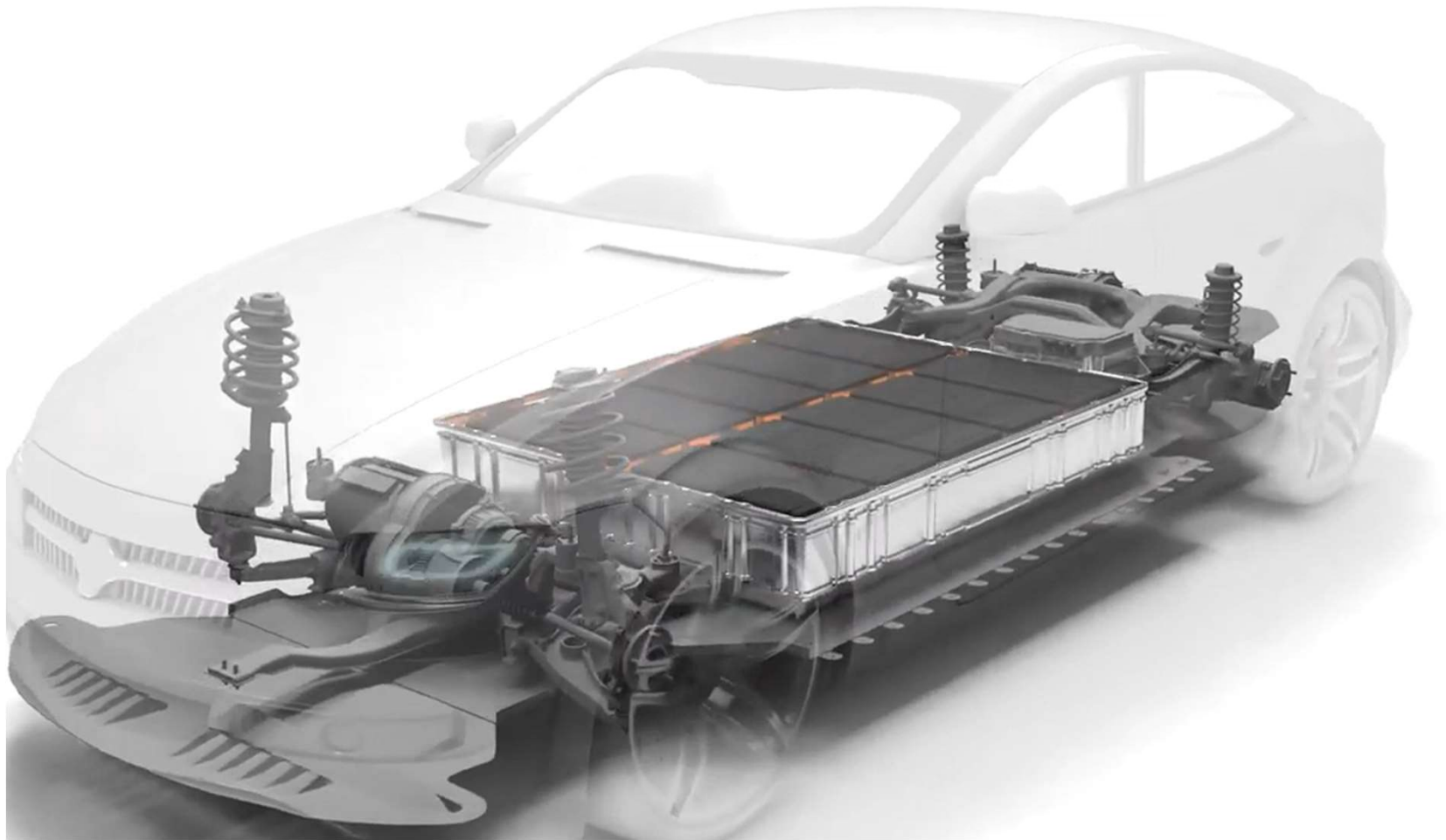


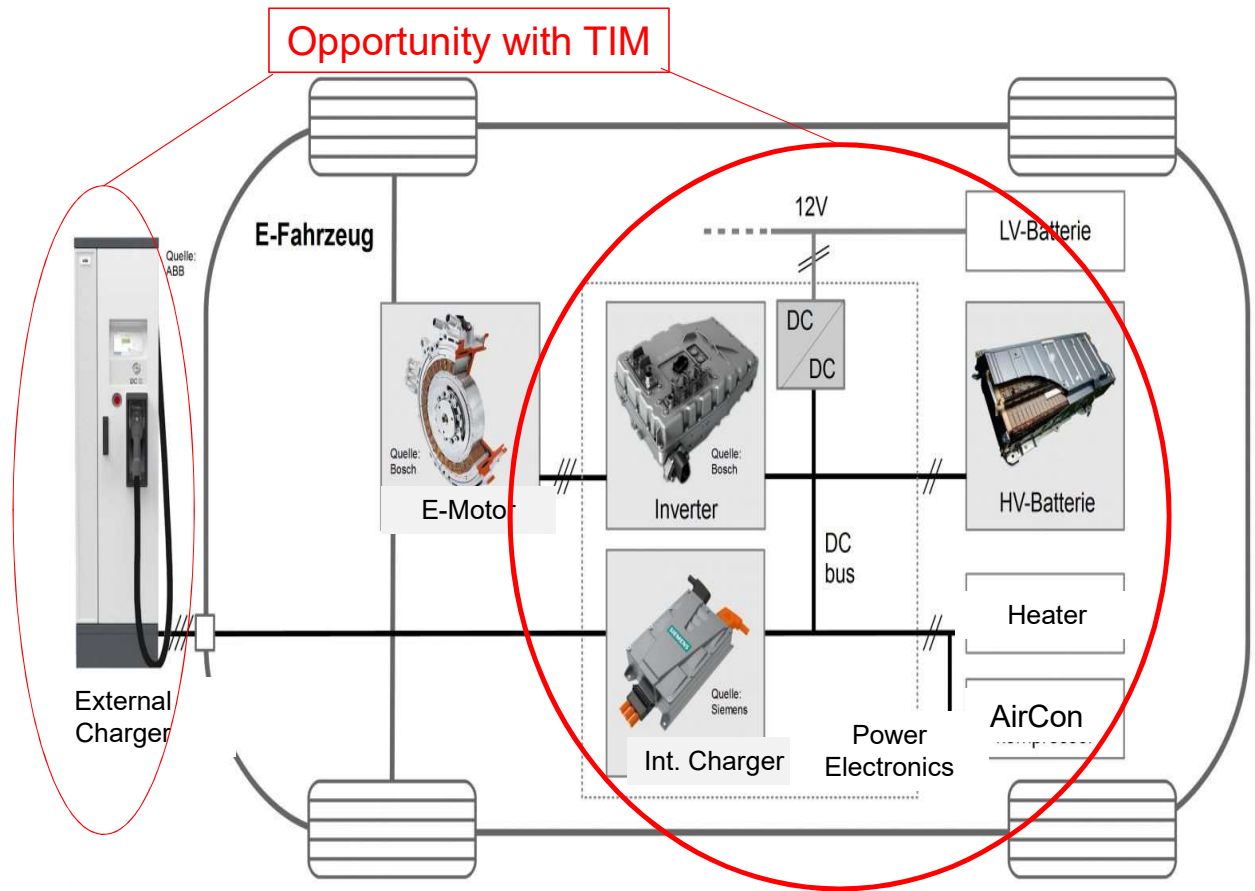
**ELANTAS Thermal Interface Materials (TIM)
For Electronics and Batteries**

