

LOCTITE

COST-EFFECTIVE AND RELIABLE
**MATERIALS FOR
WIREBOND PACKAGING**



Henkel Adhesive Technologies

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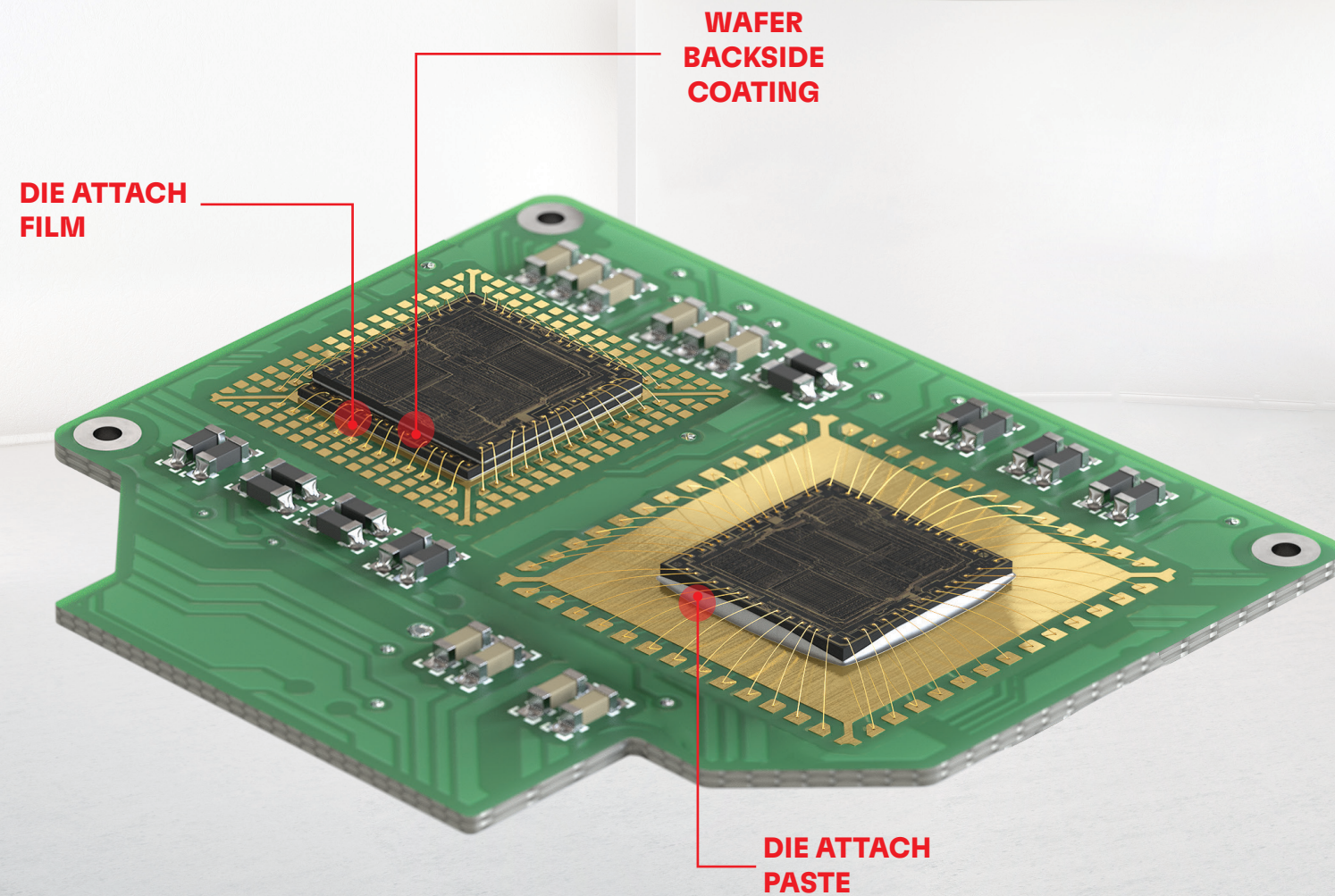
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WIREBOND PACKAGING: **RELIABLE, FLEXIBLE, AND PROVEN**

Semiconductor packaging innovation continues to push the boundaries of form and function. Wafers are thinner, die dimensions smaller, and heterogeneous integration designs like system-in-package (SiP) and system-on-module (SoM) are viable, cost-effective alternatives to transistor scaling for some applications. Both flip-chip and wirebond interconnect technologies enable these new architectures, with cost, form factor, and system speed requirements determining design approaches. Despite significant flip-chip growth, wirebond IC packaging remains a dominant interconnect technique due to its maturity, reliability, and proven performance in specific sectors, such as automotive. As a semiconductor materials innovator, Henkel has been delivering market-leading solutions for over 70 years.

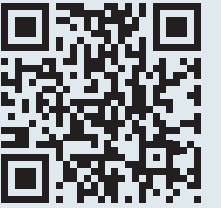
LEADFRAME PACKAGING MATERIALS

Leadframe packaging continues to post solid growth year-over-year, with advances in the automotive and industrial automation sectors driving a large portion of the expansion. Because of the reliability demands of leadframe applications, the highest levels of JEDEC MSL and automotive grade performance is required. Henkel materials have a decades-long track record of exceptional quality, with continuous innovation addressing form factor and bond line control requirements for single- and multi-chip placement within increasingly more challenging form factors.



DIE ATTACH PASTES

When thermal control and unfailing function are mission-critical, packaging specialists choose Henkel die attach pastes. With a variety of options, including market-leading ultra-high thermal sintering and pressure-less sintering formulas, LOCTITE® ABLESTIK conductive and non-conductive die attach formulations have been developed for compatibility with various metal surfaces for multiple package types, including discretes, DIPs, QFNs, QFPs and SOICs, among others.



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DIE ATTACH PASTES (DAP) FOR WIREBOND LEADFRAME PACKAGING

	Electrically Conductive	Electrically Non-conductive	Discrete & DIP	QFN	QFP	SOIC, TSOP & TSSOP
LOCTITE® ABLESTIK 3230	✓			✓	✓	
LOCTITE® ABLESTIK 3290P	✓				✓	
LOCTITE® ABLESTIK 8200TI	✓		✓	✓	✓	✓
LOCTITE® ABLESTIK 8290	✓			✓	✓	✓
LOCTITE® ABLESTIK 8302	✓			✓	✓	✓
LOCTITE® ABLESTIK ABP 8303A	✓				✓	✓
LOCTITE® ABLESTIK 8352L	✓		✓			
LOCTITE® ABLESTIK 8390	✓			✓	✓	
LOCTITE® ABLESTIK 84-1LMISR4	✓		✓			
LOCTITE® ABLESTIK ABP 6389	✓			✓	✓	
LOCTITE® ABLESTIK ABP 6395T	✓		✓		✓	
LOCTITE® ABLESTIK ABP 8060T	✓		✓			
LOCTITE® ABLESTIK ABP 8062T	✓				✓	
LOCTITE® ABLESTIK ABP 8064T	✓				✓	✓
LOCTITE® ABLESTIK ABP 8065T	✓		✓			✓
LOCTITE® ABLESTIK ABP 8066T	✓		✓			✓
LOCTITE® ABLESTIK ABP 8068TA	✓		✓	✓		✓
LOCTITE® ABLESTIK ABP 8068TB	✓		✓	✓		✓
LOCTITE® ABLESTIK ABP 8068TD	✓		✓	✓		
LOCTITE® ABLESTIK ABP 8068TI	✓		✓	✓		
LOCTITE® ABLESTIK ABP 8920TC		✓	✓			✓
LOCTITE® ABLESTIK ABP 84-3J		✓			✓	
LOCTITE® ABLESTIK ABP 84-3JT		✓				✓
LOCTITE® ABLESTIK 8600	✓		✓			
LOCTITE® ABLESTIK ABP 8611		✓			✓	✓
LOCTITE® ABLESTIK FS 849-TI	✓			✓	✓	✓
LOCTITE® ABLESTIK QMI519	✓			✓		
LOCTITE® ABLESTIK QMI529HT-LV	✓		✓		✓	✓
LOCTITE® ABLESTIK SSP 2020	✓		✓	✓		✓
LOCTITE® ABLESTIK 2025D		✓		✓	✓	✓
LOCTITE® ABLESTIK 8900NCM		✓	✓			✓
LOCTITE® ABLESTIK ABP 8910T		✓	✓			
LOCTITE® ABLESTIK 2053S		✓	✓			✓

ELECTRICALLY CONDUCTIVE DIE ATTACH PASTES (cDAP)

