THE SOURCE for Critical Information and Insight™

MARCH 2016

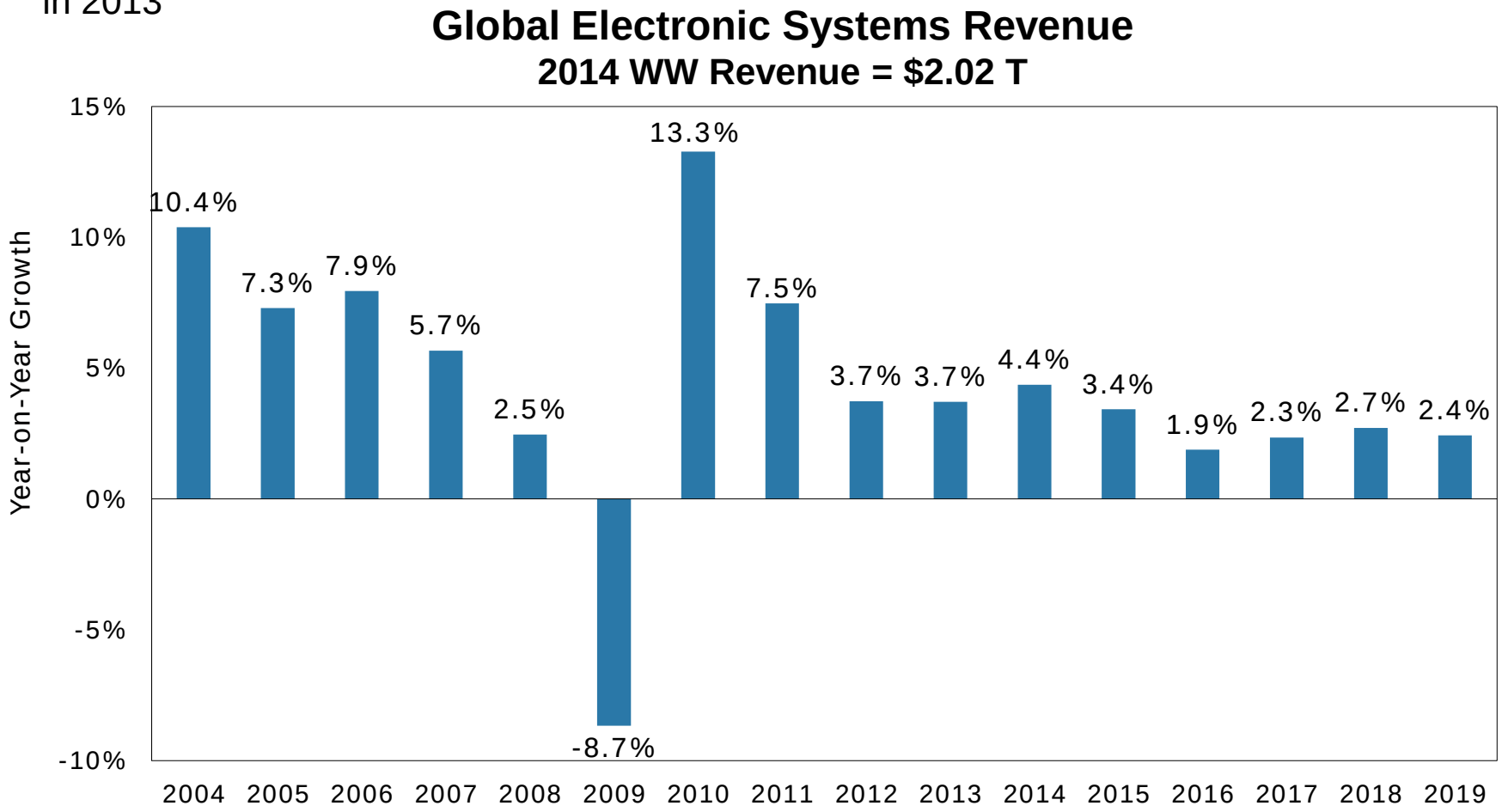
OUTLOOK FOR SEMICONDUCTORS & POWER DISCRETES & MODULES

Forecast Outlook

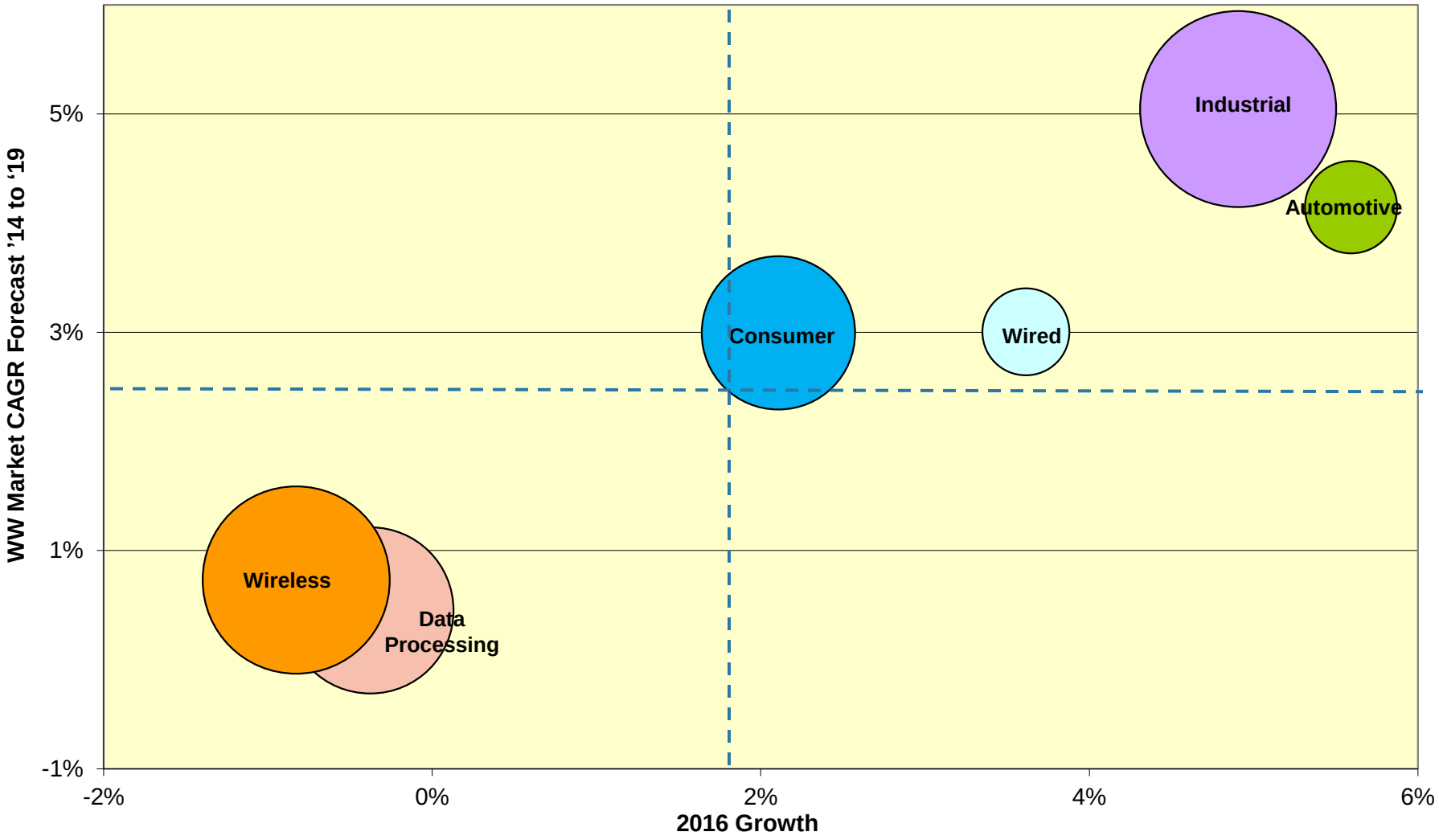
Dale Ford, Vice President

Electronic systems market – Growth drops below 2% in 2016

- Five year CAGR = 2.6%
- Industrial Electronics leads growth followed by Automotive & Consumer Electronics & Wired
- Industrial Electronics passed Data Processing as largest market in 2012; Wireless followed in 2013



Electronics growth weighed down by Wireless & Data Processing



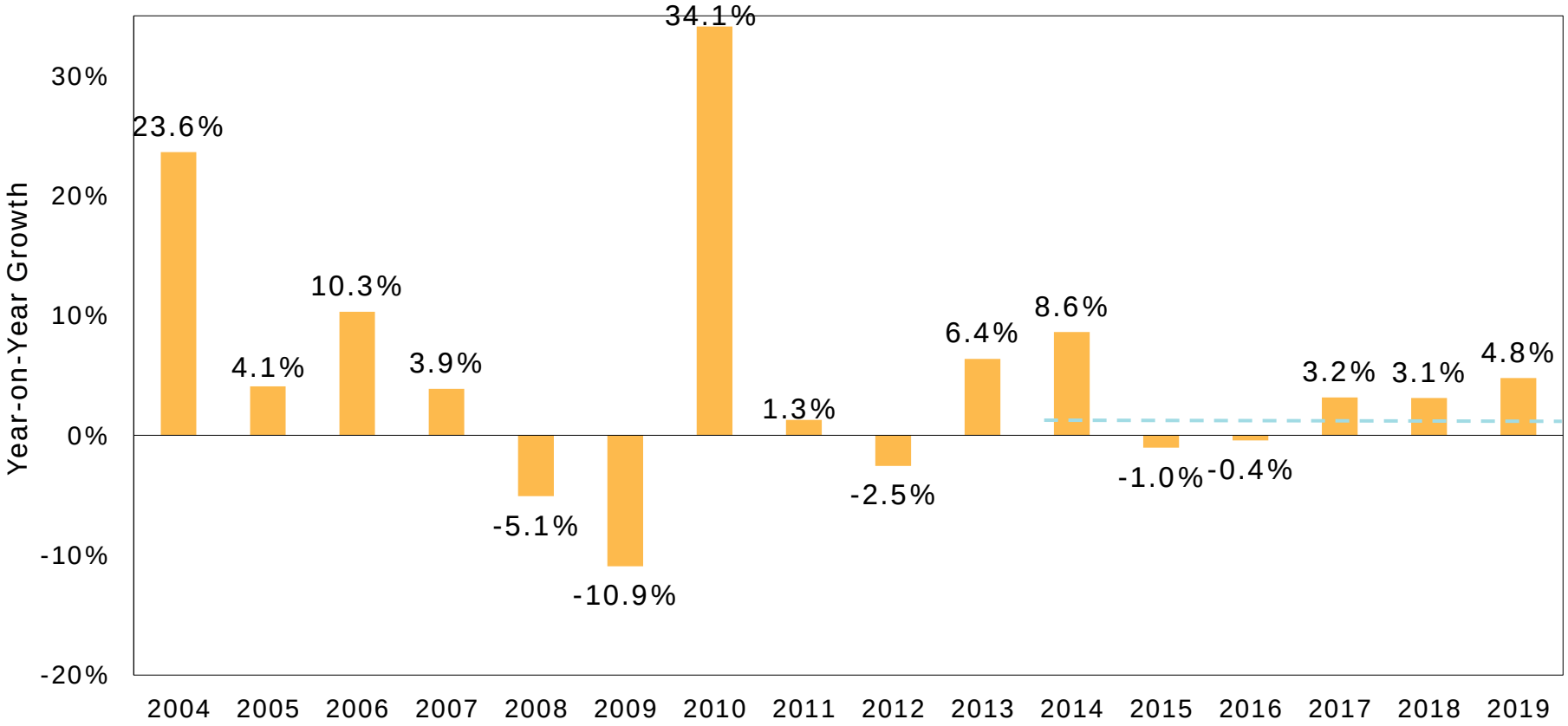
Source – IHS *Application Market Forecast Q4 2015*

