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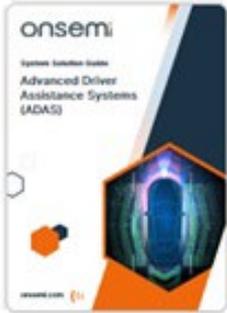
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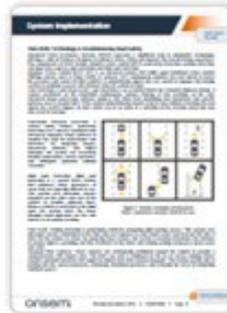
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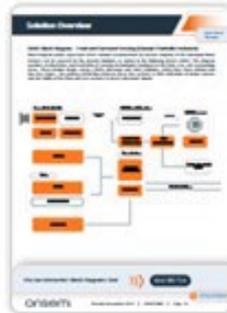
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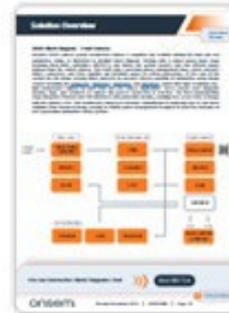
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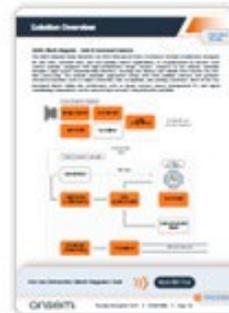
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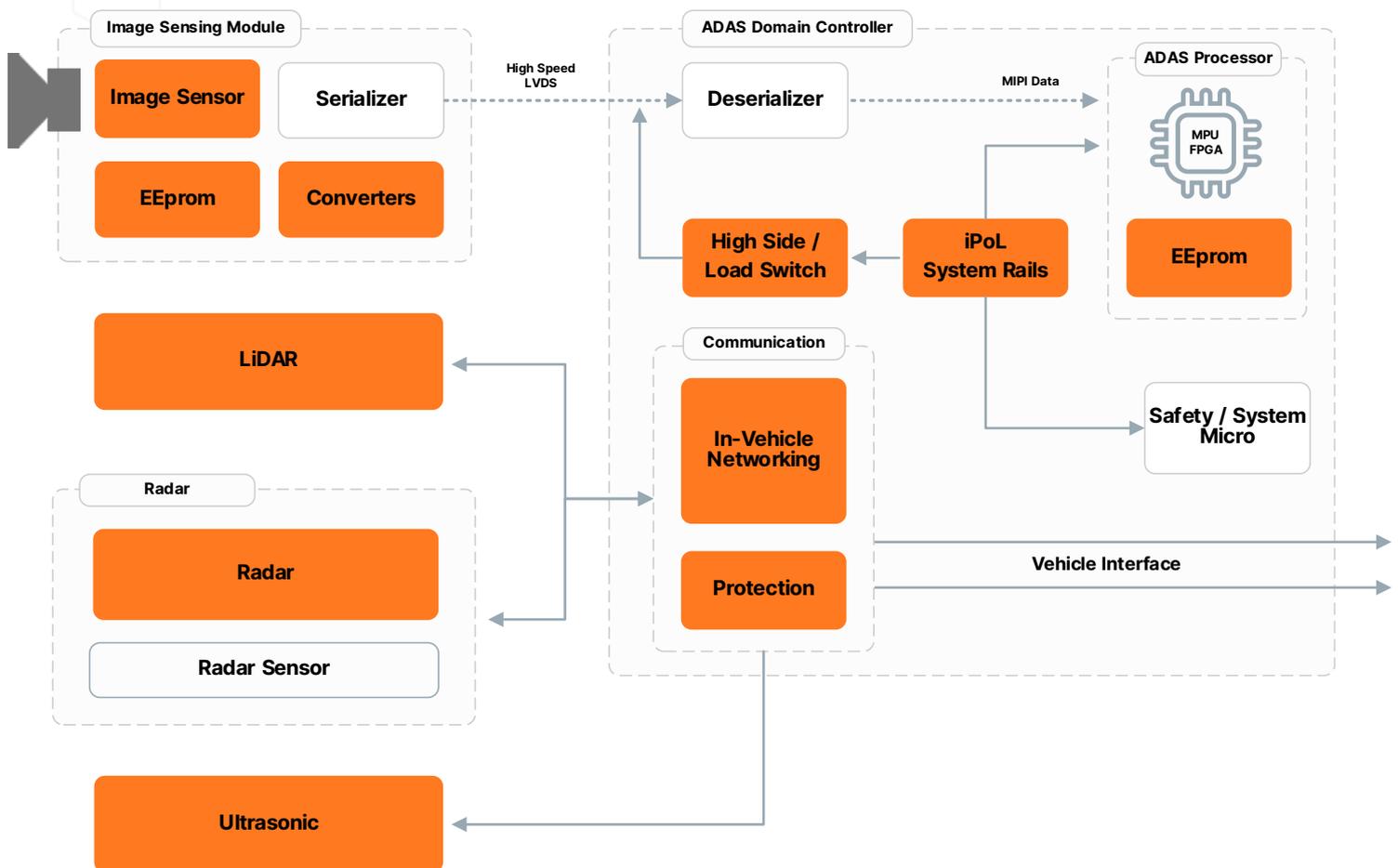
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# Solution Overview

