

Advanced Micro Devices (AMD)

\$87.52 (As of 01/28/21)

Price Target (6-12 Months): **\$92.00**

Long Term: 6-12 Months

Zacks Recommendation:

Neutral

(Since: 08/13/20)

Prior Recommendation: Outperform

Short Term: 1-3 Months

Zacks Rank: (1-5)

3-Hold

Zacks Style Scores:

VGM:B

Value: D

Growth: A

Momentum: B

Summary

AMD's Q4 performance benefited from strength in sales of Ryzen, EPYC and semi-custom products. The company is witnessing robust uptake of its Ryzen and EPYC server processors, courtesy of increasing proliferation of AI and Machine Learning (ML) in industries like cloud gaming and supercomputing domain. Further, the Xilinx acquisition will boost AMD's data center business. Growing clout of 7 nanometer (nm) products in the data center vertical, driven by work-from-home and online learning trends, is a key catalyst. The company also provided encouraging revenue guidance for 2021, on the back of growth across board. Markedly, shares of AMD have outperformed the industry in the past year. Nevertheless, increasing investments on product development amid intense competition from NVIDIA and Intel are likely to dent margins at least in the near term.

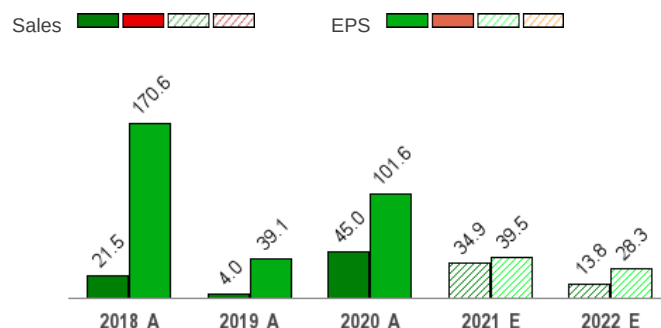
Price, Consensus & Surprise



Data Overview

52-Week High-Low	\$99.23 - \$36.75
20-Day Average Volume (Shares)	45,971,916
Market Cap	\$106.8 B
Year-To-Date Price Change	-3.1%
Beta	2.29
Dividend / Dividend Yield	\$0.00 / 0.0%
Industry	Electronics - Semiconductors
Zacks Industry Rank	Top 40% (101 out of 253)

Sales and EPS Growth Rates (Y/Y %)



Last EPS Surprise	10.6%
Last Sales Surprise	7.5%
EPS F1 Estimate 4-Week Change	-0.9%
Expected Report Date	04/27/2021
Earnings ESP	2.7%

P/E TTM	68.9
P/E F1	48.9
PEG F1	1.0
P/S TTM	10.9

Sales Estimates (millions of \$)

	Q1	Q2	Q3	Q4	Annual*
2022	3,298 E	3,585 E	4,093 E	4,183 E	14,995 E
2021	3,114 E	3,203 E	3,426 E	3,459 E	13,171 E
2020	1,786 A	1,932 A	2,801 A	3,244 A	9,763 A

EPS Estimates

	Q1	Q2	Q3	Q4	Annual*
2022	\$0.46 E	\$0.53 E	\$0.66 E	\$0.70 E	\$2.31 E
2021	\$0.39 E	\$0.42 E	\$0.51 E	\$0.53 E	\$1.80 E
2020	\$0.18 A	\$0.18 A	\$0.41 A	\$0.52 A	\$1.29 A

*Quarterly figures may not add up to annual.

The data in the charts and tables, including the Zacks Consensus EPS and Sales estimates, is as of 01/28/2021. The reports text is as of 01/29/2021.

Overview

Advanced Micro Devices has strengthened its position in the semiconductor market on the back of its evolution as an enterprise-focus company from a pure-bred consumer-PC chip provider.

AMD has emerged as a strong challenger to NVIDIA's dominance in the graphic processing unit or GPU market based on its Radeon technology.

Launch of 7 nanometer (nm)-based AMD Radeon RX 5700-series gaming graphics card family featuring RDNA architecture, high-speed GDDR6 (Graphics Double Data Rate type 6) memory and support for the PCIe 4.0 interface, has helped the company increase presence among gamers.

Further, AMD Radeon Instinct family of GPU products are gaining traction in data center applications, including deep learning training and traditional high-performance computing (HPC) workloads.

Additionally, AMD EPYC 7001 Series of high-performance processors is helping AMD gain share in the server market. Further, AMD EPYC Embedded 3000 Series of processors addresses new markets including, networking, storage and edge computing devices.

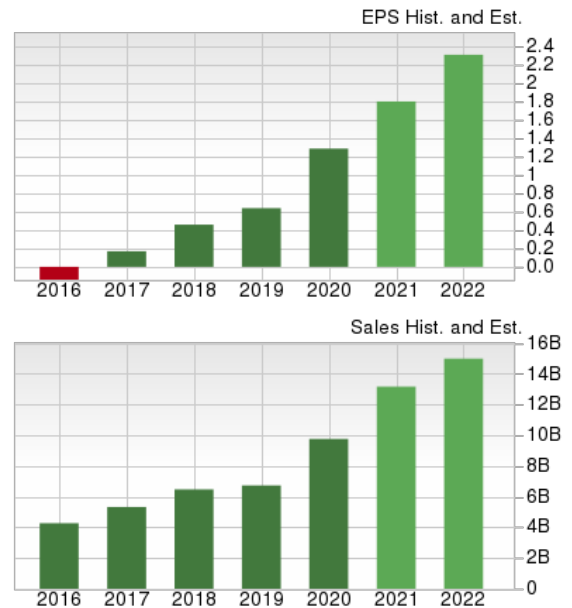
On Oct 27, AMD announced that it has entered into a definitive agreement to acquire Xilinx for \$35 billion in an all-stock transaction. The buyout will significantly help in expanding AMD's data center business.

In consumer-PC market, AMD has become a key challenger to Intel courtesy AMD Ryzen desktop processor family. The company's desktop-based processor offerings include Ryzen and high-end Ryzen Threadripper processors, among others. AMD Athlon and AMD PRO series of processors cater to commercial and consumer desktop PC market.

AMD's processors are primarily powered by the company's proprietary "Zen" CPU and "Vega" GPU architectures. Santa Clara, CA-based, AMD generated revenues of \$9.763 billion in 2020. The company reports operations under two segments — Computing and Graphics, and Enterprise, Embedded and Semi-Custom.

Computing and Graphics segment includes desktop and notebook processors and chipsets, discrete GPUs and professional graphics. This segment generated revenues of \$6.432 billion in 2020.

