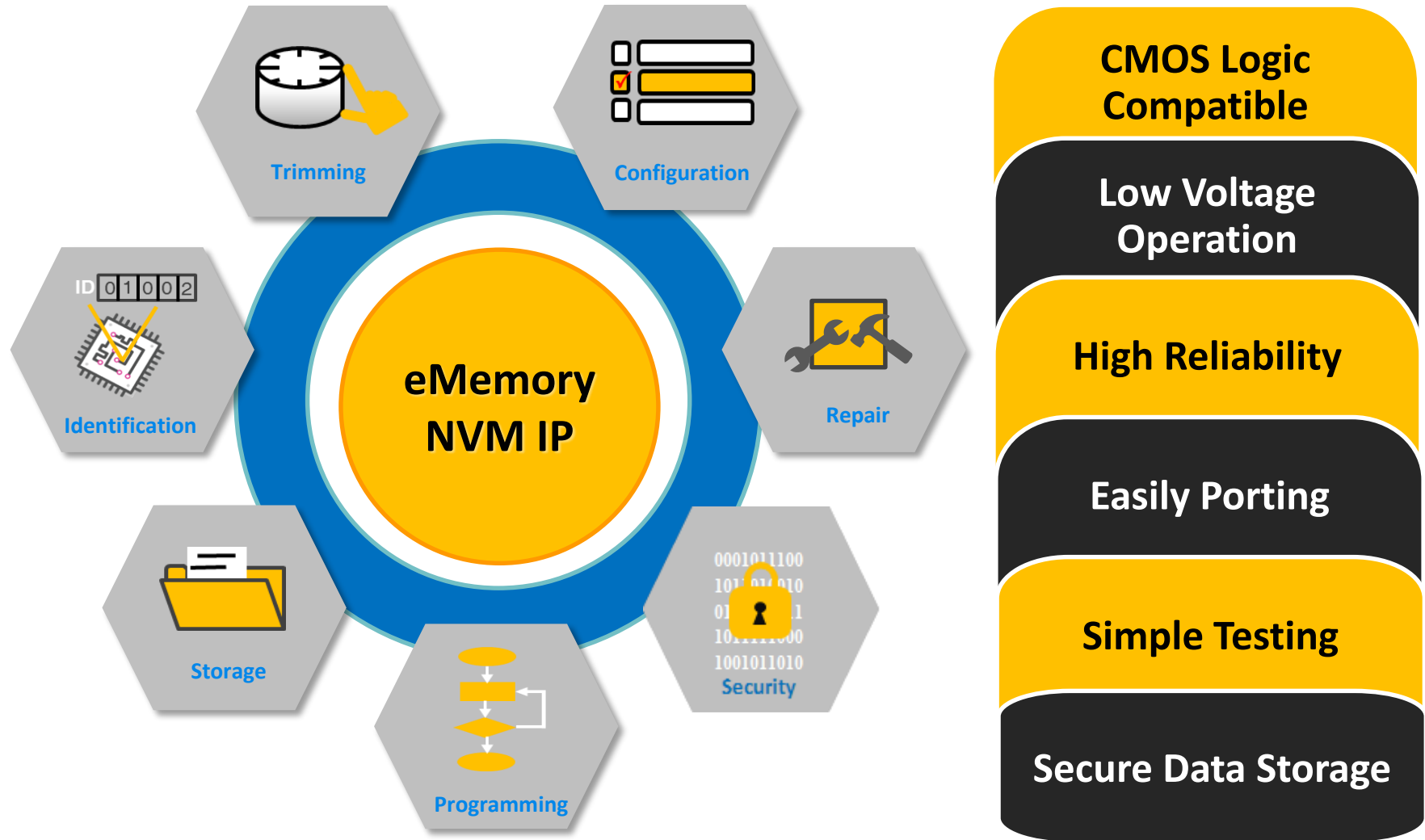
# Leading Silicon IP Provider

eMemory's embedded Non-Volatile Memory and Chip ID are foundation IP of SoC



# eMemory's Embedded NVM

eMemory's solutions can help customers effectively reduce time and development costs.



# Worldwide Customers

Our IP solutions are adopted by leading foundries, IDMs and fabless worldwide

## Global Customers

	Foundry	IDM	Fabless
Taiwan	5	1	267
China	7	0	592
North America	1	1	264
Europe	2	1	118
Korea	4	0	77
Japan	3	7	55
Others	1	0	58



