

Advanced Micro Devices, Inc

Q4 preview: tougher n-t setup, though l-t AI tailwinds remain solid

Reiterate Rating: BUY | PO: 195.00 USD | Price: 177.25 USD

Lowering Q1/CY24 but tweaking up CY25E

Reiterate Buy but flag potential for some modest correction around earnings (Jan-30) given: 1) Potential for Q1 guidance miss vs. consensus on PC/FPGA weakness, and 2) Stock run-up, now trading 46x NTM PE vs peer NVDA at 31x, and given AMD stock's recent parabolic move (up 84% in past 3 months vs. SOX up 35%). We expect inline Q4 results but lower Q1 sales to \$5.5bn, -10% QoQ, below consensus \$5.8bn, -5.6% QoQ. Some Q1 miss is already expected following peer INTC's weak report; we think focus of call will be AMD's MI300 AI accelerator expectations where we expect management to qualitatively or quantitatively raise CY24 expectations above prior \$2bn and more inline with consensus in the \$3-\$3.5bn range, with Q4'24E exit rate of over \$1.4-\$2bn quarterly. Overall, we tweak CY24/25 sales -1%/+0% and pf-EPS -1%/+2% to \$3.83/\$5.20 and raise PO to \$195 from \$165, now on 38x CY25E P/E (1.1x PEG) vs. 32x prior on continued share gains, and still within 1-2x PEG of high-growth compute peers.

Accelerator ramp key to valuation, \$7.5 CY27E EPS power

Every 1% in accelerator share represents 16c of EPS in CY25, and as much as 30c in CY27 on a larger TAM base (details on pg. 4). Our base case assumption of 7.5% accel. share and 21% CPU share represents \$7.5 EPS power by CY27E, or +30% CAGR (CY23-27E). While AI presents a large opportunity, AMD faces tough incumbents NVDA and customer chip partners (AVGO, MRVL etc), so while we can see AMD share head towards 5-10% from <5%, we are skeptical of it crossing 10% yet. As reference our assumption is: 1) NVDA continues to dominate with 75%+ share; 2) custom chips 10-15% share (Google TPU, Amazon Trainium/Inferentia etc.); 3) remaining 10-15% across AMD/other merchant options. This is regardless of training/inference mix as incumbents have multiple levers to maintain share even if demand shifts towards AI inference in our view.

CPU share gains continue in '24, enterprise key in '25

We estimate AMD server CPU gained share from INTC in Q4'23, and likely takes share again in CY24E, with 29% YoY sales growth or ~2x vs INTC. In PC CPU we expect similar growth rates for INTC/AMD. Overall we model AMD's PC + server CPU revenue share to reach 20% for the first time in CY24E (vs. INTC 72%, ARM 7%). Heading into CY25E, AMD share gains could depend on potential for enterprise recovery (e.g. Windows 10 expiration, greater enterprise AI server adoption) that tends to favor INTC's incumbency.

Estimates (Dec) (US\$)	2021A	2022A	2023E	2024E	2025E
EPS	2.80	3.50	2.65	3.83	5.20
GAAP EPS	2.57	0.84	0.33	1.61	2.98
EPS Change (YoY)	118.8%	25.0%	-24.3%	44.5%	35.8%
Consensus EPS (Bloomberg)			2.65	3.92	5.25
DPS	0	0	0	0	0
Valuation (Dec)					
P/E	63.3x	50.6x	66.9x	46.3x	34.1x
GAAP P/E	69.0x	211.0x	537.1x	110.1x	59.5x
EV / EBITDA*	64.1x	27.3x	34.3x	27.9x	22.5x
Free Cash Flow Yield*	1.1%	1.1%	0.7%	1.3%	2.4%

* For full definitions of *IQmethod*SM measures, see page 10.

29 January 2024

Equity

Key Changes

(US\$)	Previous	Current
Price Obj.	165.00	195.00
2024E Rev (m)	26,739.8	26,559.6
2025E Rev (m)	31,252.7	31,253.4
2024E EPS	3.88	3.83
2025E EPS	5.12	5.20

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Stock Data

Price	177.25 USD
Price Objective	195.00 USD
Date Established	29-Jan-2024
Investment Opinion	C-1-9
52-Week Range	72.03 USD - 184.92 USD
Mrkt Val (mn) / Shares Out	286,347 USD / 1,615.5 (mn)
Free Float	1165.0%
Average Daily Value (mn)	13596.47 USD
BofA Ticker / Exchange	AMD / NAS
Bloomberg / Reuters	AMD US / AMD.OQ
ROE (2023E)	7.8%
Net Dbt to Eqty (Dec-2022A)	-4.3%
ESGMeter TM	High

ESGMeter is not indicative of a company's future stock price performance and is not an investment recommendation or rating. ESGMeter is independent of BofA Global Research's equity investment rating, volatility risk rating, income rating, and price objective for that company. For full details, refer to "BofA ESGMeter Methodology".