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## ADAS Block Diagram – Front and Surround Sensing (Domain Controller included)

Block diagram below represents ADAS solution recommended by **onsemi**. Majority of the functional block devices can be sourced by the **onsemi** solutions as shown in the following device tables. The diagram provides an illustrative representation of sensing technologies deployed in the front, rear, and surrounding areas. These include image sensor, LiDAR, ultrasonic and radar solutions, which have been divided into four key stages. The primary distinction between these two systems is their utilization of image sensors and the ability of the front and rear systems to detect ultrasonic signals.



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# Solution Overview

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## Advancements in Automotive - ADAS Image Sensors

### Resolution

High-Resolution Vision - a key to safer cars. The resolution of an image is critical for Advanced Driver-Assistance Systems (ADAS) in modern vehicles. These systems rely on cameras to perceive the road and its surroundings, and the sharper the image, the better the system performs. In the past, car cameras offered limited resolution, like the early VGA sensors with only 0.3 megapixels (MP). This restricted their ability to capture fine details, especially at a distance. **onsemi's AR0823AT** sensor represents a significant leap forward. This innovation boasts a resolution of 8.3 megapixels, a massive improvement that translates to sharper images and the ability to detect objects more precisely using a single camera. This high resolution unlocks a wider range of applications for ADAS. Different cameras are used for different functions: the **AR0823AT** is typically used for forward-view applications, while the **AR0341AT** is used for rear or surround-view applications.

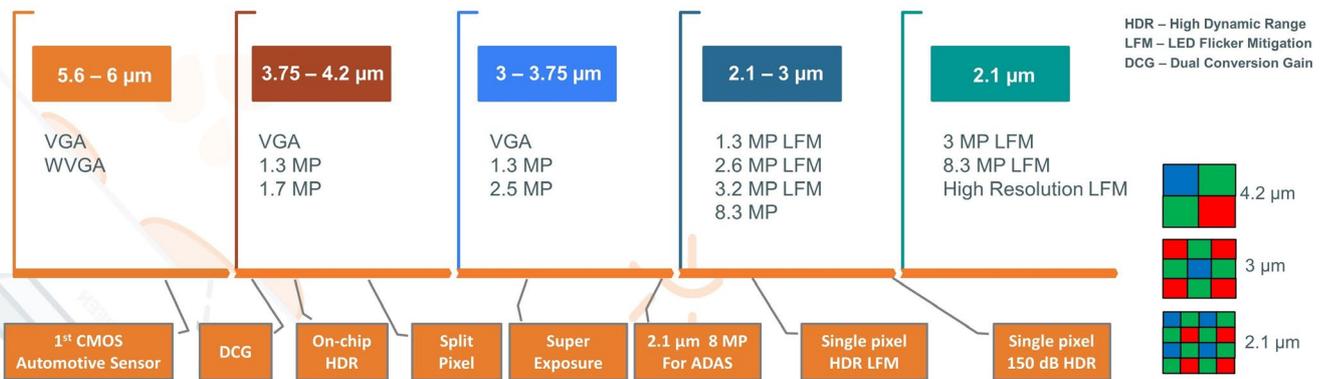
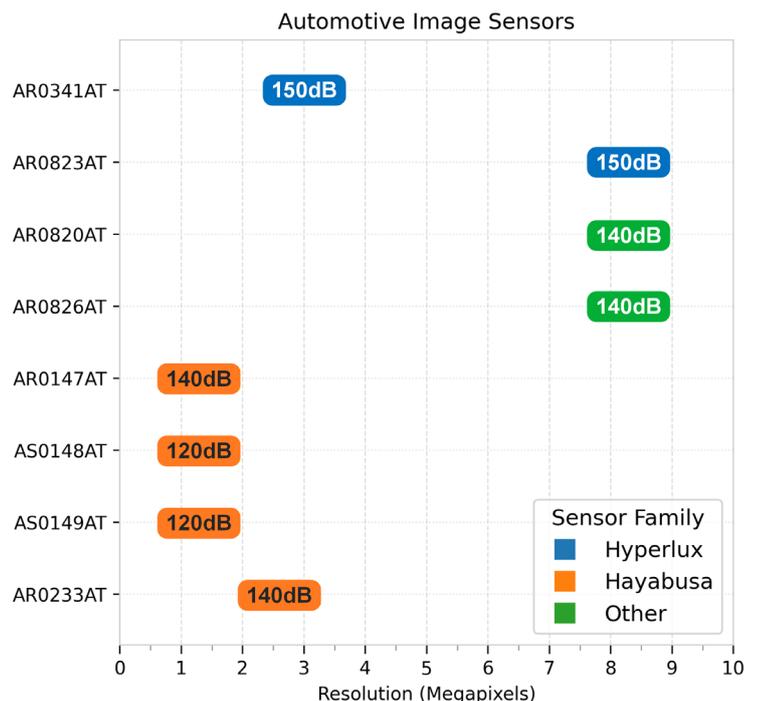


