Technology Committee
Carter Murray
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MARVELL™

NASDAQ: MRVL

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I. Investment Narrative

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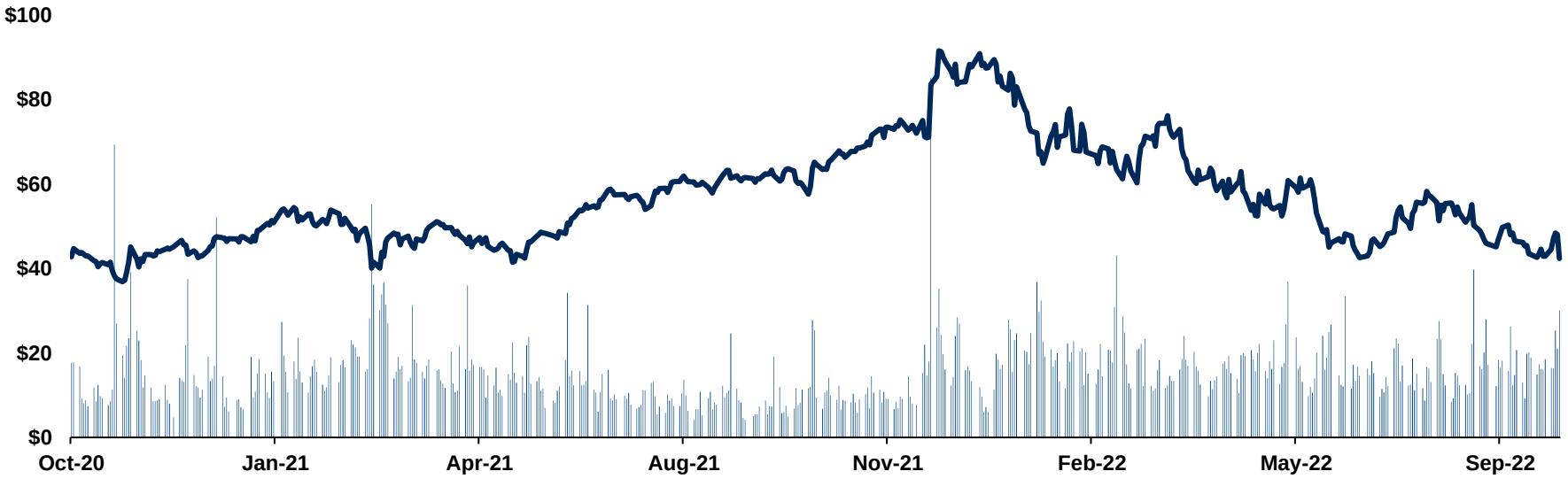
MRVL's Short Term Sell off is a Chance to Buy Long Term Value

Market Cap	$32.32B
Last Close	$38.10
52 Week Range	$35.50 – $93.85
Purchase Price	$37.74
Operating Margin	32.6%

- Marvell Technologies is a fabless semiconductor designer focused on designing and distributing infrastructure solutions
- Recommendation: **BUY** with a **PT of $59.01**, representing upside of 55% from 10/19 close – **5% weight**

Investment Overview

1. Marvell is leading the disruptive transition to ZR optics as hyperscale data centers are ramping to the next generation
2. Compute Express Link (CXL) is the driving factor in creating a fully disaggregated architecture in all data centers
3. The market has overreacted to Chinese export bans



II. Company Overview

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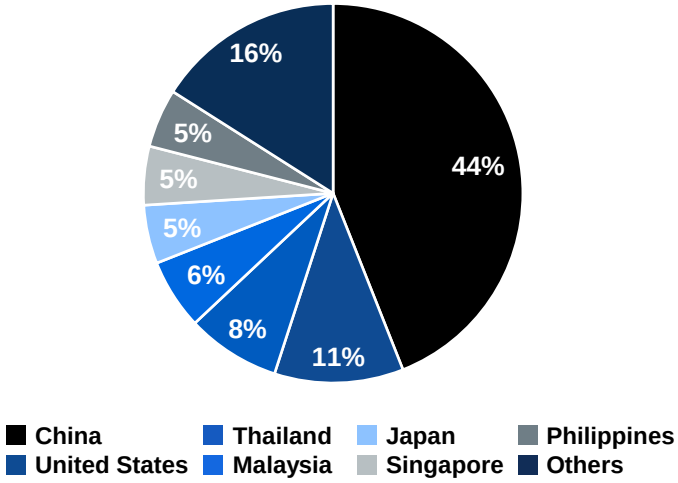
Marvell: The Future for Data Center Connectivity

Leading Products

Storage	Bravera™ SSDs & HDDs
Compute	OCTEON © Fusion MRVL Custom Processor
Electro-Optics	Inphi PAM4 & Coherent DSP
Networking	Innovium TERALYNX Prestera© Alaska ©
Security	OCTEON © NITROX ©

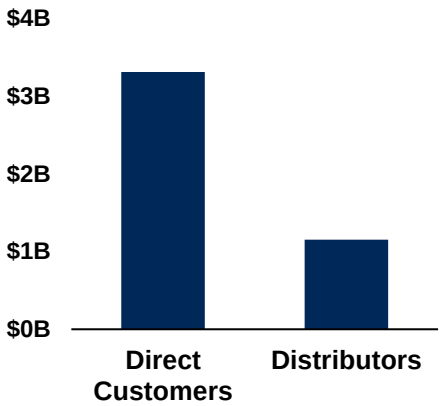
Diversified Revenue Streams

Revenue by Geography



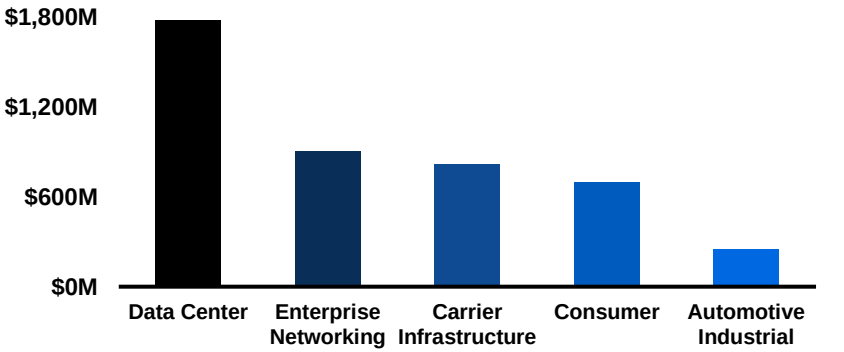
Growing Partnerships

13 → 15 → 17 → 19
Partnerships with
$100M+ customers



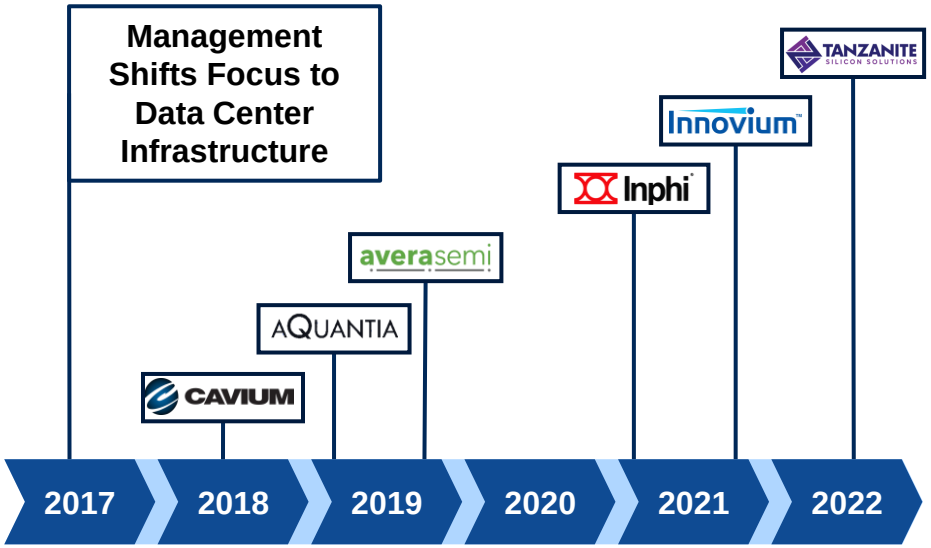
Data Center Driving Revenue

Revenue by End Market



	Data Center	Enterprise Networking	Carrier Infrastructure	Consumer	Automotive Industrial
% Rev	40%	20%	18%	16%	6%
YoY%Δ	113%	45%	64%	11%	134%

Vertical Integration Fueled by Inorganic Growth



III. Industry Overview

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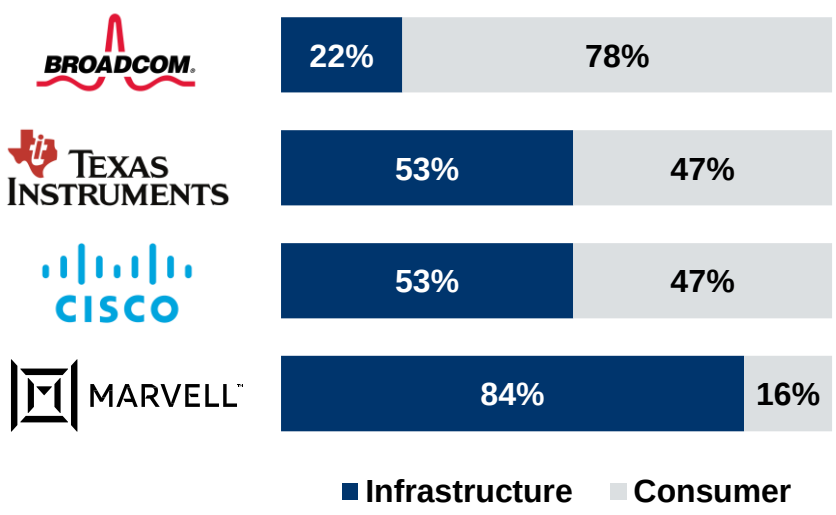
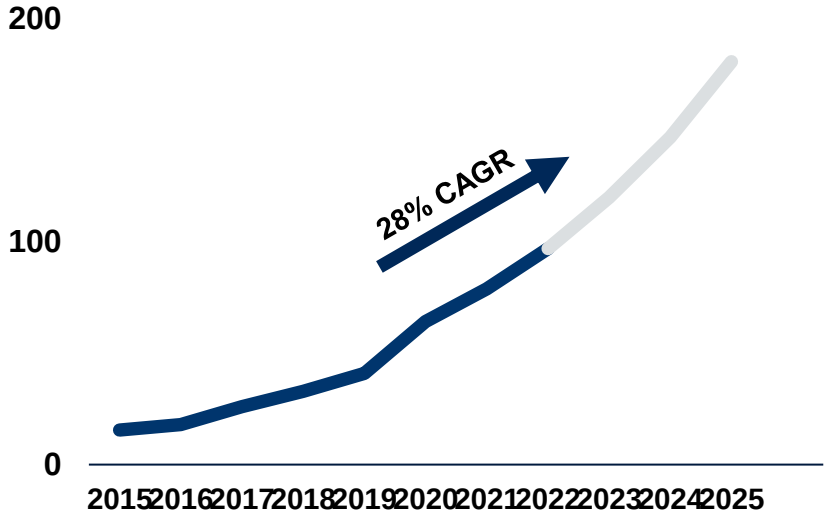
Marvell is Carving a Niche to Remedy Data Center Inefficiencies

