



# THE GLOBAL LEADER IN AUTOMOTIVE IC PACKAGING

Automotive Excellence



# THE RISE OF THE CONNECTED AUTOMOBILE



Early autos, though marvels of engineering and design, were fairly simple compared to the vehicles we rely on today.

As a result of continued innovation, today's automobiles are able to leverage technology that enhances safety, connectivity and efficiency.

The complexity inherent in automotive electronics means that reliability is critical. Now that cars rely on interdependent processes and sensors, driving is no longer quite as simple as turning the key, shifting into drive and pressing the gas pedal. Because it has the potential to impact our safety and the safety of others, automotive technology must be high-quality, reliable and proven.

# THE COMPLETE SOLUTION FOR NEXT-GEN AUTOMOTIVE SYSTEMS

Automotive electronics encompass a wide range of products – from body electronics and access systems to engine, lighting and infotainment components. Unmatched in reliability and flexibility, the packaging and technology solutions provided by Amkor and J-Devices address the most demanding technical challenges facing automotive IC manufacturers today.

As the world's largest OSAT for automotive ICs, Amkor offers an industry-leading portfolio of packaging technologies, such as:

- Low-Cost Flip Chip
- WLCSP
- System in Package (laminated and wafer-based)
- MEMS & Sensor
- Leadframe
- Power Discrete



*Dedicated automotive product test line at Amkor Technology Philippines*

## AMKOR AND J-DEVICES: WE KNOW AUTOMOTIVE

Amkor, along with J-Devices, has extensive experience with automotive process and has shipped millions of units for all automotive applications. Our packages meet APQP, safe launch and burn-in requirements and have FA capability, tri-temp testing and statistical processes in all factories. Amkor has additional processes in place for automotive requirements, such as trained personnel and separate production lines devoted to automotive applications that meet all quality certification requirements: ISO/TS16949, AEC Q-100, APAQ and VDA6.3.



# INDUSTRY-LEADING TECHNOLOGIES

## INFOTAINMENT

- USB Interface
- Navigation/GPS Systems
- Entertainment Center
- Instrumentation
- Head-Up Display



## CAMERA MODULE

- Backup Camera System
- Side Camera Alerts
- Traffic Monitor Systems

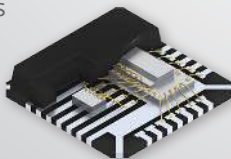


## BODY ELECTRONICS

- Interior Lighting
- Power Windows
- Power Seats
- Sunroof
- Wiper System

## MEMS & SENSORS

- Accelerometers/ Gyros/Magnetometers
- Pressure Sensors (MAP/BAP/TPMS)
- Comfort Control Systems
- Auto Light Dimmer (LED Systems)
- Auto Wiper Controller
- Pedestrian Detection



## SAFETY SYSTEMS

- Driver/Passenger Air Bag Systems
- Side Air Bag Systems
- ABS Braking Systems
- Entry Security/Alarm
- Image and Motion Systems
- Collision Warning
- Driver Drowsiness Monitor



# PACKAGING AND TEST SOLUTIONS FOR AUTOMOTIVE

## SiP

- Size reduction through increased component density



## MEMS and Sensors

- Sensor Fusion
- ECU and Satellite Sensors



## Discrete

- Cu Clip
- Al Ribbon
- Al and Cu Wire



## Wirebond

- Copper and silver wirebond



## Flip Chip

- Copper Pillar
- Solder Bump
- WLCSP



## Test

- Wafer Sort
- Final Package Test
- System-level Test
- Burn-in



# AMKOR EXPERTISE DRIVES MULTIPLE AUTOMOTIVE USE CASES

## ADAS

Advanced Driver Assistance Systems (ADAS) automate some aspects of the driving process, such as parking assistance, lane positioning and collision avoidance – enhancing automobile safety.

### Used In:

- Adaptive Cruise Control
- Collision Warning
- Lane Keep Assist
- Parking Assistant

### Enabling Technologies:

- Grade 0-2 Qualified CMOS Image Sensor
- mmWave
- Radars and LIDAR

## Chassis Electronics

The chassis is the structural framework of a motor vehicle onto which the body (and all related components) is mounted.

### Used In:

- Brakes, Suspension & Steering Control

### Enabling Technologies:

- Grade 0-1 Inertial, Pressure and Other Sensors
- A/D and D/A Converters
- Transceivers

## Powertrain In

This refers to the primary components, such as the engine, transmission and drive shafts, tasked with generating power and delivering it where it's needed for successful vehicle operation.

### Used In:

- Engine Computer
- Fuel Injection

### Enabling Technologies:

- Grade 0 and Q006 Qualified MCUs
- Sensors, Transceivers and Connectors (CAN/LIN, Ethernet Buses)

## Body Electronics

Central body control systems manage all of the safety, power management and diagnostic systems on the vehicle.

### Used In:

- Climate Control
- Doors/Seats
- Entry/Exit
- Lighting

### Enabling Technologies:

- Grade 0-2 Qualified LEDs and LED Drivers
- Power Management ICs
- NFC and Connectors (CAN/LIN, Ethernet Buses)

## Infotainment & Telematics

Autos utilize a variety of hardware and software products that help to enhance the driver and passenger experience as well as enable safety and connectivity features.

### Used In:

- Display (In Panel and Head-up)
- Navigation
- In Car Connectivity
- Audio

### Enabling Technologies:

- Grade 1-2 Qualified LED Drivers
- Touch Screen Controllers
- Power Management & RF ICs
- Sensors
- Audio & Video Codecs

## Safety

Automobile sensor systems that alert drivers to hazardous conditions or potential harm are vital for driving safety.

### Used In:

- Airbags
- TPMS

### Enabling Technologies:

- Grade 0 and Q006 Qualified MCUs
- Sensors
- Amplifiers

VISIT AMKOR TECHNOLOGY ONLINE FOR LOCATIONS AND TO VIEW CURRENT PRODUCT INFORMATION

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