

Who is Winning the Battle for ADAS and AV Processing? How Large is the Prize?

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July 2024

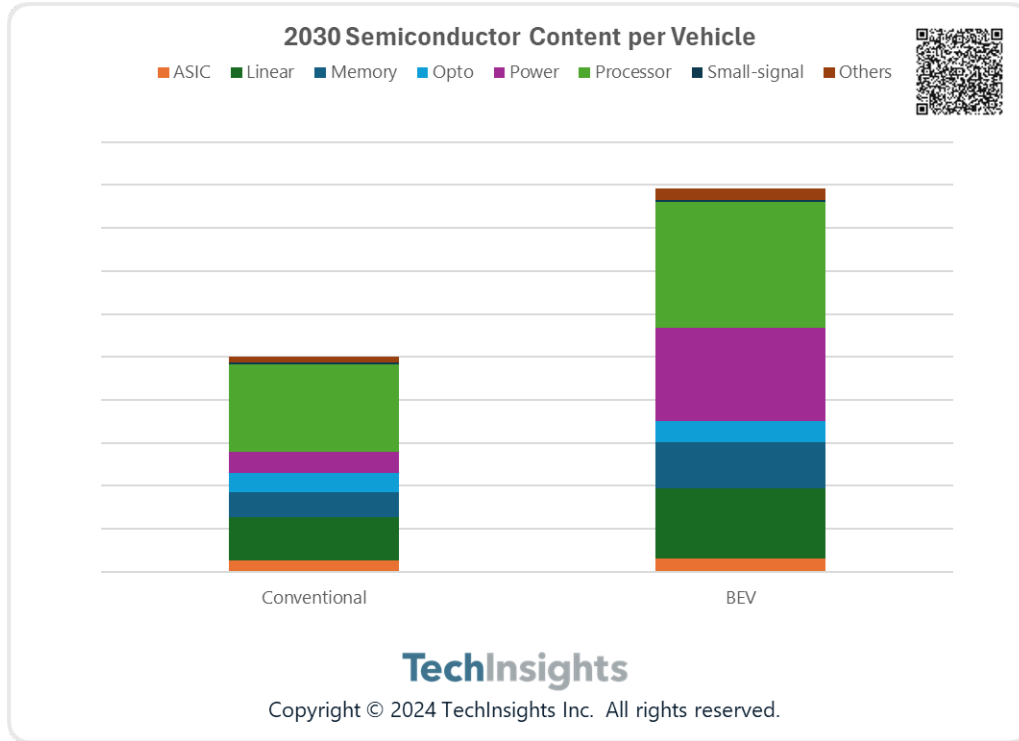
The background of the image is a close-up, slightly blurred photograph of a semiconductor chip and its associated circuit board. The chip is a dark, square component with intricate patterns on its surface. The circuit board is blue and populated with various electronic components, including resistors, capacitors, and integrated circuits. A pair of silver tweezers is visible in the lower right corner, positioned as if to handle a small component. The overall lighting is soft and focused on the central elements, creating a professional and technical atmosphere.

