



# 2023第二季法人說明會

August 9<sup>th</sup>, 2023



# 智慧財產權聲明

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A hand is shown dropping a coin into a stack of coins. To the left, another stack of coins has a small green plant with three leaves growing out of it. The background is a soft, out-of-focus green and yellow bokeh.

# 投資安全聲明

This presentation contains forward-looking statements, which are subject to risk factors associated with semiconductor and intellectual property business. It is believed that the expectations reflected in these statements are reasonable. But they may be affected by a variety of variables, many of which are beyond our control. These variables could cause actual results or trends to differ materially which include, but are not limited to: wafer price fluctuation, actual demand, rapid technology change, delays or failures of customers' tape-outs into wafer production, our ability to negotiate, monitor and enforce agreements for the determination and payment of royalties, any bug or fault in our technology which leads to significant damage to our technology and reputation, actual or potential litigation, semiconductor industry cycle and general economic conditions. Except as required by law, eMemory undertakes no obligation to update or revise any forward-looking statements, whether as a result of new information, future events, or otherwise.



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# 營運回顧



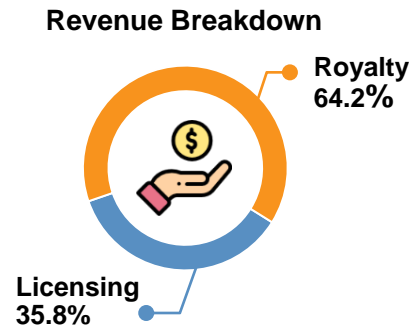
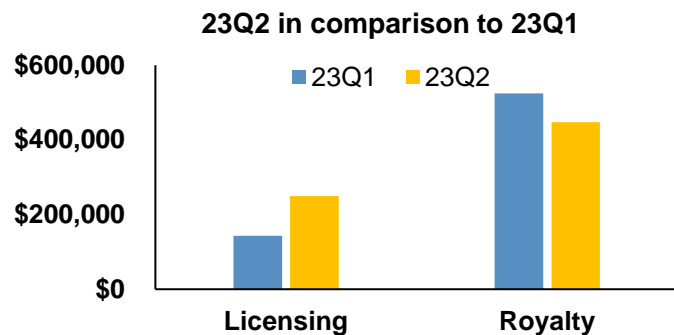
# 第二季綜合損益表

(thousands of NT dollars)

	Q2 2023	Q1 2023	QoQ	Q2 2022	YoY
Revenue	696,625	667,751	4.3%	796,292	-12.5%
Gross Margin	100%	100%	-	100%	-
Operating Expenses	327,865	300,657	9.0%	336,197	-2.5%
Operating Income	368,760	367,094	0.5%	460,095	-19.9%
Operating Margin	52.9%	55.0%	-2.1ppts	57.8%	-4.9ppts
*Net Income	351,697	313,090	12.3%	408,924	-14.0%
Net Margin	50.2%	46.1%	4.1ppts	51.5%	-1.3ppts
EPS (NT\$)	4.71	4.20	12.1%	5.48	-14.1%
ROE	53.5%	38.9%	14.6ppts	69.5%	-16.0ppts

\*Net income attributable to Shareholders of the Company

# 第二季營收貢獻分析



## Revenue

NT\$ Thousands	Q2 2023	Q1 2023	Change (QoQ)	Q2 2022	Change (YoY)
Licensing	249,711	143,049	74.6%	200,729	24.4%
Royalty	446,914	524,702	-14.8%	595,563	-25.0%
Total	696,625	667,751	4.3%	796,292	-12.5%



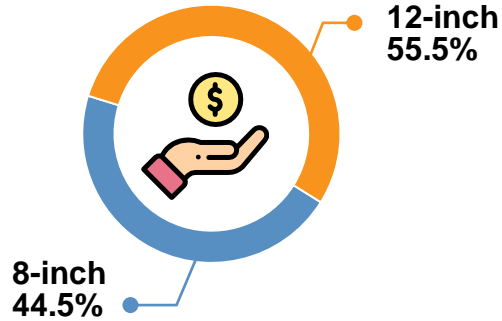
# 第二季營收分析 – 產品線

Technology	Q2 2023								
	Total Revenue			Licensing Revenue			Royalty Revenue		
	% of Q2 Revenue	Change (QoQ)	Change (YoY)	% of Q2 Licensing	Change (QoQ)	Change (YoY)	% of Q2 Royalty	Change (QoQ)	Change (YoY)
NeoBit	27.7%	2.7%	-31.8%	22.7%	101.0%	27.6%	30.5%	-14.6%	-42.8%
NeoFuse	59.6%	-2.8%	-3.5%	45.4%	60.0%	20.5%	67.5%	-15.3%	-10.2%
PUF-Based	4.0%	67.2%	-41.1%	11.0%	66.3%	-41.4%	0.1%	123.3%	-18.8%
MTP	8.7%	67.8%	68.3%	20.9%	89.9%	239.0%	1.9%	-1.6%	-58.4%



