Future Challenge and Opportunity for NAND Industry

Presenter: Bryan Ao/Research Manager

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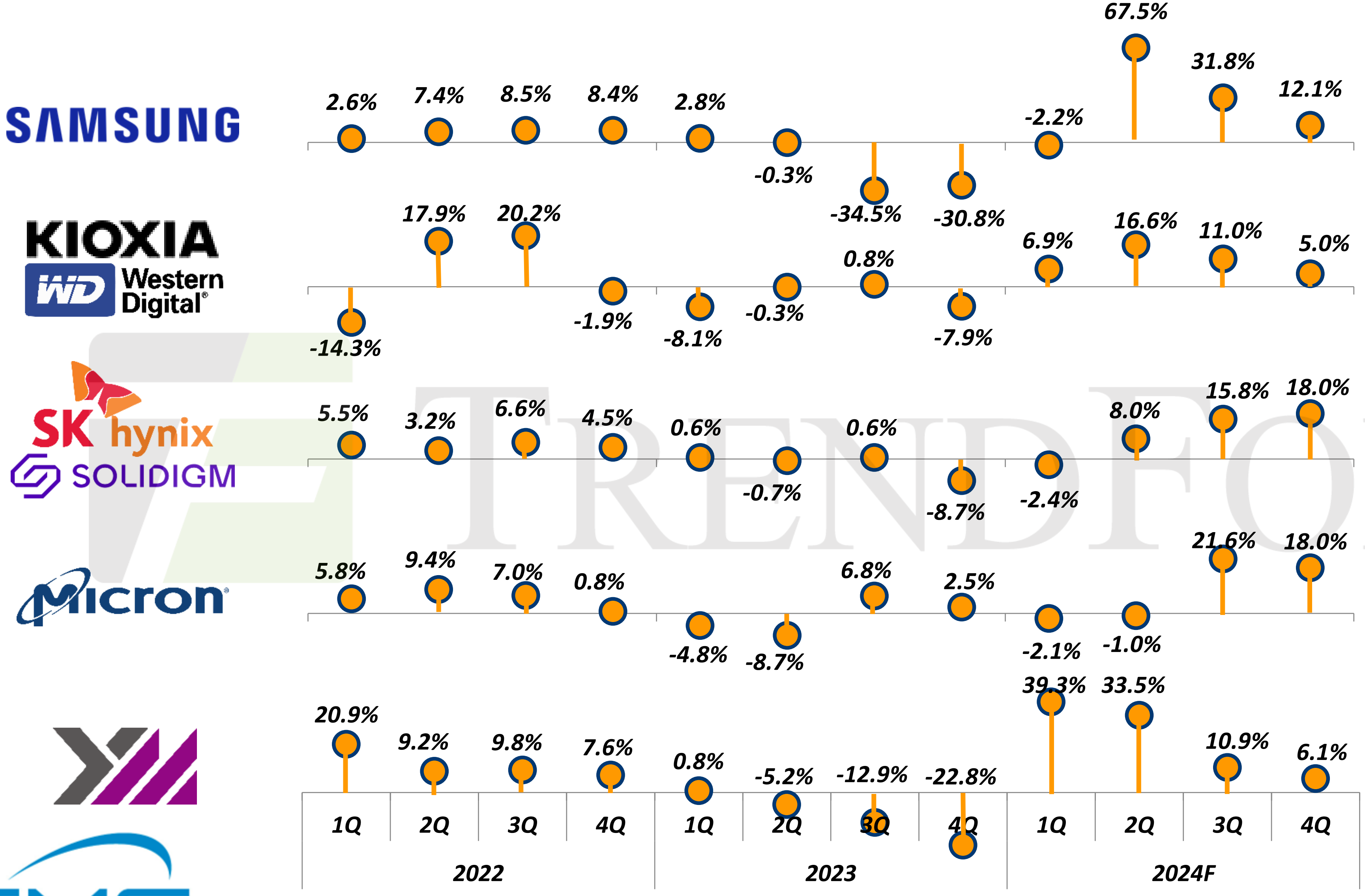
FMS the Future of Memory and Storage

