

# eMemory

## **Investor Presentation**

**eMemory Technology Inc.**

**May, 2018**

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## *eMemory – the Embedded IP Expert*

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

# Company Overview

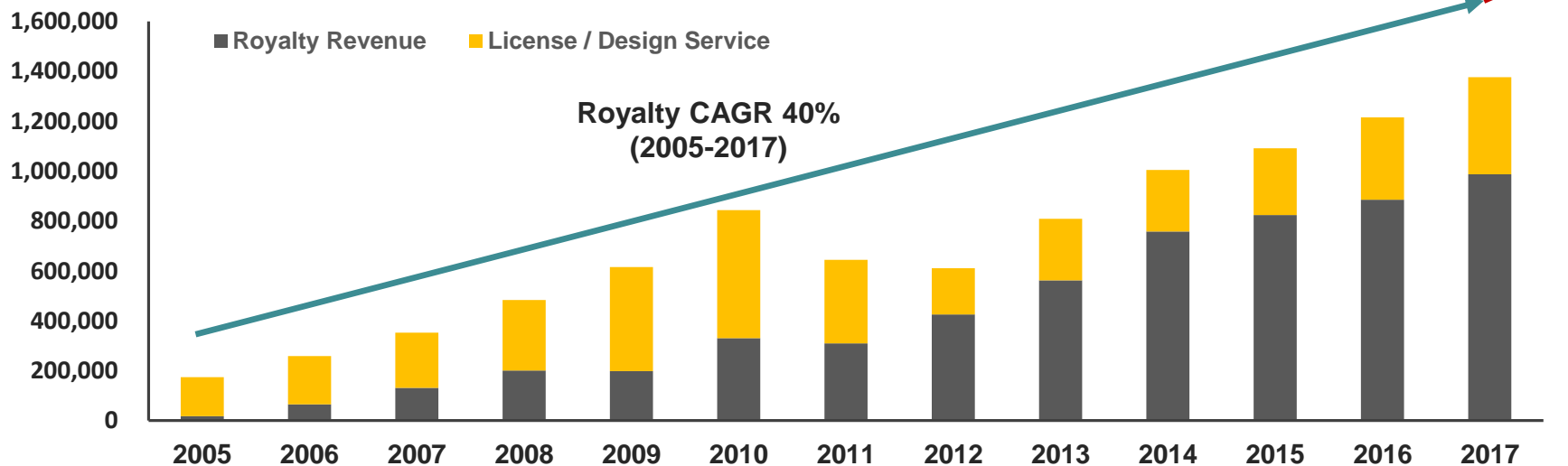
eMemory is the global leader of embedded non-volatile memory IP

## Key Facts

- Headquartered in Hsinchu (Taiwan), founded in 2000, IPO in 2011
- 100% gross margins, 48.4% OP margins
- Ranking no. 7 semiconductor IP vendor
- Over 20 mlns of wafers shipped.
- Over 540 patents Issued, another 230 pending
- 244 employees (70% R&D personnel)
- Largest embedded NVM IP vendor
- TSMC Best IP Partner Award since 2010

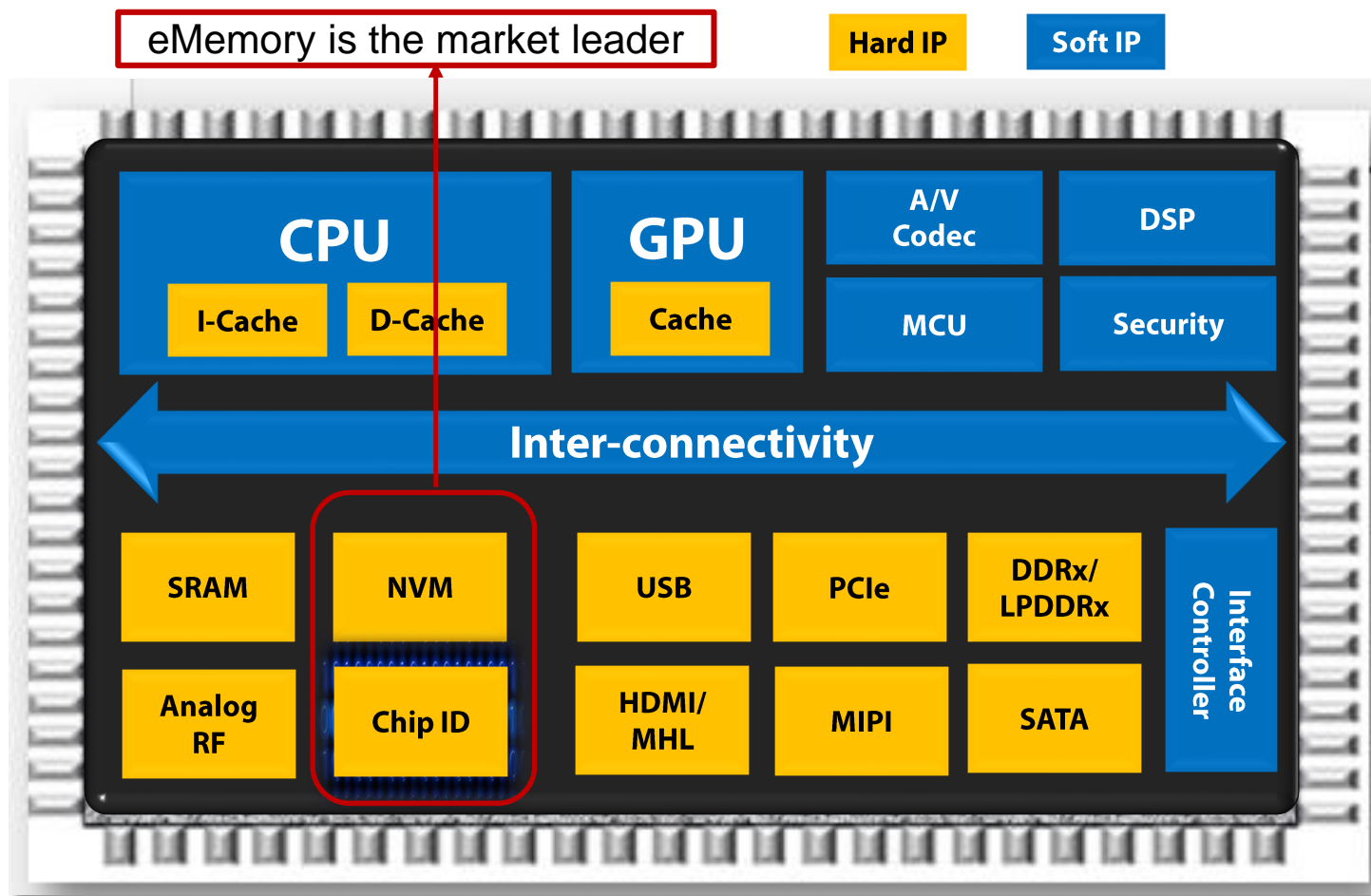
## Revenue Trend

(Unit: NT\$ 1,000)