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Timestamp: 29 January 2024 12:06AM EST

iQprofileSM Advanced Micro Devices, Inc

iQmethodSM – Bus Performance*

(US\$ Millions)	2021A	2022A	2023E	2024E	2025E
Return on Capital Employed	46.0%	15.8%	6.9%	9.7%	12.2%
Return on Equity	51.6%	17.7%	7.8%	10.8%	13.4%
Operating Margin	24.8%	26.9%	21.5%	26.6%	30.6%
Free Cash Flow	3,220	3,115	2,134	3,738	6,894

iQmethodSM – Quality of Earnings*

(US\$ Millions)	2021A	2022A	2023E	2024E	2025E
Cash Realization Ratio	1.0x	0.6x	0.6x	0.7x	0.9x
Asset Replacement Ratio	0.7x	0.1x	0.2x	0.2x	0.2x
Tax Rate	15.0%	13.0%	13.0%	13.0%	13.0%
Net Debt-to-Equity Ratio	-29.6%	-4.3%	-3.3%	-5.9%	-12.7%
Interest Cover	NM	NM	46.3x	NM	NM

Income Statement Data (Dec)

(US\$ Millions)	2021A	2022A	2023E	2024E	2025E
Sales	16,434	23,601	22,638	26,560	31,253
% Change	68.3%	43.6%	-4.1%	17.3%	17.7%
Gross Profit	7,934	12,273	11,457	14,102	17,259
% Change	82.3%	54.7%	-6.6%	23.1%	22.4%
EBITDA	4,476	10,519	8,352	10,290	12,762
% Change	127.3%	135.0%	-20.6%	23.2%	24.0%
Net Interest & Other Income	(28)	(18)	96	116	116
Net Income (Adjusted)	3,441	5,499	4,304	6,231	8,435
% Change	118.8%	59.8%	-21.7%	44.8%	35.4%

Free Cash Flow Data (Dec)

(US\$ Millions)	2021A	2022A	2023E	2024E	2025E
Net Income from Cont Operations (GAAP)	3,435	5,504	4,308	6,235	8,431
Depreciation & Amortization	407	4,174	3,496	3,238	3,185
Change in Working Capital	(395)	(1,182)	(1,445)	(2,123)	(1,036)
Deferred Taxation Charge	308	(342)	0	0	0
Other Adjustments, Net	(234)	(4,589)	(3,687)	(3,043)	(3,017)
Capital Expenditure	(301)	(450)	(538)	(568)	(668)
Free Cash Flow	3,220	3,115	2,134	3,738	6,894
% Change	312.3%	-3.3%	-31.5%	75.2%	84.4%
Share / Issue Repurchase	104	167	145	0	0
Cost of Dividends Paid	0	0	0	0	0
Change in Debt	0	679	0	0	0

Balance Sheet Data (Dec)

(US\$ Millions)	2021A	2022A	2023E	2024E	2025E
Cash & Equivalents	2,535	4,835	4,305	5,999	10,849
Trade Receivables	2,706	4,126	5,338	7,111	7,449
Other Current Assets	3,342	6,058	8,017	8,831	9,473
Property, Plant & Equipment	702	1,513	1,537	1,703	2,023
Other Non-Current Assets	3,134	51,048	49,372	49,372	49,372
Total Assets	12,419	67,580	68,569	73,015	79,167
Short-Term Debt	312	0	752	752	752
Other Current Liabilities	3,928	6,369	7,129	7,592	7,538
Long-Term Debt	1	2,467	1,715	1,715	1,715
Other Non-Current Liabilities	681	3,994	3,314	3,314	3,314
Total Liabilities	4,922	12,830	12,910	13,373	13,319
Total Equity	7,497	54,750	55,659	59,642	65,848
Total Equity & Liabilities	12,419	67,580	68,569	73,015	79,167

* For full definitions of iQmethodSM measures, see page 10.

Company Sector

Semiconductors

Company Description

Advanced Micro Devices is one of the largest suppliers of PC microprocessors and graphics processors worldwide to computing OEMs. The company's main product lines include desktop, notebook, server, graphics processors and embedded/semi-custom chips.

Investment Rationale

We rate AMD Buy. It serves a \$80bn+ addressable market opportunity in PC, server, high-end gaming, deep-learning and related markets where AMD has less than 30% value share currently. Additionally, AMD has developed competitive AI products, including formidable accelerators that can carve out mid-single digit share in a multi-hundred \$bn market.

Stock Data

Average Daily Volume

76,564,624

Quarterly Earnings Estimates

	2022	2023
Q1	1.13A	0.60A
Q2	1.05A	0.58A
Q3	0.67A	0.70A
Q4	0.69A	0.77E

AMD Estimate Changes

Below, we present AMD estimate changes by segment.

Exhibit 2: AMD Estimate Changes by Segment

We lower server/PC CPU, Embedded, console sales outlooks, and increase server GPU outlook

Segment Changes	FY23E				FY24E				FY25E			
	New	Old	Delta (\$mn)	Cons.	New	Old	Delta (\$mn)	Cons.	New	Old	Delta (\$mn)	Cons.
Data Center	6,546	6,546	0	6,521	11,366	10,944	422	11,033	15,072	14,744	327	14,116
Server CPU	5,664	5,664	0	5,659	7,308	7,474	(165)	7,598	8,416	8,606	(190)	8,536
Data Center GPU	475	475	0	575	3,613	3,026	587	3,433	6,031	5,514	518	4,885
FPGA & Adaptive SoC	228	228	0	384	128	128	0	930	149	149	0	1,556
Pensando	179	179	0	225	316	316	0	329	475	475	0	491
Client	4,678	4,678	0	4,707	5,416	5,773	(357)	6,106	5,884	6,223	(339)	6,679
Embedded	5,297	5,297	0	5,341	4,186	4,330	(144)	4,507	5,049	4,943	106	5,145
Gaming	6,118	6,118	0	6,104	5,591	5,692	(101)	5,169	5,248	5,342	(93)	5,277

Source: BofA Global Research estimates, Visible Alpha

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We lower CY24E EPS by -1% to \$3.83 and raise CY25E EPS by +2% to \$5.20.

