UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549
Form 10-Q

(Mark one)

☒QUARTERLY REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the quarterly period ended September 28, 2019
Or
☐TRANSITION REPORT PURSUANT TO SECTION 13 OR 15(d) OF THE SECURITIES EXCHANGE ACT OF 1934
For the transition period from to

Commission file number: 000-50307

FormFactor, Inc.
(Exact name of registrant as specified in its charter)

Delaware	**13-3711155**
(State or other jurisdiction of incorporation or organization)	(I.R.S. Employer Identification No.)

7005 Southfront Road, Livermore, California 94551
(Address of principal executive offices, including zip code)

(925) 290-4000
(Registrant's telephone number, including area code)

Securities registered pursuant to Section12(b) of the Act:

Title of each class	Trading Symbol(s)	Name of each exchange on which registered
Common stock, $0.001 par value	**FORM**	**NASDAQ Global Market**

Indicate by check mark whether the registrant (1) has filed all reports required to be filed by Section 13 or 15(d) of the Securities Exchange Act of 1934 during the preceding 12 months (or for such shorter period that the registrant was required to file such reports), and (2) has been subject to such filing requirements for the past 90 days. Yes ☒ No ☐

Indicate by check mark whether the registrant submitted electronically and posted on its corporate Web site, if any, every Interactive Data File required to be submitted and posted pursuant to Rule 405 of the Regulation S-T (§232.405 of this chapter) during the preceding 12 months (or for such shorter period that the registrant was required to submit and post such files). Yes ☒ No ☐

Indicate by check mark whether the registrant is a large accelerated filer, an accelerated filer, a non-accelerated filer, a smaller reporting company or an emerging growth company. See the definitions of "large accelerated filer", "accelerated filer," "smaller reporting company" and "emerging growth company" in Rule 12b-2 of the Exchange Act. (Check one):

Large Accelerated Filer	☒	Accelerated Filer	☐
Non-accelerated Filer (Do not check if a smaller reporting company)	☐	Smaller Reporting Company	☐
Emerging Growth Company	☐		

If an emerging growth company, indicate by check mark if the registrant has elected not to use the extended transition period for complying with any new or revised financial accounting standards provided pursuant to Section 13(a) of the Exchange Act. ☐

Indicate by check mark whether the registrant is a shell company (as defined in Rule 12b-2 of the Exchange Act). Yes ☐ No ☒

As of October 31, 2019, 75,699,945 shares of the registrant's common stock, par value $0.001 per share, were outstanding.

FORMFACTOR, INC.
FORM 10-Q FOR THE QUARTERLY PERIOD ENDED SEPTEMBER 28, 2019
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PART I - FINANCIAL INFORMATION

Item 1. ***Financial Statements***

FORMFACTOR, INC.
CONDENSED CONSOLIDATED BALANCE SHEETS
(In thousands, except share and per share amounts)
(Unaudited)

	September 28, 2019	December 29, 2018
ASSETS		
Current assets:		
Cash and cash equivalents	$ 122,946	$ 98,472
Marketable securities	77,025	50,531
Accounts receivable, net of allowance for doubtful accounts of $194 and $185	84,750	95,333
Inventories, net	85,989	77,706
Restricted cash	765	849
Refundable income taxes	478	1,260
Prepaid expenses and other current assets	17,834	13,669
Total current assets	389,787	337,820
Restricted cash	1,029	1,225
Operating lease, right-of-use-assets	32,300	—
Property, plant and equipment, net of accumulated depreciation of $268,486 and $263,102	56,240	54,054
Goodwill	188,559	189,214
Intangibles, net	47,054	67,640
Deferred tax assets	77,274	77,301
Other assets	1,362	968
Total assets	$ 793,605	$ 728,222
LIABILITIES AND STOCKHOLDERS' EQUITY		
Current liabilities:		
Accounts payable	$ 50,968	$ 40,006
Accrued liabilities	30,015	27,731
Current portion of term loan, net of unamortized issuance cost of $57 and $160	46,193	29,840
Deferred revenue	8,315	4,941
Operating lease liabilities	6,416	—
Total current liabilities	141,907	102,518
Term loan, less current portion, net of unamortized issuance cost of $0 and $29	—	34,971
Deferred tax liabilities	2,244	2,355
Long-term operating lease liabilities	30,074	—
Other liabilities	4,834	8,214
Total liabilities	179,059	148,058
Stockholders' equity:		
Preferred stock, $0.001 par value:		
10,000,000 shares authorized; no shares issued and outstanding	—	—
Common stock, $0.001 par value:		
250,000,000 shares authorized; 75,696,234 and 74,139,712 shares issued and outstanding	76	74
Additional paid-in capital	879,527	862,897
Accumulated other comprehensive income (loss)	(2,180)	780
Accumulated deficit	(262,877)	(283,587)
Total stockholders' equity	614,546	580,164
Total liabilities and stockholders' equity	$ 793,605	$ 728,222

The accompanying notes are an integral part of these condensed consolidated financial statements.

FORMFACTOR, INC.
CONDENSED CONSOLIDATED STATEMENTS OF INCOME
(In thousands, except per share amounts)
(Unaudited)

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Revenues	$ 140,604	$ 134,989	$ 410,835	$ 388,788
Cost of revenues	85,286	82,019	247,644	234,471
Gross profit	55,318	52,970	163,191	154,317
Operating expenses:				
Research and development	20,096	18,857	59,893	56,578
Selling, general and administrative	25,887	24,745	77,354	73,426
Total operating expenses	45,983	43,602	137,247	130,004
Operating income	9,335	9,368	25,944	24,313
Interest income	724	369	1,988	952
Interest expense	(422)	(777)	(1,539)	(2,654)
Other income (expense), net	226	121	223	(341)
Income before income taxes	9,863	9,081	26,616	22,270
Provision for income taxes	1,584	1,393	5,906	3,334
Net income	$ 8,279	$ 7,688	$ 20,710	$ 18,936
Net income per share:				
Basic	$ 0.11	$ 0.10	$ 0.28	$ 0.26
Diluted	$ 0.11	$ 0.10	$ 0.27	$ 0.25
Weighted-average number of shares used in per share calculations:				
Basic	75,280	73,837	74,749	73,273
Diluted	77,291	74,962	76,763	74,628

The accompanying notes are an integral part of these condensed consolidated financial statements.

FORMFACTOR, INC.
CONDENSED CONSOLIDATED STATEMENTS OF COMPREHENSIVE INCOME
(In thousands)
(Unaudited)

	Three Months Ended		Nine Months Ended	
	September 28, 2019	**September 29, 2018**	**September 28, 2019**	**September 29, 2018**
Net income	$ 8,279	$ 7,688	$ 20,710	$ 18,936
Other comprehensive loss, net of tax:				
Translation adjustments and other	(1,814)	(449)	(2,042)	(1,732)
Unrealized gains (losses) on available-for-sale marketable securities	11	50	304	(84)
Unrealized losses on derivative instruments	(536)	(134)	(1,222)	(47)
Other comprehensive loss, net of tax	(2,339)	(533)	(2,960)	(1,863)
Comprehensive income	$ 5,940	$ 7,155	$ 17,750	$ 17,073

The accompanying notes are an integral part of these condensed consolidated financial statements.

FORMFACTOR, INC.
CONDENSED CONSOLIDATED STATEMENTS OF STOCKHOLDERS' EQUITY
(In thousands, except shares)
(Unaudited)

	Shares	Common Stock	Additional Paid-in Capital	Accumulated Other Comprehensive Income	Accumulated Deficit	Total
	Nine Months Ended September 28, 2019					
Balances, December 29, 2018	74,139,712	$ 74	$ 862,897	$ 780	$ (283,587)	$ 580,164
Issuance of common stock under the Employee Stock Purchase Plan	544,271	—	6,806	—	—	6,806
Issuance of common stock pursuant to exercise of options for cash	112,956	—	754	—	—	754
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	899,295	2	(7,898)	—	—	(7,896)
Stock-based compensation	—	—	16,968	—	—	16,968
Other comprehensive loss	—	—	—	(2,960)	—	(2,960)
Net income	—	—	—	—	20,710	20,710
Balances, September 28, 2019	75,696,234	$ 76	$ 879,527	$ (2,180)	$ (262,877)	$ 614,546
	Three Months Ended September 28, 2019					
Balances, June 29, 2019	74,691,781	$ 75	$ 875,024	$ 159	$ (271,156)	$ 604,102
Issuance of common stock under the Employee Stock Purchase Plan	242,774	—	3,136	—	—	3,136
Issuance of common stock pursuant to exercise of options for cash	93,749	—	664	—	—	664
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	667,930	1	(5,741)	—	—	(5,740)
Stock-based compensation	—	—	6,444	—	—	6,444
Other comprehensive income	—	—	—	(2,339)	—	(2,339)
Net income	—	—	—	—	8,279	8,279
Balances, September 28, 2019	75,696,234	$ 76	$ 879,527	$ (2,180)	$ (262,877)	$ 614,546
	Nine Months Ended September 29, 2018					
Balances, December 30, 2017	72,532,176	$ 73	$ 843,116	$ 3,021	$ (387,573)	$ 458,637
Issuance of common stock under the Employee Stock Purchase Plan	610,297	1	6,661	—	—	6,662
Issuance of common stock pursuant to exercise of options for cash	105,610	—	1,049	—	—	1,049
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	853,540	1	(5,694)	—	—	(5,693)
Stock-based compensation	—	—	12,373	—	—	12,373
Adoption of ASU 2017-12	—	—	—	—	(50)	(50)
Other comprehensive loss	—	—	—	(1,863)	—	(1,863)
Net income	—	—	—	—	18,936	18,936
Balances, September 29, 2018	74,101,623	$ 75	$ 857,505	$ 1,158	$ (368,687)	$ 490,051
	Three Months Ended September 29, 2018					
Balances, June 30, 2018	73,358,108	$ 74	$ 853,278	$ 1,691	$ (376,375)	$ 478,668
Issuance of common stock under the Employee Stock Purchase Plan	268,627	—	2,957	—	—	2,957
Issuance of common stock pursuant to vesting of restricted stock units, net of stock withheld for tax	474,888	1	(3,241)	—	—	(3,240)
Stock-based compensation	—	—	4,511	—	—	4,511
Other comprehensive loss	—	—	—	(533)	—	(533)
Net income	—	—	—	—	7,688	7,688
Balances, September 29, 2018	74,101,623	$ 75	$ 857,505	$ 1,158	$ (368,687)	$ 490,051

The accompanying notes are an integral part of these condensed consolidated financial statements.

