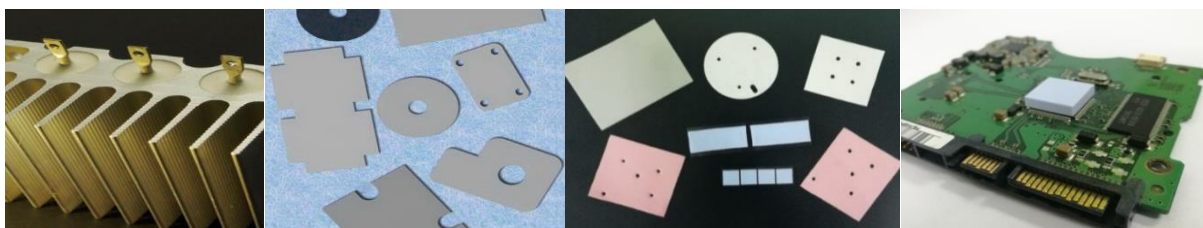
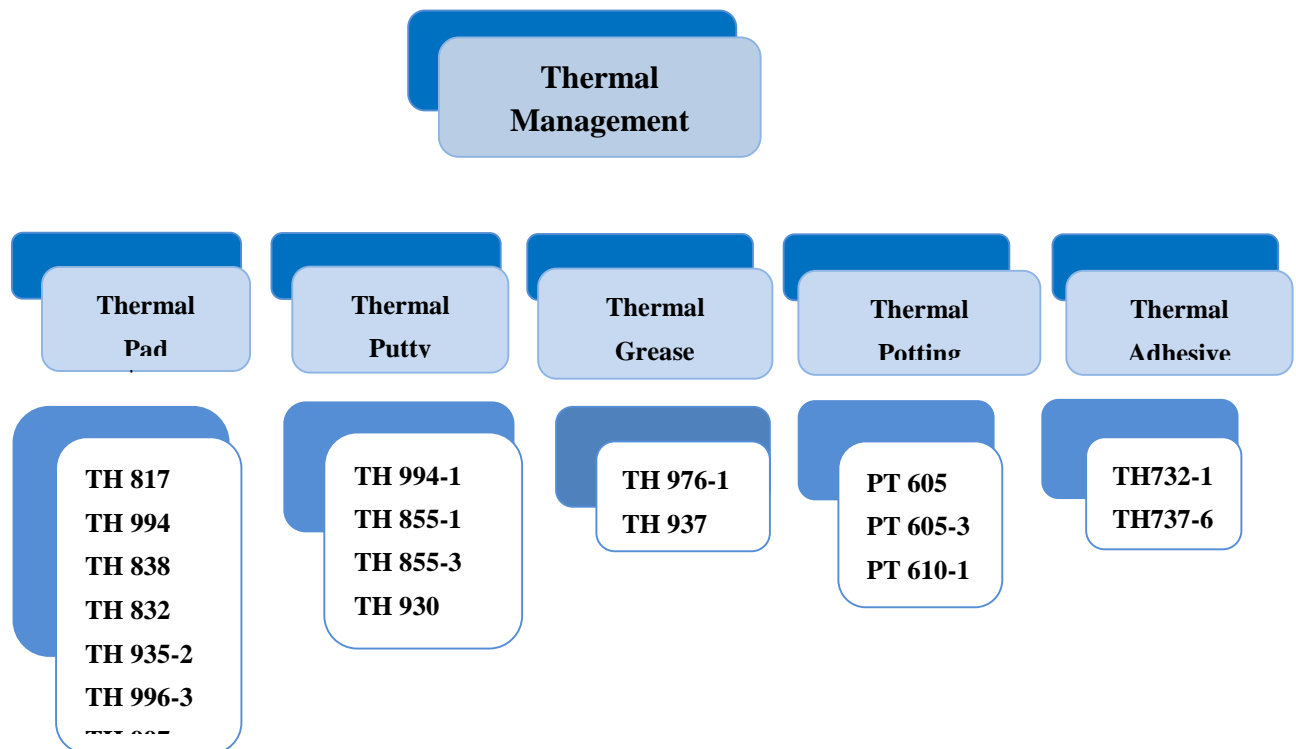