Annual semiconductor outlook

- Semiconductor market growth outlook – Next four years challenging
  - September 2012 began a new cycle that peaked in Q4 2014 – 2015/16 contracts
  - Long-term outlook sees five-year CAGR of only 1.9%

Global Semiconductor Revenue

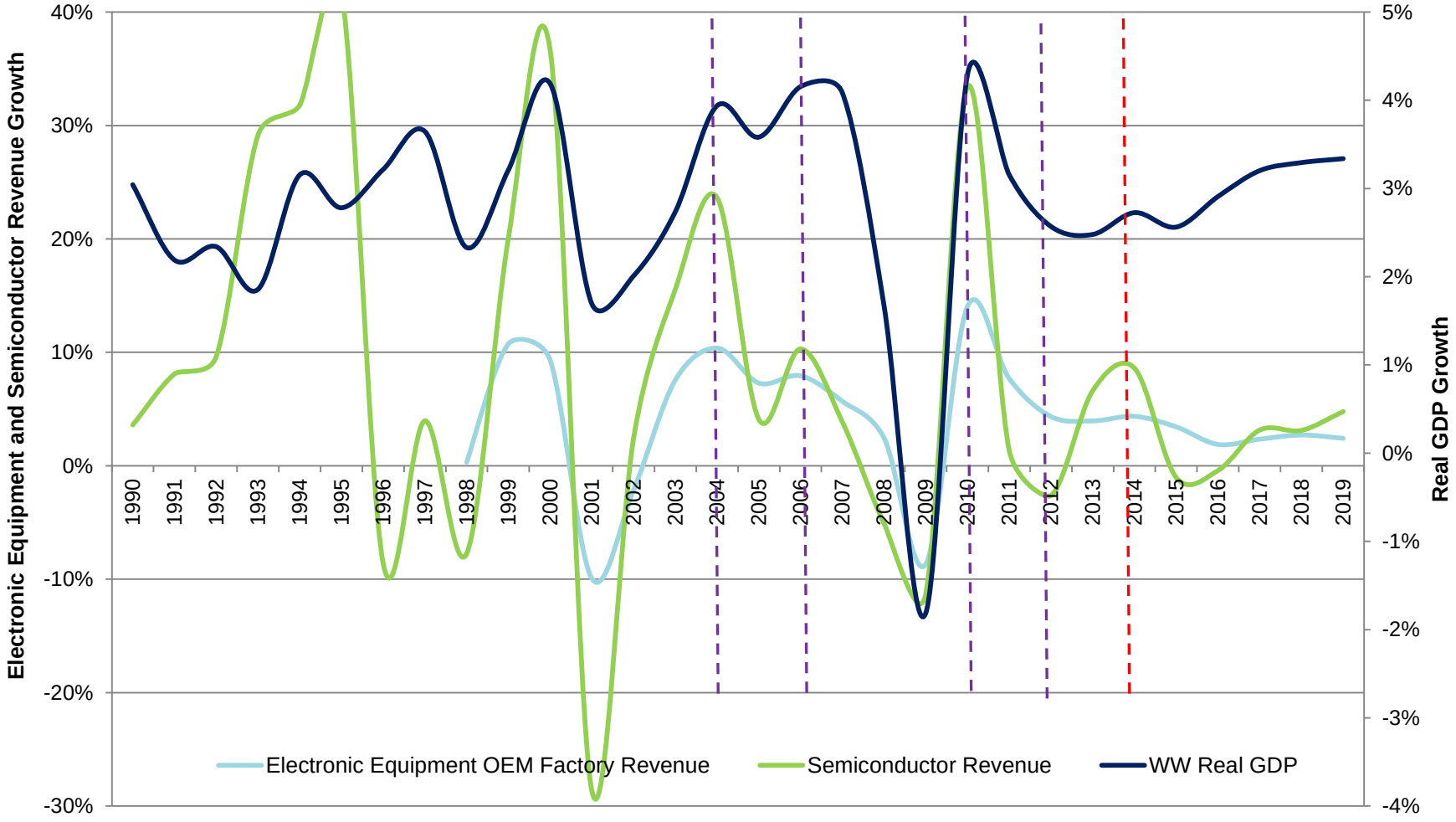
2015 Revenue = $351.5B



Source – IHS *Application Market Forecast Q4 2015*

Historic alignment between economy and electronics

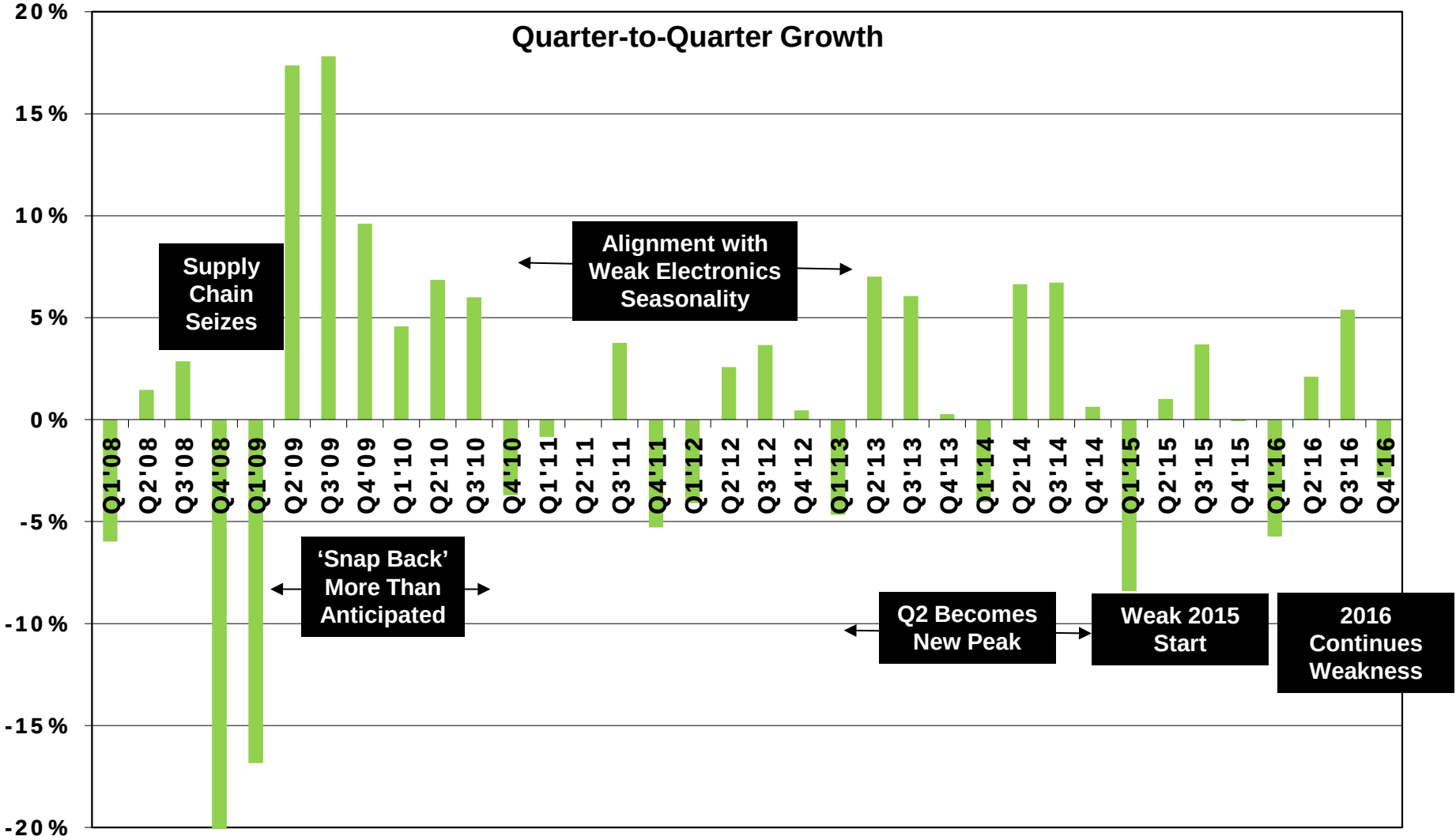
Semiconductor growth profile continues to predict accurately