FORMFACTOR, INC.
CONDENSED CONSOLIDATED STATEMENTS OF CASH FLOWS
(In thousands)
(Unaudited)

	Nine Months Ended	
	September 28, 2019	**September 29, 2018**
Cash flows from operating activities:		
Net income	$ 20,710	$ 18,936
Adjustments to reconcile net income to net cash provided by operating activities:		
Depreciation	12,644	10,494
Amortization	20,248	21,876
Amortization (accretion) of discount on investments	(291)	21
Amortization of operating lease, right-of-use assets	3,921	—
Stock-based compensation expense	17,088	12,421
Amortization of debt issuance costs	132	333
Deferred income tax provision	38	70
Provision for excess and obsolete inventories	8,046	7,414
Loss on disposal of long-lived assets	327	264
Loss on derivative instruments	132	—
Foreign currency transaction (losses) gains	(186)	409
Changes in assets and liabilities:		
Accounts receivable	10,580	(7,569)
Inventories	(17,246)	(21,806)
Prepaid expenses and other current assets	(4,509)	(1,874)
Refundable income taxes	782	933
Other assets	(595)	697
Accounts payable	10,074	10,425
Accrued liabilities	(856)	(8,882)
Other liabilities	2,374	2,197
Deferred revenues	3,625	(221)
Operating lease liabilities	(3,660)	—
Net cash provided by operating activities	83,378	46,138
Cash flows from investing activities:		
Acquisition of property, plant and equipment	(14,242)	(12,326)
Proceeds from sale of a subsidiary	93	67
Proceeds from sale of property, plant and equipment	—	23
Purchases of marketable securities	(59,602)	(18,984)
Proceeds from maturities and sales of marketable securities	33,704	17,757
Net cash used in investing activities	(40,047)	(13,463)
Cash flows from financing activities:		
Proceeds from issuances of common stock	7,672	7,712
Tax withholdings related to net share settlements of equity awards	(7,898)	(5,694)
Principal repayments on term loan	(18,750)	(33,750)
Net cash used in financing activities	(18,976)	(31,732)
Effect of exchange rate changes on cash, cash equivalents and restricted cash	(161)	(516)
Net increase in cash, cash equivalents and restricted cash	24,194	427
Cash, cash equivalents and restricted cash, beginning of period	100,546	92,726
Cash, cash equivalents and restricted cash, end of period	$ 124,740	$ 93,153
Non-cash investing and financing activities:		
Change in accounts payable and accrued liabilities related to property, plant and equipment purchases	$ 1,062	$ 4,724
Operating lease, right-of-use assets obtained in exchange for lease obligations	36,300	—
Supplemental disclosure of cash flow information:		
Cash paid for income taxes, net	$ 2,875	$ 2,513
Cash paid for interest	1,128	2,299

The accompanying notes are an integral part of these condensed consolidated financial statements.

Note 1 — Basis of Presentation and New Accounting Pronouncements

Basis of Presentation

The accompanying condensed consolidated financial information of FormFactor, Inc. is unaudited and has been prepared in accordance with accounting principles generally accepted in the United States of America ("GAAP") and pursuant to the rules and regulations of the Securities and Exchange Commission. However, such information reflects all adjustments, consisting only of normal recurring adjustments, which are, in the opinion of management, necessary for a fair presentation of the financial position, results of operations and cash flows for the interim periods. The financial information as of December 29, 2018 is derived from our 2018 Annual Report on Form 10-K. The condensed consolidated financial statements included herein should be read in conjunction with the consolidated financial statements and the notes thereto included in our 2018 Annual Report on Form 10-K. The results of operations for the interim periods presented are not necessarily indicative of the results to be expected for the full year.

Fiscal Year

We operate on a 52/53 week fiscal year, whereby the fiscal year ends on the last Saturday of December. Fiscal 2019 and 2018 each contain 52 weeks and the nine months ended September 28, 2019 and September 29, 2018 each contained 39 weeks. Fiscal 2019 will end on December 28, 2019.

Reclassifications

Certain immaterial reclassifications were made to the prior period financial statements to conform to the current period presentation.

Critical Accounting Policies

Our critical accounting policies have not changed during the nine months ended September 28, 2019 from those disclosed in our Annual Report on Form 10-K for the year ended December 29, 2018.

New Accounting Pronouncements

ASU 2018-15

In August 2018, the Financial Accounting Standard Board ("FASB") issued Accounting Standards Update ("ASU") 2018-15, "*Intangibles-Goodwill and Other-Internal-Use Software (Subtopic 350-40): Customer's Accounting for Implementation Costs Incurred in a Cloud Computing Arrangement That Is a Service Contract.*" The new guidance clarifies the accounting for implementation costs in cloud computing arrangements. ASU 2018-15 is effective for fiscal years, including interim periods within those fiscal years, beginning after December 15, 2019. Early adoption is permitted. ASU 2018-15 should be applied either retrospectively or prospectively to all implementation costs incurred after the date of adoption. We have not yet determined the impact of this standard on our financial statements.

ASU 2016-02, ASU 2018-10, ASU 2018-11 and ASU 2019-01

In February 2016, the FASB issued ASU 2016-02, "*Leases (Topic 842)*," which requires the recognition of right-of-use assets and lease liabilities for all long-term leases, including operating leases, on the balance sheet. ASU 2016-02 was amended in July 2018 by both ASU 2018-10, "*Codification Improvements to Topic 842, Leases*," and ASU 2018-11, "*Leases (Topic 842): Targeted Improvements*" and in March 2019 by ASU 2019-01, "*Leases (Topic 842): Codification Improvements.*" ASU 2016-02 provides additional guidance on the measurement of the right-of-use assets and lease liabilities and requires enhanced disclosures about our leasing arrangements. We adopted Topic 842 and all related amendments on December 30, 2018, the first day of fiscal 2019, using the modified transition approach. The modified transition approach permits a company to use its effective date as the date of initial application to apply the standard to its leases, and, therefore, not restate comparative prior period financial information. Consequently, prior period financial information is not updated, and the disclosures required under the new standard will not be provided for dates and periods before December 30, 2018. The standard provides several optional practical expedients in transition. We elected the 'package of practical expedients,' which permits us to not reassess, under the new standard, our prior conclusions about lease identification, lease classification and initial direct costs. We did not elect the use-of-hindsight or the practical expedient pertaining to land easements; the latter not being applicable to us. The new standard also provides practical expedients for an entity's ongoing accounting. We elected the short-term lease recognition exemption. This means, for those leases that qualify, we will not recognize a right-of-use asset or lease liability, and this includes not recognizing right-of-use assets or lease liabilities for existing short-term leases of those assets in transition. We also elected the practical expedient to not separate lease and non-lease components for all our leases. The adoption of the lease standard did not have any effect on our previously reported Condensed

Consolidated Statements of Income and did not result in a cumulative catch-up adjustment to opening equity. See Note 12 for additional information.

Note 2 — Concentration of Credit and Other Risks

Each of the following customers accounted for 10% or more of our revenues for the periods indicated:

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Intel Corporation	23.9%	24.5%	23.8%	18.0%
SK Hynix Inc.	13.5	*	10.6	10.2
Micron Technology, Inc.	11.9	12.0	*	10.1
Samsung Electronics., LTD.	*	*	10.0	*
	49.3%	36.5%	44.4%	38.3%

*Represents less than 10% of total revenues.

At September 28, 2019, two customers accounted for 18.8% and 17.4% of gross accounts receivable, respectively. At December 29, 2018, two customers accounted for 27.8% and 13.0% of gross accounts receivable, respectively.

Note 3 — Inventories, net

Inventories are stated at the lower of cost (principally standard cost, which approximates actual cost on a first in, first out basis) or net realizable value.

Inventories, net, consisted of the following (in thousands):

	September 28, 2019	December 29, 2018
Raw materials	$ 39,395	$ 43,380
Work-in-progress	31,486	20,431
Finished goods	15,108	13,895
	$ 85,989	$ 77,706

Note 4 — Goodwill and Intangible Assets

Goodwill by reportable segment was as follows (in thousands):

	Probe Cards	Systems	Total
Goodwill, gross, as of December 30, 2017	$ 172,482	$ 17,438	$ 189,920
Foreign currency translation	—	(706)	(706)
Goodwill, gross, as of December 29, 2018	172,482	16,732	189,214
Foreign currency translation	—	(655)	(655)
Goodwill, gross, as of September 28, 2019	$ 172,482	$ 16,077	$ 188,559

We have not recorded any goodwill impairments in the nine months ended September 28, 2019.

Intangible assets were as follows (in thousands):

	September 28, 2019			December 29, 2018		
Other Intangible Assets	Gross	Accumulated Amortization	Net	Gross	Accumulated Amortization	Net
Existing developed technologies	$ 142,890	$ 110,943	$ 31,947	$ 143,408	$ 97,111	$ 46,297
Trade name	7,576	6,893	683	12,023	9,173	2,850
Customer relationships	39,990	25,566	14,424	40,146	21,653	18,493
	$ 190,456	$ 143,402	$ 47,054	$ 195,577	$ 127,937	$ 67,640

In the current quarter we disposed of certain fully amortized trade names.

