



# Q2 2021 Investor Conference

Aug 11<sup>th</sup>, 2021

Embedded wisely, Embedded widely

**ememory**

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 soft-focus green and yellow bokeh.

# 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.

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.

# 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.**

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

# Contents

1

Review of Operations

2

Future Outlook

3

Hardware Security in DARPA

4

Q&A

5

Appendix

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 framed by a white, brush-stroke-like border on the right side.

# Review of Operations



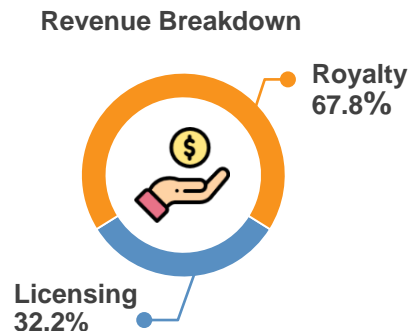
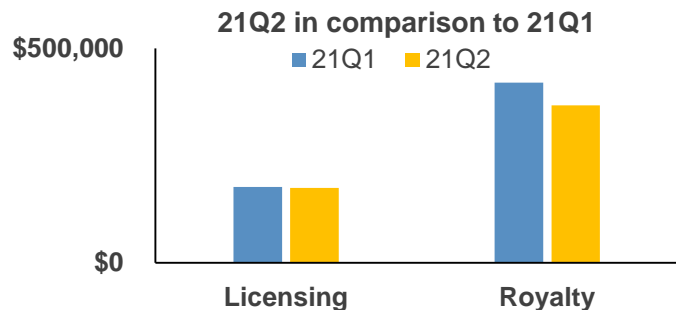
# Q2 2021 Financial Results

(thousands of NT dollars)

	Q2 2021	Q1 2021	Change (QoQ)	Q2 2020	Change (YoY)	Q1-Q2 2021	Q1-Q2 2020	Change (YoY)
Revenue	541,415	596,734	-9.3%	423,276	27.9%	1,138,149	838,712	35.7%
Gross Margin	100%	100%	-	100%	-	100%	100%	-
Operating Expenses	258,701	259,023	-0.1%	227,364	13.8%	517,724	448,827	15.4%
Operating Income	282,714	337,711	-16.3%	195,912	44.3%	620,425	389,885	59.1%
Operating Margin	52.2%	56.6%	-4.4 pts	46.3%	5.9 pts	54.5%	46.5%	8.0 pts
*Net Income	243,731	292,982	-16.8%	169,317	43.9%	536,713	346,075	55.1%
Net Margin	44.7%	48.8%	-4.1 pts	40.0%	4.7 pts	46.9%	41.3%	5.6 pts
EPS	3.27	3.93	-16.8%	2.28	43.4%	7.20	4.66	54.5%
ROE	50.2%	54.6%	-4.4 pts	41.9%	8.3 pts	55.3%	42.8%	12.5 pts

\*Net income attributable to the Shareholders of the Company

# Revenue in Different Stream



## Revenue

NT\$ Thousands	Q2 2021	Q1 2021	QoQ	Q2 2020	YoY	Q1-Q2 2021	Q1-Q2 2020	YoY
Licensing	174,559	176,993	-1.4%	118,062	47.9%	351,552	224,508	56.6%
Royalty	366,856	419,741	-12.6%	305,214	20.2%	786,597	614,204	28.1%
Total	541,415	596,734	-9.3%	423,276	27.9%	1,138,149	838,712	35.7%

US\$ Thousands	Q2 2021	Q1 2021	QoQ	Q2 2020	YoY	Q1-Q2 2021	Q1-Q2 2020	YoY
Licensing	6,218	6,241	-0.4%	3,953	57.3%	12,459	7,495	66.2%
Royalty	13,013	14,788	-12.0%	10,196	27.6%	27,801	20,532	35.4%
Total	19,231	21,029	-8.6%	14,149	35.9%	40,260	28,027	43.6%

