Investor Presentation

eMemory Technology Inc.

January 2018

智慧財產權聲明

本文件內之資訊，包括文字、圖片、圖表、表格或其他檔案等，其所有權利或利益，包括但不限於所有權及智慧財產權，皆屬力旺電子所有，請尊重智慧財產權。本文件之內容包含力旺電子之機密資訊。部分內容可參見2014年出版之Logic Non-Volatile Memory (The NVM solutions from eMemory)一書。任何在此之資訊在未經力旺電子書面同意，不得影印、散佈、複製、使用本文件或將其揭露予第三人。

eMemory, NeoBit, NeoFuse, NeoFlash, NeoEE, NeoMTP, NeoROM, EcoBit與NeoPUF皆為力旺電子在台灣或其他國家之商標或服務標章。

投資安全聲明

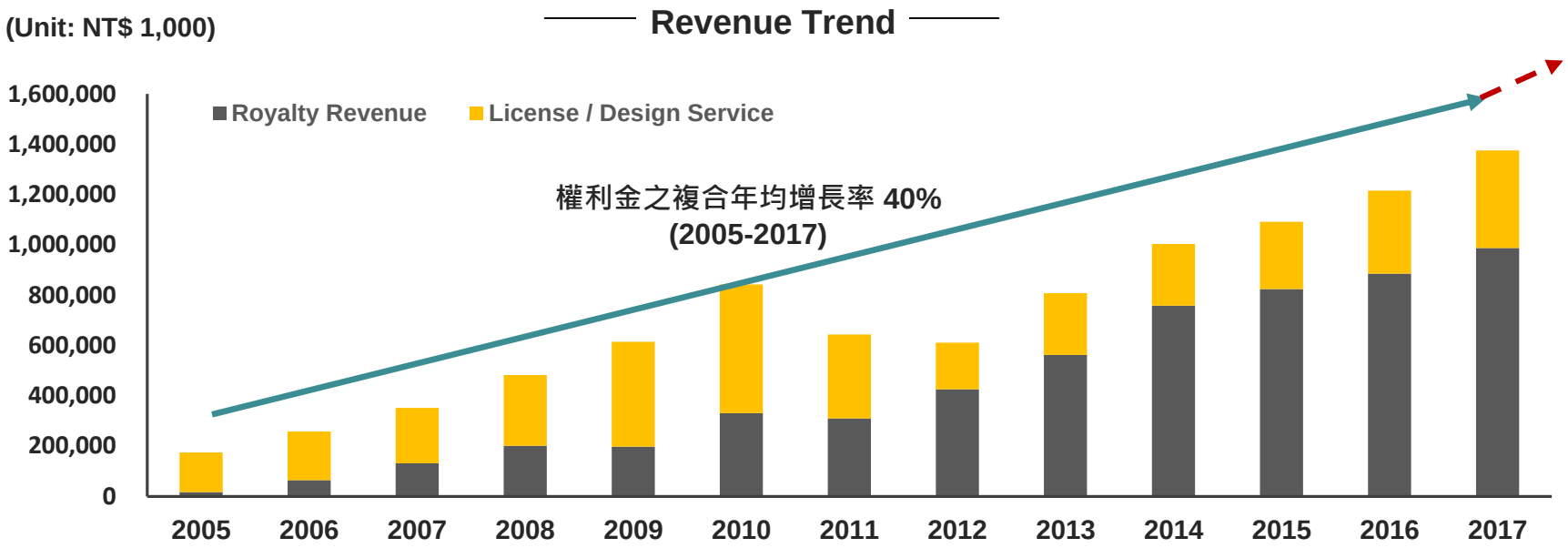
除簡報內所提供之歷史信息外，簡報事項係屬預測性陳述，受到風險及不確定性因素影響，可能造成實際結果與陳述內容發生不符，這些不確定性因素包括：技術平台是否順利導入利用、IP是否被客戶接受、客戶產品大量量產之能力及時間、產業及市場對半導體產品之供給及需求移轉、終端市場之穩定性及其他風險等。

eMemory – the Embedded IP Expert

- **Key Summary**
- **Value Creations**
- **Financials**

公司簡介

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



力旺之關鍵要素

- 2000年成立，2011年掛牌，總部設在新竹
- 營業毛利率100%，營業淨利率48.6%
- 全球第七大IP供應商
- 超過1,850萬片以上量產晶圓，嵌入使用力旺電子之矽智財
- 取得超過510件專利,另有240項專利申請中
- 238 位員工，70% 為研發人員
- 全球最大嵌入式非揮發性記憶體供應商
- 自2010起, 連續獲得台積電之 Best IP Partner獎項

全球客戶

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

全球客戶

	Foundry	IDM	Fabless
Taiwan	5	0	261
China	8	0	513
North America	1	2	242
Europe	2	1	111
Korea	3	0	71
Japan	4	8	52
Others	1	0	53

Foundry

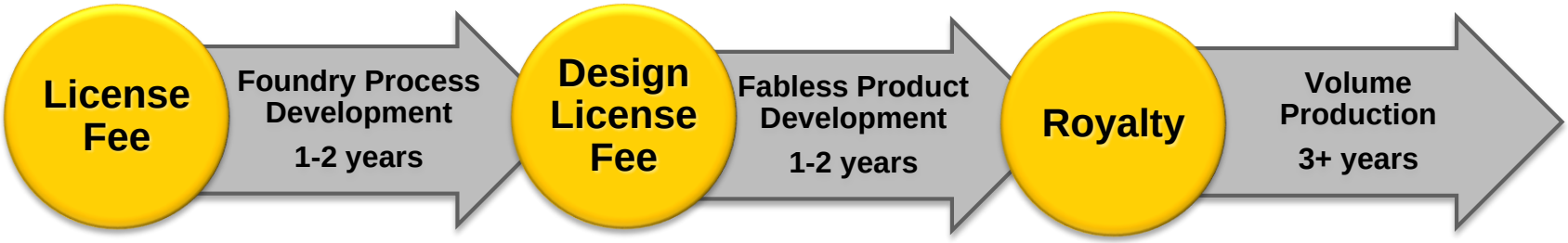
asmc, CSMC, Dongbu HiTek, FUJITSU, GLOBALFOUNDRIES, HEJIAN, HG 华虹宏力, HLMC, SMIC, MagnaChip, Maxchip, Nexchip, Powerchip 力晶科技, SK hynix, SILTERRA, TOWERJAZZ, TPSCo TowerJazz Panasonic SEMICONDUCTOR Co., Ltd., tsmc, UMC, VIS, XMC