Amortization expense was included in our Condensed Consolidated Statements of Income as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Cost of revenues	$ 4,707	$ 5,123	$ 14,137	$ 15,418
Selling, general and administrative	1,372	2,389	6,111	6,458
	$ 6,079	$ 7,512	$ 20,248	$ 21,876

The estimated future amortization of intangible assets is as follows (in thousands):

Fiscal Year	Amount
Remainder of 2019	$ 6,065
2020	23,243
2021	12,546
2022	3,467
2023	1,733
	$ 47,054

Note 5 — Accrued Liabilities

Accrued liabilities consisted of the following (in thousands):

	September 28, 2019	December 29, 2018
Accrued compensation and benefits	$ 15,640	$ 15,600
Accrued employee stock purchase plan contributions withheld	1,431	3,174
Accrued warranty	1,793	2,102
Accrued income and other taxes	7,218	4,222
Other accrued expenses	3,933	2,633
	$ 30,015	$ 27,731

Note 6 — Restructuring Charges

Restructuring charges in the first nine months of fiscal 2019 consisted of costs related to employee termination benefits, cost of long-lived asset abandonment and inventory write downs.

Restructuring charges were included in our Condensed Consolidated Statement of Income as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Cost of revenues	$ —	$ —	$ 258	$ —
Selling, general and administrative	22	—	199	—
	$ 22	$ —	$ 457	$ —

Changes to the restructuring accrual in the nine months ended September 28, 2019 were as follows (in thousands):

	Employee Severance and Benefits	Other Costs	Total Accrual
December 29, 2018	$ 20	$ —	$ 20
Restructuring charges	184	273	457
Cash payments	(128)	—	(128)
Non-cash settlement	—	(273)	(273)
September 28, 2019	$ 76	$ —	$ 76

Note 7 — Fair Value and Derivative Instruments

Whenever possible, the fair values of our financial assets and liabilities are determined using quoted market prices of identical securities or quoted market prices of similar securities from active markets. The three levels of inputs that may be used to measure fair value are as follows:

- Level 1 valuations are obtained from real-time quotes for transactions in active exchange markets involving identical securities;
- Level 2 valuations utilize significant observable inputs, such as quoted prices for similar assets or liabilities, quoted prices near the reporting date in markets that are less active, or other inputs that are observable or can be corroborated by observable market data for substantially the full term of the assets or liabilities; and
- Level 3 valuations utilize unobservable inputs to the valuation methodology and include our own data about assumptions market participants would use in pricing the asset or liability based on the best information available under the circumstances.

We did not have any transfers of assets or liabilities measured at fair value on a recurring basis to or from Level 1, Level 2 or Level 3 during the three and nine months ended September 28, 2019 or the year ended December 29, 2018.

The carrying values of Cash, Accounts receivable, net, Restricted cash, Prepaid expenses and other current assets, Accounts payable, Accrued liabilities, and Term loan approximate fair value due to their short maturities.

No changes were made to our valuation techniques during the first nine months of fiscal 2019.

Assets and Liabilities Measured at Fair Value on a Recurring Basis
Assets and liabilities measured at fair value on a recurring basis were as follows (in thousands):

September 28, 2019	**Level 1**	**Level 2**	**Total**
Assets:			
Cash equivalents:			
Money market funds	$ 959	$ —	$ 959
Marketable securities:			
U.S. treasuries	31,832	—	31,832
Certificates of deposit	—	3,648	3,648
U.S. agency securities	—	3,088	3,088
Corporate bonds	—	33,737	33,737
Commercial paper	—	4,720	4,720
	31,832	45,193	77,025
Foreign exchange derivative contracts	—	93	93
Interest rate swap derivative contracts	—	86	86
Total assets	$ 32,791	$ 45,372	$ 78,163
Liabilities:			
Foreign exchange derivative contracts	$ —	$ 739	$ 739

December 29, 2018	**Level 1**	**Level 2**	**Total**
Assets:			
Cash equivalents:			
Money market funds	$ 1,184	$ —	$ 1,184
Marketable securities:			
U.S. treasuries	7,997	—	7,997
Certificates of deposit	—	957	957
U.S. agency securities	—	8,608	8,608
Corporate bonds	—	30,674	30,674
Commercial paper	—	2,295	2,295
	7,997	42,534	50,531
Interest rate swap derivative contracts	—	871	871
Total assets	$ 9,181	$ 43,405	$ 52,586

We did not have any liabilities measured at fair value on a recurring basis at December 29, 2018.

Cash Equivalents
The fair value of our cash equivalents is determined based on quoted market prices for similar or identical securities.

Marketable Securities
We classify our marketable securities as available-for-sale and value them utilizing a market approach. Our investments are priced by pricing vendors who provide observable inputs for their pricing without applying significant judgment. Broker pricing is used mainly when a quoted price is not available, the investment is not priced by our pricing vendors or when a broker price is more reflective of fair value. Our broker-priced investments are categorized as Level 2 investments because fair value is based on similar assets without applying significant judgments. In addition, all investments have a sufficient trading volume to demonstrate that the fair value is appropriate.

Unrealized gains and losses were immaterial and were recorded as a component of Accumulated other comprehensive income in our Condensed Consolidated Balance Sheets. We did not have any other-than-temporary unrealized gains or losses at either period end included in these financial statements.

Interest Rate Swaps

The fair value of our interest rate swap contracts is determined at the end of each reporting period based on valuation models that use interest rate yield curves as inputs. For accounting purposes, our interest rate swap contracts qualify for, and are designated as, cash flow hedges. The cash flows associated with the interest rate swaps are reported in Net cash provided by operating activities in our Condensed Consolidated Statements of Cash Flows and the fair value of the interest rate swap contracts are recorded within Prepaid expenses and other current assets in our Condensed Consolidated Balance Sheets.

The impact of the interest rate swaps on our Condensed Consolidated Statements of Income was as follows (in thousands):

	Amount of Gain or (Loss) Recognized in Accumulated OCI on Derivative	Location of Gain or (Loss) Reclassified from Accumulated OCI into Income	Amount of Gain or (Loss) Reclassified from Accumulated OCI into Income	Location of Gain or (Loss) Recognized in Income on Derivative (Ineffective Portion)	Amount of Gain or (Loss) Recognized in Income on Derivative (Ineffective Portion)
Three Months Ended September 28, 2019	$ 12	Interest expense	$ 113	Interest expense	$ —
Three Months Ended September 29, 2018	$ 62	Interest expense	$ 196	Interest expense	$ —
Nine Months Ended September 28, 2019	$ (78)	Interest expense	$ 496	Interest expense	$ —
Nine Months Ended September 29, 2018	$ 418	Interest expense	$ 514	Interest expense	$ —

Foreign Exchange Derivative Contracts

We operate and sell our products in various global markets. As a result, we are exposed to changes in foreign currency exchange rates. We utilize foreign currency forward contracts to hedge against future movements in foreign exchange rates that affect certain existing foreign currency denominated assets and liabilities and forecasted foreign currency revenue and expense transactions. Under this program, our strategy is to have increases or decreases in our foreign currency exposures mitigated by gains or losses on the foreign currency forward contracts in order to mitigate the risks and volatility associated with foreign currency transaction gains or losses.

We do not use derivative financial instruments for speculative or trading purposes. For accounting purposes, certain of our foreign currency forward contracts are not designated as hedging instruments and, accordingly, we record the fair value of these contracts as of the end of our reporting period in our Condensed Consolidated Balance Sheets with changes in fair value recorded within Other income (expense), net in our Condensed Consolidated Statement of Income for both realized and unrealized gains and losses. Certain of our foreign currency forward contracts are designated as cash flow hedges, and, accordingly, we record the fair value of these contracts as of the end of our reporting period in our Condensed Consolidated Balance Sheets with changes in fair value recorded as a component of accumulated other comprehensive income and reclassified into earnings in the same period in which the hedged transaction affects earnings, and in the same line item on the Condensed Consolidated Statements of Income as the impact of the hedge transaction. At September 28, 2019, we expect to reclassify $0.6 million of the amount accumulated in other comprehensive income (loss) to earnings during the next 12 months, due to the recognition in earnings of the hedged forecasted transactions.

The fair value of our foreign exchange derivative contracts was determined based on current foreign currency exchange rates and forward points. All of our foreign exchange derivative contracts outstanding at September 28, 2019 will mature by the second quarter of fiscal 2020.

The following table provides information about our foreign currency forward contracts outstanding as of September 28, 2019 (in thousands):

Currency	Contract Position	Contract Amount (Local Currency)	Contract Amount (U.S. Dollars)
Euro Dollar	Buy	(924)	$ (1,715)
Japanese Yen	Sell	2,974,829	27,613
Korean Won	Sell	3,019,313	2,516
Total USD notional amount of outstanding foreign exchange contracts			$ 28,414

Our foreign currency contracts are classified within Level 2 of the fair value hierarchy as they are valued using pricing models that utilize observable market inputs.

The impact of foreign exchange derivative contracts not designated as cash flow hedges on our Condensed Consolidated Statements of Income was as follows (in thousands):

		Amount of Gain (Loss) Recognized on Derivatives			
		Three Months Ended		Nine Months Ended	
Derivatives Not Designated as Hedging Instruments	Location of Gain (Loss) Recognized on Derivatives	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Foreign exchange forward contracts	Other income (expense), net	$ (76)	$ 706	$ 198	$ 923

The impact of foreign exchange derivative contracts designated as cash flow hedges on our Condensed Consolidated Statements of Income was as follows (in thousands):

	Amount of Loss Recognized in Accumulated OCI on Derivative	Location of Loss Reclassified from Accumulated OCI into Income	Amount of Loss Reclassified from Accumulated OCI into Income
Three Months Ended September 28, 2019	$ 642	Cost of revenues	$ 126
		Research and development	23
		Selling, general and administrative	58
			$ 207
Three Months Ended September 29, 2018	$ —		$ —
Nine Months Ended September 28, 2019	$ 1,096	Cost of revenues	$ 297
		Research and development	42
		Selling, general and administrative	109
			$ 448
Nine Months Ended September 29, 2018	$ —		$ —

Assets and Liabilities Measured at Fair Value on a Non-Recurring Basis

We measure and report goodwill and intangible assets at fair value on a non-recurring basis if we determine these assets to be impaired or in the period when we make a business acquisition. There were no assets or liabilities measured at fair value on a nonrecurring basis during the three and nine months ended September 28, 2019 or September 29, 2018.

