



Q4 2022 Investor Conference

February 8th, 2023

Embedded Wisely, Embedded Widely

ememory



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A hand is shown dropping a coin into a stack of coins. A small green plant with three leaves is growing out of the stack. The background is a warm, golden-yellow color. The image is partially obscured by a white, brush-stroke-like graphic on the right side.

Review of Operations

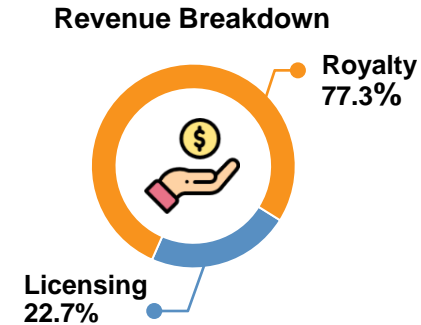
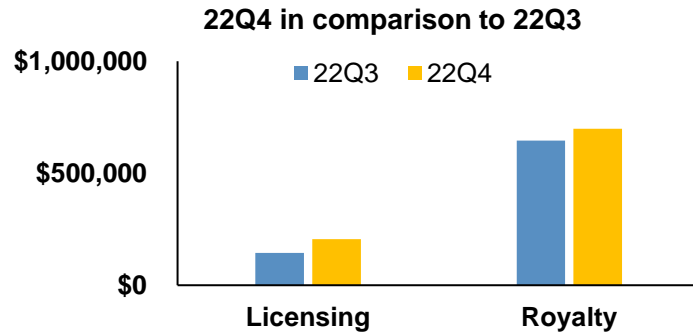
Q4 2022 Financial Results

(thousands of NT dollars)

	Q4 2022 (unaudited)	Q3 2022	Change (QoQ)	Q4 2021	Change (YoY)	FY 2022 (unaudited)	FY 2021	Change (YoY)
Revenue	902,704	790,608	14.2%	631,398	43.0%	3,216,711	2,363,824	36.1%
Gross Margin	100%	100%	-	100%	-	100%	100%	-
Operating Expenses	368,090	345,160	6.6%	299,677	22.8%	1,363,293	1,095,012	24.5%
Operating Income	534,614	445,448	20.0%	331,721	61.2%	1,853,418	1,268,812	46.1%
Operating Margin	59.2%	56.3%	2.9ppts	52.5%	6.7ppts	57.6%	53.7%	3.9ppts
*Net Income	430,536	406,430	5.9%	287,263	49.9%	1,611,909	1,101,157	46.4%
Net Margin	47.6%	50.9%	-3.3ppts	45.2%	2.4ppts	49.9%	46.3%	3.6ppts
EPS (NT\$)	5.77	5.45	5.9%	3.86	49.5%	21.61	14.78	46.2%
ROE	62.2%	63.7%	-1.5ppts	51.4%	10.8ppts	58.2%	49.3%	8.9ppts

*Net income attributable to Shareholders of the Company

Revenue across Different Streams



Revenue

NT\$ Thousands	Q4 2022	Q3 2022	Change (QoQ)	Q4 2021	Change (YoY)	FY 2022	FY 2021	Change (YoY)
Licensing	205,104	144,631	41.8%	162,632	26.1%	742,072	702,851	5.6%
Royalty	697,600	645,977	8.0%	468,766	48.8%	2,474,639	1,660,973	49.0%
Total	902,704	790,608	14.2%	631,398	43.0%	3,216,711	2,363,824	36.1%

US\$ Thousands	Q4 2022	Q3 2022	Change (QoQ)	Q4 2021	Change (YoY)	FY 2022	FY 2021	Change (YoY)
Licensing	6,672	4,829	38.2%	5,855	14.0%	25,254	25,092	0.6%
Royalty	22,028	21,616	1.9%	16,788	31.2%	83,453	59,173	41.0%
Total	28,700	26,445	8.5%	22,643	26.7%	108,707	84,265	29.0%

