



**NAMICS**  
NAMICS CORPORATION  
PRODUCT GUIDE

In the field of electro-chemical material, NAMICS pursues best product solutions with its advanced technologies and contributes to societies. NAMICS is becoming more and more environmentally-friendly, harmonizing with nature.

Over the past thirty years, the NAMICS CORPORATION has been concentrating on the research, development, manufacture and sale of insulating and conductive materials for electronic components, used in almost every field of the electronic and micro-electronic market needless to mention that we have closely been following the ever-advancing technological trends all the while.

NAMICS' motto in business is to "Satisfy requirements by the customers and market, by offering Quality and Service in the right timing with own unique technologies".

As mentioned above, NAMICS has a great variety of products both for insulating and electro-conductive usages. Our policy is to supply to each customer the tailor-made products.



## OVERCOAT

It is an insulating material for the passive components.



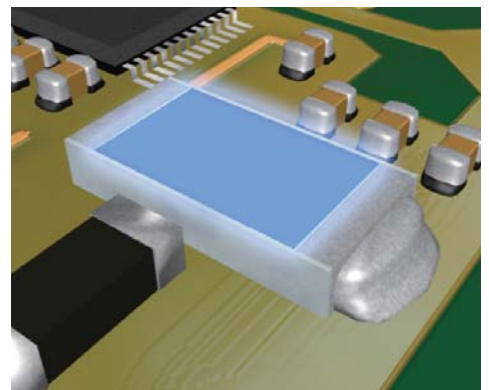
### Chip resistor protective coating



An insulating material that acts as a protective coating (G2) for chip resistors. This material has excellent printability and moisture resistance.

Product Number	Characteristics	Hue	Curing condition	Pencil hardness	Tg [°C]	C.TE ≤Tg [ppm]	C.TE ≥Tg [ppm]
1012 series	Thin-film and thick-film resistors	Black, green, blue, etc.	200°C, 30min.	4H	93	56	101
1020 series	Thick-film resistors	Black, white, blue, etc.	200°C, 30min.	4H	95	40	150
1033 series	Thick-film resistors	Black, green, blue, etc.	200°C, 30min.	4H	100	40	130
1057 series	Thin-film and thick-film resistors	Black	220°C, 20min.	4H	110	50	110

Chip resistor protective coating applications





# CHIPCOAT

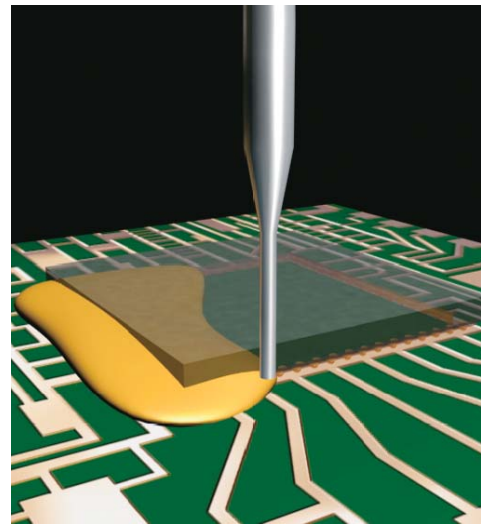
It is an insulating material of high purity to seal semiconductor IC.

## Flip Chip Underfill (UF)

Flip Chip Underfill is an insulating material used in mounting technologies involving direct electrical connections. Underfill flows by capillary action into the gap between an IC chip circuit with conductive bumps and a mounting board by capillary action. Namics has developed an extensive lineup of products in response to the demands towards of flip chip packaging. Some typical applications include CPU, LSI, and Graphic Devices. Custom formulated materials are also available for user specific applications.