Note 8 — Warranty

We offer warranties on certain products and record a liability for the estimated future costs associated with warranty claims at the time revenue is recognized. The warranty liability is based upon historical experience and our estimate of the level of future costs. While we engage in product quality programs and processes, our warranty obligation is affected by product failure rates, material usage and service delivery costs. We continuously monitor product returns for warranty and maintain a reserve for the related expenses based upon our historical experience and any specifically identified failures. As we sell new products to our customers, we must exercise considerable judgment in estimating the expected failure rates. This estimating process is based on historical experience of similar products, as well as various other assumptions that we believe to be reasonable under the circumstances.

We provide for the estimated cost of product warranties at the time revenue is recognized as a component of Cost of revenues in our Condensed Consolidated Statement of Income.

Changes in our warranty liability were as follows (in thousands):

	Nine Months Ended	
	September 28, 2019	**September 29, 2018**
Balance at beginning of period	$ 2,102	$ 3,662
Accruals	2,742	3,168
Settlements	(3,051)	(4,373)
Balance at end of period	$ 1,793	$ 2,457

Note 9 — Stockholders' Equity and Stock-Based Compensation

Common Stock Repurchase Program

In February 2017, our Board of Directors authorized a program to repurchase up to $25 million of outstanding common stock to offset potential dilution from issuances of common stock under our employee stock purchase plan and equity incentive plan. The share repurchase program will expire on February 1, 2020. Repurchased shares are retired upon the settlement of the related transactions with the excess of cost over par value charged to additional paid-in capital. All repurchases are made in compliance with Rule 10b-18 under the Securities Exchange Act of 1934, as amended.

During the nine months ended September 28, 2019, we did not repurchase any shares. As of September 28, 2019, $6.0 million remained available for future repurchases.

Restricted Stock Units

Restricted stock unit ("RSU") activity under our equity incentive plan was as follows:

	Units	**Weighted Average Grant Date Fair Value**
RSUs at December 29, 2018	3,102,226	$ 12.79
Awards granted	1,487,200	15.01
Awards vested	(1,366,925)	11.89
Awards forfeited	(130,677)	13.35
RSUs at September 28, 2019	3,091,824	$ 14.24

The total fair value of RSUs vested during the nine months ended September 28, 2019 was $22.9 million.

Performance Restricted Stock Units

We may grant Performance RSUs ("PRSUs") to certain executives, which vest based upon us achieving certain market performance criteria.

On June 4, 2019, we granted a total of 273,000 PRSUs to certain senior executives for a total grant date fair value of $4.4 million, which will be recognized ratably over the requisite service period. The performance criteria are based on a metric called Total Shareholder Return ("TSR") for the period from July 1, 2019 to June 30, 2022, relative to the TSR of the companies identified as being part of the S&P Semiconductor Select Industry Index (FormFactor peer companies) as of June 29, 2019.

There were no other PRSUs granted during the nine months ended September 28, 2019. PRSUs are included as part of the RSU activity above.

Stock Options

Stock option activity under our equity incentive plan was as follows:

	Options Outstanding	Weighted Average Exercise Price	Weighted Average Remaining Contractual Life in Years	Aggregate Intrinsic Value
Outstanding at December 29, 2018	524,725	$ 8.00		
Options exercised	(112,956)	6.67		
Outstanding at September 28, 2019	411,769	$ 8.36	2.40	$ 4,167,393
Vested and expected to vest at September 28, 2019	411,769	$ 8.36	2.40	$ 4,167,393
Exercisable at September 28, 2019	411,769	$ 8.36	2.40	$ 4,167,393

Employee Stock Purchase Plan

Information related to activity under our Employee Stock Purchase Plan ("ESPP") was as follows:

	Nine Months Ended September 28, 2019
Shares issued	544,271
Weighted average per share purchase price	$ 12.51
Weighted average per share discount from the fair value of our common stock on the date of issuance	$ 3.40

Stock-Based Compensation

Stock-based compensation was included in our Condensed Consolidated Statements of Income as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Cost of revenues	$ 1,117	$ 832	$ 3,031	$ 2,565
Research and development	1,729	1,312	4,830	3,870
Selling, general and administrative	3,658	2,393	9,227	5,986
Total stock-based compensation	$ 6,504	$ 4,537	$ 17,088	$ 12,421

Unrecognized Compensation Costs

At September 28, 2019, the unrecognized stock-based compensation was as follows (dollars in thousands):

	Unrecognized Expense	Average Expected Recognition Period in Years
Restricted stock units	$ 27,942	2.11
Performance restricted stock units	7,597	2.17
Employee stock purchase plan	1,114	0.34
Total unrecognized stock-based compensation expense	$ 36,653	2.07

Note 10 — Net Income per Share

The following table reconciles the shares used in calculating basic net income per share and diluted net income per share (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Weighted-average shares used in computing basic net income per share	75,280	73,837	74,749	73,273
Add potentially dilutive securities	2,011	1,125	2,014	1,355
Weighted-average shares used in computing diluted net income per share	77,291	74,962	76,763	74,628
Securities not included as they would have been antidilutive	—	5	23	21

Note 11 — Commitments and Contingencies

Leases
See Note 12.

Contractual Commitments and Purchase Obligations
Our purchase obligations and other contractual obligations have not materially changed as of September 28, 2019 from those disclosed in our Annual Report on Form 10-K for the year ended December 29, 2018.

Legal Matters
From time to time, we may be subject to legal proceedings and claims in the ordinary course of business. As of September 28, 2019, and as of the filing of this Quarterly Report on Form 10-Q, we were not involved in any material legal proceedings.

Note 12 — Leases

We lease real estate space under non-cancelable operating lease agreements for commercial and industrial space, as well as for our corporate headquarters located in Livermore, California. Our leases have remaining terms of 1 to 9 years, and some leases include options to extend up to 20 years. We also have operating leases for automobiles with remaining lease terms of 1 to 4 years. We did not include any of our renewal options in our lease terms for calculating our lease liability as the renewal options allow us to maintain operational flexibility and we are not reasonably certain we will exercise these options at this time. The weighted-average remaining lease term for our operating leases was 8 years at September 28, 2019 and the weighted-average discount rate was 4.7%.

The components of lease expense were as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Lease expense:				
Operating lease expense	$ 1,726	$ —	$ 5,205	$ —
Short-term lease expense	53	—	101	—
Variable lease expense	252	—	920	—
	$ 2,031	$ —	$ 6,226	$ —

Future minimum payments under our non-cancelable operating leases were as follows as of September 28, 2019 (in thousands):

Fiscal Year	Amount
Remainder of 2019	$ 1,753
2020	6,855
2021	5,984
2022	4,928
2023	4,430
Thereafter	20,403
	$ 44,353

Note 13 — Revenue

Transaction price allocated to the remaining performance obligations: On September 28, 2019, we had $4.1 million of remaining performance obligations, which were comprised of deferred service contracts and extended warranty contracts not yet delivered. We expect to recognize approximately 31% of our remaining performance obligations as revenue in the remainder of fiscal 2019, approximately 50% in fiscal 2020, and approximately 19% in fiscal 2021 and thereafter. The foregoing excludes the value of other remaining performance obligations as they have original durations of one year or less, and also excludes information about variable consideration allocated entirely to a wholly unsatisfied performance obligation.

Contract balances: The timing of revenue recognition may differ from the timing of invoicing to customers. Accounts receivable is recorded at the invoiced amount, net of an allowance for doubtful accounts. A receivable is recognized in the period we deliver goods or provide services or when our right to consideration is unconditional. A contract asset is recorded when we have performed under the contract but our right to consideration is conditional on something other than the passage of time. Contract assets as of September 28, 2019 and December 29, 2018 were $1.4 million and $0.3 million, respectively, and are reported on the Condensed Consolidated Balance Sheets as a component of Prepaid expenses and other current assets.

Contract liabilities include payments received in advance of performance under a contract and are satisfied as the associated revenue is recognized. Contract liabilities are reported on the Condensed Consolidated Balance Sheets on a contract-by-contract basis at the end of each reporting period as a component of Deferred revenue and Other liabilities. Contract liabilities as of September 28, 2019 and December 29, 2018 were $9.3 million and $5.7 million, respectively. During the three and nine months ended September 28, 2019, we recognized $1.0 million and $3.9 million of revenue, respectively, that was included in contract liabilities as of December 29, 2018.

Costs to obtain a contract: We generally expense sales commissions when incurred as a component of Selling, general and administrative expense as the amortization period is typically less than one year.

Revenue by Category: Refer to Note 14 of Notes to Condensed Consolidated Financial Statements for further details.

Note 14 — Operating Segments and Enterprise-Wide Information

Our chief operating decision maker ("CODM") is our Chief Executive Officer, who reviews operating results to make decisions about allocating resources and assessing performance for the entire company. We operate in two reportable segments consisting of the Probe Cards segment and the Systems segment. The following table summarizes the operating results by reportable segment (dollars in thousands):

	Three Months Ended							
	September 28, 2019				September 29, 2018			
	Probe Cards	Systems	Corporate and Other	Total	Probe Cards	Systems	Corporate and Other	Total
Revenues	$ 116,447	$ 24,157	$ —	$ 140,604	$ 111,606	$ 23,383	$ —	$ 134,989
Gross profit	$ 48,127	$ 13,015	$ (5,824)	$ 55,318	$ 47,675	$ 11,250	$ (5,955)	$ 52,970
Gross margin	41.3%	53.9%	—%	39.3%	42.7%	48.1%	—%	39.2%

	Nine Months Ended							
	September 28, 2019				September 29, 2018			
	Probe Cards	Systems	Corporate and Other	Total	Probe Cards	Systems	Corporate and Other	Total
Revenues	$ 338,187	$ 72,648	$ —	$ 410,835	$ 318,120	$ 70,668	$ —	$ 388,788
Gross profit	$ 141,913	$ 38,703	$ (17,425)	$ 163,191	$ 138,182	$ 34,118	$ (17,983)	$ 154,317
Gross margin	42.0%	53.3%	—%	39.7%	43.4%	48.3%	—%	39.7%

Operating results provide useful information to our management for assessment of our performance and results of operations. Certain components of our operating results are utilized to determine executive compensation along with other measures.

