

# New Frontiers in Automotive Electronics Packaging



Automotive electronics packaging is entering a new frontier. An emerging trend in automotive electronics is Advanced Driver Assist Systems (ADAS). New safety features require the use of cameras, LIDAR, radar, communication systems, and fast processing capability. Initially considered a luxury item, many safety features are becoming standard in every new vehicle, as people clamor for enhanced safety, speed and access to mass transportation solutions.

Advanced packaging formats are being adopted rapidly. This report answers critical questions: Which semiconductor packages are used for image sensors, radar, ultrasonic, and LIDAR? Where are fan-out wafer level packages and flip chip interconnects being adopted? How do package reliability requirements differ from other applications? What are future challenges for new package adoption?

The 110-page report with references and accompanying set of 94 PowerPoint slides also examines changes in interconnect technology such as the adoption of copper wire bonding and copper clip. Automotive offerings from OSATs and IC package substrate makers are described. Packaging trends in the powertrain for electric and hybrid vehicles are analyzed. Market projections for various packages in each segment are provided. Reliability requirements for packages in automotive electronics are described.

## Executive Summary

### 1 Introduction

### 2 Advanced Driver Assist Systems

#### 2.1 ADAS Sensors

##### 2.1.1 Image Sensors

Infineon/Kostal, Kyocera, Melexis, OmniVision, ON Semiconductor, Panasonic, Samsung, Sony, STMicroelectronics

##### 2.1.2 Radar-Based Sensors

Analog Devices, Autoliv, Calterah Semiconductor, Denso, Fujitsu Ten, Infineon, MANDO, NXP, STMicroelectronics, TI, Uhnder

##### 2.1.3 LIDAR

Analog Devices, Blickfeld, Cepton Technologies, Continental AG, Denso, Infineon, Innoviz Technologies, LeddarTech, Melexis, MicroVision, OSRAM, Oryx Vision, Quanergy, TetraVue, Trilumina, Valeo, Velodyne, XenomatiX

##### 2.1.4 Ultrasonic Sensors

Murata, Panasonic, Robert Bosch, TI

#### 2.2 Vehicle to X Communication

Autotalks, NXP, Renesas, Qualcomm

#### 2.3 Heads Up Display

Continental, Intersil, MicroVision, TI

#### 2.4 Sensor Fusion

Infineon, Intel/Mobileye, NVIDIA, NXP, Renesas, TI, Toshiba, Xilinx

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#### 3.2 Accident Reporting and Monitoring

#### 3.3 Smart Key

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##### 4.2.2 Resistors

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Infineon, NXP, ON Semiconductor, Renesas, STMicroelectronics, TI

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##### 4.3.3 Flip Chip

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#### 5.2 Tire Pressure Management Sensors

#### 5.3 Air Bag Sensors



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# New Frontiers in Automotive Electronics Packaging

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