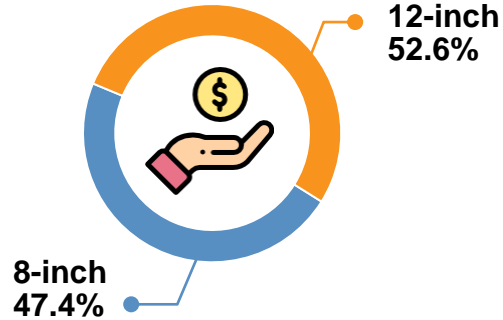
Revenue by Technology

Technology	Q4 2022								
	Total Revenue			Licensing Revenue			Royalty Revenue		
	% of Q4 Revenue	Change (QoQ)	Change (YoY)	% of Q4 Licensing	Change (QoQ)	Change (YoY)	% of Q4 Royalty	Change (QoQ)	Change (YoY)
NeoBit	29.7%	-1.1%	20.7%	17.7%	-4.0%	54.6%	33.3%	-0.7%	16.7%
NeoFuse	60.9%	20.6%	52.7%	48.4%	47.6%	-3.9%	64.6%	15.9%	75.4%
PUF-Based	5.1%	110.0%	140.6%	20.5%	112.3%	122.1%	0.6%	88.4%	1,838.8%
MTP	4.3%	-6.7%	29.0%	13.4%	39.3%	61.8%	1.5%	-49.0%	-14.6%

Technology	FY 2022					
	Total Revenue		Licensing Revenue		Royalty Revenue	
	% of FY Revenue	Change (YoY)	% of FY Licensing	Change (YoY)	% of FY Royalty	Change (YoY)
NeoBit	33.2%	16.3%	20.7%	9.8%	36.9%	17.5%
NeoFuse	58.0%	52.2%	51.8%	-1.3%	59.8%	77.0%
PUF-Based	3.8%	316.6%	15.6%	294.9%	0.3%	3,278.1%
MTP	5.0%	-15.5%	11.9%	-38.9%	3.0%	55.2%

Royalty Revenue by Wafer Size

Q4 Royalty Breakdown



- 8-inch wafers contributed 47.4% of royalty, up 9.6% sequentially and up 40.2% yearly.
- 12-inch wafers contributed 52.6% of royalty, up 6.6% QoQ and 57.5% YoY.

Wafer Size	Q4 2022			FY 2022	
	% of Q4	Change (QoQ)	Change (YoY)	% of FY	Change (YoY)
8-Inch	47.4%	9.6%	40.2%	48.8%	35.2%
12-Inch	52.6%	6.6%	57.5%	51.2%	65.0%

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Future Outlook

Future Outlook

Licensing & Royalty:

- Licensing will grow significantly this year due to the strong demand for our PUF-related solutions.
- The growth momentum of royalty will be driven by penetration rate increase from 28nm, 12/16nm, 6/7nm and the newly qualified 5nm.
- We expect H1 royalty to be impacted by overall low utilization rate in foundry customers but will pick up momentum in H2.

New IP Technology & Business Development:

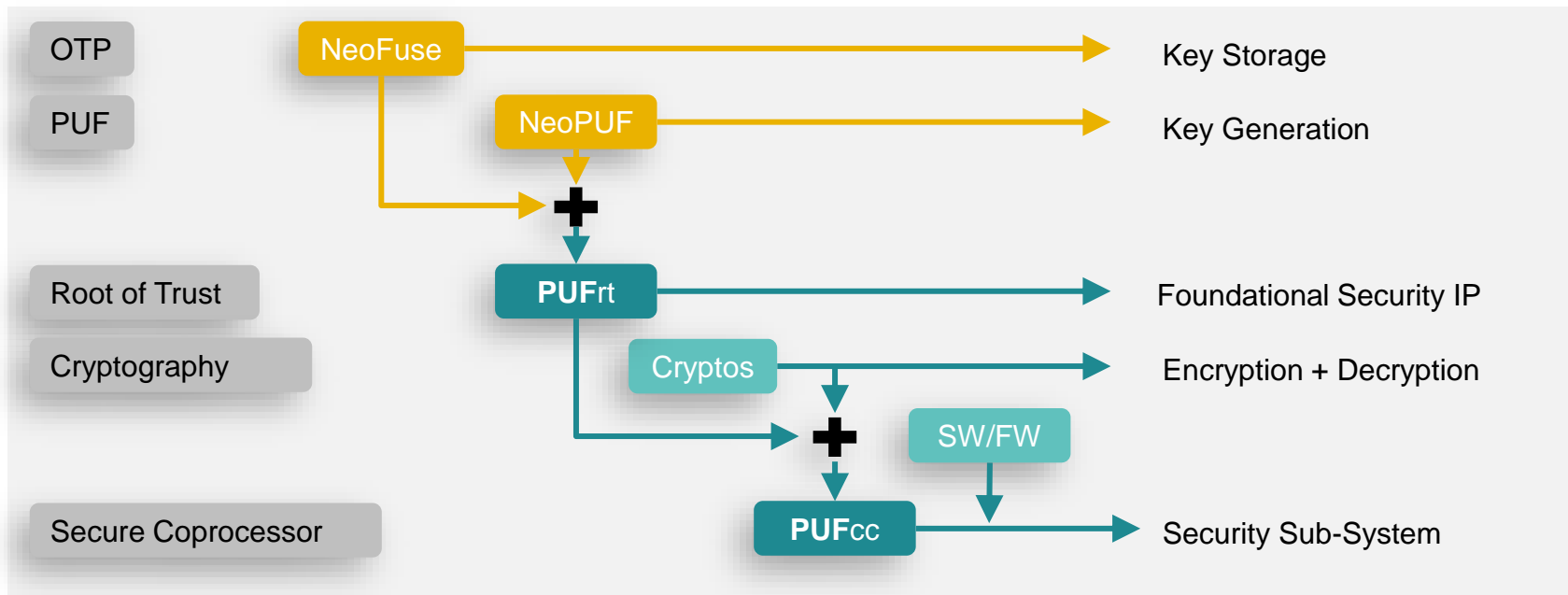
- NeoFlash technology platforms are developed in several foundries, targeting the embedded flash market.
- PUF-based IPs have completed N5 tape-out and is moving to N4/N3, maintaining the leading position in technology.



From **OTP** to **PUF**: The Evolution of **PUF-based Security** Sub-systems

Evolution from OTP to Security Sub-Systems

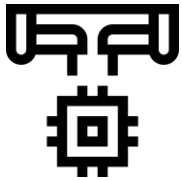
- Based on OTP Technologies, many different security functions IPs have evolved
- Regulations, such as TPM 2.0, now require Hardware Root of Trust



Security Business Development ■

- As eMemory is an established IP company, there are different **platforms** that we can leverage for sales in security IPs and sub-systems

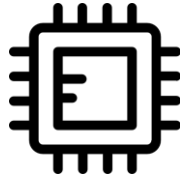
Foundry Platforms



TSMC, Intel, UMC, GF, etc.

- Licensed our security technology to major foundries
- Co-promotional activities

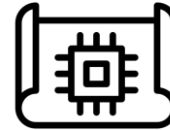
CPU Partners



Arm, RISC-V, Cadence, etc.