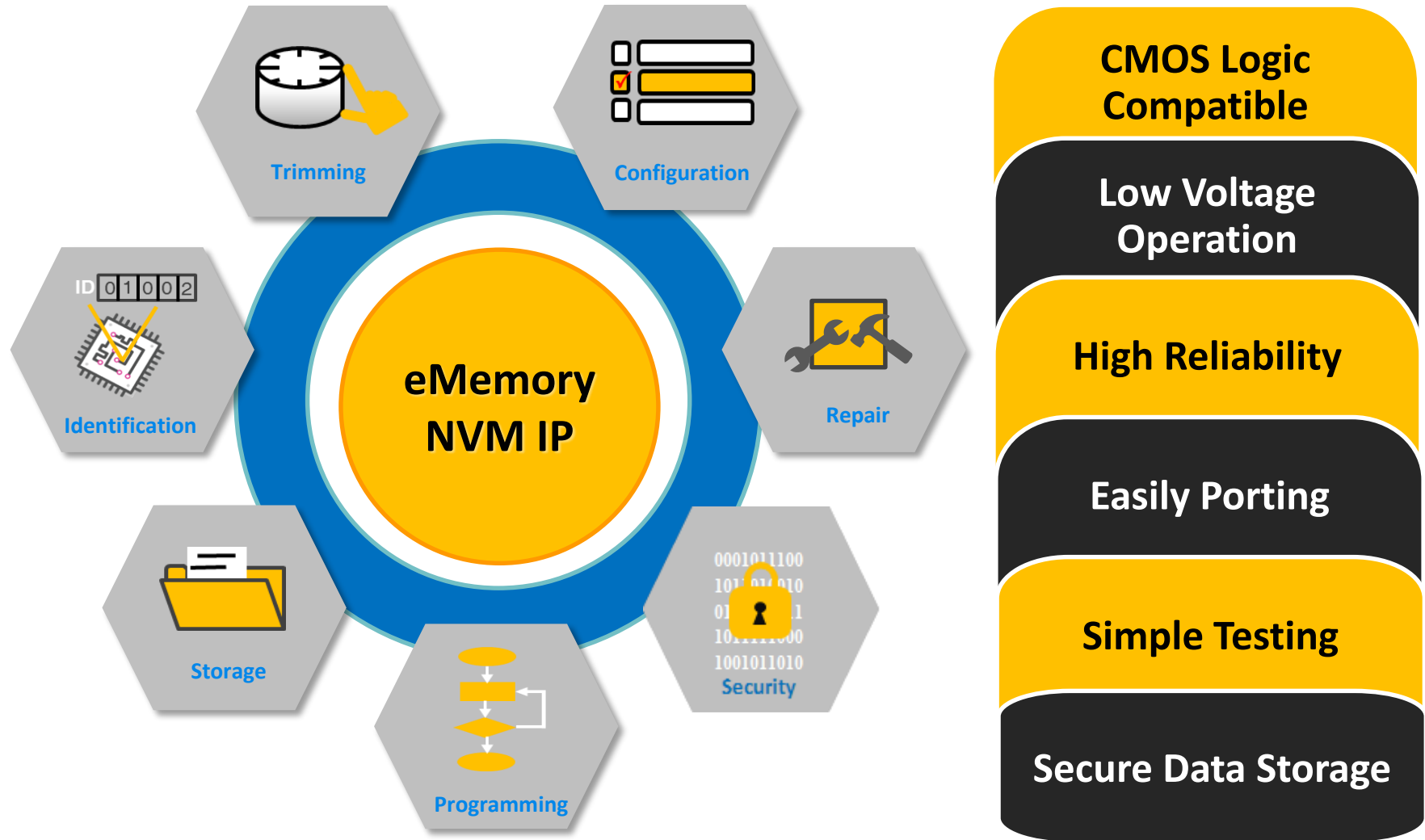
# Leading Silicon IP Provider

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	0	259
China	8	0	512
North America	1	2	240
Europe	2	1	109
Korea	3	0	75
Japan	3	8	52
Others	1	0	53