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Volume Resistivity	Thermal Conductivity	Recommended Cure
			mm			$\Omega\cdot\text{cm}$	W/mK	
LOCTITE® ABLESTIK 3230	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Low stress Excellent adhesion to Cu Oven cure 	$\leq 8 \times 8$	Cu or Ag	L3 260°C capable	5.0×10^{-2}	0.6	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 3290P	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Medium modulus Low outgassing High reliability Snap or oven cure 	$\leq 5 \times 5$	Cu, Ag or PPF	L2 260°C capable	2.0×10^{-2}	0.8	180 sec. to peak 240°C (snap)
LOCTITE® ABLESTIK 8200T1	Ag-filled die attach adhesive	<ul style="list-style-type: none"> No bleed Excellent adhesion to pre-plated finishes (PPF) Oven or snap cure 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L1 260°C capable	5.0×10^{-5}	3.5	180 sec. to peak 220°C (snap)
LOCTITE® ABLESTIK 8290	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Low stress Low bleed Excellent adhesion to Cu Oven cure 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L3 260°C capable	8.0×10^{-3}	1.6	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 8302	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low stress Excellent hot/wet adhesion Excellent peel strength Low moisture absorption Oven cure 	$\leq 8 \times 8$	Cu, Ag or PPF	L1 260°C capable	1.0×10^{-4}	0.8	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK 8352L	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low stress Minimal voiding Good bleed performance Good adhesion to multiple metal surfaces Oven or snap cure 	$\leq 8 \times 8$	Cu, Ag, PPF or Au	L2 260°C capable	5.0×10^{-5}	5.5	120 sec. to peak 220°C (snap)
LOCTITE® ABLESTIK 8390	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Low bleed Low condensable volatiles Moderately stress-absorbing Excellent dispensability In-line oven snap cure or oven cure 	$\leq 5 \times 5$	Pd or Ag	L3 260°C capable	8.0×10^{-4}	1.8	80 sec. to peak 220°C (snap)
LOCTITE® ABLESTIK 84-1LMISR4	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Excellent dispense capability Long work life High throughput Box oven cure 	$\leq 3 \times 3$	Ag, PPF or Au	L1 260°C capable	$\geq 2.0 \times 10^{-4}$	2.5	1 hr. at 175°C
LOCTITE® ABLESTIK 8600	Ag-filled, acrylate die attach adhesive	<ul style="list-style-type: none"> Low bleed Excellent in-package thermal performance Oven or snap cure 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L1 260°C capable	1.0×10^{-3}	> 4	60 sec. to peak 220°C (snap)
LOCTITE® ABLESTIK ABP 8303A	Ag-filled, BMI hybrid die attach adhesive	<ul style="list-style-type: none"> Compatible with Cu leadframe For large die Automotive grade 	$\leq 8 \times 8$	Cu, Ag or PPF	L1 260°C capable	6.2×10^{-3}	1.5	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK ABP 6389	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Compatible with Cu leadframe For medium die High thermal Automotive grade 	$\leq 5 \times 5$	Cu, Ag or PPF	L1 260°C capable	6.0×10^{-5}	10.0	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK ABP 6395T	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Compatible with Cu leadframe For small die Ultra high thermal Automotive grade 	$\leq 3 \times 3$	Cu, Ag or PPF	L1 260°C capable	4.0×10^{-5}	30.0	30 min. ramp and 30 min. hold at 200°C

ELECTRICALLY CONDUCTIVE DIE ATTACH PASTES (cDAP) - CONTINUED

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Volume Resistivity	Thermal Conductivity	Recommended Cure
			mm	cP		$\Omega\cdot\text{cm}$	W/mK	
LOCTITE® ABLESTIK ABP 8060T	Ag-filled, BMI hybrid die attach adhesive	<ul style="list-style-type: none"> High modulus High die shear strength Hydrophobic Oven cure 	$\leq 2 \times 2$	Cu, Ag, PPF or Au	L2 260°C capable	2.5×10^{-5}	20	45 min. ramp and 60 min. hold at 200°C
LOCTITE® ABLESTIK ABP 8062T	Ag-filled, BMI hybrid die attach adhesive	<ul style="list-style-type: none"> Hydrophobic Electrically conductive Thermally conductive Stable at high temperatures 	3 x 3	Ag or PPF	L3 260°C capable	5×10^{-5}	24	45 min. ramp from 25°C to 200°C + 30 min. at 200°C in N ₂ or air oven
LOCTITE® ABLESTIK ABP 8064T	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Medium modulus Low outgassing Oven cure 	3 x 3 – 8 x 8	Cu, Ag, PPF or Au	L1 260°C capable	2.0×10^{-5}	22	60 min. ramp and 60 min. hold at 180°C
LOCTITE® ABLESTIK ABP 8065T	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> No channel void issue High die shear strength Dispensable silver paste Oven or snap cure 	$\leq 2 \times 2$	Ag or Au	L3 260°C capable	3.0×10^{-5}	10	30 min. ramp and 60 min. hold at 185°C in nitrogen (oven)
LOCTITE® ABLESTIK ABP 8066T	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Long open time High die shear strength Hydrophobic Low outgassing Oven cure 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L1 260°C capable	4.0×10^{-5}	15	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK ABP 8068TA	Ag filled, semi-sintering die attach adhesive	<ul style="list-style-type: none"> One component Low temperature sintering Best in-class electrical and thermal performance Excellent workability High reliability 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L1 260°C capable	9.0×10^{-6}	110	20 min. to 130C, hold 30 min., 15 min. to 200°C, hold 1 hr.
LOCTITE® ABLESTIK ABP 8068TB	Ag filled, semi-sintering die attach adhesive with resin bleed control	<ul style="list-style-type: none"> No resin bleed out Low temperature sintering Best in-class electrical and thermal performance Excellent workability High Reliability 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L1 260°C capable	7.0×10^{-6}	100	20 min. to 130C, hold 30 min., 15 min. to 200°C, hold 1 – 2 hr.
LOCTITE® ABLESTIK ABP 8068TD	Ag-filled, pressure-less sintering paste	<ul style="list-style-type: none"> No BSM required High thermal Automotive grade 	$\leq 3 \times 3$	Ag, PPF	L1 260°C capable	1.0×10^{-5}	50	20 min. ramp and 30 min. hold at 130°C, 15 min. Ramp and hold 1 hr. at 200°C
LOCTITE® ABLESTIK ABP 8068TI	Ag-filled, pressure-less sintering paste	<ul style="list-style-type: none"> Ag or Au BSM required Ultra-high thermal Automotive grade 	$\leq 3 \times 3$	Ag, PPF	L1 260°C capable	9.0×10^{-6}	165	20 min. ramp and 30 min. hold at 130°C, 15 min. ramp and hold 1 hr. at 200°C

ELECTRICALLY CONDUCTIVE DIE ATTACH PASTES (cDAP) - CONTINUED

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Volume Resistivity	Thermal Conductivity	Recommended Cure
			mm			$\Omega \cdot \text{cm}$	W/mK	
LOCTITE® ABLESTIK FS 849-TI	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Excellent in-package thermal performance Low bleed Medium modulus Low outgassing Oven cure 	$\leq 8 \times 8$	Ag or Au	L2 260°C capable	2.0×10^{-5}	7.8	15 min. ramp and 30 min. hold at 175°C
LOCTITE® ABLESTIK QMI519	Ag-filled, BMI/acrylate die attach adhesive	<ul style="list-style-type: none"> Excellent dispense capability Long work life High throughput Hydrophobic Fast oven cure or SkipCure 	$\leq 5 \times 5$	Cu, Ag, PPF or Au	L1 260°C capable	1.0×10^{-4}	3.8	≥ 10 sec. at 200°C (SkipCure)
LOCTITE® ABLESTIK QMI529HT-LV	Ag-filled, BMI hybrid die attach adhesive	<ul style="list-style-type: none"> Good dispensing characteristics Stable at high temperatures Hydrophobic Excellent adhesive strength Oven cure 	$\leq 8 \times 8$	Ag or PPF	L1 260°C capable	5.0×10^{-5}	8	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK SSP 2020	Ag sintering die attach adhesive	<ul style="list-style-type: none"> High die shear strength Robust dispense and stencil print performance Good workability High-temperature sinter with or without pressure 	$\leq 3 \times 3$	Ag or Au	L3 260°C capable	4.8×10^{-5}	> 100	10 min. ramp and 60 min. hold at 250°C (pressure-less sintering)

ELECTRICALLY NON-CONDUCTIVE DIE ATTACH PASTES (ncDAP)