# 第二季營收分析 – Wafer Size

Q2 Royalty Breakdown



- 8-inch wafers contributed 44.5% of royalty, down 19.2% sequentially and down 34.5% yearly.
- 12-inch wafers contributed 55.5% of royalty, down 10.9% QoQ and down 15% YoY.

Wafer Size	Q2 2023		
	% of Q2	Change (QoQ)	Change (YoY)
8-Inch	44.5%	-19.2%	-34.5%
12-Inch	55.5%	-10.9%	-15.0%

# 未來展望



# 未來展望

## Licensing & Royalty:

- We expect the licensing revenue to increase significantly compared to H1.
- As new applications gradually enter the mass production stage, we expect royalties to grow quarter after quarter for the rest of the year.

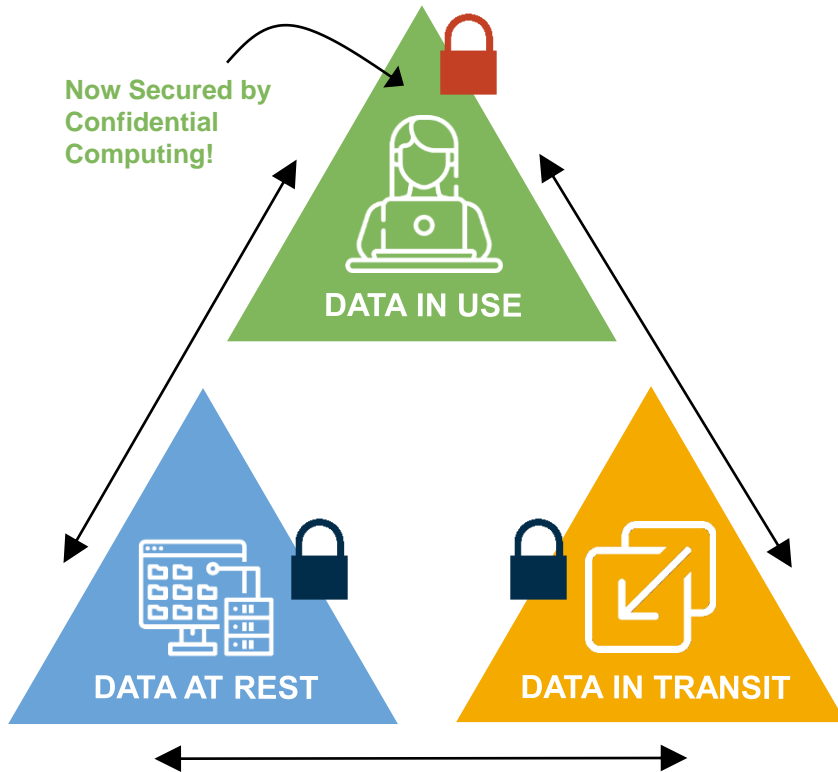
## New IP Technology & Business Development:

- The demand for 5nm design licensing is very strong, with customer adoption in Autonomous Driving, Data Centers and AI-related this year.
- Developing 3nm in several foundries with many customer requests and continue cooperating with CPU partners for 3nm Confidential Computing.
- 22nm emerging memory MRAM and ReRAM completed verification with customer design-ins.