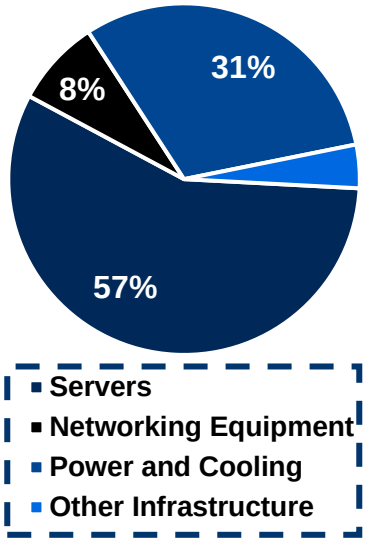
Revenue Mix vs Peers



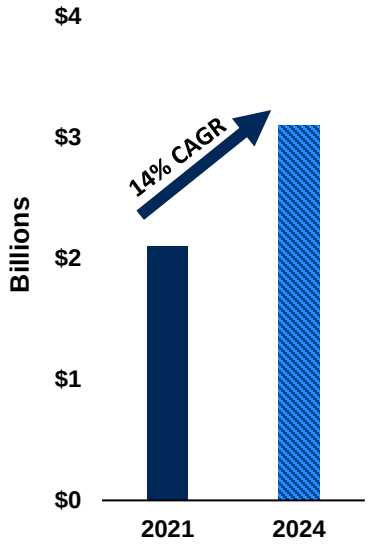
Data Growing Exponentially



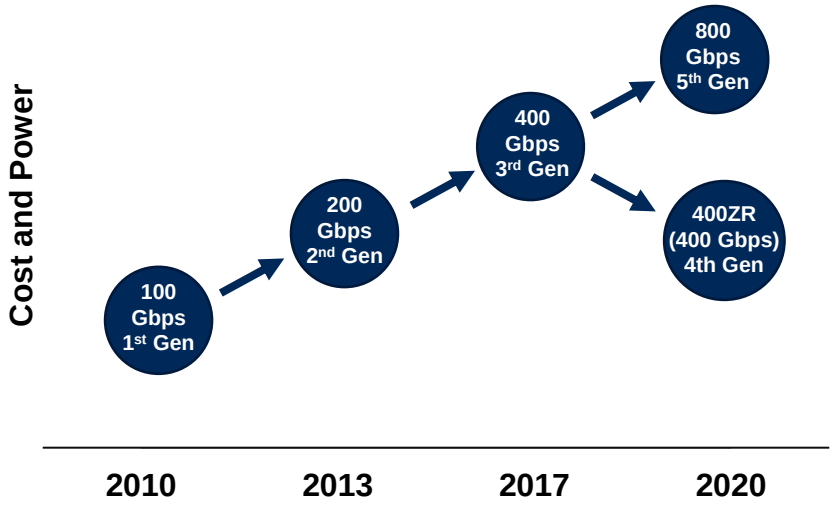
Cost Breakdown



Data Center Growth



Digital Signal Processor Generations



IV. Investment Thesis

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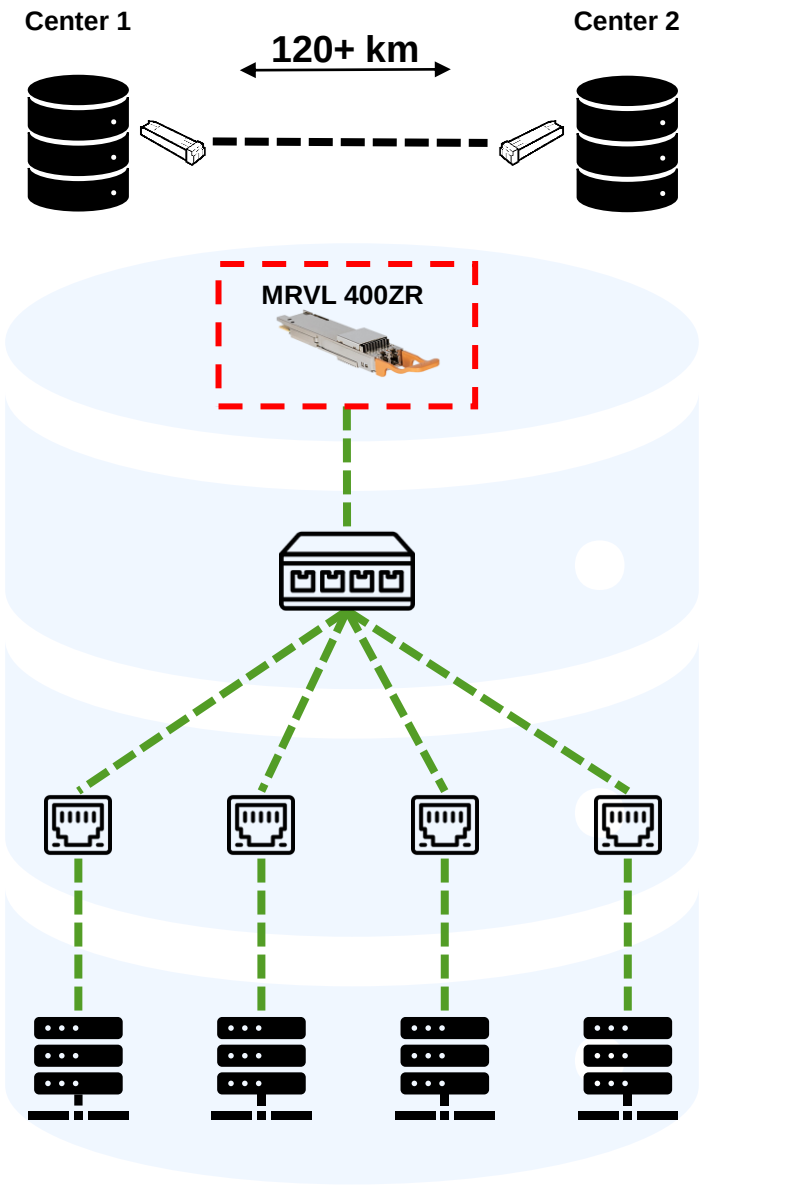
Where Does MRVL Fit in the Data Center Ecosystem?

Visualizing a Data Center



What does this part do?

Data Center

Space used to **house computer systems** and associated components such as telecommunications, storage, and processing systems

Digital Signal Processor (DSP)

Converts between real-world **analog signals and digital signals**

Ethernet Switch

Networking device that **receives, interlaces and sends data** from a sending device to a destination device

Ethernet Cable

Used to connect computer systems on a local area network to **enable the passing of large amounts of data**

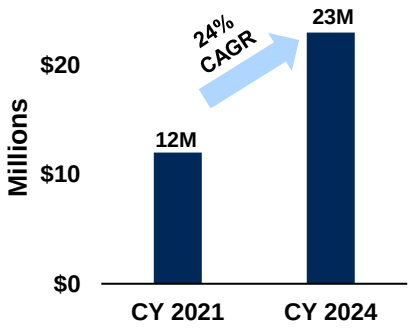
Data Center Server

Server is a piece of computer hardware or software that **provides processing power**

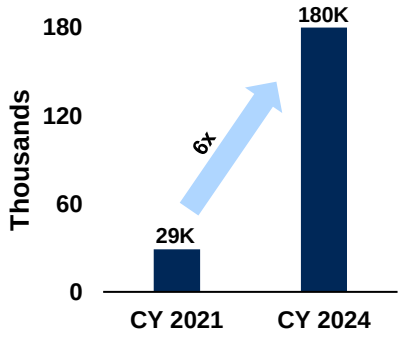
Ramp to 400G increases demand for electro-optics products

PAM4 DSP/400ZR Port Forecast Graphs

PAM4 DSP Port Forecast



400ZR Port Forecast

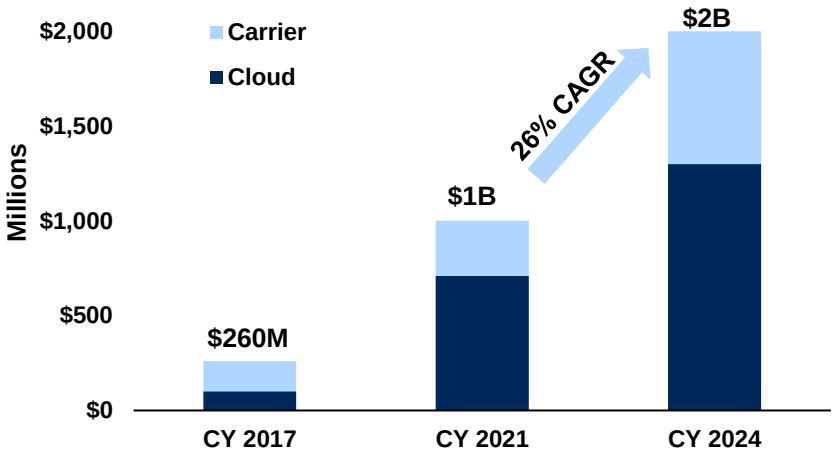


2 tier-one cloud customers in deployment phase (PAM4 DSP)

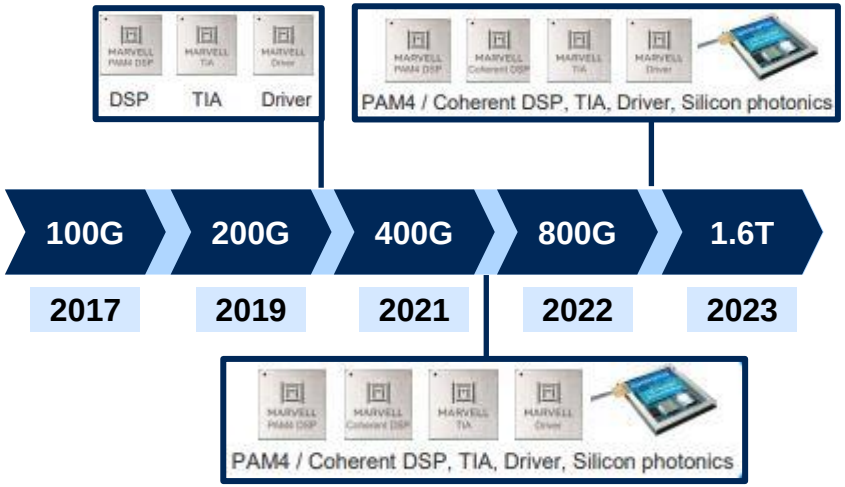
1 cloud provider deployed previous generation of COLOR (ZR)

Rapidly growing electro-optics market

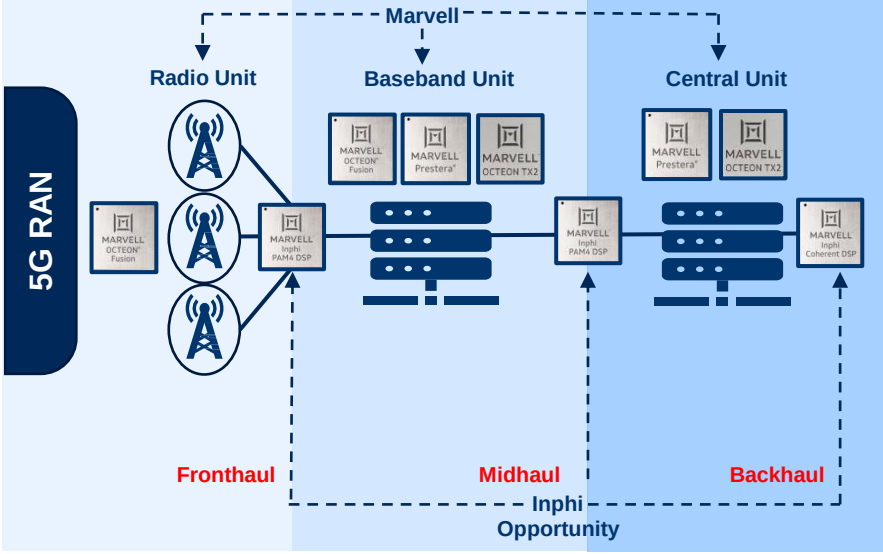
Electro-optics SAM



Unique platforms create high barriers to entry



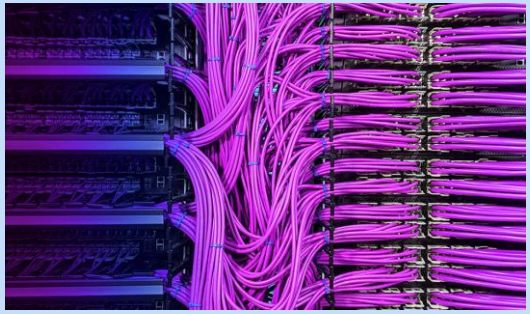
Creating a large, fully integrated ecosystem



Marvell Positioned to Capitalize on Cost Saving Technology…

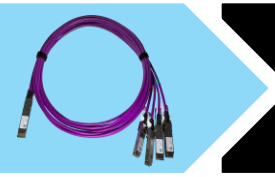
What is AEC?