Figure 4: Development of image sensors from 2004 to the present

### onsemi Automotive Portfolio

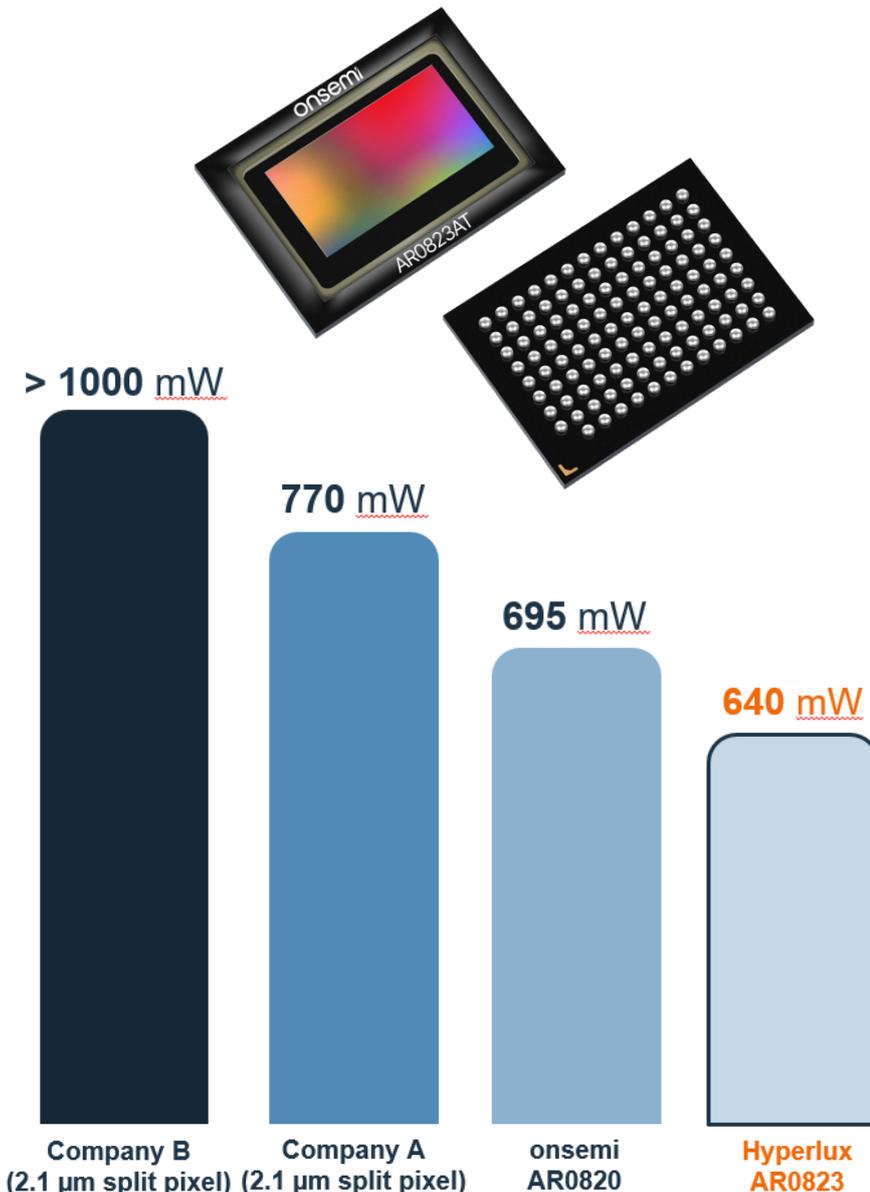
**onsemi's** automotive image sensors deliver industry-leading performance for advanced driver assistance systems and autonomous driving. Covering a wide resolution range from 1 megapixel to 8 megapixels, our portfolio ensures optimal imaging for everything from rear-view and surround cameras to high-resolution forward-facing systems. With sensor families like **Hyperlux** and **Hayabusa**, we provide tailored solutions combining exceptional image quality, low-light sensitivity, and cutting-edge HDR technology. Our sensors feature dynamic range capabilities up to 150 dB, enabling clear, accurate vision in extreme lighting conditions from bright sunlight to deep shadows ensuring safety, reliability, and superior situational awareness for next-generation vehicles.



