



#1 OSAT FOR AUTOMOTIVE PACKAGING AND TEST

Automotive Excellence



THE JOURNEY TOWARDS SELF-DRIVING AUTOMOBILES



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

The complexity inherent in automotive electronics means that reliability is critical. To ensure the highest safety standards, automotive technology must be high-quality, reliable and proven.

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

AMKOR AEC-Q100 PACKAGE QUALIFICATIONS

Grade 0	Grade 1	Grade 2
CABGA	FCBGA	fpfcCSP
SOIC	fcCSP	Stacked CSP
TSSOP	fcMSP	
TQFP	MLF®	
WLCSP	PBGA	
	SiP	
	WLFO	

THE COMPLETE SOLUTION FOR NEXT-GENERATION 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 address the most demanding technical challenges facing automotive packaging 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
- ▶ Wafer Level Packages
- ▶ System in Package (laminated and wafer-based)
- ▶ MEMS & Sensor
- ▶ Leadframe
- ▶ Power Discrete
- ▶ BGA



Amkor designated automotive product assembly line

AMKOR: WE KNOW AUTOMOTIVE

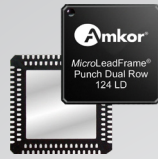
Amkor has extensive experience with automotive process requirements shipping billions of units every year for automotive applications. Our packages meet or exceed automotive quality, reliability, burn-in and safe launch plan criteria. Amkor also has failure analysis, tri-temp test and statistical process capability in all factories. In addition to meeting automotive standards such as IATF16949, VDA6.3, AEC-Q100, APQP, PPAP, etc., Amkor has automotive-trained personnel and designated production lines devoted to automotive products.



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

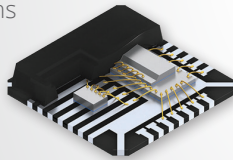


BODY ELECTRONICS

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

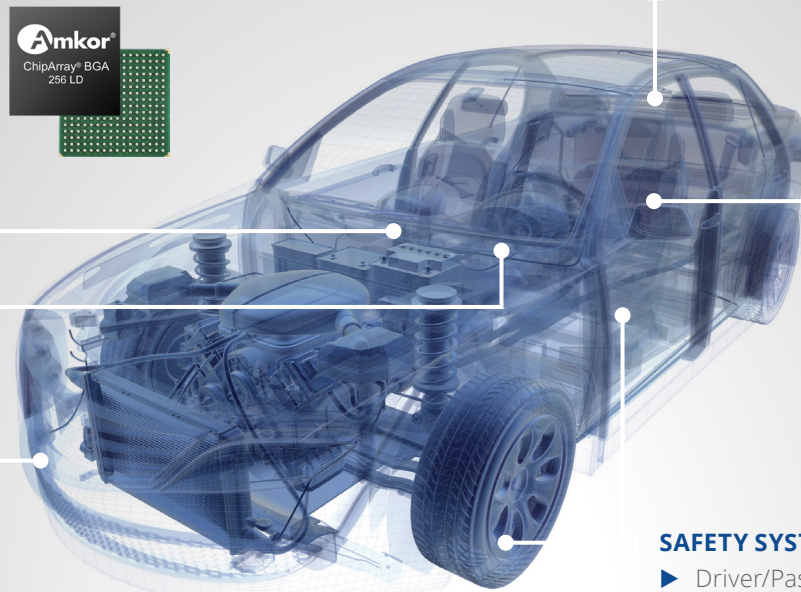
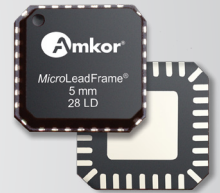
MEMS & SENSORS

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



SAFETY SYSTEMS

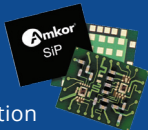
- ▶ Driver/Passenger Air Bag Systems
- ▶ Side Air Bag Systems
- ▶ ABS Braking Systems
- ▶ Entry Security/Alarm
- ▶ Image and Motion Systems
- ▶ Collision Warning
- ▶ Driver Drowsiness Monitor



PACKAGING AND TEST SOLUTIONS FOR AUTOMOTIVE

SiP

- ▶ Size reduction through increased component density



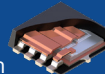
MEMS and Sensors

- ▶ Sensor Fusion
- ▶ ECU and Satellite Sensors



Discrete

- ▶ Cu Clip
- ▶ Al Ribbon
- ▶ Al and Cu Wire



Wirebond

- ▶ Copper wirebond and enhanced reliability BOM



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:

- ▶ CMOS Image Sensors
- ▶ mmWave Radar
- ▶ 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:

- ▶ Inertial, Pressure and Other Sensors
- ▶ A/D and D/A Converters
- ▶ Transceivers

Powertrain

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:

- ▶ 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:

- ▶ 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 Heads-up)
- ▶ Navigation
- ▶ In Car Connectivity
- ▶ Audio

Enabling Technologies:

- ▶ 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:

- ▶ MCUs
- ▶ Sensors
- ▶ Amplifiers

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

www.amkor.com

Questions? Contact us: sales@amkor.com



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