- **25x** Cable Reduction
- **7m** Max Range
- **800** Gbps/port

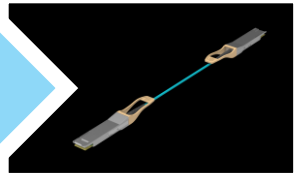


DAC

AEC



AOC

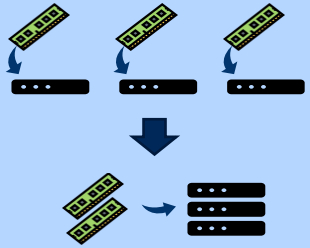


What is CXL?

TANZANITE SILICON SOLUTIONS

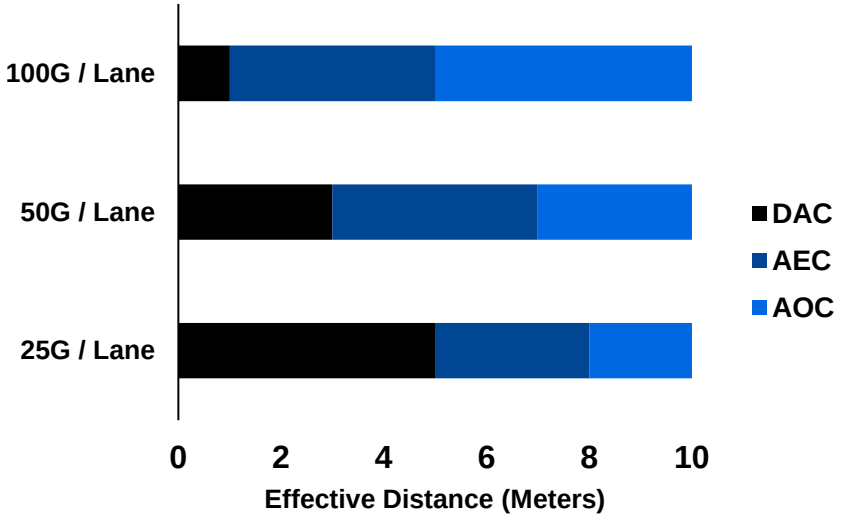
CXL allows the pooling of a systems resources to save **power** and **resources**

CXL provides the same performance for less…



- **18%** of resources go unused
- **60%** of power is consumed
- **200+** companies implementing CXL

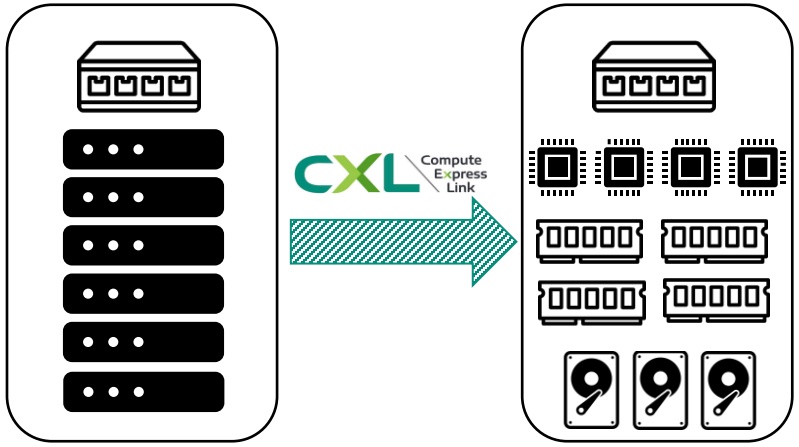
Why is AEC needed?



Inside a CXL Datacenter

Traditional Server Rack

CXL Enabled Server Rack



Driving to Lead the Fully Composable Data Center Market

Looking Forward to AEC Opportunity

DAC
(Direct Attached Cable)
Cannot Support Signal Integrity at Data Speeds 100Gbps+

AEC
(Active Electrical Cable)
Enables Reliable **Server-to-Switch Connectivity** at Higher Data Speeds

\+

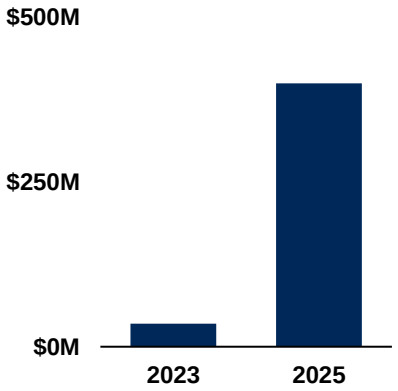
Alaska A Family

AEC Silicon Available & Developed Since 2020

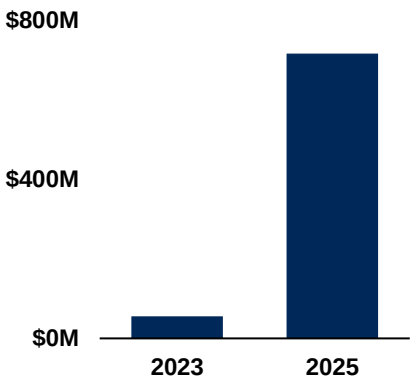
Working with Vendors to Intercept the **400G/800G** AEC Volume Opportunity in 2024/25

Positioned to be **#1** in this Market Over 4 Years(1)

Inside Rack AEC Rev.



AEC SAM



$20-$50M AEC Rev. in CY2023(1)

$300-$500M AEC Rev. in CY24/25(1)

$700-$800M SAM in CY2025(1)

18%-20% CAGR for SAM Growth(1)

CXL Compatible in Marvell's Landscape

PCIe Gen-5 eSSD

- **1st** to market
- MRVL Design Wins with Kioxia, Micron, Microsoft, Amazon

2x Transfer Rate 32 GT/s → 64 GT/s

2x Total Bandwidth 128 GB/s→252 GB/s

PCIe Gen-6 eSSD

- 2 Design Wins in NAND SSD OEM & 1 "cloud titan" (1)
- 1-2 years ahead of nearest competitor

CXL 1.1
CXL Used Within System

CXL 2.0
CXL Switching & Memory Pooling

CXL 3.0
2x Bandwidth & Memory Sharing

Future Wins With Tanzanite

Shift to CXL

- Increases Memory Capacity
- Enables Lower Latencies
- Increases Bandwidth

TANZANITE SILICON SOLUTIONS

Acquired May 2022

All-Cash Deal

Leading Developer of CXL 3.0

- Memory Expansion
- Tiered Memory
- Memory Pooling

Memory Pooling will help to create a fully composable data center

(1) J.P. Morgan Equity Research

Recent U.S. Regulations are Reshaping the Semi Industry

[7/5/2022] US authorities' pressure ASML and Japanese **lithography companies to stop selling to China**

[8/31/2022] US notifies AMD and Nvidia of a new ban **preventing high-powered GPUs from being shipped** to China on account of national security concerns

[10/7/2022] BIS (Bureau of Information Security) releases new export controls for China targeted at supercomputers and semiconductor manufacturing equipment

[8/9/2022] Biden signs the **CHIPS Act** which allocates $52.7 billion dollars to strengthen US's semiconductor fabrication ability

[10/6/2022] CHIPS Act implementation steering committee meets for the first time

July | August | September | October

[7/30/2022] **US expands restrictions from 10nm to 14nm** lithography equipment for China, and tells KLA and LAM to stop shipping equipment

[8/12/2022] US **bans shipments of EDA (Electronic Design Automation)** software for chip design of 3nm or lower to China

Stock Prices since 8/1/2022

MARVELL -31.79%	Lam RESEARCH -35.95%	NVIDIA -35.11%	intel -30.11%	BROADCOM -18.93%
ASML -30.99%	KLA -30.31%	AMD -40.15%	Texas Instruments -15.26%	CISCO -7.71%

China Export Control Fears Are Grossly Exaggerated

BIS Export Rules

US Government announced expanded export controls on China on **October 7, 2022**

Added new export control classification numbers (ECCN) to **cover high end chips and manufacturing equipment**

Target China's progress on AI by limiting exports of chips optimized for super computing

Expanded the Unverified List with 31 new companies mainly research institutes/companies

Relevant ECCNs Expanded

Most Marvell products fall under ECCNs: 5A002.a3, and 5A991.b which apply to the National Security, Encryption Items, and Antiterrorism designations, while China is classified as Regional Stability

The only new ECCNs that will likely affect Marvel's product lineup are: 3A090 and 4A090, which may affect some Octeon DPUs and future DSPs (600GB throughput or more)

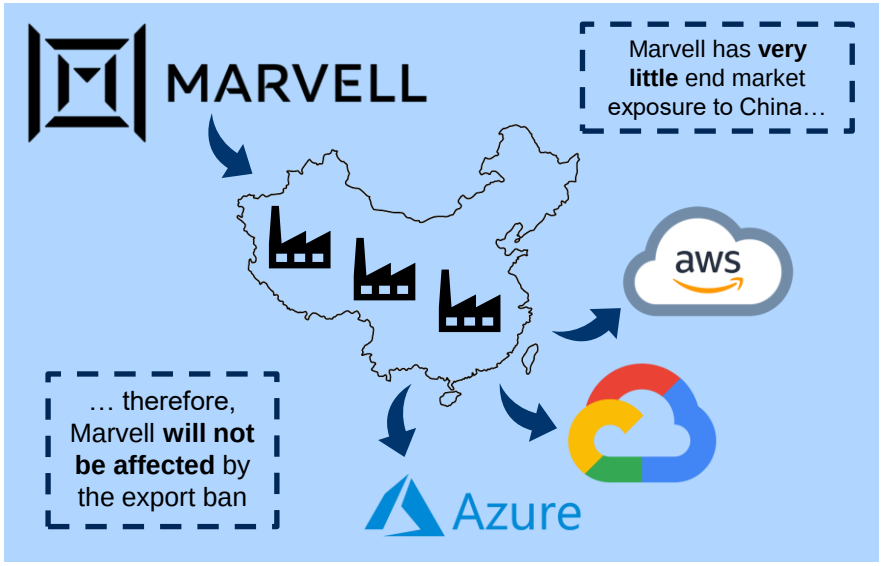
All other ECCNs are geared towards stopping China's ability to build domestic semiconductor fabrication facilities