Corporate and Other includes unallocated expenses relating to amortization of intangible assets, share-based compensation, and restructuring charges, net, which are not used in evaluating the results of, or in allocating resources to, our reportable segments.

Certain revenue category information by reportable segment was as follows (in thousands):

	Three Months Ended					
	September 28, 2019			September 29, 2018		
	Probe Cards	Systems	Total	Probe Cards	Systems	Total
Market:						
Foundry & Logic	$ 68,431	$ —	$ 68,431	$ 61,270	$ —	$ 61,270
DRAM	39,425	—	39,425	37,359	—	37,359
Flash	8,591	—	8,591	12,977	—	12,977
Systems	—	24,157	24,157	—	23,383	23,383
Total	$ 116,447	$ 24,157	$ 140,604	$ 111,606	$ 23,383	$ 134,989
Timing of revenue recognition:						
Products transferred at a point in time	$ 115,324	$ 23,561	$ 138,885	$ 111,020	$ 22,422	$ 133,442
Services transferred over time	1,123	596	1,719	586	961	1,547
Total	$ 116,447	$ 24,157	$ 140,604	$ 111,606	$ 23,383	$ 134,989
Geographical region:						
United States	$ 28,400	$ 5,265	$ 33,665	$ 34,398	$ 5,729	$ 40,127
South Korea	22,779	818	23,597	19,437	1,437	20,874
China	24,427	6,956	31,383	16,928	5,152	22,080
Taiwan	16,513	1,742	18,255	19,032	777	19,809
Japan	13,640	3,289	16,929	10,462	4,273	14,735
Europe	5,754	3,794	9,548	5,499	3,629	9,128
Asia-Pacific[1]	3,516	2,149	5,665	5,557	1,673	7,230
Rest of the world	1,418	144	1,562	293	713	1,006
Total	$ 116,447	$ 24,157	$ 140,604	$ 111,606	$ 23,383	$ 134,989

	Nine Months Ended					
	September 28, 2019			September 29, 2018		
	Probe Cards	Systems	Total	Probe Cards	Systems	Total
Market:						
Foundry & Logic	$ 213,453	$ —	$ 213,453	$ 181,819	$ —	$ 181,819
DRAM	104,355	—	104,355	105,716	—	105,716
Flash	20,379	—	20,379	30,585	—	30,585
Systems	—	72,648	72,648	—	70,668	70,668
Total	$ 338,187	$ 72,648	$ 410,835	$ 318,120	$ 70,668	$ 388,788
Timing of revenue recognition:						
Products transferred at a point in time	$ 335,054	$ 70,831	$ 405,885	$ 316,495	$ 67,794	$ 384,289
Services transferred over time	3,133	1,817	4,950	$ 1,625	$ 2,874	4,499
Total	$ 338,187	$ 72,648	$ 410,835	$ 318,120	$ 70,668	$ 388,788
Geographical region:						
United States	$ 88,127	$ 18,170	$ 106,297	$ 89,441	$ 16,227	$ 105,668
South Korea	75,157	3,334	78,491	$ 57,540	$ 4,365	61,905
China	58,882	14,699	73,581	36,975	12,018	48,993
Taiwan	50,596	4,918	55,514	$ 71,863	$ 5,896	77,759
Japan	31,807	11,647	43,454	$ 31,355	$ 10,550	41,905
Europe	15,601	14,088	29,689	$ 15,189	$ 14,991	30,180
Asia-Pacific[1]	12,568	4,043	16,611	$ 14,710	$ 4,567	19,277
Rest of the world	5,449	1,749	7,198	$ 1,047	$ 2,054	3,101
Total	$ 338,187	$ 72,648	$ 410,835	$ 318,120	$ 70,668	$ 388,788

[1] Asia-Pacific includes all countries in the region except China, Japan, South Korea, and Taiwan, which are disclosed separately.

Note 15 — Subsequent Events

Acquisition of FRT GmbH

On October 9, 2019, subsequent to the balance sheet date, we acquired 100.0% of the shares of FRT GmbH, a Germany based company, for total consideration of €19.7 million subject to normal working capital adjustments. Up to €10.3 million of additional cash consideration may be payable subject to the performance of the acquired business in 2020. This acquisition strengthens our leadership in test and measurement by expanding our addressable market into 3D surface metrology and extending the optical applications scope of our existing Systems segment.

The transaction will be accounted for in accordance with the acquisition method of accounting which requires, among other things, that assets acquired and liabilities assumed be recognized at their fair values as of the acquisition date including acquired in-process research and development assets. Due to the limited time since the acquisition date, the initial purchase allocation for the business combination is incomplete at this time. Disclosures regarding amounts recognized for major classes of assets acquired and liabilities assumed will be provided once the initial accounting is completed. The acquired subsidiary is not expected to be material to the Company’s operations and overall financial position.

We expensed $0.2 million of costs relating to legal, financial and due diligence services performed in connection with this transaction, which are included in Selling, general and administrative expenses in the accompanying Condensed Consolidated Statements of Income for the three and nine months ended September 28, 2019.

Credit Facility Agreement

On October 25, 2019, FormFactor GmbH and ATT Advanced Temperature Test Systems GmbH, our wholly owned subsidiaries, entered into a credit facility agreement (the "Credit Facility Agreement") with HSBC Trinkaus & Burkhardt AG. The Credit Facility Agreement provides for a three-year loan in the amount of €21.0 million (the "Credit Facility"). The Credit Facility bears interest at a rate equal to the Euro Interbank Offered Rate ("EURIBOR") plus 1.75% per annum. The Credit Facility will be repaid in quarterly installments of €1.75 million plus interest beginning January 25, 2020.

Item 2. ***Management's Discussion and Analysis of Financial Condition and Results of Operations***

Cautionary Statement Regarding Forward-Looking Statements

This Quarterly Report on Form 10-Q contains forward-looking statements within the meaning of the Securities Exchange Act of 1934 and the Securities Act of 1933, which are subject to risks and uncertainties. The forward-looking statements include statements concerning, among other things, our business strategy, financial and operating results, gross margins, liquidity and capital expenditure requirements, impact of accounting standards and our share repurchase plan. In some cases, you can identify these statements by forward-looking words, such as "may," "might," "will," "could," "should," "expect," "plan," "anticipate," "believe," "estimate," "predict," "intend" and "continue," the negative or plural of these words and other comparable terminology.

The forward-looking statements are only predictions based on our current expectations and our projections about future events. All forward-looking statements included in this Quarterly Report on Form 10-Q are based upon information available to us as of the filing date of this Quarterly Report on Form 10-Q. You should not place undue reliance on these forward-looking statements. We have no obligation to update any of these statements. These forward-looking statements involve known and unknown risks, uncertainties and other factors that may cause our actual results, levels of activity, performance or achievements to differ materially from those expressed or implied by these statements, including risks related to general market trends, our ability to execute our business strategy and other risks discussed in the section titled "Risk Factors" and elsewhere in our Annual Report on Form 10-K for the year ended December 29, 2018 and in this Quarterly Report on Form 10-Q. You should carefully consider the numerous risks and uncertainties described under these sections.

The following discussion and analysis should be read in conjunction with our condensed consolidated financial statements and the accompanying notes contained in this Quarterly Report on Form 10-Q. Unless expressly stated or the context otherwise requires, the terms "we," "our," "us" and "FormFactor" refer to FormFactor, Inc. and its subsidiaries.

Overview

FormFactor, Inc., headquartered in Livermore, California, is a leading provider of test and measurement technologies. We provide a broad range of high-performance probe cards, analytical probes, probe stations and thermal sub-systems to both semiconductor companies and scientific institutions. Our products provide information from a variety of semiconductor and electro-optical devices and integrated circuits from research, to development through production. Customers use our products and services to lower production costs, improve yields, and enable development of their complex next-generation products.

We operate in two reportable segments consisting of the Probe Cards segment and the Systems segment. Sales of our probe cards and analytical probes are included in the Probe Cards segment, while sales of our probe stations and thermal sub-systems are included in the Systems segment.

We generated net income of $20.7 million in the first nine months of fiscal 2019 as compared to $18.9 million in the first nine months of fiscal 2018. The increase in net income was primarily due to higher revenues, partially offset by higher operating expenses and a higher effective income tax rate.

Critical Accounting Policies and the Use of Estimates

Management's Discussion and Analysis and Note 2 to the Consolidated Financial Statements in our 2018 Annual Report on Form 10-K describe the significant accounting estimates and critical accounting policies used in preparation of the Consolidated Financial Statements. Actual results in these areas could differ from management's estimates. During the nine months ended September 28, 2019, there were no significant changes in our critical accounting policies or estimates from those reported in our Annual Report on Form 10-K for the year ended December 29, 2018, which was filed with the Securities and Exchange Commission on February 26, 2019.