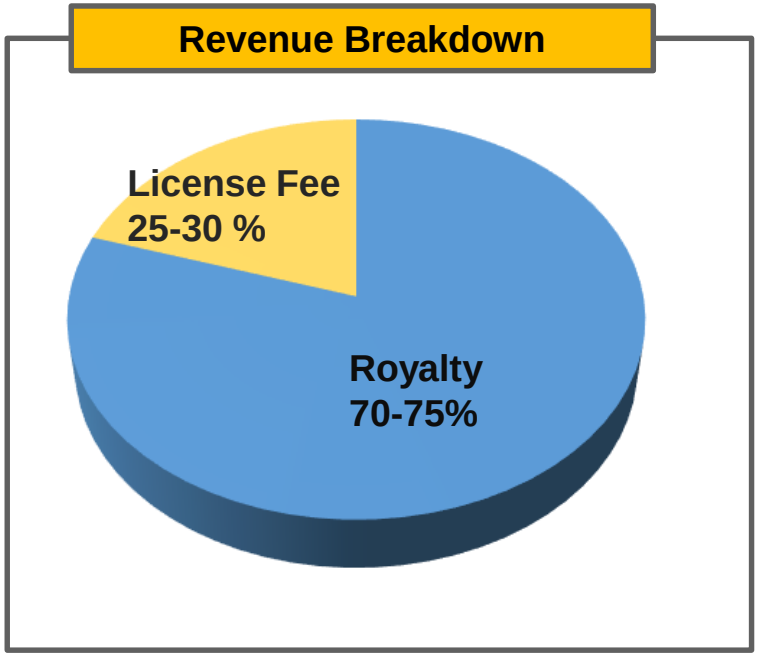
IDM

MAXIM, NXP, RENESAS, FUJITSU, JRC, MITSUBISHI ELECTRIC Changes for the Better, RICOH, MITSUMI, SII, TOSHIBA, OKI, ON Semiconductor, ON

營運模式

Recurring royalty is the backbone of our business





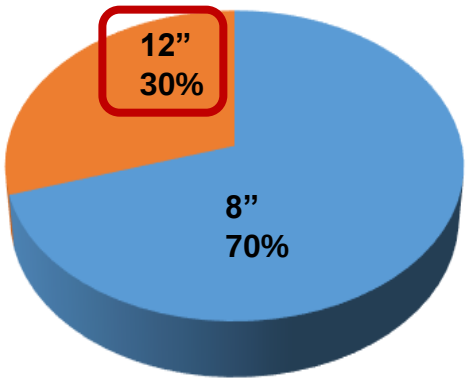
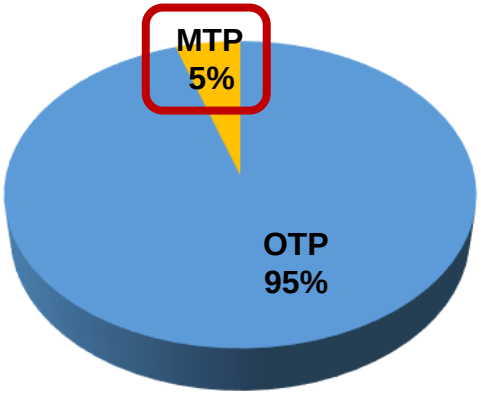
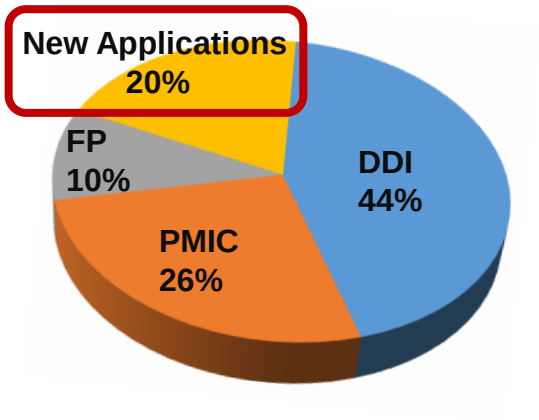
- 70-75% of revenue is from royalty based on wafer productions
- Royalty rates are based on IP type and wafer
- Royalty revenue is a key growth driver:

  More adoption = more volume shipment

  More advanced node wafers = Higher ASP per wafer

成長動能

What supports our current growths, What drives our **Future Growths**

Market Leader at 8” Way to Grow at 12”	Dominate in OTP markets New momentum from MTP	DDI/PMIC core business IoT to drive growths
		
■ Penetration grows at 12” nodes, resulting in higher ASP	■ The premium-carrying MTP solutions are about to take off	■ IP adoption grows in new applications including IoT, multi-media, networking, CIS etc.