Management Quotes

"Our cloud business are primarily U.S. hyperscale data centers. So, we have a **very limited revenue exposure with the Chinese hyperscale data centers** today."
- **Jean X. Hu | Marvell Technology, Inc. – CFO**

"One of the reasons we show so much in sales into China is because that Chinese module maker [Google subsidiary] is **making those modules and shipping them right back for U.S. cloud consumption**."
- **John S. Edmunds | Inphi Corporation – Senior VP, CFO, CAO & Secretary**

End Market Demand Outside of China



V. Valuation

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Recommend a Buy at $59.01 with 55% Upside

Buy Recommendation

DCF	
Discount Rate	12.00%
Terminal Growth Rate	3.00%
Total Discounted UFCF	$37,496
PV of Terminal Value	$17,061
Enterprise Value	$54,557
(+) Cash	$617
(-) Market Value of Debt	$4,548
(-) NCI	$0
Equity Value	$50,626
Diluted Shares Outstanding	857.90
(P) Price Per Share	$37.87
(V) Value Per Share	$59.01
P/V	**0.64**

Discount Rate vs LTGR					
	10.00%	10.50%	11.00%	11.50%	12.00%
4.00%	42%	47%	52%	56%	61%
3.50%	44%	48%	53%	58%	63%
3.00%	46%	50%	55%	59%	64%
2.50%	47%	51%	56%	61%	65%
2.00%	48%	53%	57%	62%	67%
1.50%	50%	54%	58%	63%	68%

Model Drivers

MARVELL™

- Data Center revenues expanding in long-term due to new product ramps (CXL 3.0, 400ZR+, 800G+)
- Short term decline in data center due to supply chain headwinds as well as temporary softening of demand from data centers due to challenging macro environment
- Long term growth outpacing the street as new products ramp

VI. Appendix

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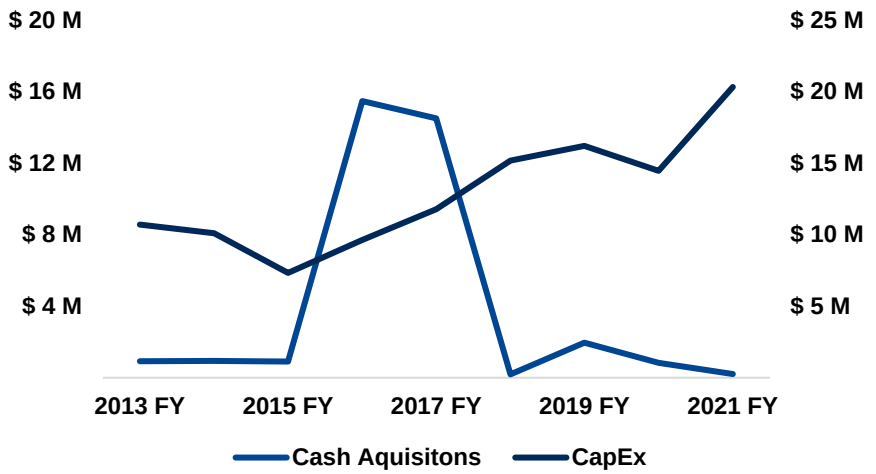
Glossary

Tech Terms	
PAM4	Pulse Amplitude Modulation (Level 4), is a way of interlacing a sine and square wave to get 2 bits of information from a signal wave instead of 1 bit, with the standard NRZ square wave
DSP	Digital Signal Processor, a processor that can convert between analog and digital signals
CXL	Compute Express Link, a PCIe based protocol to allow for disaggregation in data centers
Silicon Photonics	The use of silicon as an optical medium, usually for data transmission
ZR Optics	ZR is a distance of over 70km, as opposed to the shorter ranges from: SR, LR, LRM, and ER
TIA	Transimpedance Amplifier, is a current to voltage converter necessary for DSPs
Ethernet Switch	A device that allows switching between ethernet devices to allow 1 LAN port to give access to multiple ethernet peripherals
DAC	Direct Attach Copper cables, are traditional passive cables used in datacenters
AEC	Active Electrical Cables, are active cables to allow fast longer distance connections than DAC

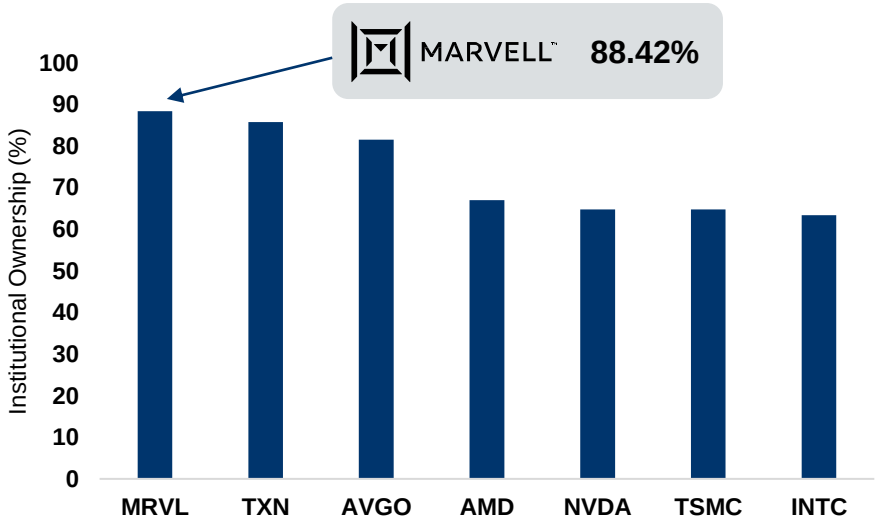
Legal Terms	
TGL	Temporary General License, a universal license to allow companies to ‘conclude’ business after Export Controls
BIS	Bureau of Information and Security, a subset of the department of commerce that deals with foreign entities and export control related to information and security
ECCN	Export Classification Control Number: identification numbers for categories of regulated products
Entity List	A blacklist of companies that trading with is strongly discouraged, and only very limited licenses apply to
Unverified List	A list of companies that have 60 days to be inspected by US officials before they join the Entity List
FDPR	Foreign Domestic Product Rule: a rule that allows the US to regulate exports if US tech or persons were involved in production or development
CCL	Commerce Control List for Department of Commerce Jurisdiction

Financial Snapshot

Spending title



Favored by 'Smart Money'



Margins and capital return

- Maintain gross margins in mid-60s (target 65%)
  - Co-investment with customers and joint development has translated to lower GM in the past
  - Customers saving costs, MRVL gets value → high gross margins w/ product blend
- Further drive operating leverage by decreasing Opex as a % of revenue
- Company is in integration/digestion mode still
  - Low profitability of large acquisitions and incremental cash flows used for shareholder returns and aggressive share buybacks

Immunity to Recession Fears

- Should softness in datacenter end market arise, MRVL will weather better than competitors due to long list of co-specific product cycles (PAM4, DSPs, ZR, DPUs, DIY SSD)
- Enterprise networking demand remains strong despite being most supply-constrained segment
- Drivers provide consistent growth when many consumer-centric peers are likely to see a slow down

Management

Years of Experience in Multiple Areas of the Industry

Matt Murphy
President and CEO

- Worked at Maxim Integrated for 20 years

Jean Hu
Chief Financial Officer

- 20+ years of financial leadership in the semiconductor industry

Raghib Hussain
President, Products & Technologies

- 25+ years of compute experience
- Pioneered Data Center Compute

Loi Nguyen
EVP, Optical & Copper Connectivity

- Former Co-Founder of Inphi
- Former engineer for Honeywell

Nariman Yousefi
EVP, Automotive, Coherent DSP & Switching

- Former Senior VP of Inphi's Coherent DSP
- Former President and CEO of ClariPhy, acquired by Inphi
- Former founding member for Broadcom Networking

Dan Christman
EVP, Storage Business Group

- 25 years storage experience
- Ability to leverage IP in other organizations

Capital Allocation Strategy

Investment in Organic Growth

- Talent/People
- 3nm/5nm Technology and IP
- Supporting Infrastructure

Acquisitions with Long Term Focus

- Inphi and Innovium Last Year as Examples
- Look for Strategic and Financial Advantages with Acquisitions

Returns to Shareholders >50% of FCF

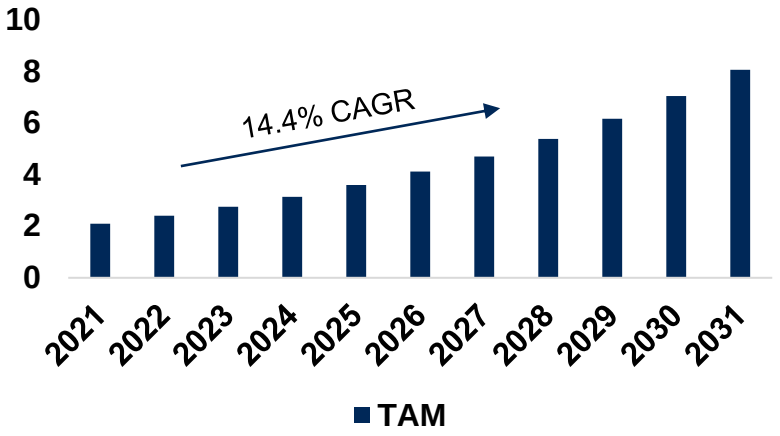
- Prioritize Share Repurchases
- Maintain Current Dividends

Automotive Growth Opportunity

What is driving Automotive Ethernet growth

- Autonomous vehicles need plenty of cameras, sensors, CPUs, and other electrical equipment that needs ethernet connectivity to run smoothly
- Demand for ADAS and infotainment in the next generation of cars heavily uses ethernet
- Vehicles are becoming more dependent on electronics and software to enable updates in the future increasing performance and features

Automotive Ethernet Market (bn)



Where these profits will come from

$

High-volume cars (older generation)
$5-8.5 of ethernet in each car

High-content cars (Electric Vehicles)
$50-70 of ethernet in each car

MRVL's position to take advantage of the growth

- MRVL's automotive segment only makes up 6% of revenue currently but it grew by 134% YoY
- MRVL was the 1st to market with a secured switch, 1 gigabit, and 10 gigabit Ethernet PHY
- Security concerns exist surrounding hackers being able to target cars, but MRVL focuses on creating secure products winning OEM usage
- Automotive revenue growth should outpace MRVL's overall revenue growth

5G Expansion

5G Growth is far from done

- **43%** of phones shipped worldwide are 5G enabled
- **27%** of networks have been upgraded to have 5G capabilities
- **11%** of the 5G networks provide coverage

MRVL is leading the 5G market

Marvell is the industry's only provider of optimized 5G RAN Silicon

This has led them to gain the top four tier-one customers below

ERICSSON

SAMSUNG

NOKIA

ZTE

The importance of MRVL's OCTEON vRAN

MARVELL
OCTEON Fusion

- The introduction of vRAN enables companies to utilize RAN basically as software
- vRAN provides a solution to being able to optimize and update systems without needing new infrastructure while being cheaper and more energy efficient than FPGAs (predecessor tech)

