Investor Conference

Embedded wisely, Embedded widely

ememory

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Review of Operations

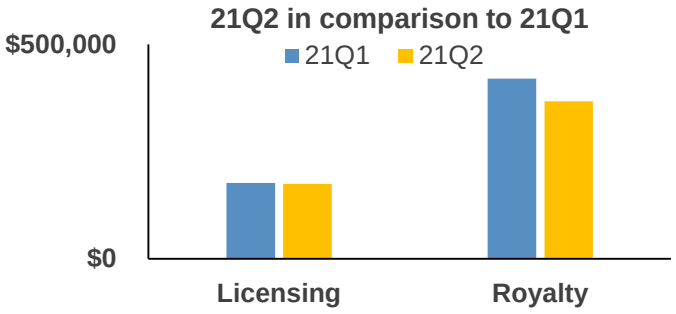
Q2 2021 Financial Results

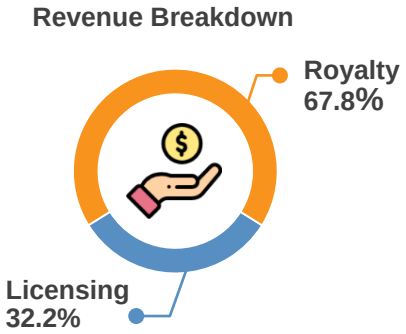
(thousands of NT dollars)

	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 ppts	46.3%	5.9 ppts	54.5%	46.5%	8.0 ppts
*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 ppts	40.0%	4.7 ppts	46.9%	41.3%	5.6 ppts
EPS	3.27	3.93	-16.8%	2.28	43.4%	7.20	4.66	54.5%
ROE	50.2%	54.6%	-4.4 ppts	41.9%	8.3 ppts	55.3%	42.8%	12.5 ppts

*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

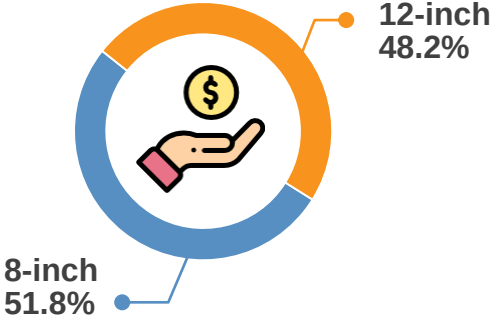
- ✓ The royalty revenue of NeoBit down 19.1% QoQ and 13.9% YoY due to some customer products (PMIC, DDI, and Fingerprint) moving into 12-inch for productions and adopting NeoFuse IP instead. New customer products (legacy PMIC, IoT, and Automotive-related) will contribute to NeoBit royalty in the future.
- ✓ 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

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, Finger -print Sensor, Smart Meters, Surveillance, ISP, CIS, DRAM, embedded Flash, IoT, AI and FPGA.

✓ **Future Target:**

AP, GPU, CPU, DPU, autonomous driving

Security

✓ **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:**

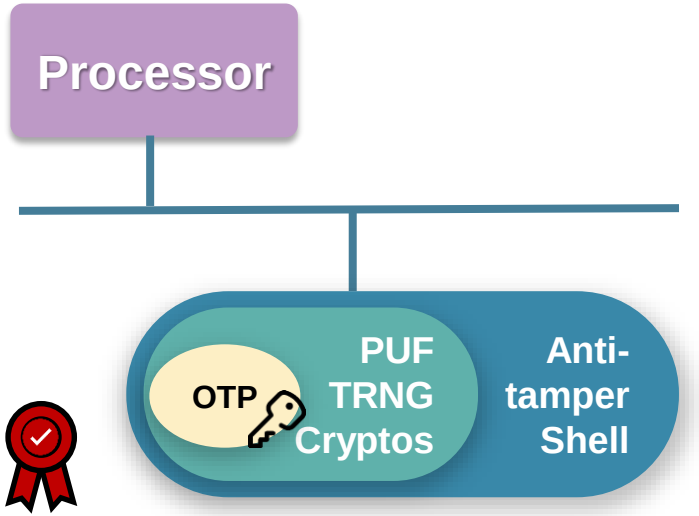
- 6nm has passed qualification test and already has customer adoption.
- 5nm plus (N5P) has completed characterization and going into qualification tests.
- Announced cooperation of PUFsecurity and Andes to integrate crypto coprocessor PUFiot into RISC-V AIoT security platform.
- Develop PUF-based solution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