As of Q317

發展前景

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

2017 worldwide foundry revenue: US$ 50 billion

eMemory IP adoption rate:4%

Going forward, growth is driven by more and more new chip applications

2018-2019

- Legacy processes
  PMIC, FP, 3D sensing, auto, healthcare, security
- Advanced processes
  STB, DTV, networking, SSD controller, OLED, Bluetooth, TDDI, CIS
- MTP adopted by a leading IDM in consumer and auto applications

2019-2020

- Legacy processes
  Auto, security, MTP
- Advanced processes
  AP, GPU, CPU,FPGA
- IDM IP adoption in DRAM repair, auto, security

2020-2025

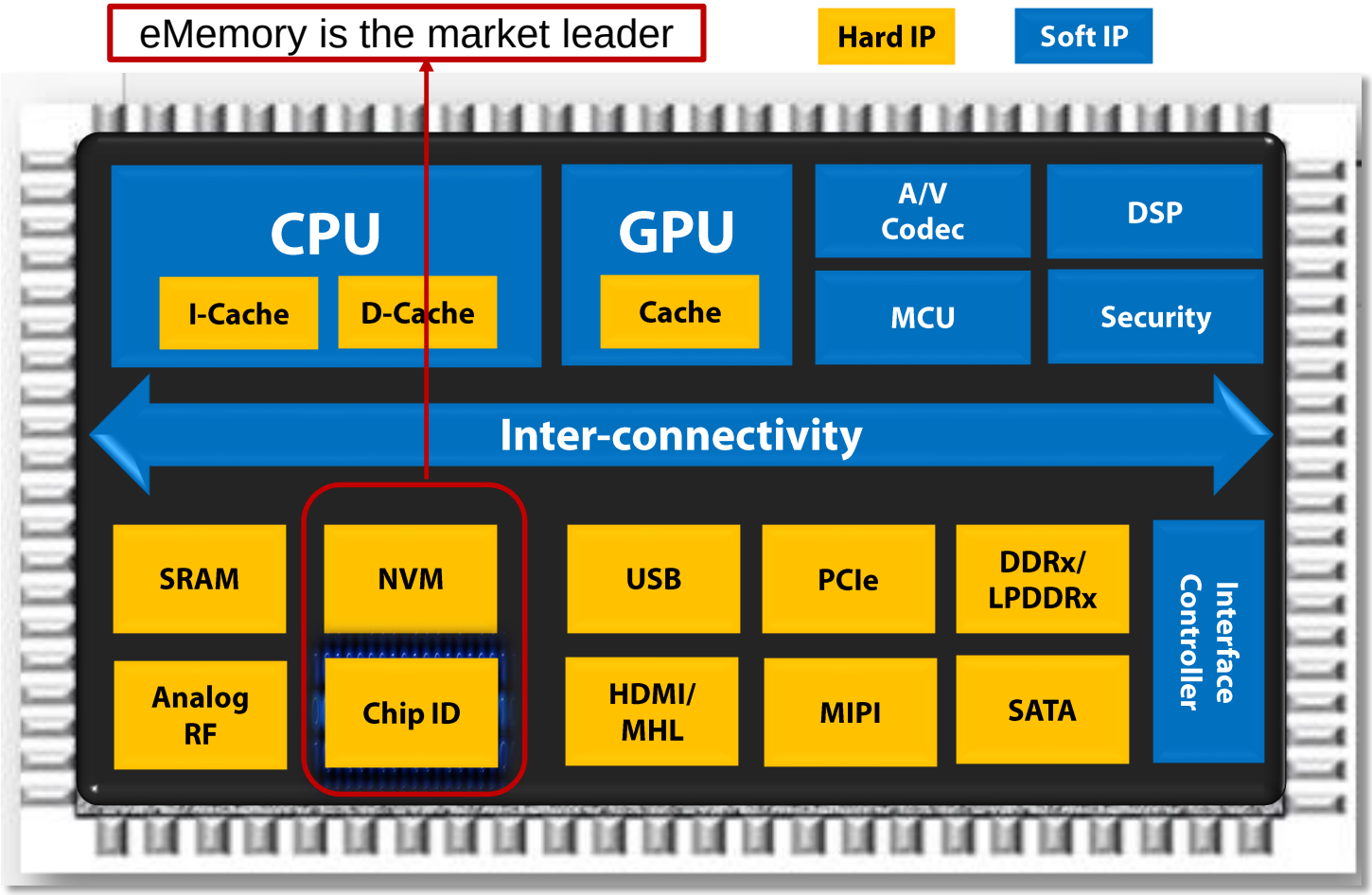
- Legacy processes
  Embedded security for IOT and driveless cars
- Advanced processes
  Embedded emerging memory
- NeoPUF implementation in blockchain and Fintech to increase revenue streams

eMemory – the Embedded IP Expert

- Key Summary
- Value Creations
- Financials

主要的矽智財供應商

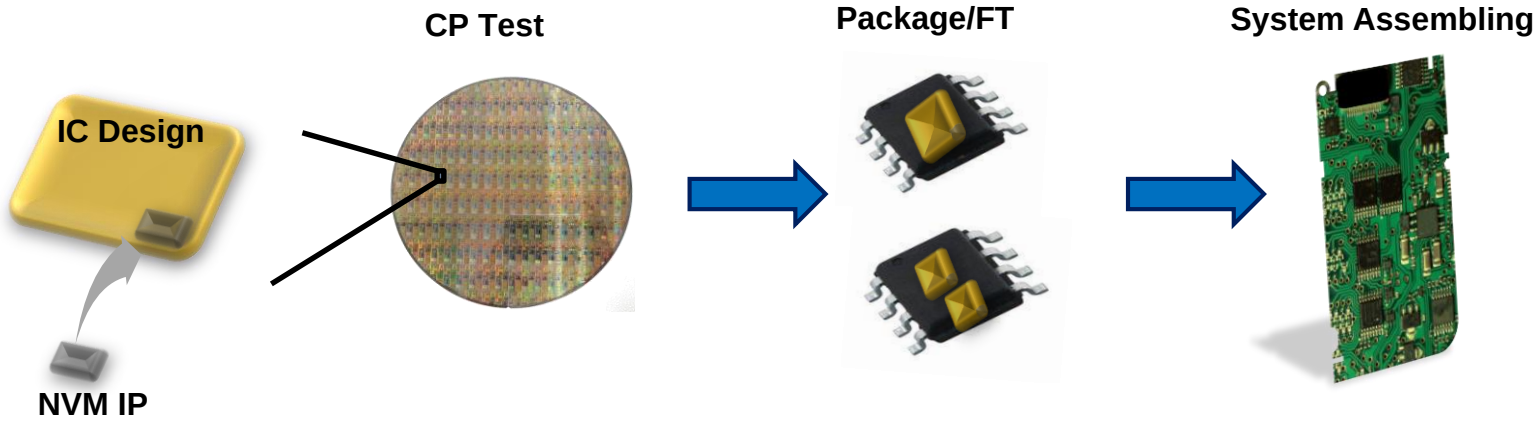
eMemory's embedded Non-Volatile Memory and Chip ID are foundation IP of SoC



