



# Investor Conference

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, out-of-focus green and yellow bokeh.

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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

# Q1 2021 Financial Results

The EPS of Q1 2021 was 3.93 NTD, ROE was 54.6%

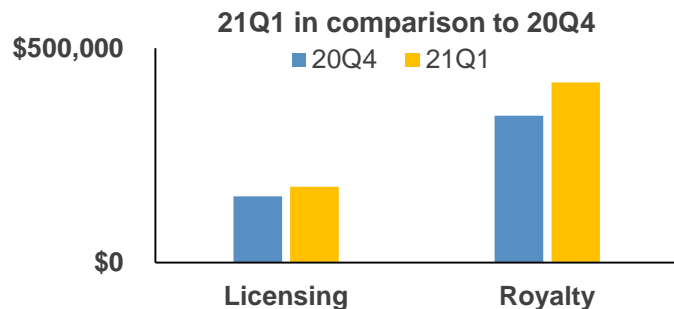
(thousands of NT dollars)

	Q1 2021	Q4 2020	Change (QoQ)	Q1 2020	Change (YoY)
Revenue	596,734	496,682	20.1%	415,436	43.6%
Gross Margin	100%	100%	-	100%	-
Operating Expenses	259,023	261,327	-0.9%	221,463	17.0%
Operating Income	337,711	235,355	43.5%	193,973	74.1%
Operating Margin	56.6%	47.4%	9.2 pts	46.7%	9.9 pts
Net Income Attributable to Shareholders of the Company	292,982	193,343	51.5%	176,758	65.8%
Net Margin	48.8%	38.7%	10.1 pts	42.5%	6.3 pts
EPS (Unit: NTD)	3.93	2.60	51.2%	2.38	65.1%
ROE	54.6%	41.8%	12.8 pts	39.5%	15.1 pts

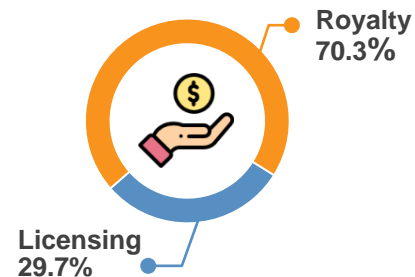
Note: Revenue of Q1 2021 in terms of US\$ is US\$21.03 mil, up 22.2% QoQ, and up 51.5% YoY.

# Revenue in Different Stream

Q1 revenue up 51.5% YoY in US dollar terms



Revenue Breakdown



Revenue

NT\$ Thousands	Q1 2021	Q4 2020	QoQ	Q1 2020	YoY
Licensing	176,993	154,472	14.6%	106,446	66.3%
Royalty	419,741	342,210	22.7%	308,990	35.8%
Total	596,734	496,682	20.1%	415,436	43.6%

US\$ Thousands	Q1 2021	Q4 2020	QoQ	Q1 2020	YoY
Licensing	6,241	5,350	16.7%	3,542	76.2%
Royalty	14,788	11,859	24.7%	10,336	43.1%
Total	21,029	17,209	22.2%	13,878	51.5%

# Revenue by Technology

The royalty of NeoFuse has a growth of 99.4% YoY in Q1

- ✓ The royalty revenue of NeoBit up 8.9% QoQ and 7.1% YoY. Its licensing revenue up 3.3% QoQ and 13.4% YoY.
- ✓ The licensing revenue of NeoFuse down 17.6% QoQ, but up 21.6% YoY. Its royalty revenue up 44.5% QoQ and 99.4% YoY.
- ✓ The licensing revenue of MTP technology up 249.7% QoQ and 652% YoY; while its royalty revenue down 3.2% QoQ and 8.2% YoY.
- ✓ The licensing revenue of PUF-based up 115.3% QoQ and 812.6% YoY.