New Business & IP Technology Development

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

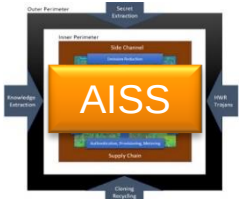
Enhanced IC Security Architectures

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

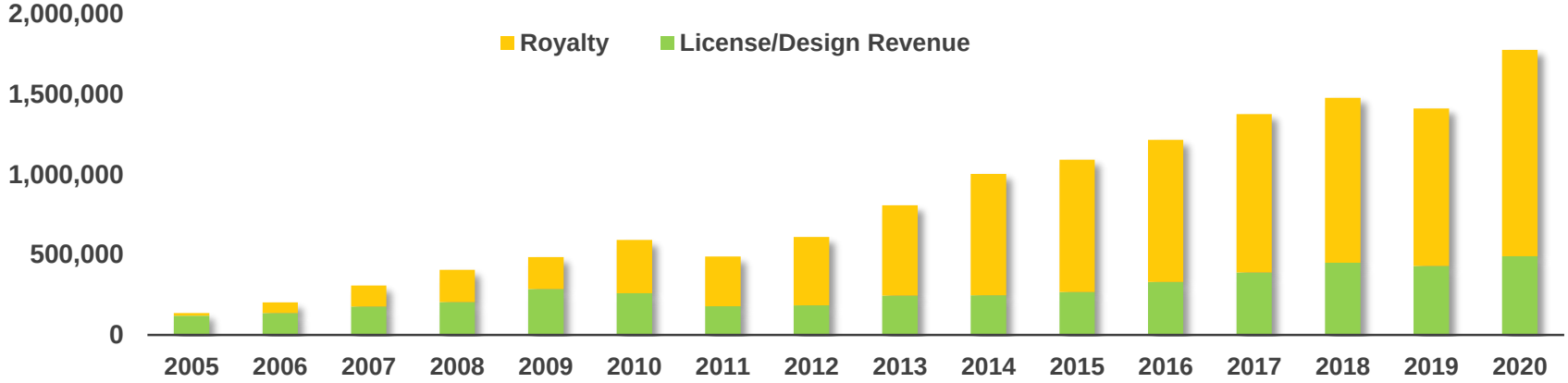
Appendix

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.

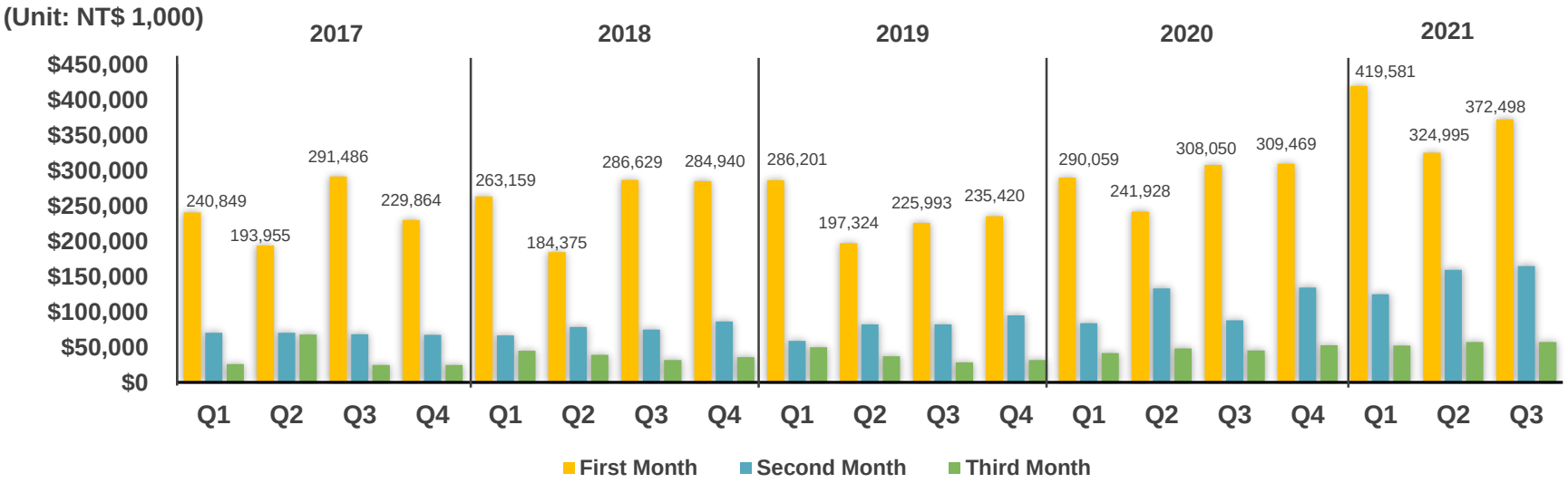
Best IP Partner

With TSMC

TSMC Best IP Partner Award since 2010.

Quarterly Revenue Pattern

- ✓ 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.