# Revenue by Technology

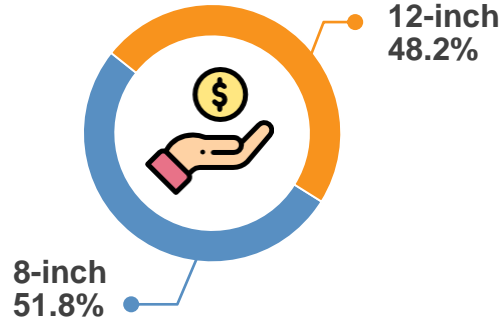
- ✓ The royalty revenue of NeoBit down 19.1% QoQ and 13.9% YoY due to some customer products (PMIC, DDI, and Fingerprint) moving into 12-inch for productions and adopting NeoFuse IP instead. New customer products (legacy PMIC, IoT, and Automotive-related) will contribute to NeoBit royalty in the future.
- ✓ The royalty revenue of NeoFuse down 7.1% QoQ due to smartphone seasonality, but up 89.6% YoY due to continuous strength on new application production.
- ✓ PUF-based contributed to 1.2% of licensing revenue. More revenue recognition will be scheduled in H2.
- ✓ The royalty revenue of MTP technology up 17.5% QoQ and 38.7% YoY.

Technology	Q2 2021								
	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	41.1%	-7.6%	0.8%	28.6%	82.9%	145.7%	47.0%	-19.1%	-13.9%
NeoFuse	52.5%	-0.8%	58.1%	58.6%	12.7%	22.1%	49.6%	-7.1%	89.6%
PUF-Based	0.4%	-62.4%	-26.1%	1.2%	-62.4%	-26.1%	0.0%	0.0%	0.0%
MTP	6.0%	-49.0%	62.7%	11.6%	-62.2%	82.0%	3.4%	17.5%	38.7%
Technology	Q1-Q2 2021								
	Total Revenue		Licensing Revenue		Royalty Revenue				
	% of Q1-Q2 Revenue	Change (YoY)	% of Q1-Q2 Licensing	Change (YoY)	% of Q1-Q2 Royalty	Change (YoY)			
NeoBit	40.7%	4.3%	22.0%	74.0%	49.1%	-3.4%			
NeoFuse	50.1%	61.9%	54.9%	21.8%	48.0%	94.5%			
PUF-Based	0.7%	122.4%	2.2%	122.4%	0.0%	0.0%			
MTP	8.5%	150.0%	20.9%	304.4%	2.9%	12.3%			



# Royalty Revenue by Wafer Size

## Q2 Royalty Breakdown



- ✓ 8-inch wafers contributed 51.8% of royalty, down 16.7% sequentially due to seasonality of smartphone customers, but up 3.3% YoY. Other products (legacy PMIC, Sensors, and Automotive-related) will contribute to 8-inch royalty in the future.
- ✓ 12-inch wafers contributed 48.2% of royalty, down 6.3% QoQ due to smartphone seasonality, but up 71.1% YoY due to the continuous strength of new application productions.

Wafer Size	Q2 2021			Q1-Q2 2021	
	% of Q2	Change (QoQ)	Change (YoY)	% of Q1-Q2	Change (YoY)
8-Inch	51.8%	-16.7%	3.3%	53.4%	12.9%
12-Inch	48.2%	-6.3%	71.1%	46.6%	75.6%



# Future Outlook

# eMemory Embedded Everywhere

- ✓ eMemory's IP seeks to penetrate across all the applications



## ✓ Product Applications:

eMemory's IP are already applied into different applications, which includes PMIC, LCD driver, Sensors, RFID, OLED Driver, Connectivity IC, DTV, STB, SSD Controller, Bluetooth, TDDI, MCU, Finger-print Sensor, Smart Meters, Surveillance, ISP, CIS, DRAM, embedded Flash, IoT, AI and FPGA.