# Security's Forefront: Confidential Computing

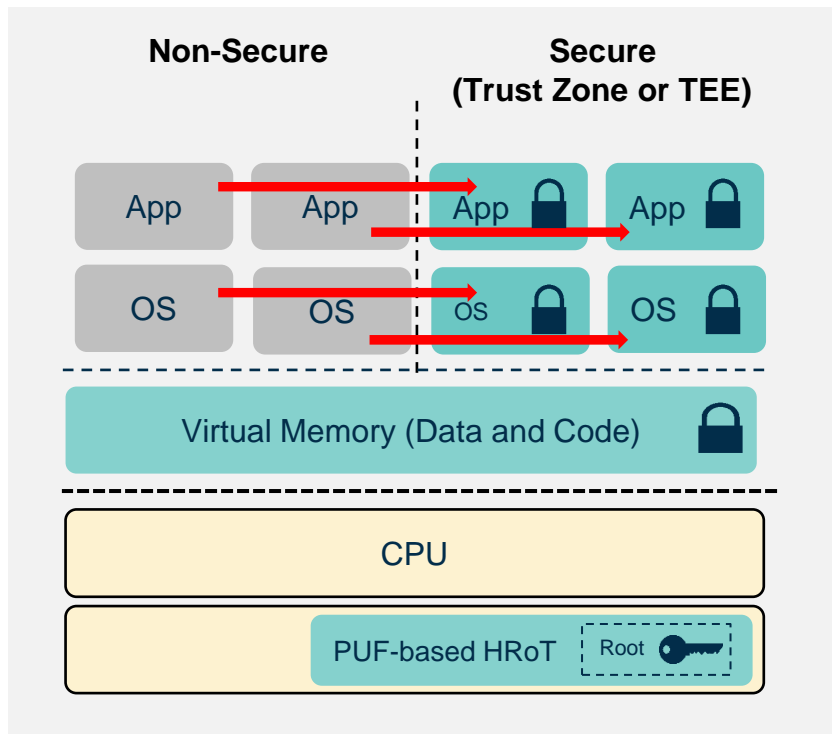


# What is Confidential Computing? ■



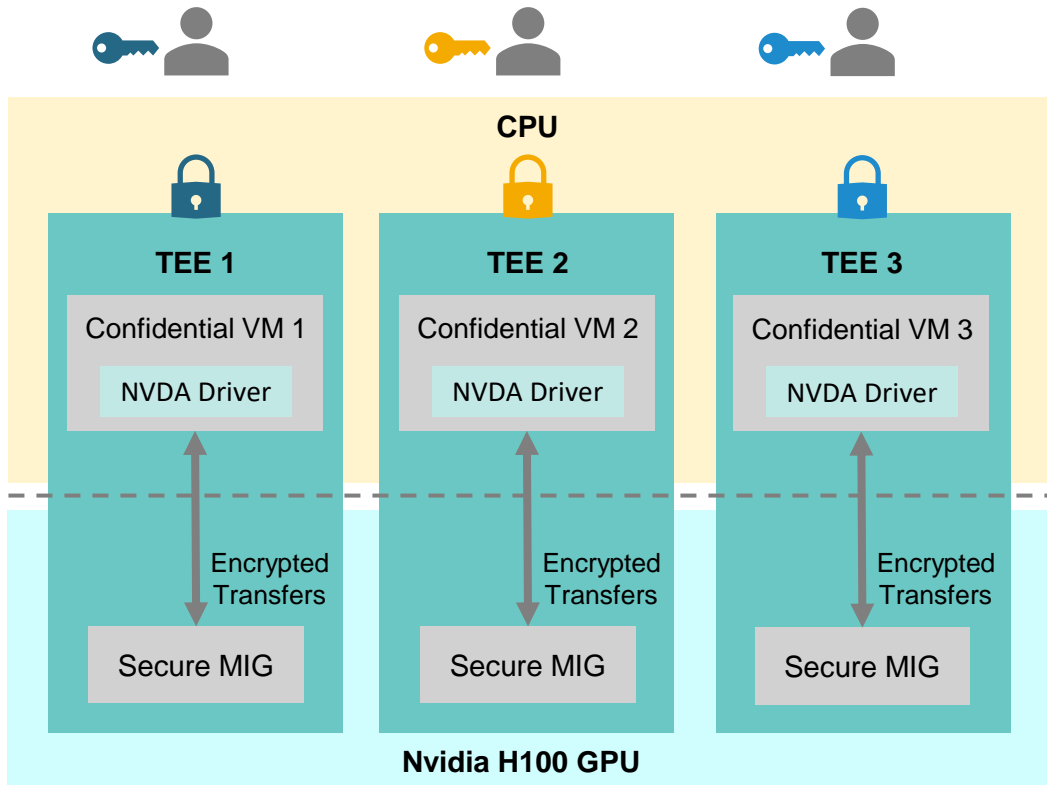
- There is a need for Security for protecting:
  - Data at Rest
  - Data in Transit
  - Data in Use
- **Data at Rest** is Data in Storage
- **Data in Transit** is Data in Communication
- **Data in Use** is Data and Code undergoing processing during Computation.

