



A1853-TX

Dual cure epoxy adhesive: UV-Heat cure adhesive

PRODUCT DESCRIPTION:

- Base chemistry: epoxy only, cationic polymerization
- One component adhesive ready for use, solvent-free, UV and/or heat curing, thixotropic, translucent blue green color

PRODUCT USE:

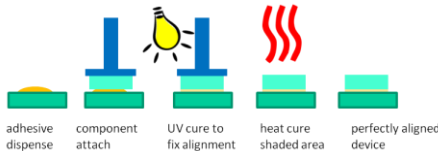
- Active alignment of components for optoelectronics and semiconductor packaging
- Module bonding with active alignment: example: bond image sensor to board or bonding VCM to lens barrel.
- Bonding of opaque substrates

FEATURES:

- Epoxy only, low thermal cure temperature with short cure time, UV-curable with LED-365nm, high adhesion, high Tg, long working life, excellent reliability performances, robust for solder reflow process
- Possible bond line thickness: 10 to 100 μm

INSTRUCTIONS FOR USE:

- 1) Clean the substrates to remove contamination, dust, moisture, salt and/or oil
- 2) Dispense adhesive on substrates
- 3) Bond substrates (with active alignment – optional)
- 4) UV cure to fix alignment or to bond
- 5) Thermal cure: to cure adhesive in shadow area and to improve adhesion of bonded parts



CURING CONDITIONS: 2 curing ways: UV + heat or heat

1) **UV + Heat curing:** both UV and heat are used in the curing process

First step: UV cure

*Metal halide/Mercury UV: UV-A (320-400 nm), intensity: 100-1,000 mW/cm²

*or LED-365 nm, UV light intensity: 200 to 1,000 mW/cm²

LED-365 nm		Metal Halide/Mercury (UV-A: 320-400 nm)	
UV intensity (mW/cm ²)	x time (sec)	UV intensity (mW/cm ²)	x time (sec)
100	20 to 40 sec	100	20 to 40 sec
or 200	10 to 20 sec	or 200	10 to 20 sec
or 500	4 to 6 sec	or 500	4 to 6 sec
or 1,000	2 to 3 sec	or 1,000	2 to 3 sec

Second step: heat cure: the adhesive is exposed to UV light first, then heat cure 85°C for 60 minutes

2) **Heat curing:** heat is the only curing source, the adhesive sees no UV light 85°C for 60 to 120 minutes or 90°C for 60 minutes or 100°C for 60 minutes

The adhesive is expected to be cured in the absence of air or sandwiched between two substrates. If the adhesive surface is exposed to air during cure, surface stickiness might result.

*** 80°C for 120 to 180 minutes. A1853-TX can be cured by heat only at 80°C when the adhesive is sandwiched between 2 substrates*****

The effect of humidity and air are greater for very thin film. If the adhesive layer is 10 μm or less, then curing in the absence of air or sandwiched between two substrates is required to fully cure the adhesive. Curing at temperature of 90 °C can improve curing of very thin film (10 μm adhesive layer)

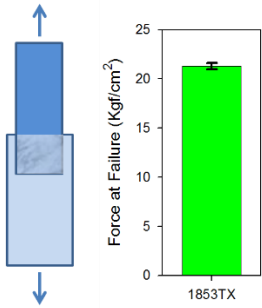
- The actual heat cure time is dependent on the heating time of the bonded components. The time to heat up the components must be added to the total cure time of the adhesive for the process
- The recommended UV cure dose is at the adhesive; if the substrate absorbs curing light, then the actual cure time needs to be increased.
- To ensure good curing speed, the humidity should be <60% RH
- Epoxy adhesives have post cure properties. Adhesion strength tests should be conducted at least 24 hrs after part assembly.