Exhibit 3: AMD Estimate Changes

We tweak CY24/25E EPS by -1%/+2% to \$3.83/\$5.20

	Sales (\$mn)			delta	Non-GAAP EPS (ex. SBC)		
	Old	NEW	delta		Old	NEW	delta
1Q23	\$5,353	\$5,353	\$0	\$0.60	\$0.60	\$0.60	\$0.00
2Q23	\$5,359	\$5,359	\$0	\$0.58	\$0.58	\$0.58	\$0.00
3Q23	\$5,800	\$5,800	\$0	\$0.70	\$0.70	\$0.70	\$0.00
4Q23E	\$6,126	\$6,126	\$0	\$0.77	\$0.77	\$0.77	\$0.00
FY23E	\$22,638	\$22,638	\$0	\$2.65	\$2.65	\$2.65	\$0.00
YoY%	-4.1%	-4.1%	0.0%	-24.3%	-24.3%	-24.3%	0.0%
1Q24E	\$5,729	\$5,525	(\$204)	\$0.67	\$0.61	\$0.61	(\$0.06)
2Q24E	\$6,256	\$6,072	(\$184)	\$0.83	\$0.78	\$0.78	(\$0.05)
3Q24E	\$7,140	\$7,100	(\$40)	\$1.12	\$1.10	\$1.10	(\$0.01)
4Q24E	\$7,615	\$7,863	\$247	\$1.26	\$1.34	\$1.34	\$0.08
FY24E	\$26,740	\$26,560	(\$180)	\$3.88	\$3.83	\$3.83	(\$0.04)
YoY%	18.1%	17.3%	-0.7%	46.1%	44.5%	44.5%	-1.1%
1Q25E	\$7,558	\$7,566	\$8	\$1.21	\$1.23	\$1.23	\$0.02
2Q25E	\$7,600	\$7,608	\$8	\$1.21	\$1.24	\$1.24	\$0.02
3Q25E	\$7,855	\$7,843	(\$13)	\$1.29	\$1.31	\$1.31	\$0.02
4Q25E	\$8,239	\$8,237	(\$2)	\$1.40	\$1.42	\$1.42	\$0.02
FY25E	\$31,253	\$31,253	\$1	\$5.12	\$5.20	\$5.20	\$0.08
YoY%	16.9%	17.7%	0.0%	32.0%	35.6%	35.6%	1.6%

Source: BofA Global Research estimates

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On next page, we present CY27E EPS sensitivity analysis based on AMD's CPU (PC + server) market share and AI data center accelerator market share.



EPS Sensitivity Analysis

Our base case assumes AMD CPU value share of 21.0% and AI accelerator value share of 7.5% in CY27E (from 19.0%/1.1% in CY23), suggesting EPS of ~\$7.50. Though we don't expect AMD to exceed 10% share any time soon, if it were to, then we highlight there is a scenario for \$10 EPS by CY27E at 15% AI accelerator share (~\$12bn sales), 24% CPU share (~\$16bn sales).

Exhibit 4: CY27E pf-EPS Sensitivity Table

AMD EPS could reach \$10 at 24% CPU share and 15% accelerator share by CY27E

		CPU (PC + Server) Market Share (%)										
AI Accelerator Market Share (%)		16%	17%	18%	19%	20%	21%	22%	23%	24%	25%	26%
	0%	\$4.41	\$4.55	\$4.69	\$4.83	\$4.97	\$5.12	\$5.26	\$5.40	\$5.54	\$5.68	\$5.82
	1%	\$4.71	\$4.85	\$5.00	\$5.14	\$5.28	\$5.42	\$5.56	\$5.70	\$5.84	\$5.98	\$6.12
	2%	\$5.02	\$5.16	\$5.30	\$5.44	\$5.58	\$5.72	\$5.86	\$6.00	\$6.14	\$6.29	\$6.43
	3%	\$5.32	\$5.46	\$5.60	\$5.74	\$5.88	\$6.02	\$6.16	\$6.31	\$6.45	\$6.59	\$6.73
	4%	\$5.62	\$5.76	\$5.90	\$6.04	\$6.18	\$6.33	\$6.47	\$6.61	\$6.75	\$6.89	\$7.03
	5%	\$5.92	\$6.06	\$6.21	\$6.35	\$6.49	\$6.63	\$6.77	\$6.91	\$7.05	\$7.19	\$7.33
	6%	\$6.23	\$6.37	\$6.51	\$6.65	\$6.79	\$6.93	\$7.07	\$7.21	\$7.35	\$7.50	\$7.64
	7%	\$6.53	\$6.67	\$6.81	\$6.95	\$7.09	\$7.23	\$7.37	\$7.52	\$7.66	\$7.80	\$7.94
	8%	\$6.83	\$6.97	\$7.11	\$7.25	\$7.40	\$7.54	\$7.68	\$7.82	\$7.96	\$8.10	\$8.24
	9%	\$7.13	\$7.27	\$7.42	\$7.56	\$7.70	\$7.84	\$7.98	\$8.12	\$8.26	\$8.40	\$8.54
	10%	\$7.44	\$7.58	\$7.72	\$7.86	\$8.00	\$8.14	\$8.28	\$8.42	\$8.56	\$8.71	\$8.85
	11%	\$7.74	\$7.88	\$8.02	\$8.16	\$8.30	\$8.44	\$8.58	\$8.73	\$8.87	\$9.01	\$9.15
	12%	\$8.04	\$8.18	\$8.32	\$8.46	\$8.61	\$8.75	\$8.89	\$9.03	\$9.17	\$9.31	\$9.45
	13%	\$8.34	\$8.48	\$8.63	\$8.77	\$8.91	\$9.05	\$9.19	\$9.33	\$9.47	\$9.61	\$9.75
	14%	\$8.65	\$8.79	\$8.93	\$9.07	\$9.21	\$9.35	\$9.49	\$9.63	\$9.77	\$9.92	\$10.06
	15%	\$8.95	\$9.09	\$9.23	\$9.37	\$9.51	\$9.65	\$9.79	\$9.94	\$10.08	\$10.22	\$10.36
	16%	\$9.25	\$9.39	\$9.53	\$9.67	\$9.82	\$9.96	\$10.10	\$10.24	\$10.38	\$10.52	\$10.66
	17%	\$9.55	\$9.69	\$9.84	\$9.98	\$10.12	\$10.26	\$10.40	\$10.54	\$10.68	\$10.82	\$10.96
	18%	\$9.86	\$10.00	\$10.14	\$10.28	\$10.42	\$10.56	\$10.70	\$10.84	\$10.98	\$11.13	\$11.27
	19%	\$10.16	\$10.30	\$10.44	\$10.58	\$10.72	\$10.86	\$11.00	\$11.15	\$11.29	\$11.43	\$11.57
	20%	\$10.46	\$10.60	\$10.74	\$10.88	\$11.03	\$11.17	\$11.31	\$11.45	\$11.59	\$11.73	\$11.87