嵌入式非揮發性記憶體之應用

eMemory's embedded NVM creates value to customers

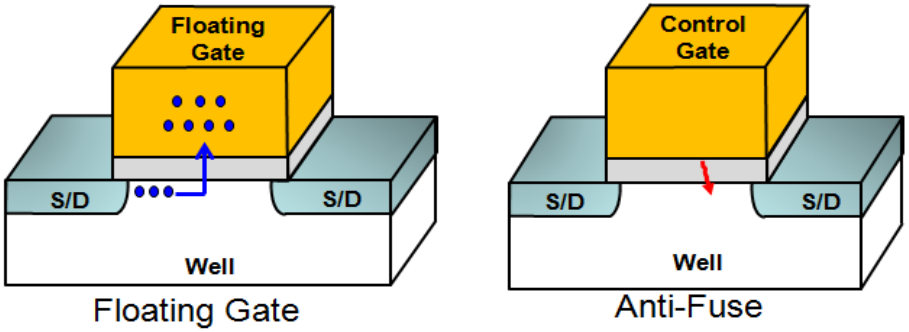
Cost Reduction | **Programmable, Configurable**



Security | **Secure Data Storage**

eFuse Key: Data is easily observed

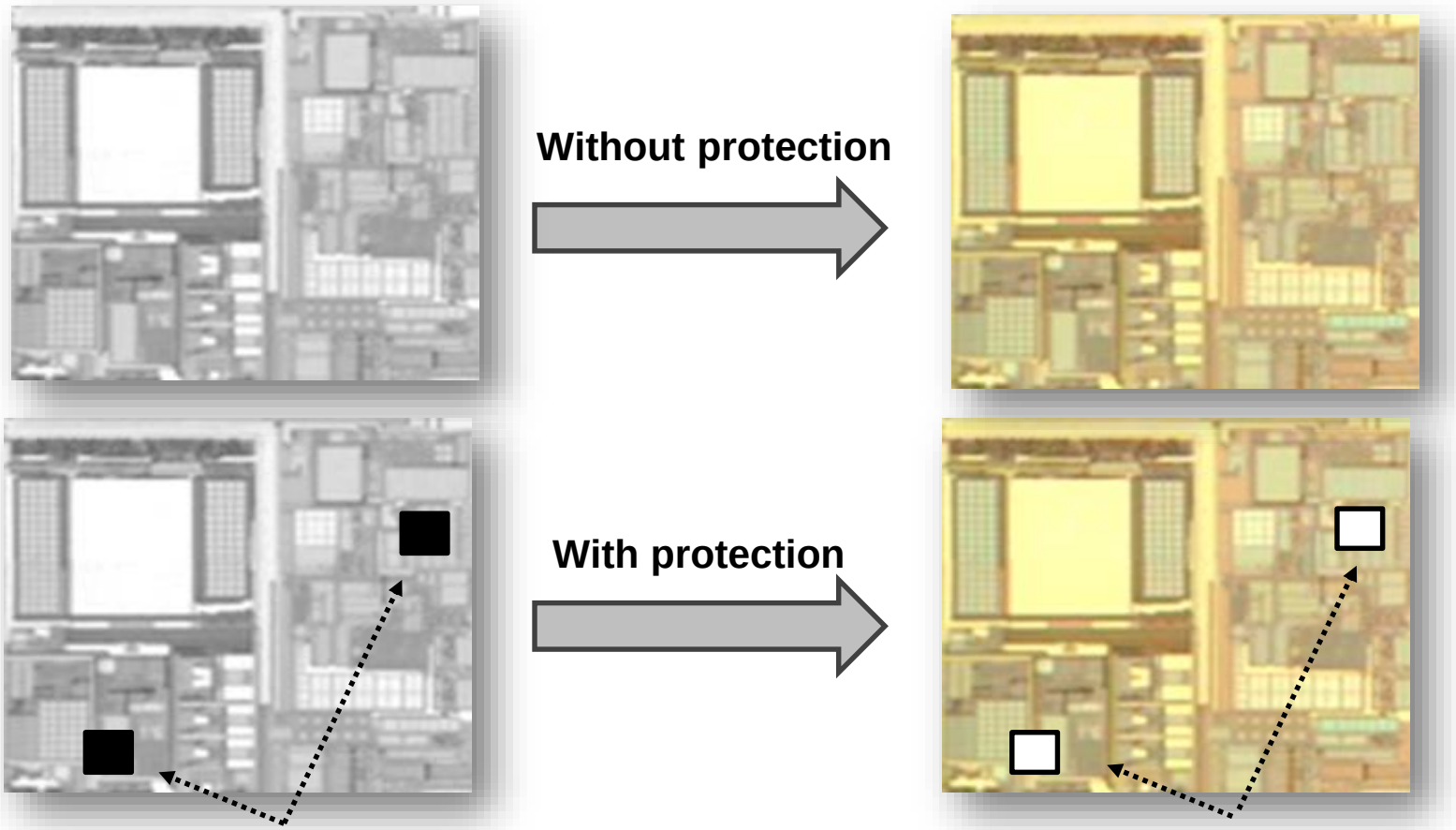
Invisible Hardware Key : Data is hard to be detected