Source – IHS Global Insight and IHS Technology

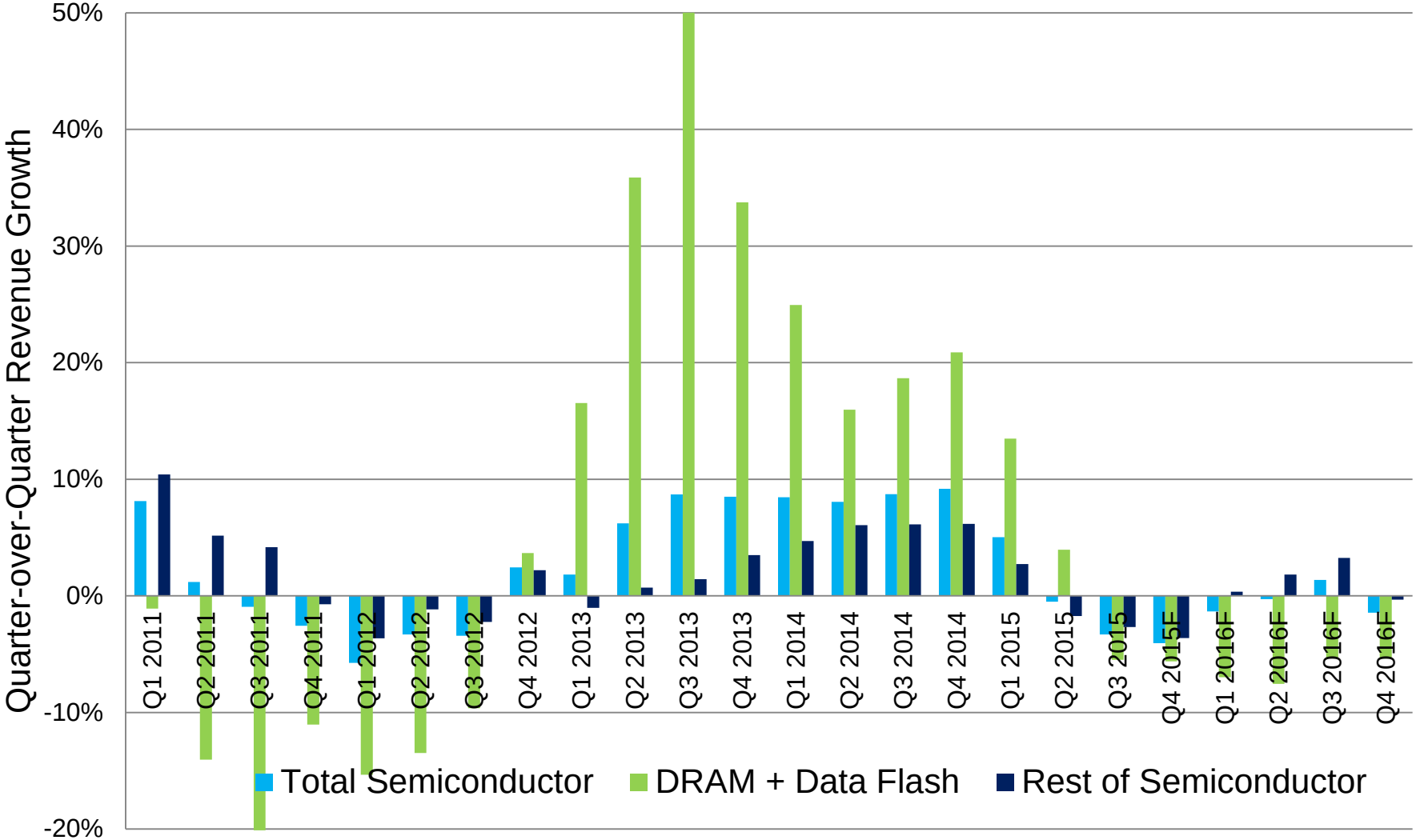
Quarterly semiconductor forecast

Q1 2015 slumps below -8.0%; Rest of year disappoints and drops 2015/16 negative



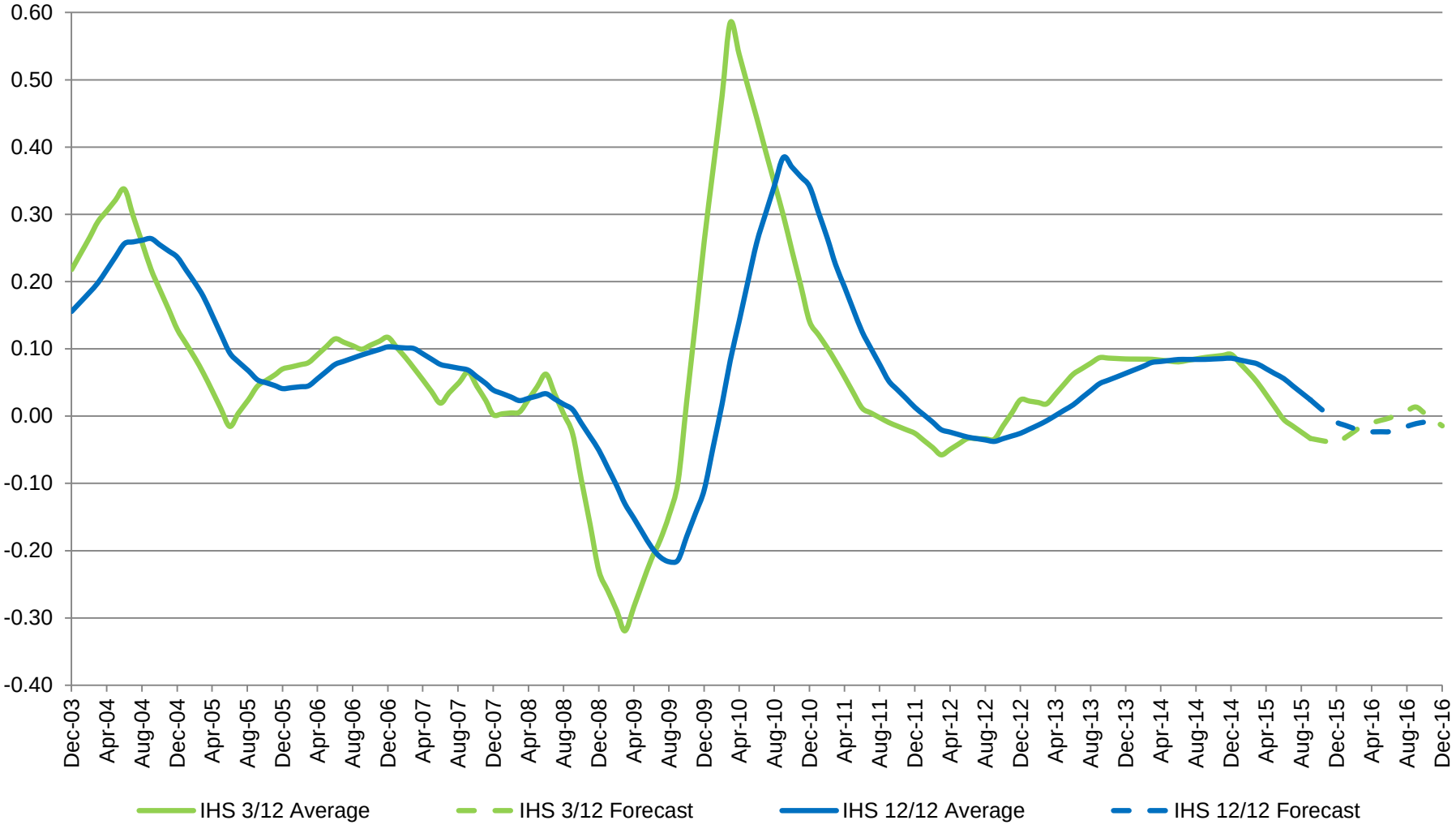
Source – IHS *Application Market Forecast Q4 2015*

2016 Growth – Weak and Negative



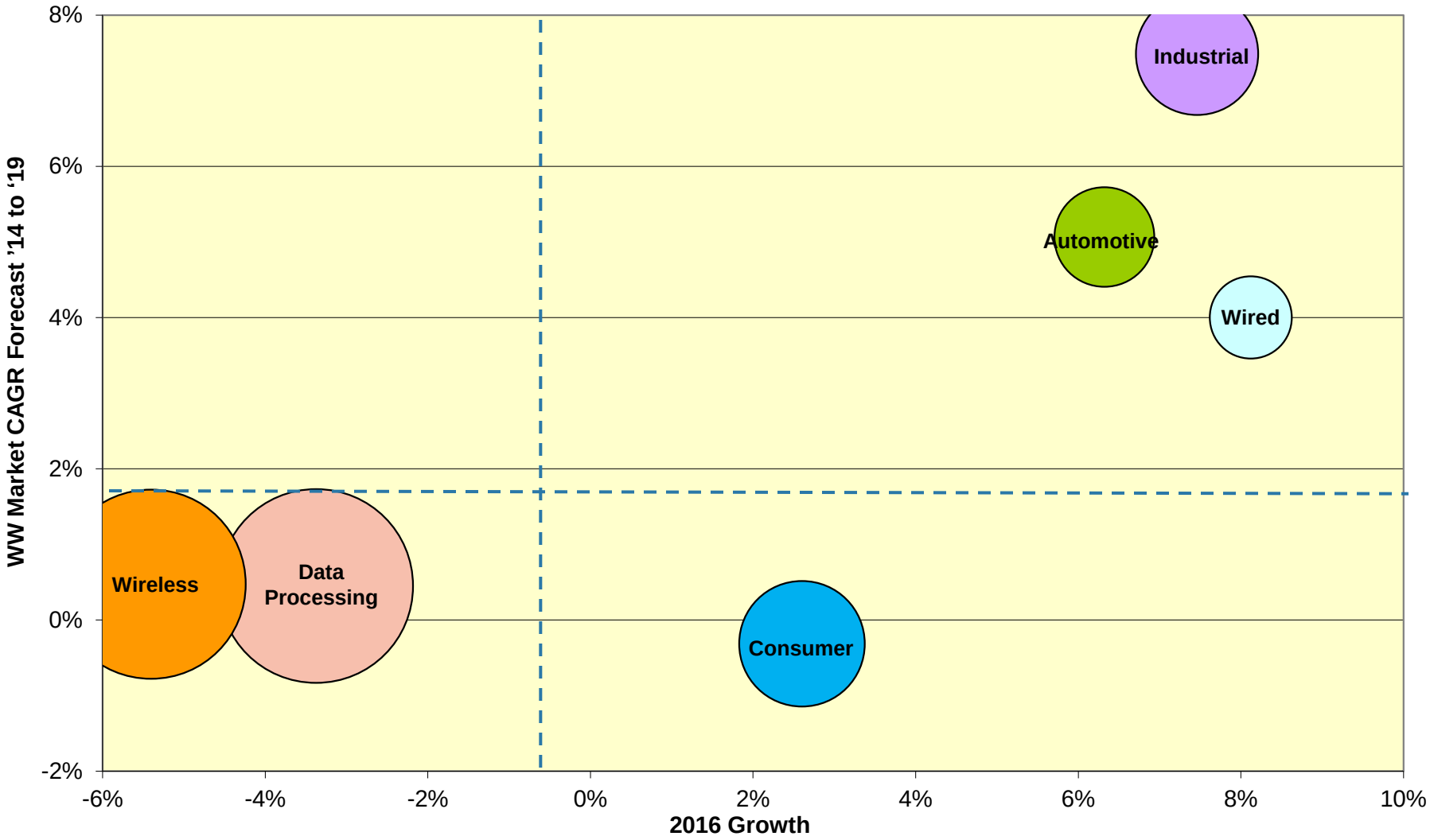
Source – IHS *Application Market Forecast Q4 2015*

3/12 and 12/12 moving averages



Source – IHS *Application Market Forecast Q4 2015*

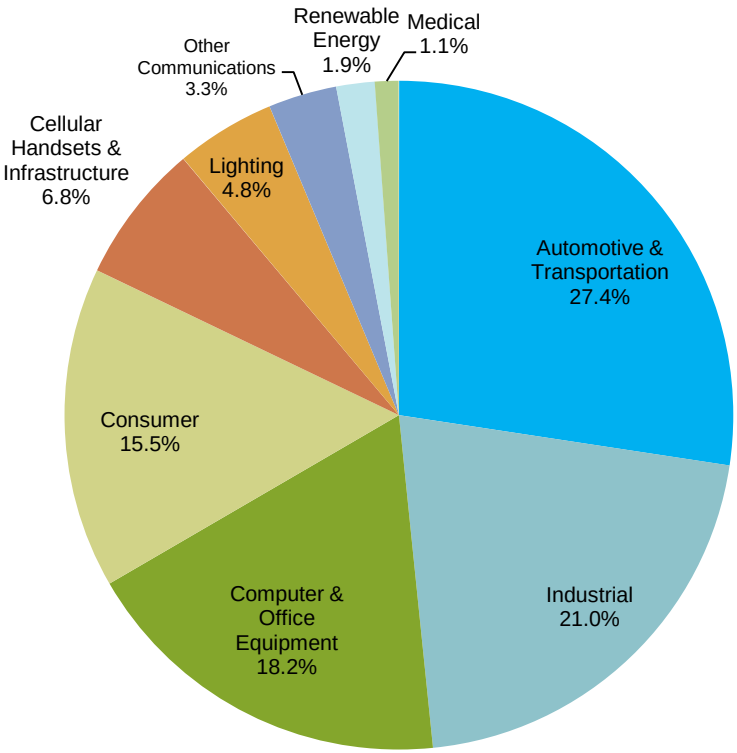
New semiconductor growth drivers for next 5 years



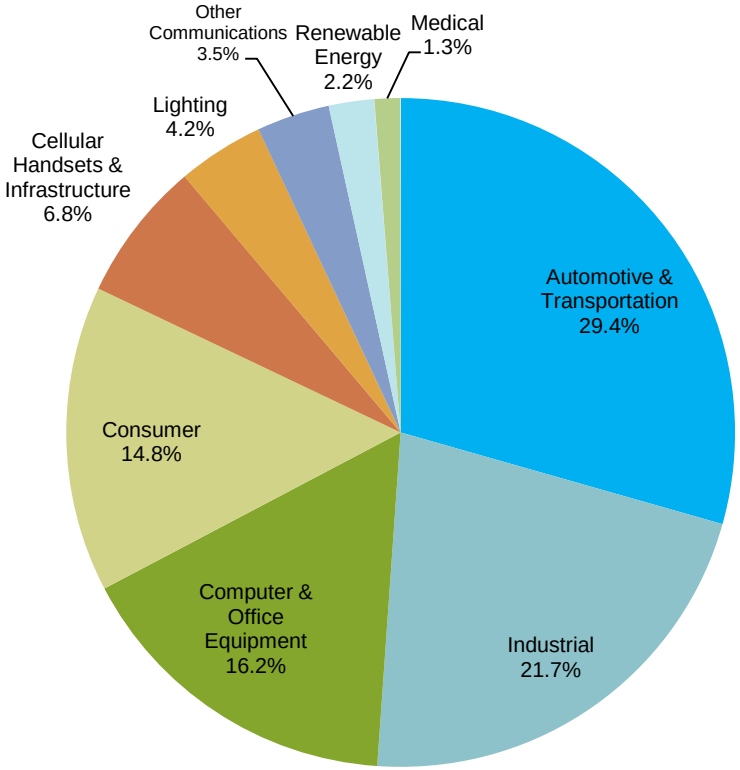
Source – IHS *Application Market Forecast Q4 2015*