## Foundry



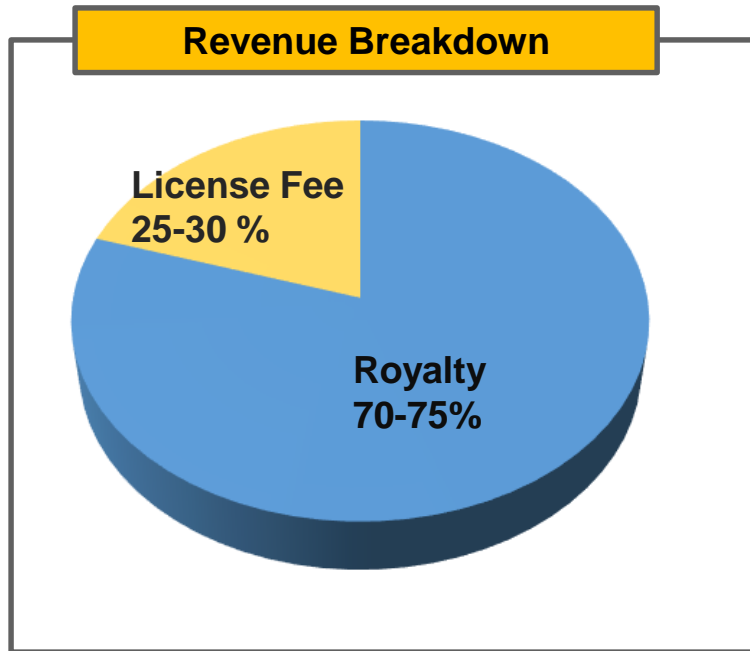
## IDM



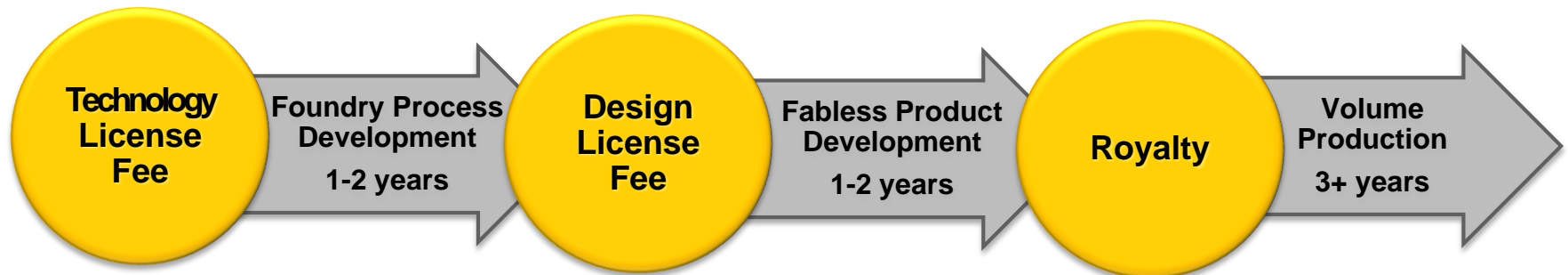


# Business Model

Recurring royalty is the backbone of our business

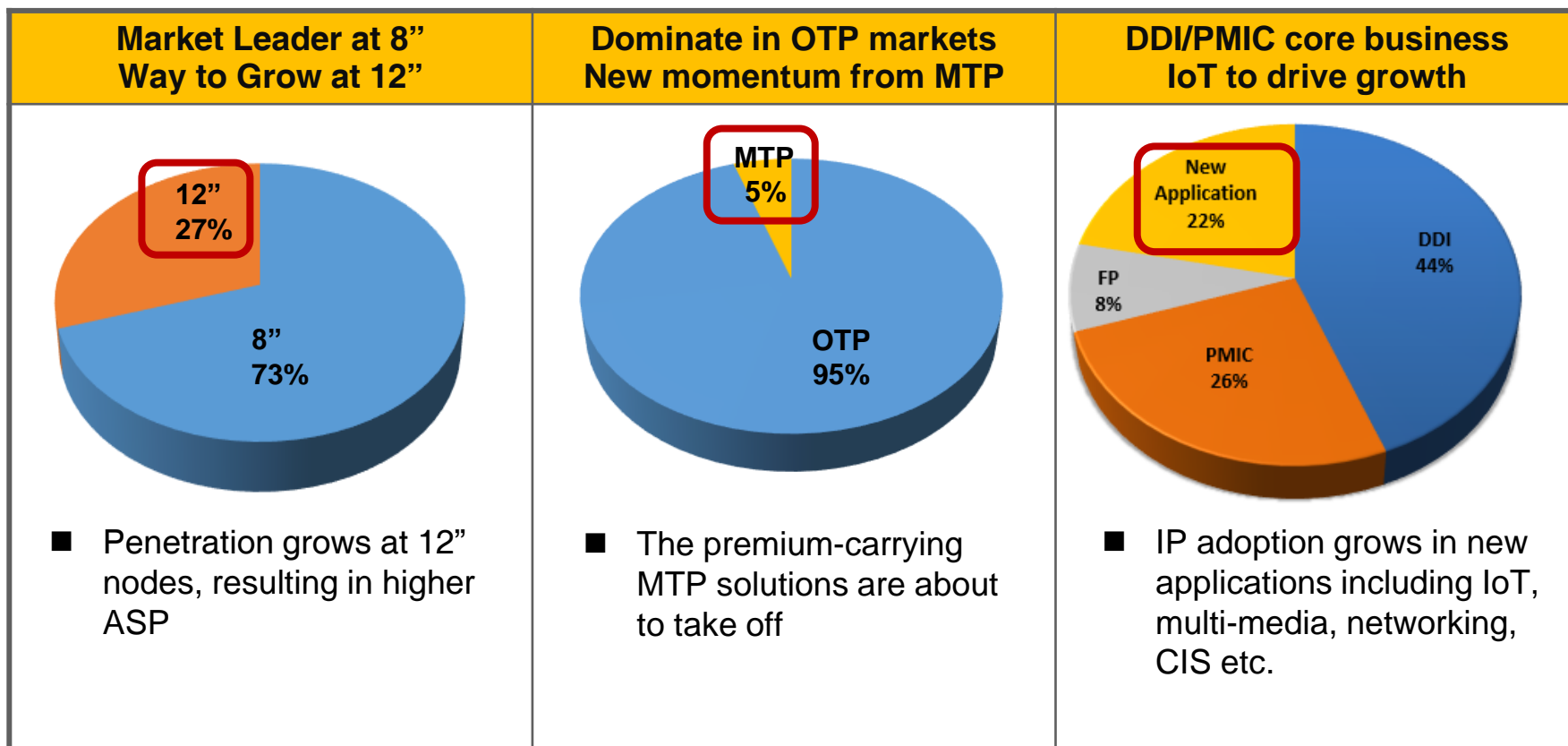


- Royalty rates are based on IP type and wafer price
- Royalty is collected by foundry partners base on wafer volume production
- Royalty revenue is a key growth driver:  
More adoption = more volume shipment  
More advanced node wafers = Higher ASP per wafer
- $\text{Royalty} = \text{Wafer Volume} *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



# Growth Engines

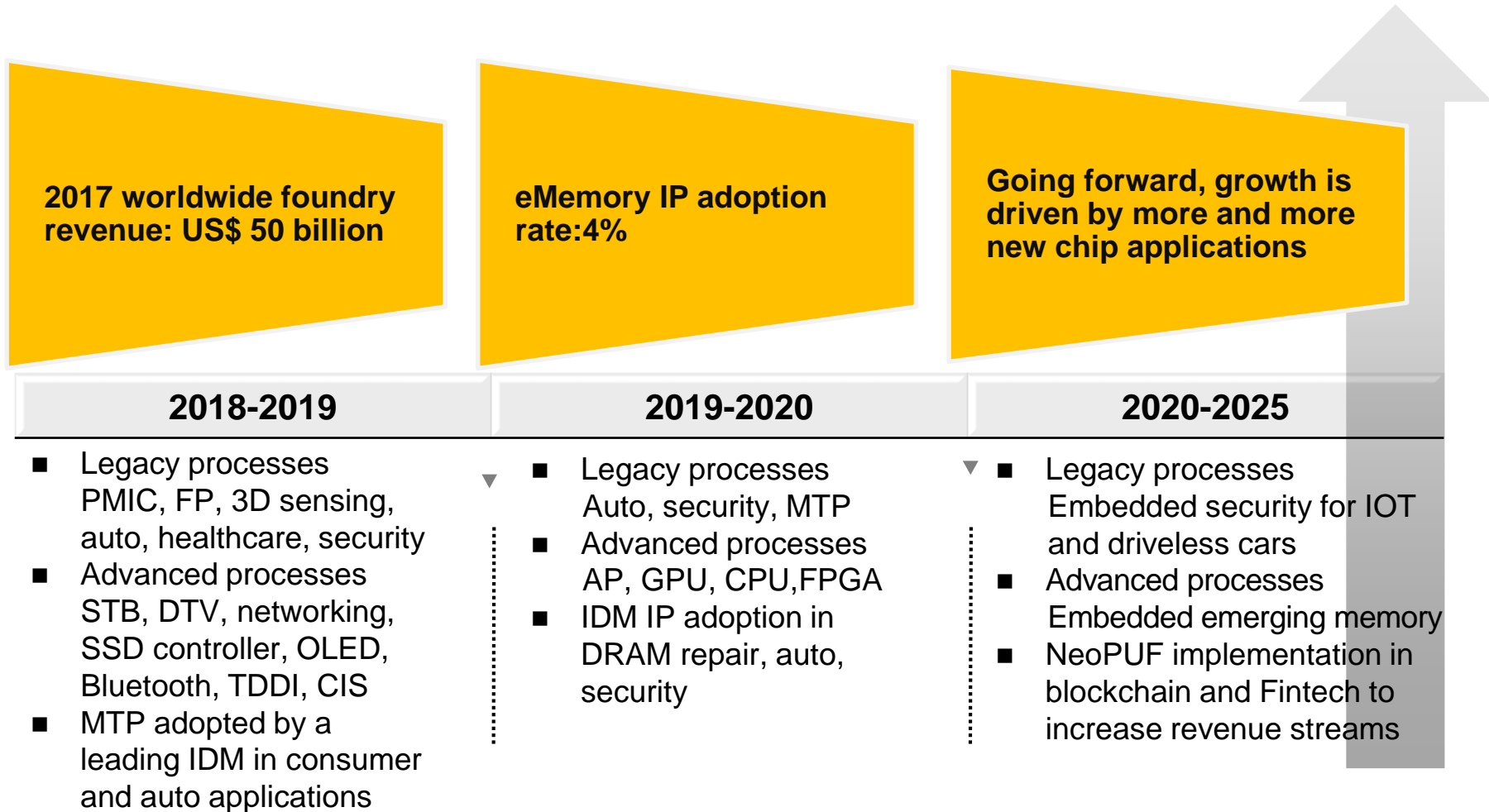
What supports our current growth, What drives our **Future Growth**