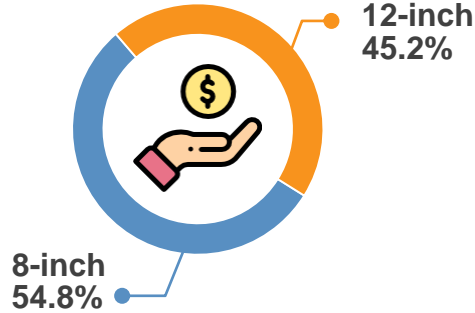
Technology	Q1 2021								
	Total Revenue			Licensing Revenue			Royalty Revenue		
	% of Q1 Revenue	Change (QoQ)	Change (YoY)	% of Q1 Licensing	Change (QoQ)	Change (YoY)	% of Q1 Royalty	Change (QoQ)	Change (YoY)
NeoBit	40.4%	8.3%	7.7%	15.4%	3.3%	13.4%	50.8%	8.9%	7.1%
NeoFuse	48.0%	16.7%	65.8%	51.3%	-17.6%	21.6%	46.7%	44.5%	99.4%
PUF-Based	0.9%	115.3%	812.6%	3.1%	115.3%	812.6%	0.0%	0.0%	0.0%
MTP	10.7%	144.5%	244.2%	30.2%	249.7%	652.0%	2.5%	-3.2%	-8.2%



# Royalty Revenue by Wafer Size

12-inch wafer increased 70.9% YoY in Q1

## Q1 Royalty Breakdown



- ✓ 8-inch wafers contributed 54.8% of royalty, up 10.2% sequentially and 16.2% YoY.
- ✓ 12-inch wafers contributed 45.2% of royalty, up 42.1% QoQ and 70.9% YoY.

## Royalty

Wafer Size	Q1 2021		
	% of Q1	Change (QoQ)	Change (YoY)
8-Inch	54.8%	10.2%	16.2%
12-Inch	45.2%	42.1%	70.9%



# Future Outlook

# eMemory Embedded Everywhere

eMemory's IP seeks to penetrate across all the applications

Core Tech



## ✓ 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, Fingerprint Sensor, Smart Meters, Surveillance, ISP, CIS, DRAM, embedded Flash and FPGA.

## ✓ Future Target:

AP, GPU, CPU, Flash, IoT, AI, autonomous driving



## ✓ The Future in Security Chip IP:

The rapid growth in AIoT and 5G drive the demand for hardware security. OTP and PUF are indispensable for root of trust in hardware security.

## ✓ PUF-based Security Solutions:

To satisfy the market needs, eMemory developed a new series of PUF-based security solution, including PUFrt, PUFiot, PUFse and PUFflash.

Security

# Our Perspectives

eMemory continue to create value for the industry and our shareholders

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## 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, 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.
- Royalties from 16nm and below start to kick in, followed by 7nm in the second half of the year.

# Our Perspectives

eMemory continue to create value for the industry and our shareholders

## ✓ For 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, Blockchain, FPGA, DPU, UFS, and Automotives.
- PUFrt and PUFiot have customer adoption in various applications.
- Customer adoption cases have been successful in the collaboration with ARM, and will expand the cooperation to more product applications.

## ✓ For New IP Technology Development:

- 6nm is going into qualification.
- 5nm plus (N5P) is going into characterization.
- Announced adoption of IP by Achronix for FPGA Hardware RoT.
- Develop PUF-based solution to be implemented in HSM.



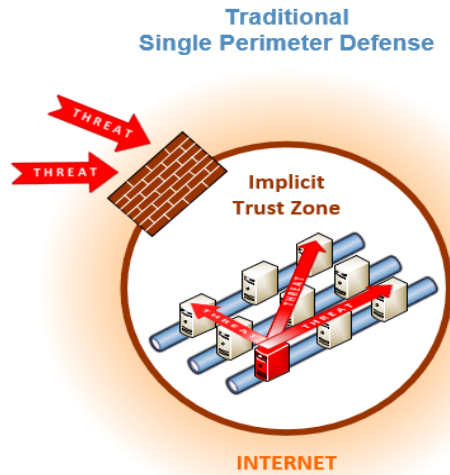
A hand is shown dropping a coin into a stack of coins. A small green plant with three leaves is growing out of the stack. The background is a warm, golden-yellow color. The image is partially obscured by a white, brush-stroke-like graphic on the right side.