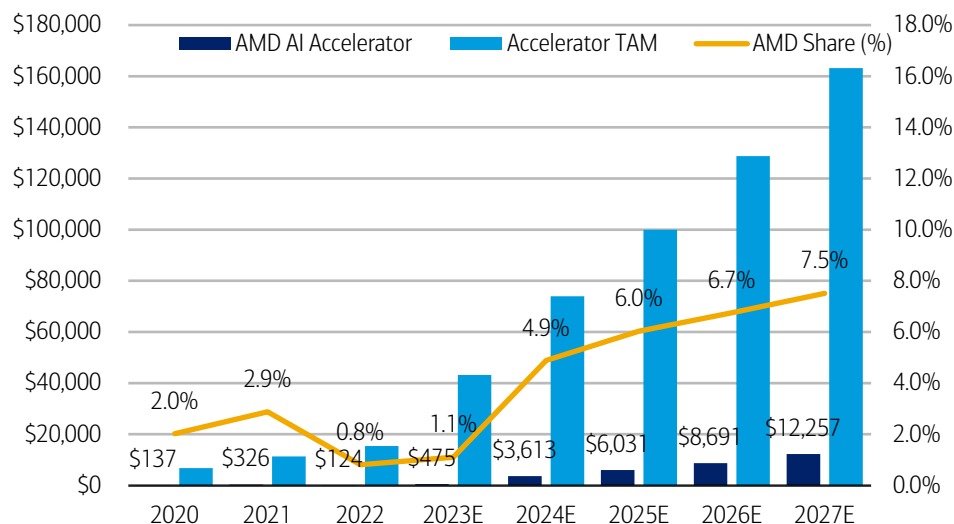
Source: BofA Global Research estimates

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We see AMD AI accelerator sales to reach \$6bn by CY25E (6.0% market share at \$100bn TAM) and potentially \$12bn by CY27E (7.5% market share at \$163bn TAM).

Exhibit 4: AMD AI Accelerator Market Share

We expect AMD accelerator share to reach 6.0% by CY25E and 7.5% by CY27E



Source: BofA Global Research estimates

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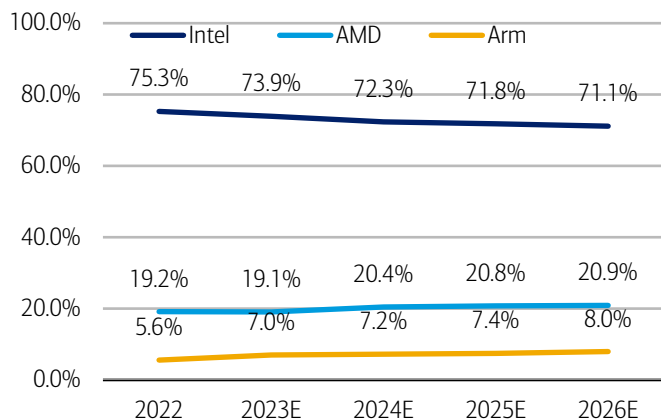
CPU Market Share Analysis

PCs + Servers

We see AMD combined CPU (PC + server) value share around ~19% today and reaching ~21% by CY26E. On a unit basis, we see AMD share at ~16% today and staying at that level through CY26E.

Exhibit 5: CPU (PC + Server) value share

AMD value share has now reached ~20%

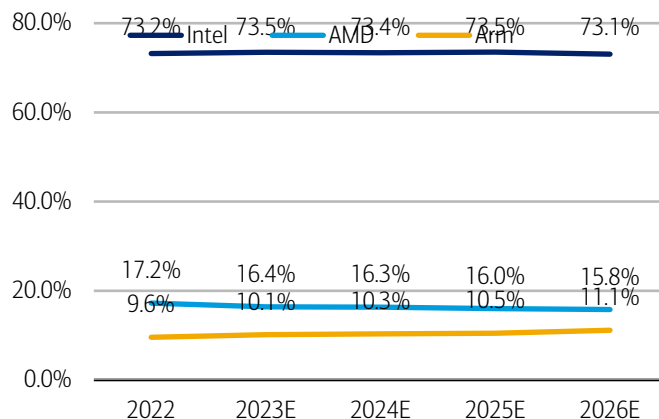


Source: BofA Global Research estimates, Mercury Research

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Exhibit 6: CPU (PC + Server) unit share