# Confidential Computing Illustrated



- Confidential Computing: the protection of data in use by performing computation in a hardware-based Trusted Execution Environment."
- For Example:
  - In CPU, there is a secure zone and non-secure zone
  - Confidential Computing creates a **TEE** (Trusted Execution Environment) to provide protection for apps and OS running on the CPU

# Confidential Computing in Nvidia's GPU for AI



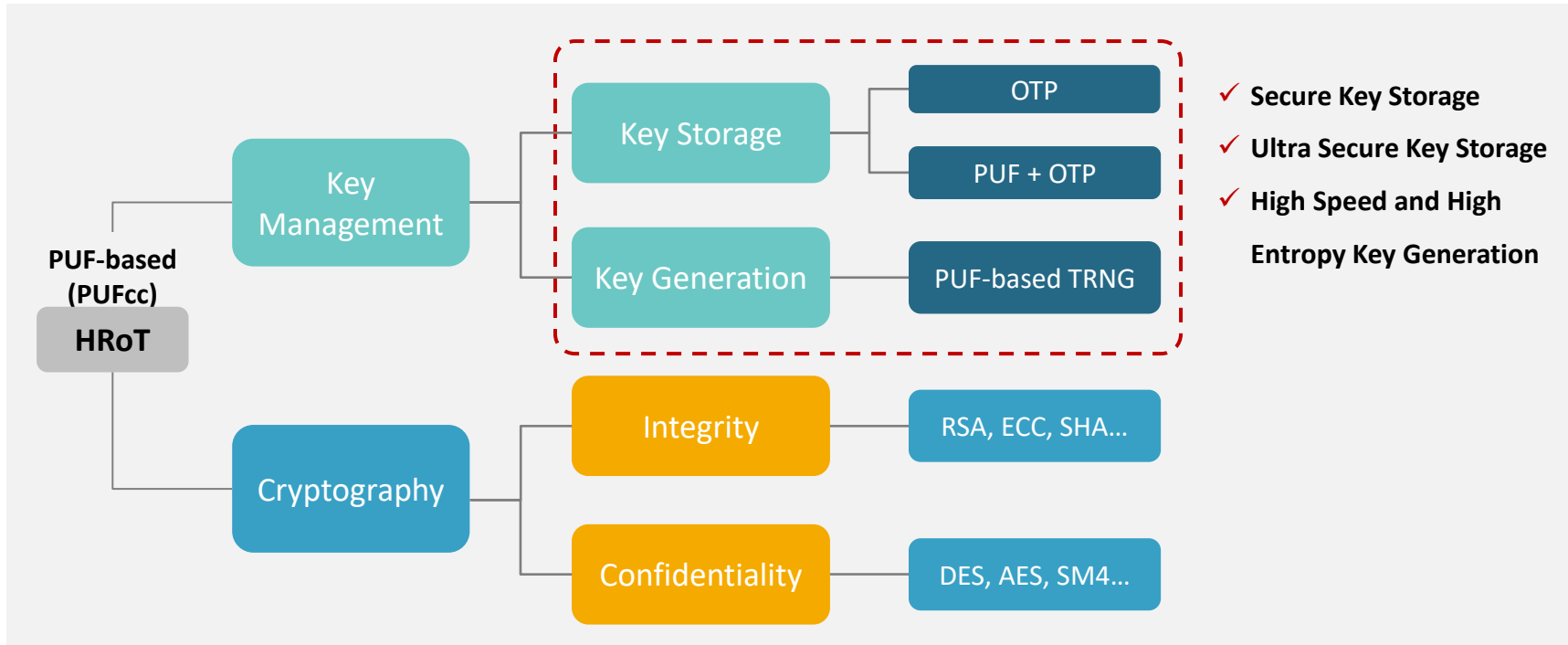
Another example in **GPU**:

- The CPU and GPU co-establishes a **TEE** to protect data/code **confidentiality** and **integrity**:
- Between authentication of CPU to GPU
- During data transfer from CPU to GPU
- During data and code processing in GPU/CPU



