



Q2 2023 Investor Conference

August 9th, 2023

Embedded Wisely, Embedded Widely

ememory



IPR Notice

All rights, titles and interests contained in this information, texts, images, figures, tables or other files herein, including, but not limited to, its ownership and the intellectual property rights, are reserved to eMemory. This information may contain privileged and confidential information. Some contents in this information can be found in Logic Non-Volatile Memory (The NVM solutions from eMemory), published in 2014. Any and all information provided herein shall not be disclosed, copied, distributed, reproduced or used in whole or in part without prior written permission of eMemory Technology Inc.

eMemory, NeoBit, NeoFuse, NeoEE, NeoMTP, NeoROM, EcoBit and NeoPUF are all trademarks and/or service marks of eMemory in Taiwan and/or in other countries.



Cautionary Statement

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.



Contents

- 1 Review of Operations
- 2 Future Outlook
- 3 Security's Forefront:
Confidential Computing
- 4 Q&A
- 5 Appendix

Review of Operations



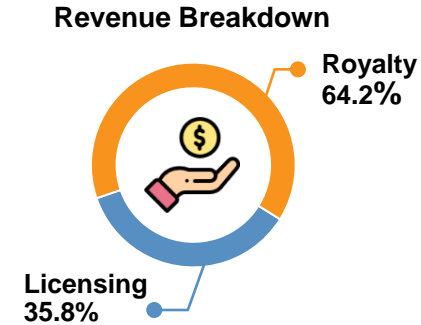
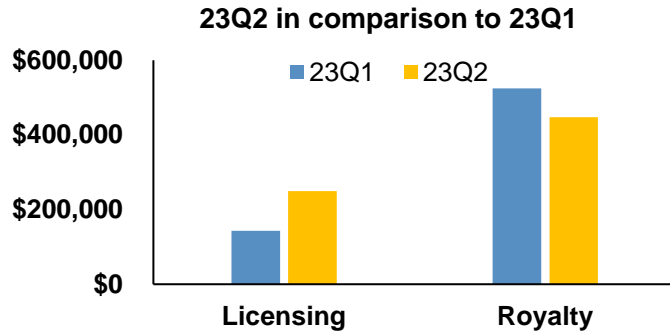
Q2 2023 Financial Results

(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

Revenue across Different Streams



Revenue

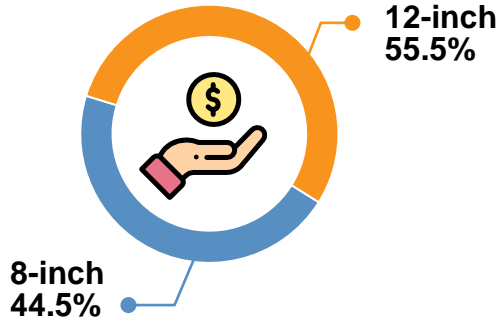
NT\$ Thousands	Q2 2023	Q1 2023	Change (QoQ)	Q2 2022	Change (YoY)
Licensing	249,711	143,049	74.6%	200,729	24.4%
Royalty	446,914	524,702	-14.8%	595,563	-25.0%
Total	696,625	667,751	4.3%	796,292	-12.5%

Revenue by Technology

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%

Royalty Revenue by 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%

Future Outlook



Future Outlook

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.

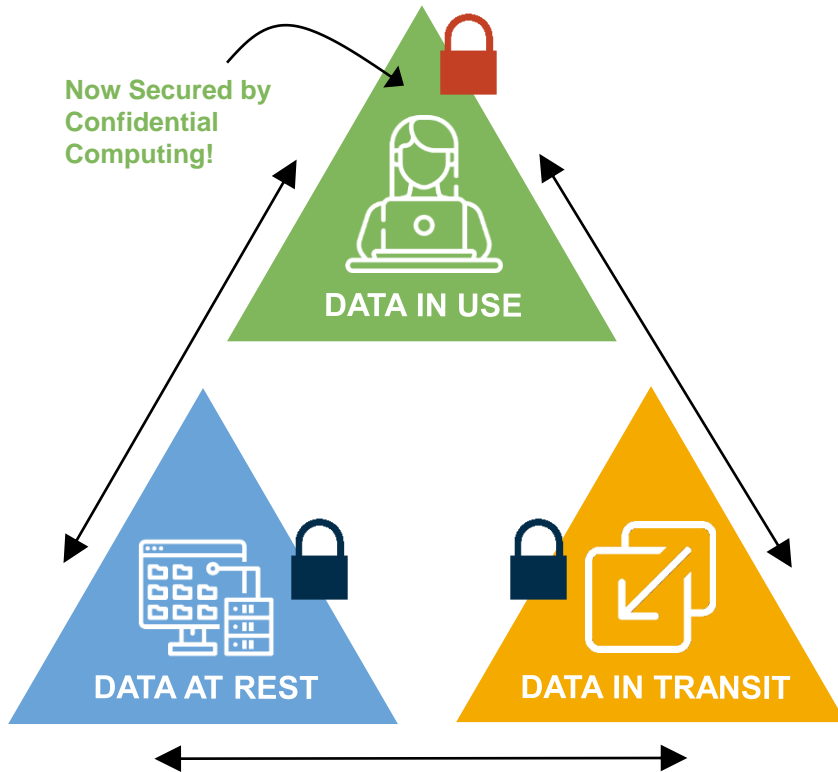
New IP Technology & Business Development:

- 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

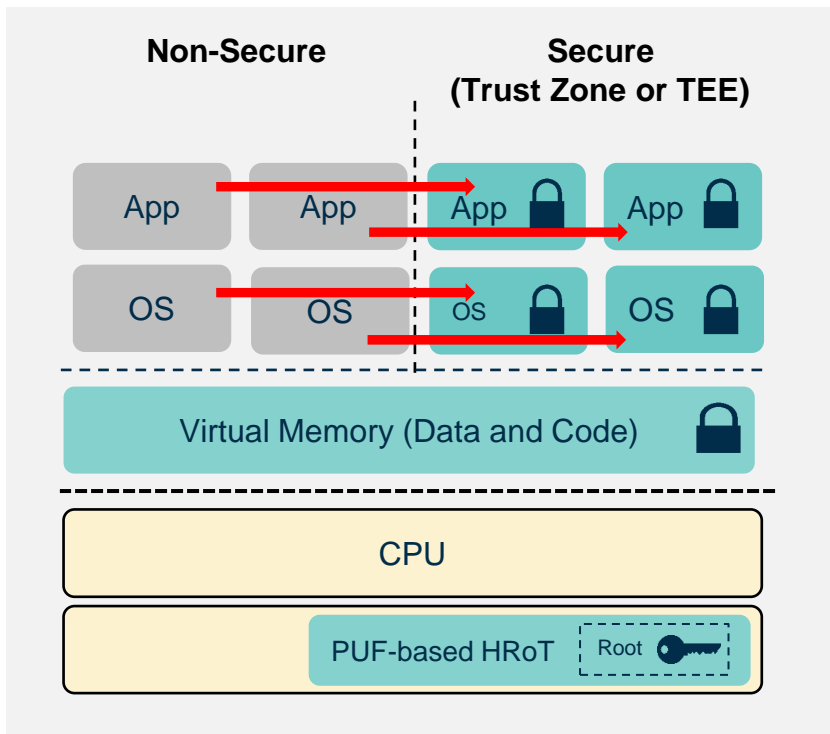


What is Confidential Computing? .