- SoC customers looking for both CPU and security subsystems

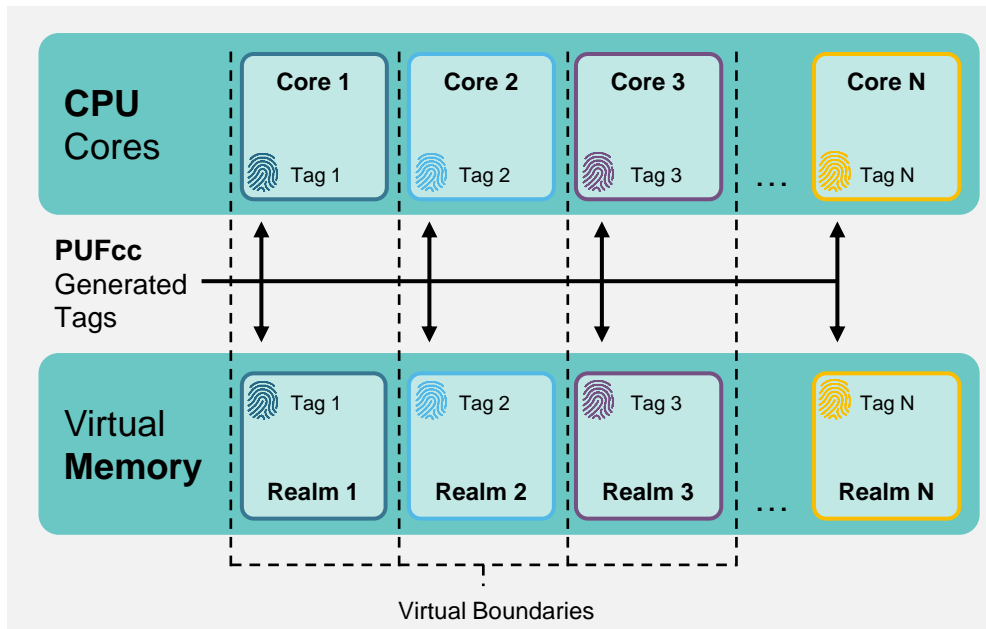
OEM



More to come

- OEMs are requesting customization from design service companies to provide security functions

Next Computing: Confidential Computing



- **Protect data** in the Virtual Memory of Multi-Core CPUs
- CPU Cores and Virtual Memory have unique corresponding **tag numbers**
- Tag numbers are internally **randomly generated** by **PUFcc** (Crypto Coprocessor IP)



Q&A



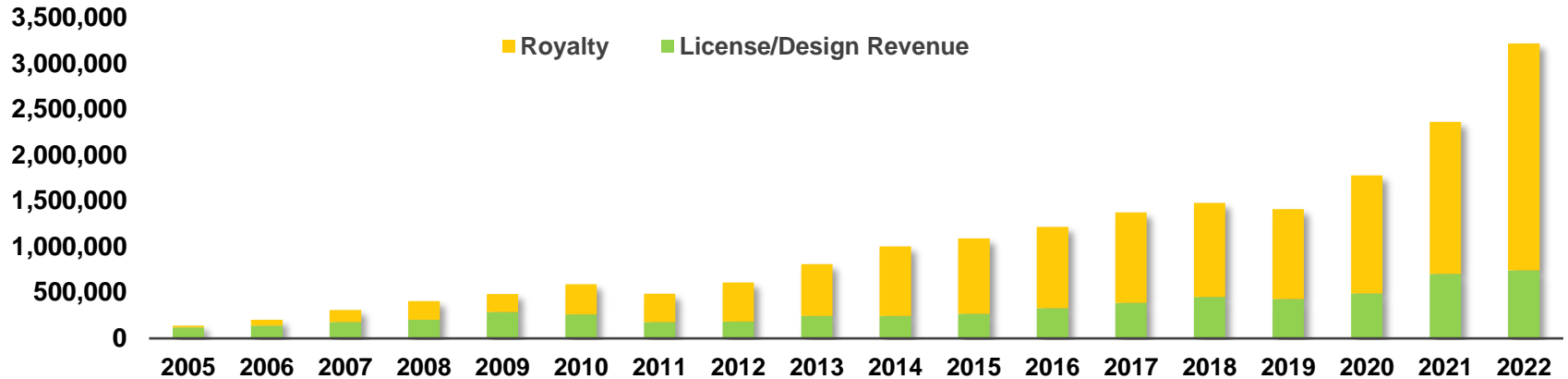
Appendix

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 48M wafers
shipped.

**1050+
Patents Issued**

188 pending patents. 331
employees with 67% R&D
personnel.