# Thermal Interface Material (TIM)

Penchem thermally conductive products are designed to dissipate the heat out from the heat sources to protect the components and devices from overheating and thus prolong the operating life and enhance the performance. The silicone and non-silicone thermal pads and putty provide very good thermal conductivity up to 17.0 W/mK. It can be die-cut to specific size and dimensions with thickness ranging from 0.5mm up to 5mm. It has an option with non-tacky surface or tacky surface on one or both sides of the pad. The thermal grease can be easily dispensed or screen printed on most surfaces. It has excellent outdoor performance with good stability and weatherability. Thermal putty is a soft substance like clay that has good thermal conduction with high electrical insulation. The 2-part potting silicone or epoxy has good flowability and weatherability. It is self-levelling and gives good adhesion on various types of substrates like plastic and metal. Its low thermo-mechanical stress makes it suitable for potting big devices such as the display modules. The 1-part heat curable thermal conductive epoxy has excellent adhesion and good mechanical strength that makes it suitable for bonding various types of substrates together.



## TIM Product Selection and Special Features

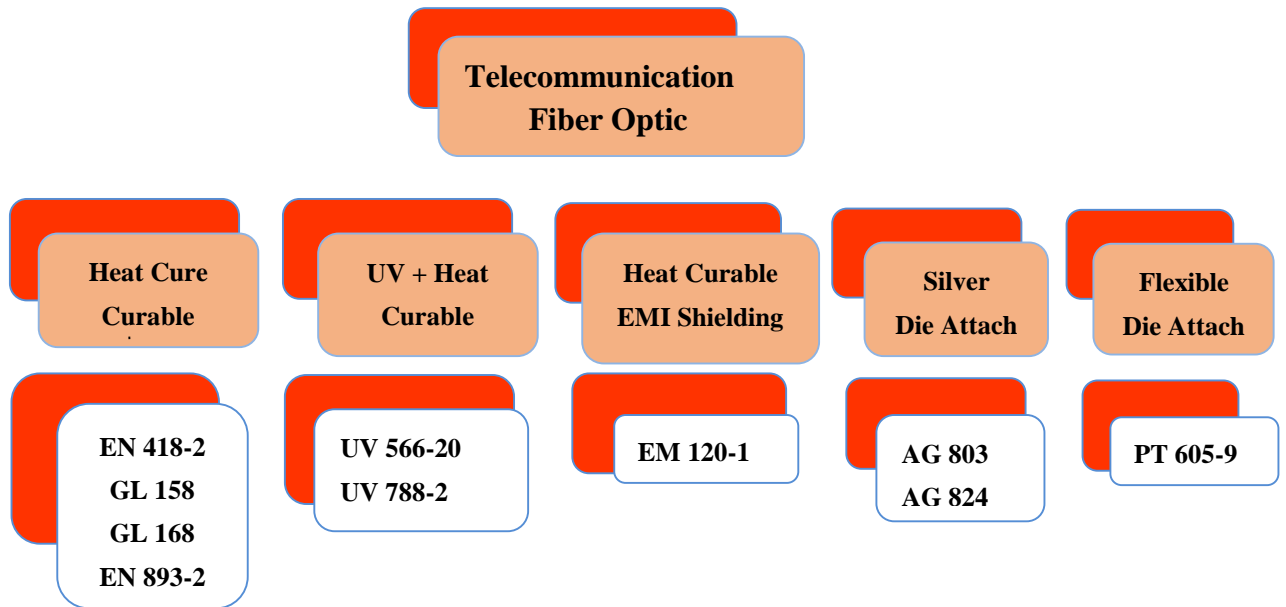
Product	Type	Hardness Shore oo	Thermal Conductivity W/mK	Special Features
<b>Non-electrically Conductive Thermal Pad</b>				
TH817	Silicone	85	17.0	Extremely high thermal conductivity, low outgassing and meet UL 94 V0.
TH994	Silicone	75-90	8.0	High thermal conductivity, low outgassing and meet UL 94 V0.
TH838	Silicone	55-75	6.0	High thermal conductivity, low outgassing and meet UL 94 V0.
TH832	Silicone	50-70	3.5	Moderate thermal conductivity, low outgassing and meet UL 94 V0.
TH935-2	Silicone	A (70-80)	4.6	Moderate thermal conductivity, low outgassing and meet UL 94 V0.
TH996-3	Silicone	50-70	2.5	Moderate thermal conductivity, low outgassing and meet UL 94 V0.
TH997	Silicone	A (10-20)	2.4	Moderate thermal conductivity, low outgassing and meet UL 94 V0.
<b>Dispensable Thermal Putty</b>				
TH949-1	Silicone	putty	11.0	Automatic Dispensable, high thermal conductivity, low outgassing, meet UL 94 V0 and low bleed. Fulfill UBDH 2000hrs
TH855-1	Silicone	putty	7.5	Automatic Dispensable, high thermal conductivity, low outgassing, meet UL 94 V0 and low bleed. Fulfill UBDH 2000hrs.
TH855-3	Silicone	putty	7.5	Automatic Dispensable, high thermal conductivity, low outgassing, meet UL 94 V0 and ultra-low bleed. Fulfill UBDH 2000hrs.
TH930	Silicone	putty	5.0	Dispensable, moderate thermal conductivity, low outgassing, meet UL 94 V0.