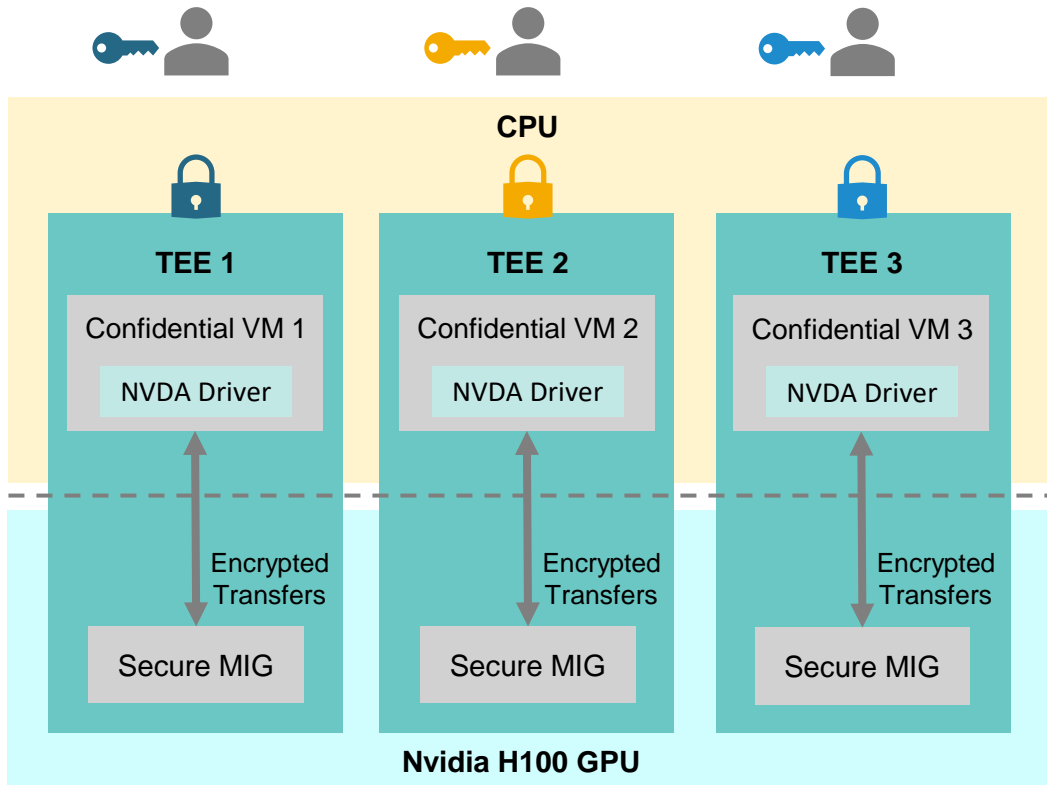
- There is a need for Security is for protecting:
 - Data at Rest
 - Data in Transit
 - Data in Use
- **Data at Rest** is Data in Storage
- **Data in Transit** is Data in Communication
- **Data in Use** is Data and Code undergoing processing during Computation.