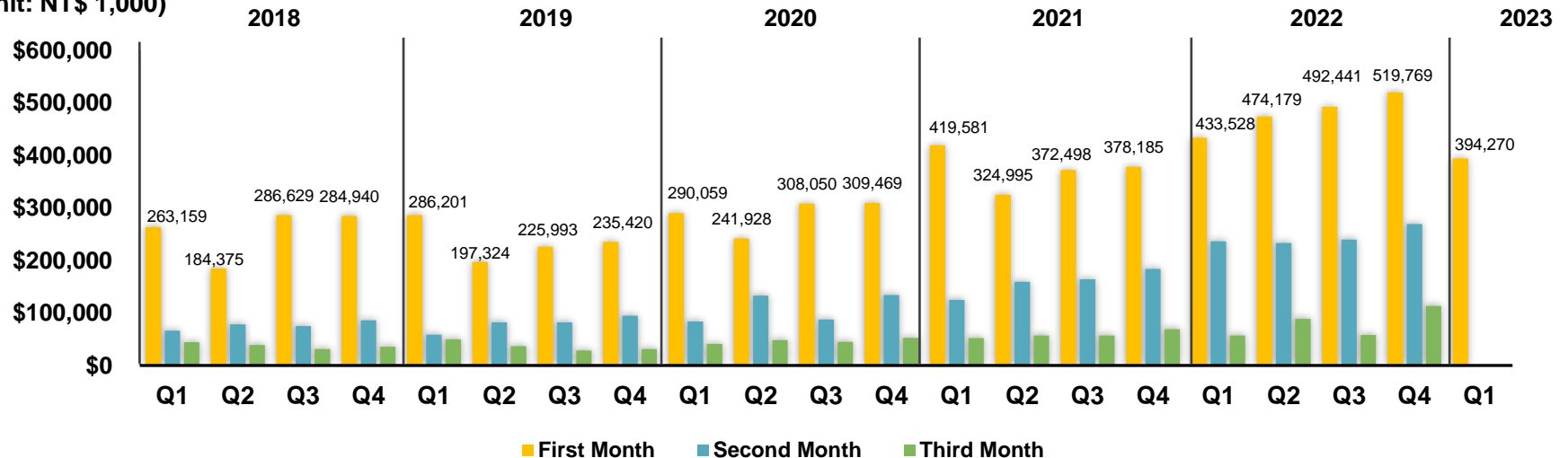
**Best IP Partner
With TSMC**

TSMC Best IP Partner Award
since 2010.