嵌入式非揮發性記憶體之應用

Security | **Secure Data Storage**

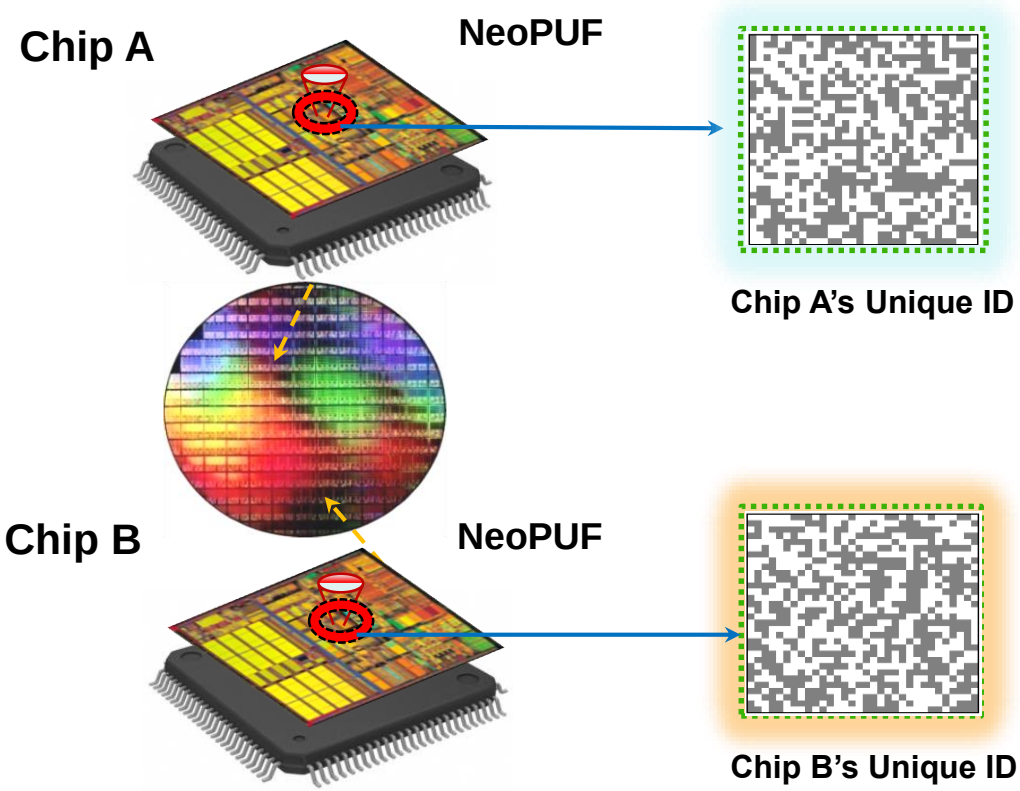
Authorized Product | **Fake Product**



Security IP/Code by Authorized Use | **Can NOT Work w/o Security IP/Code**

引領未來之技術

eMemory's Chip ID is the security element in every emerging big trends



Ideal for Crypto Applications

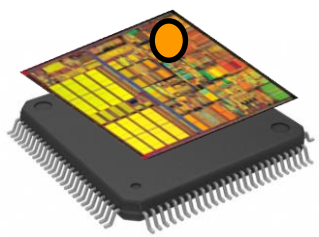
Physically Unclonable Function

- **Deep-rooted Root of Trust**
  Based on uncontrollable silicon manufacturing variations
- **Unclonable & Unpredictable**
  Manufacturing variations cannot be controlled or replicated
- **Chip-Unique**
  Every Chip bears its unique
  - ✓ Chip ID
  - ✓ Entropy source

Secure HW& SW from Chip-level

eMemory's chip ID provides the fundamental security for every single chip

Silicon PUF



Unclonable Entropy Source

Deploy Security From NeoPUF Entropy

- Chip inherent physical characters digitalized and used as **Entropy Source**
- Every chip can generate its own **Unique ID** and **Crypto Keys**
- **Personalization of keys** serves as a damage control
- Security Applications include **chip ID**, **authentication**, **data encryption**, **SW code encryption, secure firmware update** etc.

全球加密市場預測

eMemory's NeoPUF is set to capitalize on the promising new markets

IoT/IIoT

Fintech

Connected Car

By 2027 global IoT security market is forecast

US$48 billion in revenue*

CAGR of 14.9% (2017-2027)

Data Center

Chip Vendor/OEM IP Protection

'Internet of Things (IoT) Security Product Market: Global Industry Analysis 2012-2016 and Opportunity Assessment 2017-2027' , Future Market Insight

eMemory – the Embedded IP Expert

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綜合損益表

(單位:新台幣仟元)	Q3 2017	Q2 2017	Q3 2016	change (QoQ)	change (YoY)
營業收入淨額	384,423	332,220	309,367	15.7%	24.3%
營業毛利率	100%	100%	100%	-	-
營業費用	205,291	188,562	173,605	8.9%	18.3%
營業淨利率	46.6%	43.2%	43.9%	3.4ppts	2.7ppts
本期淨利	194,062	135,610	130,299	43.1%	48.9%
純益率	50.5%	40.8%	42.1%	9.7ppts	8.4ppts
每股盈餘 (單位: 新台幣元)	2.56	1.79	1.72	43.0%	48.8%
權益報酬率	40.2%	29.6%	28.9%	10.6ppts	11.3ppts

第四季各項營收

單位：新台幣仟元

K NTD	Q4 2017	Q3 2017	QoQ	Q4 2016	YoY	2017	2016	YoY
授權費	78,811	101,087	-22.04%	79,684	-1.10%	388,184	330,087	17.60%
權利金	243,055	283,336	-14.22%	226,543	7.29%	987,574	885,372	11.54%
合計	321,866	384,423	-16.27%	306,227	5.11%	1,375,758	1,215,459	13.19%