Product Number	Characteristics	Viscosity [Pa·s]	Filler size (average/maximum) [μm]	Tg [°C]	Modulus of elasticity [GPa]	C.T.E ≤Tg [ppm]	C.T.E ≥Tg [ppm]
<b>U8437-2</b>	For Pb-free bumps	40	2.0/10	137	8.0	32	100
<b>U8437-48</b>	For Pb-free bumps and tight spaces	65	0.6/3.0	145	7.0	33	100
<b>U8443</b>	Has low viscosity; for tight spaces	8	0.3/3.0	130	6.5	42	125
<b>U8410-73A</b>	Has low CTE; for tight spaces	45	0.6/3.0	120	11.0	28	90
<b>U8410-73C</b>	Has low K; for Pb-free bumps and tight spaces	50	0.6/3.0	88	11.5	31	95
<b>U8410-76</b>	Has low K; for Pb-free bumps	30	2.0/10	97	11.0	31	97
<b>U8439-1</b>	Has low K; for large ICs	60	2.0/10	70	8.0	36	120
<b>U8439-105</b>	Has low K; for large ICs and tight spaces	55	0.6/3.0	70	8.5	34	120

Flip Chip Underfill applications

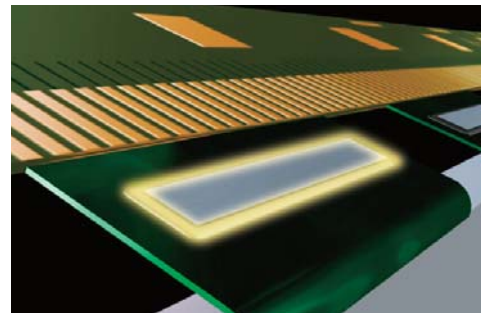


## Chip-on-Film Underfill (COF)

Chip-on-Film Underfill is used for flexible substrates as insulating material used in mounting technologies involving direct electrical connections between IC chips and mounting boards. Chip-on-Film Underfill has the ability to fill fine gaps and provides outstanding moisture resistance.

Product Number	Characteristics	Viscosity [Pa·s]	Tg [°C]	Modulus of elasticity [GPa]	C.T.E ≤Tg [ppm]	C.T.E ≥Tg [ppm]
<b>Chipcoat 8462-21</b>	Standard product	0.5	115	3.2	70	200
<b>COF 8462-220A1</b>	For tight spaces	0.6	120	3.2	70	200

Chip-on-Film Underfill applications

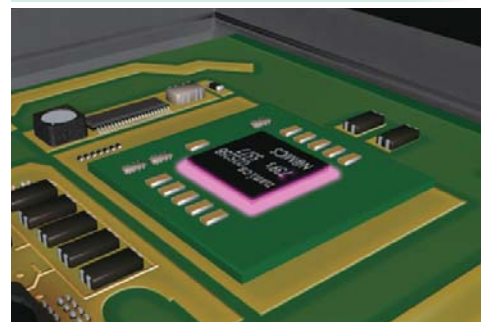


## CSP/BGA Board Level Underfill (SUF)

CSP/BGA Board Level Underfill is used for filling and sealing spaces by capillary action when doing secondary mounting of Packaged Chips to a Motherboard. CSP/BGA Board Level Underfill material improves thermal cycle performance and enhances impact resistance (drop-test qualification).

Product Number	Characteristics	Viscosity [Pa·s]	Tg [°C]	Modulus of elasticity [GPa]	C.T.E ≤Tg [ppm]	C.T.E ≥Tg [ppm]
<b>SUF 1589-1</b>	High reliability, high throughput	10.0	120	13.0	23	80
<b>SUF 1570-2</b>	High reliability, high throughput	40.0	135	8.0	32	100

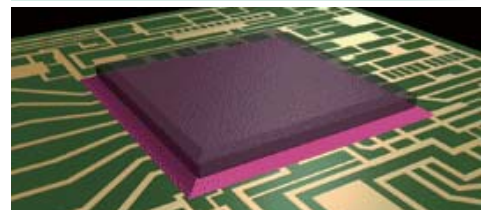
CSP/BGA Board Level Underfill applications



## Pre-applied non-conductive underfill paste (NCP)

This is a pre-applied non-conductive underfill paste. It is applied to substrates or interposers and uses a thermal compression bonding process (TCB) to encapsulate IC chips on semiconductor packages. It has excellent productivity and can form a minimum fillet allowing a small Keep Out Zone (KOZ).