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

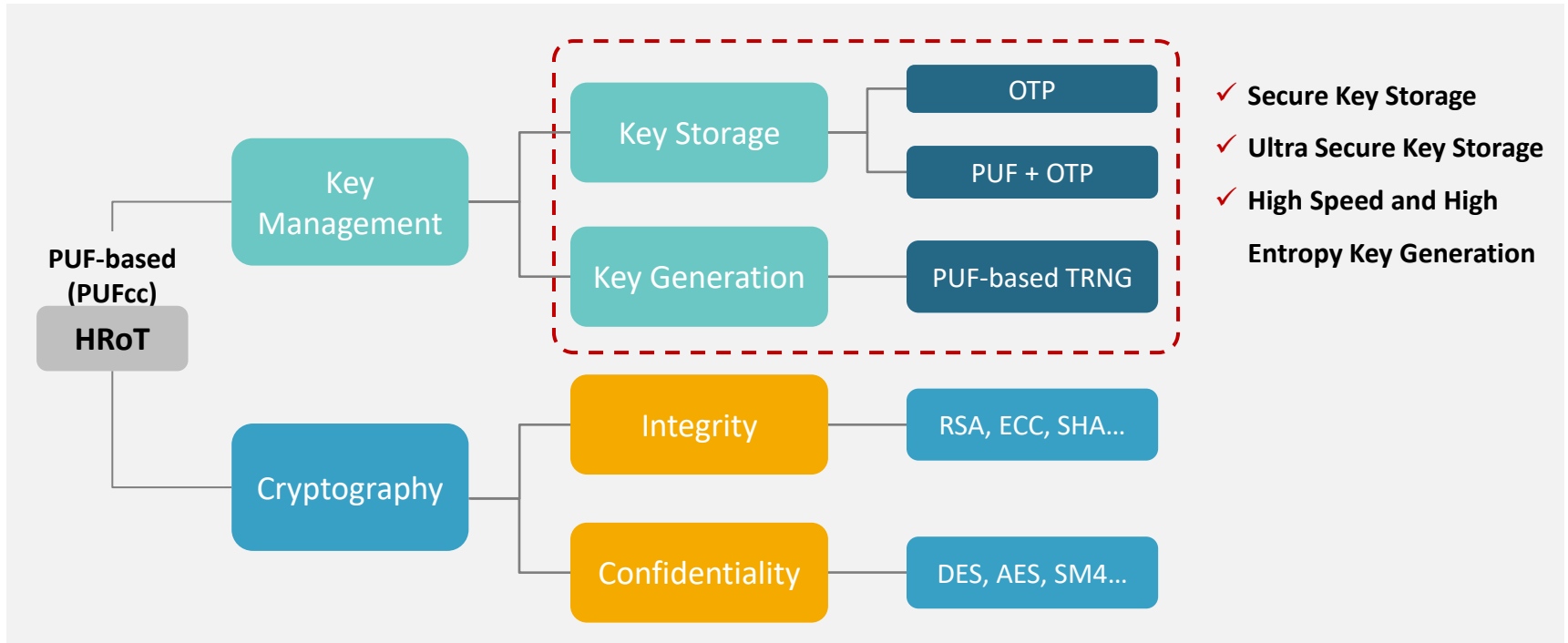


Another example in **GPU**:

- 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

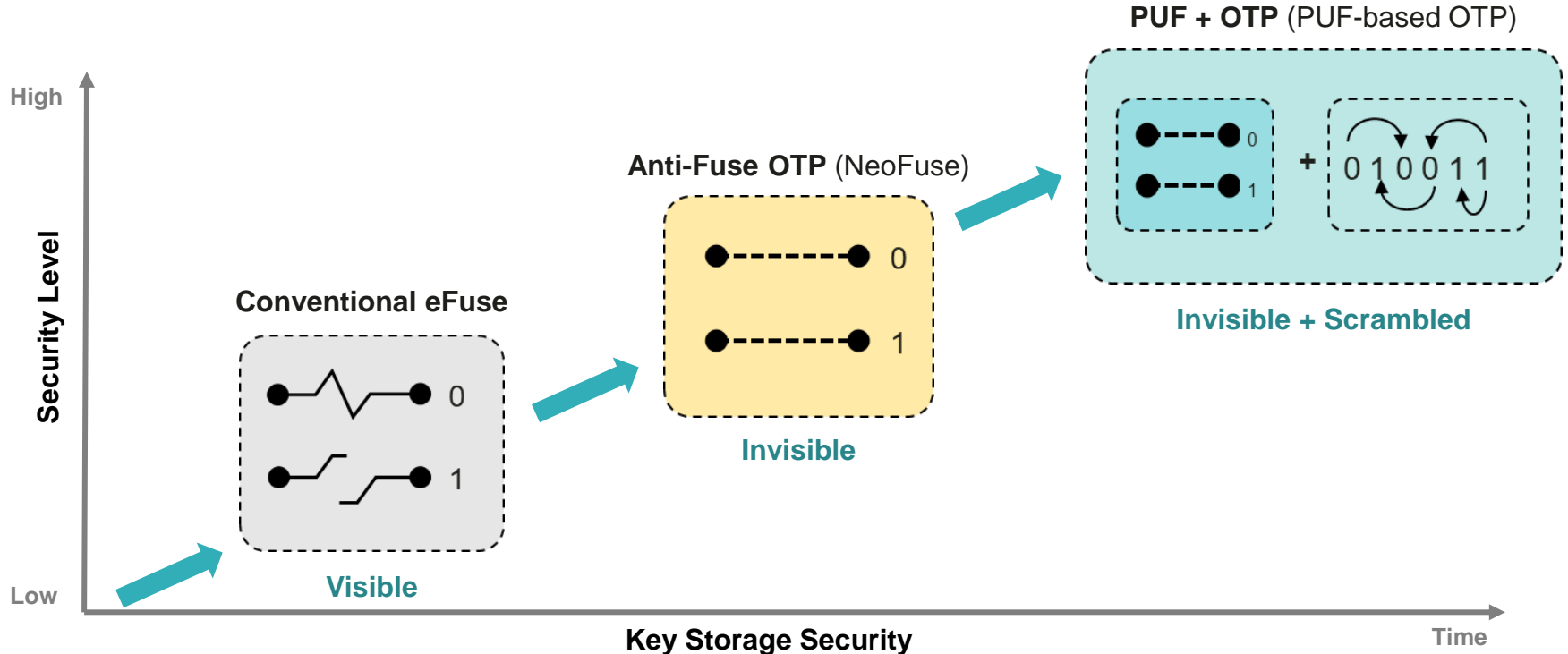
PUF-based HRoT for TEE

- 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
Entropy Source (The degree of Randomness)	High (~100x of Conventional)	Low
Speed	High (~100x of Conventional)	Low
Power Consumption	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