單位：合約數

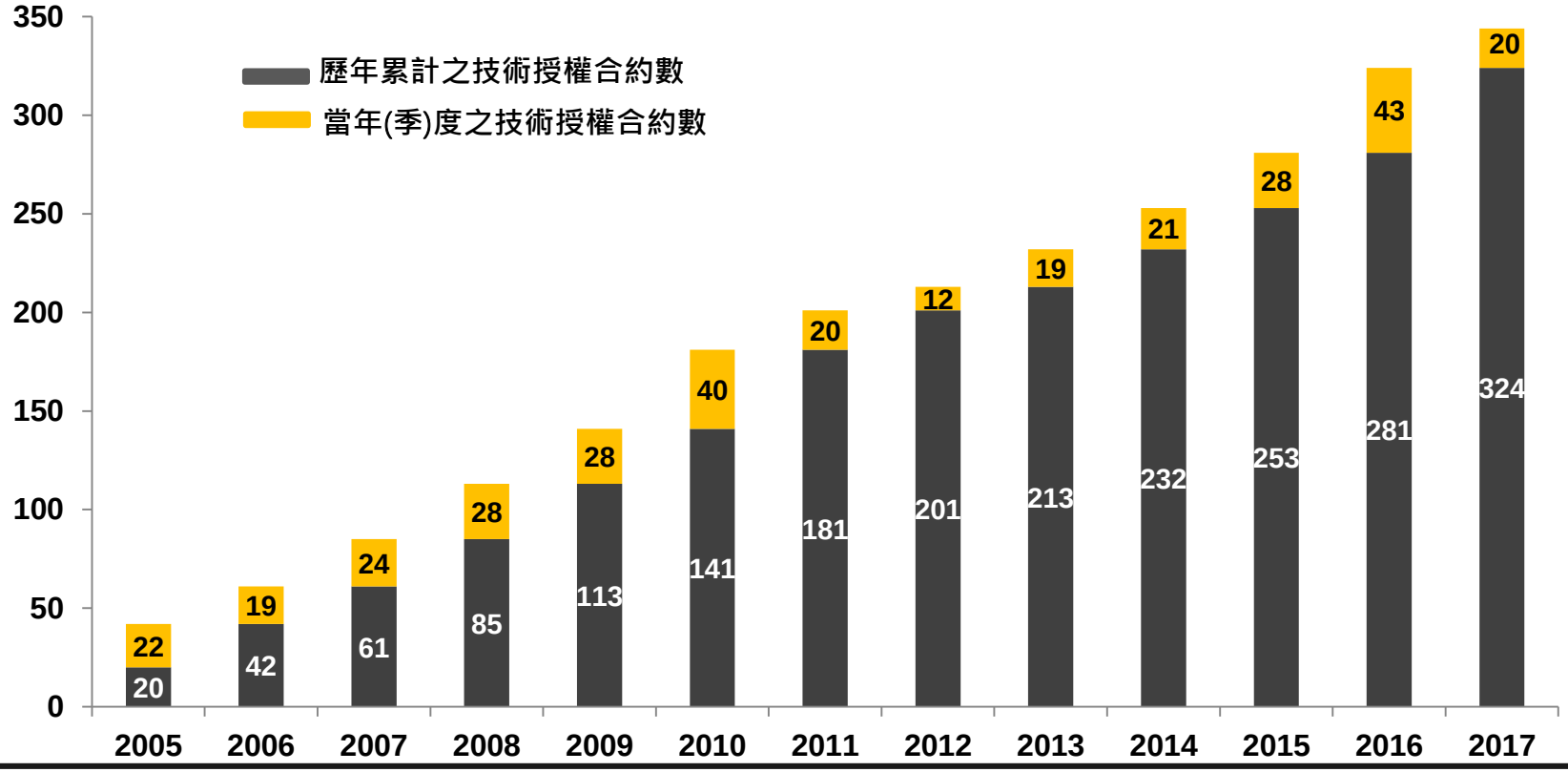
		Q4 2017	Q3 2017	2017	2016
技術授權數		3	4	20	43
設計授權數	NRE	15	23	55	56
	使用費	78	87	325	311

技術授權合約

單位：合約數

Year	2014	2015	2016	2017
License	21	28	43	20

註: 與晶圓廠簽訂的技術授權合約所含的技術製程及授權金視合約內容而定，無特別季節性因素。



目前正在建構的技術製程平台

- **New technologies being developed for 106 platforms by Q4 17.**
- **18 for NeoBit, 40 for NeoFuse, 3 for NeoPUF, 18 for NeoEE, and 27 for NeoMTP.**

	7/10nm	12/14/16nm	28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um	>0.25 um
NeoBit	-	-	-	-	1	-	7	10	
NeoFuse	3	3	10	4	8	7	1	4	-
NeoPUF	-	-	1	-	2	-	-	-	-
NeoEE	-	-	-	-	-	-	2	16	-
NeoMTP	-	-	-	1	2	2	7	15	-