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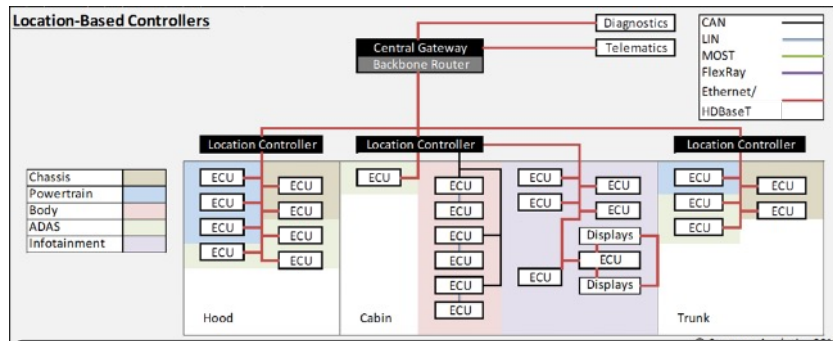
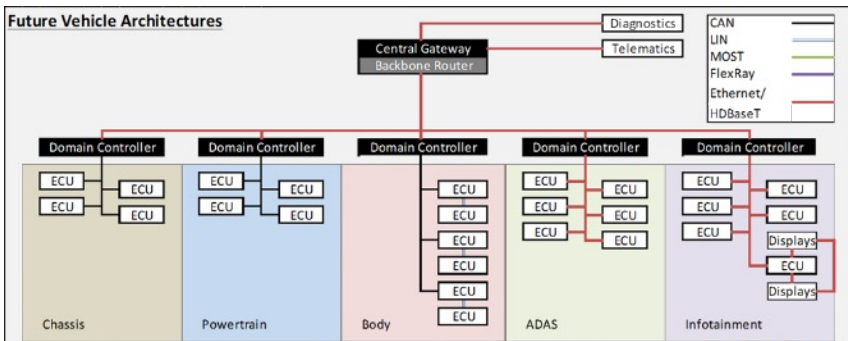
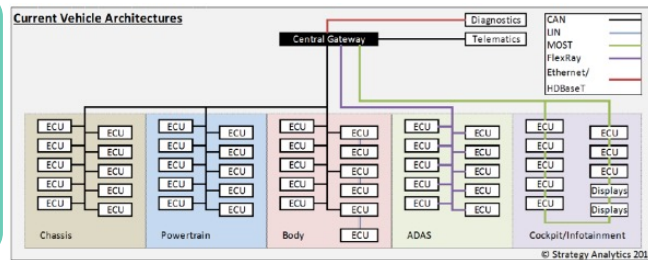
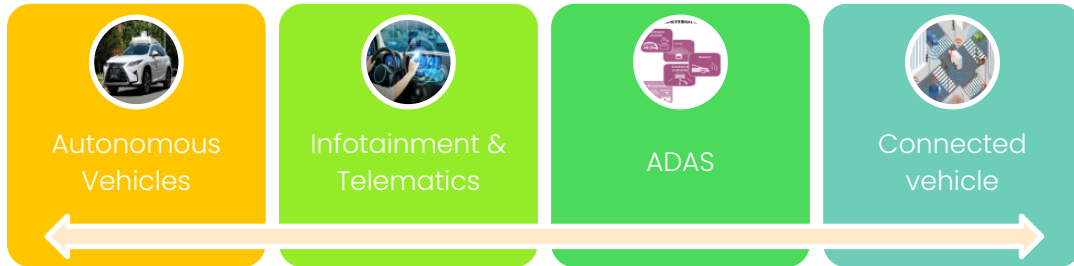
Electric Vehicles have a LOT more Semiconductors



- Compared to a conventional gasoline model, a 2030 Battery Electric Vehicle will have:
 - 1.8 x the overall content
 - **1.4 x the processor content**
 - **0.7 x 8-bit micro demand**
 - **1.8 x high-end SoC demand**
 - 4.3 x the power semi content
 - 1.6 x the linear content
 - 1.8 x the memory content
- More modern EV platforms mean overall higher processor usage due to new architectures with Zonal/Domain controllers

Source: Forecast: [Automotive Semiconductor TAM by Powertrain Type - Q2 2024](#)