AMD unit share has now reached ~16%



Source: BofA Global Research estimates, Mercury Research

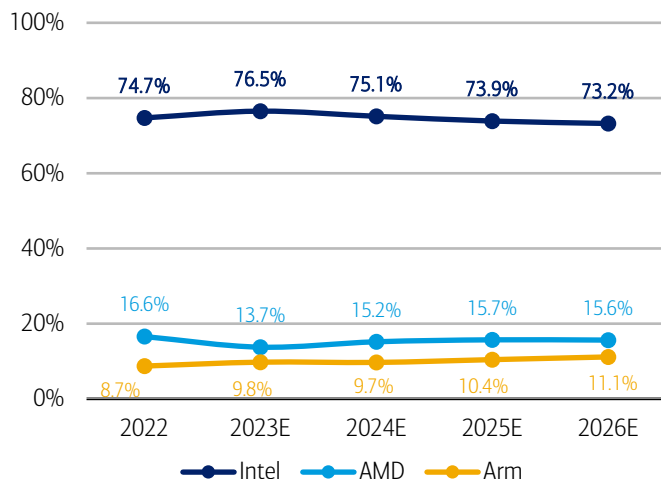
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PCs

In PCs, INTC's market share loss to AMD over the last five years has generally stabilized. However, ARM's entry (Apple, Qualcomm, Nvidia amid those in CPU development) in PCs remains a big threat to INTC. In 2023, we expect ARM PC MPU value/unit share of 10%/11% and see path towards 11%/13% by 2026E. In turn, we see INTC value share to decline to just ~70% PC unit share by CY26E vs. ~96% in CY16.

Exhibit 7: PC microprocessor (MPU) value share

AMD value share has reached ~15% from <5% in 2015/16 pre-Ryzen

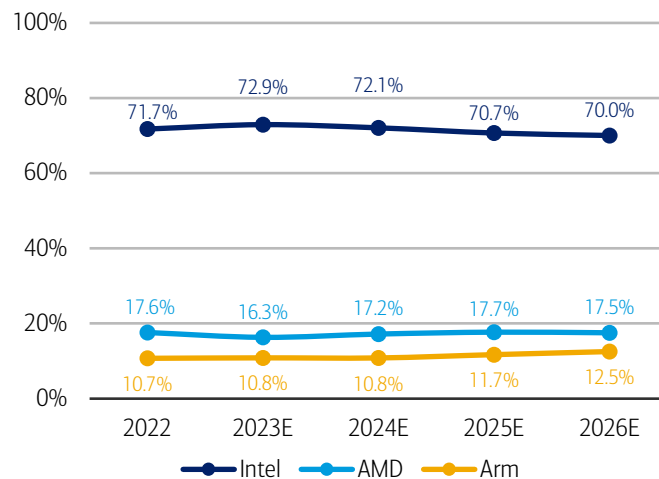


Source: BofA Global Research estimates, Mercury Research

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Exhibit 8: PC microprocessor (MPU) unit share

INTC unit share to decline to just ~70%



Source: BofA Global Research estimates, Mercury Research

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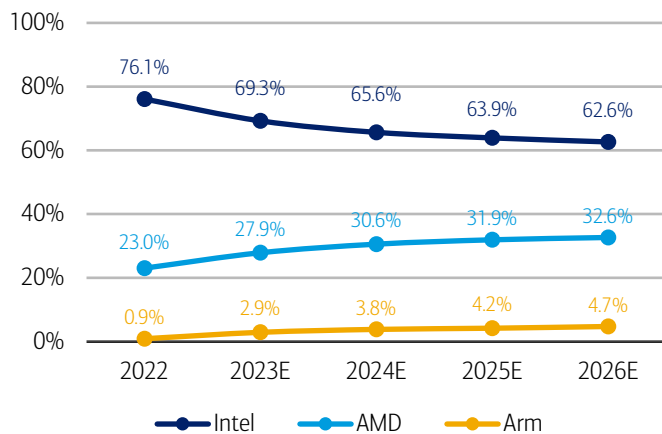


Servers

In servers, we expect both AMD and ARM to continue gaining share at the expense of INTC, given AMD's extremely competitive offerings and product executions and ARM's competitive advantage in certain high-core applications. We estimate INTC value share to decline to just ~63% by CY26E vs. ~100% in CY16.

Exhibit 9: Server MPU value share

AMD value share is 28% in 2023E and we see path to 33% by 2026E

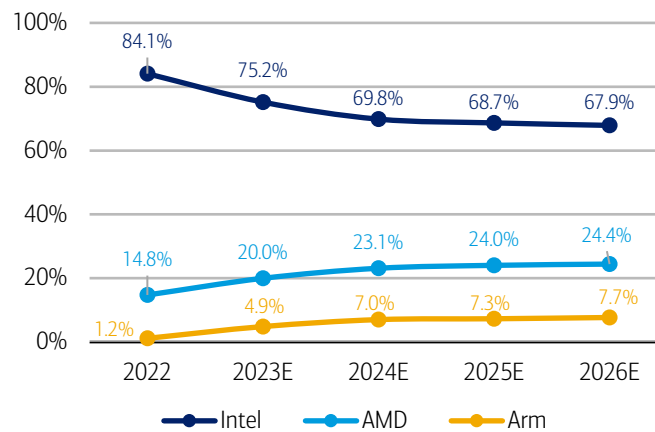


Source: BofA Global Research estimates, Mercury Research

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Exhibit 10: Server MPU unit share