2022-2024 Supply Output Comparison



Supply YoY Bit Growth

2022	2023	2024F
31.9%	-10.5%	4.9%
17.6%	0.6%	21.4%
29.6%	5.4%	9.6%
29.6%	-1.8%	16.2%
109.3%	-3.2%	40.1%

Source: TrendForce, Aug., 2024

NAND Flash Technology Roadmap 2022-2025

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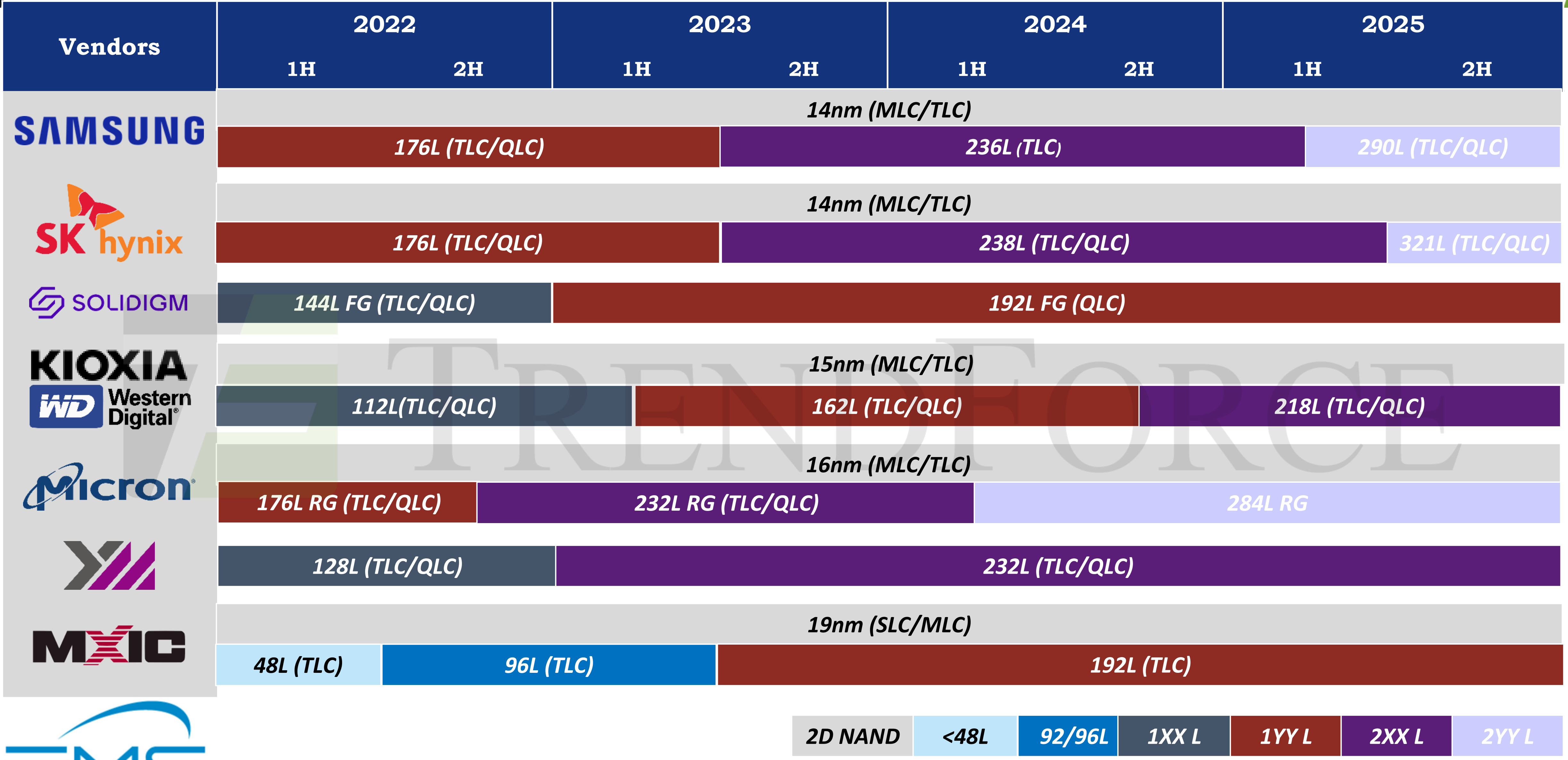