# PUF is the Key for Zero Trust Security

# Zero Trust Security

A new security model

- Never trust, always verify
- Authenticated and authorized users and device only
- De-perimeterization security protection
- Identity-centric policy



Source: NIST

# Why Zero Trust Security?

Security boundary is no longer easy to maintain

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- Borderless security strategy is essential due to:

Work from home in the world of Covid-19

Remote working

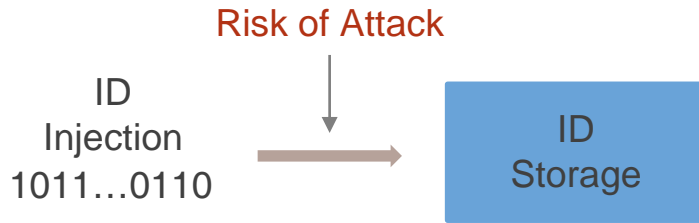
Deployment of Cloud-based services



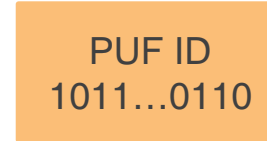
# PUF Will Be A Must for Zero Trust

PUF enables inborn ID and self-generated key for security services

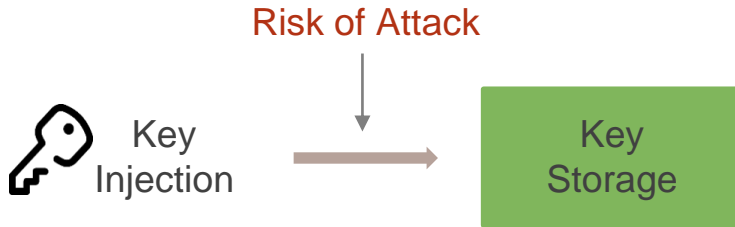
- **ID generation**



**Zero Trust**



- **Key generation for Authentication and Authorization**

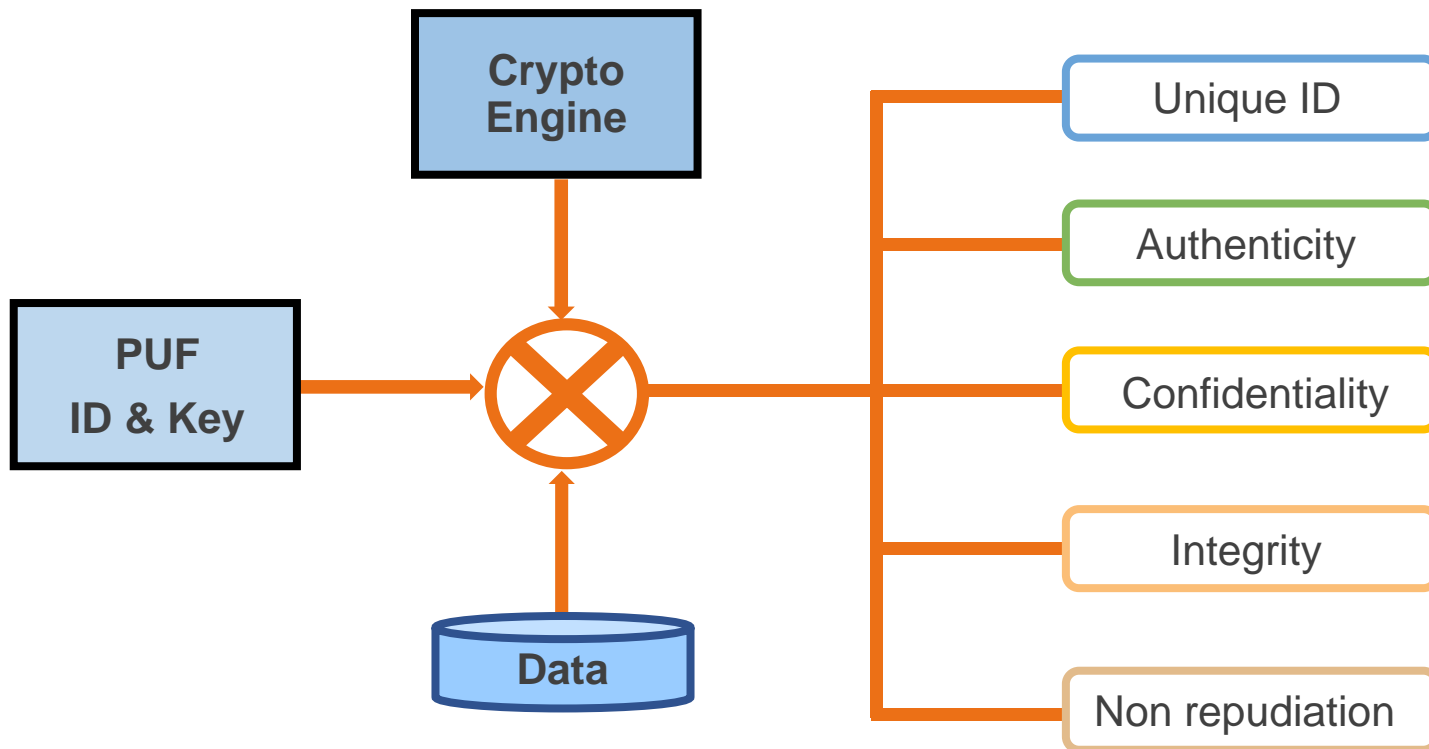


**Zero Trust**



# PUF is Essential for Zero Trust Requirements

PUF is the root of trust for achieving security services





# Q&A



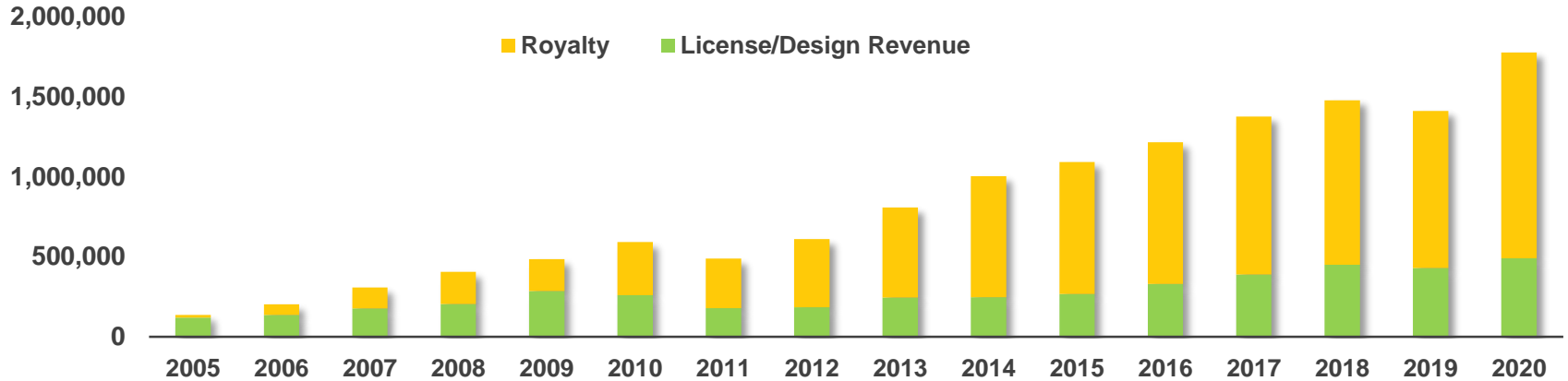
# Appendix

# 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.

**800+  
Patents Issued**

234 pending patents. 296  
employees with 67% R&D  
personnel.