Enterprise, Embedded and Semi-Custom segment includes server and embedded processors, dense servers, semi-custom SoC products, engineering services and royalties. This segment generated \$3.331 billion in revenues in 2020.



Source: Zacks Investment Research

Reasons To Buy:

- ▲ In order to diversify its business beyond the slowing, transitioning PC market, AMD is enhancing its semi-custom chip business, which has been performing well till date. AMD plans to expand its semi-custom business into other high-growth markets such as the semi-custom ultra-low power client, embedded, dense server and professional graphics markets, where it can offer differentiated products that use its APU and graphics IP. The company's release of Vega-based GPUs and increasing demand for in both gaming and blockchain industries are key catalysts. The number of Ryzen 5000-powered notebook set to be launched in 2021 is 50% higher than the ones launched in 2020. These systems are mostly from the likes of Acer, Asus, Dell, HP, Lenovo and other OEMs.
- ▲ Despite its late entry, AMD has attained the position of a major player in the microprocessor and graphics processing markets. The company started small, targeting the low-end segment and gradually built a position for itself. AMD has had a very rough time because of the strength and market position of its two primary competitors Intel and NVIDIA. While Intel remains supreme in the microprocessor segment and has also notably strengthened its graphics capabilities, NVIDIA remains strong in the graphics market. AMD combined its own engineering talent with that of ATI to develop capabilities in both these areas. Considering the might of its competitors, AMD has done well to hold its own in the face of significant changes in the markets it serves. Moreover, increasing demand for cryptocurrency mining has been a key catalyst for AMD's GPU sales in recent times.
- ▲ Strength in 7 nanometer-based processors are expected to strengthen the company's competitive position in the commercial and server market against Intel. Notably, Intel's chips utilize process technologies that are designed in-house. Meanwhile, AMD is currently leveraging Taiwan Semiconductor Manufacturing Company's 7 nm process technology, which is enabling it to deliver its advanced 7 nm chips faster to market. Further, AMD aims to deliver "Zen 4" core architecture, which is "currently in design" utilizing advanced 5 nm process technology. This is a major concern for Intel, which is yet to deliver 7 nm chips. Markedly, Intel noted delay in 7nm process-based chips in its second-quarter earnings conference. The company has detected a defect mode in 7 nm process, which caused yield degradation. This is expected to favor AMD capture market share and challenge Intel's dominance in the semiconductor market.
- ▲ Given the persistent weakness in the core PC business, AMD like Intel, has started investing in its embedded business. Strength in this segment should continue in the future too as the company scores more wins. Given continued product enhancements and design wins at strategic players in key verticals such as digital signage and medical equipment, we expect the momentum to continue through 2020. The company is currently targeting the communications, industrial, and gaming segments of the market and there appear to be suitable design wins to generate substantial revenue growth over the next few years. Acquisition of Xilinx, the pioneer in field-programmable gate arrays (FPGAs) chips, will boost AMD's data center market, which is benefiting from coronavirus crisis triggered cloud computing boom. AMD expects the acquisition to bolster its total addressable market (or TAM) to \$110 billion. The Xilinx buyout is expected to conclude by end of 2021.
- ▲ Per Gartner's preliminary data, PC shipments in fourth-quarter 2020 increased 10.7% year over year to 79.4 million units. Going by the IDC report, shipments were up 26.1% on a year-over-year basis to 91.6 million in the quarter. The improving trend in PC shipments, driven by work-from-home and online learning wave, is likely to positively impact PC-makers that eventually bode well for AMD's growth prospects.
- ▲ Management execution has been good amid testing times in the wake of the coronavirus pandemic. As of December 26, 2020, AMD had cash and cash equivalents (including marketable securities) of \$2.29 billion, while total debt (long-term plus short-term) stood at \$330 million. During the fourth quarter, the company generated \$554 million in cash from operations compared with operating cash flow of \$339 million in the third quarter. Free cash flow was \$480 million in the third quarter compared with free cash flow of \$265 million in the previous quarter. Increasing liquidity and cash flow trend reflect that the company is making investments in the right direction. Moreover, total debt to total capital of 5.4% is lower than the previous quarter's figure of 8.8%. Meanwhile, times interest earned is 28.1X, compared with the previous quarter's figure of 17.7X. The strong cash balance can aid the company to pursue strategic acquisitions and other investments in growth initiatives. Moreover, on Sep 11, AMD announced that its senior unsecured credit rating was upgraded to investment grade Baa3 by Moody's Investors Service.

AMD is well-poised to benefit from strong demand for its x86-based microprocessors, semi-custom chips, and embedded processors, and GPUs driven by increasing adoption of AI and ML techniques.

Reasons To Sell:

- ▼ In the traditional computing market, which still generates a chunk of its revenues, AMD is up against Intel's strong market position. With Intel systems so well entrenched, there is an obvious preference for system integrators to choose Intel processors over AMD. So far, Intel processors have also afforded superior functionality, enabling it to exercise pricing power. In the past, AMD was forced to resort to penetration pricing, which severely impacted its profitability. Now that it is getting into the higher-range segment, it is facing very stiff competition from Intel. Moreover, AMD faces significant competition from NVIDIA in GPU market. AMD has had relatively greater success in the mobile segment and its current product lineup indicates that this focus will continue. However, competition in the mobile segment is likely to accelerate, with more ARM-based devices coming on the market. Also, NVIDIA's acquisition of ARM Holdings, might aid the acquirer to provide full stack CPU-GPU offering, which poses a headwind for AMD.
- ▼ AMD faces significant customer concentration from Sony and Microsoft. Consequently, loss of any one of these customers is anticipated to massively hurt the top line. Notably, Sony accounted for more than 10% of the company's total revenues in 2019. Also, AMD derives a significant proportion of its revenues from outside the United States (74% in 2019), subjecting the company to exchange rate volatility.
- ▼ Moreover, the company is trading at premium in terms of Price/Book (P/B). AMD currently has a trailing 12-month P/B ratio of 27.22X. This level compares unfavorably with what the industry witnessed in the last year. Additionally, the ratio is higher than the average level of 23.92X and is towards the high end of the valuation range in this period. Consequently, the valuation looks slightly stretched from P/B perspective.

Intensifying competition in the traditional PC market and GPU segment, and customer concentration remain headwinds.

Last Earnings Report

AMD Q4 Earnings & Revenues Beat Estimates

Advanced Micro Devices reported fourth-quarter 2020 non-GAAP earnings of 52 cents per share, which surpassed the Zacks Consensus Estimate by 10.6%. Notably, the bottom line surged 63% year over year and 27% sequentially.