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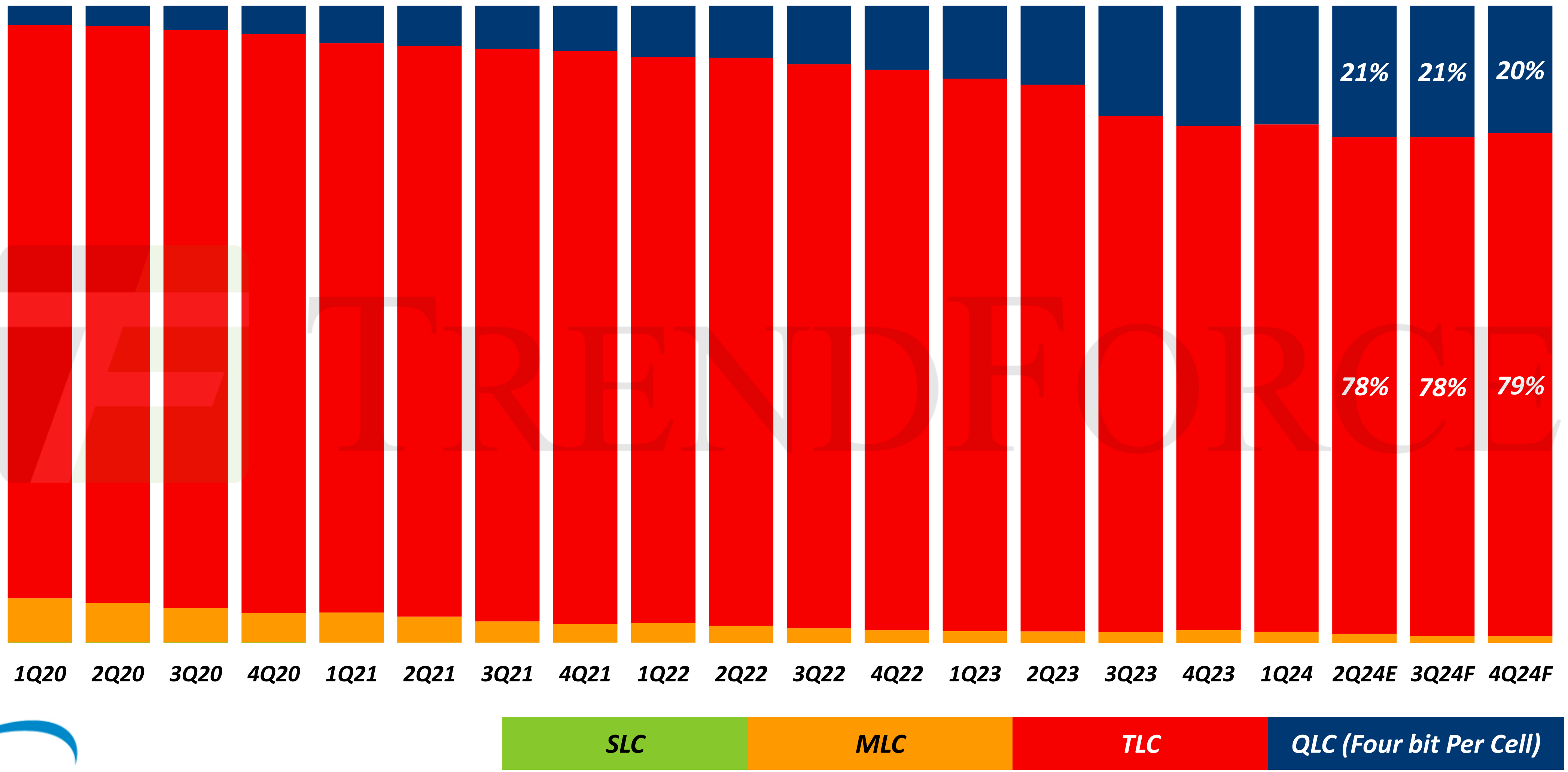
Source: TrendForce, Aug., 2024