Power discrete revenues by market

2015 Revenue = $12.4B



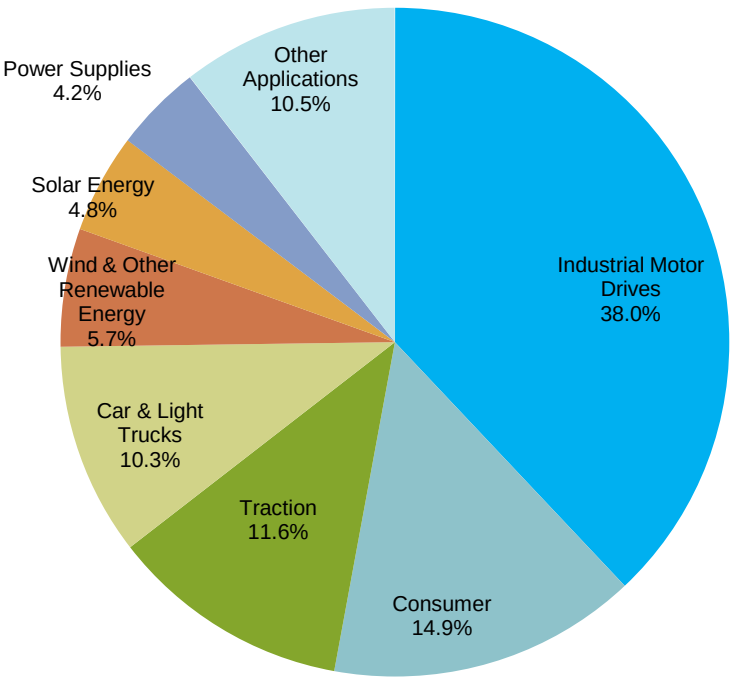
2019 Revenue = $14.6B



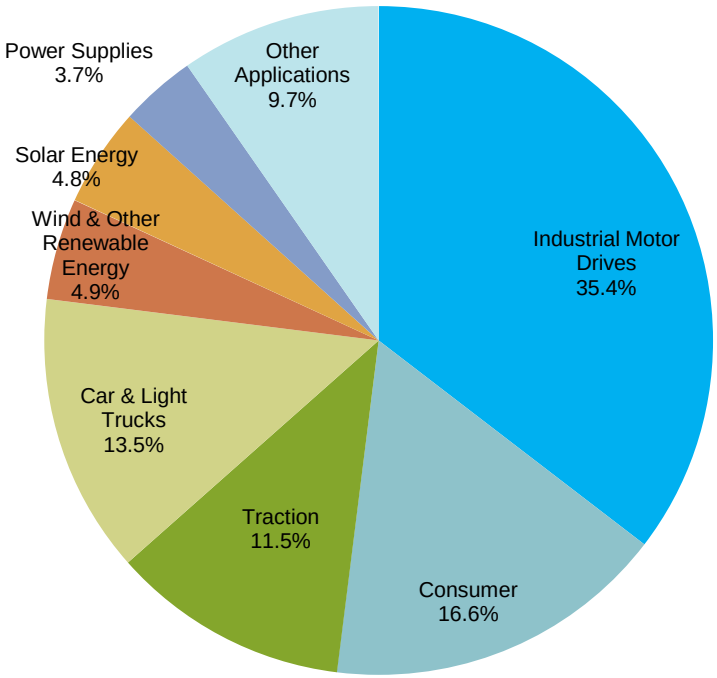
Source – IHS *The World Market for Power Semiconductors – 2015 Edition*

Power discrete module revenues by market

2015 Revenue = $4.6B

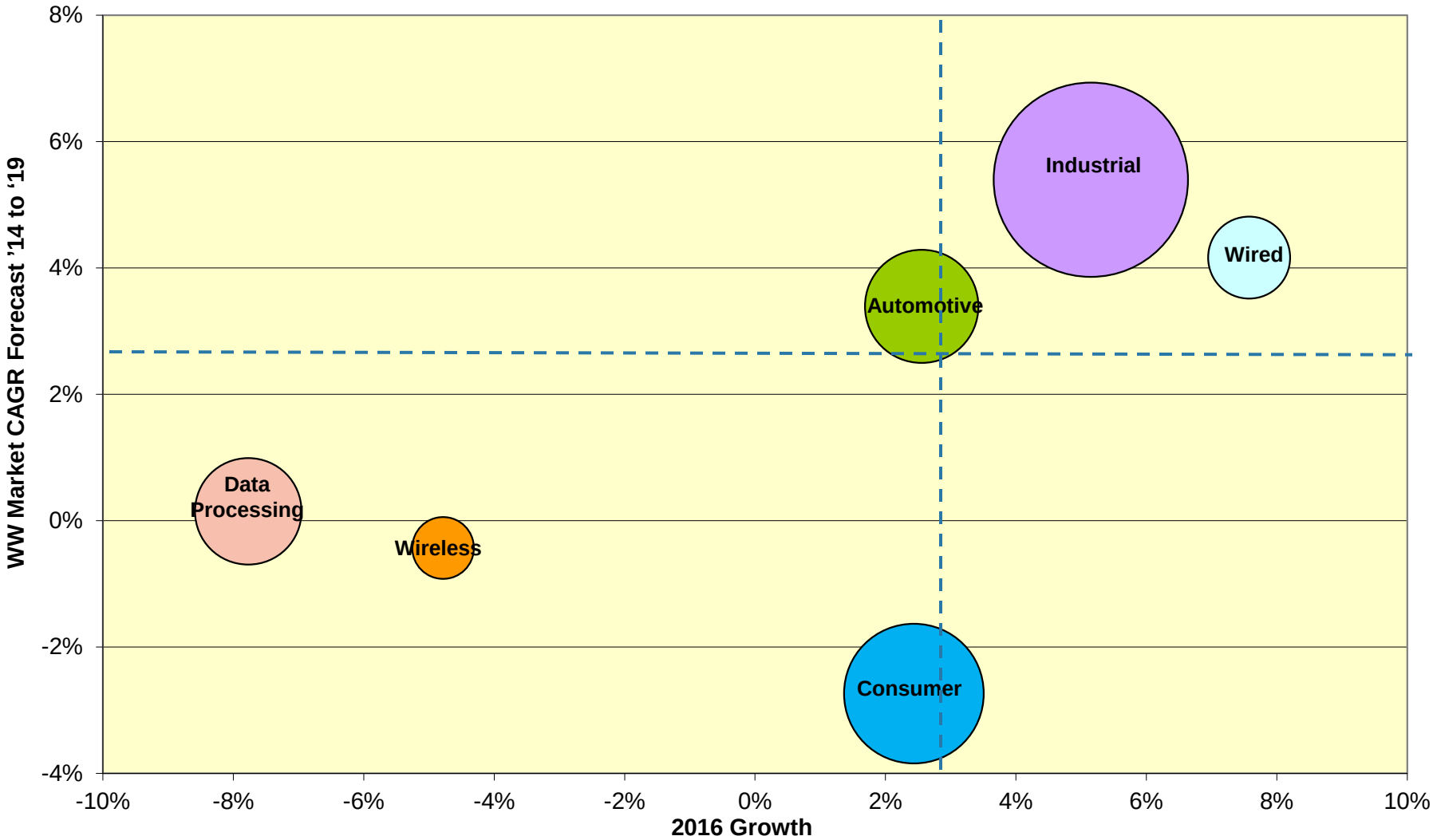


2019 Revenue = $6.3B



Source – IHS *The World Market for Power Semiconductors – 2015 Edition*

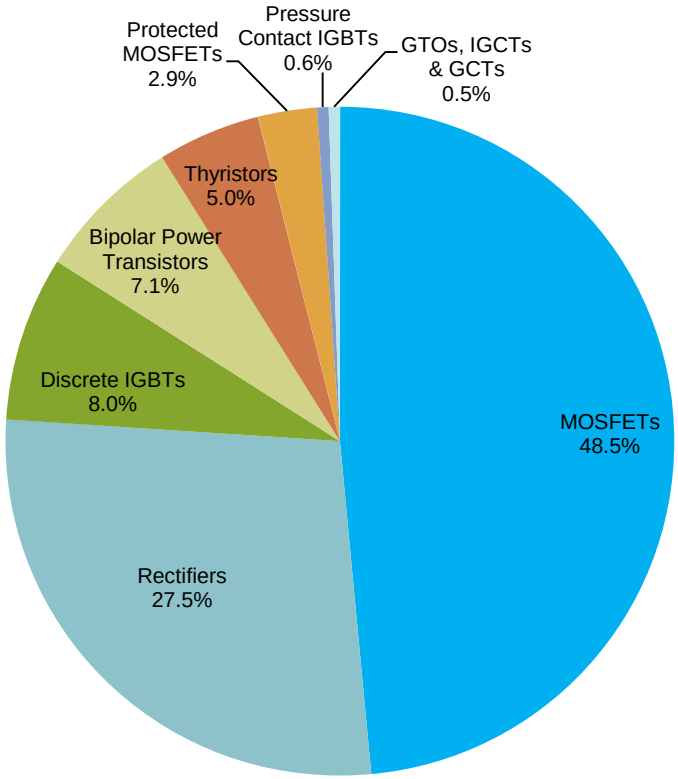
Power discretes & modules growth drivers for next 5 years



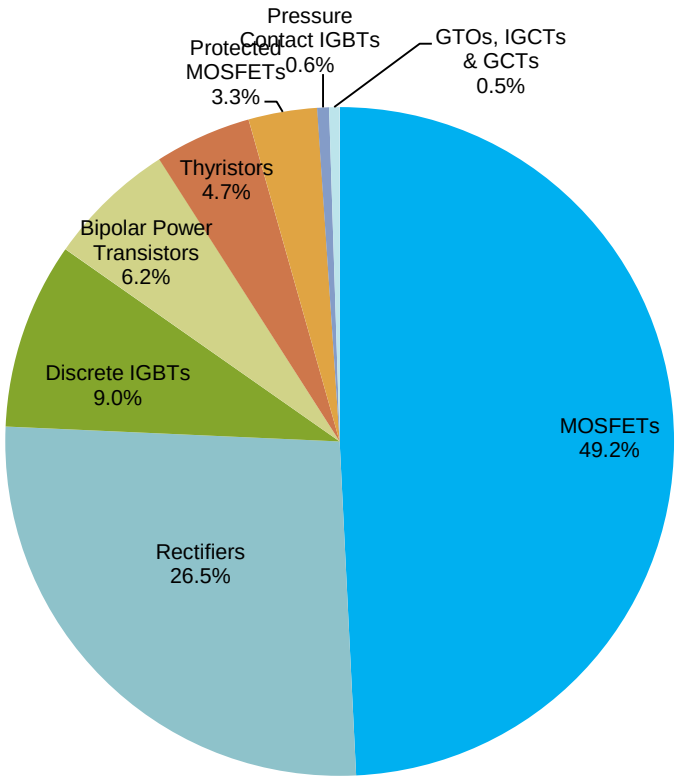
Source – IHS *Application Market Forecast Q4 2015*