Pre-applied non-conductive underfill paste (NCP)

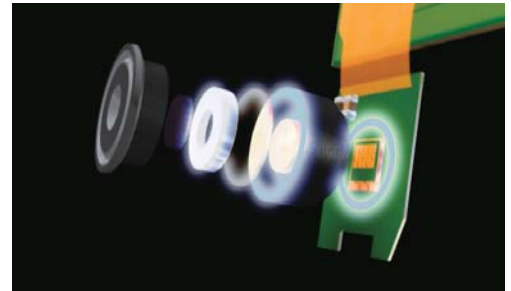


## Camera module adhesive

Camera module adhesive are insulating adhesives used in processes requiring a minimum of shrinkage due to curing by UV light. These adhesives are used for adhesions requiring high positional precision, and for bonding members that have low heat resistance.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Thixotropic index	Curing condition	Tg [°C]
UV COAT 6919	UV + thermal cure, Curable at low-temperature, High reliability	Holder adhesive	60	5	2000mJ/cm <sup>2</sup> + 80°C, 60min.	130
UV COAT 6921	UV + thermal cure, High reliability	Glass adhesive	17	2.5	3000mJ/cm <sup>2</sup> + 100°C, 60min.	80

### Camera module adhesive

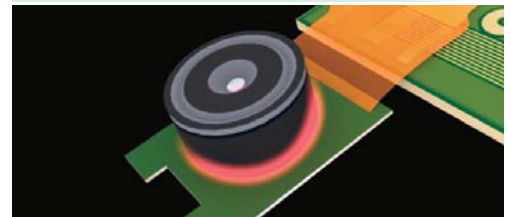


## B-stage Adhesives

These insulating adhesives can be B-staged by UV light or by heating at 100°C for 20 minutes-curing methods which provide high adhesion-and can be applied by dispensing or printing.

Product Number	Characteristics	Viscosity [Pa·s]	Pre-curing condition	Curing condition	Tg [°C]
BST001A	Heat pre-cured	20	100°C, 20min.	150°C, 60min.	110

### B-stage Adhesives applications

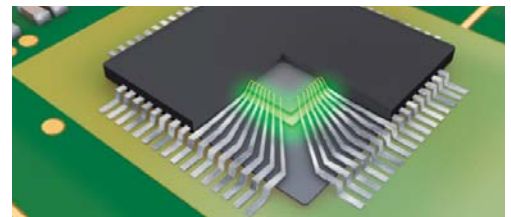


## Low-temperature Curable Adhesives

This insulating adhesive can be cured at less than 100°C, and is used for adhesions requiring high positional precision, and for bonding members that have low heat resistance.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Curing condition	Tg [°C]
AH8455-345B	Curable at low-temperature	Multiple uses	40	80°C, 60min.	106

### Low-temperature Curable Adhesives applications

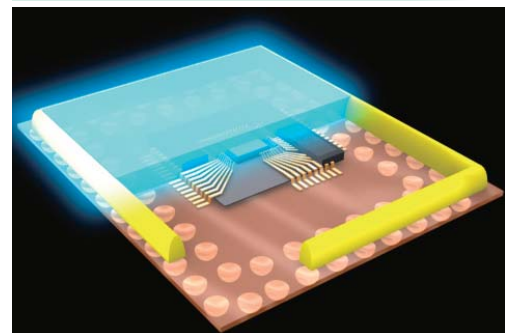


## Dam-and-Fill Encapsulant

Dam-and-Fill materials encapsulate your wire bonded device as an electrically insulating material. Dispensing a high-viscosity dam followed by a low-viscosity fill, will create a completed encapsulated package for your CSP and BGA. Dam-and-Fill materials offer high package reliability and reduced warpage.