5G Revenue opportunities

Edge Computing | **5G**

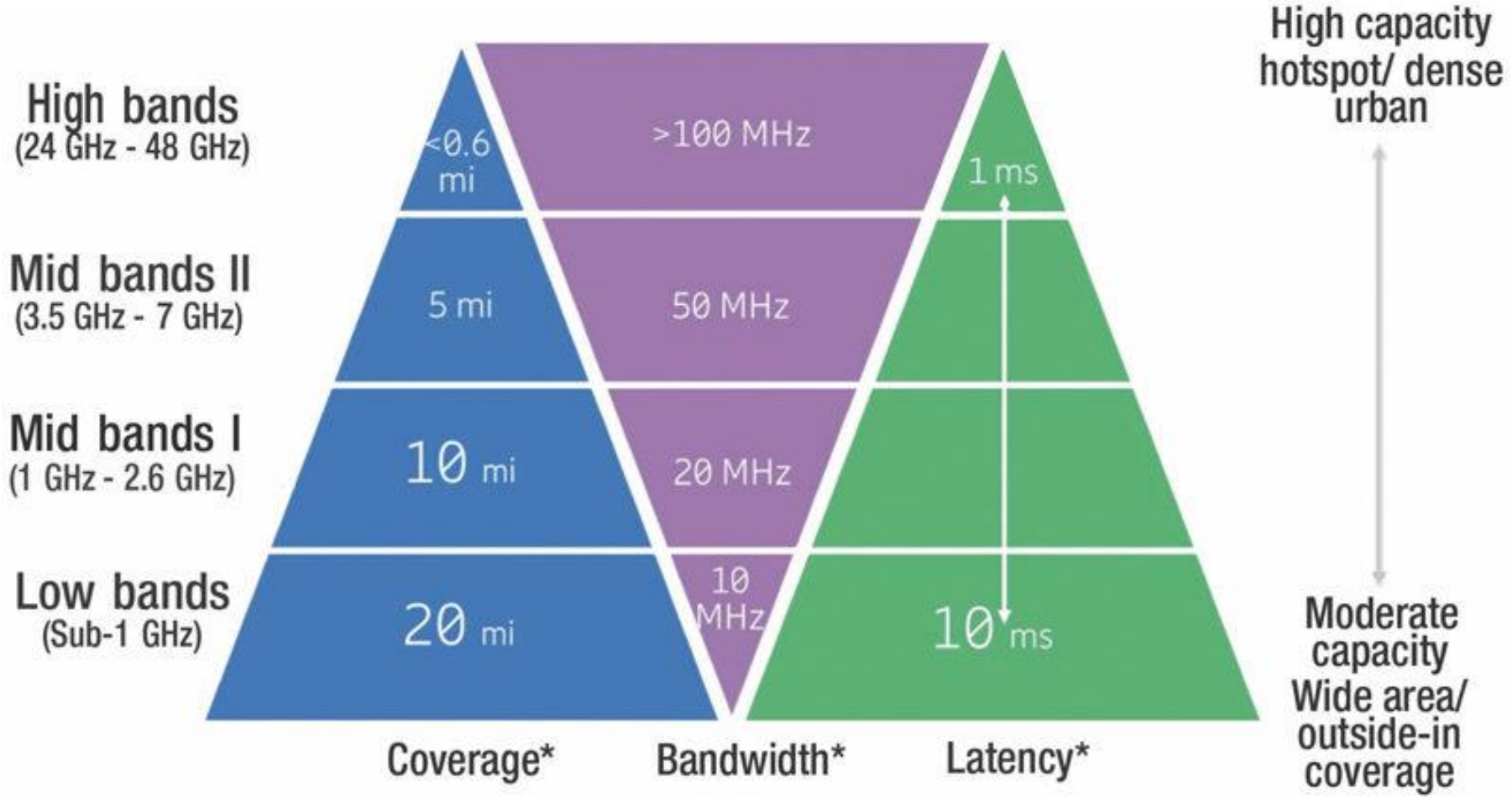
↓

Bandwidth and Latency Threshold

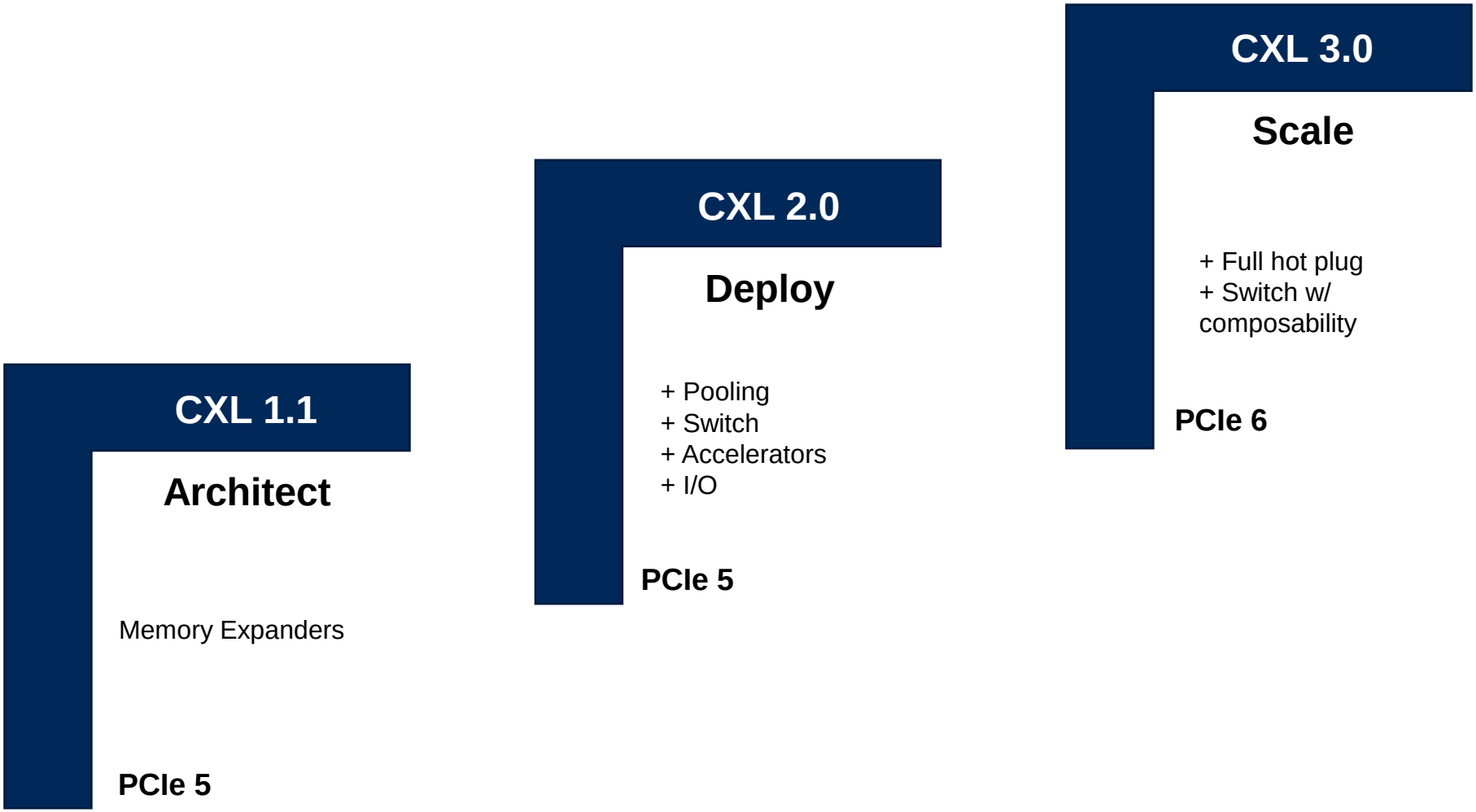
↓

IoT | **Infrastructure**

5G Low Latency Requirements



CXL Technology Roadmap



Chinese Trade Restrictions – Recent News

MRVL is less exposed to Chinese end-market than its competitors

- Two sets of regulatory action taken on October 7th, 2022
  - New export controls for advanced computing, semiconductor manufacturing, and general semiconductor supply chain
  - Addition of 31 companies to the unverified list/modification of how these companies must be treated
- U.S. Bureau of Industry and Security (BIS) has unilateral ability to cut any Chinese company off from global supply chains in 2 months

- Unverified list = precursor to the entity list
  - Entity list – people and companies supporting or engaging in terror acts (enhancing military capabilities, weapons development, etc.)
  - Includes industry titans, universities, and government agencies
  - Export license serves as a loophole

- NVDA, AMD, and others are more broadly affected
- Market is overreacting to the news since we do not even have all the necessary information to see how specific products/companies are impacted

10K Disclosure Note

"These destinations of shipment are not necessarily indicative of the geographic location of the Company's end customers or the country in which the Company's end customers sell devices containing the Company's products. For example, a substantial majority of the shipments made to China relate to sales to non-China based customers that have factories or contract manufacturing operations located within China"

Country Commerce Chart

Commerce Country Chart

Reason for Control

Countries	Chemical & Biological Weapons			Nuclear Nonproliferation		National Security		Missile Tech	Regional Stability		Firearms Convention	Crime Control			Anti-Terrorism	
	CB 1	CB 2	CB 3	NP 1	NP 2	NS 1	NS 2	MT 1	RS 1	RS 2	FC 1	CC 1	CC 2	CC 3	AT 1	AT 2
Brunei	X	X		X		X	X	X	X	X		X		X		
Bulgaria[3]	X					X		X	X							
Burkina Faso	X	X		X		X	X	X	X	X		X		X		
Burma	X	X	X	X		X	X	X	X	X		X		X		
Burundi	X	X		X		X	X	X	X	X		X		X		
Cambodia	X	X		X		X	X	X	X	X		X	X			
Cameroon	X	X		X		X	X	X	X	X		X		X		
Canada	X										X					
Cape Verde	X	X		X		X	X	X	X	X		X		X		
Central African Republic	X	X		X		X	X	X	X	X		X		X		
Chad	X	X		X		X	X	X	X	X		X		X		
Chile	X	X		X		X	X	X	X	X	X	X		X		
China	X	X	X	X		X	X	X	X	X		X		X		

ECCN	RS/AT
3B090	RS and AT
3B991	AT
3E001	RS/AT
3A090	RS/AT
3A991	AT
3D001	RS/AT
4A090	RS/AT
4D090	RS/AT
4D994	AT
4E001	RS/AT
5A992	RS/AT
5D992	RS/AT