## Foundry



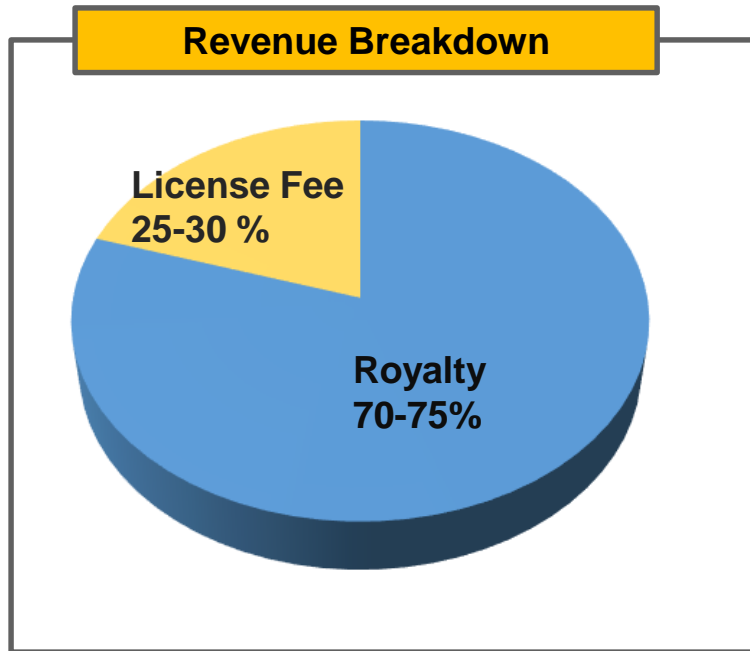
## IDM



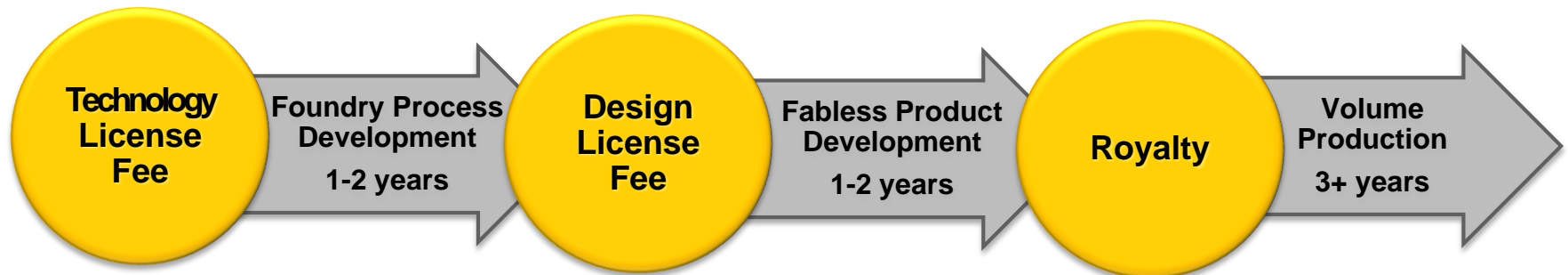


# Business Model

Recurring royalty is the backbone of our business

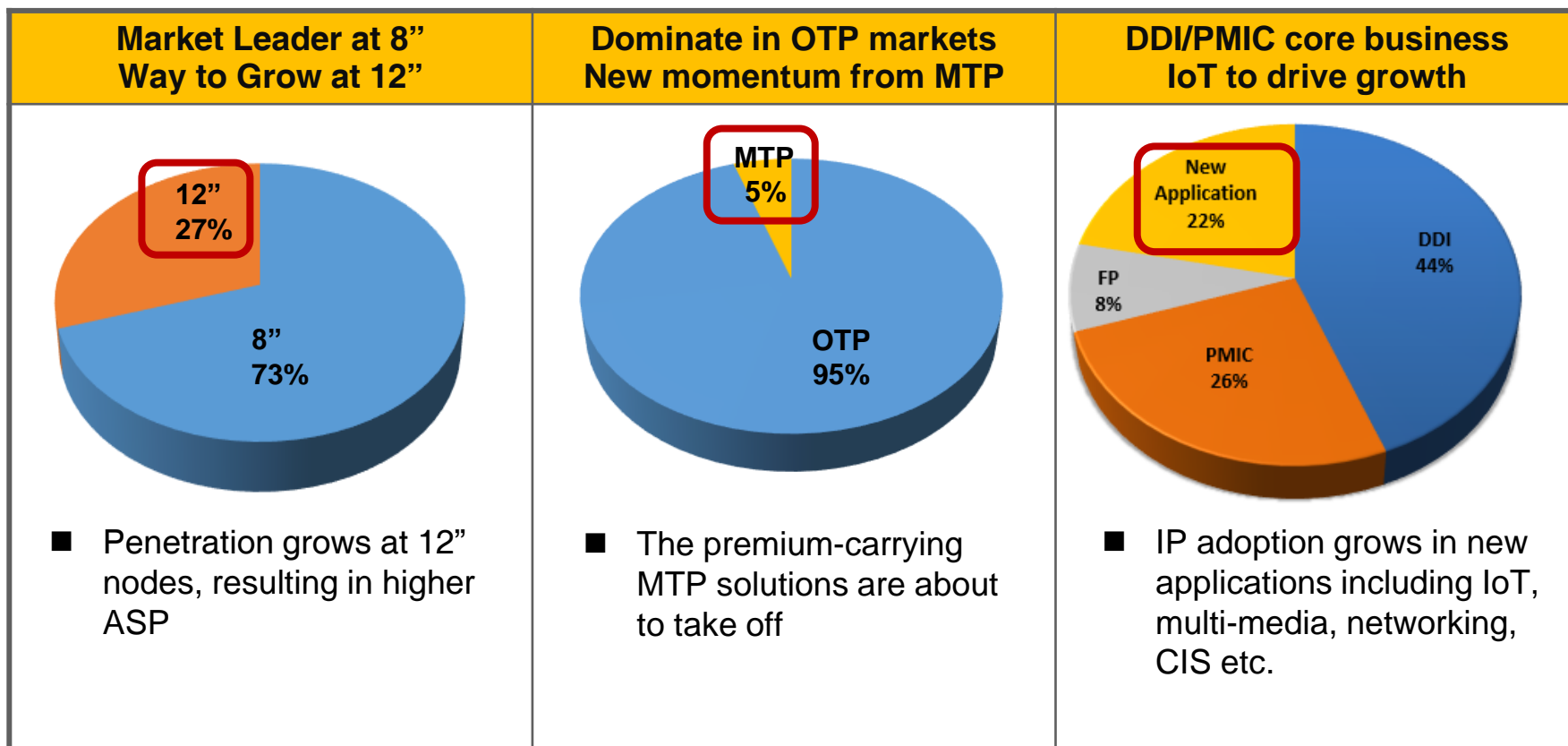


- Royalty rates are based on IP type and wafer price
- Royalty is collected by foundry partners base on wafer volume production
- Royalty revenue is a key growth driver:
  - More adoption = more volume shipment
  - More advanced node wafers = Higher ASP per wafer
- $\text{Royalty} = \text{Wafer Volume} * \text{ASP per wafer}$



# Growth Engines

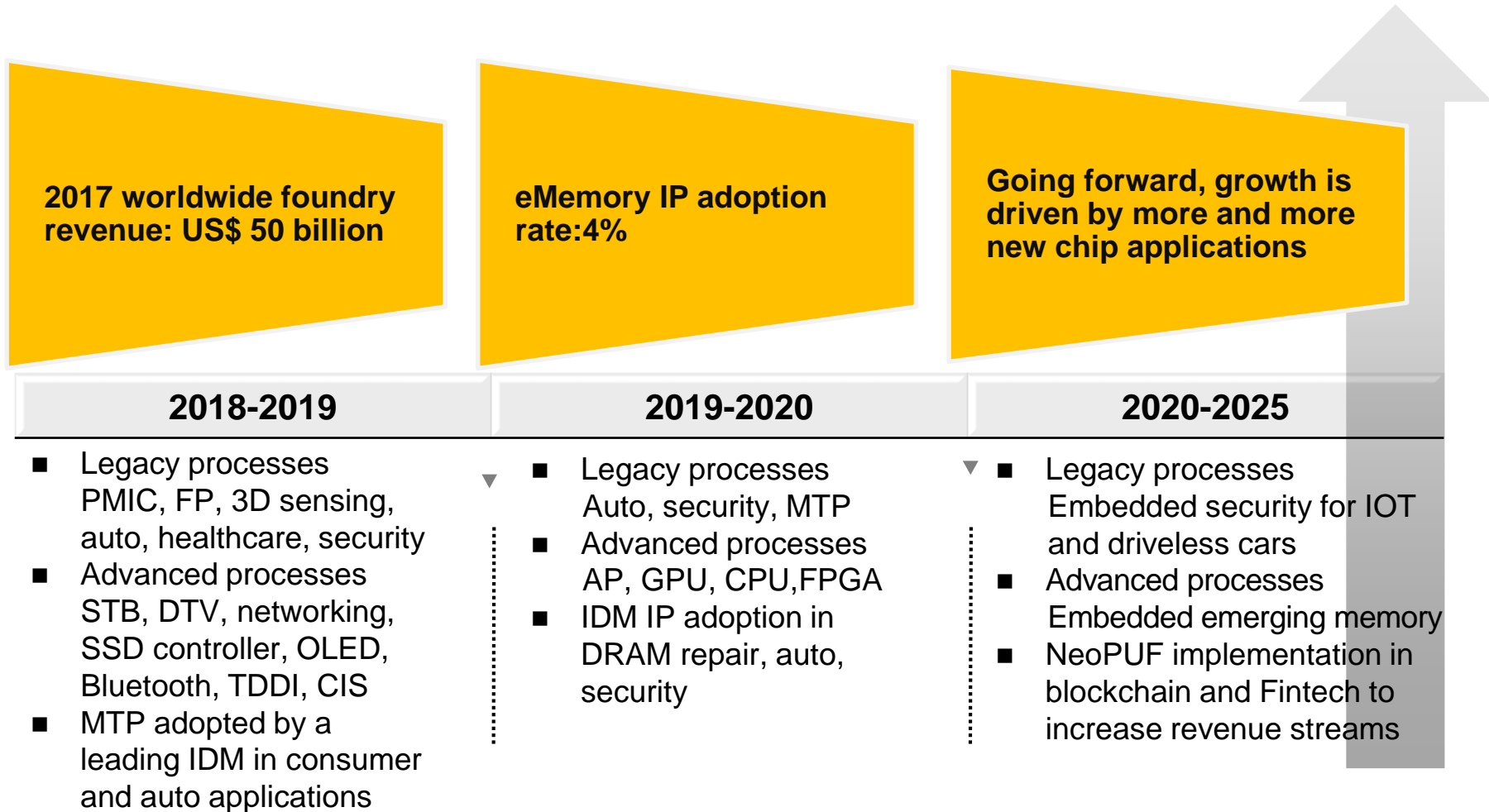
What supports our current growth, What drives our **Future Growth**