## ✓ Future Target:

AP, GPU, CPU, DPU, autonomous driving



## ✓ Product Application with PUF-based Security IP:

PUF-based security IP are being applied in AI, IoT, IIoT, GPS, PMIC and MCU.

## ✓ PUF-based Security Solutions:

Automotive, Communication, Networking and Vertical market.

# Our Perspectives

---

## Licensing & Royalty



### ✓ **Licensing:**

- Licensing revenue will grow due to continuing strong demand from NeoFuse, PUF-based solutions, and MTP.

### ✓ **Royalty:**

- 8” royalties will grow due to demand and content increases for PMIC, MCU, Fingerprint and Sensor-related in 5G, Automotive, and IoT.
- 12” royalties will have a strong growth as customers are increasing production for TDDI, OLED, ISP, DTV, STB, WiFi 6, Bluetooth, Ethernet, Switch, TWS, DRAM, and others.
- More royalty contributions from FinFET process and 28/22nm process node.

# Our Perspectives

## ✓ New Business Development:

- NeoFuse in advanced process is adopted for secure key storage. This will be a trend for security requirement.
- Business activities of PUF-based security solutions are in progress in applications of IoT, IIoT, AI, FPGA, DPU, UFS, and Automotive.
- PUFrt and PUFiot have customer adoption in various applications.
- Customer adoption cases with ARM-based cores have been successful and will expand the cooperation to CPU security architecture.
- eMemory and PUFsecurity joined DARPA Toolbox Initiative.

## ✓ New IP Technology Development:

- 6nm has passed qualification test and already has customer adoption.
- 5nm plus (N5P) has completed characterization and going into qualification tests.
- Announced cooperation of PUFsecurity and Andes to integrate crypto coprocessor PUFiot into RISC-V AIoT security platform.
- Develop PUF-based solution to be implemented in HSM.



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.

# Hardware Security In DARPA

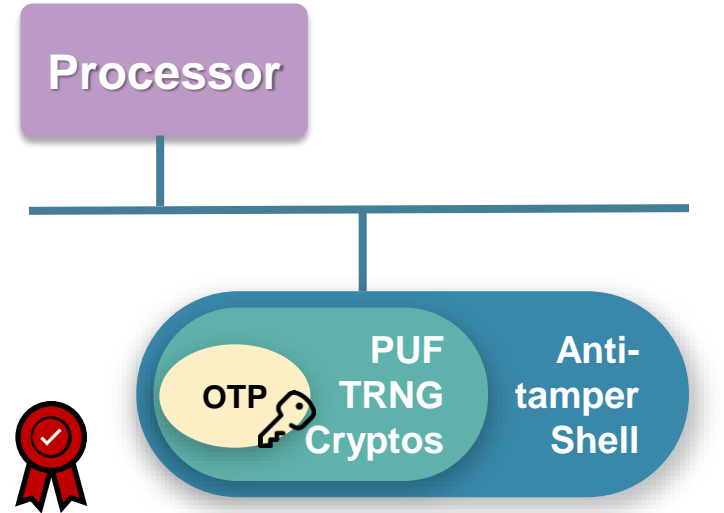


# Collaboration with DARPA

“

“Advanced on-chip security mechanisms utilize OTPs and PUFs to establish unique identity of every manufactured die are foundational building blocks for mitigation of supply chain vulnerabilities.”