Power discrete revenues by device type

2015 Revenue = $12.4B

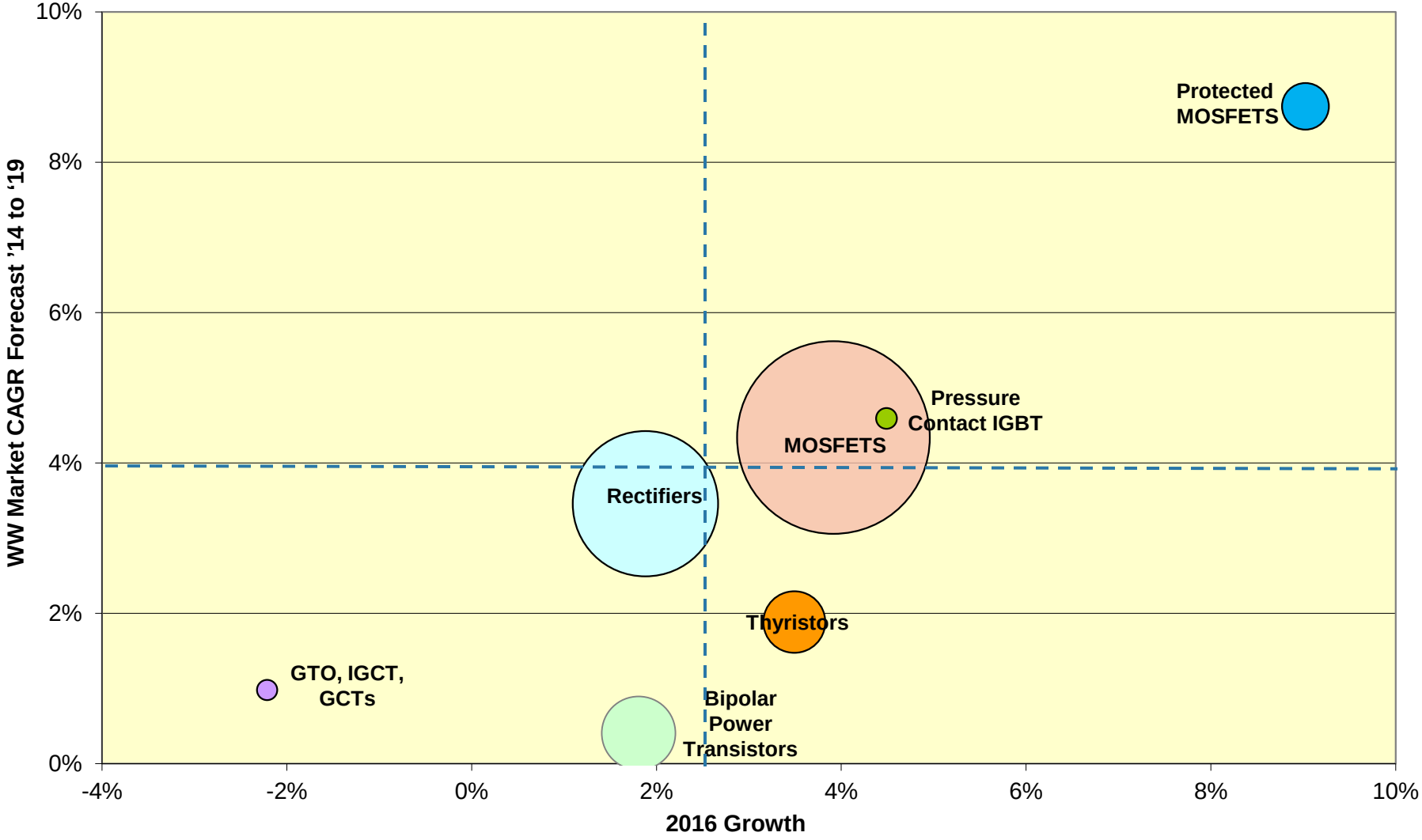


2019 Revenue = $14.6B



Source – IHS *The World Market for Power Semiconductors – 2015 Edition*

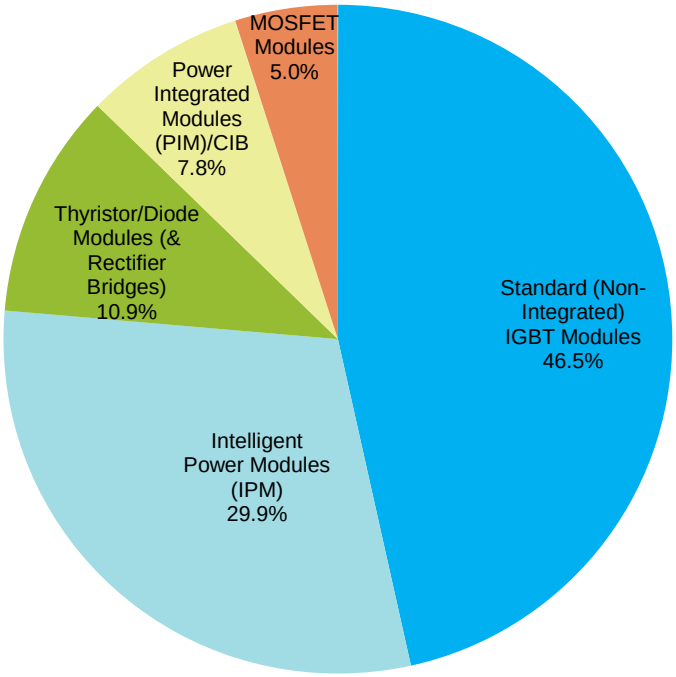
Power discretes growth opportunities



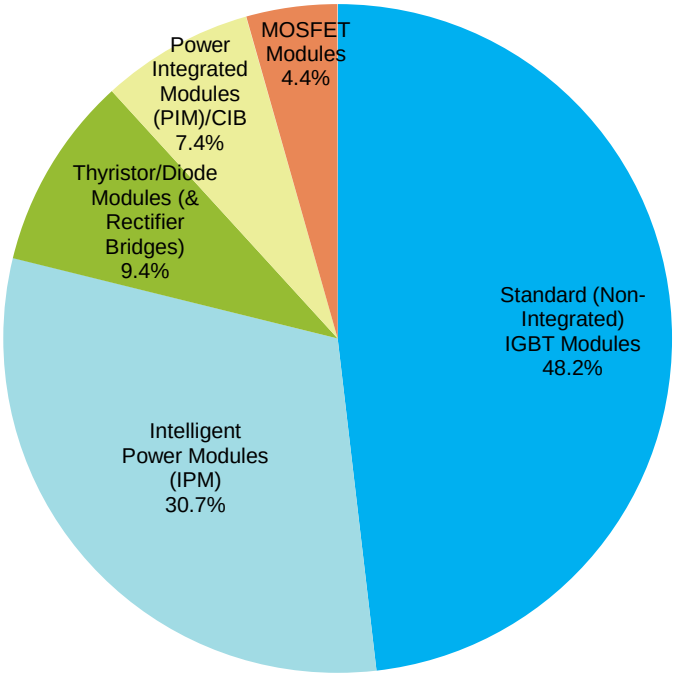
Source – IHS *Application Market Forecast Q4 2015*

Power discrete module revenues by module type

2015 Revenue = $4.6B



2019 Revenue = $6.3B



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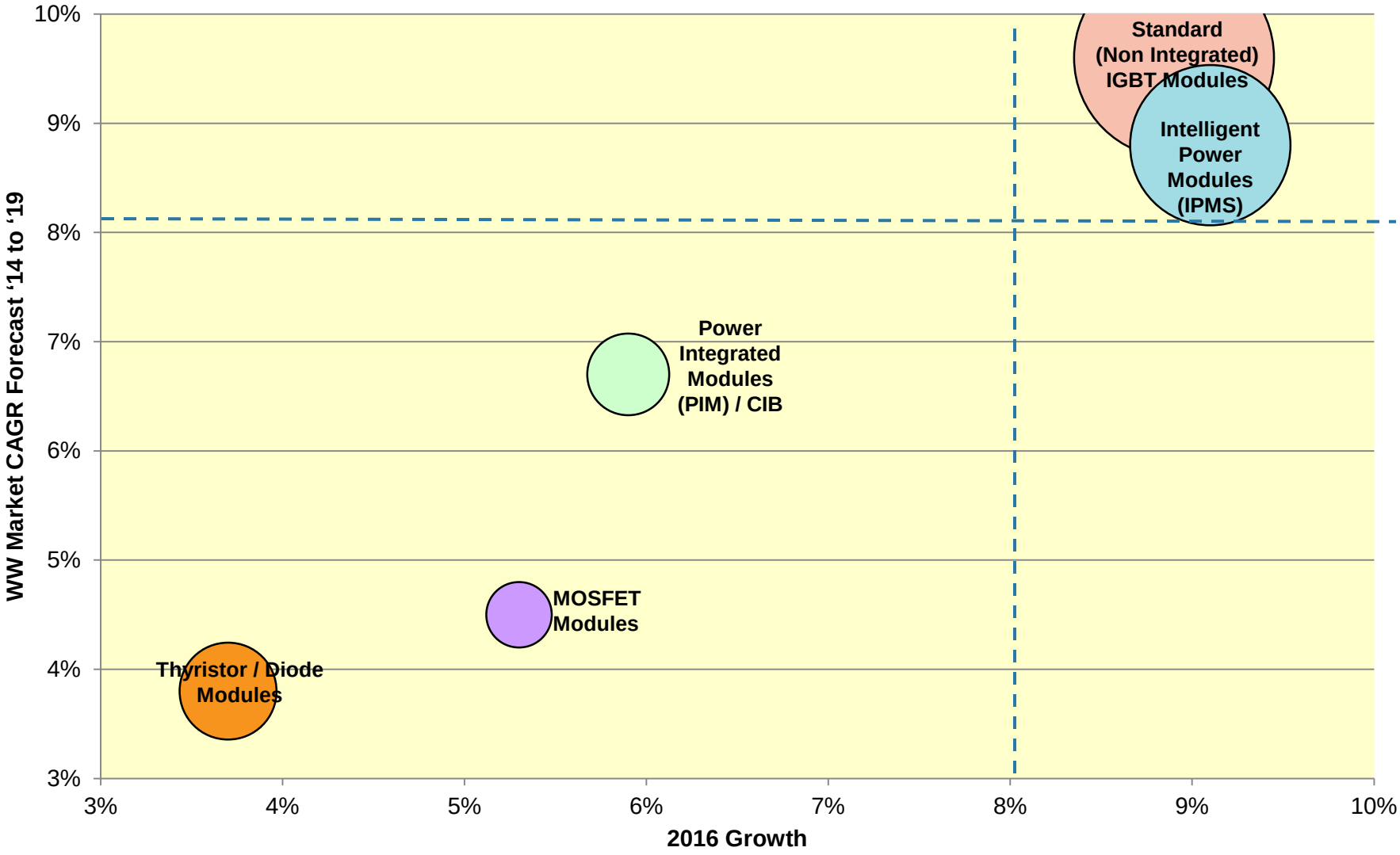
Power module growth opportunities



Preliminary 2015 semiconductor market share for top 20 suppliers

Top Suppliers of Semiconductors Worldwide - Millions of Dollars							
2014 Rank	2015 Rank	COMPANY NAME	2014 Revenue	2015E Revenue	Percent Change	Percent of Total	Cumulative Percentage
1	1	Intel**	49,964	49,319	-1.3%	14.0%	14.0%
2	2	Samsung Electronics	38,064	40,722	7.0%	11.6%	25.6%
4	3	SK Hynix	16,113	16,944	5.2%	4.8%	30.4%
3	4	Qualcomm*	19,291	16,205	-16.0%	4.6%	35.0%
5	5	Micron Technology	16,110	14,759	-8.4%	4.2%	39.2%
6	6	Texas Instruments	12,246	12,285	0.3%	3.5%	42.7%
15	7	NXP*	5,483	10,104	84.3%	2.9%	45.6%
7	8	Toshiba	10,234	9,203	-10.1%	2.6%	48.2%
8	9	Broadcom**	8,398	8,414	0.2%	2.4%	50.6%
14	10	Avago Technologies**	5,644	6,951	23.2%	2.0%	52.6%
9	11	STMicroelectronics	7,404	6,887	-7.0%	2.0%	54.6%
13	12	Infineon Technologies*	5,937	6,870	15.7%	2.0%	56.5%
23	13	Apple	2,985	6,664	123.2%	1.9%	58.4%
10	14	MediaTek	7,016	6,571	-6.3%	1.9%	60.3%
11	15	Renesas Electronics Corporation	6,815	5,731	-15.9%	1.6%	61.9%
17	16	Sony	5,053	5,250	3.9%	1.5%	63.4%
12	17	SanDisk	6,264	4,796	-23.4%	1.4%	64.8%
19	18	nVidia	4,109	4,296	4.6%	1.2%	66.0%
16	19	Advanced Micro Devices (AMD)	5,388	3,914	-27.4%	1.1%	67.1%
21	20	ON Semiconductor**	3,516	3,528	0.3%	1.0%	68.1%
		Other Semiconductor Companies	119,178	112,102	-5.9%	31.9%	100.0%
		Total Semiconductor	**355,212**	**351,515**	-1.0%	100.0%	