Results of Operations

The following table sets forth our operating results as a percentage of revenues for the periods indicated:

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Revenues	100.0 %	100.0 %	100.0 %	100.0 %
Cost of revenues	60.7	60.8	60.3	60.3
Gross profit	39.3	39.2	39.7	39.7
Operating expenses:				
Research and development	14.3	14.0	14.6	14.6
Selling, general and administrative	18.4	18.3	18.8	18.9
Total operating expenses	32.7	32.3	33.4	33.5
Operating income	6.6	6.9	6.3	6.2
Interest income	0.5	0.3	0.5	0.2
Interest expense	(0.3)	(0.6)	(0.4)	(0.7)
Other income (expense), net	0.2	0.1	0.1	(0.2)
Income before income taxes	7.0	6.7	6.5	5.5
Provision for income taxes	1.1	1.0	1.5	0.9
Net income	5.9 %	5.7 %	5.0 %	4.6 %

Revenues by Segment and Market

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
	(In thousands)			
Probe Cards	$ 116,447	$ 111,606	$ 338,187	$ 318,120
Systems	24,157	23,383	72,648	70,668
	$ 140,604	$ 134,989	$ 410,835	$ 388,788

	Three Months Ended					
	September 28, 2019	% of Revenues	September 29, 2018	% of Revenues	$ Change	% Change
	(Dollars in thousands)					
Probe Cards Markets:						
Foundry & Logic	$ 68,431	48.7%	$ 61,270	45.4%	$ 7,161	11.7 %
DRAM	39,425	28.0	37,359	27.7	2,066	5.5
Flash	8,591	6.1	12,977	9.6	(4,386)	(33.8)
Systems Market:						
Systems	24,157	17.2	23,383	17.3	774	3.3
Total revenues	$ 140,604	100.0%	$ 134,989	100.0%	$ 5,615	4.2 %

	Nine Months Ended					
	September 28, 2019	% of Revenues	September 29, 2018	% of Revenues	$ Change	% Change
	(Dollars in thousands)					
Probe Cards Markets:						
Foundry & Logic	$ 213,453	51.9%	$ 181,819	46.7%	$ 31,634	17.4 %
DRAM	104,355	25.4	105,716	27.2	(1,361)	(1.3)
Flash	20,379	5.0	30,585	7.9	(10,206)	(33.4)
Systems Market:						
Systems	72,648	17.7	70,668	18.2	1,980	2.8
Total revenues	$ 410,835	100.0%	$ 388,788	100.0%	$ 22,047	5.7 %

The increases in Foundry & Logic product revenue for the three months ended September 28, 2019, compared to the three months ended September 29, 2018, was driven by market penetration with a large semiconductor foundry. The increase in Foundry & Logic product revenue for the nine months ended September 28, 2019, compared to the nine months ended September 29, 2018, was primarily the result of lower demand in the prior year from one major customer as a result of delays in its node transitions. This major customer accounted for 23.8% of total revenues for the nine months ended September 28, 2019, compared to 18.0% for the nine months ended September 29, 2018.

The decreases in Flash product revenue for the three and nine months ended September 28, 2019, compared to the three and nine months ended September 29, 2018, were driven by decreased unit sales as a result of decreased customer demand.

The increases in Systems product revenue for the three and nine months ended September 28, 2019, compared to the three and nine months ended September 29, 2018, were driven by increased sales of probe stations, which includes a new 200mm platform, partially offset by lower revenue from thermal sub-systems.

Revenues by Geographic Region

	Three Months Ended				Nine Months Ended			
	September 28, 2019	**% of Revenue**	**September 29, 2018**	**% of Revenue**	**September 28, 2019**	**% of Revenue**	**September 29, 2018**	**% of Revenue**
	(Dollars in thousands)							
United States	$ 33,665	23.9%	$ 40,127	29.7%	$ 106,297	25.9%	$ 105,668	27.2%
South Korea	23,597	16.8	20,874	15.5	78,491	19.1	61,905	15.9
China	31,383	22.3	22,080	16.4	73,581	17.9	48,993	12.6
Taiwan	18,255	13.0	19,809	14.7	55,514	13.5	77,759	20.0
Japan	16,929	12.0	14,735	10.9	43,454	10.6	41,905	10.8
Europe	9,548	6.8	9,128	6.8	29,689	7.2	30,180	7.8
Asia-Pacific[1]	5,665	4.0	7,230	5.4	16,611	4.0	19,277	5.0
Rest of the world	1,562	1.2	1,006	0.6	7,198	1.8	3,101	0.7
Total revenues	$ 140,604	100.0%	$ 134,989	100.0%	$ 410,835	100.0%	$ 388,788	100.0%

[1] Asia-Pacific includes all countries in the region except China, Japan, South Korea and Taiwan, which are disclosed separately.

Geographic revenue information is based on the location to which we ship the product. For example, if a certain South Korean customer purchases through their U.S. subsidiary and requests the products to be shipped to an address in South Korea, this sale will be reflected in the revenue for South Korea rather than the U.S.

Changes in revenue by geographic region for the three and nine months ended September 28, 2019, compared to the three and nine months ended September 29, 2018, were primarily attributable to changes in customer demand, shifts in customer regional manufacturing strategies, and product sales mix. The most significant change in revenue by geographic region for the three and nine months ended September 28, 2019, compared to the three and nine months ended September 29, 2018 was within China, which was attributable to shifts in customer regional manufacturing strategies with large multinationals.

Cost of Revenues and Gross Margins

Cost of revenues consists primarily of manufacturing materials, compensation and benefits, shipping and handling costs, manufacturing-related overhead and amortization of certain intangible assets. Our manufacturing operations rely on a limited number of suppliers to provide key components and materials for our products, some of which are a sole source. We order materials and supplies based on backlog and forecasted customer orders. Tooling and setup costs related to changing manufacturing lots at our suppliers are also included in the cost of revenues. We expense all warranty costs, inventory provisions and amortization of certain intangible assets as cost of revenues.

Our gross profit and gross margin were as follows (dollars in thousands):

	Three Months Ended			
	September 28, 2019	**September 29, 2018**	**$ Change**	**% Change**
Gross profit	$ 55,318	$ 52,970	$ 2,348	4.4%
Gross margin	39.3%	39.2%		

	Nine Months Ended			
	September 28, 2019	**September 29, 2018**	**$ Change**	**% Change**
Gross profit	$ 163,191	$ 154,317	$ 8,874	5.8%
Gross margin	39.7%	39.7%		

Our gross profit and gross margin by segment were as follows (dollars in thousands):

	Three Months Ended							
	September 28, 2019				September 29, 2018			
	Probe Cards	Systems	Corporate and Other	Total	Probe Cards	Systems	Corporate and Other	Total
Gross profit	$ 48,127	$ 13,015	$ (5,824)	$ 55,318	$ 47,675	$ 11,250	$ (5,955)	$ 52,970
Gross margin	41.3%	53.9%	—%	39.3%	42.7%	48.1%	—%	39.2%

	Nine Months Ended							
	September 28, 2019				September 29, 2018			
	Probe Cards	Systems	Corporate and Other	Total	Probe Cards	Systems	Corporate and Other	Total
Gross profit	$141,913	$ 38,703	$ (17,425)	$ 163,191	$138,182	$ 34,118	$ (17,983)	$154,317
Gross margin	42.0%	53.3%	—%	39.7%	43.4%	48.3%	—%	39.7%

Probe Cards

For the three and nine months ended September 28, 2019, gross profit increased compared to the three and nine months ended September 29, 2018, primarily due to increased sales and higher factory utilization, offset by less favorable product mix. Gross margins decreased due to less favorable product mix.

Systems

For the three and nine months ended September 28, 2019, gross profit and gross margin increased compared to the three and nine months ended September 29, 2018, due to increased sales and a favorable product mix.

Corporate and Other

Corporate and Other includes unallocated expenses relating to amortization of intangible assets, share-based compensation expense, and restructuring charges, net, which are not used in evaluating the results of, or in allocating resources to, our reportable segments.

Overall

Gross profit and gross margin fluctuate with revenue levels, product mix, selling prices, factory loading and material costs. For the three and nine months ended September 28, 2019, compared to the three and nine months ended September 29, 2018, gross profit increased due to increased sales while gross margins remained relatively consistent with fluctuations in product mix and factory utilizations.

Cost of revenues included stock-based compensation expense as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Stock-based compensation	$ 1,117	$ 832	$ 3,031	$ 2,565

Future gross margins may be adversely impacted by lower revenues, unfavorable product mix and lower factory utilization even though we have taken significant steps to reduce our operating cost structure. Our gross margins may also be adversely affected if we are required to record additional inventory write-downs for estimated average selling prices that are below cost or because of a decrease in demand.

Research and Development

	Three Months Ended			
	September 28, 2019	September 29, 2018	$ Change	% Change
	(Dollars in thousands)			
Research and development	$ 20,096	$ 18,857	$ 1,239	6.6%
% of revenues	14.3%	14.0%		

	Nine Months Ended			
	September 28, 2019	September 29, 2018	$ Change	% Change
	(Dollars in thousands)			
Research and development	$ 59,893	$ 56,578	$ 3,315	5.9%
% of revenues	14.6%	14.6%		

The increases in research and development expenses in the three and nine months ended September 28, 2019 when compared to the corresponding periods in the prior year were primarily driven by annual compensation and benefit adjustments, partially offset by a decrease in project material costs.

A detail of the changes is as follows (in millions):

	Three Months Ended September 28, 2019 compared to Three Months Ended September 29, 2018	Nine Months Ended September 28, 2019 compared to Nine Months Ended September 29, 2018
Employee compensation costs	$ 1.1	$ 2.5
Stock-based compensation	0.4	1.0
Project material costs	(0.6)	(1.1)
Depreciation	0.1	0.4
Other general operations	0.2	0.5
	$ 1.2	$ 3.3

Research and development included stock-based compensation expense as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Stock-based compensation	$ 1,729	$ 1,312	$ 4,830	$ 3,870

Selling, General and Administrative

	Three Months Ended			
	September 28, 2019	September 29, 2018	$ Change	% Change
	(Dollars in thousands)			
Selling, general and administrative	$ 25,887	$ 24,745	$ 1,142	4.6%
% of revenues	18.4%	18.3%		

	Nine Months Ended			
	September 28, 2019	September 29, 2018	$ Change	% Change
	(Dollars in thousands)			
Selling, general and administrative	$ 77,354	$ 73,426	$ 3,928	5.3%
% of revenues	18.8%	18.9%		

The increases in selling, general and administrative in the three and nine months ended September 28, 2019 when compared to the corresponding periods in the prior year were primarily due to higher stock-based compensation related to the timing of annual grants, annual compensation and benefit adjustments, and headcount, offset partially by a decrease in the amortization of intangible assets. The increase for the nine months ended September 28, 2019 when compared to the corresponding period in the prior year was offset partially by a reduction in consulting fees.

