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The Future of Al Computing

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Prologue

01

Structural Growth of System Semiconductor Market **)**2

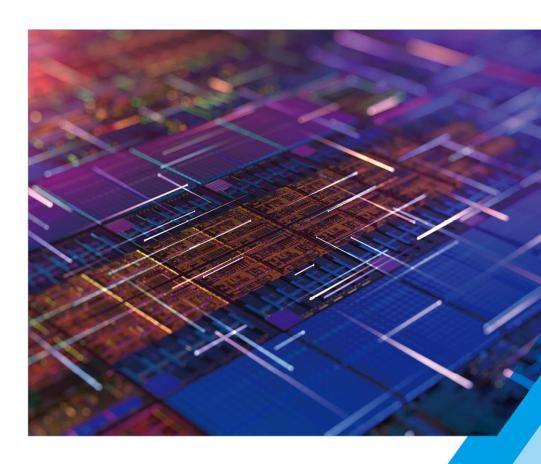
OPENEDGES Technology, as Korea's most renowned Al semiconductor IP design company 03

Financials



Prologue

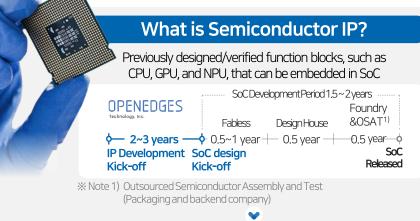
OPENEDGES Technology's Business Areas



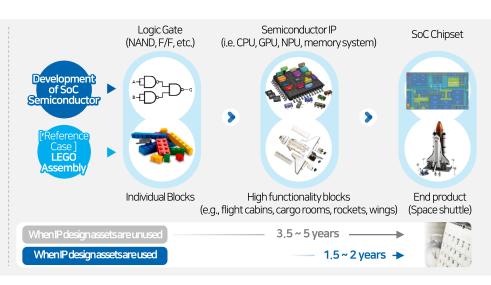


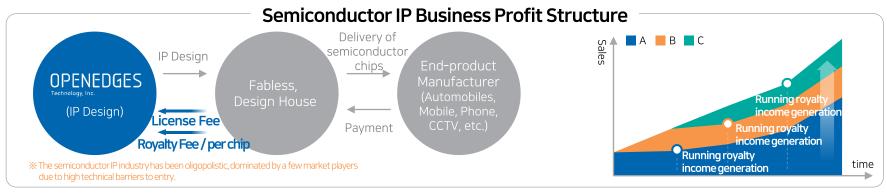
OPENEDGES Technology's Business Areas ①

Semiconductor IP is a ready-made solution requiring high-level technologies that enable faster development of SoC (System on Chip) such as AI semiconductors, reduce costs, and mitigate the risk of failure risks in development that can cost \$100 million



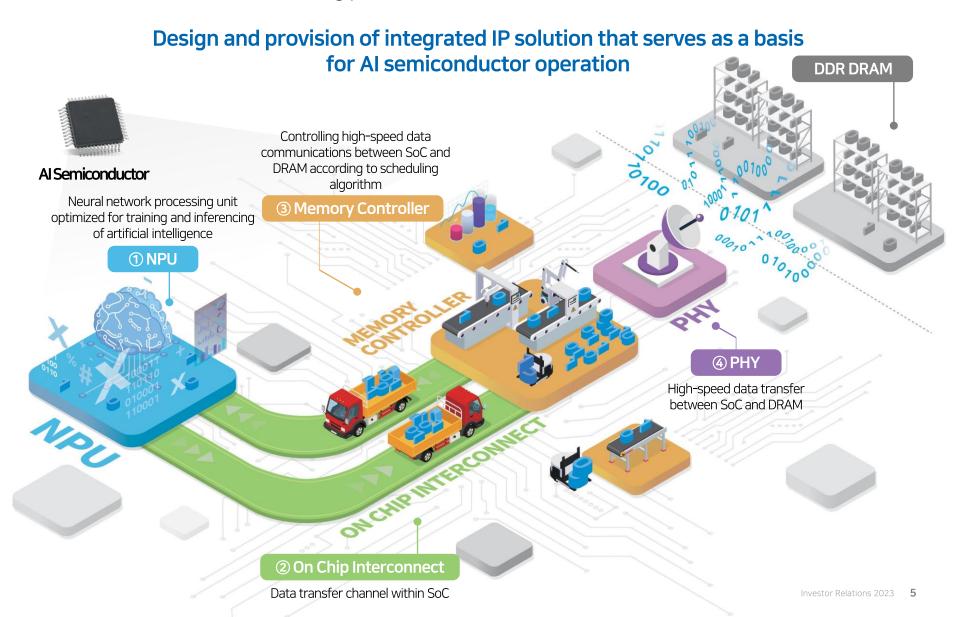
Reduction in SoC design time and cost for fabless companies







