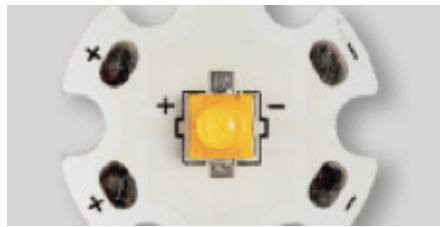


# EXTERIOR LIGHTING

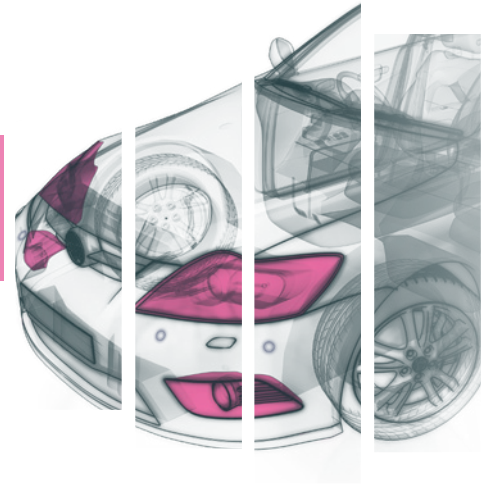
## Enabling Technologies for the Latest Generation of LED Lighting

The use of LED lighting for front and rear car lights is accelerating. One of the challenges in LED Assembly is the use of assembly processes and materials which deliver high performance and reliability along with minimal long-term light output degradation.

Alpha is at the forefront of developing solutions which enable automotive lighting companies to meet their assembly, performance and reliability requirements.



PRODUCT TYPE	PRODUCT NAME	PERFORMANCE IMPACT
High Reliability Alloy	ALPHA® Maxrel™ Alloy	Creep-resistant alloy designed for high reliability requirements. Intended for exterior lighting applications where wide temperature swings, high-thermal cycling loads, longer lifetime, vibration and creep resistance are required.
Improved Tin-Bismuth Zero Silver Alloy	ALPHA® SBX02	Enhanced drop shock and thermal cycling performance with low temperature processing. Intended for enabling PET flex circuits for in-cabin lighting applications
Ultra Low Voiding Solder Pastes	ALPHA® OM-358	Designed to provide ultra low voiding and low flux residue with both SAC305 & high reliability alloys.



## LED SOLDER PASTES

### High Reliability Solder Paste - ALPHA® MAXREL™ Alloy

ALPHA® MAXREL™ Alloys are a high temperature creep resistant family of solder alloys. They are designed for high reliability requirements where wide temperature swings, high thermal cycling loads, longer lifetime, vibration and creep resistance are required.

### SOLDER PASTES FOR FLIP CHIP WAFER BUMPING, FLIP CHIP DIE ATTACH AND CHIP-ON-BOARD (CoB)

**ALPHA® Lumet® FC** is designed for ultra-fine feature applications offered in Type 6 & 7 alloy particle sizes.

**ALPHA® Lumet P23** is the industry standard Type 6 solder paste for flip-chip die attach by Pin-Transfer / Stamping.

**ALPHA® JP510** is a proven low cost of ownership jet printable solder paste delivering ultra-high throughput for CSP LED attach.

PRODUCT TYPE	OM-358	LUMET P39	LUMET FC39	LUMET P23	LUMET JP510	LUMET P53
Alloy	SAC305 InnoLot	SAC305 Maxrel	SAC305	SAC305 SnCu0.7	SAC305	Low Temperature SBX02
Application Method	Printing	Printing	Printing	Stamping/ Pin-Transfer & Dispense	Jet Printing	Printing
Features	Ultra Low Voiding Solder Paste	Industry Standard Solder Paste	Fine Feature Printable Paste	Fine Feature Pin-Transferable Paste	Ultra-High Throughput High Precision Volume Control	Improved Reliability Compared to SnBiAg Zero Silver Alloy
Suitable Application	High Stress, High Operating Temperature Exterior Lighting (Automotive Headlamps)	General Automotive Signal and Brake Lamp	Flip Chip Wafer Bumping and Die Attach Chip Scale Package to Board Attach	Flip-Chip LED Die Attach	Chip Scale Package Attach for Board (Back Light Unit, BLU)	Flexible Circuit Assembly on PET and Polyimide Pin-in-Paste (Elimination of Wave Soldering Process) for Through Hole Driver and Controls Assembly