Market Drivers for Vehicle Architectures



Centralization trend

H/W – S/W Decoupling

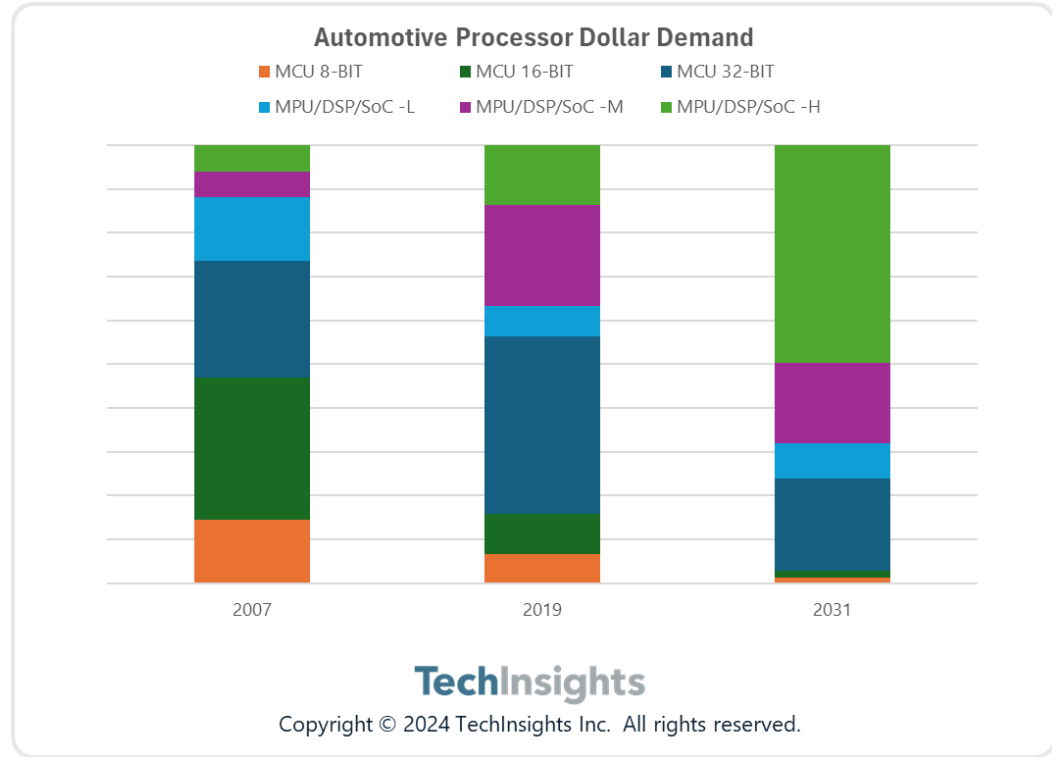
However, NO E/E architecture commonality between OEMs today, nor in the future – due to differing product mix priorities driving individual E/E optimization

Control centralized based on the location (zone) in the vehicle of the function, reducing cabling costs & weight

Much more cross-domain partner integration required

Processor Demand is Changing

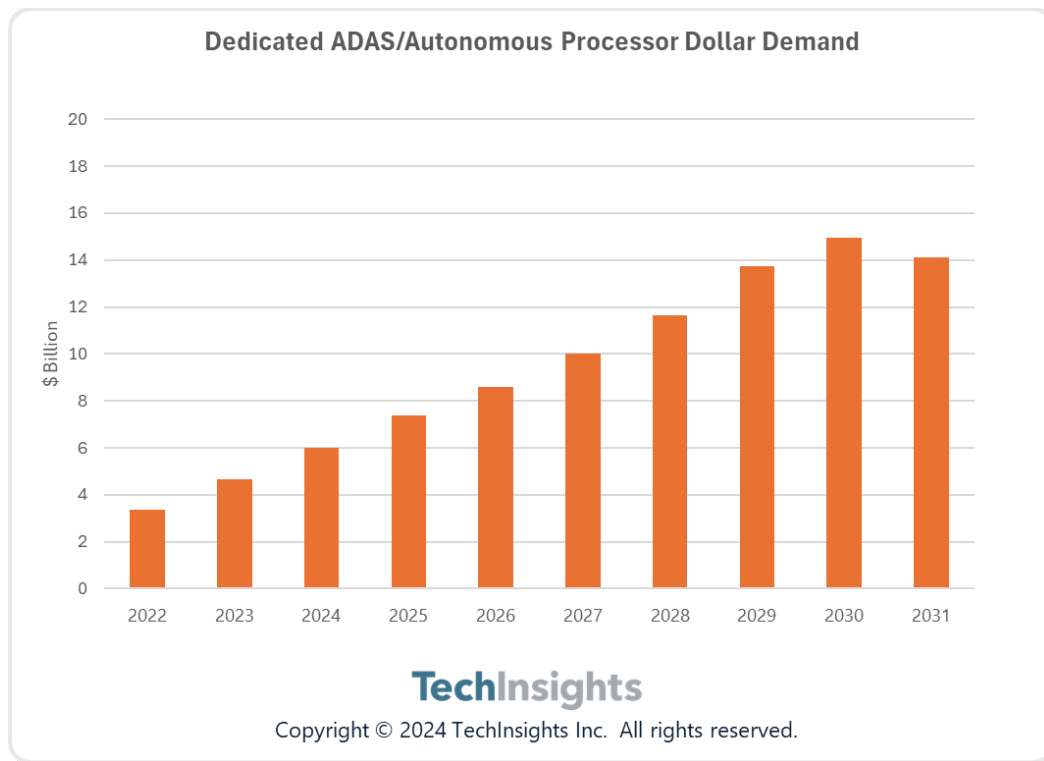
- In 2007, 16-bit microcontrollers were the largest segment of automotive processor demand
- In 2019, it was 32-bit micros
- In 2031, it will be clearly be high-end SoCs
 - Transition will actually happen**this year!**