## TIM Product Selection and Special Features

Product	Type	Viscosity cPs,25°C	Hardness Shore	Thermal Conductivity W/mK	Special Features
<b>Thermal Grease</b>					
TH976-1	Silicone	20,000	-	2.1	Moderate thermal conductivity, easily apply via pouring, brushing and dispensing.
TH937	Silicone	150,000	-	3.5	Moderate thermal conductivity, easily apply via pouring, brushing and dispensing
<b>Thermal Potting</b>					
PT605-3	Epoxy	PartA:22,200 PartB:140 Mixed:1,700	A (80)	1.1	Two Part Component, minimal thermal conductivity, easy to mix and can be used in automatic dispensable.
PT610-1	Epoxy	PartA:47,000 PartB:10,000 Mixed:12,300	D (83)	0.2	Two Part Component, meet UL 94 V0 and can be used in automatic dispensable.
<b>Thermal Adhesive</b>					
TH737-1	Epoxy	36,400	D (94)	2.6	One part component, able to cure at lower temperature 90C/15min, good in heat dissipation, excellent adhesion towards various substrates.
TH737-6	Epoxy	150,000	D (91)	2.3	One part component, able to cure at higher temperature 130C/1hr, good in heat dissipation, excellent adhesion towards various substrates.

# UV Light and Heat Curable Lens Bonding Fiber Optic Adhesive

Penchem offers an extensive range of epoxy adhesive for use in fiber optics devices in communications, data storage, sensing, power delivery and illumination. These adhesive technologies have been used in fiber optics assemblies in the common applications including sealing fibers into ferrules, bonding optical fibers into connectors or/and ferrules, potting fiber bundles, V-groove array, chip bonding such as fiber media converters and transceiver modules assemblies. Epoxies can also be used to bond secure strain relief boots and secure fiber onto packages. Unique design of epoxies with good bonding strength and optical matching to allow optimum signal transition is always desired in this industry. Therefore, high thixotropic or/and low CTE adhesive is used to hold the position of chip and prevent IC tilted to signal loss during cure. Penchem has designed adhesives for fiber optic components that have adhesion on glass, metal, ceramic and most plastic substrates provide excellent thermal and moisture resistance. Epoxies are available in one or two-part structural adhesives that are low outgassing and shrink minimally upon heat or UV cure as well as high glass transition temperature.