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

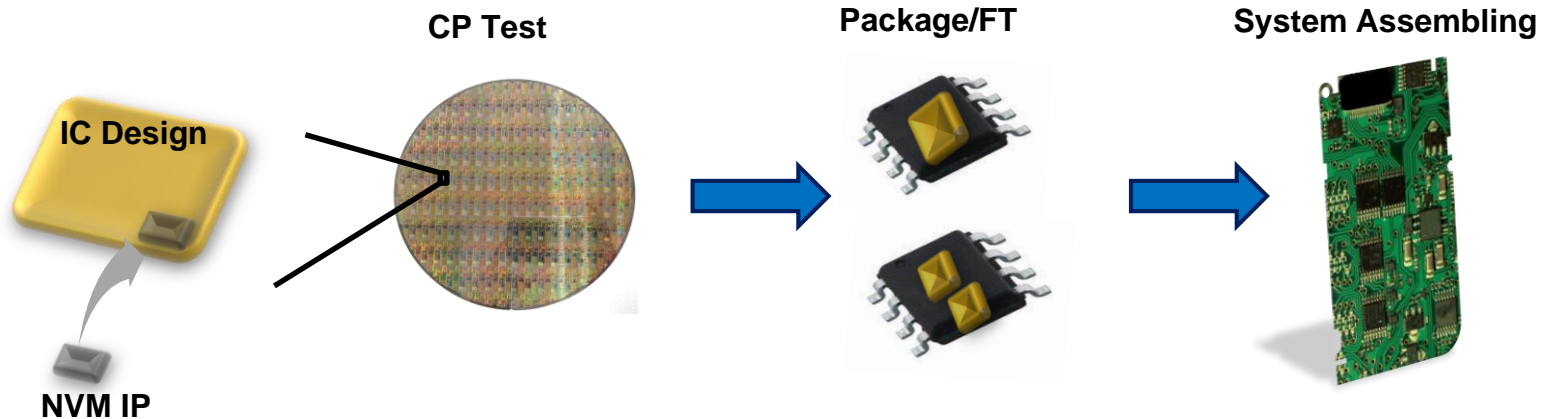
- Repair

# Embedded NVM Usage

eMemory's embedded NVM creates value for customers

## Cost Reduction

## Programmable, Configurable



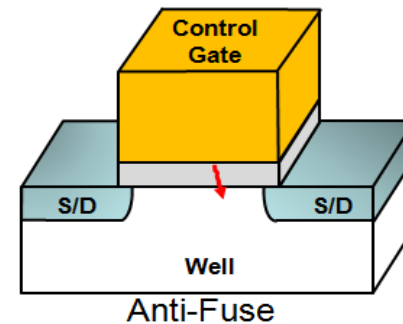
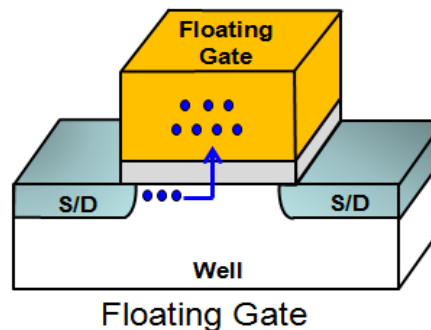
## Security