BIS Unverified List

Company	Likely Major Marvel Customer	What They Do
1. Beijing Naura Magnetoelectric Technology Co., Ltd.	N	R&D MFG + Sales of semiconductor manufacturing equipment along with other IC and components
2. Beijing PowerMac Company	N	R&D company focused on self driving cars
3. CCIC Southern Electronic Product Testing Co., Ltd.	N	Test electronics for reliability and international/domestic certification
4. Chang Zhou Jin Tan Teng Yuan Machinery Parts Co., Ltd.	N	Industrial machinery designer
5. Institute of Mineral Resources, Chinese Academy of Geological Sciences	N	Not a company but a government research organization
6. Chinese Academy of Science (CAS) Institute of Chemistry	N	Not a company but a government research organization
7. Chongqing Optel Telecom	N	R&D of 5g communications technology
8. Chongqing Xinyuhang Technology Co., Ltd.	N	Distributor of ICs and semi chips, specifically to military
9. Dandong Nondestructive Electronics	N	Specialized High low wavelength tech company
10. DK Laser Company Ltd.	N	Laser Equipment Manufacturing
11. Foshan Huaguo Optical Co., Ltd.	N	Make manufacturing equipment
12. GRG Metrology & Test (Chongqing) Co., Ltd.	N	A metrology company that works on lasers and other semiconductor solutions
13. Guangdong Dongling Carbon Tech. Co., Ltd.	N	Manufacture Silicon Wafers and chemicals for etching process
14. Guangxi Yuchai Machinery Co., Ltd.	N	State owned industrial machinery company
15. Guangzhou GRG Metrology & Test (Beijing) Co., Ltd.	N	A metrology company that works on lasers and other semiconductor solutions
16. Jialin Precision Optics (Shanghai) Co., Ltd.	N	A company that focuses on lenses (used for semiconductor etching)
17. Lishui Zhengyang Electric Power Construction	N	Electricity and power company focused on creating hydropower solutions
18. Nanjing Gova Technology Co., Ltd.	N	Semiconductor design and manufacturing company (mainly sensors)
19. Ningbo III Lasers Technology Co., Ltd.	N	A company focused on lasers (for etching)
20. Qingdao Sci-Tech Innovation Quality Testing Co., Ltd.	N	Quality Assurance and Testing Company
21. Shanghai Tech University	N	Not a company but a government research organization
22. Suzhou Sen-Chuan Machinery Technology Co., Ltd.	N	Construct customized manufacturing equipment
23. Tianjin Optical Valley Technology Co., Ltd.	N	Manufacture optical Industrial Equipment
24. University of Chinese Academy of Sciences	N	Not a company but a government research organization
25. University of Shanghai for Science and Technology	N	Not a company but a government research organization
26. Vital Advanced Materials Co., Ltd.	N	Thin film and rare earth element company
27. Wuhan Institute of Biological Products Co., Ltd.	N	Medical Research facility in Wuhan China
28. Wuhan Juhere Photonic Tech Co., Ltd.	N	An optical and silicon photonics company (in some ways a competitor to Marvell)
29. Wuxi Hengling Technology Co., Ltd.	N	Chemical company that makes etching materials
30. Xian Zhongsheng Shengyuan Technology Co., Ltd.	N	Make electronics testing and verification equipment
31. Yangtze Memory Technologies Co., Ltd.	N	Make SSDs and other memory products (They make their own SSD controllers)

ECCNs Affected by BIS Legislation

Existing ECCNs		
ECCN	**MRVL Effect**	**Meaning**
3D001	N	Software Designed for the development or production of commodities controlled by 3A001.b-3A002.h or 3B(except 3B991/3B992)
3D991	N	Software Designed for the development or production of devices parts or components controlled by 3A991, 3A992, 3B991, 3B992, and 3B001.g-h
3E001	N	Technology for the Development or production of commodities under 3A/3B/3C
3E002	N	Technology for the Development or production of commodities under 3E001 with an ALU of at least 32 bits
3E003	N	Technology for the Development or production of other commodities (Vacuum microelectronics, HEMT, HBT, SOI/SiO2, Gallium Oxide substrates)
3E991	N	Technology for the Development or production of parts controlled by 3A991/3A992/3B991/3B992
4D001	N	Software for the Development or production of commodities under 4A001/4A003/4A004/4A005
4D993	N	Program proof and validation software allowing the generation of source codes and OS (Over 500000 lines or mentioned elsewhere)
4D994	N	Software other than that controlled in 4D001 and relating to the development or production of equipment from 4A101 or 4A994
4E001	N	Technology for the development or production of commodities under 4AXXX
4E992	N	Technology for the development of Equipment under 4A994 or software controlled by 4D993 or 4D994
4E993	N	Technology for the development or production of equipment for multi-data-stream processing
5D001	N	Software as described in 5D001.a to 5D001.e
5D991	N	Software specifically designed for the development production or use of equipment controlled by 5A991 or designed for dynamic adaptive routing
5E001	N	Technology related to the development or production of high powered, laser, fast frequency, encoded, multi spectrum and specialized telecommunications
5E991	N	Technology related to the development production or use of equipment controlled by 5A991 or 5D991

New/Modified ECCNs		
ECCN	**MRVL Effect**	**Meaning**
3B090	N	Semiconductor manufacturing equipment not controlled by 3B001
3B991	N	Equipment for manufacturing parts not covered by 3B001 or 3B991
3E001	N	Technology for the development of commodities described by 3A, 3B, and 3C
3A090	Maybe	ICs with throughput over 600 Gb/s or over 4800 Tops
3A991	N	Electronic devices and components not controlled by 3A001
3D001	N	Software related to the development of 3A and 3B
4A090	Maybe	Computers and electronic assemblies containing parts detailed in 3A090
4D994	N	Computer and electronic assemblies not covered by 4A001 or 4A003
4E001	N	Technology for assemblies covered by 4A001
5A992	N	Information security tech not controlled by 5D002
5D992	N	Software related to the creation of Information security tech not controlled by 5D002

Export Control Classification Numbers (ECCN) Index

ECCN #	Short Description	ECCN #	Short Description
3A001.b	Microwave or millimeter wave items	3B991.a	Equipment designed for manufacturing electron tubes optical elements and parts covered by 3A001 and 3A991
3A001.c	Acoustic wave devices	3B991.b	Equipment specifically designed for manufacturing semiconductor assemblies with low node size
3A001.d	Electronic devices containing super conductive components	3B992.a	Equipment for inspection or testing of components under 3A001 and 3A991
3A001.e	High energy devices	3B992.b	Equipment for inspection and testing semiconductor assemblies at high precision
3A001.f	Rotary Encoder devices with precision of 1 second arc or better	3CXXX	Materials
3A001.g	Solid state piles power switching thyristor	4A001.a	Electronic Assemblies rated for operation over 85 C or below -45 C or radiation hardened
3A001.h	Solid state power semiconductor switches	4A001.b	**Reserved**
3A611.a	Electronic equipment end items and systems specifically designed for military applications	4A003.a	**Reserved**
3A611.b	**Reserved**	4A003.b	Digital Computers with Perk Performance over 29 Teraflops
3A611.c	**Reserved**	4A003.c	Electronic Assemblies designed to enhance processors over the limits in 4A003.b
3A611.d	**Reserved**	4A003.d	**Reserved**
3A611.e	High Frequency surface wave radar	4A003.e	**Reserved**
3A611.f	Asics and PLDs for military use	4A003.f	**Reserved**
3A611.g	PCBs and populated circuit cards for military use	4A003.g	Interconnects that aggregate performance by allowing computers to communicate over 2 gb/s (except networking)
3A611.h	Multichip modules for military use	4A004.a	Systolic Array Computers
3A611.i	**Reserved**	4A004.b	Neural Computers
3A611.x	Parts and components designed for Military application of technology described by 3A611	4A004.c	Optical Computers
3A991.a	Microprocessors over 5 Gflops performance, frequency over 25 MHz, transfer over 2.5 mb/s	4A005	Systems designed for generating or delivering intrusion software
3A991.b	Storage ICs, EEPROMs, Sram	4A101	Analog Computers designed or modified for use in missiles
3A991.c	High powered high speed ADCs	4A994.a	Electronic parts designed for operation in ambient above 70 Celsius
3A991.d	FPLDs i/o max 200-700	4A994.b	Digital Computers with for signal processing and image enhancement with performance over 0.0128 Teraflops
3A991.e	Fast Fourier Transform Processors with low execution time	4A994.c	Equipment designed for the aggregation of 16 or more processors
3A991.f	Custom ICs, with unknown purpose or control status is unknown with over 144 terminals	4A994.d	**Reserved**
3A991.g	Traveling wave vacuum electronic devices	4A994.e	**Reserved**
3A991.h	Wave guides designed for frequencies over 40ghz	4A994.f	Equipment for signal processing and image enhancement with performance over 0.0128 Teraflops
3A991.i	Surface acoustic wave and skimming devices	4A994.g	**Reserved**
3A991.j	High density energy cells	4A994.h	**Reserved**
3A991.k	Superconductive electromagnets and solenoids	4A994.i	Equipment with terminal interface equipment exceeding 5A991
3A991.l	Circuits for electromagnetic energy storage	4A994.j	Equipment designed to provide interconnection at data rates exceeding 80 mb/s
3A991.m	Hydrogen isotope thyratrons for current of 500a or more	4A994.k	Hybrid computers with ADCs over 32 channels or with a resolution of 14 bits and over 200000 conversions a second
3A991.n	Digital ICs based on compound semiconductor having an equivalent gate count of over 300	5A001.a	Telecommunications equipment designed to withstand high/low temps and radiation
3A991.o	Solar cells and Solar panels that are space 'qualified'	5A001.b	Telecommunications equipment designed to work underwater, operating on UL bandwidth or with over 1000 channels
3A992.a	General Purpose electronic testing equipment	5A001.c	Optical fibers more than 500m and with a tensile strength over 2*10^9 N/M^2
3A992.b	Magnetic Tape Equipment	5A001.d	Electronically steerable phased array antennas
3A992.c	Equipment with a transfer rate over 60mb/s for tape and digital recorders	5A001.e	Specialized radio direction finding equipment over 30Mhz
3A992.d	Analog Oscilloscopes over 1 Ghz	5A001.f	Mobile telecommunications jamming equipment
3A992.e	Modular Oscilloscopes	5A001.g	Passive Coherent Location systems or equipment for tracking and measuring moving entities
3A992.f	Analog Sampling Oscilloscopes	5A001.h	Counter IED equipment not specified in 5A001.f
3A992.g	Oscilloscopes with <1ns interval	5A001.i	**Reserved**
3B001.a	Atomic layer epitaxy equipment	5A001.j	IP network communications surveillance systems or equipment
3B001.b	Equipment for ion implantation	5A002.a.3	Computers and Other equipment that don't have information security as a primary function
3B001.c	**Reserved**	5A991.a	Telecommunications equipment not controlled by 5A100.a designed for below 219K and above 397K
3B001.d	**Reserved**	5A991.b	Telecommunication Transmission equipment with multiplex over 45mb/s or total over 90 mb/s
3B001.e	Automatic loading chambers for wafer handling systems	5A991.c	Stored program control switching devices
3B001.f	Lithography equipment	5A991.d	Optical fibers and cable over 50m in length
3B001.g	Masks and reticles for ICS controlled by 3A001	5A991.e	Centralized network control with node level data transmission
3B001.h	Multi layer masks with phase shifts layers not covered by 3B001.g and designed for wv under 245nm	5A991.f	Phased Array Antennas above 10.5 Ghz for beam shaping
3B001.i	Imprint lithography templates for 3A001	5A991.g	Mobile communications equipment
3B001.j	Masks and substrate blanks for EUV	5A991.h	Radio relay equipment over 19.7 Ghz
3B002.a	Equipment for testing items covered by 3A001.b.3	5B001.a	Telecommunications inspection equipment for features controlled by 5A001
3B002.b	**Reserved**	5B001.b	Telecommunications inspection equipment for transmission and switching
3B002.c	Equipment for testing microwave ICs under 3A001.b.2	5D001.a	Software designed for the development or production or use of equipment described in 5A001
3B090.a	Semiconductor manufacturing deposition equipment	5D001.b	**Reserved**
3B611.a	Military equipment for testing and inspection of materials covered by 3A611 or all other 600 series ECCNs	5D001.c	Specific software to modify characteristics of equipment controlled by 5A001 or 5B001
3B611.b	**Reserved**	5D001.d	Software especially designed for the development of telecommunication transmission or switching equipment
3B611.x	Parts and components designed for Military equipment for testing and inspection	5D001.e	Software not described by 5D001.c or 5D001.d for use by law enforcement