**Best IP Partner  
With TSMC**

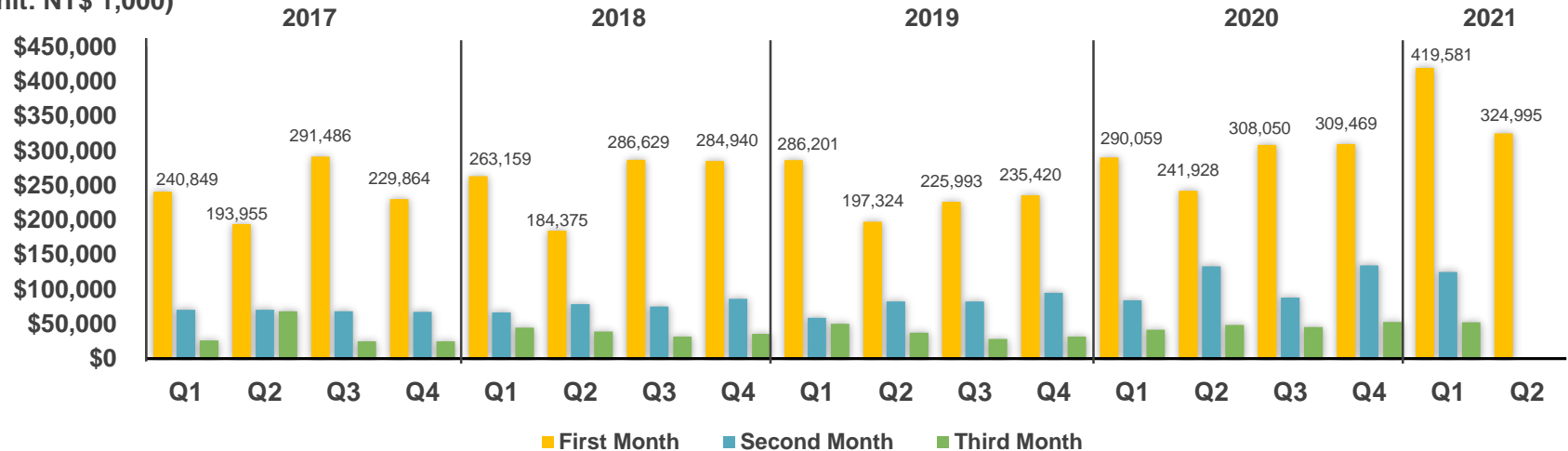
TSMC Best IP Partner Award  
since 2010.

# Quarterly Revenue Pattern

## eMemory's 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

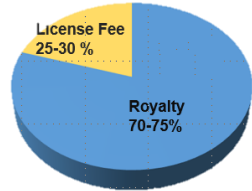
Our IP solutions are adopted by leading foundries, IDMs and fabless worldwide

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



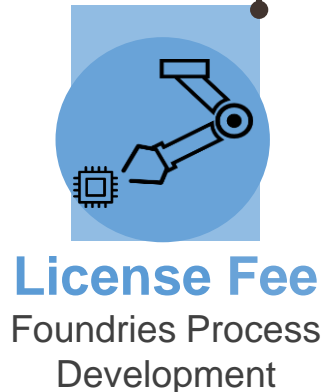
# Business Model

Recurring royalty is the backbone of our business

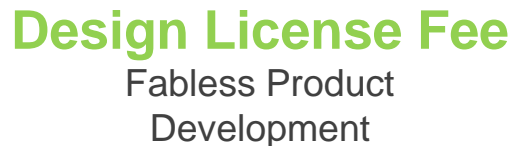


- ✓ 70-75% revenue are from royalty based on wafer production
- ✓ More adoption = more volume shipment
- ✓ More advanced node wafers = higher ASP per wafer