## ADAS - Front Image Sensors - [Hyperlux™ AR0823AT](#)

### Key Benefits:

- 8.3 MP resolution (3840 × 2160), 2.1 μm pixel size, 1/1.8" optical format
- Up to 60 fps at full resolution (single exposure), 40 fps in HDR mode
- Up to 150 dB dynamic range (dual exposure HDR with LED flicker mitigation), >120 dB flicker-free HDR in single exposure mode
- Low-light sensitivity down to ~0.03 lux (SNR<sub>5</sub> at 33 ms, 80 °C)
- Typical power consumption: ~640–810 mW; max ~940 mW
- ISO 26262 compliant: ASIL-B hardware metrics, ASIL-D design flow
- AEC-Q100 Grade 2 qualified (-40 °C to +105 °C ambient)
- Dual MIPI CSI-2 output for simultaneous ADAS and viewing streams
- Supports RRGB, RCCB, RYYCy, RGB-IR, RCCG color filter arrays



### Why Low Power Matters

Lower power consumption reduces thermal load, simplifies system design, and **extends vehicle battery life**, making [AR0823AT](#) the ideal choice for next-generation ADAS platforms. In addition, lower power enables more compact and cost-effective cooling solutions, which helps reduce overall system complexity and weight. This efficiency is especially critical for electric and hybrid vehicles, where every watt saved contributes to longer driving range and improved sustainability.