As of 2017

# Growth Prospects

Our near-term, medium-term and long-term growth engines



## eMemory – the Embedded IP Expert

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# eMemory's Solutions for Various Applications

## Display Driver IC

DDI, TDDI, OLEDDI

- Trimming

## PMIC

Mobile PMIC, Motor Drivers, Type-C

- Trimming
- Storage

## Sensor Controller

MEMS, FPC, CIS

- Trimming
- Storage
- Identification

## Multi-Media

DTV, STB, SSD, AP, Game Console

- Security

## Connectivity IC

BT, BLE, WiFi

- Storage
- Security
- Identification

## MCU

- Trimming
- Storage
- Identification
- Security

## Autotronic & Automotives

- Trimming
- Storage
- Identification
- Security

## Camera Module

CIS sensor, ISP, AF, OIS

- Trimming
- Storage
- Identification

## RFID/NFC tag

- Trimming
- Storage
- Identification

## DRAM

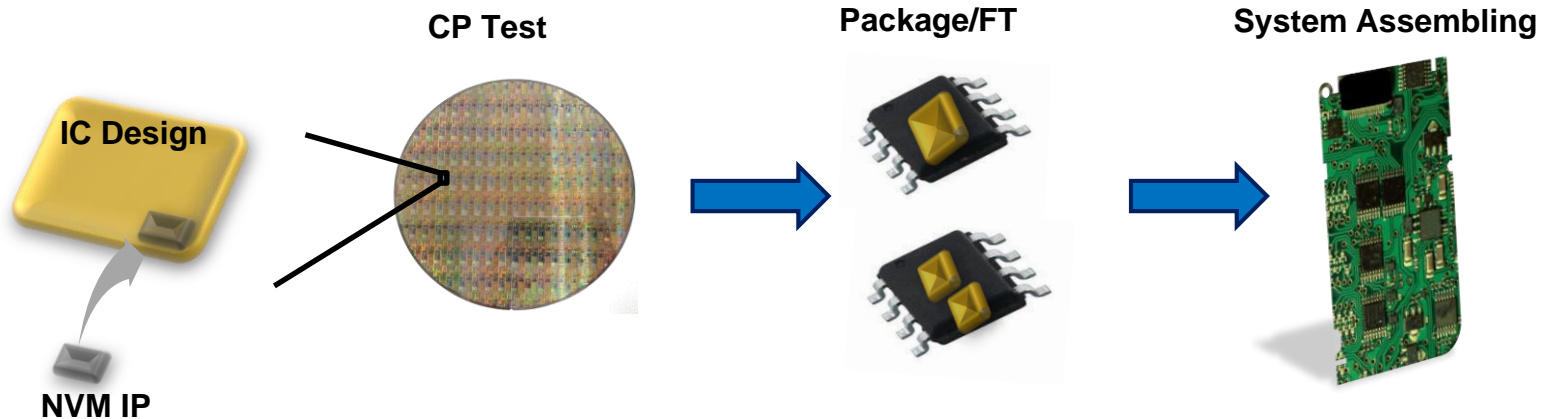
- Repair

# Embedded NVM Usage

eMemory's embedded NVM creates value for customers

## Cost Reduction

## Programmable, Configurable



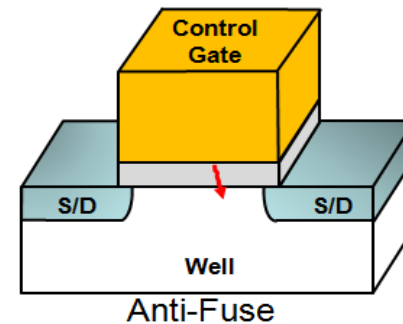
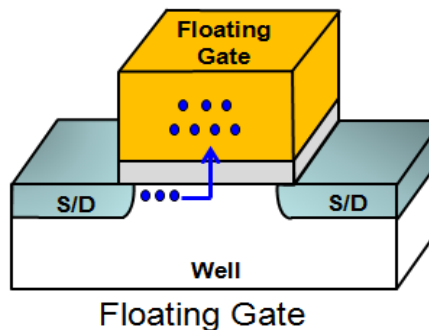
## Security