Revenues of \$3.244 billion outpaced the Zacks Consensus Estimate by 7.5% and surged 53% year over year. On a quarter-over-quarter basis, the top line increased 16%.

Strength in the Computing and Graphics and Enterprise Embedded and Semi-Custom divisions drove year-over-year improvement.

AMD also stated that it completed several regulatory milestones for its proposed acquisition of Xilinx. The buyout is expected to conclude by end of 2021.

Segmental Details

Computing and Graphics segment's (60.4% of total revenues) revenues of \$1.96 billion, increased 18% year over year and sequentially. The upside can be attributed to robust adoption of Ryzen processors.

Client processor average selling price (ASP) was lower compared with year over year ASP due to increased Ryzen mobile processor sales. However, client processor ASP improved sequentially owing to higher Ryzen desktop processor sales.

Coronavirus crisis-induced work-from-home and online learning wave continued to drive PC market strength, which led to robust growth in client processor revenues.

Nevertheless, desktop CPU sales registered "strong double-digit percentage" growth on a year-over-year and quarter-over-quarter basis. The improvement was driven by solid demand for Ryzen processors. In the fourth quarter earnings conference call, management also noted that its latest Ryzen 5000 Series desktop processor based on its Zen 3 architecture witnessed strong sell through.

In mobile domain, growth in notebook processor unit shipments and revenues was driven by increasing traction of Ryzen 4000 mobile processors. Management is optimistic regarding growing clout of Ryzen 4000 mobile processors families across leading OEMs.

The company recently launched a class of mobile processors — AMD Ryzen 5000 Series — which is based on Zen 3 core architecture at CES 2021. The company also unveiled AMD Ryzen PRO 5000 Series Mobile processors for enterprise. These are expected to be available in the first half of 2021.

Management stated that it was on track to increase the number of notebooks powered by Ryzen 5000 processors by 50% compared with the previous generation in 2021.

In graphics domain, revenues fell year over year, while registering improvement on a quarter-over-quarter basis.

Desktop GPU sales improved on a quarter-over-quarter basis due to new Radeon 6000 Series GPUs. Radeon 6000 Series GPUs are based on RDNA 2 architecture and deliver 65% performance per watt compared with the previous generation, per AMD estimates.

The company noted that Data Center GPU business declined on a year-over-year basis. However, the Data Center GPU business improved quarter over quarter, which includes shipments of AMD Instinct MI100 accelerator chips, further added AMD.

The company also added that it is working on expanding its data center GPU business along with software ecosystem expansion to support the launch of the first exascale supercomputer in the United States at Oak Ridge National Laboratory.

Enterprise, Embedded and Semi-Custom segment's (39.6% of total revenues) revenues of \$1.284 billion were up 176% year over year and 13% sequentially.

The upside can primarily be attributed to higher semi-custom product revenues and higher EPYC server processor sales.

AMD noted that semi-custom revenues improved both on a year-over-year and quarter-over-quarter basis due to higher demand from latest generation hardware consoles from Sony and Microsoft. Due to higher demand, AMD added that it expects sales of semi-custom SoCs "to be better than typical seasonality" in the first half of 2021.

In server domain, strength in AMD' latest EPYC processors enable the company to win new deals from major enterprise, cloud, and HPC companies.

In cloud vertical, AMD highlighted that 28 new AMD-based public cloud instances were rolled out in the quarter under review by major cloud providers including Amazon Web Services, Alibaba, and Oracle.

Further, Google also extended availability of its confidential computing Virtual Machines (VMs) powered by EPYC processors to nine regions.

AMD's focus on introducing new high-performance processors to support complex applications, advanced modeling, database and hyper-converged workloads are driving growth. In enterprise domain, the company's servers are witnessing rapid uptake as OEMs like Dell, Lenovo and HPE continue to clinch important deals across critical domains like, financial services, manufacturing and automotive.

Quarter Ending	12/2020
Report Date	Jan 26, 2021
Sales Surprise	7.49%
EPS Surprise	10.64%
Quarterly EPS	0.52
Annual EPS (TTM)	1.29

AMD demonstrated third generation EPYC processors (codenamed "Milan") at CES 2021 for the public for the first time. These processors are on track for public launch in March 2021.

Further, management is optimistic on increasing utilization of AMD CPUs and GPUs across supercomputing systems.

Operating Details

Non-GAAP gross margin remained unchanged at 45% on a year-over-year basis.

Non-GAAP operating expenses increased 45% year over year to \$789 million, due to higher investments in Research & development (R&D) and go-to-market initiatives along with increased variable employee compensation-related costs.

R&D expenses rose 45.1% year over year to \$573 million. Marketing, general and administrative expenses surged 49.5% year over year to \$308 million.

As a percentage of revenues, non-GAAP operating expenses were 24%, contracting 200 bps from the year-ago quarter's levels.

Adjusted EBITDA soared 60.6% year over year to \$753 million. The upside can be attributed to earnings growth.

Non-GAAP operating income came in at \$663 million, up 64% year over year. Growth in revenue base drove year-over-year improvement.

Non-GAAP operating margin of 20% expanded 100 bps year over year.

Segment wise, Computing and Graphics operating income was \$420 million compared with \$360 million reported in the year-ago quarter, courtesy of higher Ryzen processor revenues. Enterprise, Embedded and Semi-Custom operating income was \$243 million compared with \$45 million reported in the year-ago quarter, owing to higher revenues.

Balance Sheet & Cash Flow

As of Dec 26, 2020, AMD had cash and cash equivalents (including marketable securities) of \$2.29 billion compared with \$1.77 billion as of Sep 26, 2020.

As of Dec 26, 2020, total debt (long-term plus short-term) was \$330 million, down from \$373 million as of Sep 26, 2020.

Operating cash flow was reported at \$554 million against operating cash flows of \$339 million in the prior quarter.

Free cash flow was \$480 million in the fourth quarter against free cash flow of \$265 million in the prior quarter.

Quick Look at 2020 Performance

AMD reported non-GAAP revenues of \$9.763 billion in 2020, up 45% over 2019 tally.

AMD noted that its data center sales now form a "high-teens percentage" of its overall annual revenues.

Non-GAAP earnings per share was \$1.29, up 102% compared with 64 cents reported for 2019.

Non-GAAP gross margin expanded 200 bps to 45%, while non-GAAP operating margin expanded 500 bps to 17%.

For 2020, AMD generated cash flow from operations of \$1.07 billion compared with \$493 million in the previous year. Free cash flow during 2020 was \$777 million compared with \$276 million in 2019.