Product Number	Characteristics	Viscosity [Pa·s]	Tg [°C]	Modulus of elasticity [GPa]	C.T.E ≤ Tg [ppm]	C.T.E ≥ Tg [ppm]
Chipcoat G8345D	Sharp dam shape	55	145	17.0	15	60
Chipcoat G8345D-37	Sharp dam shape, Fine filler	60	140	10.0	25	70
Chipcoat G8345-6	Low warpage, High fluidity	60	145	18.0	15	50
Chipcoat G8345-29	Low warpage, Fine filler	35	140	14.0	17	60

### Dam-and-Fill Encapsulant applications

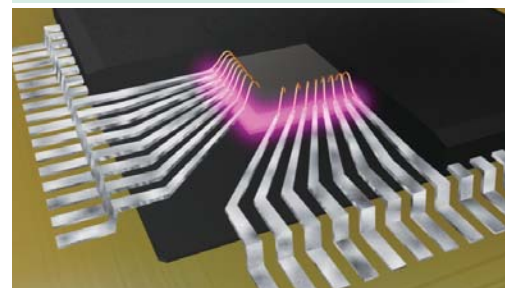


## Die Attach Adhesives

Die attach adhesive is an insulator that is dispensed in a pattern, and is used to bond the opposite side of the circuit on an IC chip, which has conductive bumps, to a mounting substrate.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Curing condition	Tg [°C]
DA8483	Printable, B-Stage type	Die attach for BGA package	55.0	B-stage: 130°C, 40min Final cure: 175°C, 2h	67
DA8481-8	Dispensing	Die attach for BGA package	7.5	ramp up to 150°C for 30 min + hold for 30min	57
DA8465	Transparent	Die attach for LED	5.0	160°C, 60min	75

### Die Attach Adhesive applications



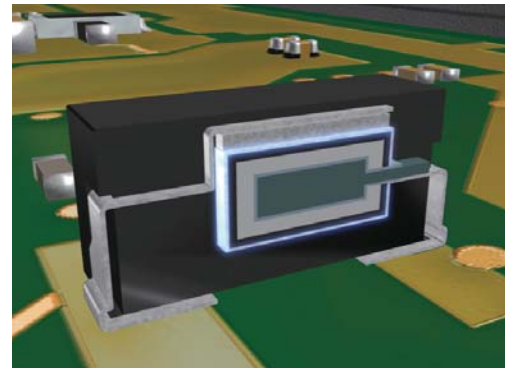


## Pastes for Terminal Electrodes of Passive Components

These electro-conductive pastes are sintered to suit specific processes, and are used for terminal electrodes of passive components for surface mounting, such as resistors, MLCCs and inductors. We are working to achieve lead-free products.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Application method	Curing condition	Volume resistivity [Ω·cm]	Adhesive strength [N/mm <sup>2</sup> ]
H9139	Standard	The plating groundwork of dexterous chip resistor	17	Dipping method	200°C, 30min.	2.5×10 <sup>-4</sup>	17
H9135	excellent adhesive strength	The plating groundwork of dexterous chip resistor	35	Dipping method	200°C, 30min.	4.0×10 <sup>-4</sup>	25
H9143	Low-cost	The plating groundwork of dexterous chip resistor	17	Dipping method	200°C, 30min.	4.0×10 <sup>-4</sup>	12
H9117S	for print	The plating groundwork of dexterous chip resistor	60	Screen printing	200°C, 30min.	0.9×10 <sup>-4</sup>	16
H9198	Soft termination	MLCC roller end face for two layers	45	Dipping method	170°C, 30min.	2.0×10 <sup>-4</sup>	18
H9480	Low resistance	Tantalum capacitor, For lead frame bonding	54	Transcript	150°C, 30min.	0.4×10 <sup>-4</sup>	17
H9480S	Low resistance	Tantalum capacitor, For taking out electrode	22	Dipping method	150°C, 30min.	0.4×10 <sup>-4</sup>	17