## Secure Data Storage

**eFuse Key: Data is easily observed**



**Invisible Hardware Key : Data is hard to be detected**



# Embedded NVM Usage

Security

Secure Data Storage

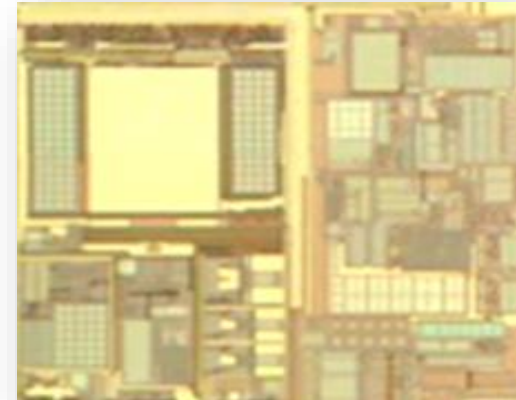
Authorized Product



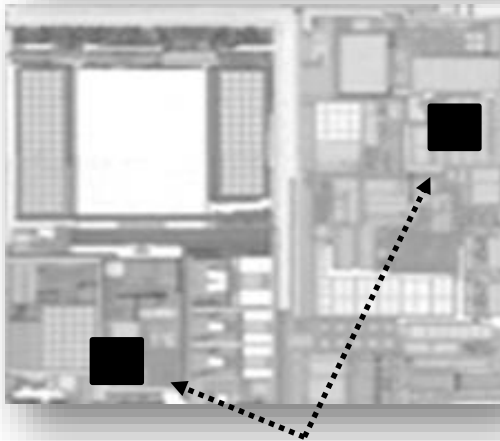
Without protection



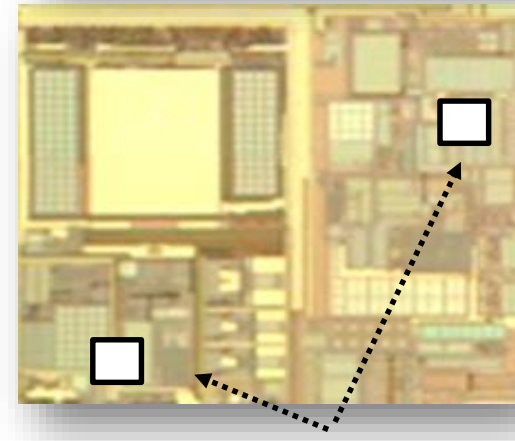
Fake Product



With protection



Security IP/Code by Authorized Use

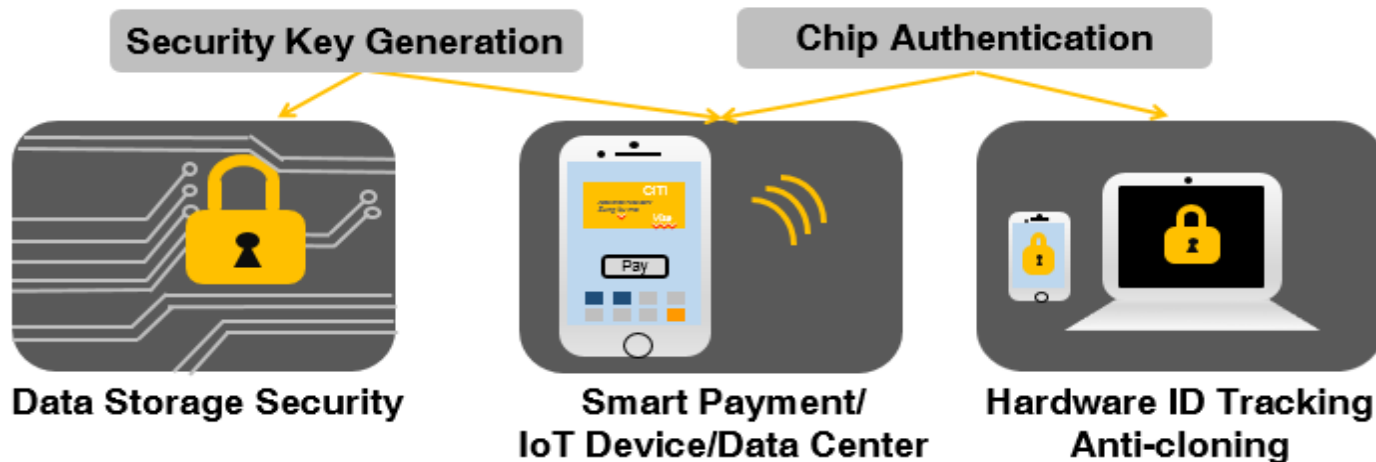


Can NOT Work w/o Security IP/Code

# New invention - NeoPUF technology

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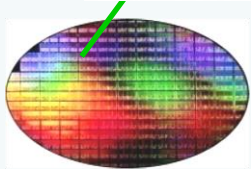
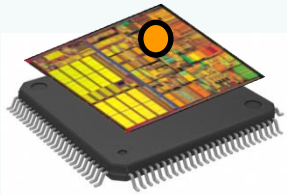
- Authentication & Security Everywhere