”



PUF-based Hardware root of trust and security solutions

- ✓ Embedded NeoFuse and NeoPUF
- ✓ Isolated secure boundary
- ✓ Anti-tampered

# DARPA Hardware Security Programs

- ✓ PUF-based root of trust and Security solutions facilitate the development of chip providers for governments and defense devices

## SSITH

System Security  
Integration Through  
Hardware and Firmware

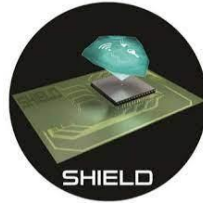


To develop **hardware security architectures** and associated design tools to protect electronic systems from remote attacks on locations such as software or firmware

Enhanced IC Security  
Architectures

## SHIELD

Supply Chain Integrity for  
Electronics Defense



To prevent counterfeit or unauthorized IC to enter module supply chain with **hardware root of trust**

Low-Cost Secure  
Supply Chain

## AISS

Automatic  
Implementation of  
Secure Silicon



To automate the process of incorporating scalable **hardware security** into chip designs

Enabling Security  
Chip Design

## AMI

Asset Management  
Infrastructure



To protect chips throughout their lifecycle by using **hardware security** and blockchain to manage **keys, authentication and certification** during field usage

Lifecycle Security  
Management



# Q&A



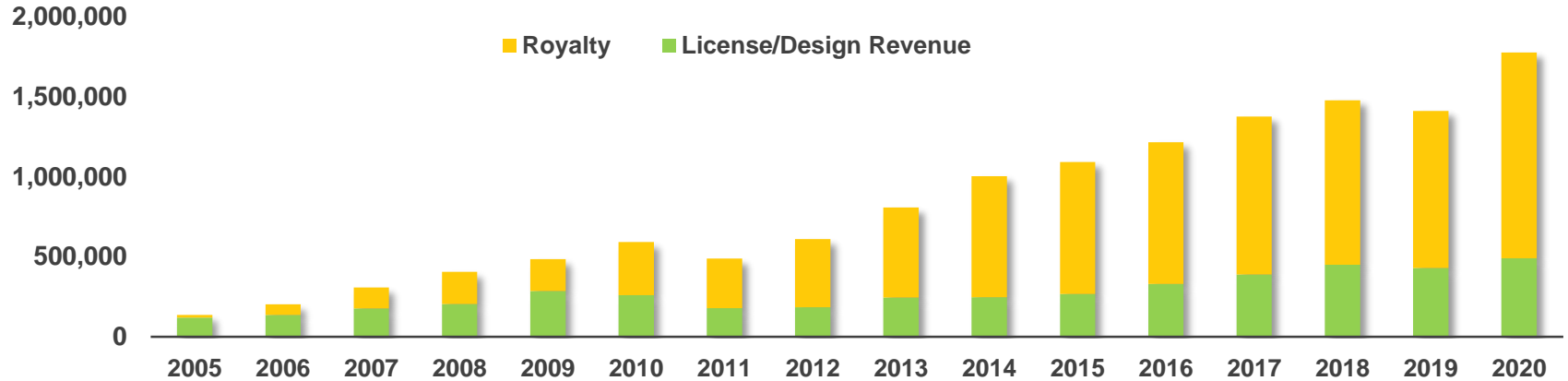
# Appendix

# 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 35M wafers  
shipped.

**900+  
Patents Issued**

221 pending patents. 296  
employees with 68% R&D  
personnel.

