20.12.2023

CondAlign

E-Align100 – ACF by CondAlign

Technical Data Sheet

Product Description

E-Align100 anisotropic conductive film is a pressure sensitive adhesive (PSA), for bonding electronic devices and components.

Anisotropic materials have z-axis electrical conductivity only. The conductive particles are arranged in chains that enable conductivity through the adhesive thickness, while simultaneously being electrically insulating in the film plane.

CondAlign ACF is bonding at room temperature and with low application pressure.

Typical application areas include:
- Flexible hybrid electronics / Flexible PCB's
- Printed electronics
- Flexible or printed batteries bonding
- Flex to flex cable contacts

This document specifies the characteristics that are essential for the intended purpose and the safe and proper provisioning of the product.

Product Specification

Technical Data

PSA film thickness		95 µm ± 10 µm
Liner thickness		50 µm nominal
Standard form factors		Contact CondAlign
Custom form factors		On request
Adhesive		Acrylic
Fillers - conductive material		Ag
Liner(s)		PET (silicone coated)
Glass transition temperature (T_g) [a]	Peak Loss Modulus	- 39 °C
Outgassing [a]	TGA up to 125 °C	< 0.25 wt %

[a] Typical values. Should be considered representative or typical only and should not be used for specification purposes.

Performance ratings

In plane resistance (xy-plane) [b]	ASTM D-257	>> 10 GΩ
Through plane resistance (z-axis) [c]		< 100 mΩ
180° Peel adhesion	ASTM D3330 method F 1 hr dwell time (stainless steel)	> 3.5 N/cm
Ultimate peel adhesion strength [a]	From time of application, Figure 4	~ 48 to 72 hrs
Operational temperature range [a]	Figure 3	- 40 °C to + 85°C
Maximum Current [d]	Figure 1	340 mA/mm2

[a] Typical values. Should be considered representative or typical only and should not be used for specification purposes.

[b] Specific surface resistance measured using a ring electrode with 5 mm distance between electrodes.

[c] Measured using a 5 mm^2 copper probe head. Resistance values include copper to ACF contact resistance + ACF resistance. Final values must be tested on end user assembly substrate and in assembly environmental conditions (temperature, humidity, application technique, etc.), to confirm value indicated in the table. Depending on substrate surface properties some additional method of applying constant minimum pressure across the surface may be required.

[d] Value given at 40°C terminal part temperature. Value depends on application, achieved contact resistance and heat transport. Users should verify and test to maximum operational levels to ensure sufficient margin. See Figure 1.

Operational life - endurance

Temperature Humidity Biased	JEDEC 22-A101D.01 – adapted	+85°C / 85 %RH	1000 hrs
Temperature Cycling	JEDEC 22-A104F.01 N3 – adapted	-40°C – 85°C	400 cycles

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Requirements and directions for use

Minimum pads distance [e]		0.3 mm
Minimum overlap area [f]		1 mm²
Minimum bend radius [g]	Operational	< 18 mm
Minimum bend radius	Handling	< 10 mm
Maximum shear force [h]	Strain relief	0.3 N
Strain relief [h]		Implement as required
Application temperature		Room temperature
Application force [a]	Low pressure	1 – 2 bars
Application time		Immediate
Storage conditions	Controlled environment	~ 21 °C, ~ 50 %RH
Storage conditions		Out of direct sunlight
Shelf life	ASTM D 3611 – 89	18 months from DoM

[a] Typical values. Should be considered representative or typical only and should not be used for specification purposes.

[e] Minimum distance between two neighbouring conductor pads. Distance suggested to ensure electrical insulation between two elements.

[f] Minimum recommended contact area between the pads and film to ensure conductivity. See Figure 2.

[g] Light bending may impact performance temporarily during bending action. Users are encouraged to test and verify in real use case conditions.

[h] Shear force action to the contact should be avoided through strain relief. Light share forces may impact performance temporarily during bending action. Users are encouraged to test and verify in real use-case conditions.

Sustainability

Carbon footprint [i]	< 2.7 kgCO_2eq/m²

[i] Cradle-to-gate & use-phase emissions. Boundary: raw material extraction, transport, ACF production, use in production of final product is included. Use in End product and End of Life not included. Estimated footprint value based on pilot line production.

Statutory and regulatory requirements

2011/65/EU (RoHS)	See MSDS	Compliant
Regulation (EC) No 1907/2006 (REACH)	See MSDS	No SVHC

Figure 1 – Maximum current density load at terminal part temperature (typical)

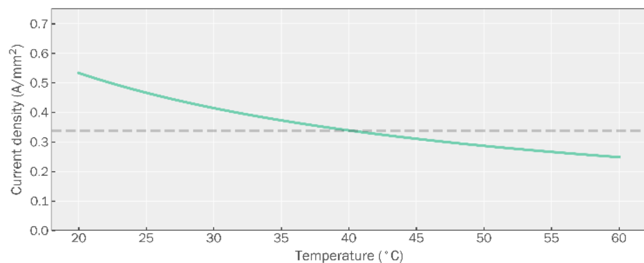


Figure 2 - Contact resistance vs contact area (typical)

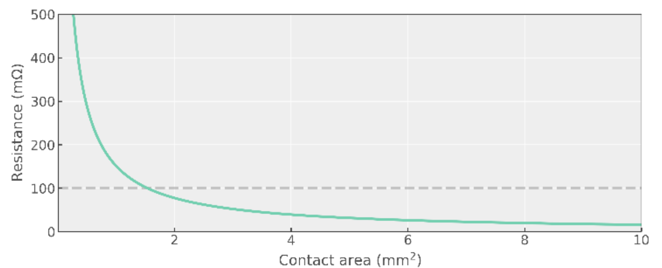


Figure 3 - Contact resistance development with substrate temperature (typical)

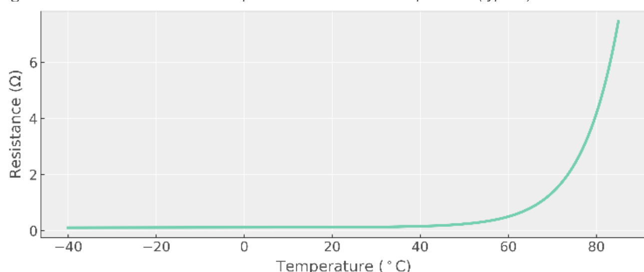
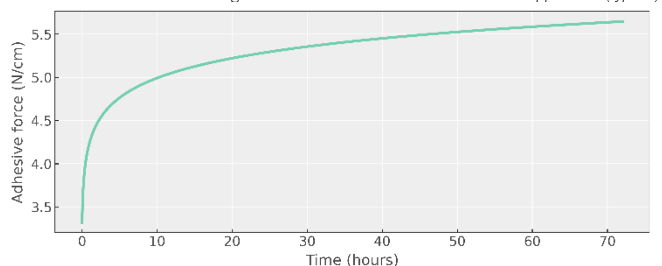


Figure 4 - Peel adhesion force with time from application (typical)



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