# Secure HW& SW from Chip-level

NeoPUF

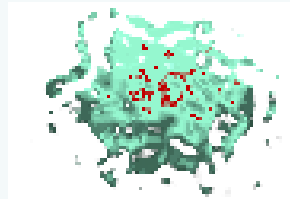


Chip Fingerprint



Unique Keys

Key Generation



Entanglement

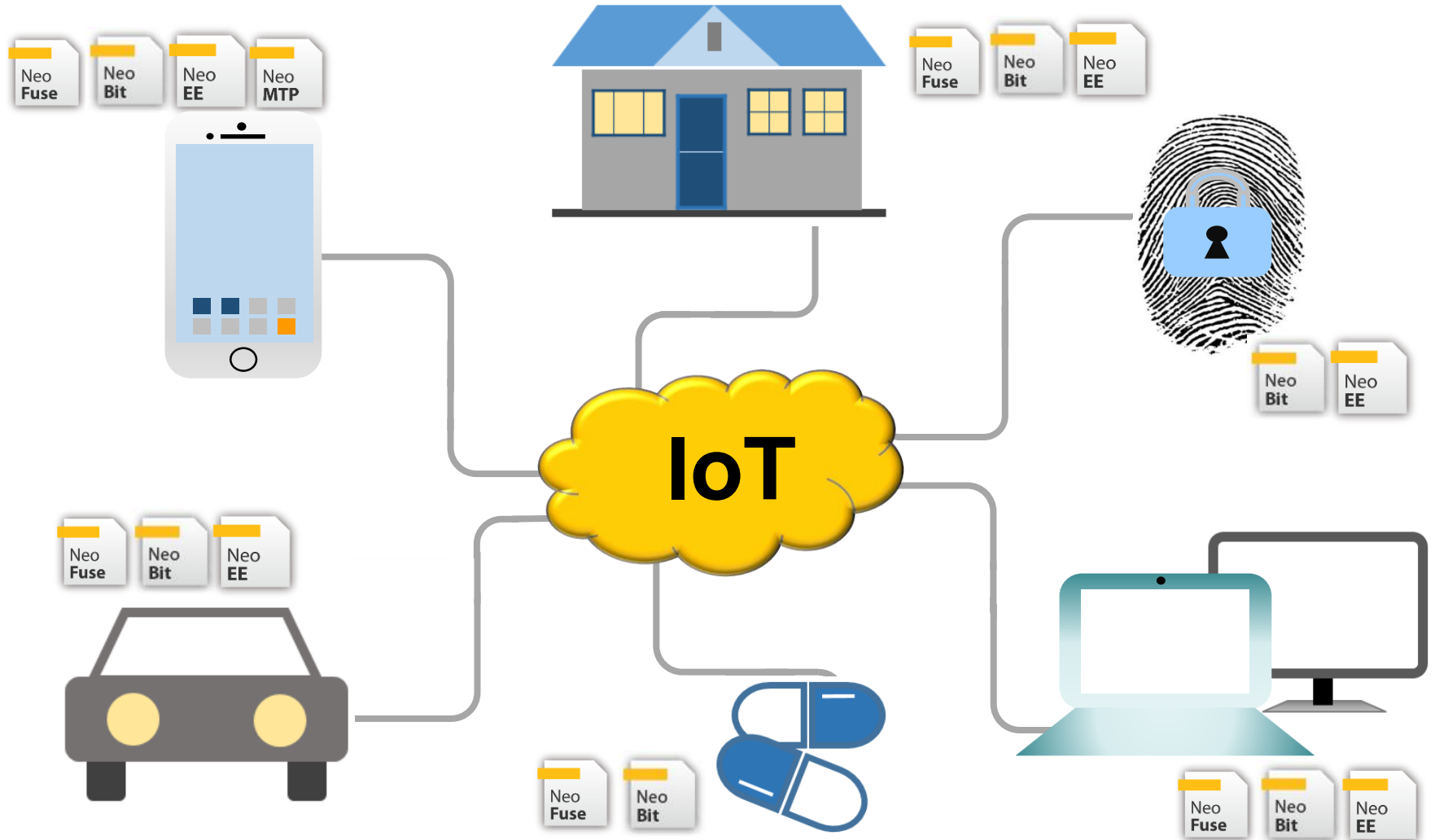


Cryptography

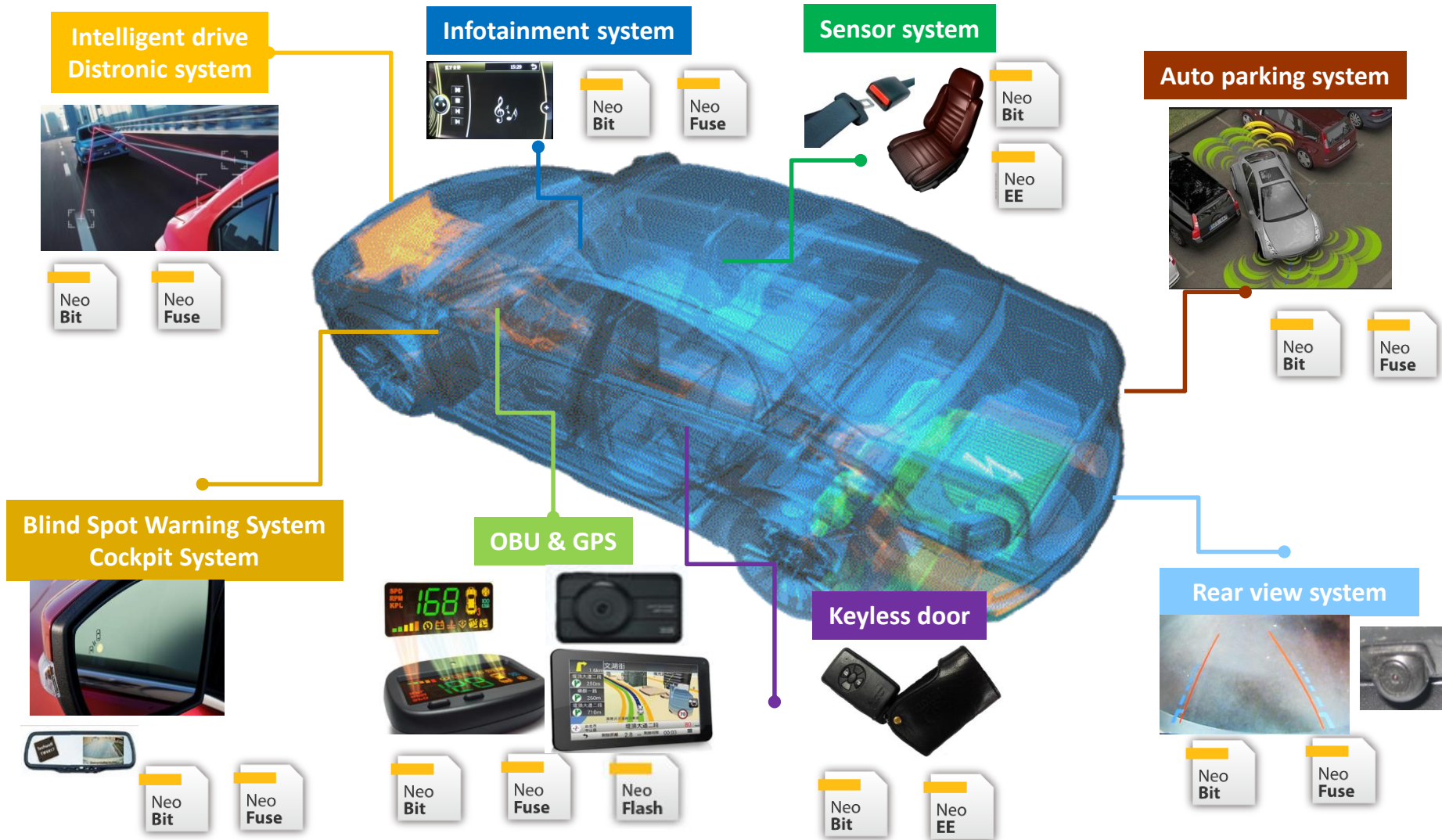


Crypto Engines

# eMemory IP in IoT



# eMemory IP in Automotive



## ***eMemory – the Embedded IP Expert***

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# Q2 Revenue Breakdown

Revenue (thousands of NT dollars)

	Q2 2018	Q1 2018	QoQ	Q2 2017	YoY	1H 2018	1H 2017	YoY
Licensing	101,283	114,540	-11.6%	134,140	-24.5%	215,823	208,286	3.6%
Royalty	200,790	259,926	-22.8%	198,080	1.4%	460,716	461,183	-0.1%
Total	302,073	374,466	-19.3%	332,220	-9.1%	676,539	669,469	1.1%

Revenue (thousands of US dollars)

	Q2 2018	Q1 2018	QoQ	Q2 2017	YoY	1H 2018	1H 2017	YoY
Licensing	3,409	3,898	-12.5%	4,443	-23.3%	7,307	6,827	7.0%
Royalty	6,844	8,828	-22.5%	6,538	4.7%	15,672	14,904	5.2%
Total	10,253	12,726	-19.4%	10,981	-6.6%	22,979	21,731	5.7%

Number of Licenses

		Q2 2018	Q1 2018	2017	2016
Technology Licenses		5	7	20	43
Design Licenses	NRE	14	13	55	56
	Usage	96	85	325	311