### Pastes for Terminal Electrodes of Passive Components applications

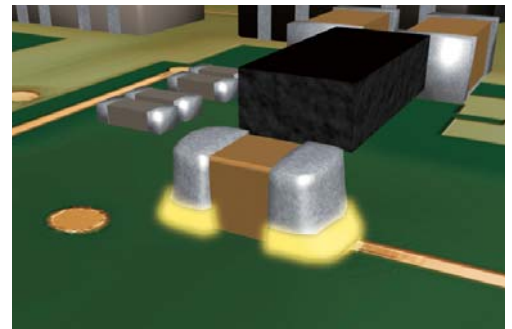


## Surface Mounting Adhesives

These are heat-cured conductive adhesives that are resistant to high-temperature solder reflow, and can be processed at low temperatures to accommodate lead-free mounting.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Application method	Curing condition	Volume resistivity [Ω·cm]	Adhesive strength [N/mm <sup>2</sup> ]
H9626	For precious metal electrodes	For bonding parts	230 (5rpm)	Screen printing	150°C, 30min.	1.5×10 <sup>-4</sup>	40
H9626D	For precious metal electrodes	For bonding parts	47 (10rpm)	Dispensing	150°C, 30min.	2.0×10 <sup>-4</sup>	40
H9672	High purity	For bonding parts	350 (5rpm)	Screen printing	150°C, 30min.	4.5×10 <sup>-4</sup>	40

### Surface Mounting Adhesives applications

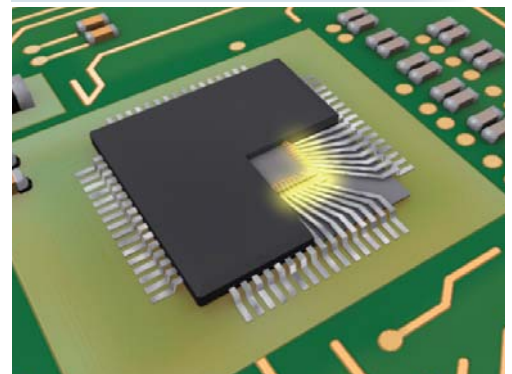


## Die Attach Adhesives

These conductive adhesives are heat-cured to accommodate various applications, including die bonding, LED bonding, lead bonding, and high thermal conductivity.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Application method	Curing condition	Volume resistivity [Ω·cm]	Adhesive strength [N/mm <sup>2</sup> ]
H9607	Applicable for all LED colors Good adhesion at high temperature	For LED	25 (E type2.5rpm)	Transferring	150°C, 120min.	1.5×10 <sup>-4</sup>	16
H9863	For Blue and White light Good heat-resistance and light-resistance	For LED	25 (E type2.5rpm)	Transferring	160°C, 90min.	1.3×10 <sup>-4</sup>	11
H9683	High thermal conductivity Excellent adhesive strength Void free	QFP, QFN	25 (E type2.5rpm)	Dispensing	150°C, 60min.	0.5×10 <sup>-4</sup>	18
H9800	Non-bleeding Good adhesion at high temperature	QFP, QFN	16 (E type5rpm)	Dispensing	150°C, 30min.	7.0×10 <sup>-3</sup>	45
H9870	Non-bleeding Low modulus	QFP, QFN	16 (E type5rpm)	Dispensing	150°C, 30min.	3.0×10 <sup>-3</sup>	15

### Die Attach Adhesives applications

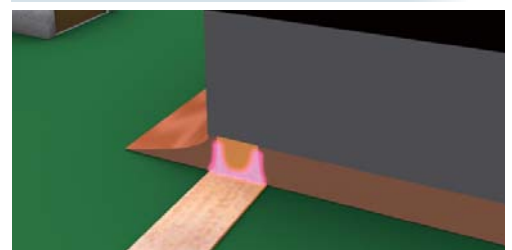


## Flip Chip Adhesive (SBB)

This thermoplastic conductive adhesive is used to supplement electrical connections between metallic bumps and mounting substrate electrodes in mounting technology involving direct electrical connections between the circuit on an IC chip, which has conductive bumps, and a mounting substrate.