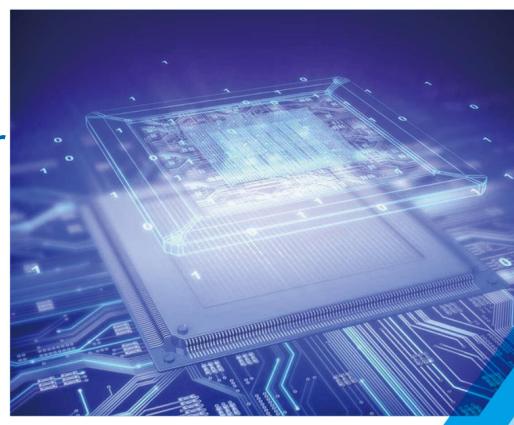
OPENEDGES Technology's Business Areas ②





Structural Development of System Semiconductor Market

- 01. Growth of Al Semiconductor & IP Market
- 02. Roles of Semiconductor IP Design Company
- 03. Increased Significance of System Semiconductor IP Design
- 04. Korea's Full-fledged System Semiconductor
 Market Investment





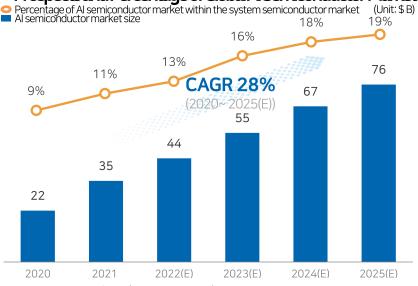
01 | Growth of Global System Semiconductor Market

Contrary to memory semiconductors, system semiconductors are continuing their steady growth

Prospects for Global Semiconductor Market during 2018-2023



Prospects and Percentage of Global AI Semiconductor Market



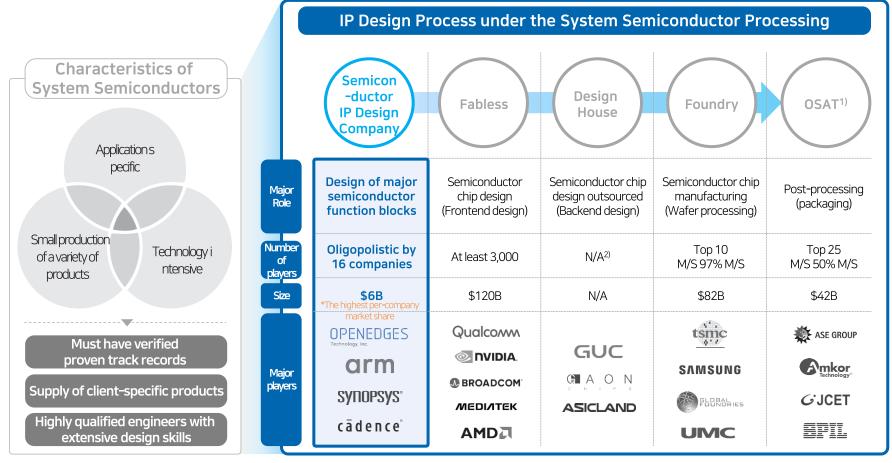
Global Semiconductor IP market forecast

	Company	2022 Sa	les (\$ M)	CAGR (20	018-2022)
	arm 2,742		'42	9%	
	SYNOPSYS*	1,3	1,315		6%
cādence°		358		14%	
OPENEDGES Technology, Inc.		7.	.7	10	17%
	Others			1	1%
	То	Total			4%
	Semiconductor IP market size	е			(Unit: \$ B)
	4.7		7.5	8.7	10.2
	2020 2021	2022E	2023E	2024E	2025E
	% Source: IPnest 2022.05, Pres	s Clipping		Investor Relat	tions 2023 7