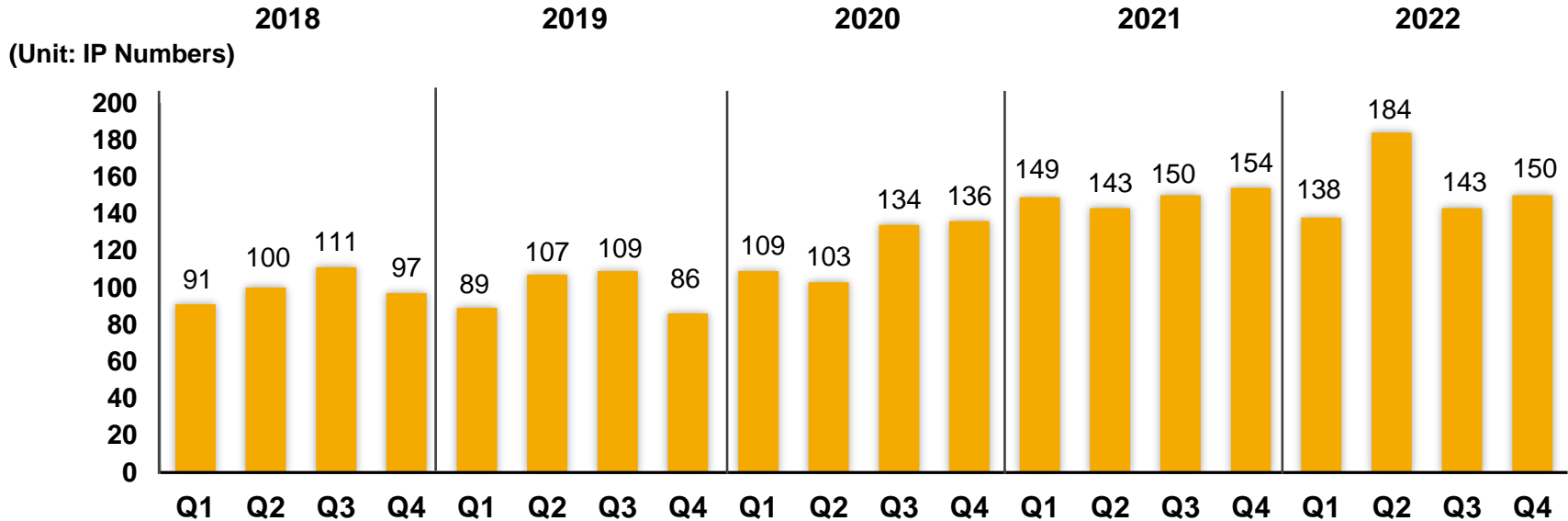
Quarterly Revenue Pattern

- 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.

(Unit: NT\$ 1,000)



Quarterly Number of New Tape-outs



Worldwide Customers

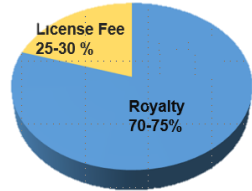
- Our IP solutions are adopted by leading foundries, IDMs and fables worldwide