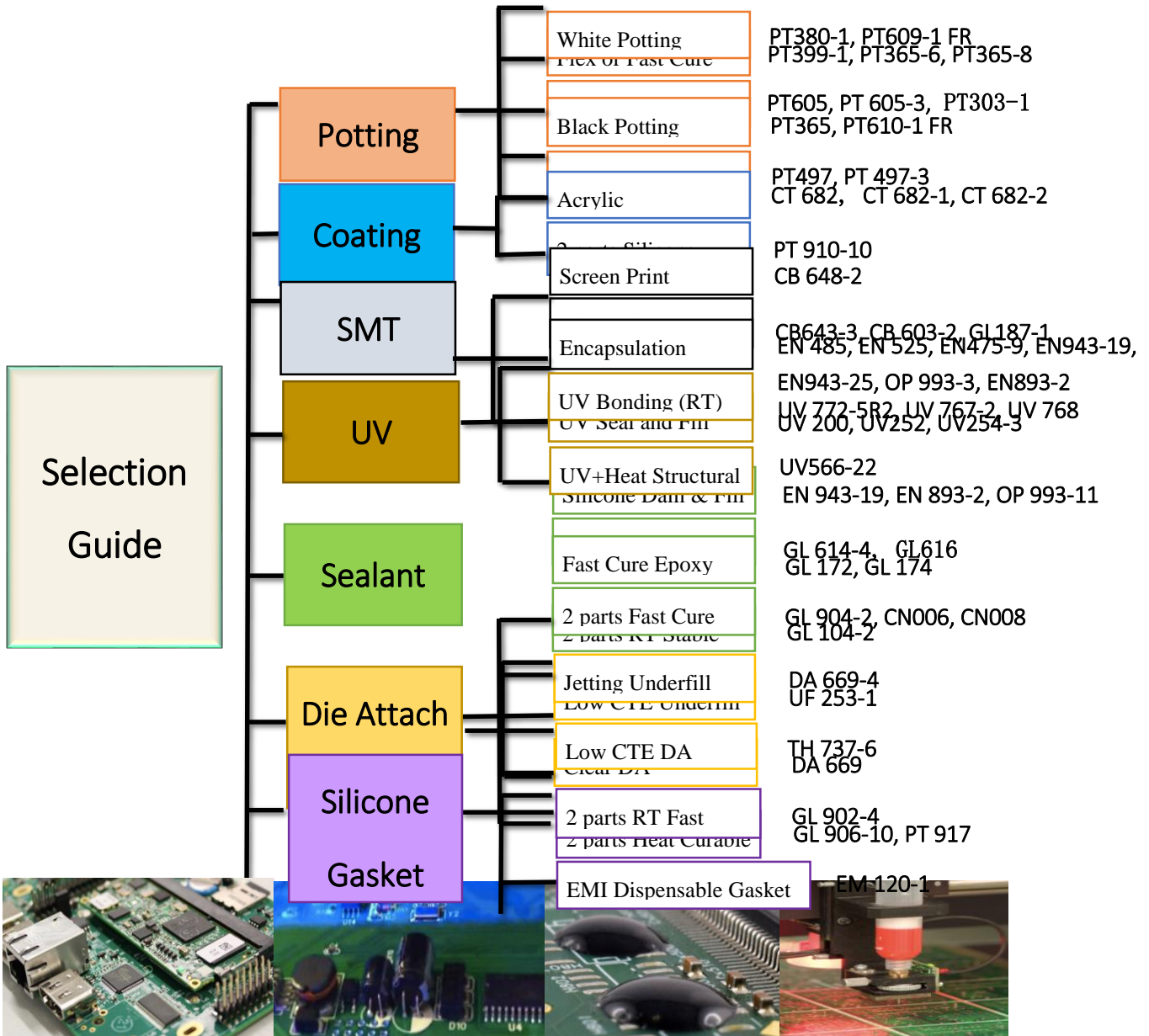


## Optical Communication Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>Heat Curable Adhesive</b>					
EN418-2	Epoxy	21,000	D88	85-100°C/1hr	Heat curable structural adhesive, black color, high adhesion strength to gold, Nickel, Kovar, PCB and ultem. Low CTE and low shrinkage adhesive with proven fulfill UBDH 2000hrs.
EN418-12	Epoxy	9,850	D86	100°C/1hr	Heat Curable and flowable epoxy, black color, high adhesion strength to gold, Nickel, Kovar, PCB, and ultem. Low CTE and low shrinkage adhesive with proven fulfill UBDH 2000hrs.
GL158	Epoxy	35,000	D85	100°C/2hr, 150°C/30min	Heat curable structural adhesive, white color, high adhesion strength, suitable for bonding of lens to PCB. Fulfill UBDH 2000hrs.
GL168	Epoxy	45,085	D85	100°C/2hr, 150°C/30min	Heat curable structural adhesive, white color, high adhesion strength, suitable for bonding of lens to PCB. Fulfill UBDH 2000hrs.
EN893-2	Silicone	4,300	0053	100°C/2hr	Low RI Heat Curable adhesive, <b>ultra-low outgassing</b> , Suitable for <b>gold wire protection</b> and gap filling application. Fulfill UBDH 2000hrs
<b>UV + Heat Curable Adhesive</b>					
UV566-20	Epoxy	6,500	D75	1W/cm <sup>2</sup> ,3s 0.2W/cm <sup>2</sup> ,15s +120°C/30min	This UV + Heat Curable structural adhesive suitable for tacking and bonding of TO can to PEI lens. Fulfill UBDH 2000hrs reliability.

UV788-2	Epoxy	22,800	D(86)	2W/cm <sup>2</sup> ,15s + 100°C/60min	UV +heat Curable adhesive, <b>high Tg, low CTE</b> , low outgassing NASA, bonding and active alignment under low UV intensity. Suitable for glass bonding, PLC, WMD assembly. <b>Fulfill MSL3000hrs reliability.</b>
<b>Heat Curable EMI Shielding</b>					
EM120-1	Silicone	5,500,000	A(35-40)	150°C/2hr	<b>80dm</b> shielding for up-to <b>400G product</b> application. Fulfill UBDH 2000hrs.
<b>Silver Die Attach</b>					