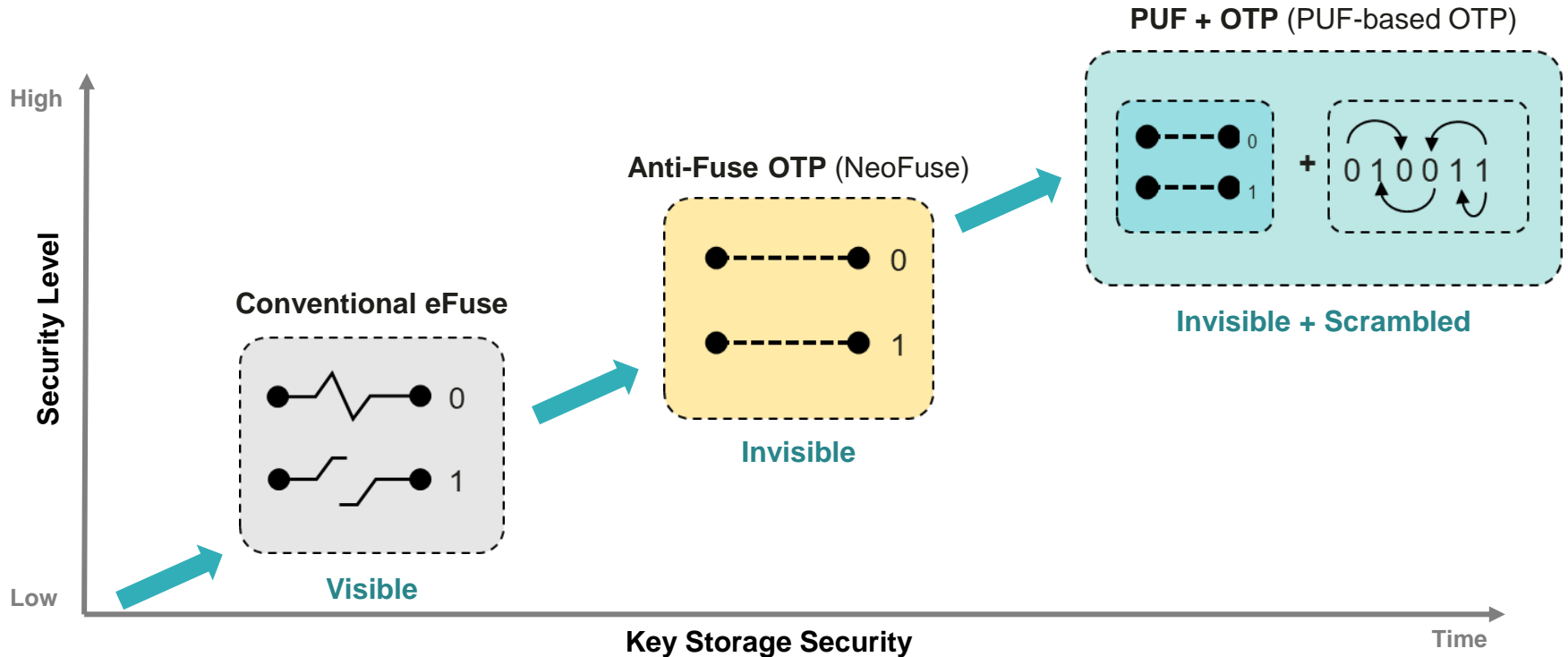
# PUF-based HRoT for TEE

- In a Trusted Executive Environment (TEE), the Hardware Root of Trust (HRoT) provide hardware security functions to protect the **integrity** and **confidentiality** of data and code.



# PUF-based Key Storage vs. Traditional

- Over time, the security level of key storage has improved from **eFuse**, through the Anti-Fuse, and now to the most secure method, **PUF-based OTP**.



# PUF-based **Key Generation** vs. Conventional ■

- PUF-based True Random Number Generator (TRNG), otherwise known as key-generation is high-speed and consumes less power due to high entropy of the generated bit, allowing it to establish better security for applications.

Specs	PUF-based TRNG	Digital TRNG
<b>Entropy Source</b> (The degree of Randomness)	High (~100x of Conventional)	Low
<b>Speed</b>	High (~100x of Conventional)	Low
<b>Power Consumption</b>	Low ( $\sim \frac{1}{100}$ x of Conventional)	High

# Summary ■

- **Confidential Computing** is a must in the GPU and CPU applications because it provides the **Integrity** and **Confidentiality** of data and code
- Compared to Conventional Root of Trust, eMemory's PUF-based Hardware Root of Trust provide the best quality **unique identities** (UID), secure **key storage**, and much higher speed **key generation** for CPU/GPU/DPUs to facilitate its Confidential Computing.