A detail of the changes is as follows (in millions):

	Three Months Ended September 28, 2019 compared to Three Months Ended September 29, 2018	Nine Months Ended September 28, 2019 compared to Nine Months Ended September 29, 2018
Stock-based compensation	$ 1.3	$ 3.2
Employee compensation	0.7	1.7
Consulting fees	—	(1.2)
Amortization of intangibles	(1.0)	(0.3)
General operating expenses	0.1	0.5
	$ 1.1	$ 3.9

Selling, general and administrative included stock-based compensation expense as follows (in thousands):

	Three Months Ended		Nine Months Ended	
	September 28, 2019	September 29, 2018	September 28, 2019	September 29, 2018
Stock-based compensation	$ 3,658	$ 2,393	$ 9,227	$ 5,986

Interest Income and Interest Expense

	Three Months Ended		Nine Months Ended	
	September 28, 2019	**September 29, 2018**	**September 28, 2019**	**September 29, 2018**
	(Dollars in thousands)			
Interest Income	$ 724	$ 369	$ 1,988	$ 952
Weighted average balance of cash and investments	$ 193,092	$ 134,516	$ 173,975	$ 136,986
Weighted average yield on cash and investments	2.02%	1.50%	2.07%	1.46%
Interest Expense	$ 422	$ 777	$ 1,539	$ 2,654
Average debt outstanding	$ 46,250	$ 84,725	$ 56,113	$ 96,003
Weighted average interest rate on debt	4.26%	4.09%	4.42%	3.88%

Interest income is earned on our cash, cash equivalents, restricted cash and marketable securities. The increases in interest income for the three and nine months ended September 28, 2019 compared with the corresponding periods of the prior year were attributable to higher investment yields, as well as higher average investment balances.

Interest expense primarily includes interest on our term loan and interest-rate swap derivative contracts, as well as term loan issuance costs amortization charges. The decreases in interest expense for the three and nine months ended September 28, 2019 compared to the same periods of the prior year were primarily due to lower outstanding debt balances as a result of principal payments made, partially offset by higher interest rates.

Other Income (Expense), Net
Other income (expense), net, primarily includes the effects of foreign currency impact and various other gains and losses.

Provision for Income Taxes

	Three Months Ended		Nine Months Ended	
	September 28, 2019	**September 29, 2018**	**September 28, 2019**	**September 29, 2018**
	(In thousands, except percentages)			
Provision for income taxes	$ 1,584	$ 1,393	$ 5,906	$ 3,334
Effective tax rate	16.1%	15.3%	22.2%	15.0%

Provision for income taxes reflects the tax provision on our operations in foreign and U.S. jurisdictions, offset by tax benefits from lapsing of statute of limitations related to uncertain tax positions in the U.S. and excess tax benefits from share based compensation plans. In the fourth quarter of fiscal 2018, we released our valuation allowance against certain U.S. deferred tax assets as sufficient positive evidence existed to support the realization of such deferred tax assets, resulting in an increase in our effective tax rate for the three and nine months ended September 28, 2019 compared to the three and nine months ended September 29, 2018.

Liquidity and Capital Resources

Capital Resources
Our working capital was $247.9 million at September 28, 2019, compared to $235.3 million at December 29, 2018.

Cash and cash equivalents primarily consist of deposits held at banks and money market funds. Marketable securities primarily consist of U.S. treasuries, U.S. agency securities and corporate bonds. We typically invest in highly-rated securities with low probabilities of default. Our investment policy requires investments to be rated single A or better, and limits the types of acceptable investments, issuer concentration and duration of the investment.

Our cash, cash equivalents and marketable securities totaled approximately $200.0 million at September 28, 2019, compared to $149.0 million at December 29, 2018. We believe that we will be able to satisfy our working capital requirements and scheduled term loan repayments for at least the next twelve months with the liquidity provided by our existing cash, cash equivalents, marketable securities and cash provided by operations. To the extent necessary, we may consider entering into short and long-
term debt obligations, raising cash through a stock issuance, or obtaining new financing facilities, which may not be available on terms favorable to us. Our future capital requirements may vary materially from those now planned.

After the third quarter ended September 28, 2019, we entered into a loan agreement for €21.0 million; see Note 15 of Notes to Condensed Consolidated Financial Statements for additional information.

If we are unsuccessful in maintaining or growing our revenues, maintaining or reducing our cost structure (in response to an industry demand downturn or other event), or increasing our available cash through debt or equity financings, our cash, cash equivalents and marketable securities may decline in fiscal 2019.

We utilize a variety of tax planning and financing strategies to manage our worldwide cash and deploy funds to locations where needed. As part of these strategies, we indefinitely reinvest a portion of our foreign earnings. Should we require additional capital in the United States, we may elect to repatriate indefinitely-reinvested foreign funds or raise capital in the United States.

Cash Flows
The following table sets forth our net cash flows from operating, investing and financing activities:

	Nine Months Ended	
	September 28, 2019	September 29, 2018
	(In thousands)	
Net cash provided by operating activities	$ 83,378	$ 46,138
Net cash used in investing activities	(40,047)	(13,463)
Net cash used in financing activities	(18,976)	(31,732)

Operating Activities
Net cash provided by operating activities for the nine months ended September 28, 2019 was primarily attributable to net income of $20.7 million and $62.1 million of net non-cash expenses, offset by changes in operating assets and liabilities.

Accounts receivable, net, decreased $10.6 million to $84.8 million at September 28, 2019, compared to $95.3 million at December 29, 2018, as a result of changes in customer sales mix, timing of customer shipments and timing of customer payments.

Inventories, net, increased $8.3 million to $86.0 million at September 28, 2019, compared to $77.7 million at December 29, 2018, as a result of increased inventory purchases to shorten lead time and improve pricing, and timing of customer demand.

Accounts payable increased $11.0 million to $51.0 million at September 28, 2019, compared to $40.0 million at December 29, 2018, as a result of timing of vendor payments.

Investing Activities
Net cash used in investing activities for the nine months ended September 28, 2019 was primarily related to $25.9 million of net purchases of marketable securities, as well as $14.2 million of cash used in the acquisition of property, plant and equipment.

Financing Activities
Net cash used in financing activities for the nine months ended September 28, 2019 primarily related to $18.8 million of principal payments made towards the repayment of our term loan and $7.9 million related to tax withholdings associated with the net share settlements of our equity awards, partially offset by $7.7 million of proceeds received from issuances of common stock under our employee stock purchase plan and stock option plans.

Debt

2016 Facility
On June 24, 2016, we entered into a credit agreement (the “Credit Agreement”) with HSBC Bank USA, National Association ("HSBC"). Pursuant to the Credit Agreement, the lenders provided us with a senior secured term loan facility of $150 million (the “Term Loan”). The proceeds of the Term Loan were used to finance a portion of the purchase price paid in connection with the acquisition of Cascade Microtech.

The Term Loan bears interest at a rate equal to, at our option, (i) the applicable London Interbank Offered Rate ("LIBOR") rate plus 2.00% per annum or (ii) Base Rate (as defined in the Credit Agreement) plus 1.00% per annum. We have currently elected to pay interest at 2.00% over the one-month LIBOR rate. Interest payments are payable in monthly installments over a five-year period.

On July 25, 2016, we entered into an interest rate swap agreement with HSBC and other lenders to hedge the interest payments on the Term Loan for the notional amount of $95.6 million. As future levels of LIBOR over the life of the loan are uncertain, we entered into these interest-rate swap agreements to hedge the exposure in interest rate risks associated with movement in LIBOR rates. By entering into the agreements, we convert a floating rate interest at one-month LIBOR plus 2% into a fixed rate interest at 2.939%. As of September 28, 2019, the notional amount of the loan that is subject to this interest rate swap is $33.8 million. See Note 7 of Notes to Condensed Consolidated Financial Statements for additional information.

The Term Loan amortizes in equal quarterly installments, which began June 30, 2016, in annual amounts equal to 5% for year one, 10% for year two, 20% for year three, 30% for year four and 35% for year five. The Credit Agreement allows voluntary prepayment to be made at any time to prepay the Term Loan in whole or in part without penalty or premium. As of September 28, 2019, we have made prepayments of $40.0 million in addition to scheduled installments per the Credit Agreement. For the three and nine months ended September 28, 2019, we did not make any prepayments in addition to scheduled installments. We expect the scheduled installments per the Credit Agreement to pay the remaining debt in the next 12 months.

The obligations under the Term Loan are guaranteed by substantially all of our assets and the assets of our domestic subsidiaries, subject to certain customary exceptions.

The Credit Agreement contains negative covenants customary for financing of this type, as well as certain financial maintenance covenants. As of September 28, 2019, the balance outstanding pursuant to the Term Loan was $46.3 million at an interest rate of 4.1% and we were in compliance with all covenants under the Credit Agreement.

2019 Facility

On October 25, 2019, FormFactor GmbH and ATT Advanced Temperature Test Systems GmbH, our wholly owned subsidiaries, entered into a credit facility agreement (the "Credit Facility Agreement") with HSBC Trinkaus & Burkhardt AG. The Credit Facility Agreement provides for a three-year loan in the amount of €21.0 million (the "credit facility"). The credit facility bears interest at a rate equal to the Euro Interbank Offered Rate ("EURIBOR") plus 1.75% per annum. The credit facility will be repaid in quarterly installments of €1.75 million plus interest beginning January 25, 2020.

Stock Repurchase Program

In February 2017, our Board of Directors authorized a program to repurchase up to $25 million of outstanding common stock to offset potential dilution from issuances of common stock under our stock-based compensation plans. The share repurchase program will expire on February 1, 2020. During the nine months ended September 28, 2019, we did not repurchase any shares of common stock and, as of September 28, 2019, $6.0 million remained available for future repurchases.

Repurchased shares are retired upon the settlement of the related trade transactions with the excess of cost over par value charged to additional paid-in capital. All repurchases were made in compliance with Rule 10b-18 under the Securities Exchange Act of 1934, as amended.

Contractual Obligations and Commitments

Other than our operating lease commitments as disclosed in Note 12 of Notes to Condensed Consolidated Financial Statements, our contractual obligations and commitments have not materially changed as of September 28, 2019 from those disclosed in our Annual Report on Form 10-K for the year ended December 29, 2018.

Off-Balance Sheet Arrangements

Historically, we have not participated in transactions that have generated relationships with unconsolidated entities or financial partnerships, such as entities often referred to as structured finance or special purpose entities, which would have been established for the purpose of facilitating off-balance sheet arrangements or other contractually narrow or limited purposes. As of September 28, 2019, we were not involved in any such off-balance sheet arrangements.