Appendix

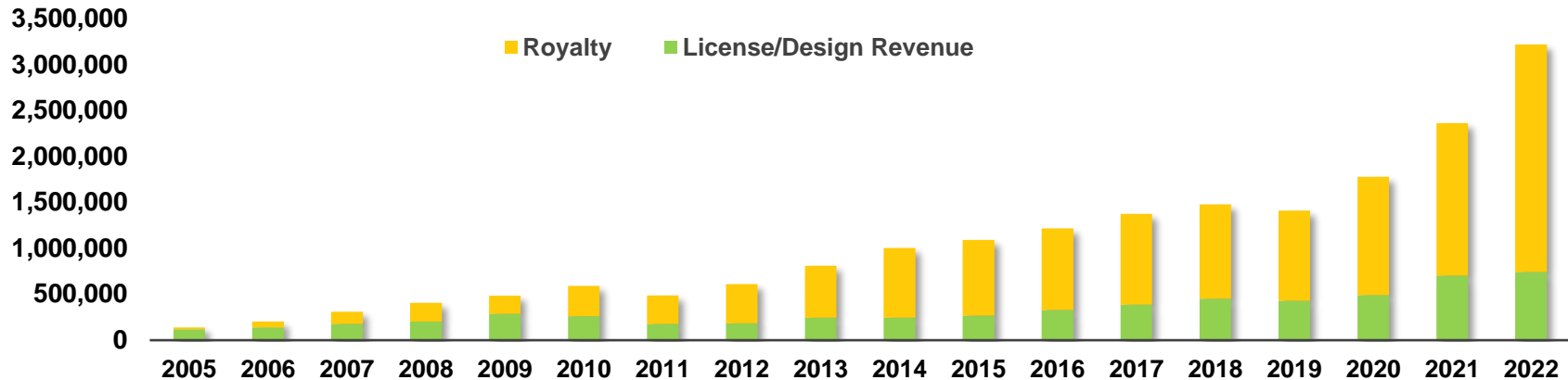


Company Overview

- 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**

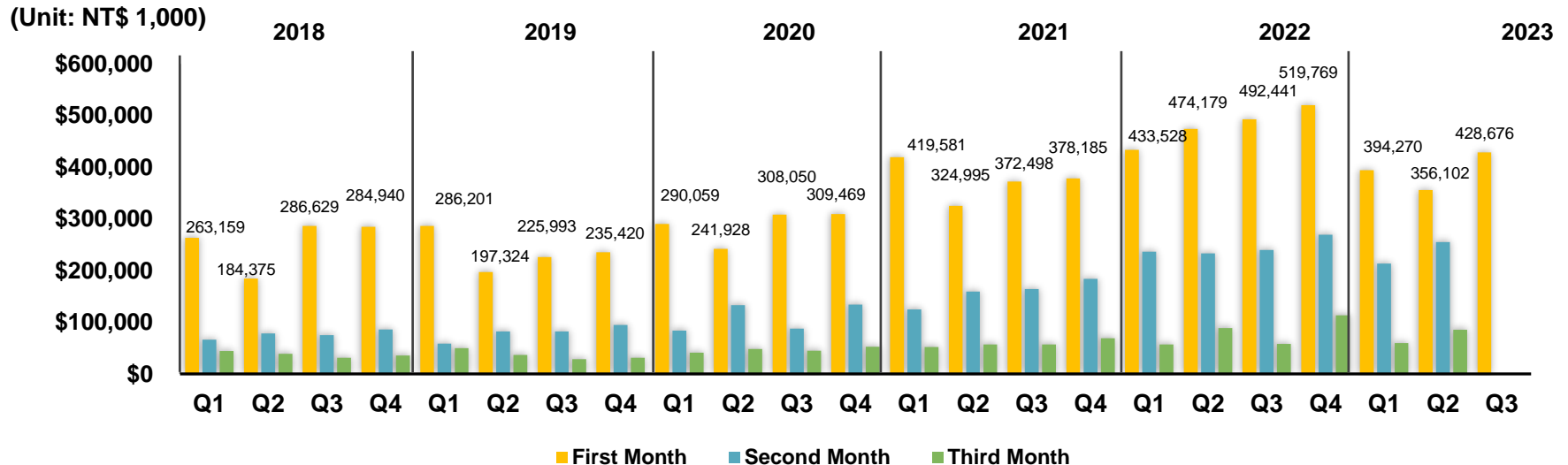
163 pending patents. 335
employees with 67% R&D
personnel.