03 | Roles of Semiconductor IP Design Companies

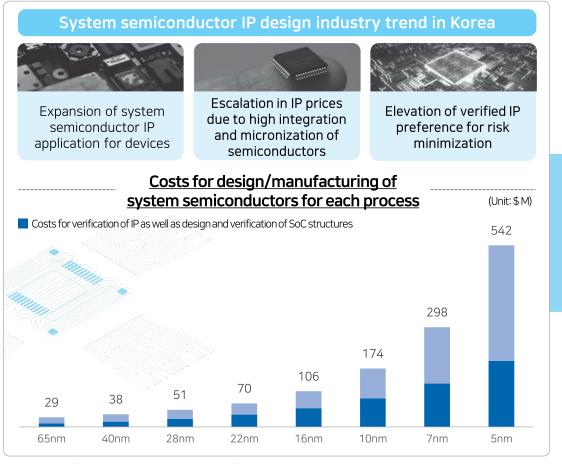
Semiconductor IP companies aim to develop and supply function blocks as needed by Fabless and Design House in a proactive manner.





04 | Increased Significance of System Semiconductor IP Design

The rapid increase of design/manufacturing costs of system semiconductors → Emphasis on the importance of verified IP companies



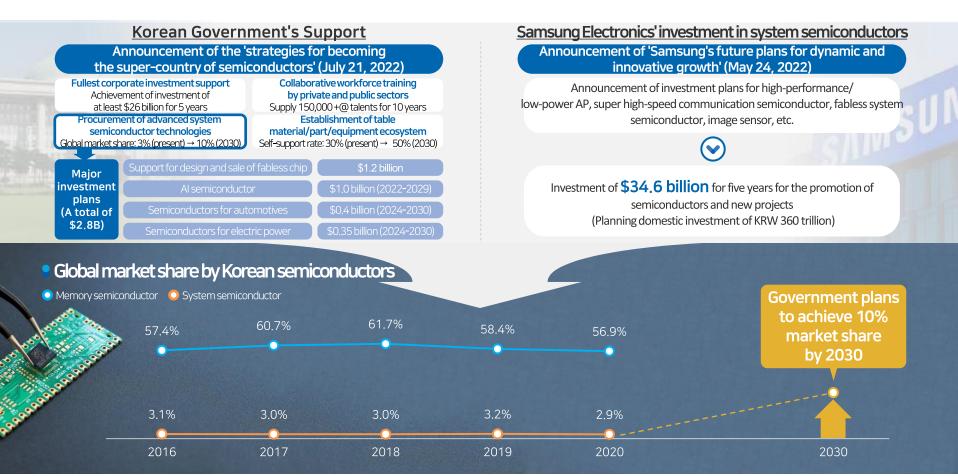




05 | Korea's Full-fledged System Semiconductor Market Investment

Activation of Korea's system semiconductor market by large-scale investment in collaboration by private and public sectors

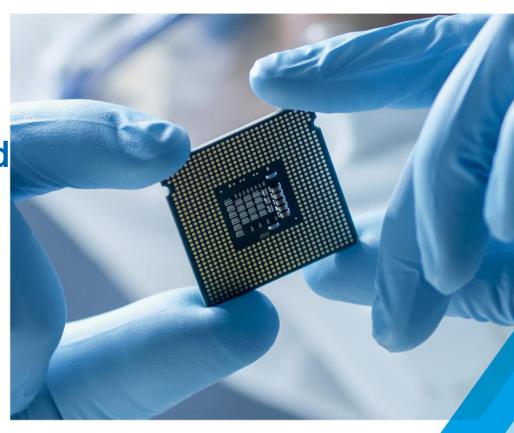
→ Expected to benefit as the only AI semiconductor IP supplier in Korea



02

OPENEDGES Technology, as Korea's most renowned Al semiconductor IP design company

- O1. The Overview of OPENEDGES's Core Competitiveness
- 02. A Global Team of Professionals
- 03. Industry's Highest Technological Competitiveness
- 04. Verified Global Track Records
- 05. Business Partnership with Global Enterprises





01 | The Overview of OPENEDGES' Core Competitiveness

OPENEDGES hold the key success factors

to become a global leader in the AI semiconductor IP market





Industry's highest technological competitiveness







02 A Global Team of Professionals 1 HQ

Leadership of industry-leading experts with over 20 years of experience from Samsung Electronics/SK Hynix, and more.