Other Legislation/TSMC Reliance

Legal

Bill	What it Means
S.3309/ H.R.7576	Securing Semiconductor Supply Chains Act
H.R.7372	Protecting Semiconductor Supply Chain Materials from Authoritarian Acts
H.R.8104	Defense Stockpiling Act
H.R.6359/ S.3331	Investing in Domestic Semiconductor Manufacturing Act
H.R. 9039	To prohibit the material expansion of semiconductor manufacturing in the People's Republic of China with Federal financial assistance, and for other purposes.
H.R.7104/ S.2107	FABS Act
H.R.4704	Mature Technology Node Resiliency and Manufacturing Act of 2021
S.1260/ H.R.4521	Unites States Innovation and Competition Act
H.R.1131	China Technology Transfer Control Act
H.R.6484/ S.3526	STAND with Taiwan Act
H.R.4346	CHIPS Act

TSMC Reliance

Year	2004	2006	2009	2011	2014	2015	2017	2018	2020
Node (nm)	90	65	40	28	20	16/12	10	7	5
Price per wafer	$1650	$1937	$2274	$2891	$3677	$3984	$5992	$9346	$16988
Cost per chip	$2433	$1428	$713	$453	$399	$331	$274	$233	$238

TSMC Customers	Share of Revenue
Apple	23.9%
AMD	10.2%
Qualcomm	8.2%
MediaTek	8.1%
NVIDIA	7.6%
Broadcom	6.6%
Intel	5.0%
Will Semi	1.9%
NXP	1.6%
Marvell	1.6%

DCF

	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
Revenues	2,415	2,866	2,699	2,969	4,462	6,057	7,353	8,136	9,773	11,218	12,981	14,947
COGS	936	1,047	1,005	1,107	1,595	2,150	2,573	2,840	3,401	3,870	4,479	5,157
Gross Profit	1,479	1,819	1,694	1,862	2,867	3,907	4,779	5,297	6,372	7,348	8,503	9,790
Operating Expenses	856	1,041	1,164	1,435	1,673	1,988	2,428	2,992	3,554	4,017	4,643	5,177
Operating Profit	630	790	544	444	1,225	1,972	2,424	2,304	2,818	3,331	3,860	4,613
Income Tax Rate	4.00%	4.00%	5.00%	5.00%	6.00%	6.00%	9.00%	12.00%	15.00%	18.00%	21.00%	21.00%
Income Tax (Expense)	25	32	27	22	74	118	218	277	423	600	811	969
NOPAT	605	758	517	421	1152	1853	2206	2028	2396	2731	3049	3644
(+) D&A	83	124	157	198	266	331	480	488	586	701	779	897
(-)CapEx	45	39	76	82	107	169	233	280	325	391	421	454
Unlevered FCF	**644**	**844**	**597**	**537**	**1311**	**2015**	**2453**	**2236**	**2657**	**3042**	**3407**	**4087**
Year						0.5	1.5	2.5	3.5	4.5	5.5	6.5
PV OF UFCF						1904	2070	1685	1787	1826	1827	1956

2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040
17,444	20,189	23,530	27,192	28,552	29,980	31,478	33,052	34,705	36,440	38,262	40,175
6,018	6,965	8,118	9,381	9,850	10,343	10,860	11,403	11,973	12,572	13,200	13,861
11,426	13,224	15,412	17,811	18,702	19,637	20,618	21,649	22,732	23,868	25,062	26,315
5,838	6,507	7,519	8,737	9,174	9,633	10,114	10,620	11,151	11,709	12,294	12,909
5,588	6,717	7,893	9,074	9,528	10,004	10,504	11,029	11,581	12,160	12,768	13,406
21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%	21.00%
1173	1411	1658	1906	2,001	2,101	2,206	2,316	2,432	2,554	2,681	2,815
4414	5306	6236	7168	7,527	7,903	8,298	8,713	9,149	9,606	10,087	10,591
1047	1211	1412	1632	1,713	1,799	1,889	1,983	2,082	2,186	2,296	2,411
486	523	555	588	618	649	681	715	751	788	828	869
4975	**5994**	**7092**	**8212**	**8622**	**9053**	**9506**	**9981**	**10480**	**11004**	**11555**	**12132**
7.5	8.5	9.5	10.5	12	13	14	15	16	17	18	19
2127	2288	2417	2498	2,342	2,196	2,059	1,930	1,809	1,696	1,590	1,491

Consolidated Build

Calendar Ended	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fiscal Year Ended	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
	A	A	A	A	E	E	E	E	E	E	E	E	E	E	E
Consolidated Operating Build															
Revenue	2,866	2,699	2,969	4,462	6,057	7,353	8,136	9,773	11,218	12,981	14,947	17,444	20,189	23,530	27,192
1yr % Chg	19%	-6%	10%	50%	36%	21%	11%	20%	15%	16%	15%	17%	16%	17%	16%
2yr Stack	23%	13%	4%	60%	86%	57%	32%	31%	35%	30%	31%	32%	32%	32%	32%
1q % Chg															
GAAP Cost of Sales															
Adjustments	12	14	16	31	53	74	73	78	56	65	75	87	101	118	136
Non-GAAP Cost of Sales	1,047	1,005	1,107	1,595	2,150	2,573	2,840	3,401	3,870	4,479	5,157	6,018	6,965	8,118	9,381
1yr % Chg	12%	-4%	10%	44%	35%	20%	10%	20%	14%	16%	15%	17%	16%	17%	16%
4yr Stack				62%	85%	109%	109%	85%	64%	60%	64%	61%	63%	64%	65%
1q % Chg															
% of Revenue	36%	37%	37%	35%	35%	34%	34%	34%	34%	34%	34%	34%	34%	34%	34%
1yr - Chg	-6%	1%	0%	-4%	-1%	-2%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2yr Stack		-5%	2%	-4%	-6%	-3%	-2%	0%	0%	0%	0%	0%	0%	0%	0%
1q - Chg															
GAAP Gross Profit															
Adjustments															
Non-GAAP Gross Profit	1,819	1,694	1,862	2,867	3,907	4,779	5,297	6,372	7,348	8,503	9,790	11,426	13,224	15,412	17,811
1yr % Chg	23%	-7%	10%	54%	36%	22%	11%	20%	15%	16%	15%	17%	16%	17%	16%
2yr Stack		16%	3%	64%	90%	59%	33%	31%	36%	31%	31%	32%	32%	32%	32%
1q % Chg															
% of Revenue	63%	63%	63%	64%	64%	65%	65%	65%	66%	66%	66%	66%	66%	66%	66%
1yr - Chg	4%	-1%	0%	2%	0%	1%	0%	0%	0%	0%	0%	0%	0%	0%	0%
2yr Stack		3%	-1%	2%	3%	1%	1%	0%	1%	0%	0%	0%	0%	0%	0%
1q - Chg															
Research and Development	914	1,080	1,073	1,424	1,786	2005	2,197	2,590	2,917	3,375	3,737	4,187	4,643	5,412	6,254
1yr % Chg	28%	18%	-1%	33%	25%	12%	10%	18%	13%	16%	11%	12%	11%	17%	16%
2yr Stack		46%	17%	32%	58%	38%	22%	27%	31%	28%	26%	23%	23%	27%	32%
1q % Chg															
% of Revenue	31.9%	40.0%	36.1%	31.9%	29.5%	27.3%	27%	27%	26%	26%	25%	24%	23%	23%	23%
1yr - Chg	8%	26%	-10%	-12%	-8%	-8%	-1%	-2%	-2%	0%	-4%	-4%	-4%	0%	0%
2yr Stack		33%	16%	-21%	-19%	-15%	-9%	-3%	-4%	-2%	-4%	-8%	-8%	-4%	0%
1q - Chg															

Consolidated Build (cont)

Calendar Ended	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032
Fiscal Year Ended	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033
	FY19	FY20	FY21	FY22	FY23	FY24	FY25	FY26	FY27	FY28	FY29	FY30	FY31	FY32	FY33
	A	A	A	A	E	E	E	E	E	E	E	E	E	E	E
1q - Chg															
Selling, General, & Administrative Expenses	424	465	467	955	910	1011	1,082	1,271	1,402	1,558	1,719	1,919	2,120	2,353	2,719
1yr % Chg	78%	9%	1%	104%	-5%	11%	7%	17%	10%	11%	10%	12%	10%	11%	16%
2yr Stack		88%	10%	105%	100%	6%	18%	24%	28%	21%	21%	22%	22%	21%	27%
1q % Chg															
% of Revenue	14.8%	17.2%	15.7%	21.4%	15.0%	13.8%	13.3%	13.0%	12.5%	12.0%	11.5%	11.0%	10.5%	10.0%	10.0%
1yr - Chg	50%	16%	-9%	36%	-30%	-8%	-3%	-2%	-4%	-4%	-4%	-4%	-5%	-5%	0%
2yr Stack		66%	8%	27%	6%	-38%	-12%	-6%	-6%	-8%	-8%	-9%	-9%	-9%	-5%
1q - Chg															
Other Operating Expenses															
Total GAAP Operating Expenses	1,338	1,545	1,540	2,380	2,696	3,017	3,279	3,860	4,319	4,933	5,456	6,106	6,763	7,765	8,973
Adjustments	(49)	(89)	(105)	(370)	(359)	(337)	(287)	(307)	(302)	(290)	(278)	(267)	(256)	(246)	(236)
Total Non-GAAP Operating Expenses	1,041	1,164	1,435	1,673	1,988	2428	2,992	3,554	4,017	4,643	5,177	5,838	6,507	7,519	8,737
1yr % Chg	22%	12%	23%	17%	19%	22%	23%	19%	13%	16%	12%	13%	11%	16%	16%
2yr Stack		33%	35%	40%	35%	41%	45%	42%	32%	29%	27%	24%	24%	27%	32%
1q % Chg															
% of Revenue	36%	43%	49%	38%	33%	33%	33%	32%	32%	35%	36%	38%	41%	42%	41%
1yr - Chg	2%	19%	12%	-22%	-14%	1%	-1%	-1%	-1%	11%	1%	7%	7%	2%	-2%
2yr Stack		21%	31%	-9%	-35%	-13%	0%	-2%	-2%	9%	12%	8%	13%	8%	-1%
1q - Chg															
GAAP Operating Profit															
Adjustments															
Non-GAAP Operating Profit	790	544	444	1,225	1,972	2424	2,304	2,818	3,331	3,860	4,613	5,588	6,717	7,893	9,074
1yr % Chg	25%	-31%	-18%	176%	61%	23%	-5%	22%	18%	16%	20%	21%	20%	18%	15%
2yr Stack		-6%	-50%	158%	237%	84%	18%	17%	40%	34%	35%	41%	41%	38%	32%
1q % Chg															
% of Revenue	28%	20%	15%	27%	33%	33%	28%	29%	30%	30%	31%	32%	33%	34%	33%
1yr - Chg	6%	-27%	-26%	84%	19%	1%	-14%	2%	3%	0%	4%	4%	4%	1%	-1%
2yr Stack		-21%	-53%	58%	102%	20%	-13%	-12%	5%	3%	4%	8%	8%	5%	0%
1q - Chg															