# Q&A



# 附錄

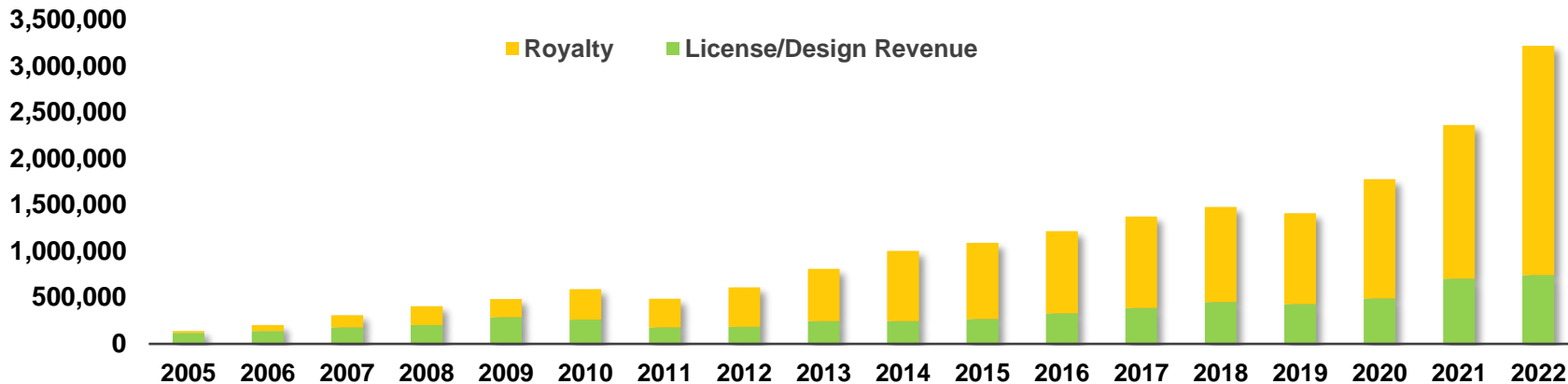


# 公司介紹

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

## Revenue Trend

(Unit: NT\$ 1,000)



**Founded  
In 2000**

Based in Hsinchu, Taiwan.  
IPO in 2011. Over 52M wafers  
shipped.

**1100+  
Patents Issued**

163 pending patents. 335  
employees with 67% R&D  
personnel.

**Best IP Partner  
With TSMC**

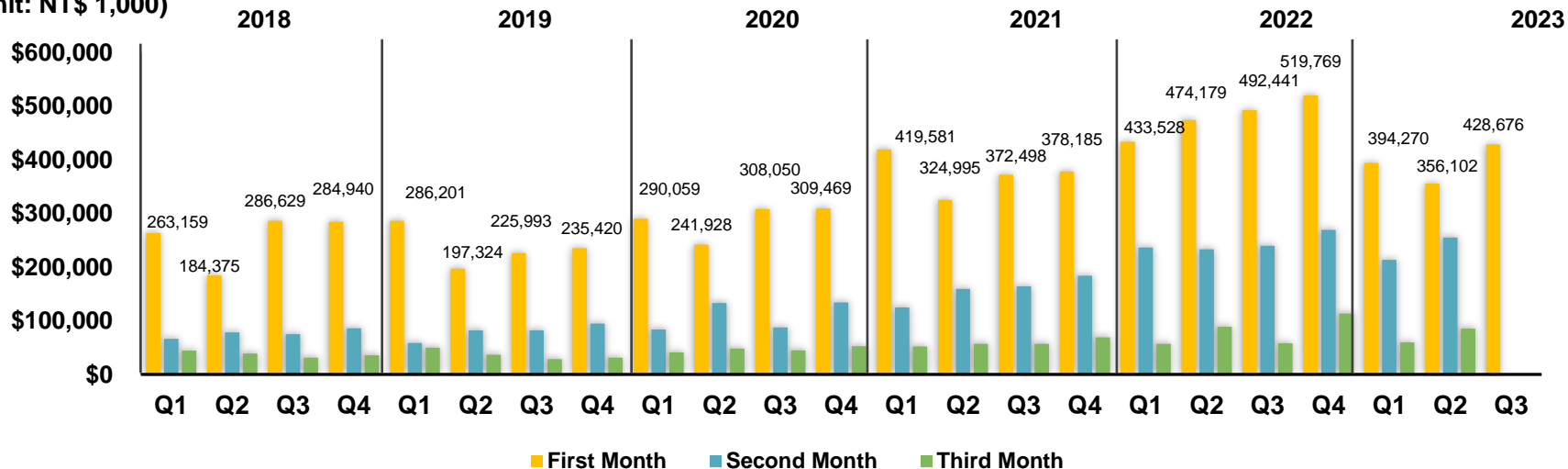
TSMC Best IP Partner Award  
since 2010.