R&D personnel

Among the total personnel (137 team members)

83%

114 **R&D** personnel

Percentage of Ph.D. and Ph.D. M.S. degree holders (55 members) among the R&D personnel 48 **50**%







Sean Lee Representative Director/CEO



Ph.D. Candidate in Electrical and Computer Engineering, Seoul National University

- 2017-Present: Representative Director, OPENEDGES Technology, Inc.
- 2008-2015: Principal Researcher, Samsung Electronics (Exvnos Development)
- 2007-2008: Samsung Advanced Institute of Technology



Jake Choi NPUTeam Head



SAMSUNG MASTINITE OF TECHNOLOGY

SK hynix SAMSUNG

Ph.D. in Electrical and Computer Engineering, Purdue University

- 2018-Present: NPU Team Head, OPENEDGES Technology, Inc.
- 2015-2018: Principal Researcher, SK Hynix
- 2009-2014: Architecture Lab Part Head, Samsung Electronics



Sunny Kim PHYTeam Head



SAMSUNG

M,S,in Electrical Engineering, Sungkyunkwan University

- 2021-Present: PHY Team Head. OPENEDGES Technology. Inc.
- 2018-2021: NAND IP Development Team Head, SK Hvnix
- 1998-2017: Principal Researcher, Samsung Electronics



Eric Jung System Architecture Team Head







B.S. in Electronic and Electrical Engineering, Kyungpook National University

- 2018-Present: SA Team Head, OPENEDGES Technology, Inc.
- 2013-2018: Lead Engineer, Imagination Tech.
- 2003-2013: DM Technology, Chips & Media



Cody Hwang R&D Center Head / CTO / Co-founder





M.S.in Electrical Engineering, Seoul National University • 2017- Present: CTO, OPENEDGES Technology, Inc.

- 2010-2015: CTO. CodeHolics
- 2000-2010: Daewoo Electronics, Chips & Media



Henry Moon Memorycontroller Team Head



SK hynix | SAMSUNG

M.S.in Computer Engineering, Seoul National University

- 2018-Present: MC Team Head, OPENEDGES Technology, Inc.
- 2017-2018: Memory System Laboratory Part Head, SK Hynix
- 2000-2016: AP Development Team Part Head, Samsung Electronics



Dean Kim Verification Team Head



Master of Architecture, Seoul National University

- 2022-Present: Verification Team Head, OPENEDGES Technology, Inc.
- 2005-2022: Digital Technology Team Part Head. Samsung Electronics
- 2001-2005: MIDAS IT.









Ph.D. in Computer System Engineering, Korea University

- 2021-Present: NoC Team Head, OPENEDGES Technology, Inc.
- 2009-2021: SW Development Team Head, Chips & Media
- 2000-2009: Advanced Digital Chips, Inc. (Adchips)



02 | Global Team of Professionals ② Global Networks

With the leading expertise of professionals from global networks with extensive experience







M.S. in Electrical and Electronic Engineering, Univ. of Toronto

- 2018-Present: CEO. The Six Semiconductor
- 2012-2018: Silicon Director, etc., Peraso Technologies
- 2000-2011: PHY Analog Design Manager, AMD



TSS/CEO

pixelworks



AMD | PERASO

- M.S. in IC Design, Hong Kong Univ.
- 2018-Present: COO. The Six Semiconductor 2006-2016: Principal Engineer, Pixelworks
- 2001-2006: Senior Engineer, ATI Tech.





AMD SYNOPSYS"



B.S. in Electronic Engineering, Waterloo Univ.

- 2022-Present: Applied Eng. & IP Val. VP Engineering, The Six Semiconductor
- 1999-2021: Synopsys, AMD, ATI Tech., etc.



Jason Mangattur

TSS/VPEnaineering

Moez Cherif OTC/Software Group Leader

ARTERISE | MAGMA | SYNOPSYS"



- Ph.D. in Computer Science, INPG Univ. • 2021-Present: S/W Group Head, U.S. entity of OPENEDGES Technology
- 2018-2021: Principal S/W Architect, Arteris IP
- 1995-2017: Synopsys, Magma Design Automation, etc.