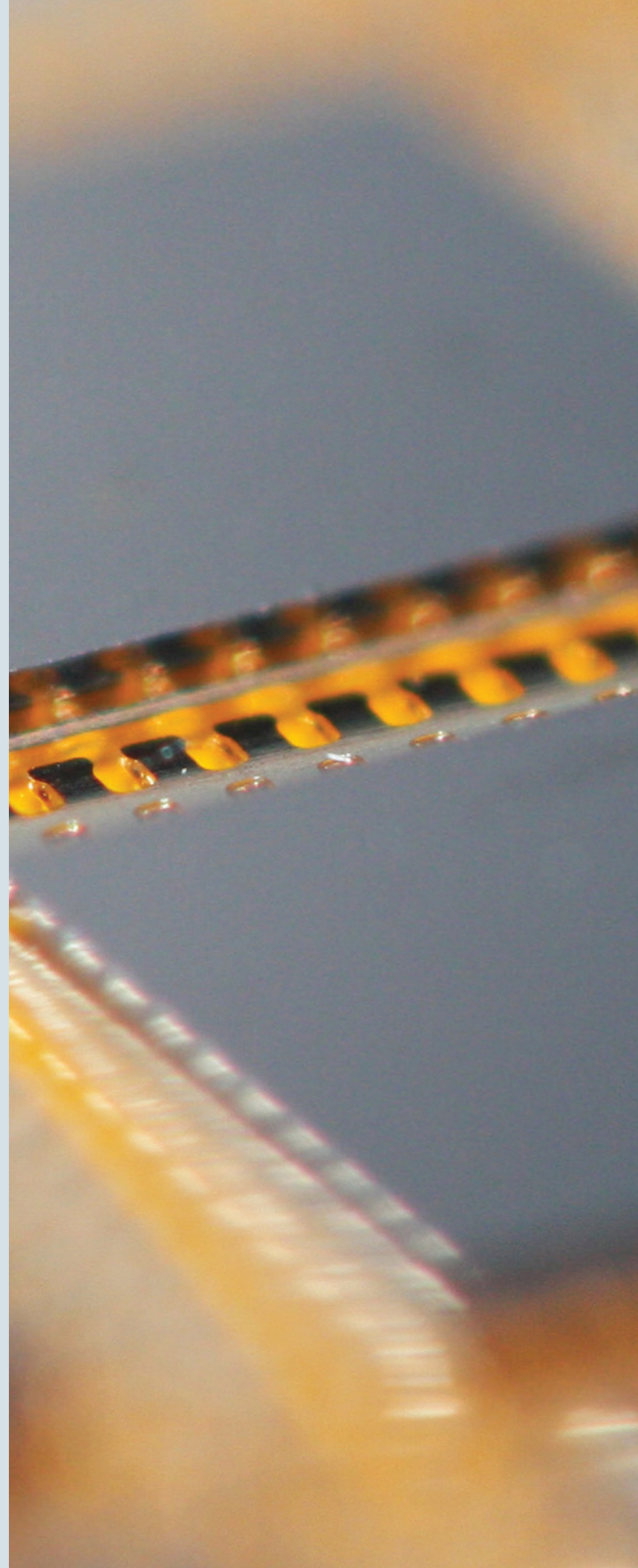
Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Modulus at 25°C	Thermal Conductivity	Recommended Cure
			mm	cP		MPa	W/mK	
LOCTITE® ABLESTIK 2025D	Silica-filled die attach adhesive	<ul style="list-style-type: none"> Low bleed Very low stress Red color for vision recognition Oven cure 	$\leq 8 \times 8$	Cu, Ag or Au	L3 260°C capable	407	0.4	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 8900NCM	PTFE-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Low bleed Low voiding Moderately stress absorbing Excellent dispense capability Contains no category 3 carcinogenic, mutagenic, or reprotoxic (CMR) substances Oven cure 	$\leq 8 \times 8$	Pd, Cu, Ag or PPF	L3 260°C capable	680	0.3	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK ABP 8611	BMI hybrid die attach adhesive	<ul style="list-style-type: none"> Excellent dielectric properties Suitable for Cu wire or Au wire bonding High modulus at high temperatures Oven cure 	$\leq 2 \times 2$	Cu, Ag or PPF	L3 260°C capable	5,000	0.7	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK ABP 8910T	Alumina-filled, BMI hybrid die attach adhesive	<ul style="list-style-type: none"> Medium modulus High reliability Oven cure 	$\leq 8 \times 8$	Cu, Ag or PPF	L3 260°C capable	8,870	1.3	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK ABP 84-3JT	Non-conductive, BMI hybrid die attach adhesive	<ul style="list-style-type: none"> Non-conductive Insulating Good adhesion to Cu and Ag No resin bleed-out Snap curable Contains 1 mil spacers for better bond line and stress control 	$\leq 5 \times 5$	Ag or Cu	L3 260°C capable	2,950	0.6	30 min. ramp to 175°C + 60 MIN. at 175°C in N ₂ oven
LOCTITE® ABLESTIK 2053S	Polymer Filler Epoxy	<ul style="list-style-type: none"> Non-conductive Low stress Red color 	5 X 5	Solder mask or Au	L3 260°C capable	87	0.19	30 min. at 175°C + 15 min. at 175°C
LOCTITE® ABLESTIK ABP 8920TC	Alumina-filled, die attach adhesive	<ul style="list-style-type: none"> Non-conductive High thermal Good insulation High reliability 	$\leq 3 \times 3$	Cu, Ag, PPF	L1 260°C capable	7.7×10^{12}	3.0	30 min. ramp and 60 min. hold at 175°C
LOCTITE® ABLESTIK ABP 84-3J	Silica-filled, die attach adhesive	<ul style="list-style-type: none"> Non-conductive Good insulation White color 	$\leq 3 \times 3$	Cu	L1 260°C capable	3.5×10^{13}	0.5	30 min. ramp and 60 min. hold at 150°C



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DIE ATTACH FILMS

Die attach films are ideal for applications and processes with challenging die-to-pad ratios, high-density packaging designs, and thin wafer handling complexities. Multiple formulations are available and have been engineered to comply with many factors, such as wire type compatibility, cure preferences, wafer grinding, and die size requirements.

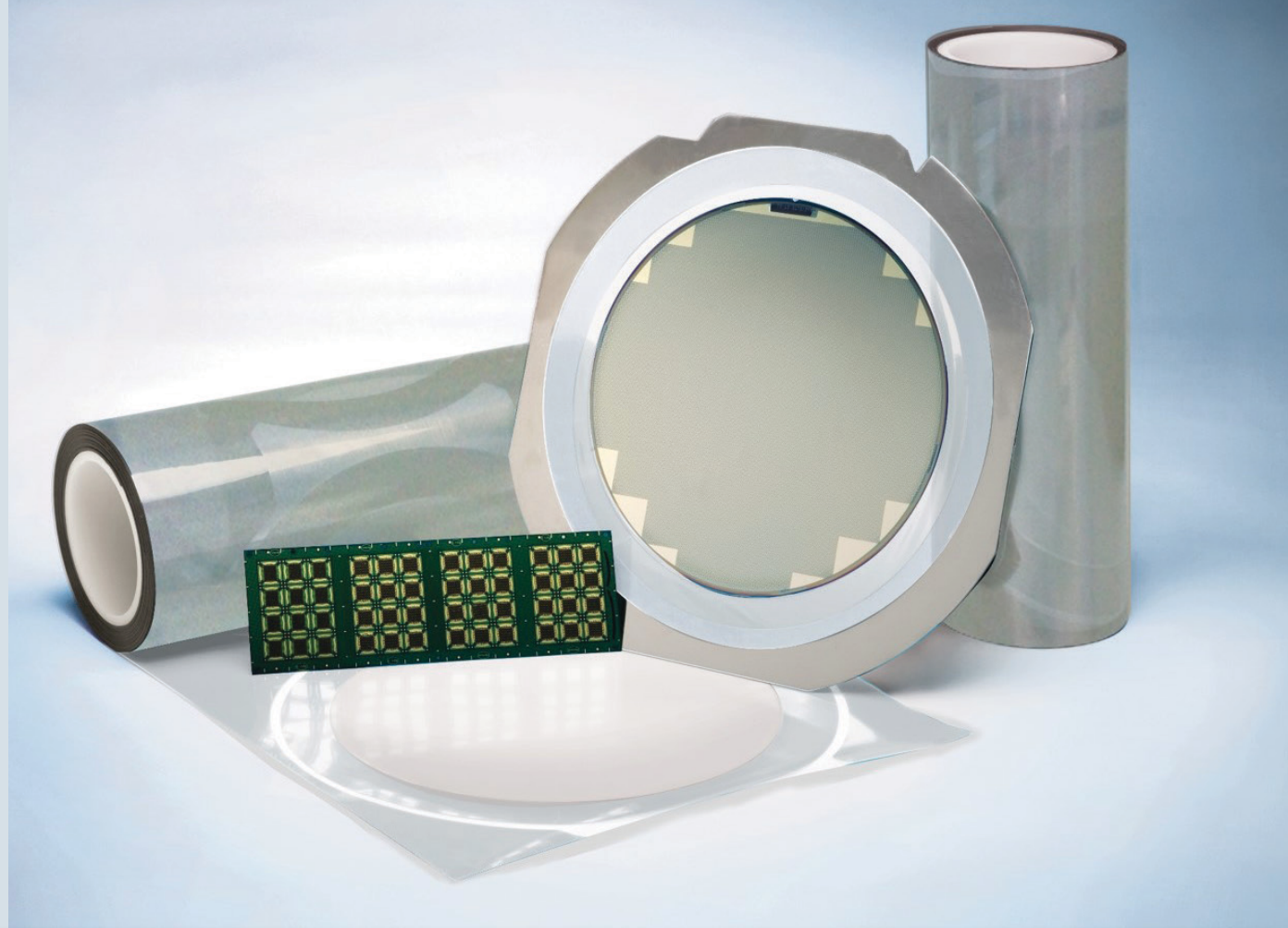


DIE ATTACH FILM FOR WIREBOND LEADFRAME PACKAGING

	Electrically Conductive	Electrically Non-conductive	Logic IC, MOSFET, & RF	QFN	QFP	SOIC, TSOP and TSSOP
LOCTITE® ABLESTIK CDF 200P SERIES	✓		✓			
LOCTITE® ABLESTIK CDF 300P SERIES	✓		✓			
LOCTITE® ABLESTIK CDF 500P SERIES	✓		✓			
LOCTITE® ABLESTIK CDF 600P SERIES	✓		✓			
LOCTITE® ABLESTIK CDF 800P SERIES	✓		✓			
LOCTITE® ABLESTIK ATB 100GR SERIES		✓		✓		✓
LOCTITE® ABLESTIK ATB 100HB SERIES		✓		✓		✓
LOCTITE® ABLESTIK ATB F100E SERIES		✓		✓		✓

ELECTRICALLY CONDUCTIVE DIE ATTACH FILM (cDAF)

Product Name	Description	Key Attributes	Film Thickness µm	Moisture Sensitivity Level, MSL MPa	Thermal Conductivity W/mK	In-Package Thermal Resistance K/W
LOCTITE® ABLESTIK CDF 200P SERIES	Ag-filled die attach adhesive	<ul style="list-style-type: none"> • Suitable for small die • Recommended for thin wafer handling applications • Oven cure 	15 or 30	L1 260°C capable	2.3	1.5
LOCTITE® ABLESTIK CDF 300P SERIES	Ag-filled die attach adhesive	<ul style="list-style-type: none"> • Suitable for small die • High adhesion • Good wetting • Oven cure 	15 or 30	L1 260°C capable	1.0	2.1
LOCTITE® ABLESTIK CDF 500P SERIES	Ag-filled die attach adhesive	<ul style="list-style-type: none"> • Suitable for medium to large dies • Good wetting and low warpage • Recommended for thin wafer handling applications • Oven cure 	15 or 30	L1 260°C capable	1.5	1.4
LOCTITE® ABLESTIK CDF 600P SERIES	Ag-filled die attach adhesive	<ul style="list-style-type: none"> • Low stress and excellent wetting for large die • Compatible with various metal surfaces, including solder • Recommended for thin wafer handling applications • Oven cure 	25	L2 260°C capable	1.0	2.1
LOCTITE® ABLESTIK CDF 800P SERIES	Ag-filled die attach adhesive	<ul style="list-style-type: none"> • Suitable for small die • Recommended for thin wafer handling applications • Oven cure 	15	L1 260°C capable	3.4	0.7

