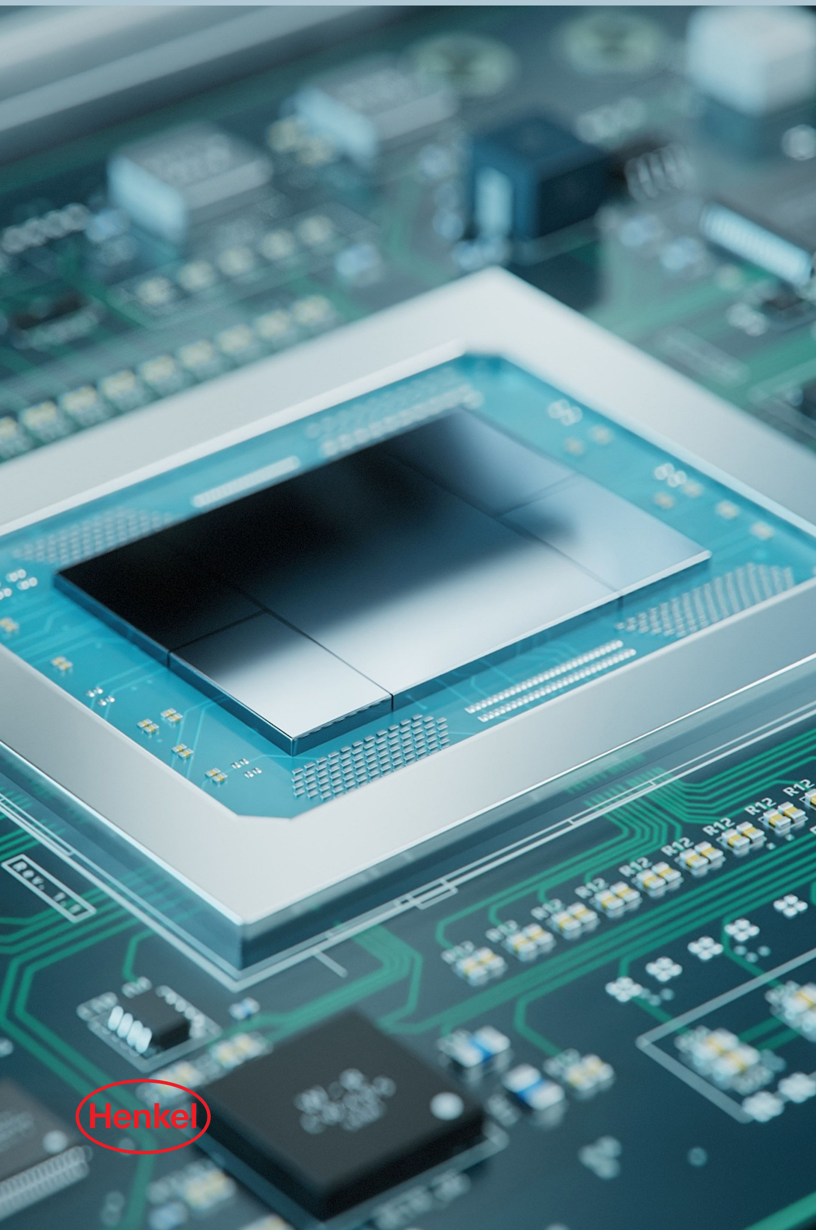
LOCTITE®

PROTECTING HIGH-VALUE AI AND HPC DEVICES

LOCTITE® ECCOBOND UF 9000AE

Fast Flow, Low Stress Capillary Underfill for High-Density, Large Body Semiconductor Packages



The demands of AI and high-performance computing (HPC) are accelerating the use of next-generation flip-chip BGA (FCBGA) and high-density fan-out (HD-FO)/2.5D integrated advanced packaging designs. Large, high-density I/O die within large package body dimensions are the norm for these ascendant technologies. Preventing warpage and die cracking is critical for performance and long-term reliability, and robust protection of fine-pitch interconnects on large die can be challenging.

A new semiconductor capillary underfill, LOCTITE® ECCOBOND UF 9000AE, delivers the die interconnect safeguarding required while enabling high UPH processing and providing safety-prioritized features. A fast flow, PFAS-free, epoxy encapsulant, LOCTITE® ECCOBOND UF 9000AE protects against die warpage and cracking. With high fracture toughness and excellent flow rates, the novel underfill bridges the gap between comprehensive interconnect protection and high processability for the market's most complex packages.

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Product	LOCTITE® ECCOBOND UF 9000AE
Application		Semiconductor underfill, electronic encapsulant
Viscosity at 25°C (cps), 5 rpm		9,082
T.I.		0.8
Pot Life at 25°C, hr.		24
Cure		15 min. ramp to 100°C; 90 min. hold at 100 °C + 15 min. ramp from 100°C to 165°C; 2 hr. hold at 165°C
Thermal Expansion ppm/°C	Below T_g	23
	Above T_g	85

Key Features and Benefits:

High Reliability

- Low shrinkage and high toughness (K1c = 3.0) offer die and underfill crack resistance
- Low CTE (23 ppm/°C below T_g), highly filled system reduces warpage propensity
- Low/no-voiding bump encapsulation for fine-pitch I/O (100 µm) and low gap heights (> 45 µm)
- Good reliability across all metrics (MSL3a + 2,000 TCT-B cycles, 192 hr. uHAST. 1,000 hr. HTS at 150°C)

Excellent Workability/Processability

- Fast flow for high UPH; 20% faster than previous-generation material*
- Low resin bleed out (RBO) and narrow fillets allow denser chip integration
- Thorough coverage on large die up to 50 mm x 50 mm, and demonstrated effectiveness with large package bodies up to 110 mm x 110 mm
- Excellent workability; long stage life at 100° C

Value Protection

- Proven performance on flip-chip BGA, Cu pillar, and other high-density interconnect designs
- Safeguards large, thin die in complex, 2.5D AI and HPC packages

Health and Safety

- PFAS-free

*Die size-dependent, per internal and customer evaluation testing results.

Discover more about Henkel's semiconductor underfill portfolio for advanced packaging applications. Get in touch with our team.

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