Ricky Lau TSS/CTO

AMD SYNOPSYS*

M.S. in Electrical and Electronic Engineering, Univ. of Toronto

- 2018-Present: CTO. The Six Semiconductor
- 2014-2018: PHY Digital Design Engineer, Synopsys
- 2003-2014: PHY Analog Design Engineer, etc., AMD



Alan Poon TSS/VPEngineering

AMD PERASO

M.S. in Application Engineering, Univ. of Toronto • 2019-Present: The Six Semiconductor

- Full Design Custom VP Engineering
- 2004-2019 Peraso Technology, AMD, etc.



Nisreen Atout TSS/DirectorofProgram Operations&System Engineering





B.S. in Electrical Engineering, Univ. of Toronto

- 2022-Present: Director of Program Operations & System Engineering, The Six Semiconductor
- 2016-2022: Director of Systems Engineering, Rambus
- 2006-2016: AMD, Semtech, etc.



Roger Jennings OTC/VP of Engineering

ARTERISE AMD (intel)



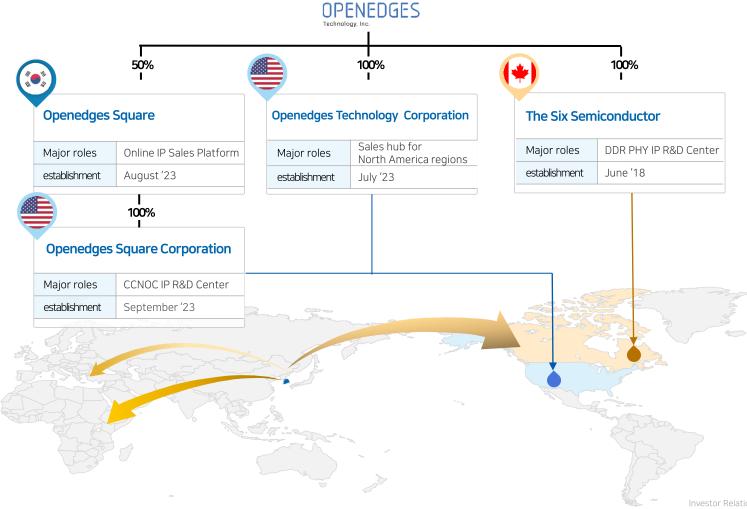
M.S. in Electrical and Electronic Engineering, Univ. of Memphis 2022-Present: VP of Engineering, U.S. entity of OPENEDGES Technology, Inc.

- 2020-2022: Arteris IP Senior Director of Engineering
- 2000-2021: Intel, Juniper Networks, AMD etc.



02 | A Global Team of Professionals - Global Presence

Seeking Global Expansion for the International hubs



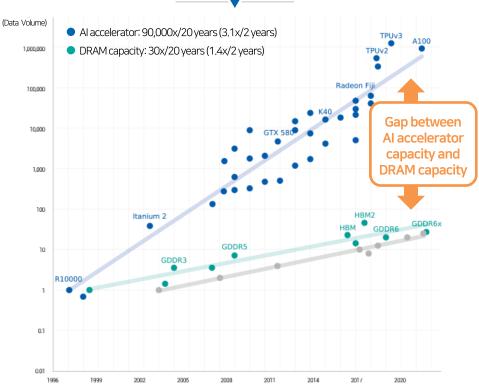


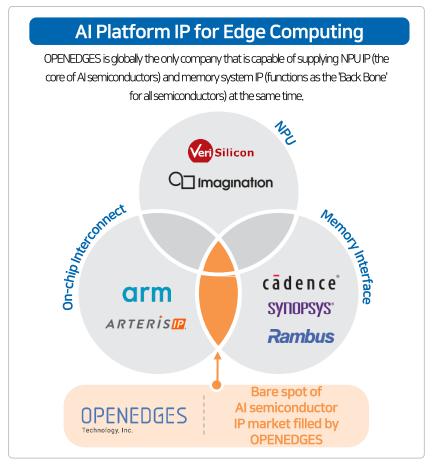
03 | Industry's Highest Technological Competitiveness ①

Al semiconductors are characterized as 'Data Intensive Computing' → Most optimize NPU and memory systems in edge AI with limited resources

OPENEDGES is the only global leading AI semiconductor IP platform provider

The gap between the required data processing volume and the capacity provided by DRAMs has increased due to the development of AI accelerator technologies