Confidential

# Financial Income Statement

Amount in Thousands of NT Dollars, except margins/EPS/ROE

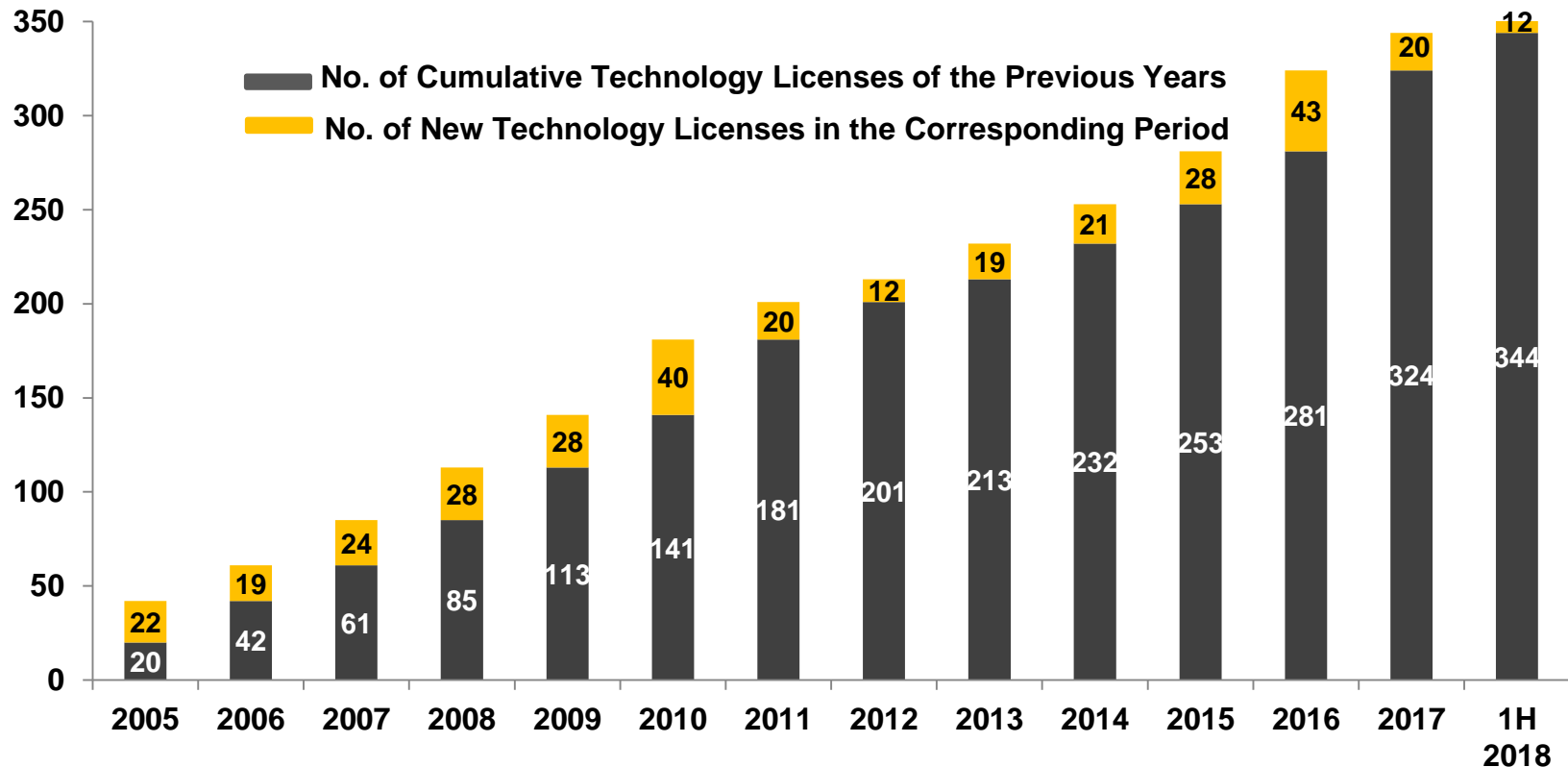
	Q2 2018	Q1 2018	Q2 2017	change (QoQ)	change (YoY)
Revenue	302,073	374,466	332,220	-19.3%	-9.1%
Gross Margin	100%	100%	100%	-	-
Operating Expenses	183,706	193,201	188,562	-4.9%	-2.6%
Operating Margin	39.2%	48.4%	43.2%	-9.2ppts	-4.0ppts
Net Income	112,193	168,730	135,610	-33.5%	-17.3%
Net Margin	37.1%	45.1%	40.8%	-8.0ppts	-3.7ppts
EPS	1.48	2.23	1.79	-33.5%	-17.3%
ROE	23.2%	31.3%	29.6%	-8.1ppts	-6.4ppts

# Technology Licensing

## Number of Licenses

Year	2015	2016	2017	1H 2018
License	28	43	20	12

Note: Terms (including number of process platforms and licensing fees) for each technology license are set contractually. Payments are made according to set milestones, and there are no particular seasonal factors involved.



# New Technologies Under Development

- New technologies being developed for **102** platforms by Q2 18.
- **14** for NeoBit, **50** for NeoFuse, **4** for NeoPUF, **12** for NeoEE, and **22** for NeoMTP.

	7/10nm	12/14/16nm	22/28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um
NeoBit	-	-	-	-	1	2	7	4
NeoFuse	3	5	14	6	8	9	3	2
NeoPUF	-	-	2	-	2	-	-	-
NeoEE	-	-	-	-	-	1	1	10
NeoMTP	-	-	-	-	2	1	7	12

As of June 30<sup>th</sup>, 2018



# Application Markets

12"

8"

7nm	10nm	12/14/16nm	28nm	40nm	55/65nm	80/90nm	110/130nm	160/180nm	250nm	350nm
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NeoBit