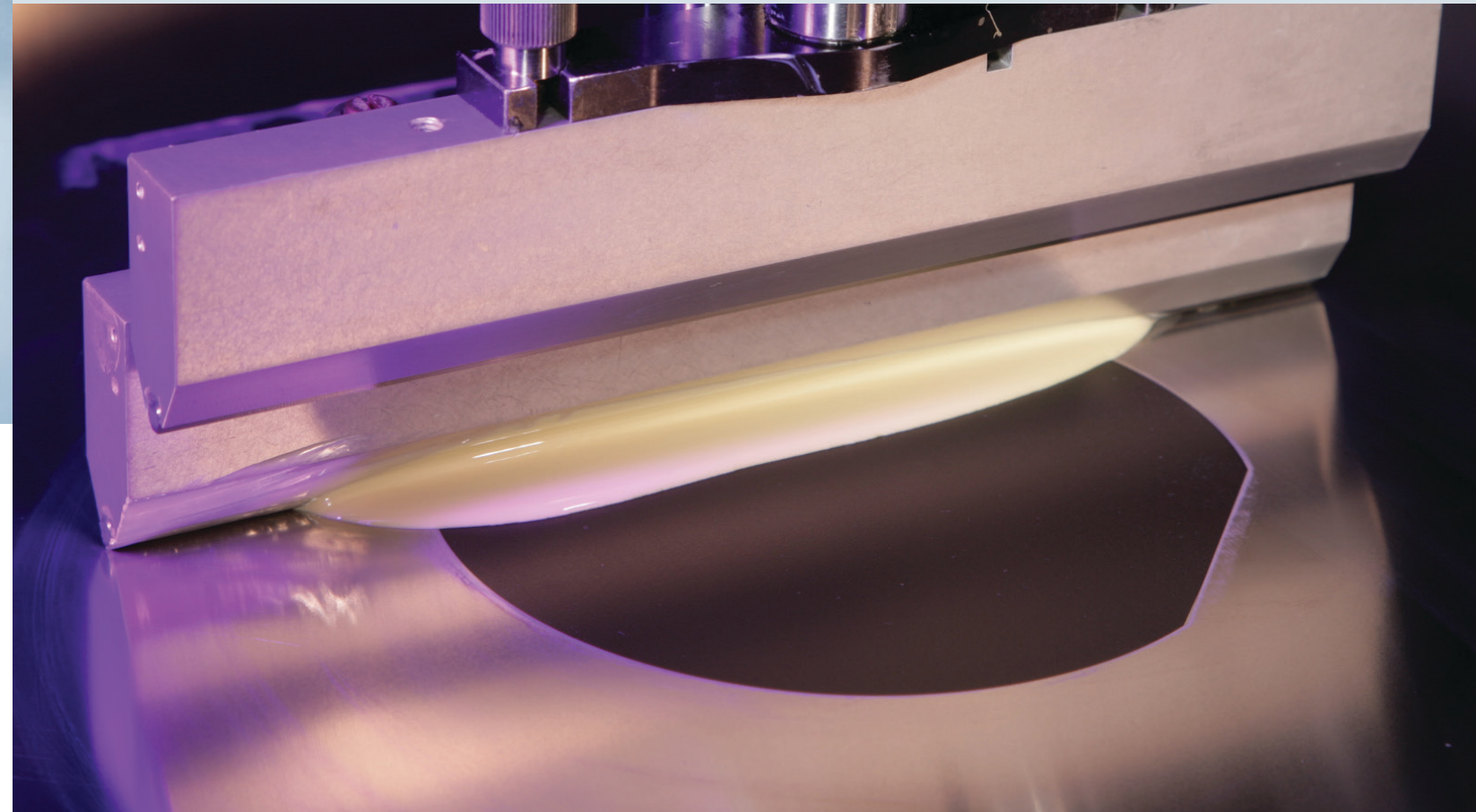


WAFER BACKSIDE COATINGS

Enabling maximum UPH, wafer backside coatings are screen or stencil printed to allow mass imaging of the entire wafer, eliminating the need for serial adhesive dispensing. After the material is B-staged, a film is formed, which provides uniform and controlled bond lines and precise fillets, which are particularly important for die attachment within small package dimensions.



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ELECTRICALLY NON-CONDUCTIVE DICING DIE ATTACH FILM (ncDDF)

Product Name	Description	Key Attributes	Dicing Tape	Film Thickness µm	Thermal Conductivity W/mK	Moisture Sensitivity Level, MSL	Modulus at 25°C MPa
LOCTITE® ABLESTIK ATB 100GR SERIES	Silica-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> • Excellent workability • Excellent adhesion on both leadframe and laminate substrate • High reliability • Consistent dicing and die pickup for small to medium die 	Non-UV	25	0.34	L1 260°C capable	3,205
LOCTITE® ABLESTIK ATB 100HB SERIES	Silica-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> • Long thermal budget (1 - 1.5 hr at 175°C) • Consistent dicing and die pickup for large die applications • Good adhesion on various leadframe finishes 	UV/Non-UV	5, 10, 15, 20, 25 or 30	0.21	L1 260°C capable	2,299
LOCTITE® ABLESTIK ATB F100E SERIES	Silica-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> • Suitable for small to large die • Excellent workability at die sizes below 3 x 3 mm • Long work life (4 months before and after lamination) • Compatible with stealth dicing before grind (SDBG) process • Film over wire (FoW) and film over die (FoD) applications • Oven cure 	UV/Non-UV	25 FoW: 35 – 80 FoD: 90 – 150	≥ 75	L1 260°C capable	5,256

WAFER BACKSIDE COATINGS FOR WIREBOND LEADFRAME PACKAGING

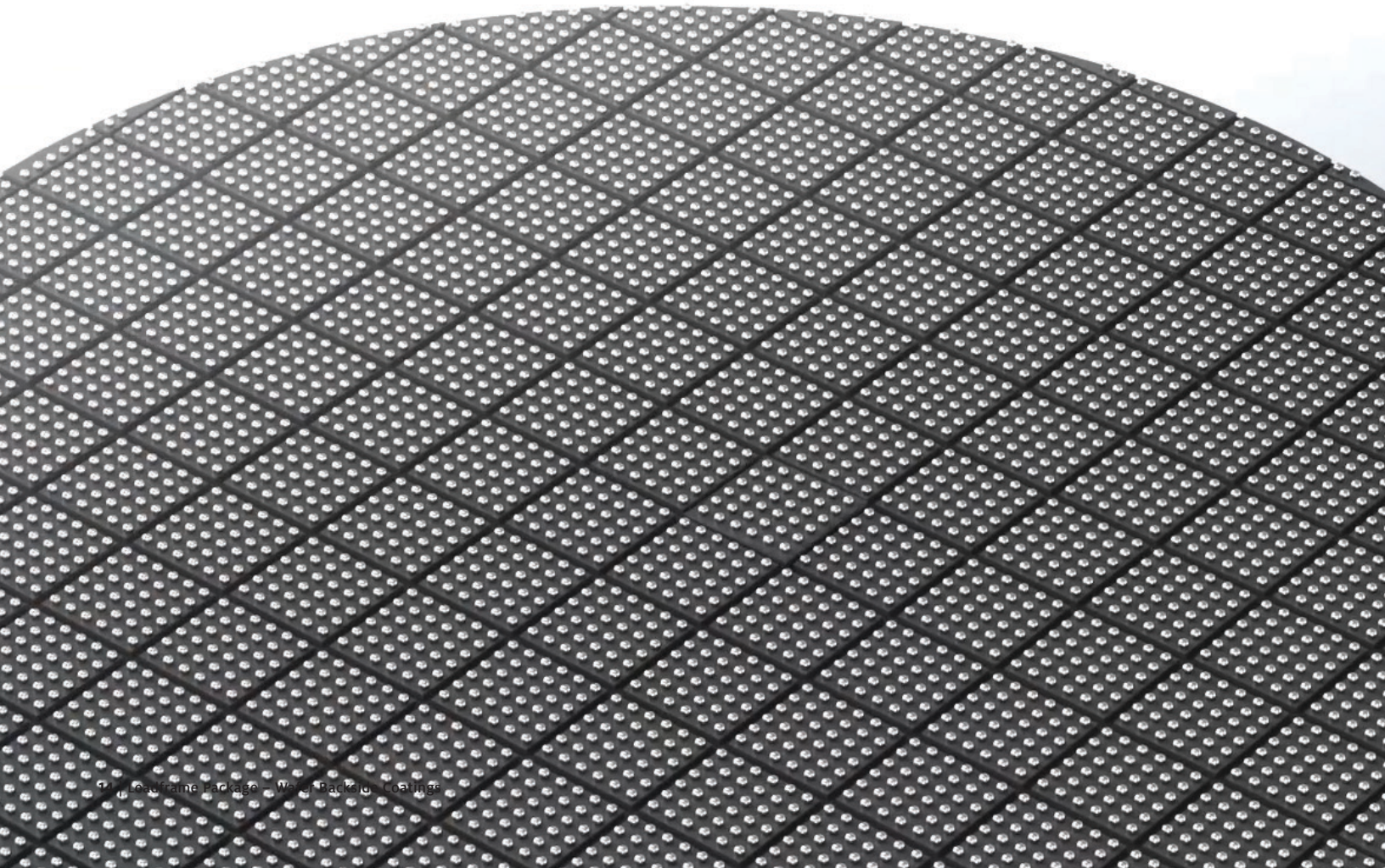
	Electrically Conductive	Electrically Non-conductive	Discrete	QFN & SOIC/SOP
LOCTITE® ABLESTIK 8008	✓			✓
LOCTITE® ABLESTIK 8008HT	✓		✓	✓
LOCTITE® ABLESTIK 8008MD	✓		✓	✓
LOCTITE® ABLESTIK 8006NS		✓		✓