## 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

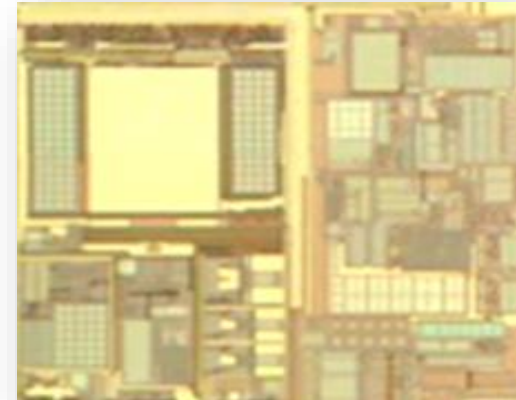
Authorized Product



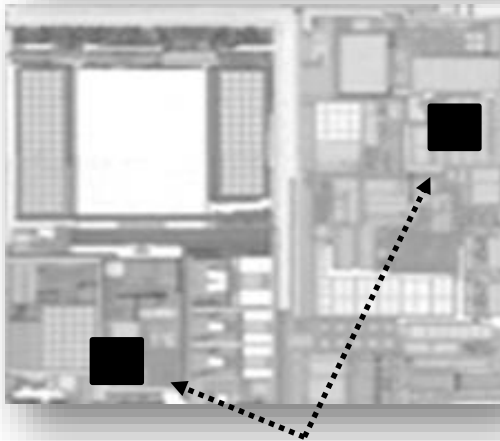
Without protection



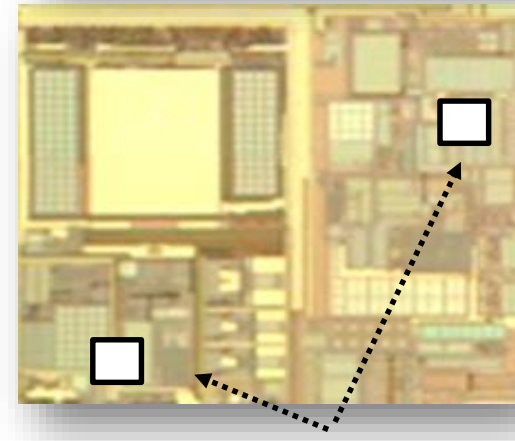
Fake Product



With protection



Security IP/Code by Authorized Use

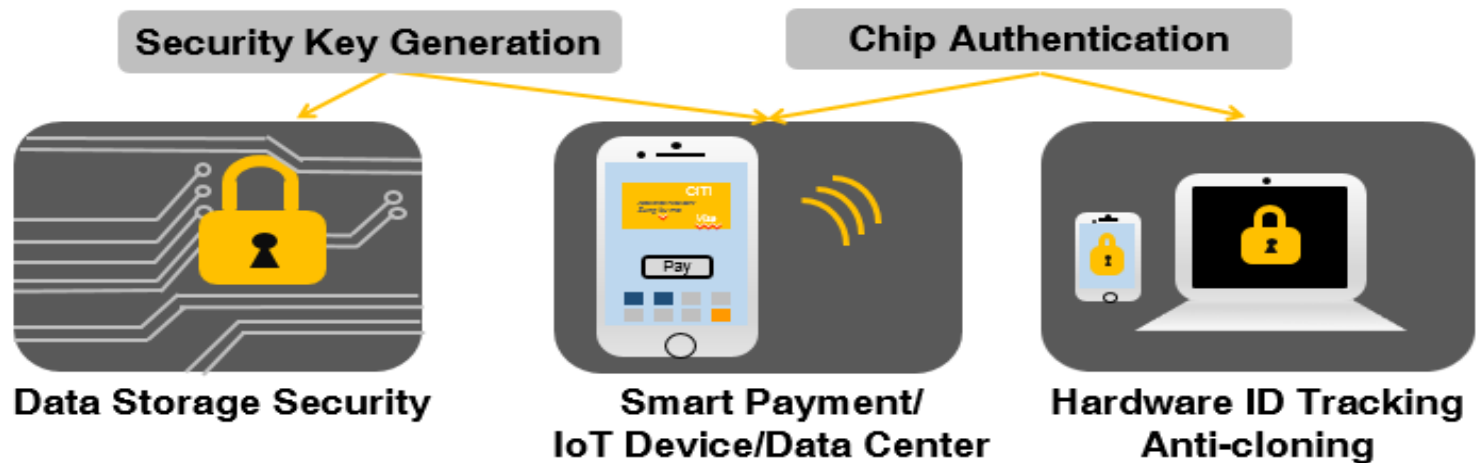


Can NOT Work w/o Security IP/Code

# New invention - NeoPUF technology

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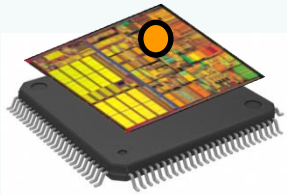
- Authentication & Security Everywhere



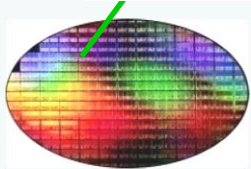


# Secure HW& SW from Chip-level

NeoPUF

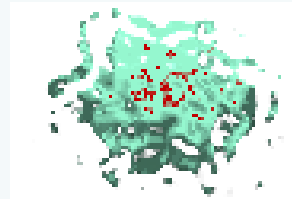


Chip Fingerprint



Unique Keys

Key Generation



Entanglement

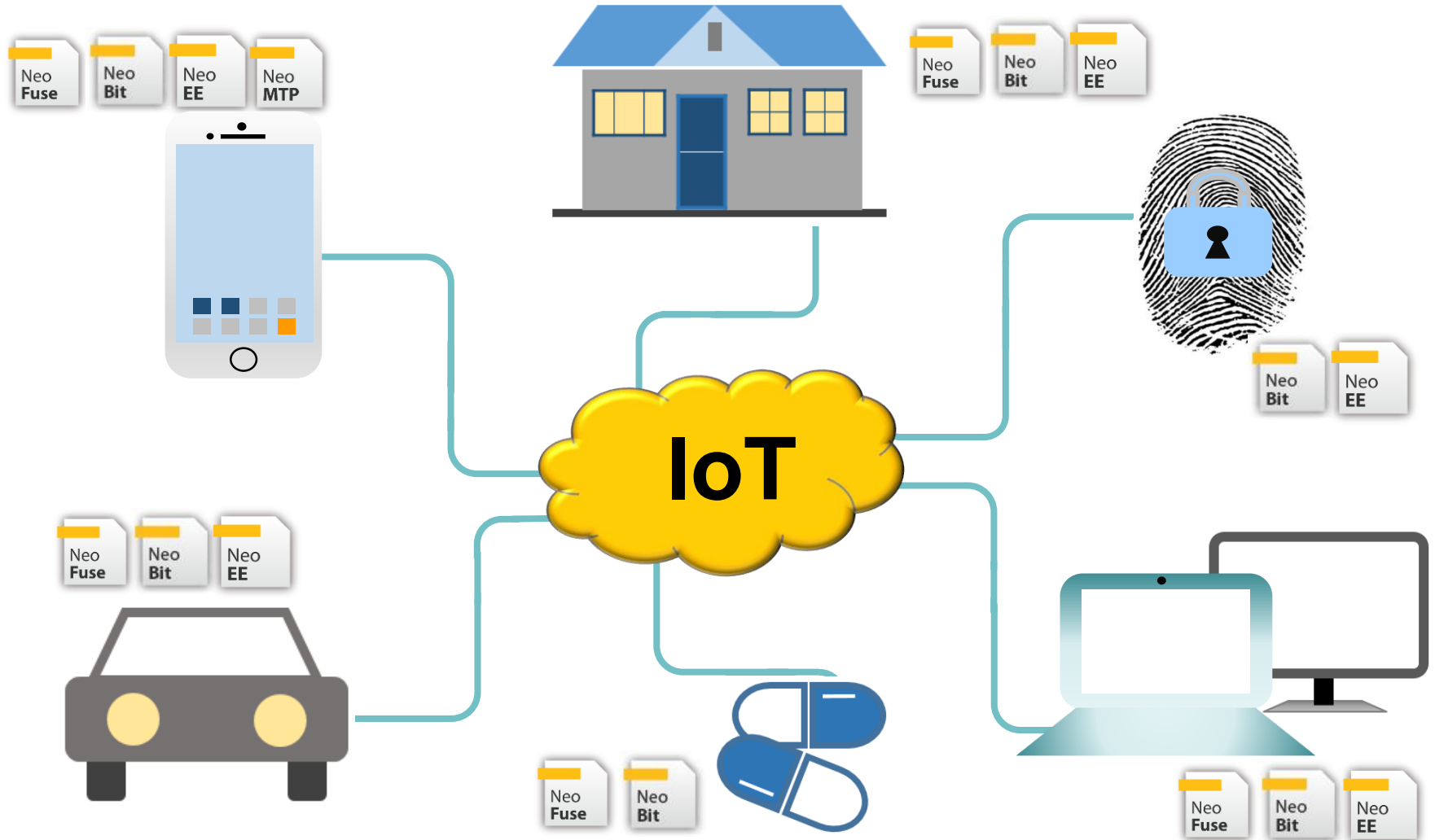


Cryptography



Crypto Engines

# eMemory IP in IoT



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

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# Q1 Revenue Breakdown

Revenue (thousands of NT dollars)