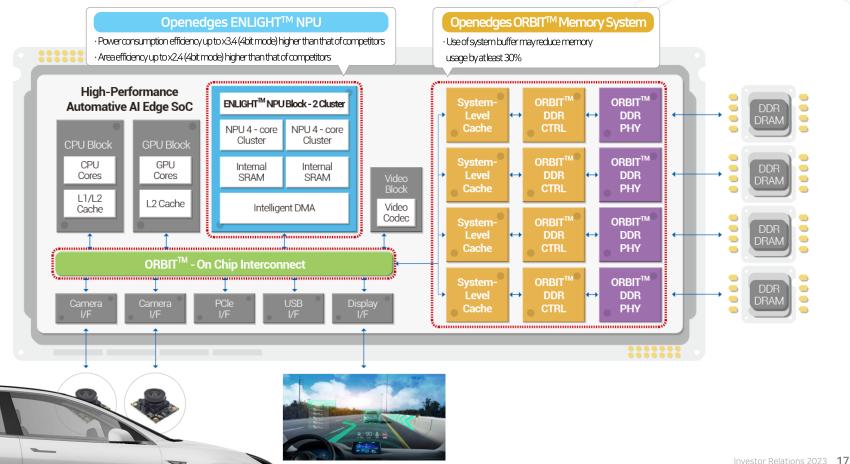




03 | Industry's Highest Technological Competitiveness 2

A leading AI semiconductor IP platform provider, OPENEDGES provides higher efficiencies in power, size, and memory compared to its competitors

[Examples showing OPENEDGES' integrated IP solutions applied to the AI semiconductor for autonomous driving vehicles]





03 | Industry's Highest Technological Competitiveness ③ Leading the market through the development of cutting-edge technology

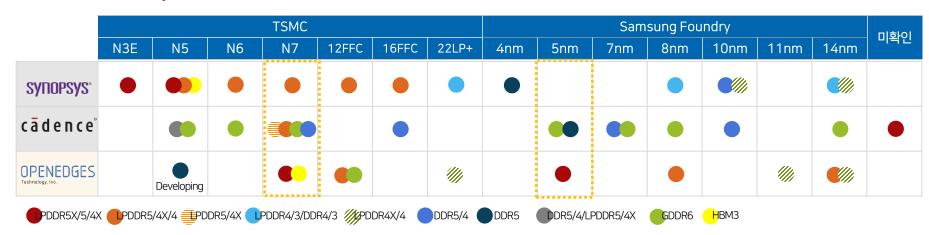
Division	IP	Description	Development status	Remark
	ENLIGHT™ (Neural Processing Unit)	ENLIGHT™-L (1st gen. a.k.a v1.0)	Now	Lightweight IoT applications (Keyword recognition, security camera application)
Al Platform IP Solution		ENLIGHT™-R (2nd gen. a.k.a v2.0)	Now	Intermediate IoT applications (ADAS)
for Edge Computing		ENLIGHT™-P (3rd gen. a.k.a v3.0)	In the process	Automotive high-performance applications (Level 3 or higher self-driving vehicle application)
		ENLIGHT™-X (4th gen. a.k.a v4.0)	In the future	Automotive high-performance applications (Level 4 or higher self-driving vehicle application)
		DDR4/3, LPDDR4X/4/3	Now	Current Mainstream Technology
		LPDDR5X/5/4X/4	Now	Next-generation Mainstream Technology
	OMC [™] (DDR Memory	НВМ3	Now	Server and ultra-high-performance products
		DDR5	Now	Next-generation Mainstream Technology
	Controller)	GDDR6	Now	High-performance AI product
		GDDR7	In the future	High-performance AI product
		LPDDR6	In the future	Next-generation Mainstream Technology
		LPDDR4X/4	Now	TSMC 22nm Nodes
		LPDDR4X/4, LPDDR5/4X/4	Now	TSMC 12nm Nodes
		GDDR6	Now	TSMC 12nm Nodes
Total Memory		LPDDR5X/5/4X/4	Now	TSMC 7nm Nodes
System Solution IP		НВМ3	Now	TSMC 7nm Nodes
(ORBIT™)		DDR5	In the process	TSMC 5nm Nodes
,	OPHY™ (DDR PHY)	LPDDR6	In the future	-
		LPDDR3, DDR4/3	Now	Samsung 28nm Nodes
		LPDDR4X/4, LPDDR5/4X/4	Now	Samsung 14nm Nodes
		LPDDR4X/4	Now	Samsung 11nm Nodes
		LPDDR5/4X/4	Now	Samsung 8nm Nodes
		LPDDR5X/5/4X/4	Now	Samsung 5nm Nodes
		LPDDR6	In the future	-
		GDDR7	In the future	-
	OICTM	OIC TM	Now	Non- Cache-Coherent NoC
	(On-Chip-Interconnect)	OIC™-AI	In the process	Cache-Coherent NoC