ELECTRICALLY CONDUCTIVE WAFER BACKSIDE COATINGS (cWBC)

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Volume Resistivity	Thermal Conductivity	Recommended Cure
			mm					
LOCTITE® ABLESTIK 8008	Ag-filled die attach wafer backside coating adhesive	<ul style="list-style-type: none"> Excellent stencil printing and low surface roughness Void-free bondline without bleed Oven B-stage and snap or oven cure 	$\leq 3 \times 3$	Cu, Ag or PPF	L1 260°C capable	1.0×10^{-4}	2.2	60 sec. at 230°C (snap)
LOCTITE® ABLESTIK 8008HT	Ag-filled die attach wafer backside coating adhesive	<ul style="list-style-type: none"> Applied by stencil printing Void-free bondline without bleed Oven B-stage and snap or oven cure 	$\leq 1 \times 1$	Cu, Ag or PPF	L1 260°C capable	6.0×10^{-5}	11.0	20 sec. at 170°C (snap)
LOCTITE® ABLESTIK 8008MD	Ag-filled die attach wafer backside coating adhesive	<ul style="list-style-type: none"> Applied by stencil printing Low stress Good substrate wetting Oven B-stage and oven cure 	$\leq 4 \times 4$	Cu, Ag or PPF	L1 260°C capable	5.0×10^{-4}	6.0	10 min. ramp and 60 min. hold at 115°C

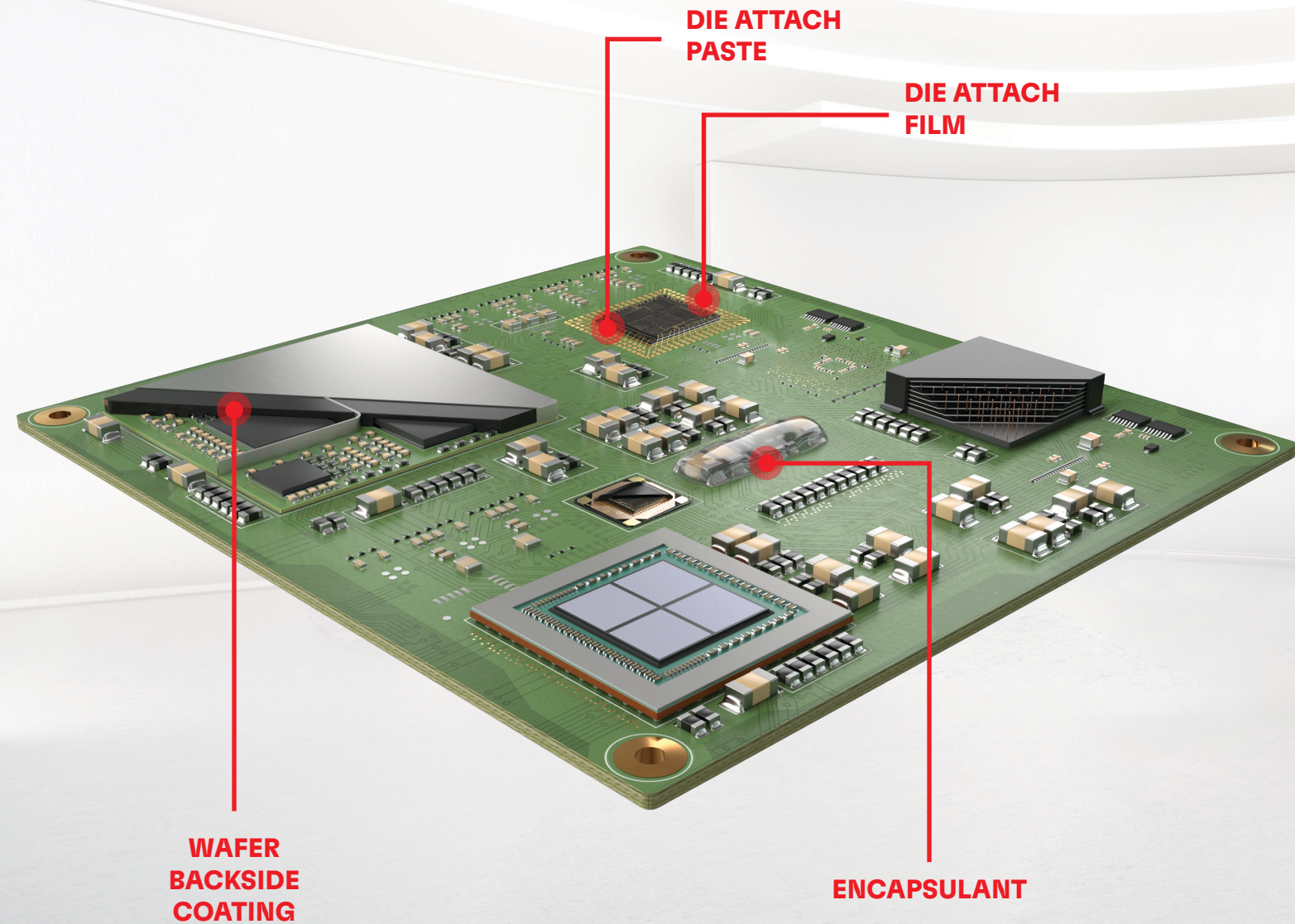
ELECTRICALLY NON-CONDUCTIVE WAFER BACKSIDE COATINGS (ncWBC)

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Modulus At 25°C (Mpa)	CTE (Ppm/°C)		Recommended Cure
							Below T _g	Above T _g	
			mm			W/mK	$\Omega\cdot\text{cm}$	W/mK	
LOCTITE® ABLESTIK 8006NS	Alumina/silica-filled, epoxy die attach wafer backside coating adhesive	<ul style="list-style-type: none"> Applied by stencil or screen printing Consistent bondline down to 25 μm with minimal die tilt Oven B-stage and oven cure 	$\leq 4 \times 4$	Cu, Ag or PPF	L1 260°C capable	4,376	33	136	2 hr. at 160°C



LAMINATE PACKAGING MATERIALS

In addition to Henkel's well-known Bismaleimide (BMI)-based adhesives, new advances in IC packaging materials have been developed to facilitate high performance for various package designs – from LGAs to large format SiPs and SoMs. Products are available in paste, liquid, and film mediums, offering processing flexibility and precision for the most demanding applications and manufacturing environments.



DIE ATTACH PASTES

Conductive and non-conductive LOCTITE® ABLESTIK brand die attach pastes are the market standard for high reliability and excellent performance. Meeting challenging high-density laminate package requirements and covering a wide die size range, Henkel die attach pastes provide key attributes such as fast oven cure or snap cure profiles, low modulus to manage stress and eliminate warpage, and low moisture absorption to prevent high temperature processing-induced cracking.



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DIE ATTACH PASTES (DAP) FOR WIREBOND LAMINATE PACKAGING

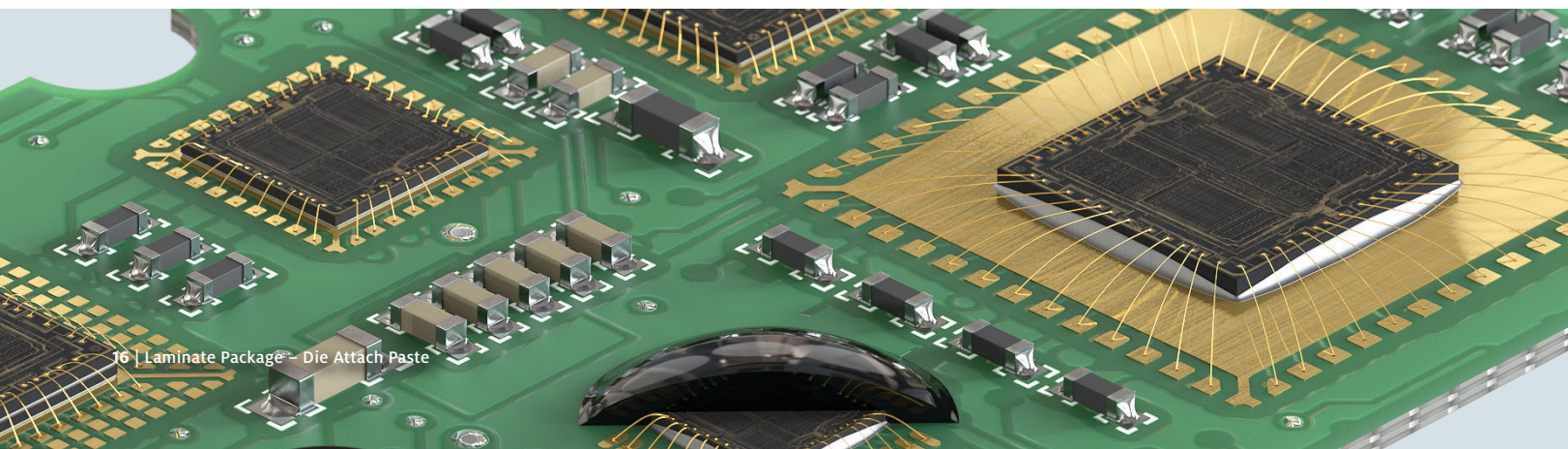
	Electrically Conductive	Electrically Non-conductive	BGA, PBGA, FBGA, & CBGA	LGA	SmartCard (COB)
LOCTITE® ABLESTIK 2000	✓		✓		
LOCTITE® ABLESTIK 2100A	✓		✓	✓	
LOCTITE® ABLESTIK 2300	✓		✓	✓	
LOCTITE® ABLESTIK 2700HT	✓		✓	✓	
LOCTITE® ABLESTIK ABP 2030SCR	✓				✓
LOCTITE® ABLESTIK ABP 2032S	✓				✓
LOCTITE® ABLESTIK ABP 2025D		✓	✓	✓	
LOCTITE® ABLESTIK ABP 2053S		✓	✓	✓	
LOCTITE® ABLESTIK ABP 2033SC		✓			✓
LOCTITE® ABLESTIK ABP 2035SCR		✓			✓
LOCTITE® ABLESTIK ABP 8068TB	✓			✓	
LOCTITE® ABLESTIK ABP 8910T		✓	✓		
LOCTITE® ABLESTIK ABP 8920TC		✓	✓		