* Includes 2015 Acquisitions; ** Does not include announced acquisitions for 2016

Source – IHS *Competitive Landscaping Tool Q4 2015*

Preliminary 2015 semiconductor market share for top 20 suppliers

Plus results from major announced acquisitions expected to close in H1 2016

Top Suppliers of Semiconductors Worldwide - Millions of Dollars							
2014 Rank	2015 Rank	COMPANY NAME	2014 Revenue	2015E Revenue	Percent Change	Percent of Total	Cumulative Percentage
1	1	Intel** + Altera**	49,964	50,957	2.0%	14.5%	14.5%
2	2	Samsung Electronics	38,064	40,722	7.0%	11.6%	26.1%
4	3	SK Hynix	16,113	16,944	5.2%	4.8%	30.9%
3	4	Qualcomm*	19,291	16,205	-16.0%	4.6%	35.5%
8	5	Avago Technologies** + Broadcom**	5,644	15,365	172.2%	4.4%	39.9%
5	6	Micron Technology	16,110	14,759	-8.4%	4.2%	44.1%
6	7	Texas Instruments	12,246	12,285	0.3%	3.5%	47.6%
15	8	NXP*	5,483	10,104	84.3%	2.9%	50.5%
7	9	Toshiba	10,234	9,203	-10.1%	2.6%	53.1%
9	10	STMicroelectronics	7,404	6,887	-7.0%	2.0%	55.0%
13	11	Infineon Technologies*	5,937	6,870	15.7%	2.0%	57.0%
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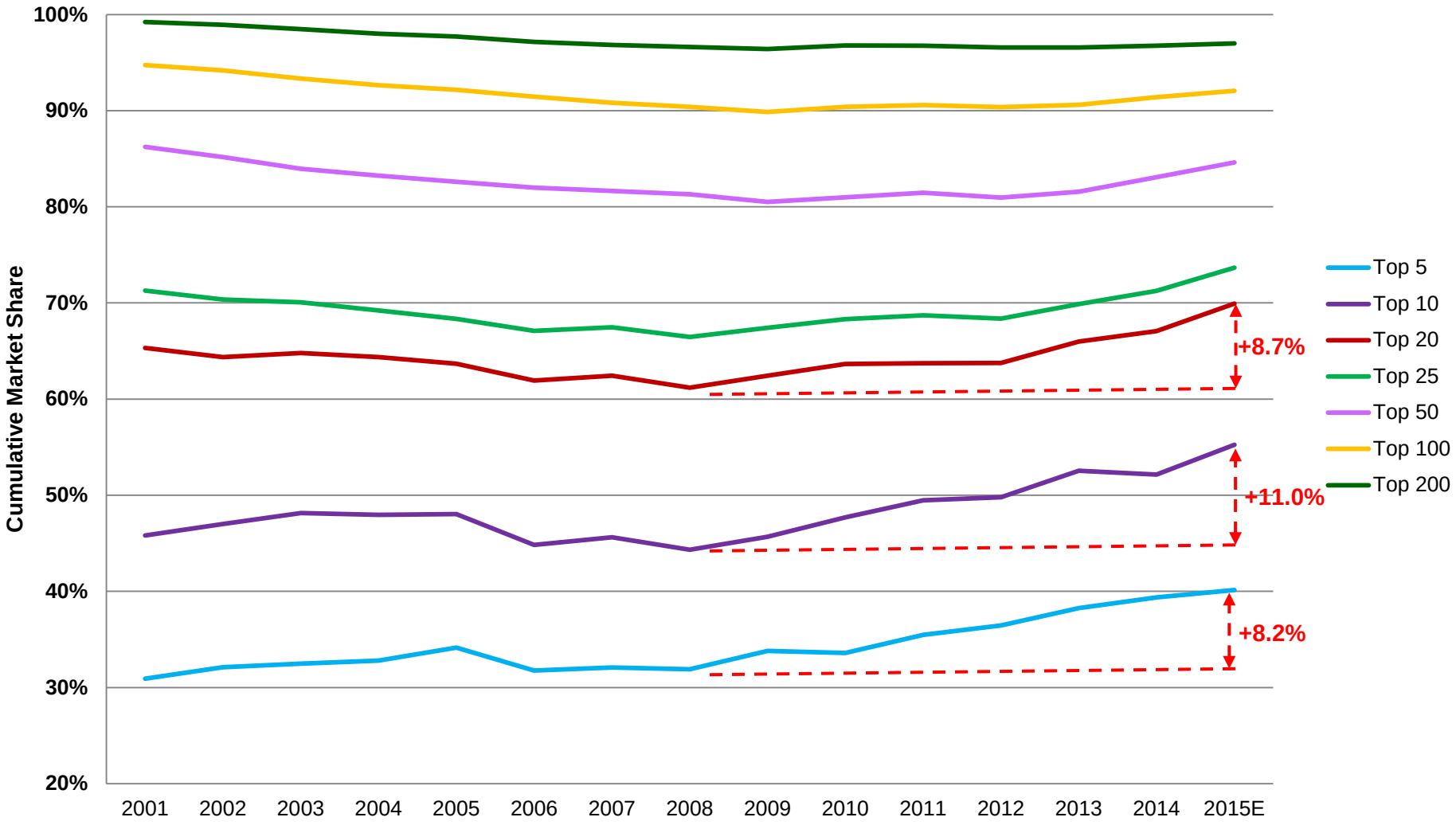
17	15	Sony	5,053	5,250	3.9%	1.5%	63.9%
21	16	ON Semiconductor** + Fairchild Semiconductor**	3,516	4,889	39.1%	1.4%	65.3%
12	17	SanDisk	6,264	4,796	-23.4%	1.4%	66.6%
19	18	nVidia	4,109	4,296	4.6%	1.2%	67.8%
16	19	Advanced Micro Devices (AMD)	5,388	3,914	-27.4%	1.1%	69.0%
22	20	Analog Devices	3,094	3,358	8.5%	1.0%	69.9%
		Other Semiconductor Companies	124,482	105,745	-15.1%	30.1%	100.0%
		Total Semiconductor	**355,212**	**351,515**	-1.0%	100.0%	

* Includes 2015 Acquisitions AND announced acquisitions for 2016

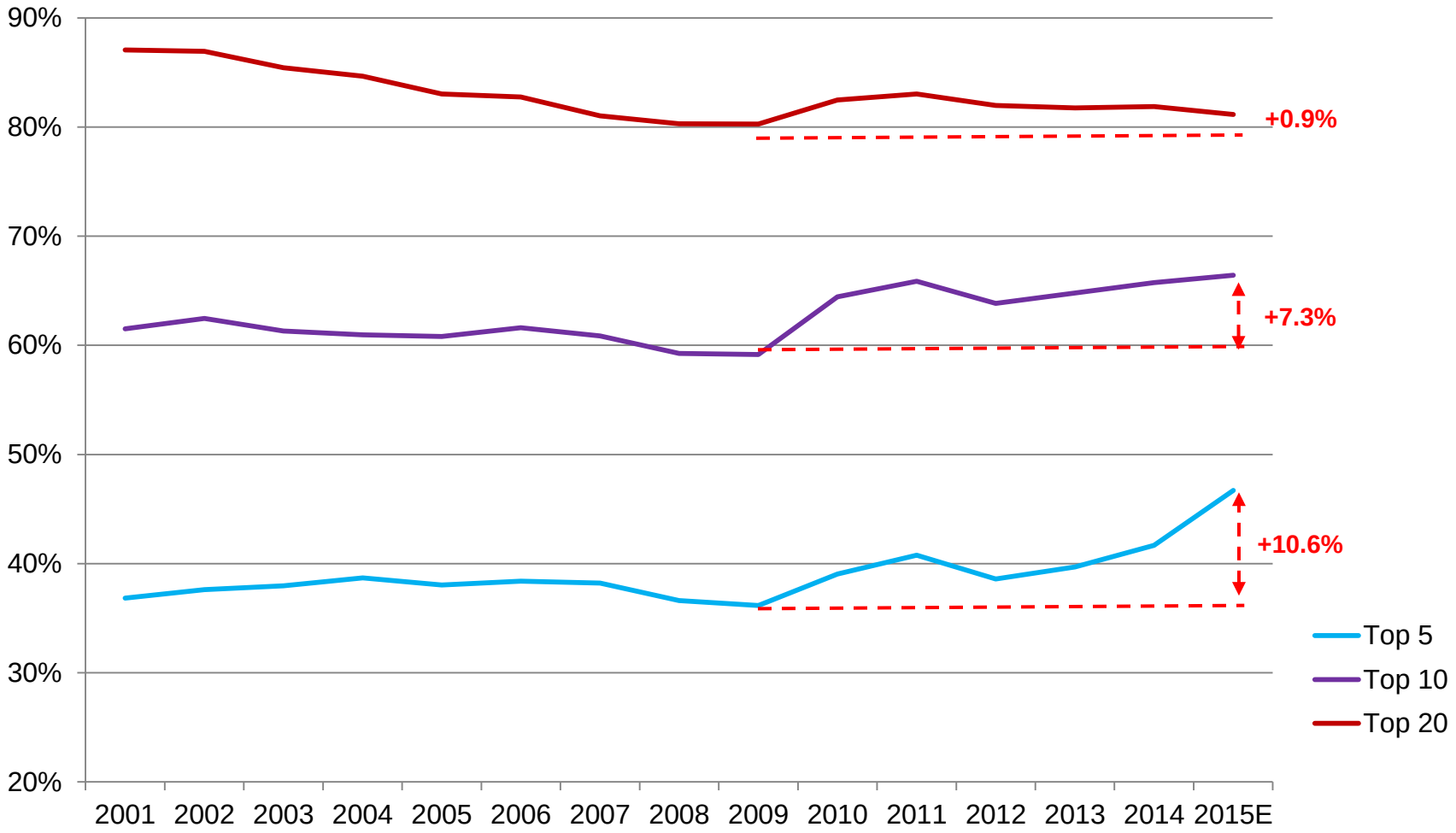
Source – IHS *Competitive Landscaping Tool Q4 2015*