03 Industry's Highest Technological Competitiveness @

Concentrate on areas that major global competitors cannot cover & expand M/S

DDR PHY IP Competition status



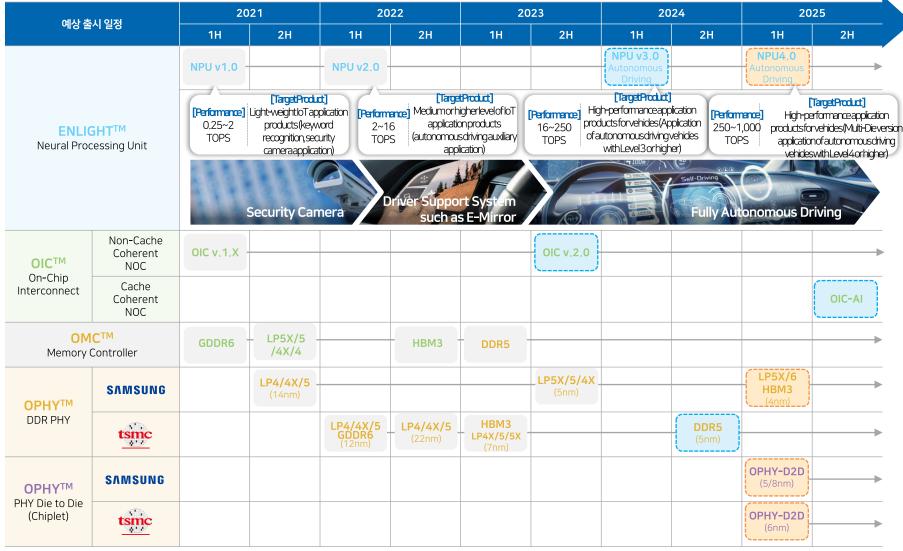
- Synopsys and Cadence are offering PHY IP for LPDDR5X/5 only on the TSMC nodes
- -PHY IP for OPENEDGES Technology TSMC N7 LPDDR5X is easily expandable to TSMC N6
- -DDR5 PHY IP development for TSMC N5 is in progress

Market Share Expansion Strategies

- ✓ PHY IP for LPDDR5X/5 is supported worldwide only among major IP vendors in the Samsung Foundry process
- ✓ Maximizing customer convenience by providing PHY IP applicable to various package types
- ✓ In a test chip implemented with an area less than 50% compared to competitors, silicon-proven PHY IP is provided after demonstrating the target performance



03 | Industry's Highest Technological Competitiveness (5) Maximize first-mover advantage of AI semiconductor integrated IP solutions





04 | Verified Global Track Records

Expanding global track record as value recognized as the essential solution in various industries





05 | Business Partnership with Global Enterprises

Securing stable IP demands + Proactive response to advanced technologies and market trends





03

2Q23 Financials

01. Financial Statement Summary

02. 2Q23 Performance Analysis

Appendix. Openedges Square Business Overview





01 | Financial Statements Summary

2nd quarter sales ended with additional orders secured after 1st quarter After bottoming out in the first quarter, quarterly sales are expected to steadily rise.