ELECTRICALLY CONDUCTIVE DIE ATTACH PASTES (cDAP)

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Thermal Conductivity	Recommended Cure
			mm			W/mK	
LOCTITE® ABLESTIK 2000	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low bleed Low stress Ultra-low moisture absorption Fast oven cure with no voids 	≤ 12 x 12	Solder mask or Au	L2 260°C capable	1.2	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 2100A	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low bleed Low stress Oven cure 	≤ 12 x 12	Solder mask or Au	L2 260°C capable	1.2	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 2300	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low bleed Low stress Excellent dispensability Low voiding Oven cure 	≤ 8 x 8	Solder mask or Au	L2 260°C capable	0.6	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 2700HT	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Excellent bleed performance Long work life Strong hot/wet adhesion to Au Ideal for small needle dispensing Oven cure 	≤ 3 x 3	Solder mask, Ag or Au	L3 260°C capable	11.0	30 min. ramp and 30 min. hold at 175°C in nitrogen
LOCTITE® ABLESTIK ABP 2030SCR	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low stress Compatible with dam & fill encapsulants Excellent dispensing performance for high throughput application Snap cure 	≤ 10 x 10	Solder mask, Ag, Au or plastics	L2 260°C capable	2.0	120 sec. 120°C
LOCTITE® ABLESTIK ABP 2032S	Ag-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Good adhesion to a variety of substrates Good dispensing characteristics Low temperature oven cure 	≤ 10 x 10	Solder mask, Ag, Au, steel or plastics	L2 260°C capable	1.0	60 min. at 80°C
LOCTITE® ABLESTIK ABP 8068TB	Ag-filled, pressure-less sintering die attach adhesive	<ul style="list-style-type: none"> High thermal conductivity Good adhesion to a variety of substrates BSM (backside metallization) required Oven cure 	< 3x3	Ag, Au	L2 260°C capable	100	20 min. ramp and 30 min. hold at 130°C, + 15 min. ramp and hold 2 hr. at 200°C

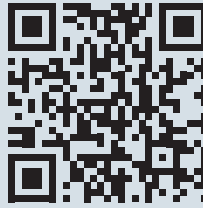
ELECTRICALLY NON-CONDUCTIVE DIE ATTACH PASTES (ncDAP)

Product Name	Description	Key Attributes	Die Size	Substrate Finish	Moisture Sensitivity Level, MSL	Modulus at 25°C	Thermal Conductivity	Recommended Cure
			mm			MPa	W/mK	
LOCTITE® ABLESTIK 2025D	Silica-filled die attach adhesive	<ul style="list-style-type: none"> Low bleed Very low stress Red color for vision recognition Good adhesion to a variety of substrates Oven cure 	≤ 8 x 8	Solder mask, Cu, Ag or Au	L3 260°C capable	407	1.2	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 2033SC	Silica-filled die attach adhesive	<ul style="list-style-type: none"> Long work life Low bleed Optimized rheology Snap cure 	≤ 8 x 8	Solder mask, Ni, Cu, Ag or Au	L3 260°C capable	2,100	1.2	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK ABP 2035SCR	Silica-filled die attach adhesive	<ul style="list-style-type: none"> Low stress Compatible with dam & fill encapsulants Excellent dispensing performance for high throughput application Snap cure or low temperature oven cure 	≤ 5 x 5	Solder mask or Au	L3 260°C capable	1,500	0.6	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK 2053S	Polymer Filler Epoxy	<ul style="list-style-type: none"> Non-conductive Low Stress Red Color 	≤ 5 x 5	Solder mask or Au	L3 260°C capable	87	11.0	30 min. ramp and 30 min. hold at 175°C in nitrogen
LOCTITE® ABLESTIK ABP 8910T	Alumina-filled die attach adhesive	<ul style="list-style-type: none"> Non-conductive High thermal High reliability Blue color 	≤ 5 x 5	Solder mask or Au	L3 260°C capable	8,870	1.3	30 min. ramp and 15 min. hold at 175°C
LOCTITE® ABLESTIK ABP 8920TC	Alumina-filled die attach adhesive	<ul style="list-style-type: none"> Non-conductive High thermal High reliability White color 	≤ 5 x 5	Solder mask or Au	L3 260°C capable	8,850	3.0	30 min. ramp and 60 min. hold at 175°C



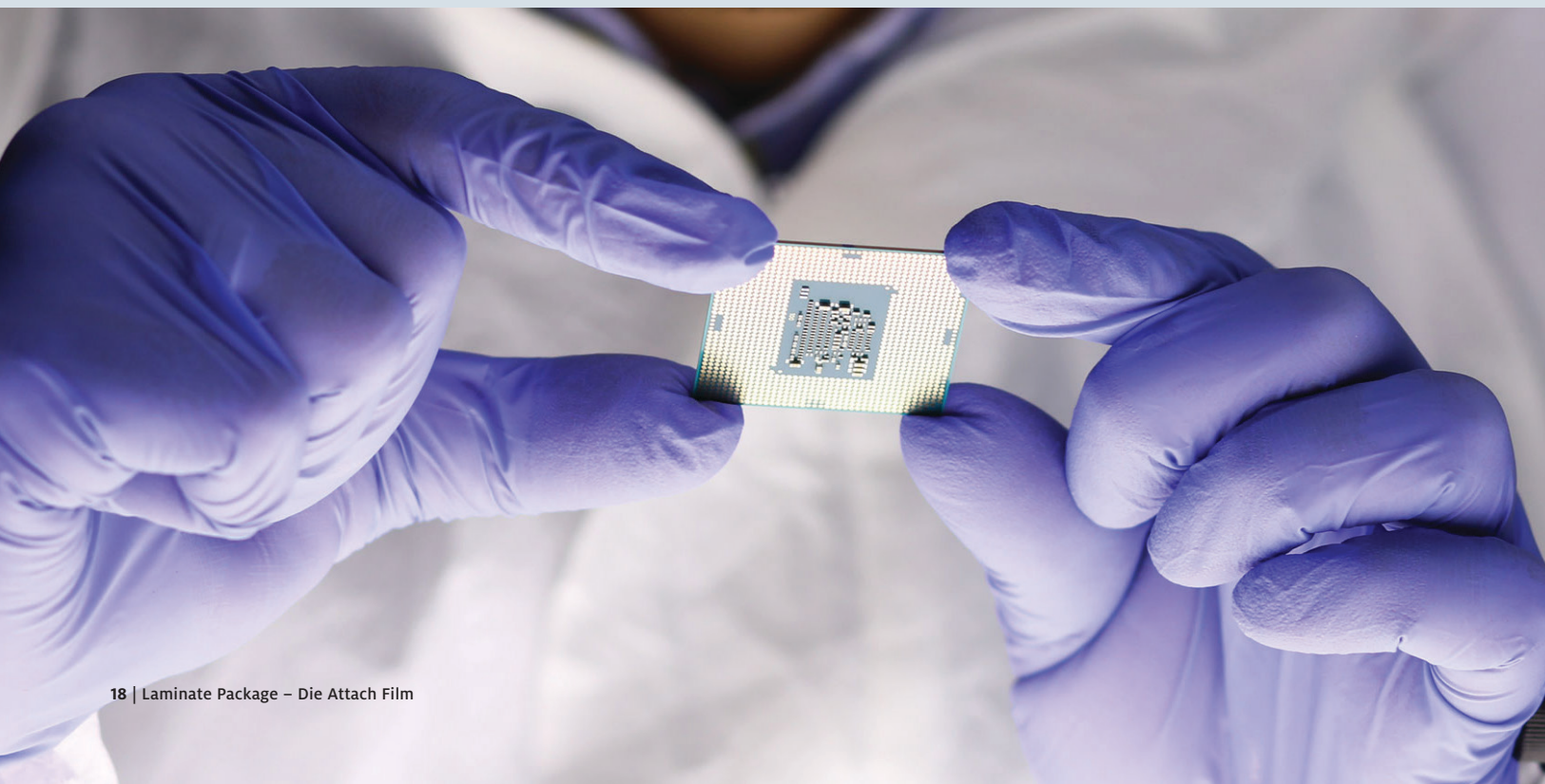
DIE ATTACH FILMS

Henkel's film technology ingenuity is well-known across market sectors. Semiconductor packaging is no different. We pioneered the market's first conductive die attach film for devices like MOSFETs and RF to provide a solution for miniaturization, challenging die-to-pad ratios, low stress, and high adhesion. Electrically non-conductive die attach films deliver wafer handling stability and support, and offer thin bond lines for multi-die stacks.