Source: [Automotive Semiconductor Demand Forecast 2022 to 2031 - May 2024](#)

What is the Near-Term ADAS/AV Processor Demand?

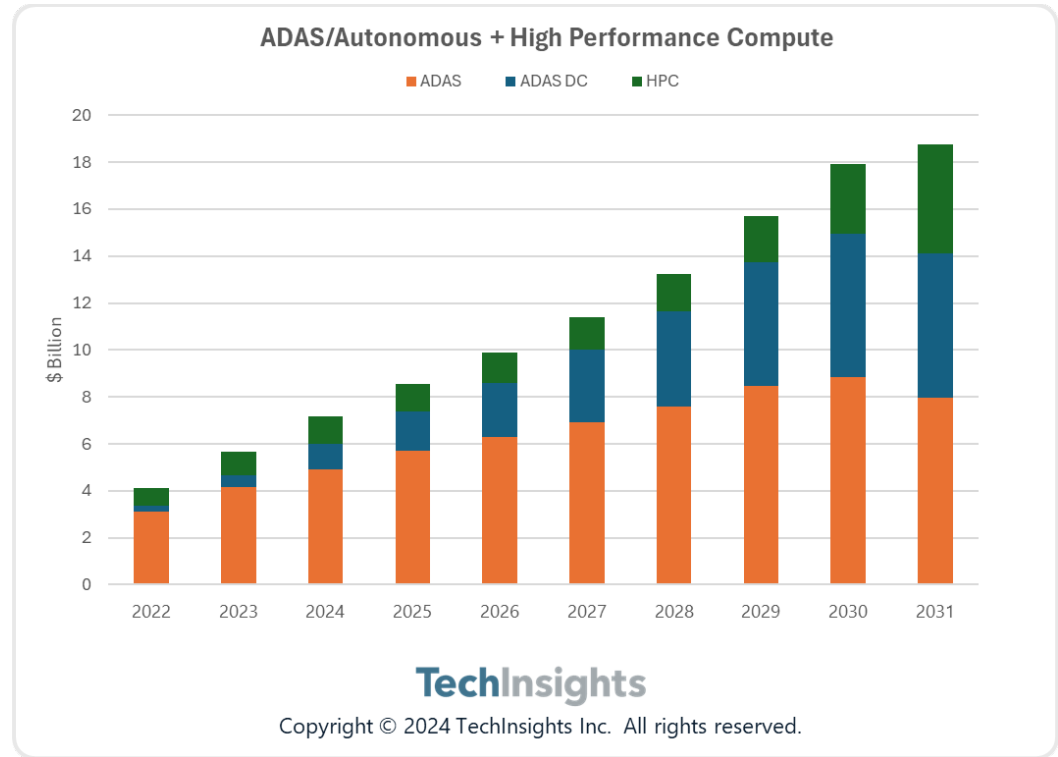
- Over \$14B of processor ADAS/Autonomous processor demand expected in 2030
- Over half of that will be for the highest-end SOCs.
- BUT..
- **Why does it go down in 2031?**