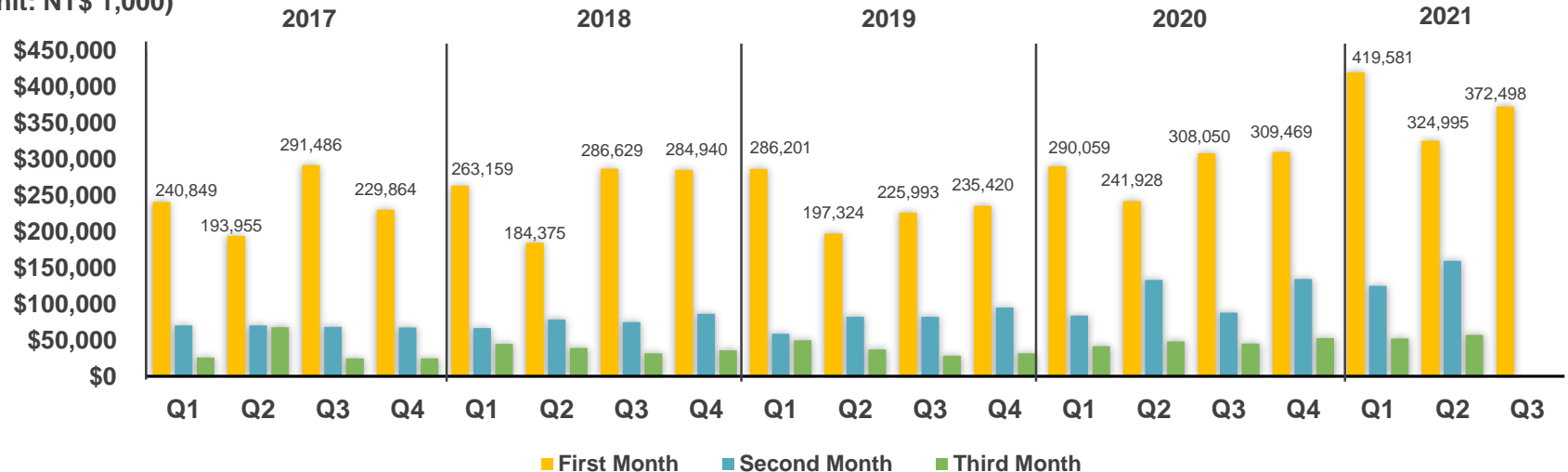
**Best IP Partner  
With TSMC**

TSMC Best IP Partner Award  
since 2010.

# Quarterly Revenue Pattern

- ✓ 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)





# Worldwide Customers

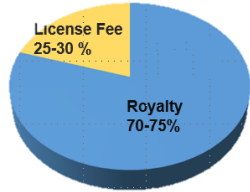
✓ Our IP solutions are adopted by leading foundries, IDMs and fables worldwide

Country	Foundry	IDM	Fabless
Taiwan	4	1	304
China	8	0	827
Korea	4	0	89
Japan	4	6	68
North America	1	2	303
Europe	2	1	182
Others	1	0	73



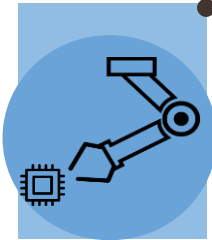
# Business Model

- ✓ Recurring royalty is the backbone of our business



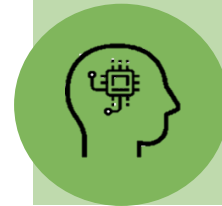
- ✓ 70-75% revenue are from royalty based on wafer production
- ✓ More adoption = more volume shipment
- ✓ More advanced node wafers = higher ASP per wafer

Revenue Breakdown



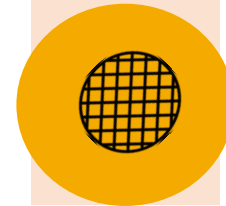
**License Fee**  
Foundries Process  
Development