Guidance

Following stellar fourth-quarter 2020 results, the company provided encouraging outlook for 2021.

AMD expects first-quarter 2021 revenues to be \$3.2 billion (+/- \$100 million), which indicates year-over-year growth of 79%. For first-quarter 2021, AMD expects robust sales across all its businesses to drive year-over-year increase in revenues. However, on a quarter-over-quarter basis, this suggests a decline of 1%.

Non-GAAP gross margin is anticipated to be 46%, while non-GAAP operating expenses are expected to be \$830 million.

For 2021, management expects revenue to increase 37% propelled by growth across board. The non-GAAP gross margin for 2021 is anticipated to be 47%, while non-GAAP operating expenses are expected to be 26% of total revenues.

Recent News

On Jan 12, 2021, at CES 2021, AMD unveiled a new class of mobile processors — AMD Ryzen 5000 Series — based on Zen 3 core architecture. The company added that laptops based on AMD Ryzen 5000 Series mobile processors will be available from first-quarter 2021 from leading manufacturers including ASUS, Lenovo and HP.

On Dec 2, AMD announced that Amazon Web Services (AWS) is expanding usage of its offerings. New Amazon Elastic Compute Cloud (Amazon EC2) G4ad instances will be based on AMD's processors. Moreover, Amazon GameLift game server hosting solution is utilizing AMD's EPYC processor-powered Amazon EC2 C5a, M5a and R5a instances.

On Nov 16, AMD rolled out Instinct MI100 accelerator based on ROCm 4.0 open ecosystem and unveiled EPYC CPUs and Instinct accelerator based implementations, with focus on accelerating HPC applications in the cloud.

On Nov 11, AMD and IBM inked a multi-year agreement with an aim to jointly develop, enhance and expand the security and AI offerings. The focus is to design innovative open system architectures to boost Confidential Computing across hybrid cloud environments.

On Nov 10, AMD rolled out Ryzen Embedded V2000 Series processors that offers improved performance along with enhanced security. The processors are based on 7 nm process technology and features Zen 2 core and AMD Radeon graphics card.

On Oct 28, AMD unveiled Radeon RX 6000 Series graphics cards, that offer high performance, and immersive gaming experience with advanced visuals, and engaging features for PC gaming enthusiasts.

On Oct 27, AMD announced that it has entered into a definitive agreement to acquire Xilinx for \$35 billion in an all-stock transaction. The buyout will significantly help in expanding AMD's data center business.

On Oct 15, AMD announced that its EPYC processors being utilized in Microsoft Azure Virtual Machines will now aid customers to leverage Azure Data Explorer, a Platform as a Service (PaaS) solution optimized for data exploration and analytics in near real time.

On Oct 14, AMD announced that its EPYC processors were utilized by Lenovo Group Limited for its latest hyperconverged infrastructure (HCI) solution — ThinkAgile HX. It is a scalable HCI platform built in collaboration with VMware, Nutanix and Microsoft.

On Oct 8, AMD rolled out Ryzen 5000 Series desktop processors based on its latest "Zen 3" architecture.

Valuation

Advanced Micro Devices shares are up 11.9% in the past six-month period and 79.4% over the trailing 12-month period. Stocks in the Zacks sub-industry and the Zacks Computer & Technology sector are up 34.7% and 28.5% in the past six-month period, respectively. In the past year, the Zacks sub-industry and sector are up 58.2% and 42%, respectively.

The S&P 500 index is up 16.6% in the past six-month period and 16.2% in the past year.

The stock is currently trading at 8.53X forward 12-month sales, which compares to 8.69X for the Zacks sub-industry, 5.05X for the Zacks sector and 4.44X for the S&P 500 index.

Over the past five years, the stock has traded as high as 10.75X and as low as 0.37X, with a 5-year median of 2.71X. Our Neutral recommendation indicates that the stock will perform in line with the market. Our \$92 price target reflects 8.97X forward 12-month sales.

The table below shows summary valuation data for AMD

Valuation Multiples - AMD					
		Stock	Sub-Industry	Sector	S&P 500
P/S F12M	Current	8.53	8.69	5.05	4.44
	5-Year High	10.75	8.69	5.05	4.44
	5-Year Low	0.37	4.65	2.77	3.2
	5-Year Median	2.71	5.81	3.47	3.67
EV/Sales TTM	Current	10.58	8.49	5.75	4.45
	5-Year High	13.99	8.49	5.75	4.45
	5-Year Low	0.67	2.94	2.85	2.61
	5-Year Median	2.97	5.47	3.9	3.59

As of 01/28/2021

Source: Zacks Investment Research

Industry Analysis Zacks Industry Rank: Top 40% (101 out of 253)



Source: Zacks Investment Research

Top Peers

Company (Ticker)	Rec	Rank
DIALOG SEMICON (DLGNF)	Outperform	2
Intel Corporation (INTC)	Outperform	2
Amkor Technology, Inc. (AMKR)	Neutral	3
Broadcom Inc. (AVGO)	Neutral	2
Cirrus Logic, Inc. (CRUS)	Neutral	3
NVIDIA Corporation (NVDA)	Neutral	3
Semiconductor Manufacturing International Corporation (SMICY)	Neutral	3
Synaptics Incorporated (SYNA)	Neutral	2

The positions listed should not be deemed a recommendation to buy, hold or sell.