Recent Accounting Pronouncements

See Note 1 of Notes to Condensed Consolidated Financial Statements.

Item 3. ***Quantitative and Qualitative Disclosures about Market Risk***

For financial market risks related to changes in interest rates and foreign currency exchange rates, reference is made to Item 7A "Quantitative and Qualitative Disclosures about Market Risk" contained in Part II of our Annual Report on Form 10-K for the fiscal year ended December 29, 2018. Our exposure to market risk has not changed materially since December 29, 2018.

Item 4. ***Controls and Procedures***

Evaluation of Disclosure Controls and Procedures

Based on our management's evaluation (with the participation of our principal executive officer and principal financial officer), as of the end of the period covered by this report, our principal executive officer and principal financial officer have concluded that our disclosure controls and procedures (as defined in Rules 13a-15(e) and 15d-15(e) under the Securities Exchange Act of 1934, as amended, (the "Exchange Act")) are effective to ensure that information required to be disclosed by us in reports that we file or submit under the Exchange Act is recorded, processed, summarized and reported within the time periods specified in Securities and Exchange Commission rules and forms and is accumulated and communicated to our management, including our principal executive officer and principal financial officer, as appropriate to allow timely decisions regarding required disclosure.

Changes in Internal Control over Financial Reporting

There have been no changes in our internal control over financial reporting (as defined in Rules 13a-15(f) and 15d-15(f) under the Exchange Act) that occurred during the period covered by this Quarterly Report on Form 10-Q that have materially affected, or are reasonably likely to materially affect, our internal control over financial reporting.

Limitations on the Effectiveness of Controls

Control systems, no matter how well designed and operated, can provide only reasonable, not absolute, assurance that the control systems' objectives are being met. Further, the design of any control systems must reflect the fact that there are resource constraints, and the benefits of all controls must be considered relative to their costs. Because of the inherent limitations in all control systems, no evaluation of controls can provide absolute assurance that all control issues and instances of fraud, if any, within our company have been detected. These inherent limitations include the realities that judgments in decision making can be faulty and that breakdowns can occur because of a simple error or mistake. Control systems can also be circumvented by the individual acts of some persons, by collusion of two or more people, or by management override of the controls. The design of any system of controls is based, in part, on certain assumptions about the likelihood of future events, and there can be no assurance that any design will succeed in achieving its stated goals under all potential future conditions. Over time, controls may become inadequate because of changes in conditions or deterioration in the degree of compliance with policies or procedures.

CEO and CFO Certifications

We have attached as exhibits to this Quarterly Report on Form 10-Q the certifications of our Chief Executive Officer and Chief Financial Officer, which are required in accordance with the Exchange Act. We recommend that this Item 4 be read in conjunction with the certifications for a more complete understanding of the subject matter presented.

PART II - OTHER INFORMATION

Item 1A. *Risk Factors*

There have been no material changes during the nine months ended September 28, 2019 to the risk factors discussed in our Annual Report on Form 10-K for the year ended December 29, 2018. If any of the identified risks actually occur, our business, financial condition and results of operations could suffer. The trading price of our common stock could decline and you may lose all or part of your investment in our common stock. The risks and uncertainties described in our Annual Report on Form 10-K for the year ended December 29, 2018 are not the only ones we face. Additional risks that we currently do not know about or that we currently believe to be immaterial may also impair our business operations.

Item 6. *Exhibits*

The following exhibits are filed herewith and this list constitutes the exhibit index.

Exhibit		Incorporated by Reference			Filed
Number	Exhibit Description	Form	Date	Number	Herewith
3.1	Amended and Restated Certificate of Incorporation of the Registrant as filed with the Delaware Secretary of State on June 17, 2003	S-1	October 20, 2003	3.01	
3.2	Amended and Restated Bylaws of the Registrant	8-K	July 22, 2016	3.2	
31.01	Certification of Chief Executive Officer pursuant to 15 U.S.C. Section 7241, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				X
31.02	Certification of Chief Financial Officer pursuant to 15 U.S.C. Section 7241, as adopted pursuant to Section 302 of the Sarbanes-Oxley Act of 2002				X
32.01	Certification of Chief Executive Officer and Chief Financial Officer pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002				*
101.INS	XBRL Instance Document				X
101.SCH	XBRL Taxonomy Extension Schema Document				X
101.CAL	XBRL Taxonomy Extension Calculation Linkbase Document				X
101.DEF	XBRL Taxonomy Extension Definition Linkbase Document				X
101.LAB	XBRL Taxonomy Extension Label Linkbase Document				X
101.PRE	XBRL Taxonomy Extension Presentation Linkbase Document				X

* This exhibit shall not be deemed “filed” for purposes of Section 18 of the Securities Exchange Act of 1934 or otherwise subject to the liabilities of that section, nor shall it be deemed incorporated by reference in any filing under the Securities Act of 1933 or the Securities Exchange Act of 1934, whether made before or after the date hereof and irrespective of any general incorporation language in any filings.

SIGNATURE

Pursuant to the requirements of the Securities Exchange Act of 1934, the registrant has duly caused this report to be signed on its behalf by the undersigned thereunto duly authorized.

FormFactor, Inc.

Date: November 5, 2019 By: /s/ SHAI SHAHAR

Shai Shahar
Chief Financial Officer
(Duly Authorized Officer, Principal Financial Officer, and Principal Accounting Officer)

Exhibit 31.01

**CERTIFICATION OF CHIEF EXECUTIVE OFFICER
PURSUANT TO 15 U.S.C. SECTION 7241, AS
ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002**

I, Michael D. Slessor, certify that:

1. I have reviewed the quarterly report on Form 10-Q of FormFactor, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant's other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c. Evaluated the effectiveness of the registrant's disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d. Disclosed in the quarterly report any change in the registrant's internal control over financial reporting that occurred during the registrant's most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant's internal control over financial reporting.

5. The registrant's other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant's auditors and the audit committee of the registrant's board of directors (or persons performing the equivalent functions):

   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant's ability to record, process, summarize and report financial information; and

   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant's internal control over financial reporting.

Date: November 5, 2019

/s/ MICHAEL D. SLESSOR

Michael D. Slessor
Chief Executive Officer
(Principal Executive Officer and Director)

Exhibit 31.02

CERTIFICATION OF CHIEF FINANCIAL OFFICER
PURSUANT TO 15 U.S.C. SECTION 7241,
AS ADOPTED PURSUANT TO SECTION 302 OF THE SARBANES-OXLEY ACT OF 2002

I, Shai Shahar, certify that:

1. I have reviewed the quarterly report on Form 10-Q of FormFactor, Inc.;

2. Based on my knowledge, this report does not contain any untrue statement of a material fact or omit to state a material fact necessary to make the statements made, in light of the circumstances under which such statements were made, not misleading with respect to the period covered by this report;

3. Based on my knowledge, the financial statements, and other financial information included in this report, fairly present in all material respects the financial condition, results of operations and cash flows of the registrant as of, and for, the periods presented in this report;

4. The registrant’s other certifying officer and I are responsible for establishing and maintaining disclosure controls and procedures (as defined in Exchange Act Rules 13a-15(e) and 15d-15(e)) and internal control over financial reporting (as defined in Exchange Act Rules 13a-15(f) and 15d-15(f)) for the registrant and have:

   a. Designed such disclosure controls and procedures, or caused such disclosure controls and procedures to be designed under our supervision, to ensure that material information relating to the registrant, including its consolidated subsidiaries, is made known to us by others within those entities, particularly during the period in which this report is being prepared;

   b. Designed such internal control over financial reporting, or caused such internal control over financial reporting to be designed under our supervision, to provide reasonable assurance regarding the reliability of financial reporting and the preparation of financial statements for external purposes in accordance with generally accepted accounting principles;

   c. Evaluated the effectiveness of the registrant’s disclosure controls and procedures and presented in this report our conclusions about the effectiveness of the disclosure controls and procedures, as of the end of the period covered by this report based on such evaluation; and

   d. Disclosed in the quarterly report any change in the registrant’s internal control over financial reporting that occurred during the registrant’s most recent fiscal quarter that has materially affected, or is reasonably likely to materially affect, the registrant’s internal control over financial reporting.

5. The registrant’s other certifying officer and I have disclosed, based on our most recent evaluation of internal control over financial reporting, to the registrant’s auditors and the audit committee of the registrant’s board of directors (or persons performing the equivalent functions):

   a. All significant deficiencies and material weaknesses in the design or operation of internal control over financial reporting which are reasonably likely to adversely affect the registrant’s ability to record, process, summarize and report financial information; and

   b. Any fraud, whether or not material, that involves management or other employees who have a significant role in the registrant’s internal control over financial reporting.

Date: November 5, 2019

/s/ SHAI SHAHAR

Shai Shahar
Chief Financial Officer
(Principal Financial Officer and Principal Accounting Officer)

Exhibit 32.01

CERTIFICATION OF
CHIEF EXECUTIVE OFFICER AND CHIEF FINANCIAL OFFICER
PURSUANT TO 18 U.S.C. SECTION 1350,
AS ADOPTED PURSUANT TO SECTION 906 OF THE SARBANES-OXLEY ACT OF 2002

In connection with the Quarterly Report on Form 10-Q of FormFactor, Inc., a Delaware corporation, for the period ended September 28, 2019, as filed with the Securities and Exchange Commission, each of the undersigned officers of FormFactor, Inc. certifies pursuant to 18 U.S.C. Section 1350, as adopted pursuant to Section 906 of the Sarbanes-Oxley Act of 2002, that, to his respective knowledge:

1. The quarterly report fully complies with the requirements of Section 13(a) or 15(d) of the Securities Exchange Act of 1934, as amended; and

2. The information contained in the quarterly report fairly presents, in all material respects, the financial condition and results of operations of FormFactor, Inc. for the periods presented therein.

Date:	November 5, 2019	/s/ MICHAEL D. SLESSOR
		Michael D. Slessor *Chief Executive Officer* *(Principal Executive Officer and Director)*
Date:	November 5, 2019	/s/ SHAI SHAHAR
		Shai Shahar *Chief Financial Officer* *(Principal Financial Officer and Principal Accounting Officer)*