1-4 years



**Design License Fee**  
Fabless Product  
Development

1-4 years



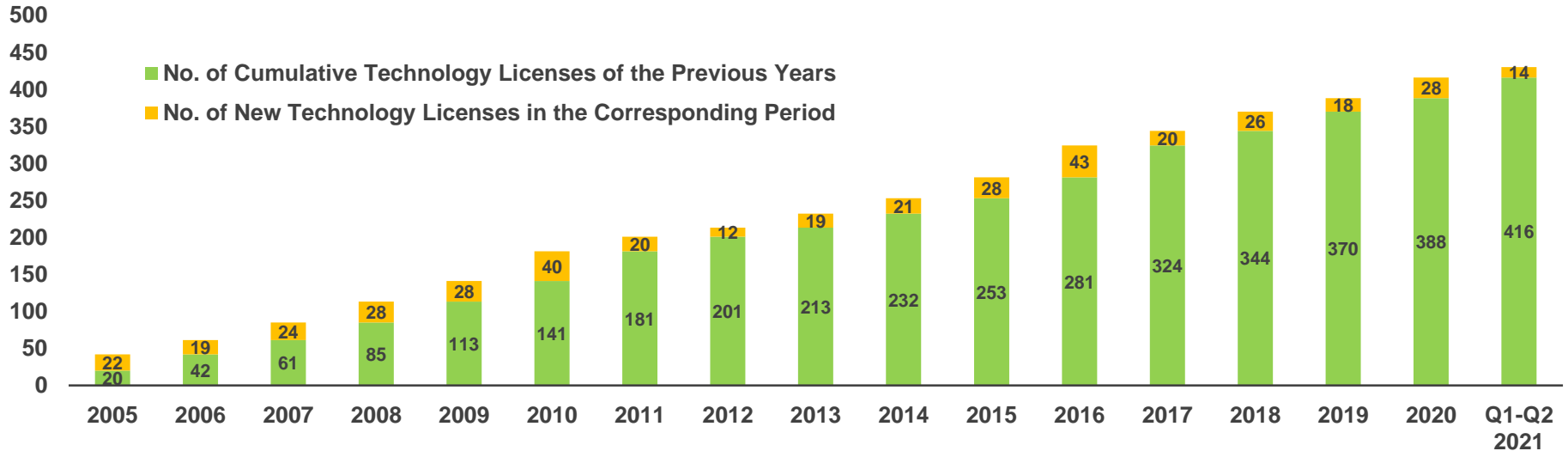
**Royalty**  
Wafer Mass Production

# Technology Licenses

Number of Licenses

Year	2016	2017	2018	2019	2020	Q1-Q2 2021
License	43	20	26	18	28	14

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 **103** platforms by Q2 2021.
- ✓ **9** licensing contracts were signed.

Technology	5/6nm	7/10nm	12/16nm	22/28nm	40nm	55/65nm	80/90nm	0.11~ 0.13um	0.15~ 0.18um	>0.25um
NeoBit	-	-	-	-	-	1	3	8	11	1
NeoFuse	2	1	5	13	2	10	7	1	1	-
PUF-Based	2	-	-	-	2	1	-	-	-	-
MTP	-	-	-	2	-	3	4	9	14	-

Note: As of Jun 30<sup>th</sup>, 2021

# Technology Development

✓ Developments by process nodes

12" Fabs	Production	Development	IP Type	Process Type
5/6nm	0	4	OTP, PUF	FF
7/10nm	2	1	OTP	FF, FF+
12/16nm	5	5	OTP	FF, FF+, FFC, FFC+, LPP
22/28nm	34	15	OTP, MTP	LP/ULP/ULL, HPC/HPC+, HV-OLED, DRAM, SOI
40nm	17	4	OTP, PUF	LP/ULP, E-Flash, HV-DDI/OLED
55/65nm	27	15	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, DRAM, CIS, BCD, PM
80/90nm	18	11	OTP, MTP	HV-DDI/OLED, LP, Generic, BCD, CIS
0.11/0.13um	18	2	OTP, MTP	HV-DDI, BCD, Generic
0.18um	1	3	OTP, MTP	BCD, Generic
<b>Total</b>	<b>122</b>	<b>60</b>		

8" Fabs	Development	IP Type	Process Type
90nm	3	OTP	HV-DDI, LL, BCD
0.11/0.13um	16	OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, Flash, SOI, Generic
0.152/0.16/0.18um	23	OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, Generic
0.25um	1	OTP	BCD
0.35um	0	OTP	UHV
<b>Total</b>	<b>43</b>		

Note: As of Jun 30<sup>th</sup>, 2021

A hand is shown dropping a coin into a stack of coins. A small plant with three yellow leaves is growing out of the stack. The background is a warm, golden-yellow color. The image is framed by a white, brush-stroke-like border.

**THANKS**

**Embedded wisely, Embedded widely**