Industry Comparison Industry: Electronics - Semiconductors				Industry Peers		
	AMD	X Industry	S&P 500	AMKR	INTC	NVDA
Zacks Recommendation (Long Term)	Neutral	-	-	Neutral	Outperform	Neutral
Zacks Rank (Short Term)	3	-	-	3	2	3
VGM Score	B	-	-	A	A	C
Market Cap	106.85 B	1.29 B	26.41 B	3.92 B	217.74 B	319.84 B
# of Analysts	13	3	13	1	13	13
Dividend Yield	0.00%	0.00%	1.45%	0.99%	2.46%	0.12%
Value Score	D	-	-	A	A	F
Cash/Price	0.02	0.12	0.06	0.21	0.10	0.03
EV/EBITDA	137.69	9.57	14.73	5.53	6.82	93.73
PEG F1	0.99	1.48	2.43	NA	1.44	2.91
P/B	18.31	3.19	3.66	1.76	2.69	20.86
P/CF	115.07	21.89	14.44	5.88	6.57	99.38
P/E F1	48.92	21.97	19.77	11.97	10.83	53.19
P/S TTM	10.94	3.59	2.84	0.81	2.80	21.64
Earnings Yield	2.01%	2.78%	4.98%	8.35%	9.24%	1.88%
Debt/Equity	0.06	0.07	0.69	0.53	0.42	0.39
Cash Flow (\$/share)	0.76	0.49	6.85	2.76	8.53	5.25
Growth Score	A	-	-	C	B	B
Historical EPS Growth (3-5 Years)	85.91%	2.10%	9.69%	21.25%	20.61%	34.19%
Projected EPS Growth (F1/F0)	38.47%	33.33%	12.80%	8.87%	-6.62%	67.80%
Current Cash Flow Growth	44.79%	-3.19%	4.88%	-5.49%	6.32%	-20.70%
Historical Cash Flow Growth (3-5 Years)	27.24%	9.57%	8.07%	-0.41%	11.49%	28.68%
Current Ratio	2.54	2.54	1.38	1.65	1.91	3.92
Debt/Capital	5.35%	8.88%	41.57%	34.73%	29.49%	28.00%
Net Margin	25.50%	3.34%	10.44%	6.39%	26.84%	25.89%
Return on Equity	32.60%	3.82%	15.37%	14.81%	28.58%	32.61%
Sales/Assets	1.37	0.64	0.51	0.98	0.52	0.64
Projected Sales Growth (F1/F0)	25.36%	10.36%	5.98%	6.65%	-3.78%	51.08%
Momentum Score	B	-	-	B	A	D
Daily Price Change	-1.49%	0.00%	1.38%	0.34%	4.62%	1.03%
1-Week Price Change	5.19%	4.60%	-0.02%	2.38%	-1.60%	6.63%
4-Week Price Change	-4.57%	10.61%	0.04%	7.53%	12.53%	-0.03%
12-Week Price Change	5.45%	31.02%	8.96%	24.83%	22.73%	-7.83%
52-Week Price Change	79.42%	54.35%	7.48%	35.46%	-15.65%	112.38%
20-Day Average Volume (Shares)	45,971,916	333,970	1,962,643	916,267	45,265,948	7,309,971
EPS F1 Estimate 1-Week Change	1.06%	0.00%	0.00%	0.00%	4.24%	0.00%
EPS F1 Estimate 4-Week Change	-0.87%	0.00%	0.26%	0.00%	6.15%	0.04%
EPS F1 Estimate 12-Week Change	1.06%	5.49%	1.63%	0.00%	5.56%	10.39%
EPS Q1 Estimate Monthly Change	6.56%	0.00%	0.05%	0.00%	14.39%	0.05%

Source: Zacks Investment Research

Zacks Stock Rating System

We offer two rating systems that take into account investors' holding horizons: Zacks Rank and Zacks Recommendation. Each provides valuable insights into the future profitability of the stock and can be used separately or in combination with each other depending on your investment style.

Zacks Recommendation

The Zacks Recommendation aims to predict performance over the next 6 to 12 months. The foundation for the quantitatively determined Zacks Recommendation is trends in the company's estimate revisions and earnings outlook. The Zacks Recommendation is broken down into 3 Levels; Outperform, Neutral and Underperform. Unlike many Wall Street firms, we maintain a balance between the number of Outperform and Neutral recommendations. Our team of 70 analysts are fully versed in the benefits of earnings estimate revisions and how that is harnessed through the Zacks quantitative rating system. But we have given our analysts the ability to override the Zacks Recommendation for the 1200 stocks that they follow. The reason for the analyst over-rides is that there are often factors such as valuation, industry conditions and management effectiveness that a trained investment professional can spot better than a quantitative model.

Zacks Rank

The Zacks Rank is our short-term rating system that is most effective over the one- to three-month holding horizon. The underlying driver for the quantitatively-determined Zacks Rank is the same as the Zacks Recommendation, and reflects trends in earnings estimate revisions.

Zacks Style Scores

The Zacks Style Score is as a complementary indicator to the Zacks rating system, giving investors a way to focus on the highest rated stocks that best fit their own stock picking preferences.

Academic research has proven that stocks with the best Value, Growth and Momentum characteristics outperform the market. The Zacks Style Scores rate stocks on each of these individual styles and assigns a rating of A, B, C, D and F. We also produce the VGM Score (V for Value, G for Growth and M for Momentum), which combines the weighted average of the individual Style Scores into one score. This is perfectly suited for those who want their stocks to have the best scores across the board.

Value Score	D
Growth Score	A
Momentum Score	B
VGM Score	B

As an investor, you want to buy stocks with the highest probability of success. That means buying stocks with a Zacks Recommendation of Outperform, which also has a Style Score of an A or a B.

Disclosures

This report contains independent commentary to be used for informational purposes only. The analysts contributing to this report do not hold any shares of this stock. The analysts contributing to this report do not serve on the board of the company that issued this stock. The EPS and revenue forecasts are the Zacks Consensus estimates, unless indicated otherwise on the reports first page. Additionally, the analysts contributing to this report certify that the views expressed herein accurately reflect the analysts personal views as to the subject securities and issuers. ZIR certifies that no part of the analysts compensation was, is, or will be, directly or indirectly, related to the specific recommendation or views expressed by the analyst in the report.

Additional information on the securities mentioned in this report is available upon request. This report is based on data obtained from sources we believe to be reliable, but is not guaranteed as to accuracy and does not purport to be complete. Any opinions expressed herein are subject to change.

ZIR is not an investment advisor and the report should not be construed as advice designed to meet the particular investment needs of any investor. Prior to making any investment decision, you are advised to consult with your broker, investment advisor, or other appropriate tax or financial professional to determine the suitability of any investment. This report and others like it are published regularly and not in response to episodic market activity or events affecting the securities industry.

This report is not to be construed as an offer or the solicitation of an offer to buy or sell the securities herein mentioned. ZIR or its officers, employees or customers may have a position long or short in the securities mentioned and buy or sell the securities from time to time. ZIR is not a broker-dealer. ZIR may enter into arms-length agreements with broker-dealers to provide this research to their clients. Zacks and its staff are not involved in investment banking activities for the stock issuer covered in this report.

ZIR uses the following rating system for the securities it covers. **Outperform-** ZIR expects that the subject company will outperform the broader U.S. equities markets over the next six to twelve months. **Neutral-** ZIR expects that the company will perform in line with the broader U.S. equities markets over the next six to twelve months. **Underperform-** ZIR expects the company will underperform the broader U.S. equities markets over the next six to twelve months.

No part of this report can be reprinted, republished or transmitted electronically without the prior written authorization of ZIR.