AG803	Epoxy	25,000	D(86)	120°C/2hr, 150°C/1hr, 170°C/30min	High viscosity silver epoxy, high Tg, excellent adhesion and low volume resistivity. Fulfill UBDH 2000hrs.
AG824	Epoxy	7,000	D(77)	150°C/2hr	Low viscosity silver epoxy, high Tg, excellent adhesion and low volume resistivity. Fulfill UBDH 2000hrs.
<b>Flexible Die Attach</b>					
PT605-9	Epoxy	900-1,300	A(66)	120°C/2hr, 130°C/1.5hr	Low viscosity, flexible and good in heat dissipation for die attach application.

# General Electronics Products



## General Electronics Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>Potting</b>					
PT380-1	Epoxy	Part A:14,300 Part B:67; Mixed:1,720	D84	25°C/24hr, 80°C/2hr	Mix ratio 2:1 White colour potting epoxy with excellent adhesion towards various substrates.
PT399-1	Epoxy	Part A:750 Part B:50	A60	25°C/>2.5hr, 50°C/>1hr	Mix ratio 2:1 Fast cure flexible epoxy with excellent adhesion towards various substrates.
PT605-3	Epoxy	Part A:22,200 Part B:140; Mixed:1,700	A80	25°C/24hr, 50°C/4hr	Mix ratio 2:1 Flexible epoxy with thermal conductivity and excellent adhesion towards various substrates.
PT303-1	PU	Part A:32,000 Part B:75; Mixed:1,700	A85	25°C/24hr	Mix ratio 2.35:1 Flexible polyurethane potting with excellent adhesion towards various substrates.
PT365	Epoxy	Part A:15,080 Part B:100; Mixed:1,190	D78	25°C/24hr, 80°C/2hr	Mix ratio 2:1 Black colour potting epoxy with excellent adhesion towards various substrates.
PT497-3	Epoxy	Part A:3,700 Part B:10; Mixed:1,050	D82	25°C/24hr, 80°C/2hr, 100°C/30min,	Mix ratio 3:1 Clear colour potting epoxy with excellent adhesion towards various substrates.
PT609-1	Epoxy	Part A:447,440 Part B:65; Mixed:28,800	D83	25°C/24hr, 80°C/2hr 120°C/10min 150°C/5min	Mix ratio 8:1 White colour potting epoxy with flame retardant.
PT610-1	Epoxy	Part A:47,000 Part B:10,2500; Mixed:12,200	D83	25°C/16-24hr, 80°C/2hr	Mix ratio 1:1 Black colour potting epoxy with flame retardant.