Data Center (Inphi)

Inphi Build	219	314	310	322	453	530	689	991	1378	1724	2121	2359	2644	2958	3403	3918	4742	5837
1yr % Chg	13%	43%	-1%	4%	41%	17%	30%	44%	39%	25%	23%	11%	12%	12%	15%	15%	21%	23%
2yr Stack		57%	42%	3%	44%	58%	47%	74%	83%	64%	48%	34%	23%	24%	27%	30%	36%	44%
3yr Stack			55%	46%	43%	61%	88%	91%	113%	108%	87%	59%	46%	35%	39%	42%	51%	59%
4yr Stack				59%	86%	60%	92%	132%	130%	138%	131%	98%	71%	58%	50%	54%	63%	74%
1q % Chg																		
100G Build					55	83	119	164	170	149	144	125	112	88	70	55	44	35
100G Ports Quarterly					2900	3460	3360	3630	3180	2798	2463	2167	1907	1678	1477	1300	1144	1006
1yr % Chg						19%	-3%	8%	-12%	-12%	-12%	-12%	-12%	-12%	-12%	-12%	-12%	-12%
% non-PAM4					95%	88%	80%	70%	60%	55%	45%	38%	30%	30%	30%	30%	30%	30%
% PAM4					5%	12%	20%	30%	40%	45%	55%	62%	70%	70%	70%	70%	70%	70%
100G Port PAM4 ASP - FS.com (ColorZ Included)					659	599	518	457	411	370	333	300	270	243	219	197	177	159
Price Decay (annually)						-9%	-14%	-12%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%	-10%
100G PAM4 Revenue					100	244	348	498	523	466	451	403	360	285	226	179	142	112
Inphi 100G Market Share					55%	34%	34%	33%	33%	32%	32%	31%	31%	31%	31%	31%	31%	31%
200/400G Build					266	272	362	324	395	317	305	298	297	296	296	233	178	130
200/400G Ports					240	444	1012	1927	3620	3982	4261	4474	4697	4932	5179	5438	5710	5995
1yr % Chg						85%	128%	90%	88%	10%	7%	5%	5%	5%	5%	5%	5%	5%
200G/400G Port ASP					3438	3000	2125	1112	873	786	707	658	625	594	564	536	509	483
% Chg						-13%	-29%	-48%	-21%	-10%	-10%	-7%	-5%	-5%	-5%	-5%	-5%	-5%
200/400G Revenue (millions)					818	851	1248	1178	1580	1408	1356	1324	1321	1317	1314	1165	1017	869
DSP % TAM (50% of Transciever)					409	425	624	589	790	704	678	662	660	659	657	583	508	435
Inphi Market Share					65%	64%	58%	55%	50%	45%	45%	45%	45%	45%	45%	40%	35%	30%
Inphi Revenue					266	272	362	324	395	317	305	298	297	296	296	233	178	130
800G Revenue							14	105	265	565	805	827	831	814	826	852	929	1003
1yr % Chg								655%	152%	113%	42%	3%	0%	-2%	1%	3%	9%	8%
800G Total Sales							19	150	407	869	1609	1838	2077	2326	2582	2840	3096	3344
1yr % Chg								709%	172%	113%	85%	14%	13%	12%	11%	10%	9%	8%
Inphi Market Share							75%	70%	65%	65%	50%	45%	40%	35%	32%	30%	30%	30%
1yr % Chg								-7%	-7%	0%	-23%	-10%	-11%	-13%	-9%	-6%	0%	0%
400ZR Build							40	235	325	437	586	808	1088	1426	1862	2411	3207	4265
ASP							7000	6090	5359	4716	4197	3862	3591	3376	3207	3047	2894	2750
ASP Historical Decay (annual)								-13%	-15%	-12%	-11%	-8%	-7%	-6%	-5%	-5%	-5%	-5%
400ZR Port Count							15	114	181	280.55	429.2415	644	946	1363	1935	2729	3820	5349
								757%	58%	55%	53%	50%	47%	44%	42%	41%	40%	40%
400ZR Revenue							106	696	970	1323	1802	2486	3399	4601	6207	8314	11057	14706
DSP % TAM (50% of Transciever)							53	348	485	662	901	1243	1700	2300	3103	4157	5529	7353
Inphi Market Share							75%	68%	67%	66%	65%	65%	64%	62%	60%	58%	58%	58%
Other Telecomunication Networking Devices					132	175	155	163	223	256	282	301	316	332	349	366	385	404
1q % Chg						33%	-11%	5%	36%	15%	10%	7%	5%	5%	5%	5%	5%	5%

Data Center (Marvell)

Data Center Revenue Excluding Inphi	579	755	932	1,344	1,694	2304	3105	3858	4753	5916	7436	9059	10991	12947
1yr % Chg		30%	23%	44%	26%	36%	35%	24%	23%	24%	26%	22%	21%	18%
2yr Stack			54%	68%	70%	62%	71%	59%	47%	48%	50%	48%	43%	39%
3yr Stack				98%	94%	106%	97%	95%	82%	72%	73%	72%	69%	61%
4yr Stack					124%	130%	141%	121%	118%	107%	98%	95%	93%	87%
1q % Chg														
Cloud Revenue	171	269	342	509	743	1085	1566	2045	2652	3448	4488	5686	7054	8514
1yr % Chg		57%	27%	49%	46%	46%	44%	31%	30%	30%	30%	27%	24%	21%
2yr Stack			84%	76%	95%	92%	90%	75%	60%	60%	60%	57%	51%	45%
3yr Stack				133%	122%	141%	136%	121%	105%	90%	90%	87%	81%	71%
4yr Stack					179%	168%	185%	167%	151%	135%	120%	117%	111%	102%
1q % Chg														
CXL Revenue					21	153	378	559	784	1086	1497	1864	2367	2816
1yr % Chg						638%	147%	48%	40%	38%	38%	25%	27%	19%
Data Center Switch Market	956	1070	1193	1409	1594	1700	2057	2530	3188	4112	5346	6790	8215	9776
% of Data Center Switches Using CXL					1%	10%	23%	34%	41%	48%	56%	61%	67%	72%
CXL Revenue					21	170	473	860	1307	1974	2994	4142	5504	7039
Marvell Market Share					100%	90%	80%	65%	60%	55%	50%	45%	43%	40%
Data Center Switch Revenue (Not Including CXL)	36	56	89	162	247	340	453	582	765	1028	1390	1901	2382	2933
1yr % Chg		57%	59%	81%	53%	38%	33%	29%	31%	34%	35%	37%	25%	23%
Data Center Switch Market	956	1070	1193	1409	1594	1700	2057	2530	3188	4112	5346	6790	8215	9776
1yr % Chg		12%	12%	18%	18%	20%	21%	23%	26%	29%	30%	27%	21%	19%
Market Share Cloud	4%	5%	8%	12%	16%	20%	22%	23%	24%	25%	26%	28%	29%	30%
1yr % Chg														
Other Cloud	135	212.41	252	346	474	592	735	904	1102	1334	1601	1921	2305	2766
1yr % Chg		57%	19%	38%	37%	25%	24%	23%	22%	21%	20%	20%	20%	20%
2yr Stack			76%	56%	74%	62%	49%	47%	45%	43%	41%	40%	40%	40%
3yr Stack				114%	93%	99%	86%	72%	69%	66%	63%	61%	60%	60%
4yr Stack					150%	118%	123%	109%	94%	90%	86%	83%	81%	80%
1q % Chg														
On-Premise Data Center	408	486	590	835	951	1065	1161	1254	1317	1383	1452	1510	1570	1618
1yr % Chg		19%	21%	42%	14%	12%	9%	8%	5%	5%	5%	4%	4%	3%
2yr Stack			40%	63%	56%	26%	21%	17%	13%	10%	10%	9%	8%	7%
3yr Stack				82%	77%	68%	35%	29%	22%	18%	15%	14%	13%	11%
4yr Stack					96%	89%	77%	43%	34%	27%	23%	19%	18%	16%
1q % Chg														
% Total Data Center Revenue														

Variance

Calendar Ended	Oct-22	Jan-23	Apr-23	Jul-23	Oct-23	Jan-24	Jan-23	Jan-24	Jan-25
Fiscal Year Ended	2023		2024				2023	2024	2025
	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	FY22	FY23	FY24
	E	E	E	E	E	E	E	E	E
Total Revenue									
Model	1,483	1,610	1,683	1,777	1,878	2,015	6,057	7,353	8,136
Street	1,558	1,625	1,651	1,722	1,797	1,874	6,147	7,044	8,014
Variance	*-5%*	*-1%*	*2%*	*3%*	*5%*	*8%*	*-1%*	*4%*	*2%*
Data Center Revenue									
Model	545	629	683	723	801	868	1,993	2,631	3,493
Street	616	661	688	738	787	838	2,561	3,068	3,740
Variance	*-11%*	*-5%*	*-1%*	*-2%*	*2%*	*4%*	*-22%*	*-14%*	*-7%*
Carrier Revenue									
Model	282	317	314	354	373	427	1,162	1,468	1,534
Street	271	282	290	303	315	325	1,090	1,234	1,394
Variance	*4%*	*12%*	*8%*	*17%*	*19%*	*31%*	*7%*	*19%*	*10%*
Enterprise Networking Revenue									
Model	401	406	418	427	424	429	1,408	1,656	1,904
Street	409	409	403	402	406	412	1,445	1,610	1,635
Variance	*-2%*	*-1%*	*4%*	*6%*	*4%*	*4%*	*-3%*	*3%*	*16%*
Consumer Revenue									
Model	*163*	*161*	*160*	*158*	*156*	*155*	*667*	*629*	*622*
Street	164	165	676	163	166	171	676	676	660
Variance	*-1%*	*-2%*	*-76%*	*-3%*	*-6%*	*-10%*	*-1%*	*-7%*	*-6%*
Auto/Industrial Revenue									
Model	*91*	*97*	*108*	*116*	*123*	*137*	*354*	*484*	*582*
Street	96	104	108	116	125	134	373	483	594
Variance	*-5%*	*-7%*	*0%*	*0%*	*-1%*	*2%*	*-5%*	*0%*	*-2%*
Gross Profit									
Model	964	1,063	1,111	1,173	1,240	1,330	3,907	4,779	5,297
Street	1,013	1,058	1,077	1,124	1,174	1,225	4,008	4,600	5,241
Variance	*-5%*	*0%*	*3%*	*4%*	*6%*	*9%*	*-3%*	*4%*	*1%*
R&D - % of Revenue									
Model	30%	28%	28%	27%	27%	27%	29.5%	27.3%	27.0%
Street	29%	28%	28%	27%	26%	26%	29%	27%	25%
Variance	*2%*	*2%*	*0%*	*1%*	*2%*	*4%*	*1%*	*2%*	*6%*
SGA - % of Revenue									
Model	15%	15%	14%	14%	14%	13%	15%	14%	13%
Street	15%	14%	14%	14%	13%	13%	15%	14%	12%
Variance	*3%*	*4%*	*-1%*	*1%*	*2%*	*2%*	*0%*	*1%*	*8%*