QLC output continue increase due to more adoption in SSD segment



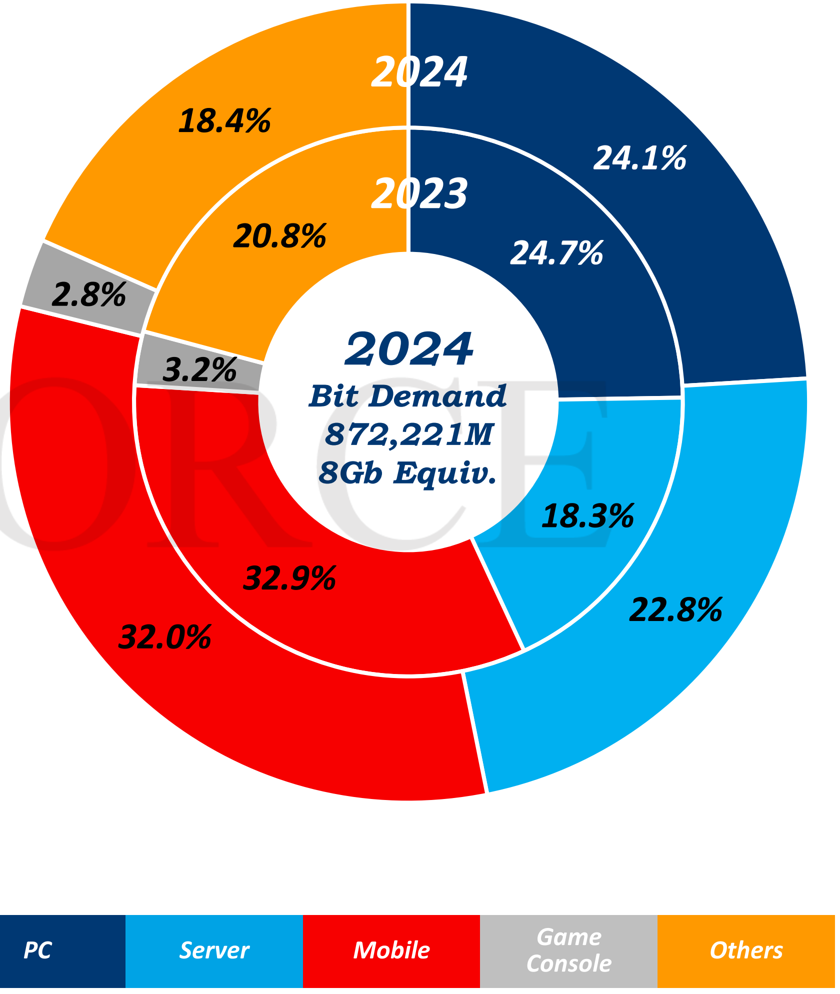
Source: TrendForce, Aug., 2024

2023-2024 Demand Bit Contribution by Applications

TrendForce

Avg. Content Per Box (Unit: GB) | YoY %

	2023	2024	YoY % 2023	YoY % 2024
Smartphone	214.75	233.02	19.2%	8.5%
Server	3,851.35	4,879.06	14.9%	26.7%
Notebook	612.91	671.12	10.1%	9.5%



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Source: TrendForce, Aug., 2024