Additional Disclosure

This material represents an assessment of the market and economic environment at a specific point in time and is not intended to be a forecast of future events, or a guarantee of future results. Forward-looking statements are subject to certain risks and uncertainties. Any statements that refer to expectations, projections or characterizations of future events or circumstances, including any underlying assumptions, are forward-looking statements. Actual results, performance, or achievements may differ materially from those expressed or implied.

Returns quoted represent past performance which is no guarantee of future results. Investment returns and principal value will fluctuate so that when shares are redeemed, they may be worth more or less than their original cost. Current performance may be higher or lower than the performance shown.

Investing involves risk; principal loss is possible. There is no guarantee that companies that can issue dividends will declare, continue to pay or increase dividends.

Glossary of Terms and Definitions

52-Week High-Low: The range of the highest and lowest prices at which a stock has traded during the past year. This range is determined based on the stock's daily closing price which may differ from the intra-day high or low. Many investors use it as a technical indicator to determine a stock's current value and future price movement. The idea here is that if price breaks out from the 52-week range, in either direction, the momentum may continue in the same direction.

20-Day Average Volume (Shares): The average number of shares of a company traded in a day over the last 20 days. It is a direct indication of a security's overall liquidity. The higher the average daily trading volume, the easier it is to enter or exit the stock at a desired price with more buyers and sellers being available.

Daily Price Change: This is the percentage difference between a trading day's closing price and the prior trading day's closing price. This item is updated at 9 p.m. EST each day.

1-Week Price Change: This is the percentage change in a stock's closing price over the last 5 trading days. This change reflects the collective buying and selling sentiment over the 1-week period.

A strong weekly price increase for the stock, especially when accompanied by increased volume, is an indication of it gaining momentum.

4-Week Price Change: This is the percentage change in a stock's closing price over the last 20 trading days or past 4 weeks. This is a medium-term price change metric and an indication of the stock gaining momentum.

12-Week Price Change: This is the percentage change of a stock's closing price over the last 60 trading days or past 12 weeks. Similar to 4-week price change, this is a medium-term price change metric. It shows whether a stock has been enjoying strong investor demand, or if it has been in consolidation, or distress over this period.

52-Week Price Change: This is the percentage change in a stock's closing price over the last 260 trading days or past 52 weeks. This long-term price change metric is a good reference point for investors. Some investors seek stocks with the best percentage price change over the last 52 weeks, expecting the momentum to continue.

Market Cap: The number of outstanding common shares of a company times its latest price per share. This figure represents a company's size, which indicates various characteristics, including price stability and risk, in which investors could be interested.

Year-To-Date Price Change: Change in a stock's daily closing price in the period of time beginning the first day of the current calendar year through to the previous trading day.

of Analysts: Number of EPS estimates used in calculating the current-quarter consensus. These estimates come from the brokerage analysts tracking this stock. However, the number of such analysts tracking this stock may not match the number of estimates, as all brokerage analysts may not come up with an estimate or provide it to us.

Beta: A measure of risk commonly used to compare the volatility of a stock to the overall market. The S&P 500 Index is the base for calculating beta and carries a value of 1. A stock with beta below 1 is less risky than the market as a whole. And a stock with beta above 1 is riskier.

Dividend: The portion of earnings a company is expected to distribute to its common shareholders in the next 12 months for each share they own. Dividends are usually paid quarterly. Dividend payments reflect positively on a company and help maintain investors' trust. Investors typically find dividend-paying stocks appealing because the dividend adds to any market price appreciation to result in higher return on investment (ROI). Moreover, a steady or increasing dividend payment provides investors a cushion in a down market.

Dividend Yield: The ratio of a company's annual dividend to its share price. The annual dividend used in the ratio is calculated based on the most recent dividend paid by the company. Dividend yield is an estimate of the dividend-only return from a stock in the next 12 months. Since dividend itself doesn't change frequently, dividend yield usually changes with a stock's price movement. As a result, often an unusually high dividend yield is a result of weak stock price.

S&P 500 Index: The Standard & Poor's 500 (S&P 500) Index is an unmanaged group of securities considered to be representative of the stock market in general. It is a market-capitalization-weighted index of stocks of the 500 largest U.S. companies. Each stock's weight in the index is proportionate to its market value.

Industry: One of the 250+ groups that Zacks classifies all stocks into based on the nature of business. These groups are termed as expanded (aka "X") industries and map to their respective (economic) sectors; Zacks has 16 sectors.

Zacks Industry Rank: The Zacks Industry Rank is determined by calculating the average Zacks Rank for all stocks in the industry and then assigning an ordinal rank to it. For example, an industry with an average Zacks Rank of 1.6 is better than an industry with an average Zacks Rank of 2.3. So, the industry with the better average Zacks Rank would get a better Zacks Industry Rank. If an industry has the best average Zacks Rank, it would be considered the top industry (1 out of 250+), which would place it at the top 1% of Zacks-ranked industries. Studies have shown that roughly half of a stock's price movement can be attributed to the industry group it belongs to. In fact, the top 50% of Zacks-ranked industries outperforms the bottom 50% by a factor of more than 2 to 1.

Last EPS Surprise: The percentage deviation of a company's last reported earnings per share from the Zacks Consensus Estimate. Companies with a positive earnings surprise are more likely to surprise again in the future (or miss again if they recently missed).

Last Sales Surprise: The percentage deviation of a company's last reported sales from the Zacks Consensus Estimate.

Expected Report Date: This is an estimated date of a company's next earnings release. The information originated or gathered by Zacks Investment Research from its information providers or publicly available sources is the basis of this estimate.

Earnings ESP: The Zacks Earnings ESP compares the Most Accurate Estimate to the Zacks Consensus Estimate for the yet-to-be reported quarter. The Most Accurate Estimate is the most recent version of the Zacks Consensus EPS Estimate. The idea here is that analysts revising their estimates closer to an earnings release have the latest information, which could potentially be more accurate than what they and others contributing to the consensus had predicted earlier. Thus, a positive or negative Earnings ESP reading theoretically indicates the likely deviation of the actual earnings from the consensus estimate. However, the model's predictive power is significant for positive ESP readings only. A positive Earnings ESP is a strong predictor of an earnings beat, particularly when combined with a Zacks Rank #1 (Strong Buy), #2 (Buy) or #3 (Hold). Our research shows that stocks with this combination produce a positive surprise nearly 70% of the time.

Periods:

TTM: Trailing 12 months. Using TTM figures is an effective way of analyzing the most-recent financial data in an annualized format that helps neutralize the effects of seasonality and other quarter-to-quarter variation.

F1: Current fiscal year. This period is used to analyze the estimates for the ongoing full fiscal year.

F2: Next fiscal year. This period is used to analyze the estimates for the next full fiscal year.