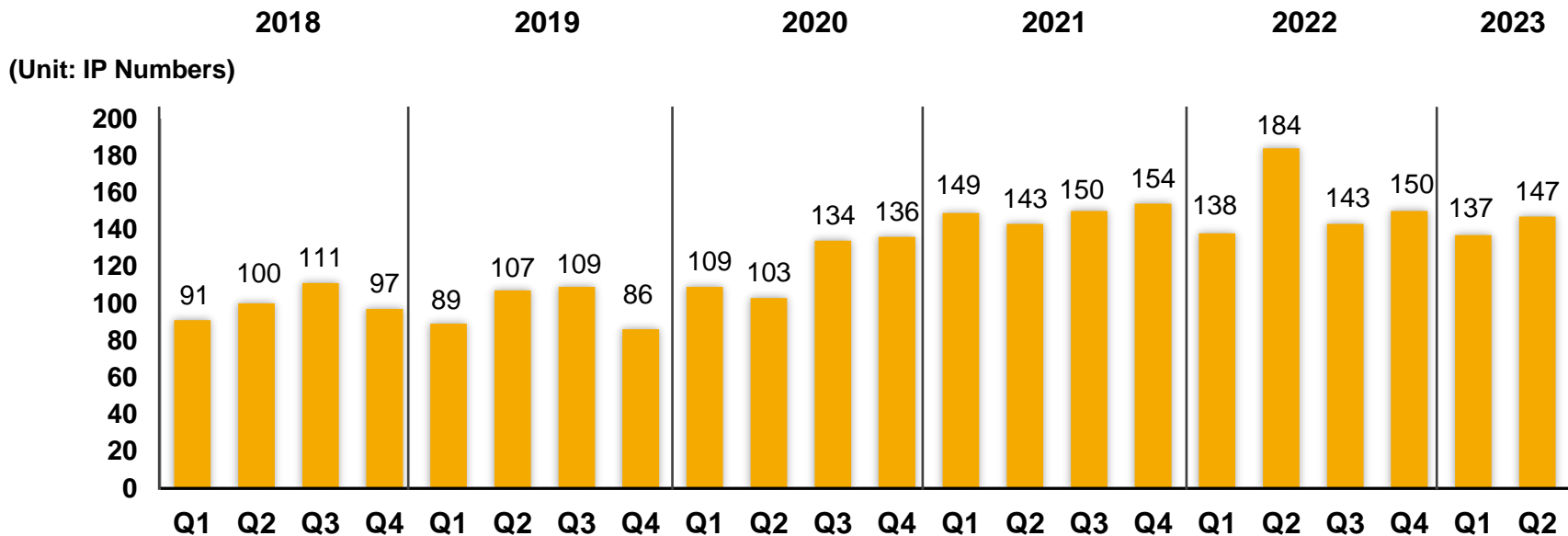
# 每季營收

- 1<sup>st</sup> month: Receive License Fees of the month and Royalty from most foundries on previous quarter's wafer shipments.
- 2<sup>nd</sup> month: Receive License Fees of the month and Royalty from other foundries.
- 3<sup>rd</sup> month: License Fees Only.

(Unit: NT\$ 1,000)



# 每季新Tape-out (NTO)



# 全球客戶

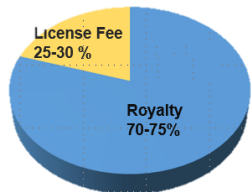
- Our IP solutions are adopted by leading foundries, IDMs and fables worldwide

Country	Foundry	IDM	Fabless
Taiwan	4	1	323
China	9	0	1105
Korea	4	0	96
Japan	4	7	80
North America	1	1	365
Europe	2	1	211
Others	1	0	103



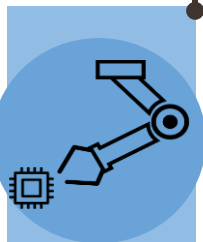
# 營運模式

- Recurring royalty is the backbone of our business



- 70-75% revenue are from royalty based on wafer production
- More adoption = more volume shipment
- More advanced node wafers = higher ASP per wafer

Revenue Breakdown



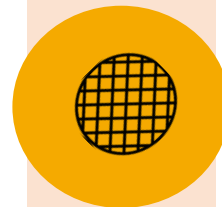
**License Fee**  
Foundries Process Development