2020-2024 NAND Flash Industry Outlook

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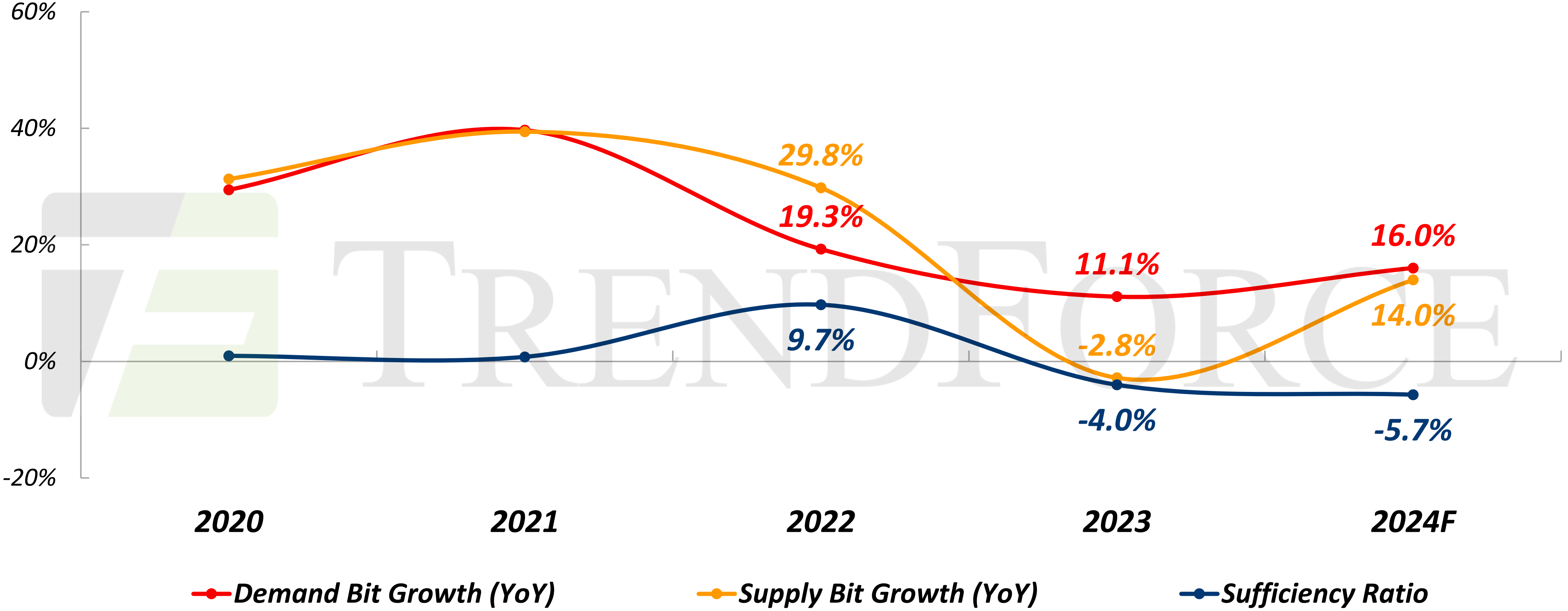
YoY Growth Rates of NAND Flash Supply/Demand/ Sufficiency Ratio