Source: [Automotive Semiconductor Demand Forecast 2022 to 2031 - May 2024](#)

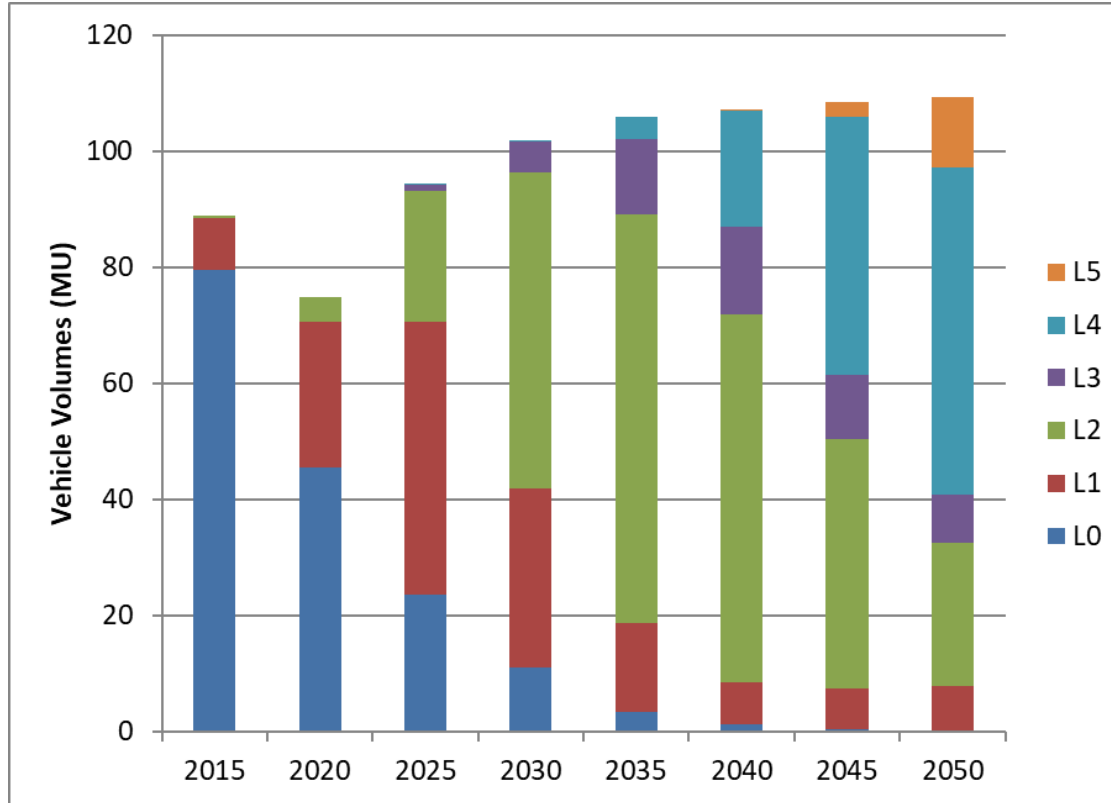
What is the Near-Term ADAS/AV Processor Demand?

- Growth trajectory for ADAS processors in discrete systems is starting to flatten then fall
- Much faster growth in centralized dedicated ADAS Domain Controllers and general-purpose High-Performance Compute



Source: [Automotive Semiconductor Demand Forecast 2022 to 2031 - May 2024](#)

So, What are the AV Trends?