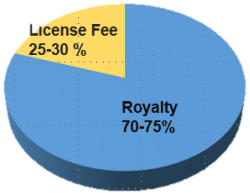
Worldwide Customers

✓ 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

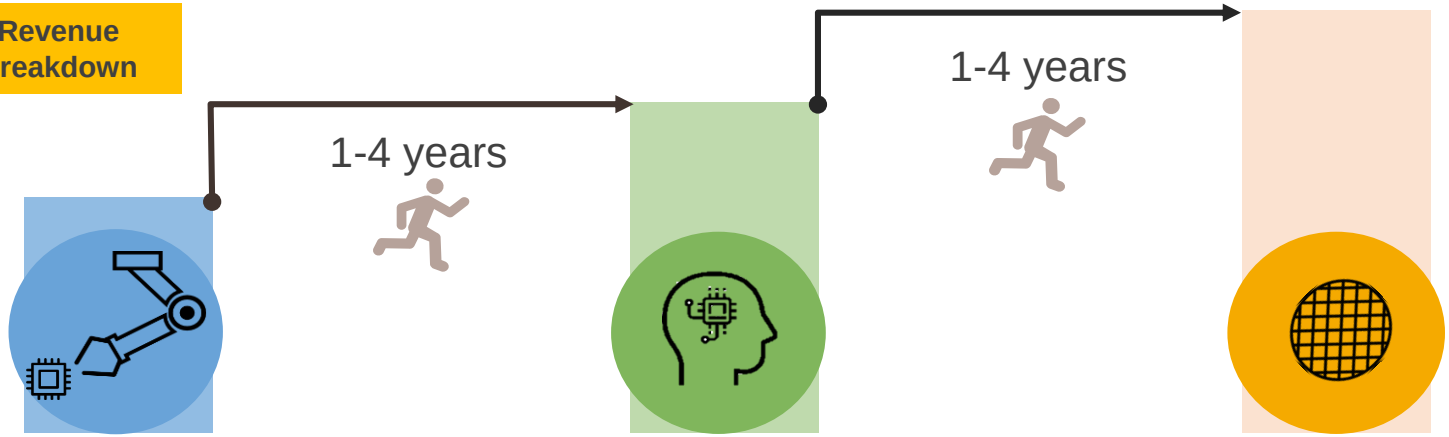
Business Model

- ✓ Recurring royalty is the backbone of our business



Revenue Breakdown

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



License Fee
Foundries Process Development

Design License Fee
Fabless Product Development

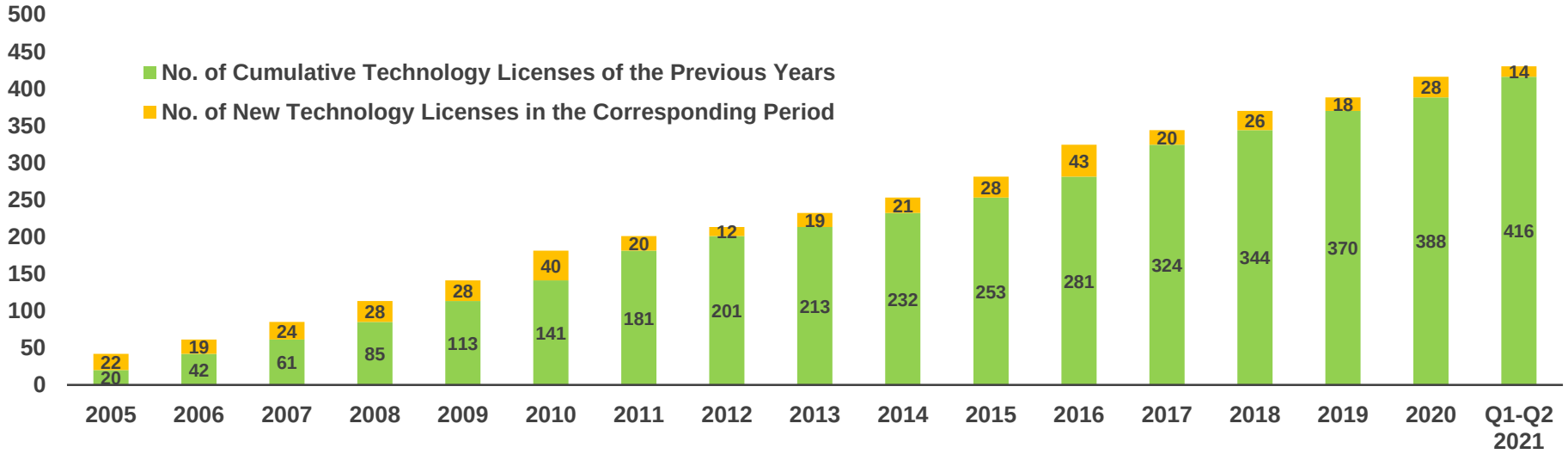
Royalty
Wafer Mass Production

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 30th, 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
Total	122	60		

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
Total	43		

Note: As of Jun 30th, 2021

THANKS

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