## General Electronics Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>Coating</b>					
CT682	Acrylic	266	D(50)	25°C/16hr 80°C/30min	Clear colour water resistant conformal coating for PCB and electronic components.
CT682-1	Acrylic	65	D(50)	25°C/16hr 80°C/30min	Clear colour with fluorescence agent for easy inspection under UV light. It's water resistant conformal coating for PCB and electronic components.
CT682-2	Acrylic	385	D(50)	25°C/16hr 80°C/30min	Flame retardant Translucent conformal coating with fluorescence agent for easy inspection under UV light. It's water resistant conformal coating for PCB and electronic components.
CT985-5	Silicone	2,980	A37	130°C/5min	Translucent conformal coating with good self-leveling.
PT910-10	Silicone	Part A:6,000 Part B:3,350 Mixed:4,600	D(25)	25°C/24hr	Mix ratio 1:1 two parts silicone with slightly translucent in colour and used for potting for coating for electronic component.

## General Electronics Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>SMT Structural</b>					
CB648-2	Epoxy	134,000	D90	150°C/5min, 80°C/2hr	Screen print SMT epoxy for component bonding.
CB643	Epoxy	30,000	D86	150°C/90sec	High Speed Dispensable and low temperature curable SMT epoxy for PCBA bonding.
CB643-3	Epoxy	223,300	D86	150°C/90sec	Lower CTE, High Tg, High speed dispensing and low temperature curable SMT epoxy for PCBA bonding.
CB603-2	Epoxy	40,550	D86	80°C/40min, 120°C/4min	High speed dispensing and low temperature curable SMT epoxy for camera module and component bonding.
GL187-1	Epoxy	80,000	D80	90°C/90sec	High speed dispensing, extremely fast curable and low temperature curable SMT epoxy for camera module and component bonding.
EN485	Epoxy	52,050	D85	100°C/4hr, 120°C/2hr, 150°C/1hr	Black encapsulant of IC chip and sealing for electronic component. Also suitable for dam application.
EN525	Epoxy	30,820	D90	120°C/1hr, 150°C/30min	Black encapsulant of IC chip and sealing for electronic component.
EN475-9	Epoxy	1,800	D81	110°C/2hr, 120°C/1hr	Low viscosity black encapsulant of IC chip and sealing for electronic component.
OP993-3	Silicone	6,500	A12	150°C/120min	Soft silicone and used as encapsulant for electronic components
OP993-13	Silicone	15,400	Gel	100°C/120min	Ultrasoft silicone and used as gap filling and RI matching application.

## General Electronics Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>UV curable</b>					
UV772-5R2	Acrylate	500	D70	2W/cm <sup>2</sup> ,10s	Room Temperature Storage. Fast UV tacking adhesive and in medical tubing, electronic devices and optical communication device bonding
UV767-2	Acrylate	7,600	D81	2W/cm <sup>2</sup> ,3-15s, Hg 300mW/cm <sup>2</sup> ,3s	Room Temperature storage. Fast UV and visible light cure for plastics, PCB, glass, ceramic and nickel.
UV252	Acrylate	13,300	D64	2W/cm <sup>2</sup> ,15s 0.35W/cm <sup>2</sup> ,100s	Fast UV curable adhesive, flexible and good adhesion towards for PC, ABS, glass, EMC and ceramic.
UV768	Urethane acrylate	2,700	D56	2W/cm <sup>2</sup> ,15s	Fast UV curable adhesive, flexible and good adhesion towards for PC, ABS and glass.
UV200	Acrylate	245	D62	420mW/cm <sup>2</sup> ,10s	UV curable acrylate adhesive designed for use in electric, electronic, medical and automotive applications.
UV566-22	Epoxy	4,400	D75	1W/cm <sup>2</sup> ,3s 0.5W/cm <sup>2</sup> ,6s 0.2W/cm <sup>2</sup> ,15s +120°C/30min	UV + Heat Curable structural adhesive suitable for tacking and bonding of TO can to PEI lens. Fulfill UBDH 2000hrs and 10,000hrs HTOL reliabilities.