Combined market shares of top semiconductor suppliers



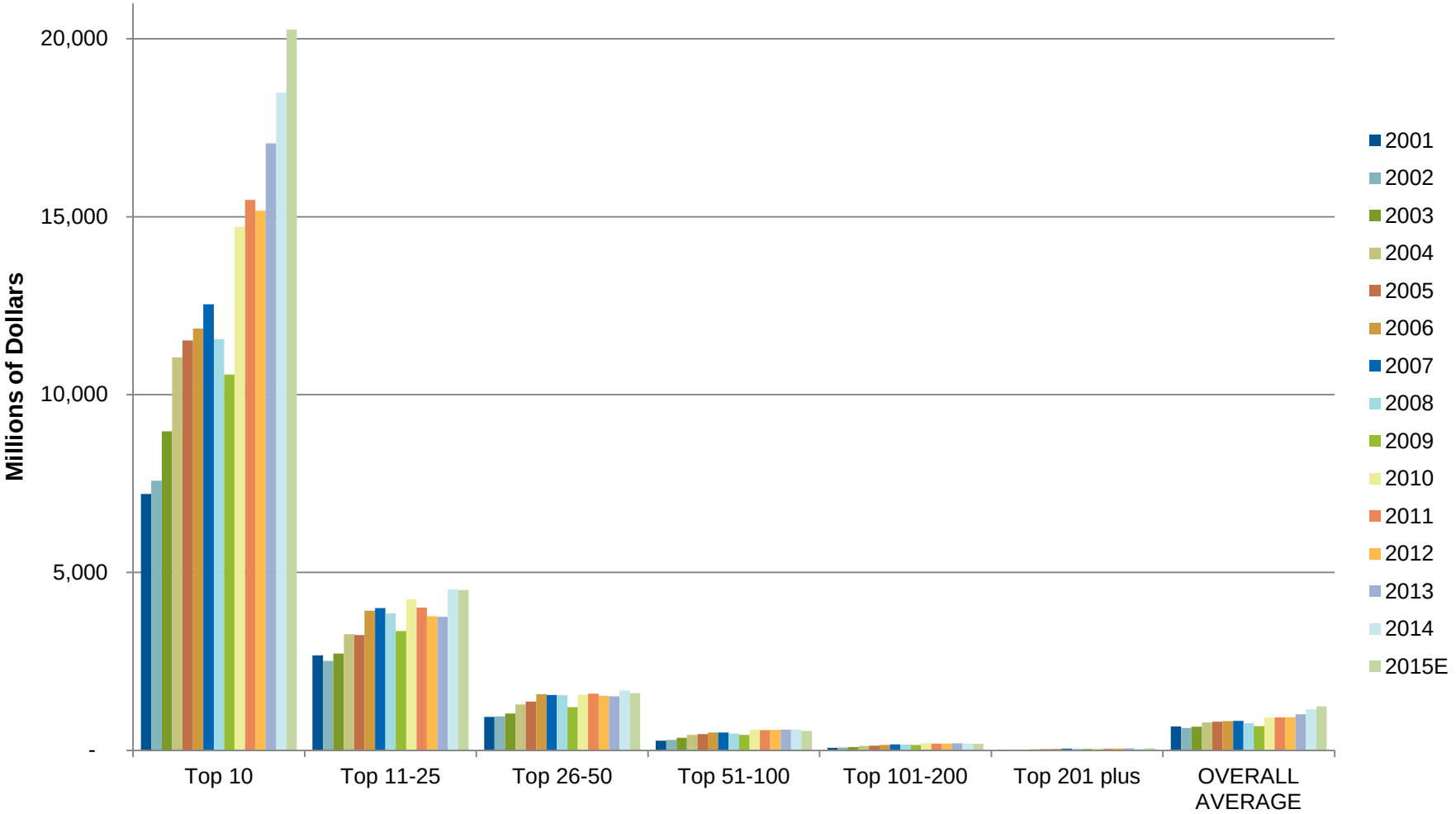
Source – IHS *Competitive Landscaping Tool Q4 2015*

Combined market shares of top power discrete & module suppliers



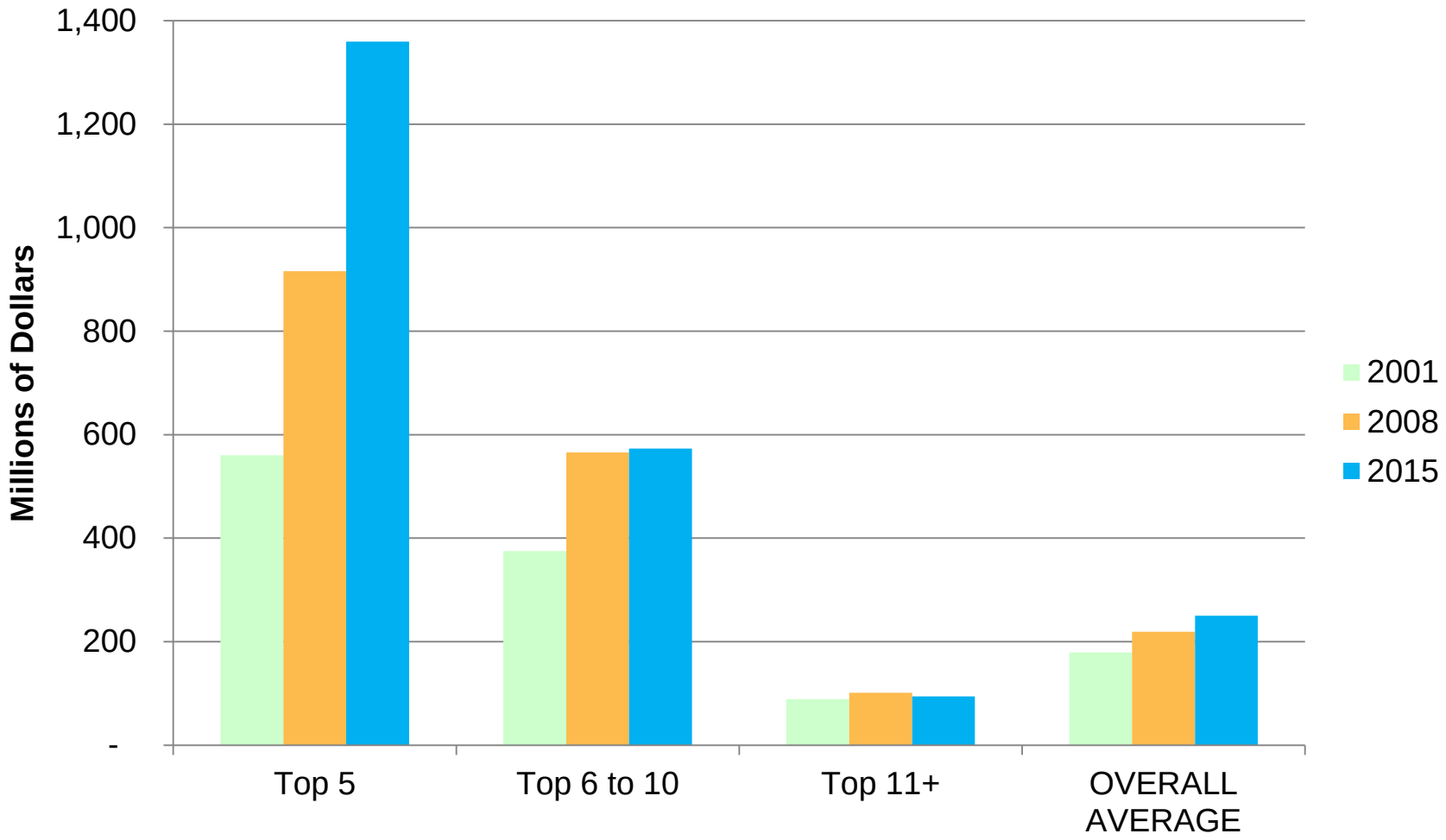
Source – IHS *Competitive Landscaping Tool Q4 2015*

Average annual semiconductor revenue by ranking group



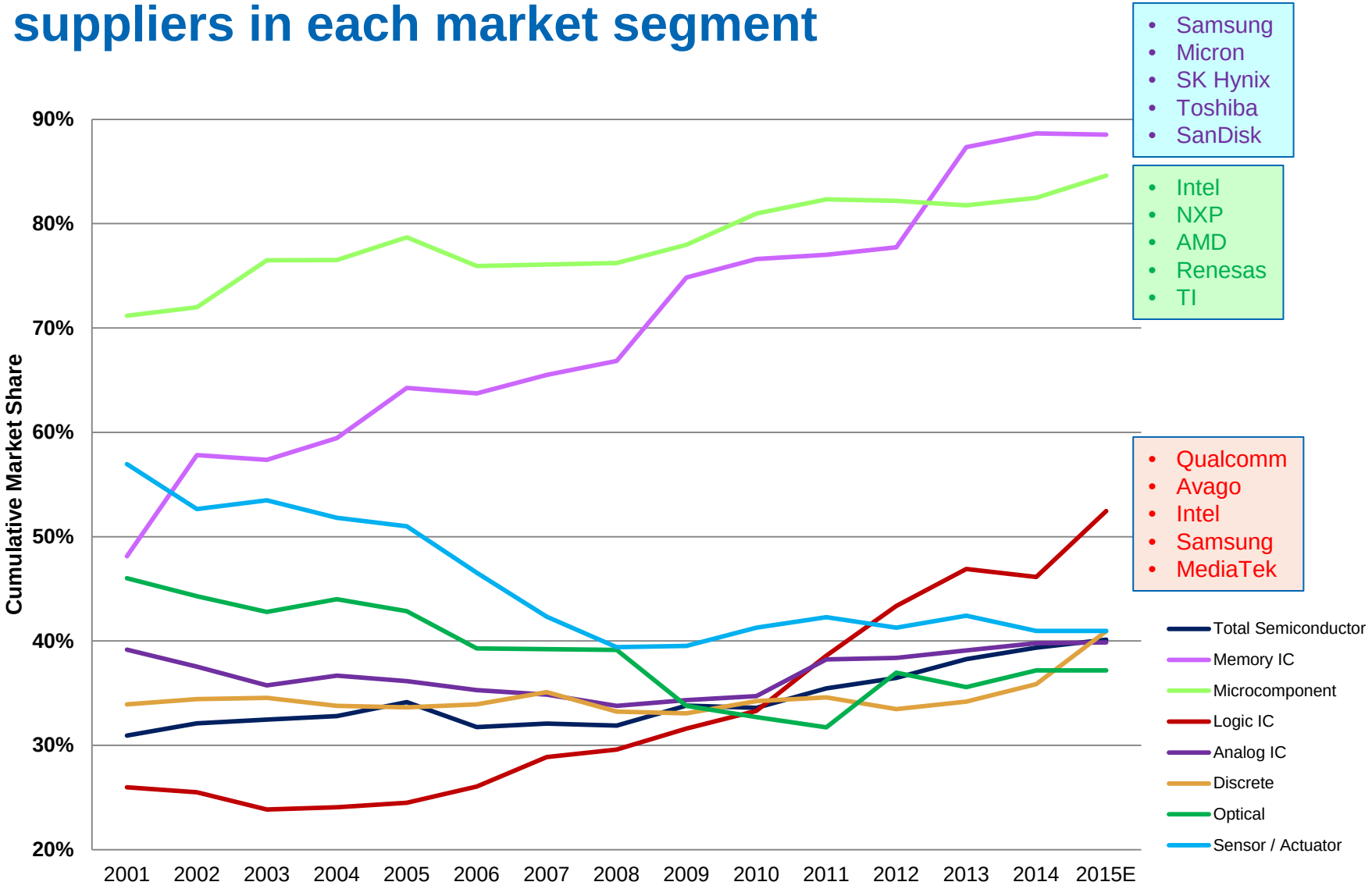
Source – IHS *Competitive Landscaping Tool Q4 2015*

Average annual power discrete / module revenue by ranking group



Source – IHS *Competitive Landscaping Tool Q4 2015*

Combined market shares of top five semiconductor suppliers in each market segment