As of Dec. 31st, 2017

目前正在建構的技術製程平台

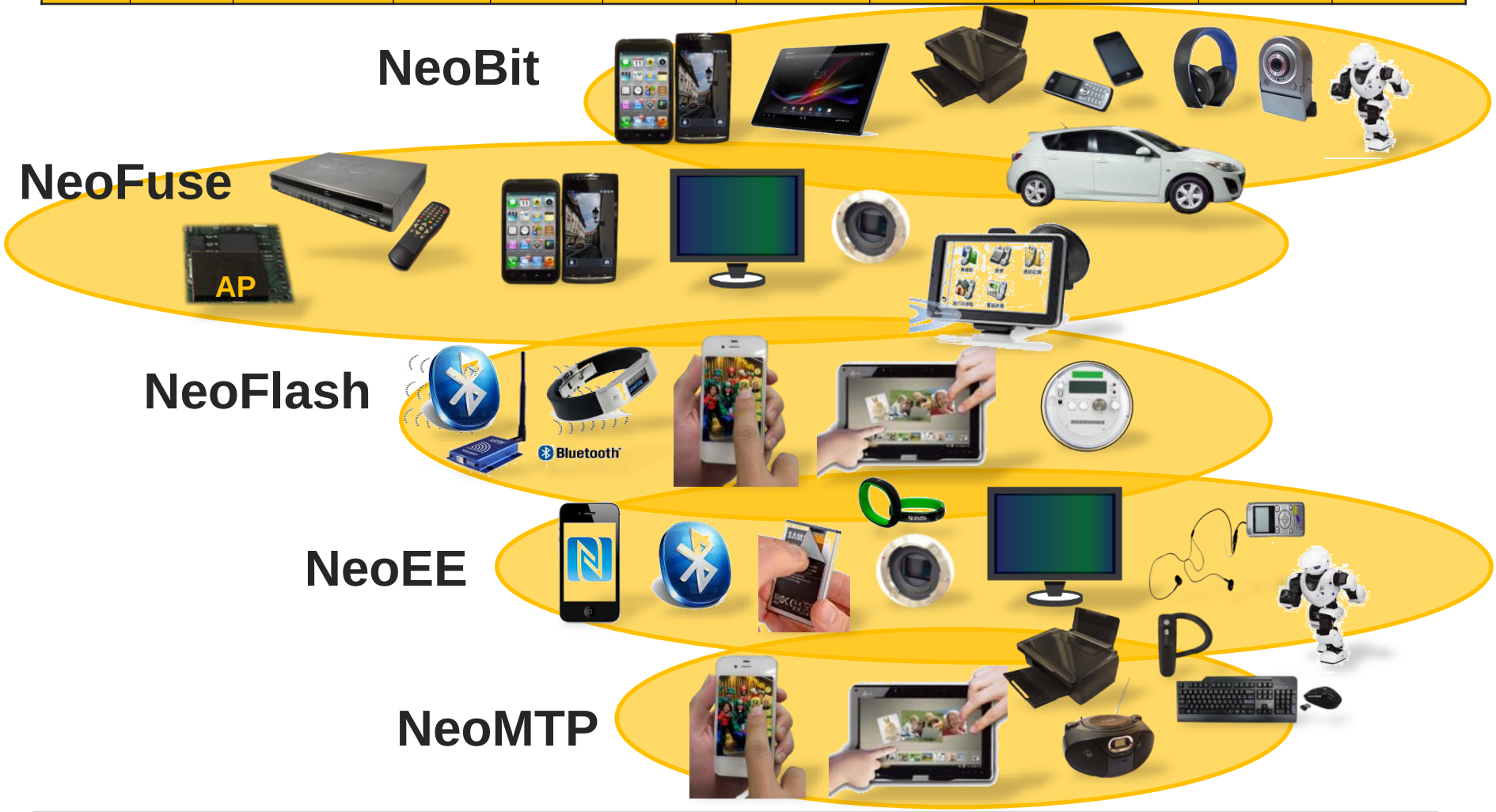
12" Fabs	Production	Development	NVM Type	Process Type
7/10nm	0	3	OTP	FF
14/16nm	2	3	OTP	FF+
28nm	10	11	OTP	LP/HPM, HLP/HPM, LPS
40nm	10	5	OTP, MTP	HV-DDI, LP, eFlash
55/65nm	15	13	OTP, MTP	LP, HV-DDI, HV-OLED, DRAM, CIS, eFlash
80/90nm	7	6	OTP, MTP	HV-DDI, HV-OLED, LP, eFlash
0.13/0.11um	9	2	OTP	HV-DDI, BCD, Generic
0.18um	1	0	OTP	BCD
Total	54	43		

8" Fabs	Development	NVM Type	Process Type
90nm	3	OTP	HV-DDI, LL
0.13/0.11um	15	OTP, MTP	HV-DDI, BCD, LP, RF, CIS, LL, Green
0.18/0.16/0.152um	45	OTP, MTP	Generic, LP, LL, MR, HV, Green, BCD
0.25um	0	OTP, MTP	BCD
0.35um	0	OTP	UHV
Total	63		

Note: As of Dec. 31st, 2017

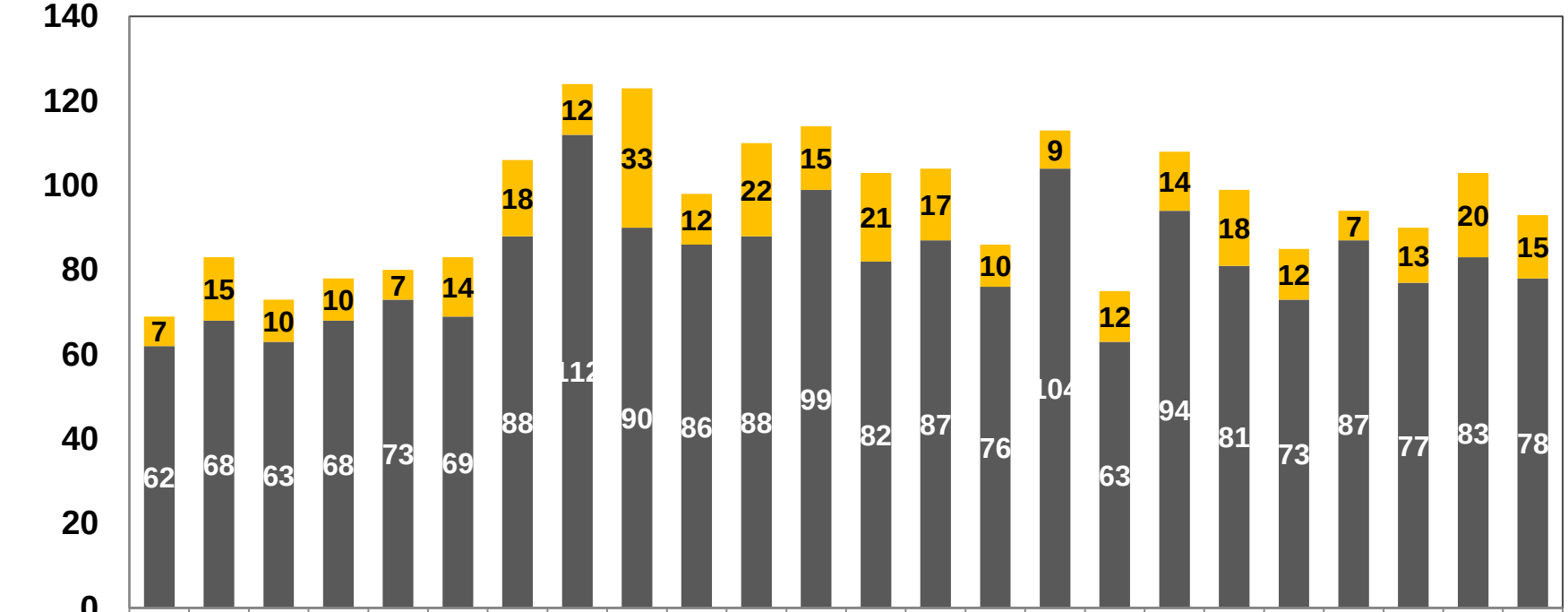
力旺IP的應用

12"								8"		
7nm	10nm	12/14/16nm	28nm	40nm	55/65nm	80/90nm	110/130nm	160/180nm	250nm	350nm