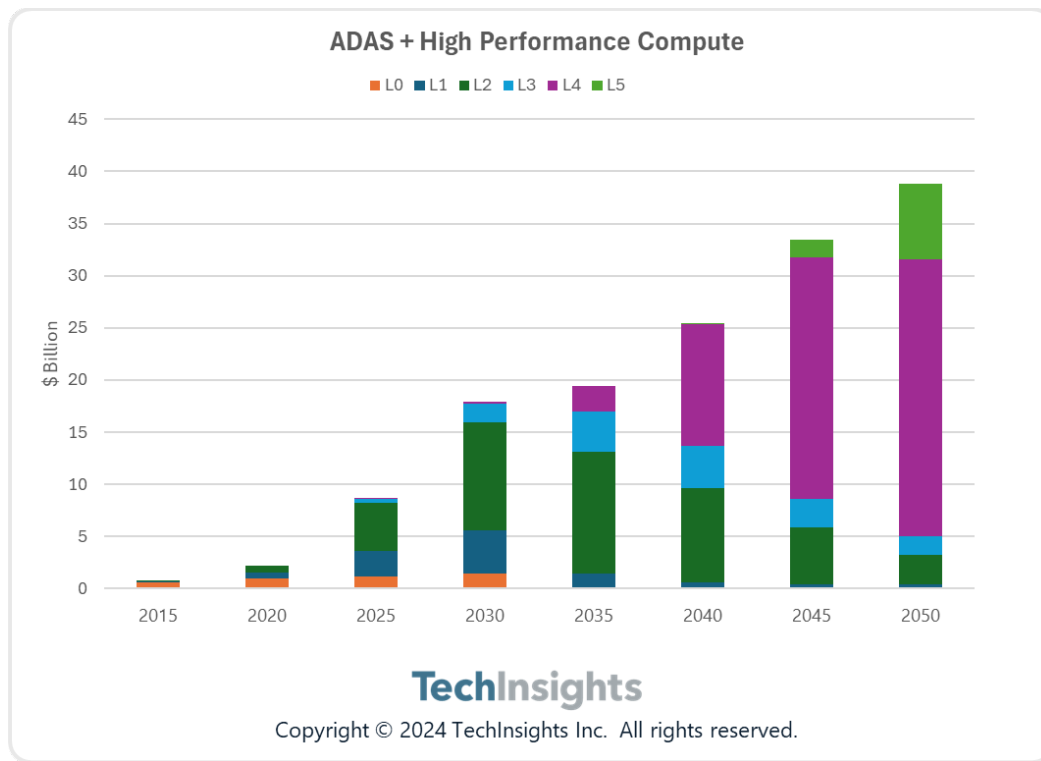
Source: Autonomous Vehicles and Sensors Market [Scenarios](#) - Nov 2023

- Much ADAS (e.g. AEB) is classified as L0
- L1 demand driven mainly by LKA function (now offered by almost all LDWS solutions)
- L2 ACC and auto-park systems to grow strongly during the 2020s
- L3 now emerging – but still expected by TechInsights to be “stop-gap” solution on the path to L4
- L4 demand has been delayed – many automakers pulling back

AEB = Autonomous Emergency Braking
ACC = Autonomous Cruise Control
LKA = Lane Keep Assist
LDWS = Lane Departure Warning System

What Could this Mean for Processors?

- Potential for almost \$40B by 2050
- L2 dominates until 2035
- L3 remains niche



Strategies of Chip Rivals

Autonomous/Gaming/Server ⇔ Scale Down to ADAS



IVI / Smartphone ⇔ Digital Chassis ⇔ Leverage Arriver

Industry (Re) Focus on High Level ADAS (L2+, L3)



Dominant in ADAS ⇔ Vertically Integrated, becoming Tier 1 ⇔ Scale up to Autonomous

Chipelets vs Monolithic

Chipelets

- Scalable
- Adaptable – mix-and-match across chipmakers & process nodes
- Reusable
- Parallel development → lower TTM
- Higher yields – defective chipelets can be swapped out
- Cost-effective
 - Approx 2x plus cost saving at a die cost level (some of which will need to be spent on test/packaging)
- **But – the interconnect between chipelets is crucial**