NeoFuse

NeoFlash

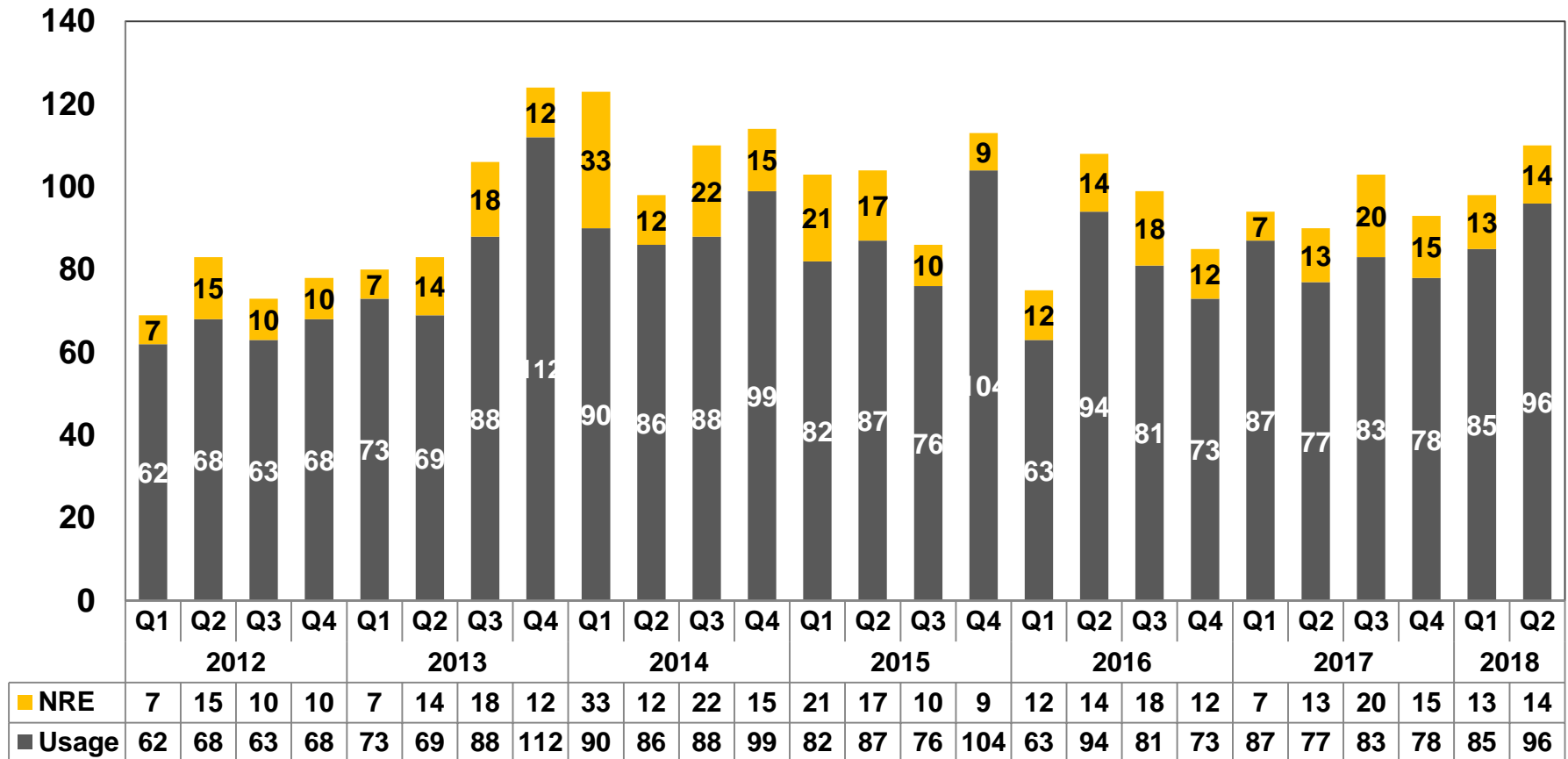
NeoEE

NeoMTP



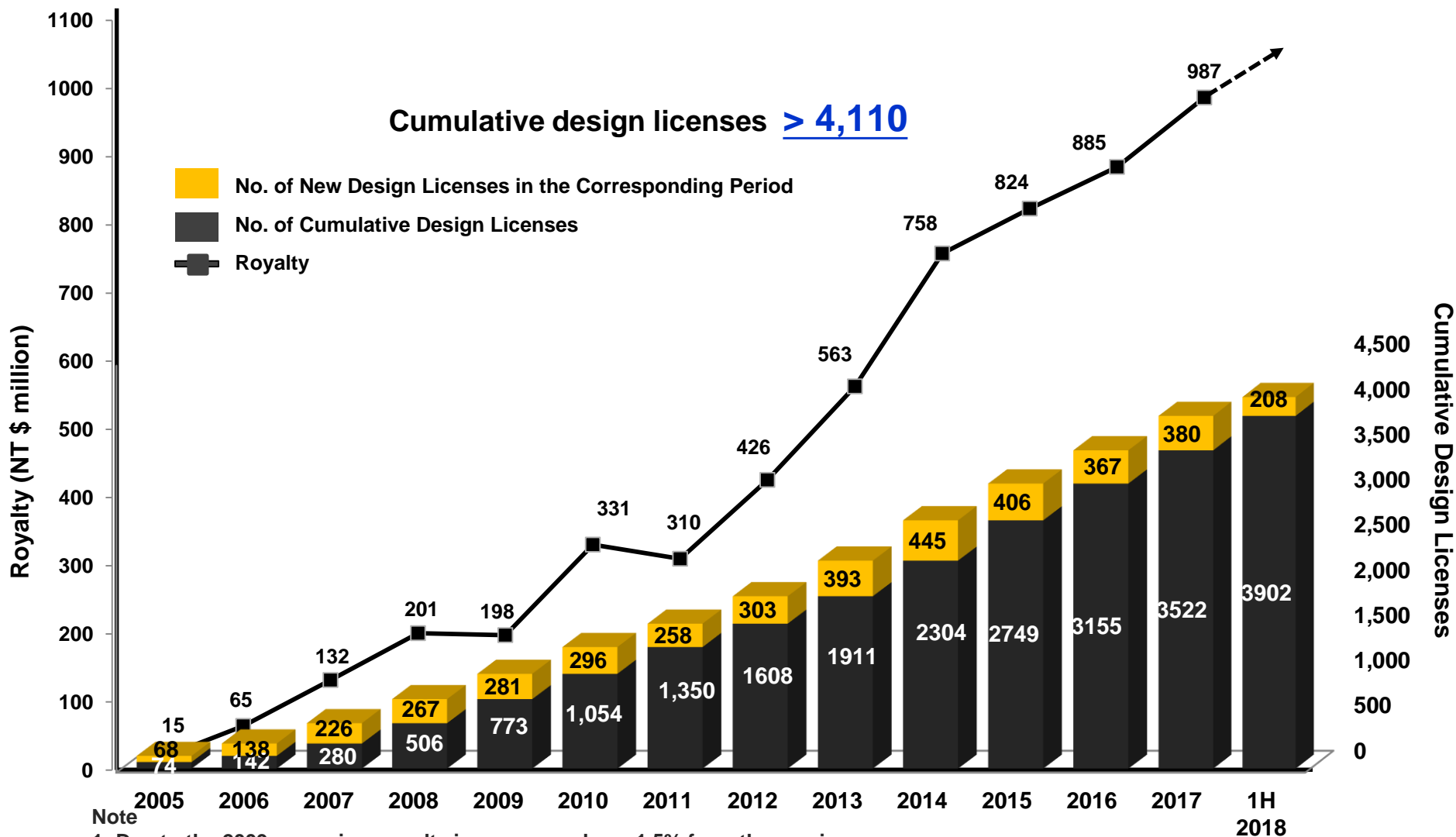
# Design Licensing (New Tape-Out)

- A total **208** NTO in 1H 2018 ( **380** NTO in 2017, **367**@2016, **406**@2015, **445**@2014 )



Note\*: As the applications of MCU at several foundries have gradually entered mass production, and the business model of the main foundry partner which provides green process has shifted to — eMemory licenses IP cell to the foundry for it to provide direct design service to customers - as the result, the new tape out number of MCU has been affected, but the royalty coming from IP cell usage continues to roll in.  
In summary, even the new tape out number of MCU is lower than before; the corresponding wafer output and royalty continue to grow.