Summary of Financial Statements

(Unit: KRW 1 million)

	1H23	2022	2021	2020		
Current Assets	27,125	44,304	29,020	6,216		
Non-current Assets	12,735	9,552	7,077	4,075		
Total Assets	39,860	53,855	36,097	10,291		
Current Liabilities	14,881	18,318	9,171	5,477		
Non-current Liabilities	3,431	3,288	6,374	31,551		
Total Liabilities	18,311	21,606	15,545	37,028		
Capital	2,137	2,116	1,653	15		
Capital Surplus	97,682	96,376	58,927	-		
Other Capital	3,186	2,026	3,007	1,697		
Earned Surplus	-81,457	-68,269	-43,035	-28,449		
Total Capital	21,549	32,249	20,553	-26,737		

Summary of Income Statements

(Unit: KRW 1 million)

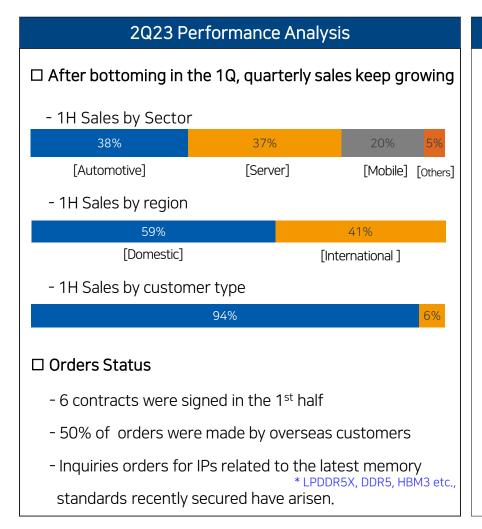
	2Q23	1Q23	Change	Change(%)
Sales	2,842	1,059	1,783	168.3
Sales Cost	-	-	-	-
Gross Margin	2,842	1,059	1,783	168.3
Sales Management Expenses	8,422	8,801	-379	-4.3
Operating Profits	- 5,581	- 7,742	2,161	N/A
Financial Profits	319	415	-96	-23.2
Financial Costs	301	331	-30	-9.3
Other Profits	10	43	-33	-75.8
Other Costs	7	19	-12	-65.6
Net Profit before Corporate Tax Costs	-5,559	-7,634	2,075	N/A
Corporate Tax Costs	-2	-4	2	N/A
Current Net Income	- 5,557	- 7,631	2,074	N/A

^{*} Based on the consolidated financial statements



02 | 2Q23 Performance Analysis

Although delayed contracts, Orders are expected to continue steadily Sales in the second half are expected to be way higher than in the first half



Orders and Sales Forecast after 2023

- ☐ Inquiry for new IP provision arises in addition to PJT that was currently under negotiation.
 - Additional orders arise due to IP development related to the latest memory standards
 - Including existing negotiations, contract negotiations are currently underway with more than 20 domestic and foreign customers.

Current status of order candidates

	Contract	PJT Drop	Lost	Remain	Total
Status	6	0	2	21	27
(%)	(22%)	(0%)	(7%)	(78%)	(100%)

- ☐ Sales expected to increase due to receipt of IP orders related to the latest memory standards.
 - Due to IP total solution + latest memory standard IP
 - Efforts are being made to provide IP within the year through a guick contract award in the second half.
 - Preparing next year by strengthen IP lineup, like NPU v3, OIC v2(NCC-NoC), and TSMC 5nm DDR5 PHY IP



01 | Openedges Square Business Overview

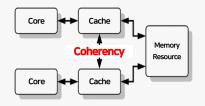
Established subsidiary Openedges Square for developing CCNOC IP & Web Based SoC Design Service

- Establishment Overview: Subsidiary Formation
 - Company Name: OPENEDGES Square
 - Capital: \$28M (@ USD/KRW 1,300 Won)
 - HQ: \$14M (in-kind contribution) + FI: \$14M (cash contribution)
 - In-kind contribution subject to valuation by an accounting firm
 - Total Budget: \$36M (R&D expenses + operational funds)
 - Additional capital injection of \$22M required, Excluding the initial cash contribution of \$14M
 - Board of Director (Proposed): 2 Internal + 2 External
 - Internal Directors: (CEO) Sean, (CTO) Cody
 - External Directors: Representatives of Financial Investors
 - Majority Control: HQ will hold a call option for some of FI's shares

Core Business

Cachecoherent Network **Solutions**

Core function block within AI Semiconductors responsible for maintaining consistent cache data across Al accelerators (Multi-Core)





Early Commercialization and Stable Growth through Synergy with **Our Existing Semiconductor IP Business**

Webbased SoC Design Service

Development and Provision of Web-Based Design Platform/Portal to Lead the Transformation of Conventional, Consumptive SoC Design Paradigm (No Current Competitors)