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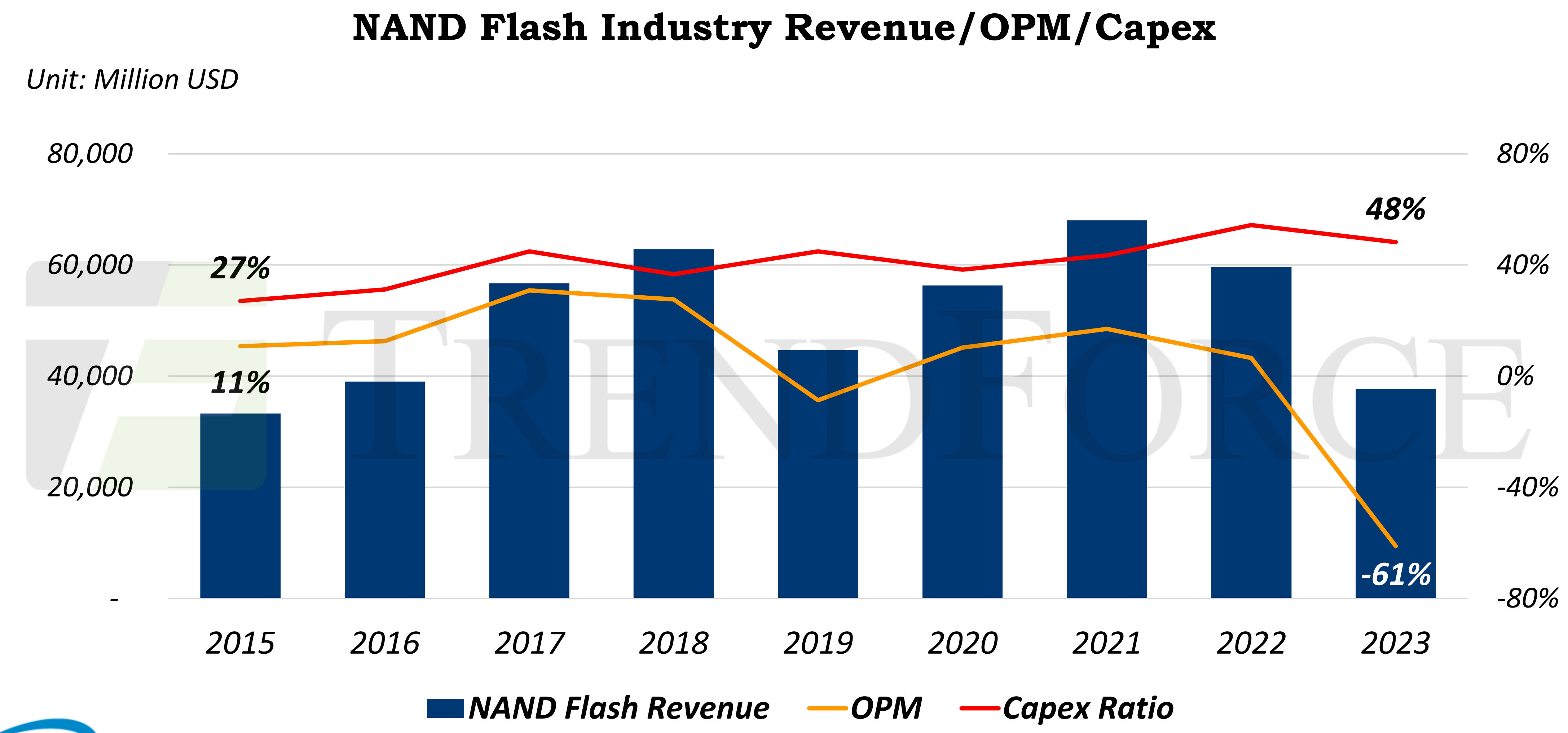
Source: TrendForce, Aug., 2024

2015-2023 Capex Ratio and OPM VS Revenue



Source: TrendForce, Aug., 2024

Future Challenges of NAND Industry

1

The capital investment required for future process upgrades is rapidly increasing, and the cost optimization margin has been revised downward. How to maintain cost competitiveness without causing a substantial increase in market supply is an important issue.

2

The rise of high-capacity storage products (e.g., 16TB) for AI applications is happening while the average NAND content in mobile phones and PCs remains below 1TB.
How NAND suppliers can flexibly adjust the allocation of production capacity to meet different product demands is crucial.

3

Whether AI applications can create opportunities to expand NAND consumption bits among PCs and mobile phones is uncertain.

4

Consolidation among NAND suppliers?

Source: TrendForce, Aug., 2024

TrendForce & TRI Research Areas

IC	Memory	Consumer Electronics	Green Energy
Display Panel	Smartphones & Apps	LED	Innovative Technology
Intelligent Living	Industry 4.0	Automotive Technology	AI
Communication, Broadband & Networking		Gov. & Ent. Consulting Service	
Cloud Computing & IoT			

Sales & Services

Semiconductor Research
DRAM, NAND Flash, Foundry
SR_MI
SR_MI@TrendForce.com

Green Energy Research
Solar PV
GER_MI
GER_MI@TrendForce.com

Optoelectronics Research
Micro LED, Mini LED, VCSEL, UV, Video Wall, Lighting
OR_MI
OR_MI@TrendForce.com

Display Research
TFT-LCD , OLED , Smartphone , Tablet , NB , Monitor/AIO , TV
DR_MI
DR_MI@TrendForce.com

ICT Application Research
Communication & Broadband, Consumer Electronics, Innovative Technological Applications, Automotive, Industry 4.0, Gov. & Ent.
TRI_MI
TRI_MI@TrendForce.com