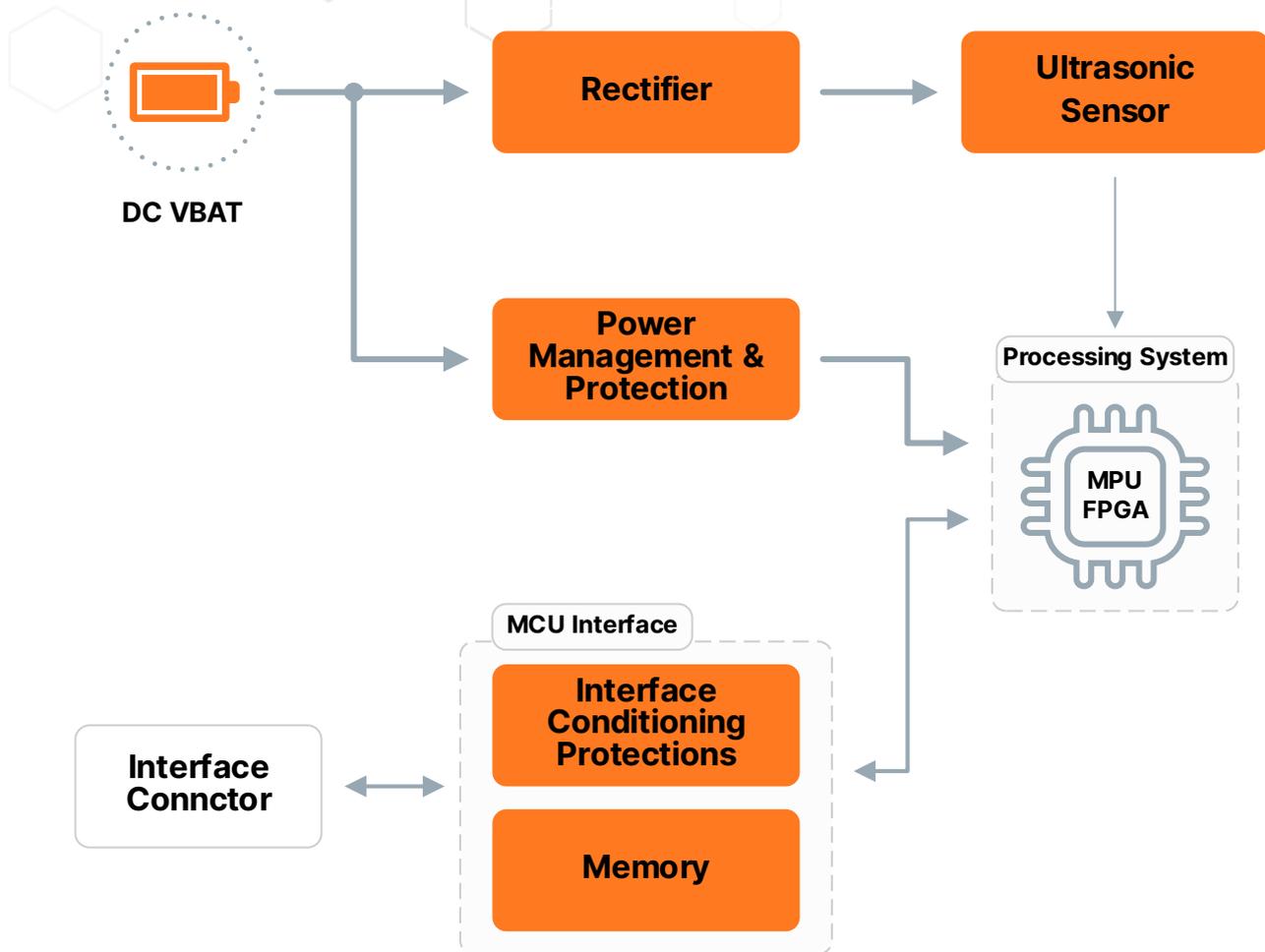
Figure 6: Typical Power Consumption: 8 MP, 30 fps, 125°C (T<sub>j</sub>)

# Solution Overview

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## ADAS Block Diagram - Ultrasonic Parking Distance Measurement

The [NCV75215](#) ultrasonic sensor disrupts the market by offering a powerful value proposition for manufacturers seeking top-of-the-line ultrasonic distance measurement. Forget the frustration of conventional sensors with their inaccuracies – the [NCV75215](#) boasts high-sensitivity and low-noise operation. This translates to real-world benefits for drivers using parking assist systems equipped with this sensor. Imagine parking with confidence, thanks to real-time, ultra-precise distance readings that effortlessly guide you into tight spots. But the [NCV75215](#)'s value proposition extends far beyond the realm of parking. The sensor is engineered for robust operation, featuring built-in noise and temperature monitoring to ensure reliable performance in any environment even harsh conditions won't faze it.



Additionally, its EEPROM memory allows for configuration and user data storage, making it a highly adaptable solution. This adaptability makes the [NCV75215](#) a champion not only for parking assist systems, but also for applications in robotics, industrial automation, and any scenario demanding precise object detection. In essence, the [NCV75215](#) is more than just a sensor – it's a key to innovation and enhanced functionality.

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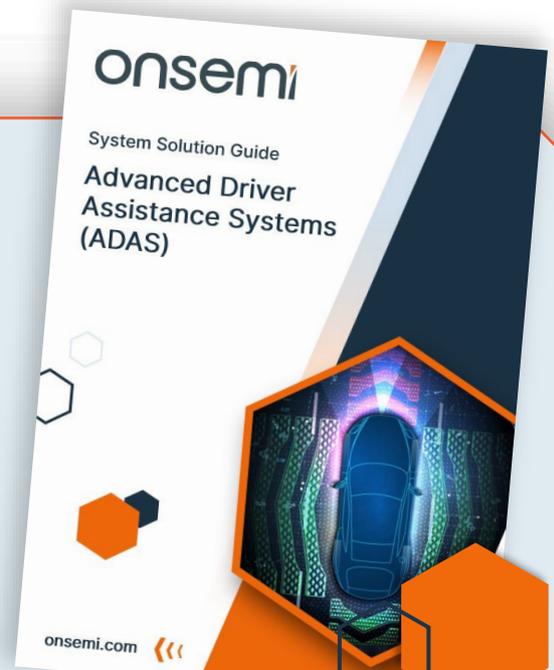
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