F12M: Forward 12 months. Using F12M figures is an effective way of analyzing the near-term (the following four unreported quarters) estimates in an annualized manner. Instead of typically representing estimates for the full fiscal year, which may not represent the nitty-gritty of each quarter, F12M figures suggest an all-inclusive annualized estimate for the following four quarters. The annualization helps neutralize the potential effects of seasonality and other quarter-to-quarter variations.

P/E Ratio: The price-to-earnings ratio measures a company's current market price per share relative to its earnings per share (EPS). Usually, the trailing-12-month (TTM) EPS, current-fiscal-year (F1) EPS estimate, or forward-12-month (F12M) EPS estimate is used as the denominator. In essence, this ratio shows what the market is willing to pay today for each dollar of EPS. In other words, this ratio gives a sense of what the relative value of the company is at the already reported level of earnings or at a future level of earnings.

It is one of the most widely-used multiples for determining the value of a company and helps comparing its valuation with that of a competitor, the industry group or a benchmark.

PEG Ratio: The price/earnings to growth ratio is a stock's P/E ratio using current fiscal year (F1) EPS estimate divided by its expected EPS growth rate over the coming 3 to 5 years. This ratio essentially determines a stock's value by factoring in the company's expected earnings growth and is thus believed to provide a more complete picture than just the P/E ratio, particularly for faster-growing companies.

P/S Ratio: The price-to-sales ratio is calculated as a company's current price per share divided by trailing 12 months (TTM) sales or revenues per share. This ratio shows what the market is willing to pay today for each dollar of TTM sales per share. The P/S ratio is at times the only valuation metric when the company has yet to become profitable.

Cash/Price Ratio: The cash-to-price ratio or Cash Yield is calculated as cash and marketable securities per share divided by the company's current share price. Like the earnings yield, which shows the anticipated yield (or return) on a stock from earnings for each dollar invested, the cash yield does the same, with cash being the source of return instead of earnings. For example, a cash/price ratio of 0.08 suggests a return of 8% or 8 cents for every \$1 investment.

EV/EBITDA Ratio: The EV/EBITDA ratio, also known as Enterprise Multiple, is calculated as a company's enterprise value (market capitalization + value of total long-term debt + book value of preferred shares - cash and marketable securities) divided by EBITDA (earnings before interest, taxes, depreciation and amortization). Usually, trailing-12-month (TTM) or forward-12-month (F12M) EBITDA is used as the denominator.

EV/Sales Ratio: The enterprise value-to-sales ratio is calculated as a company's enterprise value (market capitalization + value of total long-term debt + book value of preferred shares - cash and marketable securities) divided by annual sales. It is an expansion of the P/S valuation, which uses market value instead of enterprise value. The EV/Sales ratio is perceived as more accurate than P/S, in part, because the market capitalization does not take a company's debt into account when valuing it.

EV/CF Ratio: The enterprise value-to-cash flow ratio is calculated as a company's enterprise value (market capitalization + value of total long-term debt + book value of preferred shares - cash and marketable securities) divided by the trailing-12-month (TTM) operating cash flow. It's a measure of how long it would take to buy the entire business if you were able to use all the company's operating cash flow.

The EV/CF ratio is perceived as more accurate than the P/CF ratio, in part, because the market price does not take a company's debt into account when valuing it.

EV/FCF Ratio: The enterprise value-to-free cash flow metric compares a company's enterprise value to its trailing-12-month (TTM) free cash flow (FCF). This metric is very similar to the EV/CF ratio, but is considered a more exact measure owing to the fact that it uses free cash flow, which subtracts capital expenditures (CAPEX) from a company's total operating cash flow, thereby reflecting the actual cash flow available for funding growth activities and payments to shareholders.

P/EBITDA Ratio: The P/EBITDA ratio is calculated as a company's per share market value divided by EBITDA (earnings before interest, taxes, depreciation, and amortization). This metric is very similar to the EV/EBITDA ratio, but is considered a little less exact measure as it uses market price, which does not take a company's debt into account. However, since EBITDA is often considered a proxy for cash income, the metric is used as a measure of what the market is willing to pay today for each dollar of the company's cash profitability in the trailing 12 months (TTM) or forward 12 months (F12M).

P/B Ratio: The price-to-book ratio is calculated as a company's current price per share divided by its book value (total assets – liabilities – preferred stocks) per share. In short, the book value is how much a company is worth. In other words, it reflects the total value of a company's assets that its common shareholders would receive if it were to be liquidated. So, the P/B ratio indicates whether you're paying higher or lower than what would remain if the company went bankrupt immediately. Investors typically use this metric to determine how a company's stock price stacks up to its intrinsic value.

P/TB Ratio: The price-to-tangible-book value ratio is calculated as the per share market value of a company divided by the value of its tangible assets (total assets – liabilities – preferred stocks – intangible assets) per share. Tangible book value is the same thing as book value except it excludes the value of intangible assets to get a step closer to the baseline value of the company.

P/CF Ratio: The price-to-cash flow ratio measures a company's per share market price relative to its trailing-12-month (TTM) operating cash flow per share. This metric is used to determine whether a company is undervalued or overvalued relative to another stock, industry or sector. And like the P/E ratio, a lower number is typically considered better from the value perspective.

One of the reasons why P/CF ratio is often preferred over P/E ratio is the fact that operating cash flow adds back non-cash expenses such as depreciation and amortization to net income. This feature helps valuing stocks that have positive cash flow but are not profitable because of large noncash charges.

P/FCF Ratio: The price-to-free cash flow ratio is an extension of P/CF ratio, which uses trailing-12-month (TTM) free cash flow per share instead of operating cash flow per share. This metric is considered a more exact measure than P/CF ratio, as free cash flow subtracts capital expenditures (CAPEX) from a company's total operating cash flow, thereby reflecting the actual cash flow available for funding activities that generate additional revenues.

Earnings Yield: The earnings yield is calculated as current fiscal year (F1) EPS estimate divided by the company's current share price. The ratio, which is the inverse of the P/E ratio, measures the anticipated yield (or return) from earnings for each dollar invested in a stock today.

For example, earnings yield for a stock, which is trading at \$35 and expected to earn \$3 per share in the current fiscal year (F1), would be 0.0857 ($3/35 = 0.0857$) or 8.57%. In other words, for \$1 invested in the stock today, the yield from earnings is anticipated to be 8.57 cents.