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DIE ATTACH FILMS FOR WIREBOND LAMINATE PACKAGING							
	Electrically	Electrically Non-conductive	Logic IC, MOSFET & RF	Memory, Logic, MEMs & Sensors	Skip Cure	Curable DDF	Small Die DDF
LOCTITE® ABLESTIK CDF 600P SERIES	✓		✓			✓	
LOCTITE® ABLESTIK ATB 100HB SERIES		✓		✓	✓		
LOCTITE® ABLESTIK ATB 100GR SERIES		✓		✓		✓	✓
LOCTITE® ABLESTIK ATB 100U SERIES		✓		✓		✓	
LOCTITE® ABLESTIK ATB 100US SERIES		✓		✓	✓		
LOCTITE® ABLESTIK ATB F100E SERIES		✓		✓		✓	✓



ELECTRICALLY CONDUCTIVE DIE ATTACH FILMS (cDAF)

Product Name	Description	Key Attributes	Film Thickness	Moisture Sensitivity Level, MSL	Thermal Conductivity	In-Package Thermal Resistance
			µm		W/mk	K/W
LOCTITE® ABLESTIK CDF 600P SERIES	Ag-filled die attach adhesive	<ul style="list-style-type: none"> Low stress and excellent wetting for large die Compatible with various metal surfaces, including solder Recommended for thin wafer handling applications Oven cure 	25	L2 260°C capable	1	2.1

ELECTRICALLY NON-CONDUCTIVE DIE ATTACH FILMS (ncDAF)

Product Name	Description	Key Attributes	Dicing Tape	Film Thickness	Wafer Thickness	Moisture Sensitivity Level, MSL	Modulus at 25°C
				µm	µm		MPa
LOCTITE® ABLESTIK ATB 100HB SERIES	Silica-filled die attach adhesive	<ul style="list-style-type: none"> Long thermal budget (1 – 1.5 hr. at 175°C) Consistent dicing and die pickup for large die applications SkipCure during molding process 	UV/ Non-UV	5, 10, 15, 20, 25 or 30	≥ 50	L2 260°C capable	2,299
LOCTITE® ABLESTIK ATB 100GR SERIES	Silica-filled die attach adhesive	<ul style="list-style-type: none"> Excellent workability Excellent adhesion on both leadframe and laminate substrate High reliability Consistent dicing and die pickup from small to medium die 	Non-UV	25	≥ 75	L2 260°C capable	3,205
LOCTITE® ABLESTIK ATB 100U SERIES	Silica-filled, rubberized epoxy die attach adhesive	<ul style="list-style-type: none"> Compatible with Cu wire or Au wire packages Compatible with Stealth Dicing Before Grind (SDBG) process Fast oven cure 	Non-UV	5, 10, 15, 20, 25 or 30	≥ 75	L2 260°C capable	875
LOCTITE® ABLESTIK ATB 100US SERIES	Silica-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Long thermal budget (4 hr. at 175°C) Consistent dicing and die pickup for large die applications SkipCure during molding process 	UV/ Non-UV	5, 10, 15, 20, 25 or 30	≥ 50	L2 260°C capable	1,277
LOCTITE® ABLESTIK ATB F100E SERIES	Silica-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> Suitable for small to large die Excellent workability for below 3 mm x 3 mm die Long work life (4 months before and after lamination) Compatible with Stealth Dicing Before Grind (SDBG) process Film over wire (FoW) and film over die (FoD) applications Oven cure 	UV/ Non-UV	25 FoW: 35 – 80 FoD: 90 – 150	≥ 75	L2 260°C capable	5,256

PRINTABLE BOC DIE ATTACH MATERIALS

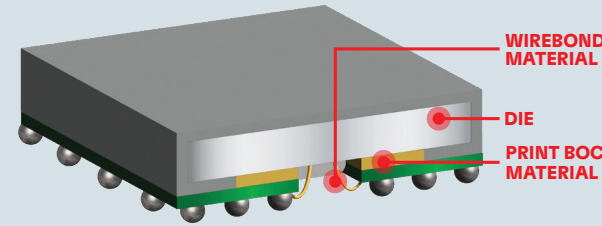
Board-on-Chip (BoC) is a common chip-scale packing technique for memory devices, particularly DRAM. Because of the requirement for controlled tolerances and fine features, die attach materials must deliver key attributes like minimized die tilt, uniform bond line thickness, and little to no fillet formation. Henkel has perfected B-stage printable adhesives that align with mass production dynamics and enable fine feature designs.



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PRINTABLE BOC DIE ATTACH ADHESIVES FOR WIREBOND LAMINATE PACKAGING

	Memory	B-Stage Die Attach Material
LOCTITE® ABLESTIK 6200	✓	✓
LOCTITE® ABLESTIK 6202C	✓	✓
LOCTITE® ABLESTIK 6202C-X	✓	✓

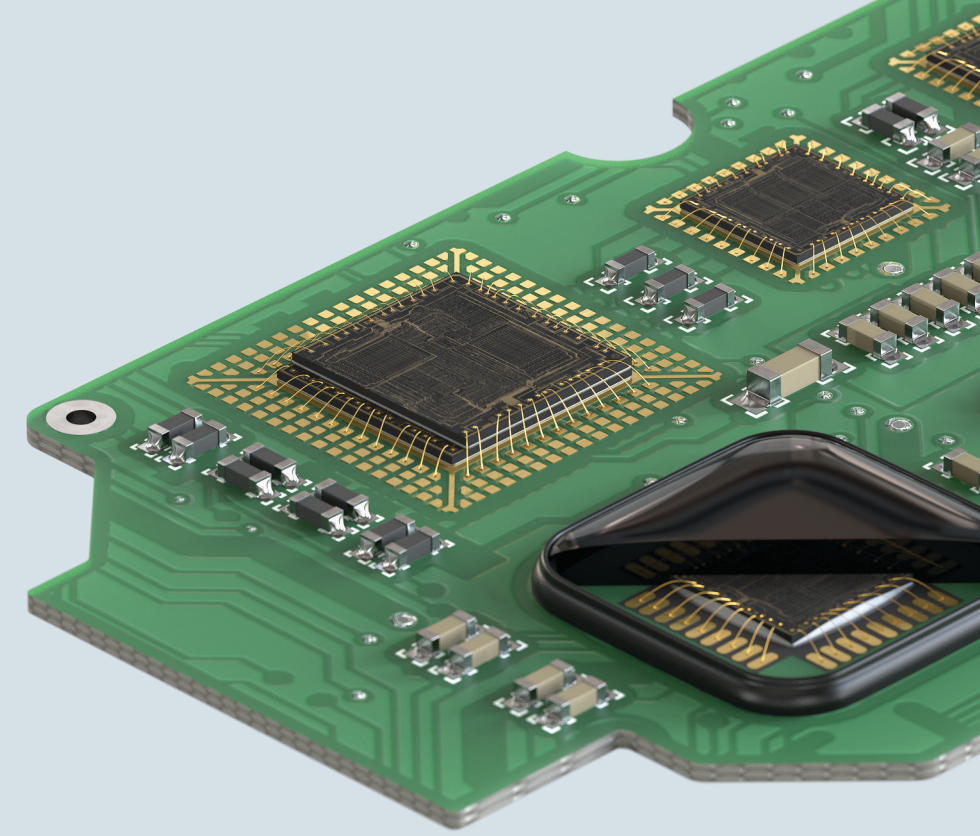


ENCAPSULANTS

Henkel dam/fill and glob top encapsulant systems help protect chips from mechanical damage and corrosion. Optimized for fast dispensing with flexible cure profiles, JEDEC-compliant, high-purity epoxy encapsulants help secure reliability over the device lifetime.



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PRINTABLE BOC DIE ATTACH MATERIALS

Product Name	Description	Key Attributes	Viscosity, Brookfield CP51 at 25°C and 5 rpm	Glass Transition Temperature, T _g , by TMA	CTE (ppm/°C)		Recommended B-Stage Condition	Cure Schedule
					Below T _g	Above T _g		
LOCTITE® ABLESTIK 6200	Silica-filled, rubberized epoxy die attach adhesive	<ul style="list-style-type: none"> • Stencil printing • Low moisture uptake • Low bleed • Ideal for chip scale packages (CSP) where tolerance and bleed need to be minimized • Oven cure • Designed for flex or laminate based substrates 	21,000	-10	94	237	60 min. at 120°C	30 min. ramp + 60 min. soak at 175°C
LOCTITE® ABLESTIK 6202C	Silica-filled, epoxy die attach adhesive	<ul style="list-style-type: none"> • Stencil printing • Low warpage • Ideal for CSPs where tolerance and bleed need to be minimized • Oven cure • Recommended for large die sizes • Designed for laminate based substrates 	28,000	40	70	350	1 hr. at 125°C	30 min. ramp + 60 min. soak at 175°C
LOCTITE® ABLESTIK 6202C-X	Silica-filled, rubberized epoxy die attach adhesive	<ul style="list-style-type: none"> • Small particle size • Stencil printing • Low warpage • Ideal for CSPs where tolerance and bleed need to be minimized • Oven cure • Recommended for large die sizes • Designed for laminate based substrates 	30,000	40	70	232	30 min. ramp + 90 min. soak at 125°C + 30 min. ramp down to 25°C in vented magazine in oven with good air flow	30 min. ramp + 90 min. soak at 90°C + 30 min. ramp & 60 min. soak at 175°C in vented magazine in oven with good air flow

ENCAPSULANTS FOR WIREBOND LAMINATE PACKAGING

	Dam	Fill	Glob Top
LOCTITE® ECCOBOND FP4451TD	✓		
LOCTITE® ECCOBOND FP0087		✓	
LOCTITE® ECCOBOND FP4450HF		✓	
LOCTITE® ECCOBOND FP4470		✓	
LOCTITE® ECCOBOND FP4651		✓	
LOCTITE® ECCOBOND FP4802		✓	
LOCTITE® ECCOBOND FP4323			✓
LOCTITE® ECCOBOND FP4460			✓
LOCTITE® ECCOBOND FP4660			✓
LOCTITE® ECCOBOND EO7021			✓