# Cumulative Licenses Drive Future Royalties



Note

- 1: Due to the 2009 recession, royalty income was down 1.5% from the previous year.
- 2: Prepaid royalty from a single customer contributed to 2010 annual growth of 67%, followed by a drop of 6.3% in 2011.
- 3: CAGR for 2009-2013 was 30%.

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# Outlook for Q3 and beyond

- **Key drivers to licensing revenue:**
  - **Established strategic partnerships with worldwide foundries to expand our technology footprint on various process platforms. The largest foundry in Korea became our partner in Q2.**
  - **As we grow our IP library, our IP design licensing revenue will increase.**
  - **New MTP licensing contracts will also drive the growth of licensing revenue in the future.**

# Outlook for Q3 and beyond

- **Key drivers to royalty revenue :**

- 8-inch processes**

- **Royalty revenue from PMIC will increase due to our success in contract renegotiation with the largest fabless IC design house in US. Chips developed under the new contract are ready for volume production.**
    - **MTP technology has been adopted by a large IDM in Europe, and is ready for mass production. In addition, the second largest IC Design Company in the US has taped out wireless charging chips that adopted our technology.**
    - **Rising adoption of in-display fingerprint sensors at a growing number of OEMs.**

# Outlook for Q3 and beyond

- We are in prime position to capitalize on the popularity of IoT devices, connected cars, and healthcare wearables as our IPs can be embedded in sensors, MCU, and PMIC targeting these applications.

## 12-inch processes

- The migration of DDI to TDDI and OLED IC continues. The growing popularity of TDDI and OLED will lead to the increase of royalty revenue from 40 and 55nm.
- Major IC design houses in Asia have adopted our IP for their 28nm consumer IC products. More tape-outs at 28nm for set-top box, multimedia IC, SSD controllers, and network-related IC.

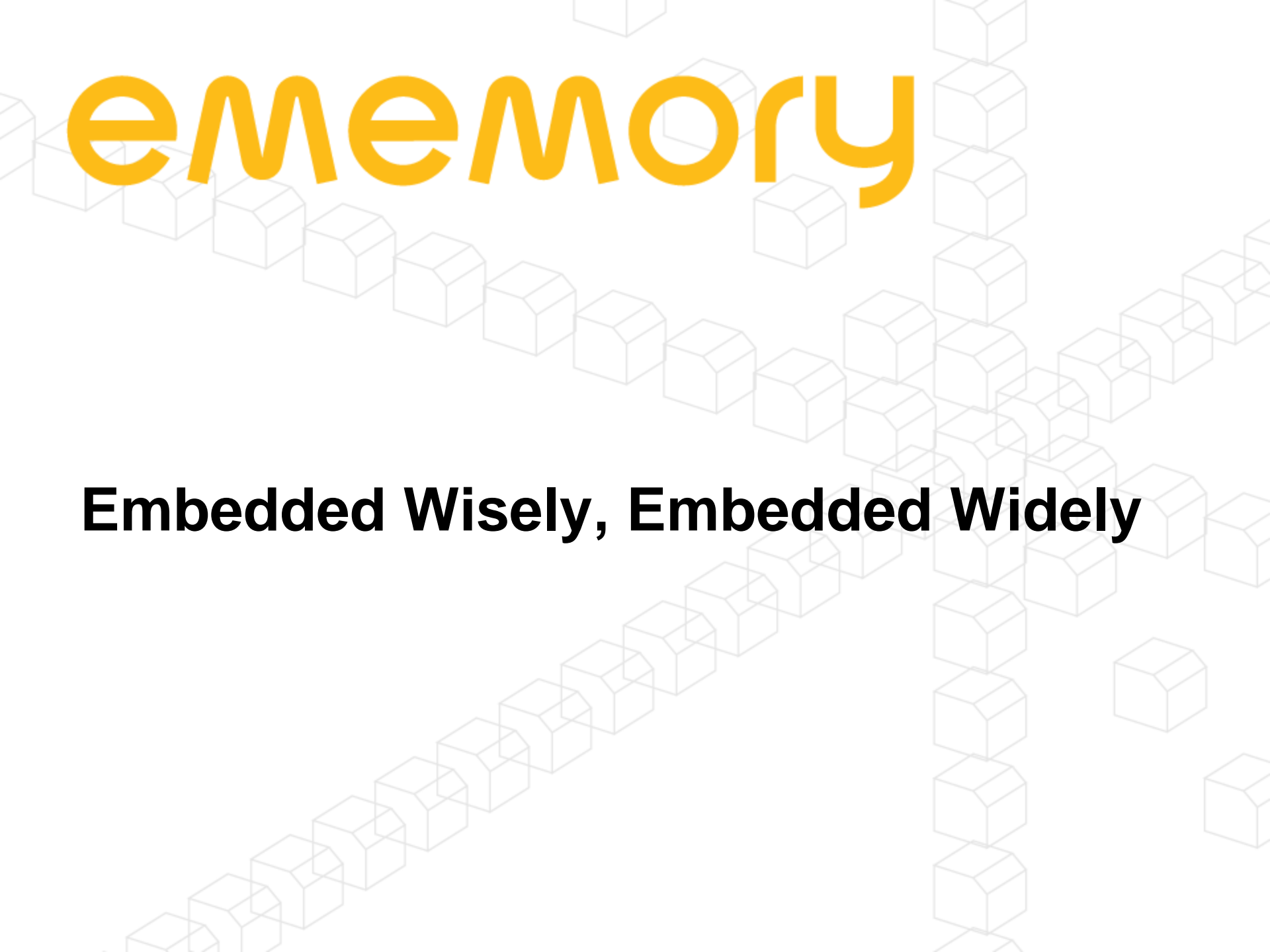
# Outlook for Q3 and beyond

- **Development of new applications**
  - **NeoFuse has been adopted on 25nm DRAM process technology for memory repair. As mentioned before, five licensing contracts were signed in Q2. One of the five was related to DRAM; therefore, we expect royalty revenue from NeoFuse to increase in the near future.**
  - **NeoPUF is expected to be adopted for various security applications including RF, FPGA, portable POS machines, printer cartridges, IoT devices, and smart card. To facilitate the wide adoption of NeoPUF, we have formed strategic partnership with the world's leading semiconductor IP company.**



# Outlook for Q3 and beyond

- **Development of new technologies**
  - › **We continue to partner with main foundries in the development of IPs at 5/7/12/14nm and 22nm SOI process platforms.**
  - › **We are currently developing a new memory technology with a top IDM company in the US.**



# ememory

**Embedded Wisely, Embedded Widely**