AMD unit share of 20% could grow towards 24% by 2026E



Source: BofA Global Research estimates, Mercury Research

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Glossary:

AMD: Advanced Micro Devices

INTC: Intel

NVDA: Nvidia

MRVL: Marvell

ARM: Arm Limited

CPU: Central Processing Unit

GPU: Graphics Processing Unit

TPU: Tensor Processing Unit

AI: Artificial Intelligence

PC: Personal Computer

DC: Data Center

FPGA: Field-Programmable Gate Array

TAM: Total Addressable Market

SAM: Serviceable Available Market

ASIC: Application-Specific Integrated Circuit

TSMC: Taiwan Semiconductor Manufacturing Company

Product Roadmaps

PCs

AMD's product cadence/execution in PCs has been generally consistent over the last few years, though TSMC's pushouts of new process node ramps have also impacted AMD (delayed Zen 5 adoption). Notably, INTC is quickly catching up with faster product launches. AMD was also first to launch AI PC CPUs (with integrated NPUs) in both laptops and desktops, though INTC should similarly catch up with Meteor Lake products.

In 2024, AMD will likely launch 3nm Zen 5 products in both desktops and laptops by 2H, directly competing against INTC's Arrow Lake, Lunar Lake "Intel 20A" products.

Exhibit 12: PC CPU roadmaps for AMD and INTC

We anticipate INTC to ramp its I-4 node Meteor Lake desktop CPU in 2024, and AMD to ramp its 5nm Zen 4 PC CPUs throughout the year

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26	4Q26
Desktop CPUs	AMD (Ryzen)	Zen 3 3D V-Cache (T-7nm)	Zen 4 "Raphael" (T-5nm)	Zen 4 3D V-Cache (T-5nm)	Zen 4 "Phoenix" (T-4nm)	Zen 5 "Granite Ridge" (T-3nm)	Zen 5 3D V-Cache (T-3nm)														
	INTC (Core)	"Alder Lake" (I-7)	"Raptor Lake" (I-7)	"Meteor Lake" (I-4 / T-3nm)	"Arrow Lake" (I-20A / T-3nm)	"Panther Lake" (I-18A / External)															
Notebook CPUs	AMD (Ryzen)	Zen 3+ "Rembrandt" (T-6nm)	Zen 4 "Phoenix" (T-4nm)	Zen 4 "Hawk Point" (T-4nm)	Zen 5 "Strix Point" (T-3nm)																
	INTC (Core)	"Alder Lake" (I-7)	"Raptor Lake" (I-7)	"Meteor Lake" (I-4 / T-3nm)	"Lunar Lake" (I-20A / External)	"Panther Lake" (I-18A / External)															

Source: BofA Global Research

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Servers

2024 server growth could accelerate throughout the year as leading CPU vendors release their next generation server CPU products. We expect AMD to launch its next-gen 3nm/4nm "Turin" server CPUs in CY24. Similarly, INTC should ramp its "Intel 7" process node Emerald Rapids throughout the year until its long-awaited "Intel 3" Granite Rapids launches later in the year. NVDA, an ARM-based CPU provider, should also ramp its Grace CPU throughout CY24.

Moreover in CY24, INTC should launch its energy-optimized "Sierra Forest" E-core processor to complement its server CPU offering. This directly competes against AMD's high-core count EPYC-C "Bergamo" and NVDA's ARM-based "Grace".

While INTC's product execution in servers had been plagued with constant delays between 2018-2022, we note the company is generally back on track, with an annual product cadence following the launch of Sapphire Rapids in late 2022.

Exhibit 13: Server CPU roadmap for AMD, INTC, NVDA

We expect INTC I-3 node server CPU, Granite Rapids, to launch in 2024, along with AMD T-3nm Turin server CPU

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26	4Q26
Server CPUs	AMD (EPYC)	Zen 3 "Milan-X" (T-7nm)	Zen 4 "Genoa" (T-5nm)	Zen 4 "Genoa-X" (T-5nm)	Zen 5 "Turin" (T-4nm / T-3nm)																
	AMD (EPYC C)				Zen 4c "Bergamo" (T-5nm)									Zen 5c (T-3nm)							
	INTC (Xeon P)	"Ice Lake" (I-10nm+)	"Sapphire Rapids" (I-7)	"Emerald Rapids" (I-7)	"Granite Rapids" (I-3)	"Diamond Rapids" (I-18A)															
	INTC (Xeon E)									"Sierra Forest" (I-3)	"Clearwater Forest" (I-18A)										
	NVDA									"Grace" (T-4nm)											

Source: BofA Global Research

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AI Accelerators

In AI accelerators, leading vendor NVDA should release and ramp its next-gen “Blackwell” B100 3nm GPU in CY24E. AMD should similarly ramp its latest MI300X GPU at cloud vendors and enterprise OEMs throughout the year.

INTC’s latest “Ponte Vecchio” Data Center GPU Max series GPUs have very little traction at customers, and INTC has shifted focus toward its Gaudi training accelerators. We expect a continued ramp of INTC’s latest Gaudi2 through 1H24E until Gaudi3 launches mid-year. By 2025, INTC should merge the two lineups together, forming a single “Falcon Shores” lineup to compete against NVDA’s X100 and AMD’s MI400.