	Q1 2018	Q4 2017	QoQ	Q1 2017	YoY	2017	2016	YoY
<b>Licensing</b>	114,540	78,811	45.3%	74,146	54.5%	388,184	330,087	17.6%
<b>Royalty</b>	259,926	243,055	6.9%	263,103	-1.2%	987,574	885,372	11.5%
<b>Total</b>	374,466	321,866	16.3%	337,249	11.0%	1,375,758	1,215,459	13.2%

Revenue (thousands of US dollars)

	Q1 2018	Q4 2017	QoQ	Q1 2017	YoY	2017	2016	YoY
<b>Licensing</b>	3,898	2,620	48.8%	2,384	63.5%	12,787	10,256	24.7%
<b>Royalty</b>	8,828	8,066	9.4%	8,366	5.5%	32,311	27,422	17.8%
<b>Total</b>	12,726	10,686	19.1%	10,750	18.4%	45,098	37,678	19.7%

Number of Licenses

		Q1 2018	Q4 2017	2017	2016
<b>Technology Licenses</b>		7	3	20	43
<b>Design Licenses</b>	<b>NRE</b>	15	15	55	56
	<b>Usage</b>	87	78	325	311

# Financial Income Statement

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

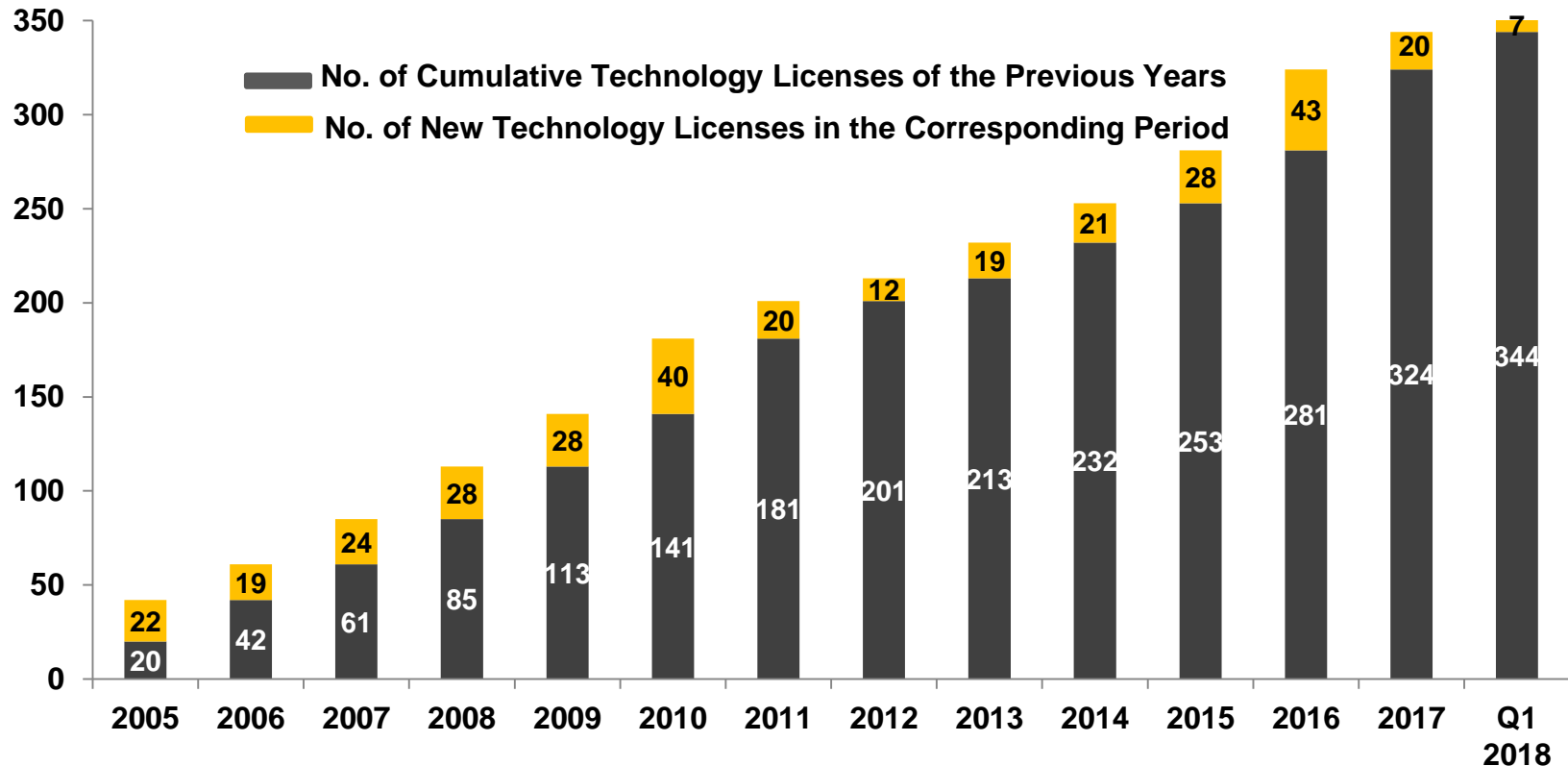
	Q1 2018	Q4 2017	Q1 2017	change (QoQ)	change (YoY)
Revenue	374,466	321,866	337,249	16.3%	11.0%
Gross Margin	100%	100%	100%	-	-
Operating Expenses	193,201	185,484	193,603	4.2%	-0.2%
Operating Margin	48.4%	42.4%	42.6%	6.0ppts	5.8ppts
Net Income	168,730	117,659	151,378	43.4%	11.5%
Net Margin	45.1%	36.6%	44.9%	8.5ppts	0.2ppts
EPS	2.23	1.55	2.00	43.9%	11.5%
ROE	31.3%	23.6%	30.2%	7.7ppts	1.1ppts

# Technology Licensing

## Number of Licenses

Year	2015	2016	2017	Q1 2018
License	28	43	20	7

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 **100** platforms by Q1 18.
- **15** for NeoBit, **45** for NeoFuse, **4** for NeoPUF, **11** for NeoEE, and **25** for NeoMTP.