**Best IP Partner
With TSMC**

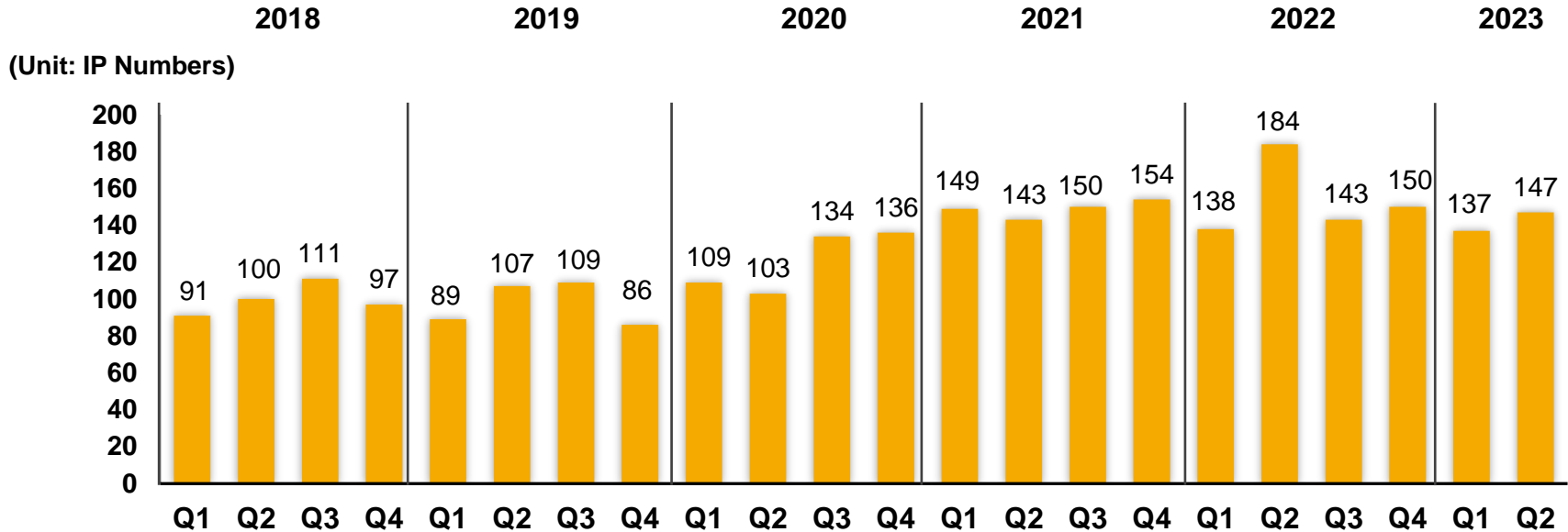
TSMC Best IP Partner Award
since 2010.

Quarterly Revenue Pattern

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



Quarterly Number of New Tape-outs



Worldwide Customers

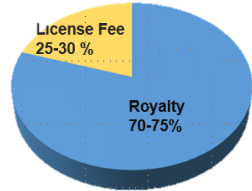
- Our IP solutions are adopted by leading foundries, IDMs and fables worldwide