Exhibit 14: AI accelerator roadmap for AMD, INTC, NVDA

We expect Intel’s Gaudi 3 (T-5nm) to compete with AMD’s MI300 and NVDA’s B100 in 2024

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26	4Q26		
Server Accel.	AMD (MI)	CDNA 2 "Aldebaran" "MI200/250" (T-6nm)								CDNA 3 + Zen 4 "MI300" (T-5nm / T-6nm)													
	NVDA (for x86)	"Ampere" (T-7nm)	"Hopper" "H100" (T-4nm)							"H200" (T-4nm)		"Blackwell" "B100" (T-3nm)				"X100" (T-2nm)							
	NVDA (x86 Ent.)									"Lovelace" "L40S" (T-5nm)				"Blackwell" "B40" (T-3nm)				"X40" (T-2nm)					
	NVDA (for Arm)									"Grace Hopper" "GH200" (T-4nm / T-4nm)				"Grace Blackwell" "GB200" (T-4nm / T-3nm)				"GX200" (T-4nm / T-2nm)					
	INTC (GPU)			"Ponte Vecchio" (T-5nm / T-7nm / I-7)												"Falcon Shores" (Advanced Node)				"Falcon Shores 2" (Advanced Node)			
	INTC (ASIC-I)	"Goya" (T-16nm)					"Greco" (T-7nm)																
	INTC (ASIC-T)	"Gaudi" (T-16nm)					"Gaudi 2" (T-7nm)					"Gaudi 3" (T-5nm)											

Source: BofA Global Research

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Gaming GPU

In gaming GPUs, we expect both AMD and NVDA to launch their next-gen 3nm (or 4nm) platforms by the end of this year (with ramps in CY25E). Usually, higher-end SKUs are released first, followed by mid-tier and low-end SKUs, and we expect this trend to continue this cycle.

Importantly, latest media reports point to INTC potentially cancelling their next-gen DG3 “Battlemage” products. Battlemage has already been delayed numerous times and potentially no longer has competitive advantage against competition, particularly in low-/mid-tier where INTC focuses on. This could overall lead to INTC generally fading its consumer GPU products out and instead shifting resources to its upcoming Gaudi3 ASIC and Falcon Shore AI accelerator product.

Exhibit 15: PC GPU roadmap for AMD, INTC, NVDA

We expect AMD/NVDA to launch next-gen GPUs by the end of 2024

		1Q22	2Q22	3Q22	4Q22	1Q23	2Q23	3Q23	4Q23	1Q24	2Q24	3Q24	4Q24	1Q25	2Q25	3Q25	4Q25	1Q26	2Q26	3Q26	4Q26
Gaming GPUs	AMD (Radeon)	RDNA 2 "Navi 2X" (T-7nm)			RDNA 3 "Navi 3X" (T-5nm)								RDNA 4 "Navi 4X" (Advanced Node)								
	NVDA (GeForce)	"Ampere" (S-8nm)			"Ada Lovelace" (T-4nm)								"Lovelace Next" (Advanced Node)								
	INTC (Arc)	DG2 "Alchemist" (T-6nm)								DG3 "Battlemage" (Advanced Node)											

Source: BofA Global Research

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Price objective basis & risk

Advanced Micro Devices, Inc (AMD)

Our \$195 PO is based on 38x our 2025E non-GAAP EPS, which is towards the middle of AMD's historical 17x-64x range, justified by AI upside offset by slowdown in cyclical embedded/console markets.

Downside risks: 1) M&A integration risks, 2) Strong competition from larger names, 3) Lumpy nature of consumer and enterprise spending that could create delays in acceptance and success of new products, 4) High reliance on one outsourced manufacturing partner, 5) Maturity of current game console cycle.

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US - Semiconductors and Semiconductor Capital Equipment Coverage Cluster

Investment rating	Company	BofA Ticker	Bloomberg symbol	Analyst
BUY				
	Advanced Micro Devices, Inc	AMD	AMD US	Vivek Arya
	Analog Devices Inc.	ADI	ADI US	Vivek Arya
	Applied Materials, Inc.	AMAT	AMAT US	Vivek Arya
	Arm Holdings	ARM	ARM US	Vivek Arya
	Broadcom Inc	AVGO	AVGO US	Vivek Arya
	Cadence	CDNS	CDNS US	Vivek Arya
	Camtek	CAMT	CAMT US	Vivek Arya
	KLA Corporation	KLAC	KLAC US	Vivek Arya
	Lam Research Corp.	LRCX	LRCX US	Vivek Arya
	M/A-Com	MTSI	MTSI US	Vivek Arya
	Marvell Technology Group Ltd.	MRVL	MRVL US	Vivek Arya
	Microchip	MCHP	MCHP US	Vivek Arya
	Micron Technology, Inc	MU	MU US	Vivek Arya
	Nova	NVMI	NVMI US	Vivek Arya
	NVIDIA Corporation	NVDA	NVDA US	Vivek Arya
	NXP Semiconductors NV	NXPI	NXPI US	Vivek Arya
	onsemi	ON	ON US	Vivek Arya
	Synopsys	SNPS	SNPS US	Vivek Arya
NEUTRAL				
	Advanced Energy Industries	AEIS	AEIS US	Duksan Jang
	Allegro MicroSystems	ALGM	ALGM US	Blake Friedman
	Axcelis Technologies	ACLS	ACLS US	Duksan Jang
	Coherent Corp	COHR	COHR US	Vivek Arya
	GlobalFoundries	GFS	GFS US	Vivek Arya
	Intel	INTC	INTC US	Vivek Arya
	Lattice Semiconductor	LSCC	LSCC US	Blake Friedman
	Texas Instruments Inc.	TXN	TXN US	Vivek Arya
UNDERPERFORM				
	Ambarella	AMBA	AMBA US	Vivek Arya
	Credo Technology	CRDO	CRDO US	Vivek Arya
	Lumentum Holdings	LITE	LITE US	Vivek Arya
	Qorvo Inc.	QRVO	QRVO US	Vivek Arya
	Skyworks Solutions, Inc.	SWKS	SWKS US	Vivek Arya
	Teradyne	TER	TER US	Vivek Arya
	Wolfspeed Inc	WOLF	WOLF US	Vivek Arya