	7/10nm	12/14/16nm	22/28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um
NeoBit	-	-	-	-	1	1	7	6
NeoFuse	3	3	12	6	6	9	3	3
NeoPUF	-	-	2	-	2	-	-	-
NeoEE	-	-	-	-	-	-	1	10
NeoMTP	-	-	-	1	2	2	7	13

As of March 31st, 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



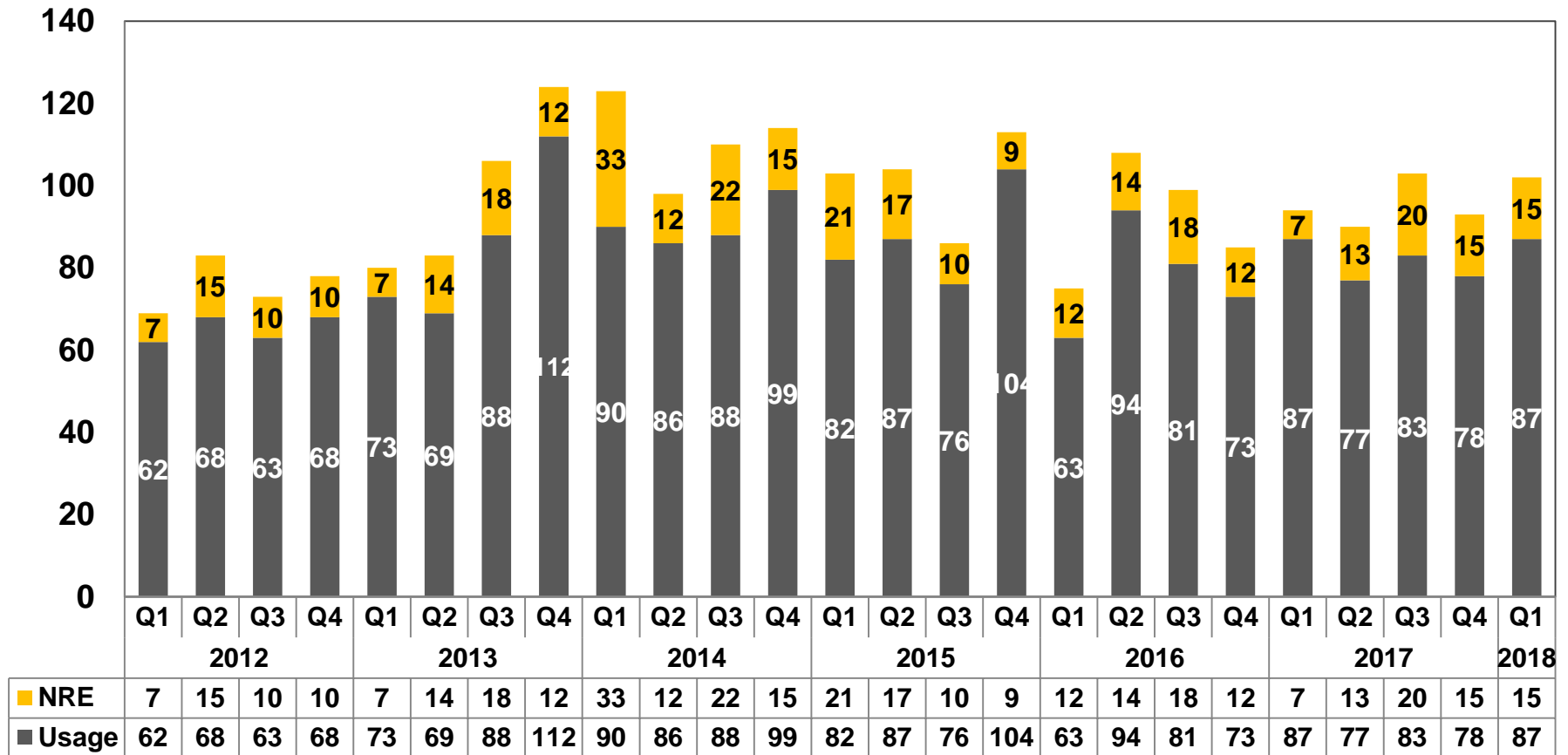
NeoMTP





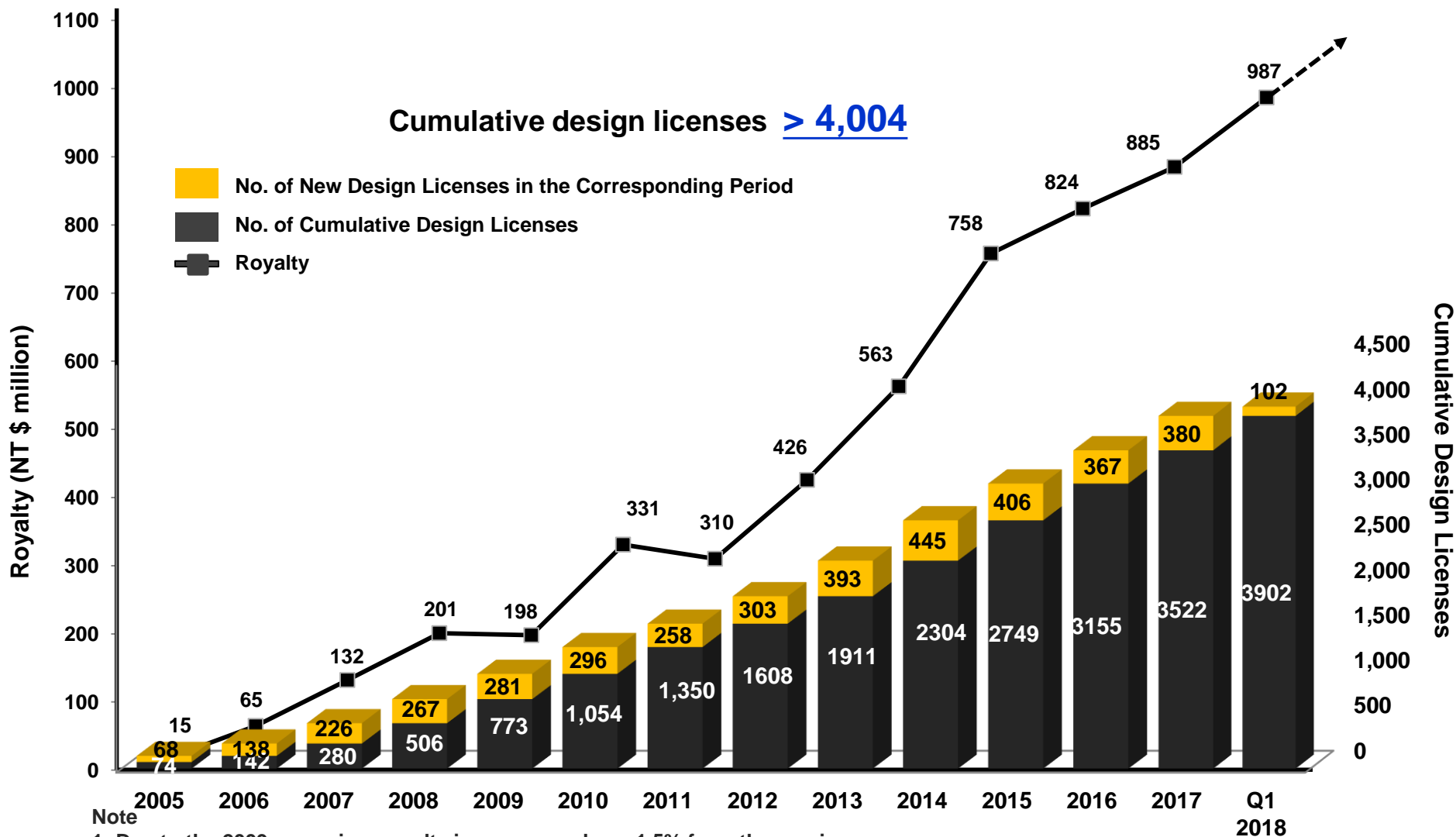
# Design Licensing (New Tape-Out)

- A total **102** NTO in Q1 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%.