Monolithic

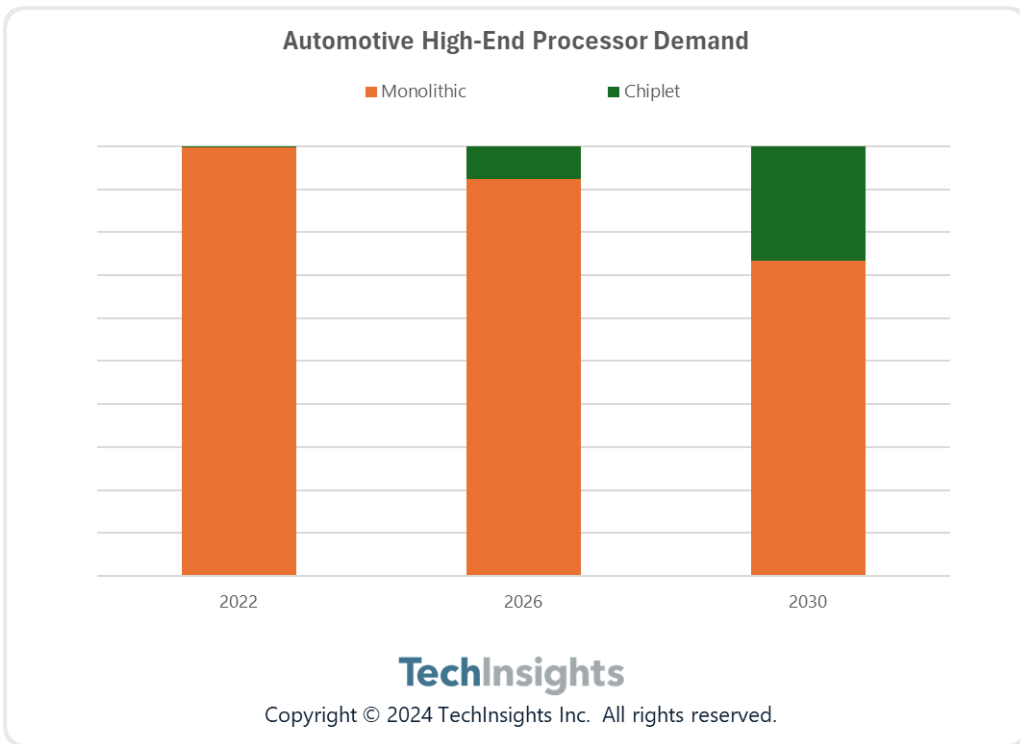
- Tight integration
- Superior performance
- Lower latency

But –

- **Longer development cycles**
- **May have lower yields**
- **More costly**

Current automotive needs mean that the time is right for chipelets

Chiplet Opportunities – Will it Disrupt?



- Potential for ~25% of high-end automotive processor demand to be chiplet-based in 2030
- Some of the keenest proponents (e.g. Renesas) are those NOT currently winning

Will we see roll-your-own chiplets competing with the “Big 3”?

Source: [TechInsights estimates – sign up to our Platform to hear more!](#)

Key Take-Aways

Processor demand is becoming dominated by the high-end, and ADAS /AV / Cockpit applications

ADAS Processor Demand still dominated by discrete applications – but that is changing

L2 will be the dominant form of automation, and hence processor demand, through to the mid-2030s

Qualcomm, NVIDIA and Mobileye all have different market position – so room for all

Chipelets may disrupt the market dynamic

This is a whole software / hardware ecosystem play

TOPS alone will NOT win the battle

Any Questions?

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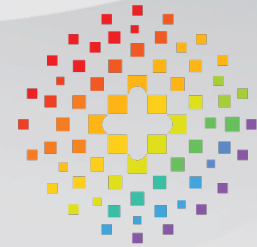
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