Country	Foundry	IDM	Fables
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

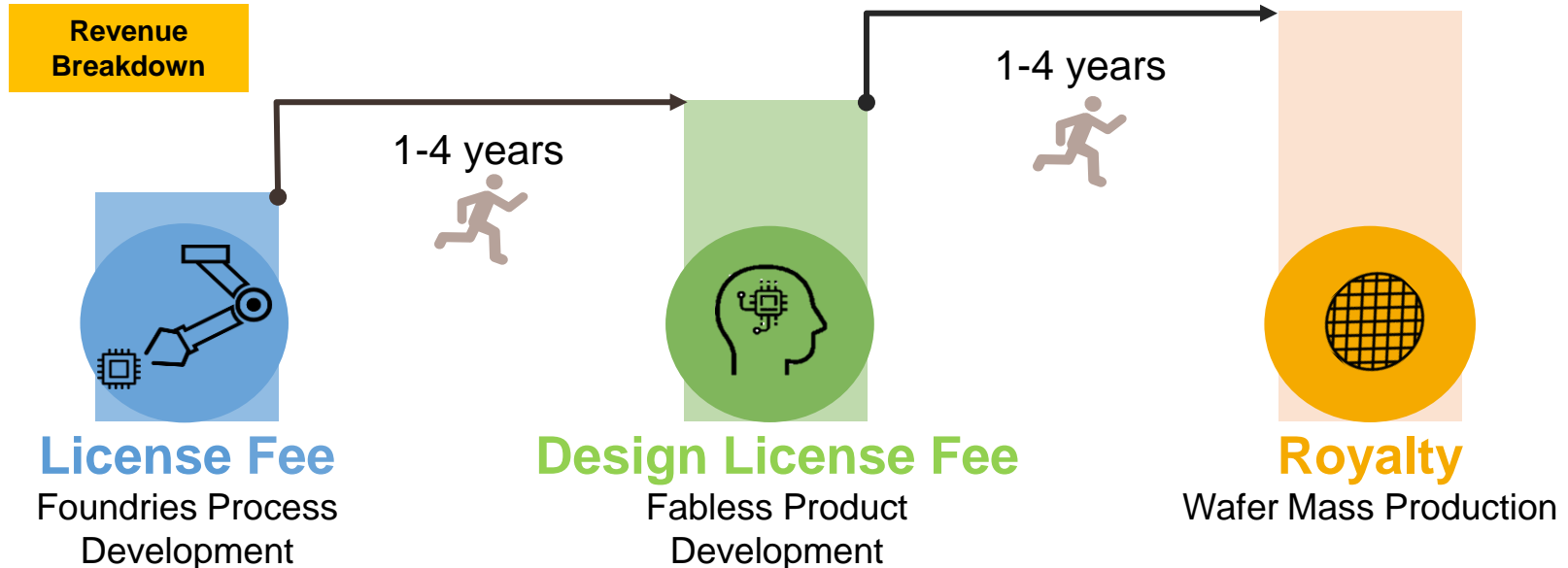


Business Model

- 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

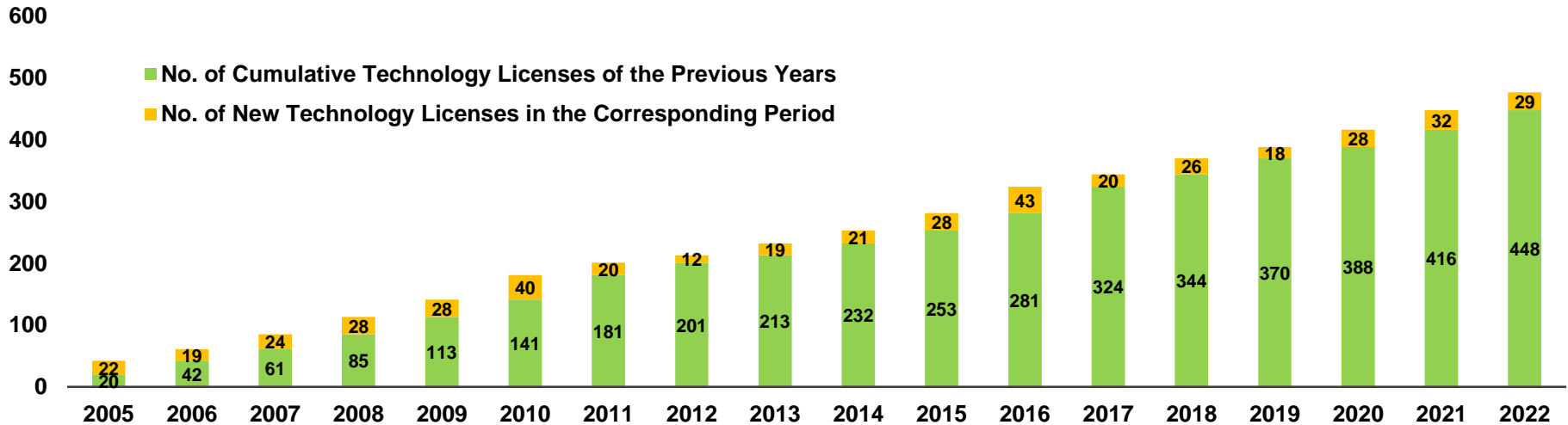


Technology Licenses

Number of Licenses

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

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 135 platforms by Q4 2022.
- 6 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	2	2	1	6	8	6	18	8	1	3	-
PUF-Based	-	2	-	-	1	-	1	-	-	-	-
MTP	-	-	-	-	2	1	7	6	13	17	-

Note: As of December 31st, 2022

Technology Development

- Developments by process nodes

12" Fabs	Production	Development	IP Type	Process Type
3nm	0	2	OTP	FF
4/5nm	0	4	OTP, PUF	FF
6/7nm	4	1	OTP, PUF	FF, FF+
12/16nm	8	6	OTP, PUF	FF, FF+, FFC, FFC+, LPP
22/28nm	44	11	OTP, PUF, MTP	LP/ULP/ULL, HPC/HPC+, HV-OLED, DRAM, SOI, ReRAM, M RAM, E-Flash
40nm	22	7	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, ReRAM
55/65nm	36	28	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, DRAM, CIS, BCD, PM
80/90nm	22	12	OTP, MTP	HV-DDI/OLED, LP, Generic, BCD, CIS
0.11/0.13um	20	4	OTP, MTP	HV-DDI, BCD, Generic
0.15/0.18um	1	12	OTP, MTP	BCD, Generic
Total	157	87		

8" Fabs	Production	Development	IP Type	Process Type
80/90nm	9	3	OTP	HV-DDI, LL, BCD
0.11/0.13um	76	24	OTP, MTP, PUF	HV/HV-MR, BCD, LP/LL, CIS, Green, Flash, SOI, Generic
0.152/0.16/0.18um	225	20	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	416	48		

Note: As of December 31st, 2022

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THANKS

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For more information, please visit:

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

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