### General Electronics Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>Sealant</b>					
EN943-19	Silicone	4,800	A64	150°C/30min, 120°C/2hr	Black encapsulant for gold wire protection application.
EN893-2	Silicone	4,300	OO53	100°C/2hr	Low RI Heat Curable adhesive, ultra-low outgassing, suitable for gold wire protection and gap filling application. Fulfill UBDH 2000hrs
OP993-11	Silicone	3,942	Gel	100°C/2hr	Low RI heat Curable adhesive, ultra-low outgassing, Suitable for RI Matching and gap filling application. Fulfill UBDH2000hrs.
GL614-4	Epoxy	42,000	D83	150°C/15min, 160°C/5min	Heat curable structural adhesive, white color, high adhesion strength, suitable for bonding of lens, metal and PCB bonding.
GL616	Epoxy	25,000	D85	100°C/2hr, 150°C/30min	Heat curable structural adhesive, white color, high adhesion strength, suitable for bonding of lens to PCB. Room temperature stable 1-part adhesive passed UBDH 2000hrs.
GL107-2	Epoxy	56,268	D81	150°C/1hr	BFA food grade adhesive with high Tg and high bonding strength
GL172	Epoxy	21,040	D85	25°C/24hr, 70°C/30min	Fast tack free for alignment bonding and fast cure dark blue epoxy for electrical and electronic devices.
GL174	Epoxy	3,500	D85	25°C/24hr, 80°C/3hr	Fast tack free for alignment bonding and fast cure dark blue epoxy for electrical and electronic devices.
GL904-2	Epoxy	5,082	D80	25°C/24hr, 80°C/1hr	Mix ratio 1:1 two parts fast tack-free within 10mins epoxy adhesive for electrical and electronic devices
GL104-2	Epoxy	5,600	D73	75°C/45min	Mix ratio 1:1 two parts epoxy adhesive for electrical and electronic devices.
GL187-1	Epoxy	80,000	D80	90°C/90secs	Heat curable red epoxy with fast curable and strong adhesion strength.
CN006	Cyanoacrylate	80-120	D60	25°C/10-15s	Snap curable moisture adhesive to all substrates except PP and PTFE. Low whitening and high strength.

### General Electronics Adhesives

Product	Type	Viscosity cPs,25°C	Hardness Shore	Cure Profile	Special Features
<b>Die Attach/ Underfill</b>					
DA659	Epoxy	1,266	A74	120°C/1.5hr	Flexible Die Attach and underfill for stress sensitive die bonding
DA669-4	Epoxy	6,500	D84	165°C/1hr	Jetting of Epoxy adhesive for electronic die attach applications and surface mount device.
UF253-1	Epoxy	1,200	D88	130°C/10min, 150°C/5min	Low viscosity epoxy adhesive for electronic underfill for CSP, BGA and flip chip on board.
TH737-6	Epoxy	35,500	D91	110°C/1hr	One-part component, able to cure at higher temperature 110C/1hr, good in heat dissipation, excellent adhesion towards various substrates.
DA669	Epoxy	1,000	D91	120°C/2hr, 150°C/1hr	Low viscosity epoxy adhesive for electronic underfill applications
<b>Silicone Gasket</b>					
GL902-4	Silicone	Part A:7,500 Part B:7,500	A30	25°C/24hr	Mix ratio 1:1 two parts silicone sealant for speaker and electronic parts or devices.
GL906-10	Silicone	32,400	A44	150°C/15min	Cure-in-place silicone gasket, sealant and adhesive for electrics and electronic application.
PT917	Silicone	Part A:14,420 Part B:13,010	A37	25°C/24hr, 80°C/2hr	Mix ratio 1:1 two parts silicone rubber used for mold making and potting application.
EM120-1	Silicone	5,500,000	A35-40	150°C/2hr	80dm shielding for up-to 400G product application. Fulfill UBDH 2000hrs.