iQmethodSM Measures Definitions

Business Performance

Return On Capital Employed

Return On Equity

Operating Margin

Earnings Growth

Free Cash Flow

Quality of Earnings

Cash Realization Ratio

Asset Replacement Ratio

Tax Rate

Net Debt-To-Equity Ratio

Interest Cover

Valuation Toolkit

Price / Earnings Ratio

Price / Book Value

Dividend Yield

Free Cash Flow Yield

Enterprise Value / Sales

EV / EBITDA

Numerator

$\text{NOPAT} = (\text{EBIT} + \text{Interest Income}) \times (1 - \text{Tax Rate}) + \text{Goodwill Amortization}$

Net Income

Operating Profit

Expected 5 Year CAGR From Latest Actual

Cash Flow From Operations – Total Capex

Numerator

Cash Flow From Operations

Capex

Tax Charge

Net Debt = Total Debt – Cash & Equivalents

EBIT

Numerator

Current Share Price

Current Share Price

Annualised Declared Cash Dividend

Cash Flow From Operations – Total Capex

$\text{EV} = \text{Current Share Price} \times \text{Current Shares} + \text{Minority Equity} + \text{Net Debt} +$

Other LT Liabilities

Enterprise Value

Denominator

$\text{Total Assets} - \text{Current Liabilities} + \text{ST Debt} + \text{Accumulated Goodwill}$

Amortization

Shareholders' Equity

Sales

N/A

N/A

Denominator

Net Income

Depreciation

Pre-Tax Income

Total Equity

Interest Expense

Denominator

Diluted Earnings Per Share (Basis As Specified)

Shareholders' Equity / Current Basic Shares

Current Share Price

$\text{Market Cap} = \text{Current Share Price} \times \text{Current Basic Shares}$

Sales

Basic EBIT + Depreciation + Amortization

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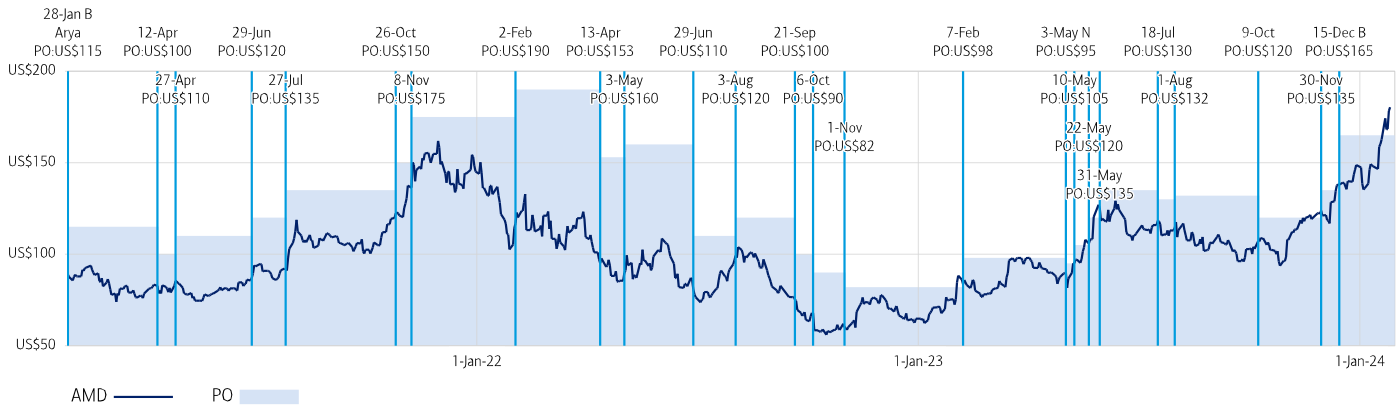
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Advanced Micro (AMD) Price Chart



B: Buy, N: Neutral, U: Underperform, PO: Price Objective, NA: No longer valid, NR: No Rating

The Investment Opinion System is contained at the end of the report under the heading "Fundamental Equity Opinion Key". Dark grey shading indicates the security is restricted with the opinion suspended. Medium grey shading indicates the security is under review with the opinion withdrawn. Light grey shading indicates the security is not covered. Chart is current as of a date no more than one trading day prior to the date of the report.

Equity Investment Rating Distribution: Technology Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	215	53.09%	Buy	111	51.63%
Hold	97	23.95%	Hold	45	46.39%
Sell	93	22.96%	Sell	24	25.81%

Equity Investment Rating Distribution: Global Group (as of 31 Dec 2023)

Coverage Universe	Count	Percent	Inv. Banking Relationships ^{R1}	Count	Percent
Buy	1895	53.62%	Buy	1083	57.15%
Hold	832	23.54%	Hold	454	54.57%
Sell	807	22.84%	Sell	383	47.46%

^{R1} Issuers that were investment banking clients of BofA Securities or one of its affiliates within the past 12 months. For purposes of this Investment Rating Distribution, the coverage universe includes only stocks. A stock rated Neutral is included as a Hold, and a stock rated Underperform is included as a Sell.

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Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

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