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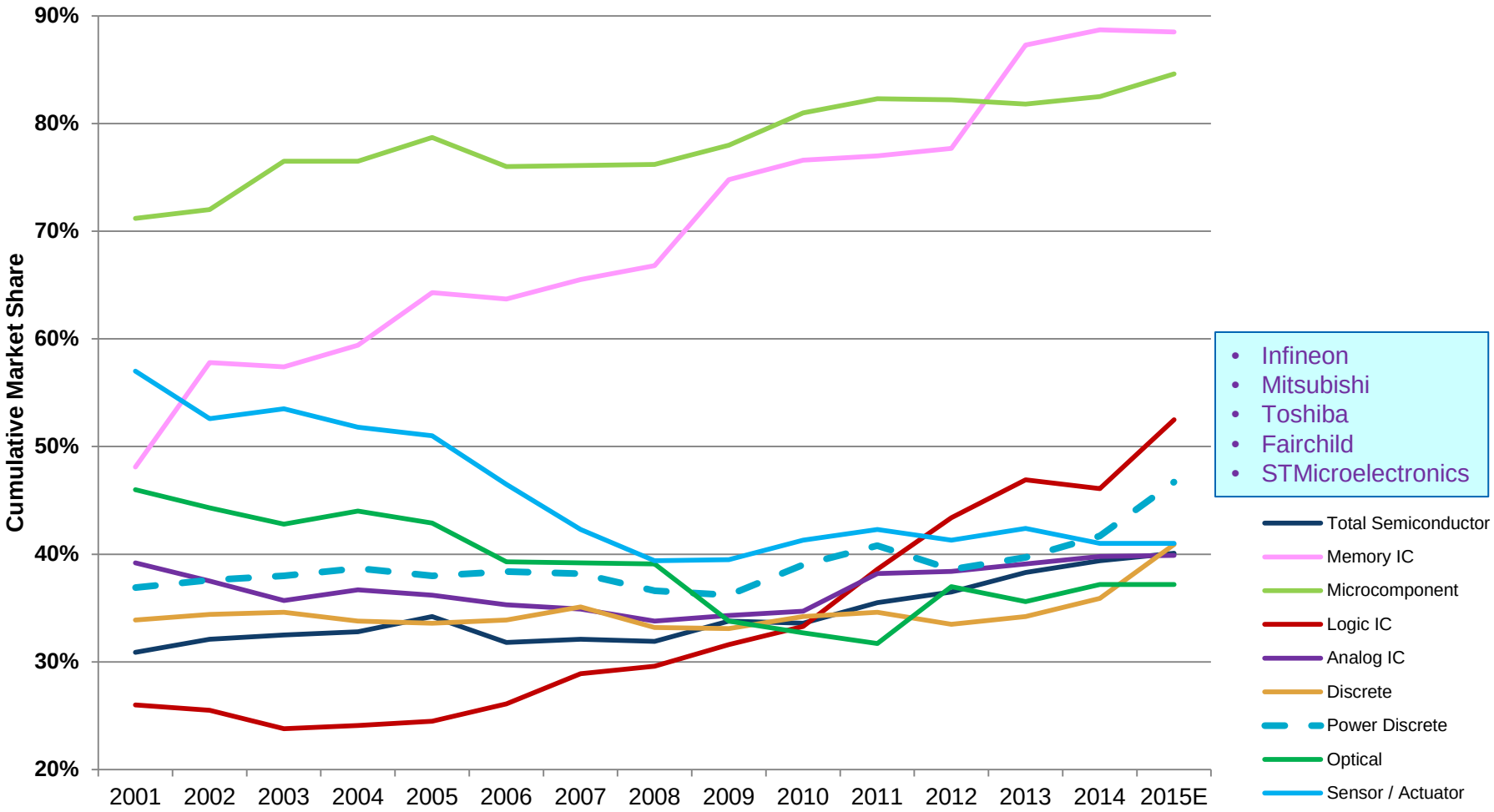
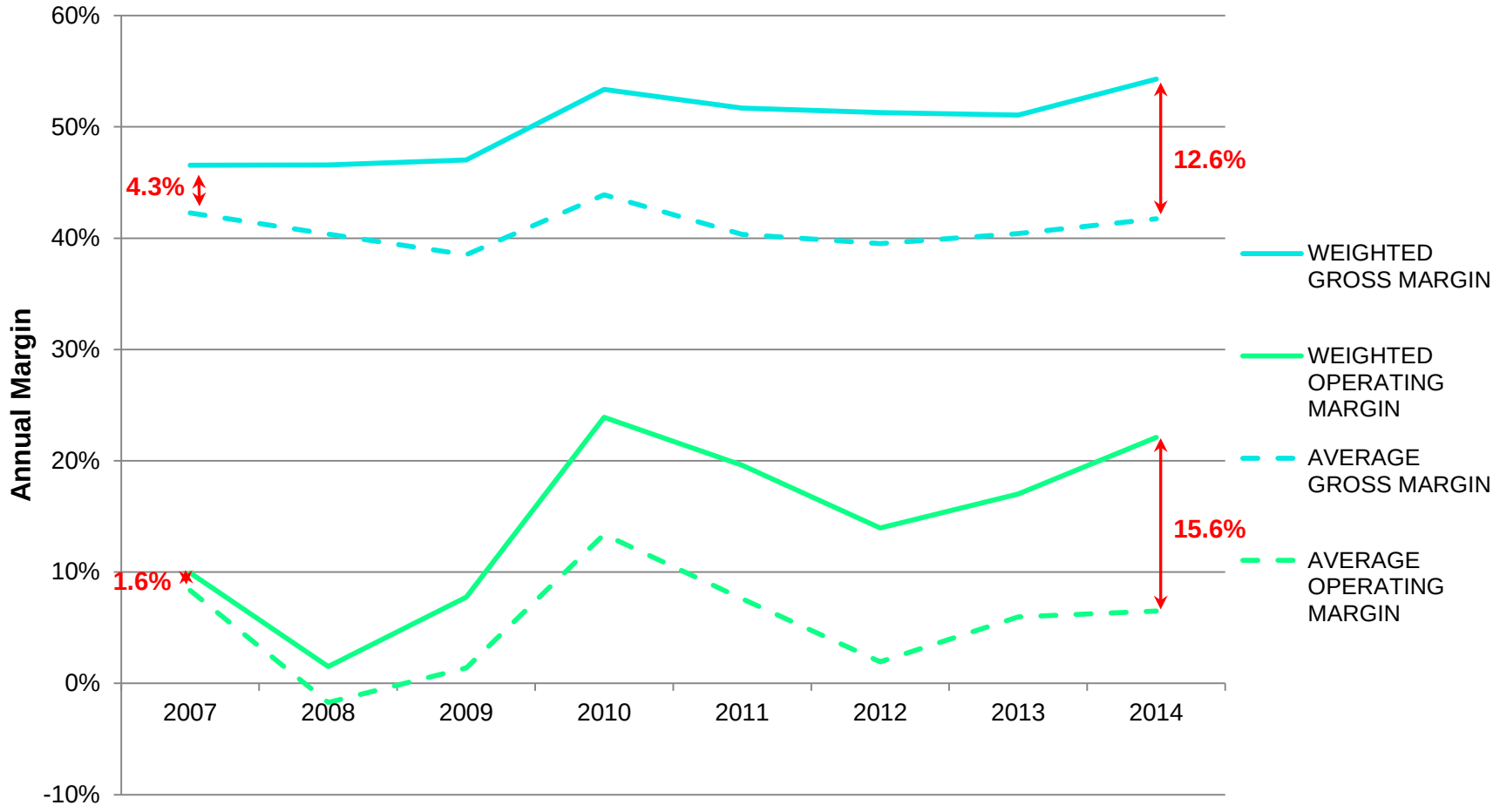
Combined market shares of top five semiconductor suppliers in each market segment



Source – IHS *Competitive Landscaping Tool Q4 2015*

Combined margins of 100 companies with semiconductor revenues over 70% of total company revenue

Representing over 63% of semiconductor revenue in 2014



Source – IHS *Competitive Landscaping Tool Q4 2015*

Comparison of Top 10 power discrete & module suppliers
2001 to 2015

Rank	2006	2015
1	STMicroelectronics	Infineon Technologies
2	Fairchild Semiconductor	Mitsubishi
3	International Rectifier	Toshiba
4	Toshiba	Fairchild Semiconductor
5	Infineon Technologies	STMicroelectronics
6	Mitsubishi	Vishay Intertechnology
7	Vishay Intertechnology	Fuji Electric
8	Fuji Electric	ON Semiconductor
9	ON Semiconductor	Renesas Electronics Corporation
10	Sanken Electric Company	ROHM Semiconductor

Source – IHS *The World Market for Power Semiconductors – 2015 Edition*

Top Ten Transformational Technologies

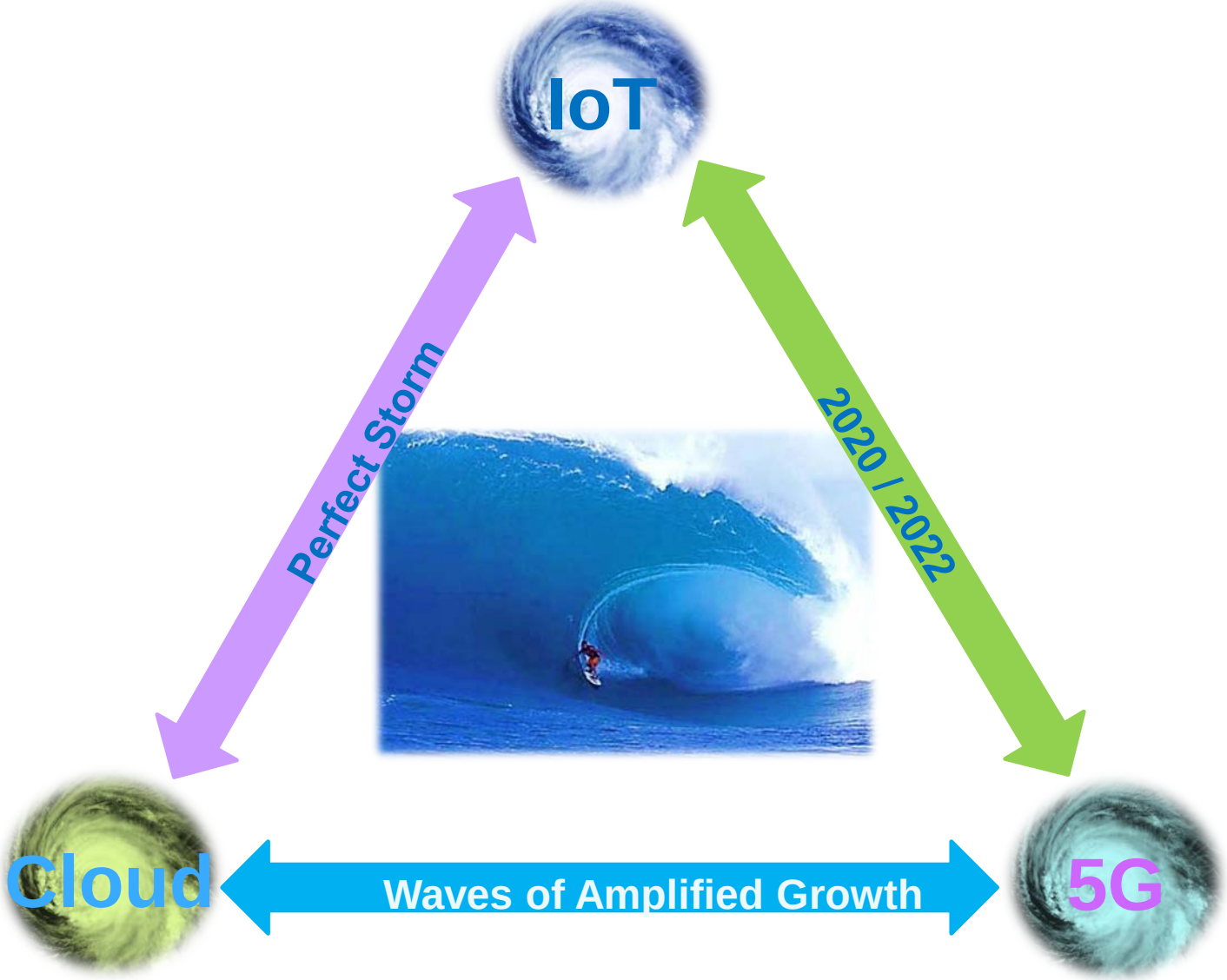
. . . And More

CURRENT IHS TECHNOLOGY RESEARCH COVERAGE

1) Internet of Things
2) Cloud Computing / Big Data
3) 3D Printing
4) Energy Storage / Advanced Battery Technology
5) Graphene
6) Advanced User Interfaces
7) Sensors of all Types
8) Flexible Displays
9) Biometrics for Security / Health
10) Artificial Intelligence

- Encryption & Security
- Carrier Aggregation
- Wireless Charging
- Virtual Reality
- Biomedical Technology
- HEVC
- High Resolution Displays
- LTE Direct
- “Smart” Extensions
- Quantum Computing
- Visible Light Communications

The developing technology triumvirate



For More Information -

- The World Market for Power Semiconductors –2015 Edition

  https://technology.ihs.com/Services/426851/power-semiconductor-intelligence-service

- Semiconductor Application Forecast AMFT Intelligence Service

  https://technology.ihs.com/Services/548447/semiconductor-application-forecast-amft-intelligence-service

- Semiconductor Competitive Landscaping CLT Intelligence Service

  https://technology.ihs.com/Services/548450/semiconductor-competitive-landscape-clt-intelligence-service

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Forecast Outlook

Dale Ford, Vice President