The maximum adhesion strength is achieved by HEAT cure. For best adhesion, UV fix cure should be kept at a minimum and the majority of the bonded components should be cured by HEAT



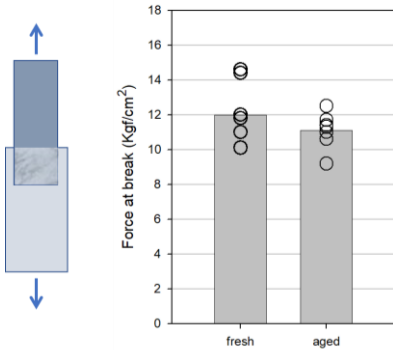
A1853-TX (page 2)

Bond strength study:



PC/PC bonded strips, 25 μm adhesive thickness,
UV dose 1.5 J/cm² + 80°C 1 hr

Reliability Study



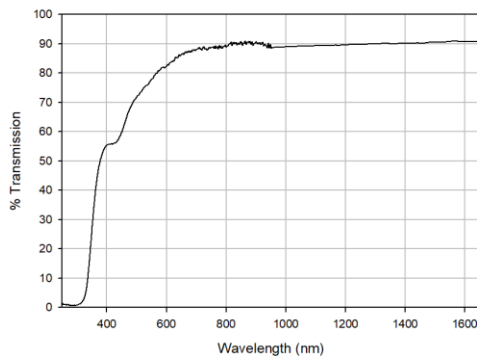
LCP/LCP bonded strip, 25 μm adhesive thickness
Heat cure 85°C 1 hr

Fresh: test after bonding

Aged: test after aging at 110 °C + 100% relative humidity for 20 hours

UV-Vis and NIR Spectra:

A1853-TX 10 micron between glass slides
Curing: UV dose 2J/cm² + 85 °C 1 hour
air reference; no correction for surface reflection



TYPICAL PROPERTIES

Liquid

Viscosity at 25 °C, mPa.s or cps (shear rate: 10/s)	60,000 to 70,000
Thixotropic index (shear rate: 1/s over 10/s)	7
Density (g/mL)	1.2
Shelf life (-40 to -20°C):	6 months
Pot life or working life (20 - 25°C):	48 hours

Cured film

Appearance of cured adhesive	light yellow to tan
Outgas, weight % (per Telcordia GR-1221)	0.03
Outgas, weight % (per MIL-STD 883/5011)	0.22

Cured film properties (continued)

Water permeability (g/m 24 hrs, 50 °C/95% RH, 75 μm film)	2.2 x 10 ⁻⁴
Shrinkage (volume, %)	1
Hardness, shore D	75-80
Glass transition temperature (DMA tan delta, °C)	165
Coefficient of thermal expansion (ASTM E831)	
below Tg (x10 ⁻⁶), °C ⁻¹	53
above Tg (x10 ⁻⁶), °C ⁻¹	155
Physical properties tested at 25°C, 50% RH (ASTM D638)	
Tensile strength, MPa	150
Elongation (%)	5
Young's Modulus, MPa	2,000

Operating temperature, °C -40 to 150

GENERAL USAGE INFORMATION:

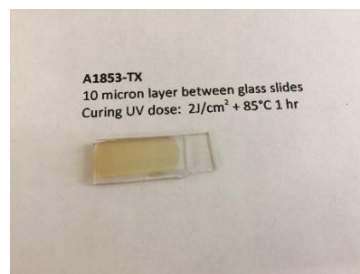
Shipment: adhesive is shipped in cold pack

Storage: After receipt, cold storage at -20 °C or -40 °C in the original container is required

Before use: The cold adhesive needs to reach RT (20-25°C) before use. The container needs to sit at RT, adding heat is not allowed. Room temperature equilibration time is dependent on container size, but a 10-30 gram syringe equilibration time is approximately 30-60 minutes. Condensed water on the container must be removed prior to use

SAFETY AND HANDLING

The uncured adhesive can be cleaned from apparatus with isopropyl alcohol (IPA), methyl ethyl ketone (MEK), acetone or commercial alcohol based cleaning solution. Avoid direct skin and eye contact. Use only in well ventilated areas. Use protective clothing, **gloves and safety goggles**. Read Safety Data Sheet before handling.



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