ENCAPSULANTS - GLOB TOP

Product Name	Description	Key Attributes	Application	Viscosity at 25°C	Glass Transition Temperature	CTE, Below	Recommended Cure
				cP	T _g (°C)	(ppm/°C)	
LOCTITE® ECCOBOND FP4323	Epoxy glob top encapsulant	<ul style="list-style-type: none"> Low CTE for improved thermal cycling Thixotropic Excellent moisture and chemical resistance Oven cure 	COB and plastic PGA	220,000 at 2 RPM	174	28	4 hr. at 150°C
LOCTITE® ECCOBOND FP4460	Epoxy glob top encapsulant	<ul style="list-style-type: none"> Low stress and high flow Improved work life Good pressure pot performance with low shrinkage Excellent moisture and chemical resistance Oven cure 	Automotive, BGA, memory, COB, SiP and SmartCard	300,000 at 10 RPM	173	20	3 hr. at 150°C
LOCTITE® ECCOBOND FP4660	Epoxy/anhydride glob top encapsulant	<ul style="list-style-type: none"> Low stress Excellent chemical resistance and thermal stability Jettable Oven cure 	CSP and low stress applications	120,000 at 5 RPM	135	13	30 min. at 125°C + 90 min. at 165°C
LOCTITE® EO7021	Epoxy glob top encapsulant	<ul style="list-style-type: none"> One component Fast oven cure at moderate temperatures 	CSP, BGA and SmartCard	17,000 at 5 RPM	125	67	1 hr. at 120°C

ENCAPSULANTS - DAM

Product Name	Description	Key Attributes	Application	Viscosity at 25°C	Glass Transition Temperature	CTE, Below	Recommended Cure
				cP	T _g (°C)	(ppm/°C)	

LOCTITE® ECCOBOND FP4451TD	Epoxy dam encapsulant	<ul style="list-style-type: none"> Ionically clean High thixotropy with high height to width aspect ratio (0.7) Excellent chemical resistance and thermal stability Designed for use with fill encapsulant LOCTITE® ECCOBOND FP4450 Oven cure 	BGA and memory	300,000 at 20 RPM	150	21	30 min. at 125°C + 90 min. at 165°C
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ENCAPSULANTS - FILL

Product Name	Description	Key Attributes	Application	Viscosity at 25°C	Glass Transition Temperature	CTE, Below	Recommended Cure
				cP	T _g (°C)	(ppm/°C)	

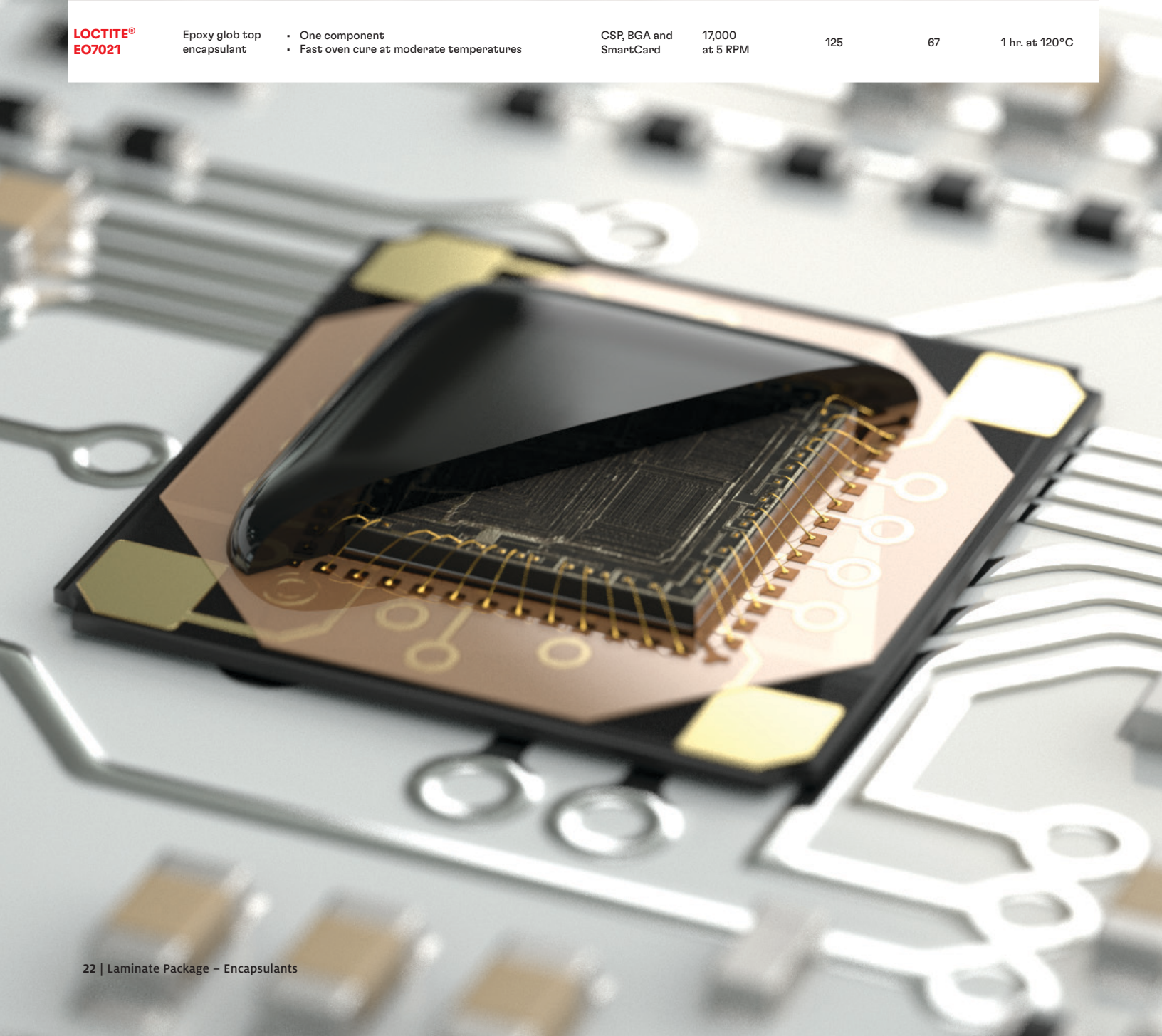
LOCTITE® ECCOBOND FP0087	Epoxy fill encapsulant	<ul style="list-style-type: none"> Low stress and high flow with reduced warpage and cracking Low CTE Excellent thermal shock and moisture resistance Halogen-free Oven cure 	Stress-sensitive devices and severe automotive environments	20,000 at 20 RPM	175	18	1 hr. at 125°C + 1 hr. at 180°C
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LOCTITE® ECCOBOND FP4450HF	Epoxy fill encapsulant	<ul style="list-style-type: none"> Excellent chemical, corrosion and moisture resistance High thermal stability Very high flow and fine filler (max. particle size 25 µm) Oven cure 	Automotive, BGA, memory, COB, SiP and SmartCard	32,000 at 20 RPM	164	21	30 min. at 125°C + 90 min. at 165°C
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LOCTITE® ECCOBOND FP4470	Epoxy fill encapsulant	<ul style="list-style-type: none"> MSL3 260°C capable High reliability Excellent flow, good for fine pitch wires and deep cavities 260°C reflow capability for Pb-free applications Oven cure 	BGA, CSP and full array on low temperature co-fired ceramic (LTCC)	42,000 at 10 RPM	148	18	30 min. at 125°C + 90 min. at 165°C
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LOCTITE® ECCOBOND FP4651	Epoxy fill encapsulant	<ul style="list-style-type: none"> Low stress Low CTE Easy to dispense Excellent chemical resistance and thermal stability Oven cure 	Automotive, BGA, memory, COB, SiP, SmartCard and chip array ceramic packages	130,000 at 20 RPM	150	11	1 hr. at 125°C + 90 min. at 165°C
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LOCTITE® ECCOBOND FP4802	Epoxy fill encapsulant	<ul style="list-style-type: none"> MSL2 260°C capable Low warpage Excellent flow, good for fine pitch wires and deep cavities Oven cure 	BGA, CSP and full array on low temperature co-fired ceramic (LTCC)	80,000 at 10 RPM	50	20	60 min. at 120°C + 120 min. at 165°C
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GLOBAL RESOURCES, LOCAL EXPERTISE

At Henkel, we take innovation and customer collaboration seriously. That's why we've invested in resources around the world to meet you where you are. With teams of technology experts and digital tools to connect global R&D and application centers, we help you bring new products to market faster, more sustainably, and more competitively. Discover why Henkel's approach to thinking globally and acting locally sets us – and you – apart.



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APPENDIX

INDEX OF TERMS

TERM	DESCRIPTION
BGA	Ball Grid Array
BMI	Bismaleimide Resin
CBGA	Ceramic Ball Grid Array
COB	Chip On Board
CSP	Chip Scale Package
CTE	Coefficient of Thermal Expansion
DIP	Dual In-line Package
EMI	Electromagnetic Interference
FBGA	Fine Ball Grid Array
IC	Integrated Circuit
LGA	Land Grid Array
MEMS	Micro-Electro Mechanical Systems
MOSFET	Metal-Oxide Semiconductor Field-Effect Transistor
MSL	Moisture Sensitivity Level
PBGA	Plastic Ball Grid Array
PGA	Pin Grid Array
PPF	Pre-Plated Finishes consisting of layers of Ni, Pd and a Au finish
PTFE	PolyTetraFluoroEthylene
QFN	Quad Flat No-leads Package
QFP	Quad Flat Package
RF	Radio Frequency
SiP	System-in-Package
SOIC	Small Outline Integrated Circuit
TSOP	Thin Small Outline Package
TSSOP	Thin-Shrink Small Outline Package

CURE TYPES

CURE TYPE	DESCRIPTION
B-stage	Partial cure until the material is in a solid state and relatively tack-free at room temperature, but will soften and flow when heated
Oven cure	Standard thermal cure in a traditional box oven, usually between 15 min. and 1 hr.
Snap cure	Fast thermal cure via in-line oven, with or without contact heat, usually under 2 min.
SkipCure	Very fast thermal cure that can be partially cured during the wirebonding process and fully cured during the molding process
UV cure	Cure by exposure to ultraviolet light

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