Product Number	Characteristics	Applications	Viscosity [Pa·s]	Application method	Curing condition	Volume resistivity [Ω·cm]	Adhesive strength [N/mm <sup>2</sup> ]
H9807	Low stress and high reliability	SBB	20	Transferring	120°C, 120min.	0.7×10 <sup>-4</sup>	0.4

### Flip Chip Adhesive applications





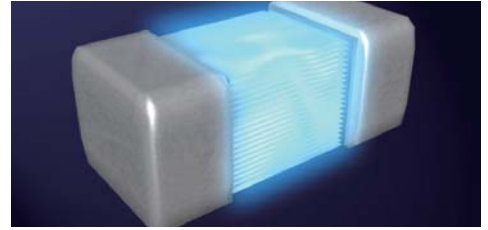


## Pastes for Internal Electrodes of Passive Components

These electro-conductive pastes are sintered to suit specific processes, and are used for internal electrodes of passive components for surface mounting, such as MLCCs and inductors.

Product Number	Characteristics	Applications	Filler	Application method	Sintering condition [°C]
7000 series	Low resistance, High printing precision, various shrinkage rates	Chip inductors, LTCC	Ag	Screen printing	800~900

## Pastes for Internal Electrodes of Passive Components applications

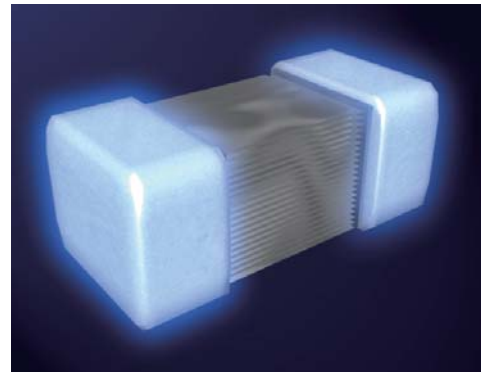


## Pastes for Terminal Electrodes of Passive Components

These electro-conductive pastes are sintered to suit specific processes, and are used for terminal electrodes of passive components for surface mounting, such as resistors, MLCCs and inductors. We are working to achieve lead-free products.

Product Number	Characteristics	Applications	Filler	Application method	Sintering condition [°C]
SR400 series	Excellent adhesion strength, good solderability	NTC thermistors	Ag	Screen printing	700~800
DP4000 series	High reliability lead free, good plating fluid resistance	Chip inductors, Chip varistors, Chip thermistors	Ag	Dipping method	600~750
SR4000 series	Good breakage properties, lead free	Chip resistors	Ag	Screen printing	800~900
SR5000 series	Good ohmic contact, good solderability	PTC thermistors	Ag	Screen printing	550~650
6000 series	High reliability, good plating fluid resistance	MLCC	Cu	Dipping method	750~900
7000 series	Excellent printing precision, various shrinkage rates	LTCC	Ag	Screen printing	800~900

## Pastes for Terminal Electrodes of Passive Components applications

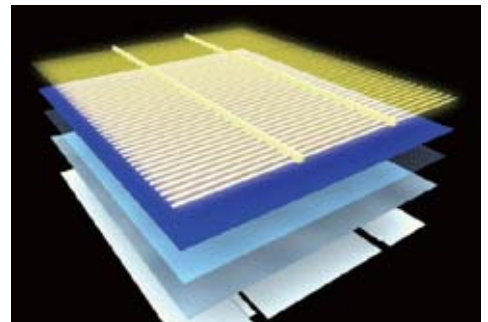


## Pastes for Electrodes on the Back/Front of Solar Cells

These electro-conductive pastes are sintered to suit specific processes, and are used for bus and finger electrodes on the surface of solar cells, and tab electrodes on the underside.