1-4 years



**Design License Fee**  
Fabless Product Development

1-4 years



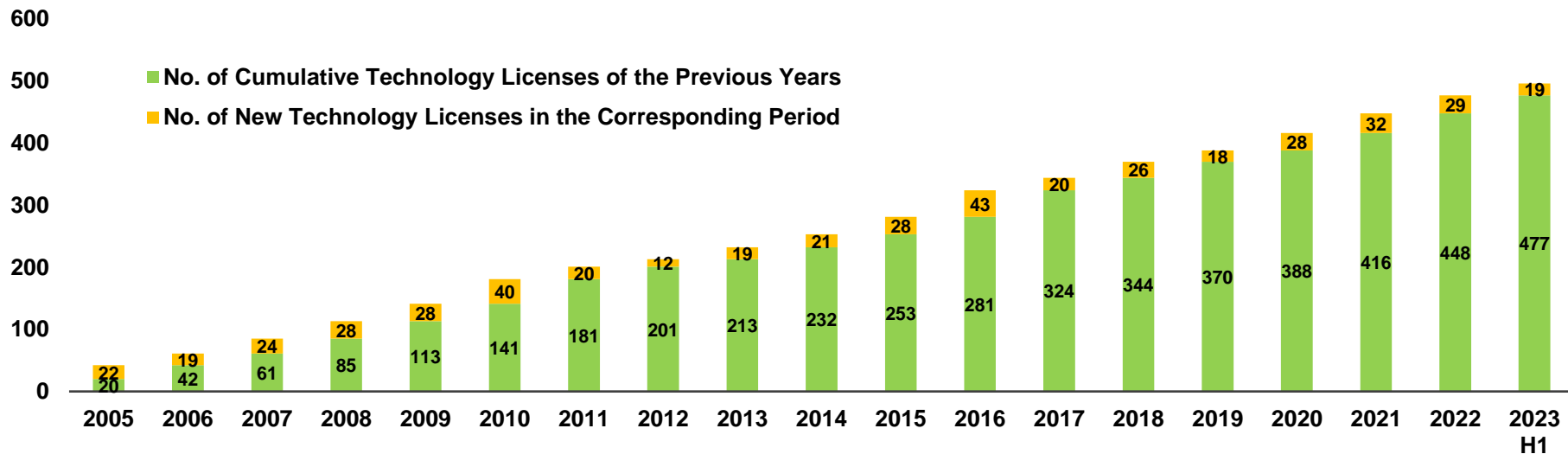
**Royalty**  
Wafer Mass Production

# 技術授權合約

Number of Licenses

Year	2016	2017	2018	2019	2020	2021	2022	2023 H1
License	43	20	26	18	28	32	29	19

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.



# 建構中的技術製程平台

- New technologies are being developed for 143 platforms by Q2 2023.
- 10 licensing contracts were signed.

Technology	3nm	4/5nm	6/7nm	12/16nm	22/28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um	>0.25um
NeoBit	-	-	-	-	-	-	2	1	14	12	1
NeoFuse	3	2	1	6	13	6	19	6	3	3	-
PUF-Based	-	2	-	1	1	-	1	-	-	-	-
MTP	-	-	-	-	2	1	8	8	10	17	-

Note: As of June 30<sup>th</sup>, 2023

# 建構中的技術製程平台

- Developments by process nodes

12" Fabs	Production	Development	IP Type	Process Type
3nm	0	3	OTP	FF, FFP
4/5nm	2	4	OTP, PUF	FF, FF-Auto
6/7nm	4	1	OTP, PUF	FF, FF+
12/16nm	9	7	OTP, PUF	FF, FF+, FFC, FFC+, LPP, DRAM, HV
22/28nm	46	16	OTP, PUF, MTP	LP/ULP/ULL, HPC/HPC+, HV-OLED, DRAM, SOI, ReRAM, MRAM, E-Flash, BCD
40nm	23	7	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, ReRAM, BCD+
55/65nm	38	30	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, DRAM, CIS, BCD, PM
80/90nm	24	12	OTP, MTP	HV-DDI/OLED, LP, Generic, BCD, CIS
0.11/0.13um	21	3	OTP, MTP	HV-DDI, BCD, Generic
0.15/0.18um	5	10	OTP, MTP	BCD, Generic
<b>Total</b>	<b>172</b>	<b>93</b>		

8" Fabs	Production	Development	IP Type	Process Type
80/90nm	9	3	OTP	HV-DDI, LL, BCD
0.11/0.13um	77	24	OTP, MTP, PUF	HV/HV-MR, BCD, LP/LL, CIS, Green, Flash, SOI, Generic
0.152/0.16/0.18um	230	22	OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, Generic
0.25um	42	1	OTP	BCD
0.3/0.35um	53	0	OTP, MTP	UHV, BCD
0.4/0.5um	11	0	OTP	UHV, BCD
<b>Total</b>	<b>422</b>	<b>50</b>		

Note: As of June 30<sup>th</sup>, 2023



# THANKS

## Embedded Wisely, Embedded Widely

For more information, please visit:

eMemory Website: <https://www.ememory.com.tw/>

PUFsecurity Website: <https://www.pufsecurity.com/>