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

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# Outlook for Q2 and beyond

- **Key drivers to licensing revenue:**
  - **Establishing partnerships with more foundries worldwide on various processes. This year, Korea's largest foundry is expected to be added on the list. Besides that, several new license contracts beyond 16nm platform are going to be signed in this year.**
  - **Our growing IP library will further contribute to growth of licensing revenue.**
  - **The increasing number of MTP license contracts will drive the growth of licensing revenue in the future.**

# Outlook for Q2 and beyond

- **Key drivers to royalty revenue :**

- 8-inch processes**

- **Royalty revenue which contribute from PMIC application will grow due to the change of business terms with US largest chipmaker from one-time fee to royalty-based, which is expected to mass production this year. And, the US second largest IC Design Company has taped out and embedded our IP into its wireless charger, will contribute royalty growth in the future.**
    - **MTP technology was adopted by a European IDM company, and is ready for mass production.**
    - **Continuing to expand our market share in Fingerprint application by new customers and new applications.**
    - **Increasing design activities of application in IOT, Automotive and healthcare related.**

# Outlook for Q2 and beyond

## 12-inch processes

- The trend that DDI applications migrate to TDDI and OLED remains unchanged, will contribute to the revenue growth of 12-inch processes.
- More tape-outs at 28nm for Set-top box, multimedia, SSD controllers, and Network-related applications. Major Asia design houses have adopted our IP into their 28nm products and will contribute to our royalty in 2018 and beyond.

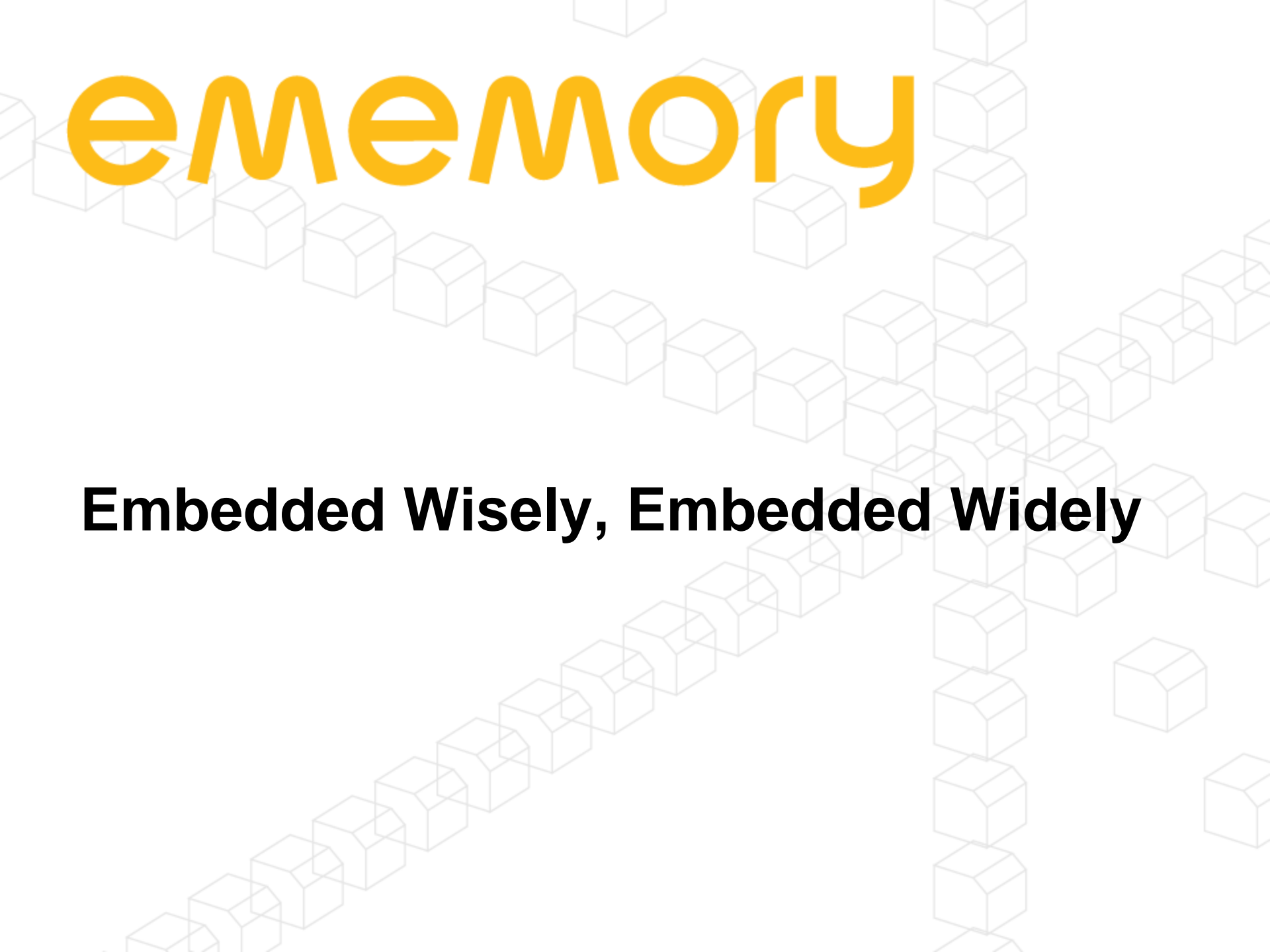
# Outlook for Q2 and beyond

- **Development of new applications**

- **NeoFuse solutions have successfully designed into DRAM IDM for memory repair function, starting from 25nm and beyond, will contribute to royalty in the future.**
- **NeoPUF is expected to work on RF, FPGA, portable POS machines, and cartridges related applications, will start contribute to royalty revenue in 2019.**

- **Development of new technologies**

- **We constantly cooperate with main foundries in development of IPs at 5/7/12/14nm and 22nm SOI platforms.**
- **We have started to co-develop new memory technology with a top IDM company in the US.**



# ememory

**Embedded Wisely, Embedded Widely**