



Flash Memory Summit

Semiconductor Industry Outlook and Drivers for Low Power Adoption

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Industry Outlook- The semiconductor industry will surge past \$600b in 2022



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Growth of ~10% based on 6-7% unit growth and ASP growth of 3-4%. Looking at a flat to slightly down 2023 number. Note: ASP's have been up 3 years in a row which has not happened since early 1990's.

Demand remains strong in some segments but other have been begun to show signs of correction. Auto will continue to lead while some end markets have seen demand already begin to rollover.

Capacity expansion behind the forecasted 8% level as companies await clear guidance on subsidies and are hesitant to over invest in supply. Example Micron cutting CapEx guidance.

Government policy and macroeconomic conditions remain the top industry concerns as well as global stability with the war in Ukraine.

Return to more normal conditions is coming but some areas will continue to experience strength and supply tightness for the next 2-3 years

End Market Trends- Mixed performance across markets



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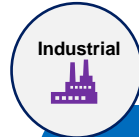
Automotive as biggest driver of growth. Dramatic increase in Semi content due to multiple secular trends.

Strong unit growth in semiconductors as supply constraints persist.



Data Center driving Compute end market growth with PC lagging

Data Center will drive above average growth through GPU's, increased power management and memory growth while PC's will decline in 2023



Industrial getting boost from stimulus and integration of Semi content through IoT

Increased content and integration of IoT capabilities on back of 5G rollout supporting growth on top of stimulus programs



A number of negative headwinds for the consumer. Best Buy cut guidance during earnings

Consumer in-line with historical trends with increased content but dragged down by inflation in the near term



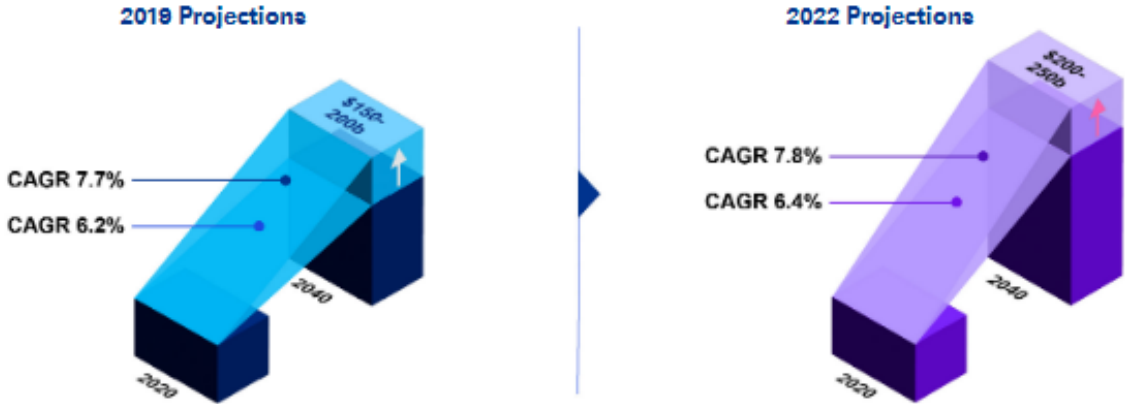
Qualcomm stated handsets were down 9% YoY in 2Q. NXP said wired comms were weak.

Communications slowing post 5G roll out and lower handset growth

Automotive will experience the most growth in the coming decades



Exhibit 4: A brighter future for Automotive Semiconductors



Source: KPMG

Semiconductor Executive Outlook



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Financial expectations

Confidence is at an all-time high with surging demand in multiple end applications driving business projections upward and accelerating the need for additional capacity.

95% expect their company's revenue to grow over the next year, and 34% forecast it will grow more than 20%.

88% expect capital expenditures (capex) to increase over the next year.

Operational expectations

Semiconductor firms continue to organize around end markets and solutions, to better focus on customer demand. Many are making investments in their supply chain.

53% agree their organization has moved toward being more oriented by end markets (for example, automotive, communications, etc.).

56% foresee the semiconductor shortage continuing into 2023.

60% plan to diversify their supply chain in the next 12 months.

Growth products and applications

Applications for the automotive sector surpassed IoT and are now perceived to be the #2 revenue driver for the next fiscal year.

Top three applications driving company revenue growth over the next year:

- 1 Wireless communications
- 2 Automotive
- 3 Internet of Things

Industry issues and strategic priorities

Besides ongoing supply/demand imbalance, semiconductor firms are challenged to attract, develop, and retain skilled talent.

Top three strategic priorities over the next three years (besides growth):

- 1 Talent development/retention
- 2 Supply chain flexibility
- 3 Mergers and acquisitions (M&A)



Semiconductor products with the greatest perceived growth potential over the next 12 months (averages on a 1–5 scale with 1=low growth and 5=high growth)

	2022 Outlook	2021 Outlook
Sensors/MEMS	3.9	3.8
Microprocessors (GPU/MCU/MPU)	3.8	3.6
Analog/RF/Mixed signal	3.7	3.7
Optoelectronics	3.4	3.3
Memory (Flash/DRAM)	3.2	3.3
Other logic	3.1	3.0
Discretes	3.1	2.9

Source: KPMG Global Semiconductor Industry Survey findings, 2022 (n=152).

Some key considerations for ultra low power adoption

Migration of current products to lower power – positive ROI for power reduction in current sockets

New devices which are enabled by lower power semiconductors- these are most impacted by current constraints

Lower power driving investment across semiconductor landscape. Ex: ADI/Maxim merger and GaN SPAC's

Data Center power constraints are no longer solely driving investments on leading edge but also in specialty areas such as Si Photonics

The ecosystem with software optimization to support the hardware is critical and must be maintained through any near term economic downturn

Major opportunities for Ultra Low Power align well with the highest growth segments and strategic priorities of the overall market in MEMS/Sensors, Auto, IoT and Flash Memory





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