Product Number	Characteristics	Applications	Filler	Application method	Sintering condition [°C]
SR3992 series	High conversion efficiency Fine line	For front electrode	Ag	Screen printing	750~800
SR3922 series	Excellent solderability Excellent pull strength	Busbar electrode for double printing process	Ag	Screen printing	750~800
SR3910R series	Excellent pull strength	For back electrode	Ag	Screen printing	750~800
H9455 series	Low resistance Pb-free	Hetero junction cell electrode	Ag	Screen printing	180~220

## Pastes for Electrodes on the Back/ Front of Solar Cells applications



# DEVELOPMENT

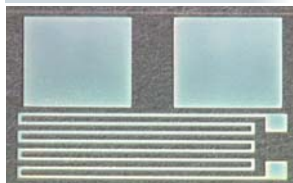


## Low-temperature Sintered Conductive Pastes Using MO Technology

In recent years, forming flexible electronic circuits on plastic substrates, including PET, has been studied due to demands for weight reduction and miniaturization of electronic devices.

We are currently developing silver pastes with a volume resistivity of 1.0E-06 (Ω·cm) cured at a 150°C, and we will be rolling them out in applications in the future.

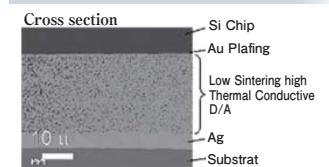
Low-temperature Sintered Conductive Pastes Using MO Technology applications



## Low-temperature sintered high thermally conductive die attach pastes using MO technology

High thermally conductive materials are requested for higher density and integrated devices. Pb free technology materials have not yet been established, so we have developed MO paste which can be cured at 150°C and is compatible with Cu lead frames. Its thermal conductivity is 170W/mK and it contains epoxy resin to improve the adhesion of the sintered Ag.

Low-temperature sintered high thermally conductive die attach pastes using MO technology



# ADFLEMA

ADFLEMA films are highly non-conductive thermal cure thin adhesive films. These films are applicable for high frequency, thinner and smaller components used in semiconductors and passive components.

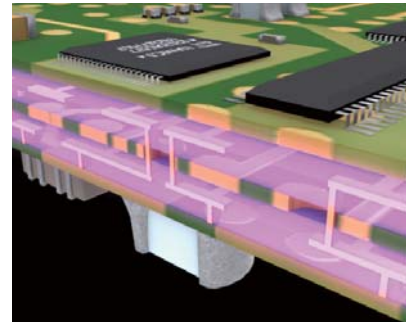


## Insulating adhesive film for high frequency, high speed transmission flexible (FPC) and rigid electronic circuit substrates

This is an unreacted thermosetting resin film which provides high adhesion and high heat resistance. This insulating thin film is available in thicknesses of 5-30 $\mu$ m. It has a low dielectric constant and a low dissipation factor in GHz frequency range. It has excellent fluidity which allows it to adapt to the concavity or convexity of surfaces under low temperature and low pressure. It has multiple uses, such as MEMS and processing materials, cover-lay for FPC, interlayer dielectric film, and buildup material. Laser and plating processes are also available.

Product Number	Characteristics	Film thickness	Cure Condition	$\epsilon_r$	$\tan\delta$	Cu peel Strength [N/cm]	Tg [°C]	Elastic Modulus [GPa]	C.T.E. $\alpha_1$ [ppm/°C]	Thermal Resistance [T85% decrease]	Insulating Disruptive Voltage
NC0201	High reliability (Low water absorption, high purity). High adhesion strength	5-30, 50 $\mu$ m	200°C, 60min 1MPa	2.5	0.0025	11	185	0.8	130	370°C	Equivalent with HB
NC0204	High Tg, Low elastic modulus, High adhesion strength, Low dielectric loss	25 $\mu$ m	200°C, 60min 1MPa	2.4	0.0030	7	235	0.3	130	350°C	Equivalent with HB
NC0207	High Tg, Low elastic modulus, High adhesion strength, Low dielectric loss	25 $\mu$ m	200°C, 60min 1MPa	2.4	0.0027	7	230	0.3	130	350°C	Equivalent with HB
NC0208	Flame resistance High elastic modulus Low CTE	20 $\mu$ m	180°C, 60min 1MPa	3.0	0.0050	7	180	2.0	60	370°C	Equivalent with VTM-0