Revenue Breakdown



1-4 years



1-4 years





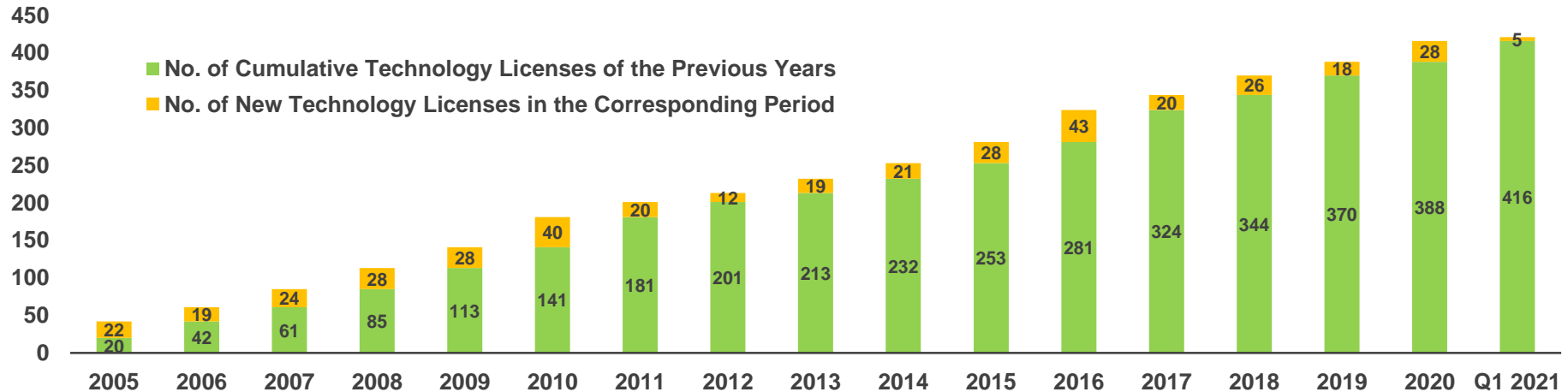
# Technology Licenses

## Cumulative technology licenses

### Number of Licenses

Year	2016	2017	2018	2019	2020	Q1 2021
License	43	20	26	18	28	5

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

Products in different process nodes

- ✓ New technologies are being developed for **105** platforms by Q1 2021.
- ✓ **5** 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	9	13	1
NeoFuse	2	1	4	10	2	10	8	1	1	-
PUF-Based	2	-	-	-	2	1	-	-	-	-
MTP	-	-	-	2	1	3	4	10	14	-

Note: As of Mar 31<sup>st</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	4	OTP	FF, FF+, FFC, FFC+
22/28nm	34	12	OTP, MTP	LP/ULP/ULL, HPC/HPC+, HV-OLED, DRAM, SOI
40nm	16	5	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED
55/65nm	26	15	OTP, PUF, MTP	LP/ULP, E-Flash, HV-DDI/OLED, DRAM, CIS, BCD, PM
80/90nm	16	13	OTP, MTP	HV-DDI/OLED, LP, Generic, BCD, CIS
0.11/0.13um	17	3	OTP, MTP	HV-DDI, BCD, Generic
0.18um	1	3	OTP	BCD, Generic
<b>Total</b>	<b>117</b>	<b>60</b>		

8" Fabs	Development	IP Type	Process Type
90nm	2	OTP	HV-DDI, LL, BCD
0.11/0.13um	17	OTP, MTP	HV/HV-MR, BCD, LP/LL, CIS, Green, Flash, SOI, Generic
0.152/0.16/0.18um	25	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>45</b>		

Note: As of Mar 31<sup>st</sup>, 2021

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**THANKS**

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