每季設計授權數

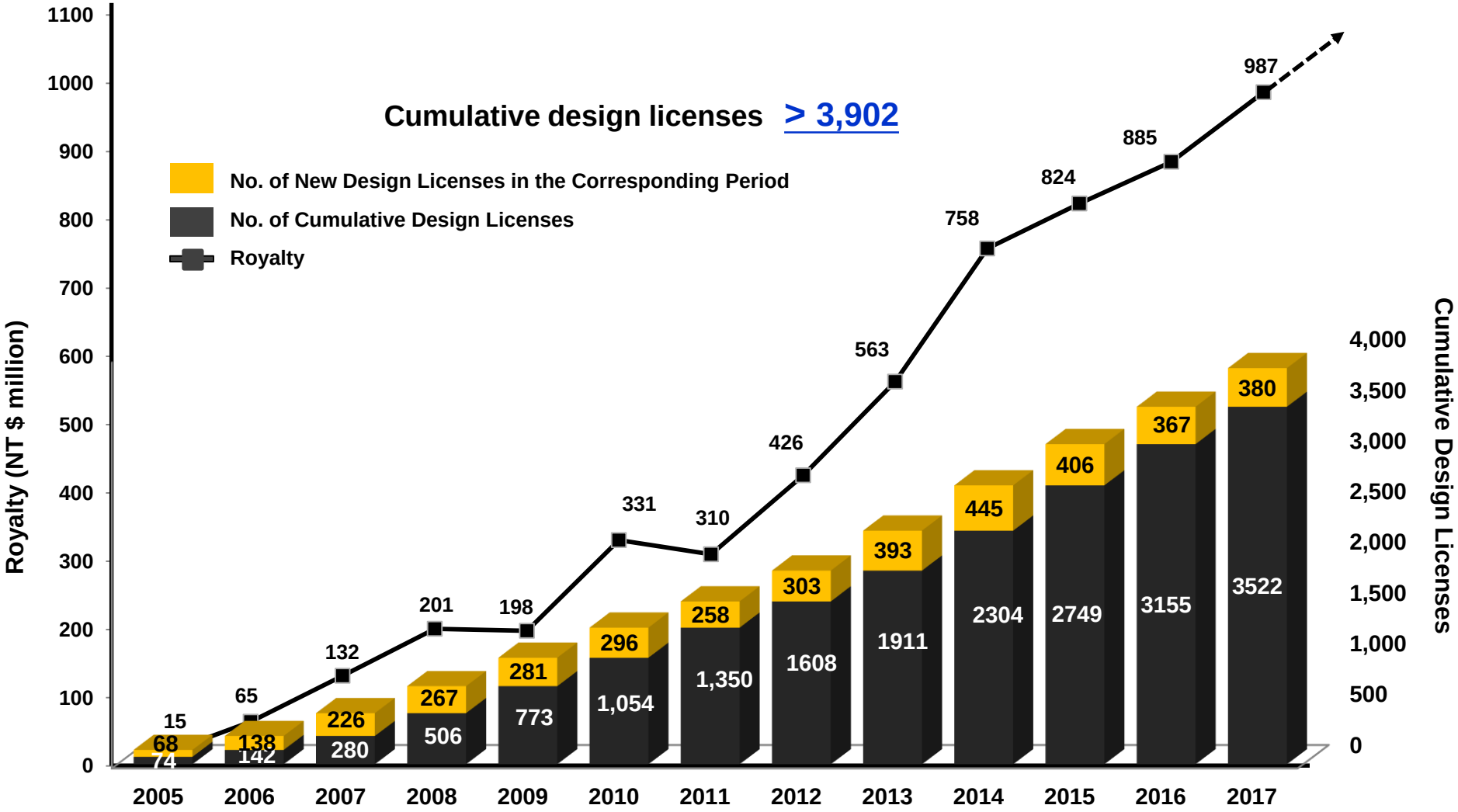
- A total 380 NTO in Q1-Q3 2017 (367@2016, 406@2015, 445@2014, 393@2013)



	2012 Q1	2012 Q2	2012 Q3	2012 Q4	2013 Q1	2013 Q2	2013 Q3	2013 Q4	2014 Q1	2014 Q2	2014 Q3	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2	2017 Q3	2017 Q4
NRE	7	15	10	10	7	14	18	12	33	12	22	15	21	17	10	9	12	14	18	12	7	13	20	15
Usage	62	68	63	68	73	69	88	112	90	86	88	99	82	87	76	104	63	94	81	73	87	77	83	78

註：客戶在各代工廠的諸多MCU NTO已陸續進入量產，加上與主要Green process代工廠的商業模式商業模式調整為直接license IP cell 給代工廠，由代工廠提供設計服務給客戶，造成tape out 數減少，但仍對使用IP cell 的晶片支付權利金. 雖然MCU的NTO數量有明顯減少，但是相關的晶圓產出和權利金收入還是持續增加

權利金取決於過去累積的設計授權數



註1. 2009年因整體半導體景氣衰退，權利金年衰退1.5%。
註2. 2011年因2010年單一客戶預付權利金，導致2010年成長67%，2011年年衰退6.3%。
註3. 2009-2013年權利金年複合成長率為30%。

ememory

Embedded Wisely, Embedded Widely