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

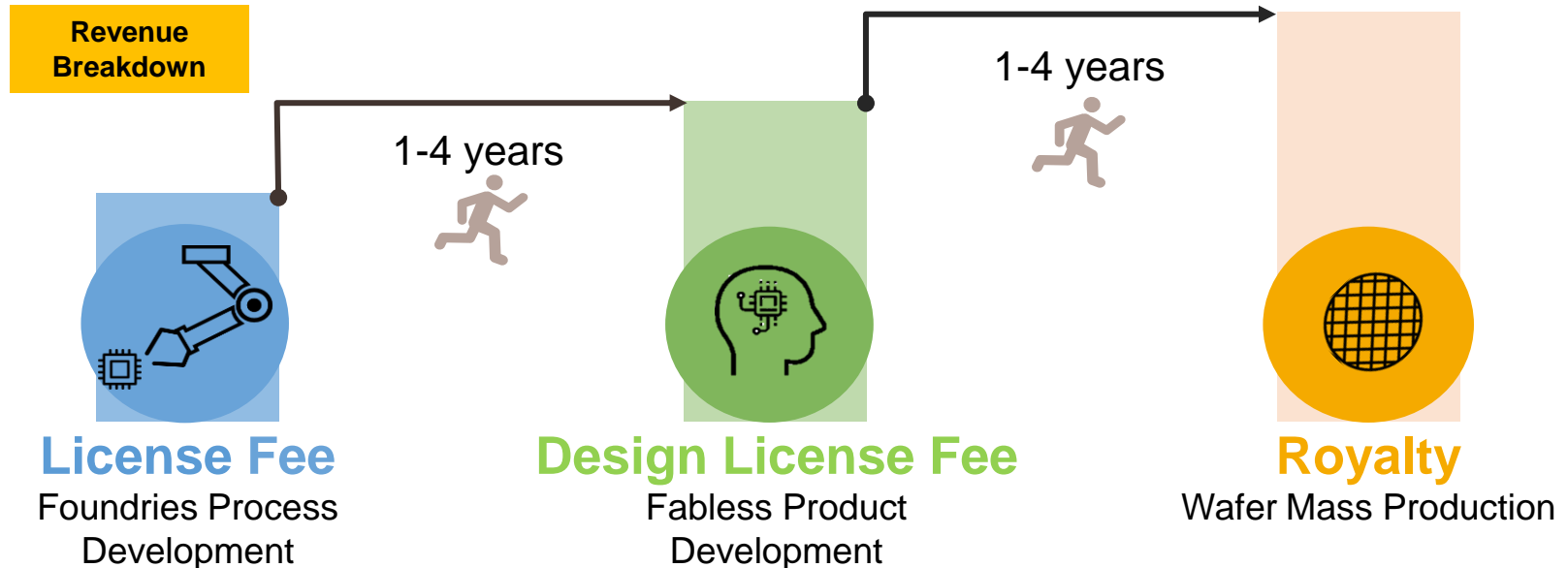


Business Model

- 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

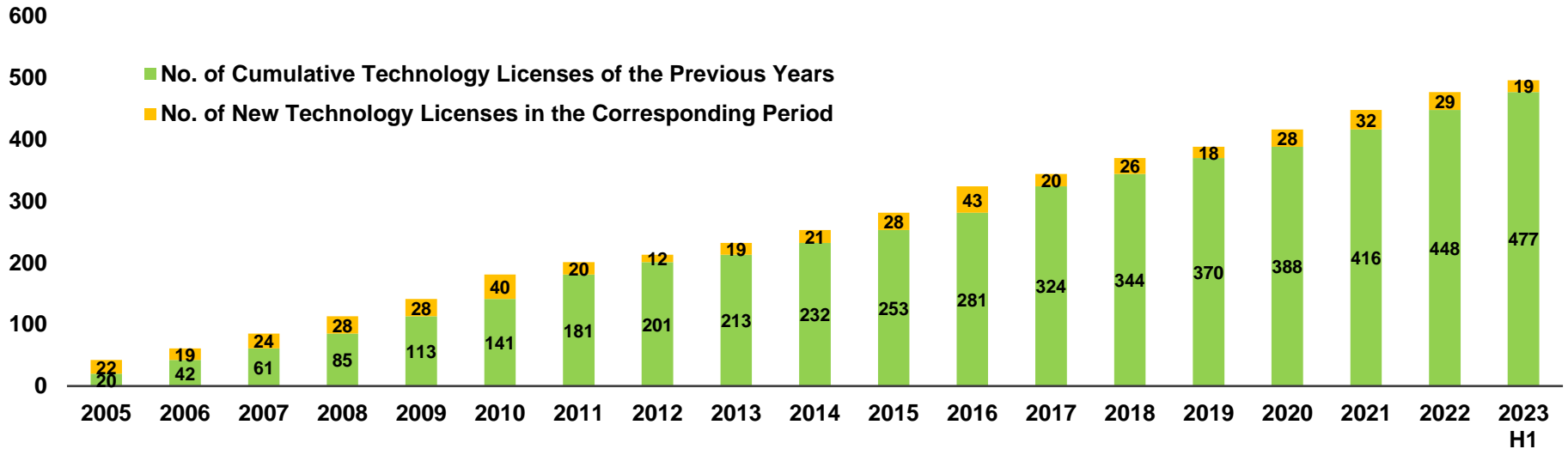


Technology Licenses

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.



New Technology Under Development

- 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 30th, 2023

Technology Development

- 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
Total	172	93		

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
Total	422	50		

Note: As of June 30th, 2023

THANKS

Embedded Wisely, Embedded Widely

For more information, please visit:

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

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