## Insulating adhesive film for high frequency, high speed transmission flexible (FPC) and rigid electronic circuit substrates

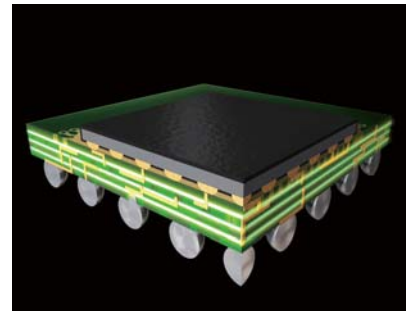


## High functionality insulating adhesive film for electronic parts and modules

This is an unreacted thermosetting resin film which provides high adhesion, high heat resistance and high reliability. This insulating thin film is available in thicknesses of 5-30 $\mu$ m. It has a low dielectric constant and a low dissipation factor in GHz frequency range. It has excellent fluidity which allows it to adapt to the concavity or convexity of surfaces under low temperature and low pressure. It is useful for reducing the size and lowering the profile of electronic components for RF modules.

Product Number	Characteristics	Film thickness	Cure Condition	$\epsilon_r$	$\tan\delta$	Cu peel Strength [N/cm]	Tg [°C]	Elastic Modulus [GPa]	C.T.E. $\alpha_1$ [ppm/°C]	Thermal Resistance [T85% decrease]	Insulating Disruptive Voltage
NC0201	High reliability (Low water absorption, high purity). High adhesion strength	5-30, 50 $\mu$ m	200°C, 60min 1MPa	2.5	0.0025	11	185	0.8	130	370°C	Equivalent with HB
NC0204	High Tg, Low elastic modulus High adhesion strength, Low dielectric loss	25 $\mu$ m	200°C, 60min 1MPa	2.4	0.0030	7	235	0.3	130	350°C	Equivalent with HB
NC0206	High reliability (Low water absorption, high purity). High adhesion strength	30 $\mu$ m	180°C, 60min 1MPa	2.5	0.0035	11	170	1.0	130	350°C	Equivalent with HB
NC0207	High Tg, Low elastic modulus High adhesion strength, Low dielectric loss	25 $\mu$ m	200°C, 60min 1MPa	2.4	0.0027	7	230	0.3	130	350°C	Equivalent with HB
NC0208	Flame resistance High elastic modulus Low CTE	20 $\mu$ m	180°C, 60min 1MPa	3.0	0.0050	7	180	2.0	60	370°C	Equivalent with VTM-0

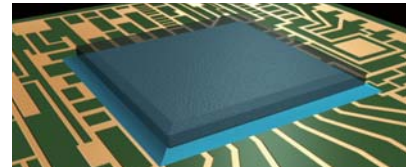
## High functionality insulating adhesive film for electronic parts and modules



## Insulating adhesive film for sealing semiconductor components

This is a pre-applied non-conductive thin film adhesive. It is laminated to substrates or interposers and uses a thermal compression bonding process (TCB) to encapsulate IC chips on semiconductor packages. It has excellent productivity and can form a minimum fillet allowing a small Keep Out Zone (KOZ). It can also be applied directly to silicon chips.

## Insulating adhesive film for sealing semiconductor components



## Insulating high thermally conductive film for heatsinks

Insulating adhesive film suitable for bonding heatsinks. It has the capability of adhering on irregular surfaces because it becomes flexible when heated.

Product Number	Characteristics	Film thickness	Cure Condition	Thermal conductivity [W/mK]	Cu peel Strength [N/cm]	Elastic Modulus [GPa]	Thermal Resistance [T85% decrease]	Insulating Disruptive Voltage [AC KV/mm]
TC0202	High Tg, Low elastic modulus High adhesion strength, Low dielectric loss	50~80 $\mu$ m	180°C, 120min.	3	10	1	350°C	50



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