Investors most commonly compare the earnings yield of a stock to that of a broad market index (such as the S&P 500) and prevailing interest rates, such as the current 10-year Treasury yield. Since bonds and stocks compete for investors' dollars, stock investors typically demand a higher yield for the extra risk they assume compared to investors of U.S. Treasury-backed securities that offer virtually risk-free returns. This additional return is referred to as the risk premium.

Debt/Equity Ratio: The debt-to-equity ratio is calculated as a company's total liabilities divided by its shareholder equity. This metric is used to gauge a company's financial leverage. In other words, it is a measure of the degree to which a company is financing its operations through debt versus its own funds. The higher the ratio, the higher the risk for shareholders.

However, this ratio is difficult to compare across industry groups where ideal amounts of debt vary. Some businesses are more capital intensive than others and typically require higher debt to finance their operations. So, a company's debt-to-equity ratio should be compared with other companies in the same industry.

Cash Flow (\$/share): Cash flow per share is calculated as operating cash flow (after-tax earnings + depreciation + other non-cash charges) divided by common shares outstanding. It is used by many investors as a measure of a company's financial strength. Since cash flow per share takes into consideration a company's ability to generate cash by adding back non-cash expenses, it is regarded by some as a more accurate measure of a company's financial situation than earnings per share, which could be artificially deflated.

Current Ratio: The current ratio or liquidity ratio is a company's current assets divided by its current liabilities. It measures a company's ability to pay short-term obligations. A current ratio that is in line with the industry average or slightly higher is generally considered acceptable. A current ratio that is lower than the industry average would indicate a higher risk of distress or default. A higher number is usually better. However, a very high current ratio compared to the industry average could be an indication of inefficient use of assets by management.

Debt/Capital Ratio: Debt-to-capital ratio is a company's total debt (interest-bearing debt + both short- and long-term liabilities) divided its total capital (interest-bearing debt + shareholders' equity). It is a measure of a company's financial leverage. All else being equal, the higher the debt-to-capital ratio, the riskier the stock.

However, this ratio can vary widely from industry to industry, the ideal amount of required debt being different. Some businesses are more capital intensive than others and typically require higher debt to finance their operations. So, a company's debt-to-capital ratio should be compared with the same for its industry.

Net Margin: Net margin is calculated as net income divided by sales. It shows how much of each dollar in sales generated by a company translates into profit. For example, if a company's net margin is 15%, its net income is 15 cents for every \$1 of sales it makes.

A change in margin can reflect either a change in business conditions, or a company's cost controls, or both. If a company's expenses are growing faster than sales, its net margin will decline. However, different net margin rates are considered good for different industries, so it's better to compare net margin rates of companies in the same industry group.

Return on Equity: Return on equity (ROE) is calculated as trailing-12-month net income divided by trailing-12-month average shareholder equity (including reinvested earnings). This metric is considered a measure of how effectively management is using a company's assets to generate profits. For example, if a company's ROE is 10%, it creates 10 cents profits for every \$1 shareholder equity, which is basically the company's assets minus debt. A company's ROE deemed good or bad depends on what's normal for its peers or industry group.

Sales/Assets Ratio: The sales-to-assets ratio or asset utilization ratio or asset turnover ratio is calculated as a company's annual sales divided by average assets (average of assets at the beginning of the year and at the year's end). This metric helps investors understand how effectively a company is using its assets to generate sales. For example, a sales-to-assets ratio of 2.5 indicates that the company generated \$2.50 in sales for every \$1 of assets on its books.

The higher the sales-to-assets ratio, the better the company is performing. However, similar to many other ratios, the asset turnover ratio tends to be higher for companies in certain industries/sectors than in others. So, a company's sales-to-assets ratio should be compared with the same for its industry/sector.

Historical EPS Growth (3-5 Years): This is the average annual (trailing-12-month) EPS growth rate over the last 3-5 years. This metric helps investors see how a company's EPS has grown from a long-term perspective.

Note: There are many factors that can influence short-term numbers — a recession will reduce this number, while a recovery will inflate it. The longterm perspective helps smooth out short-term events.

Projected EPS Growth (F1/F0): This is the estimated EPS growth rate for the current financial year. It is calculated as the consensus estimate for the current fiscal year (F1) divided by the reported EPS for the last completed fiscal year (F0).

Current Cash Flow Growth: It measures the latest year-over-year change in operating cash flow. Cash flow growth tells an investor how quickly a company is generating inflows of cash from operations. A positive change in the cash flow is desired and shows that more 'cash' is coming in than going out.

Historical Cash Flow Growth (3-5 Years): This is the annualized change in cash flow over the last 3-5 years. The change in a longer period helps put the current reading into proper perspective. By looking at the rate, rather than the actual dollar value, the comparison across the industry and peers becomes easier.

Projected Sales Growth (F1/F0): This metric looks at the estimated sales growth for the current year. It is calculated as sales estimate for the current fiscal year (F1) divided by the reported sales for the last completed fiscal year (F0).

Like EPS growth, a higher rate is better for sales growth. A look at a company's projected sales growth instantly tells you what the outlook is for their products and services. However, different sales growth rates are considered good for different industries, so it's better to compare sales growth rates of companies in the same industry group.

EPS F1 Estimate 1-Week Change: The percentage change in the Zacks Consensus EPS estimate for the current fiscal year over the past week. The change in a company's consensus EPS estimate (or earnings estimate revision) has proven to be strongly correlated with the near-term price movement of its shares. It is an integral part of the Zacks Rank.

If a stock's consensus EPS estimate is \$1.10 now versus \$1.00 a week ago, that will be reflected as a 10% upward revision. If, on the other hand, it went from \$1.00 to 90 cents, that would be a 10% downward revision.

EPS F1 Estimate 4-Week Change: The percentage change in the Zacks Consensus EPS estimate for the current fiscal year over the past four weeks.

A stock's earnings estimate revision in a 1-week period is important. But it's more meaningful to look at the longer-term revision. And, of course, the 4-week change helps put the 1-week change into proper perspective.

EPS F1 Estimate 12-Week Change: The percentage change in the Zacks Consensus EPS estimate for the current fiscal year over the past 12 weeks.

This metric essentially shows how the consensus EPS estimate has changed over a period longer than 1 week or 4 weeks.

EPS Q1 Estimate Monthly Change: The percentage change in the Zacks Consensus EPS estimate for the current fiscal quarter over the past four weeks.

While the revision in consensus EPS estimate for the current fiscal year is strongly correlated with the near-term price movement of its shares, the estimate revision for the current fiscal quarter is an important metric as well, especially over the short term, and particularly as a stock approaches its earnings date. If a stock's Q1 EPS estimate decreases ahead of its earnings release, it's usually a negative sign, whereas an increase is a positive sign.