TIM for Electronics and Batteries

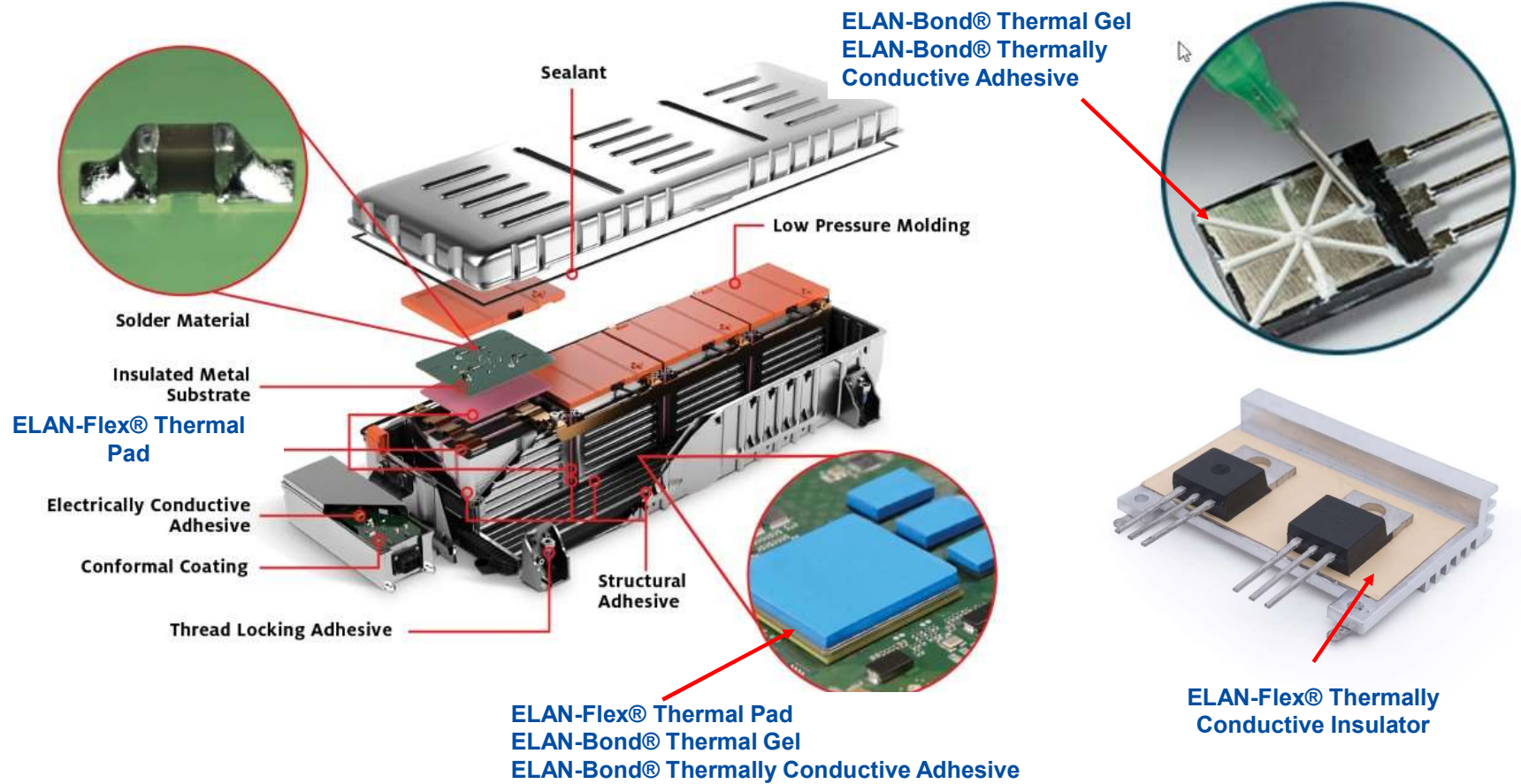


ELANTAS TIM for Electronics and Batteries

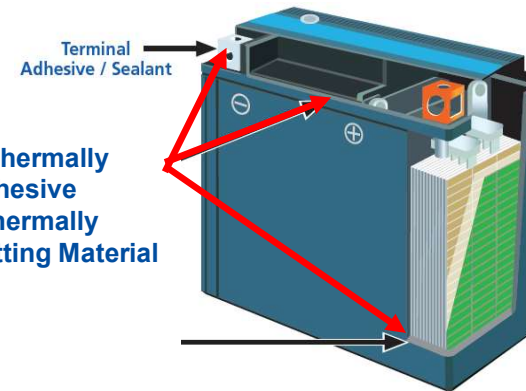
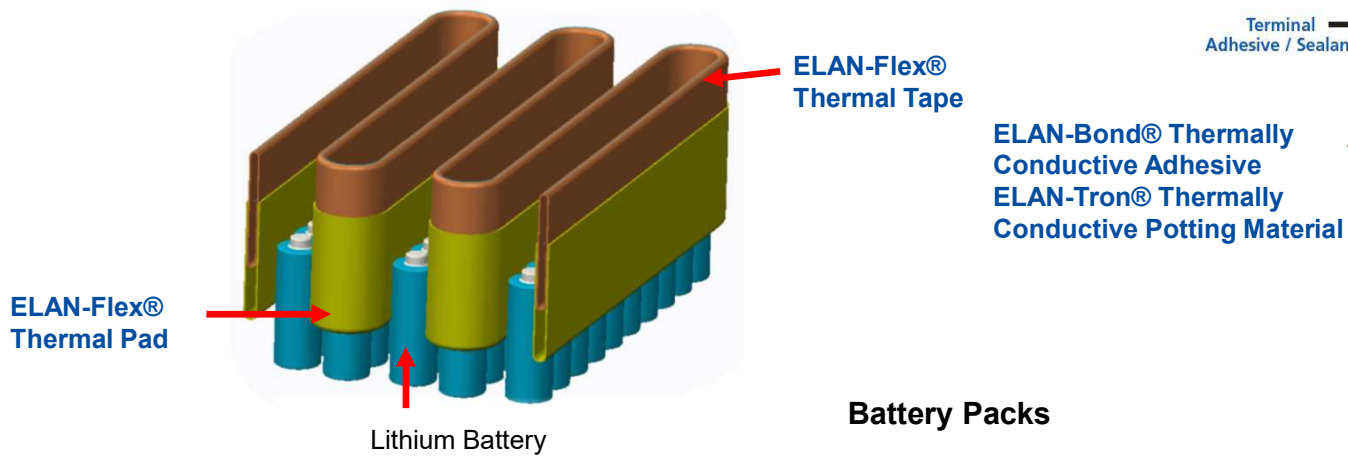
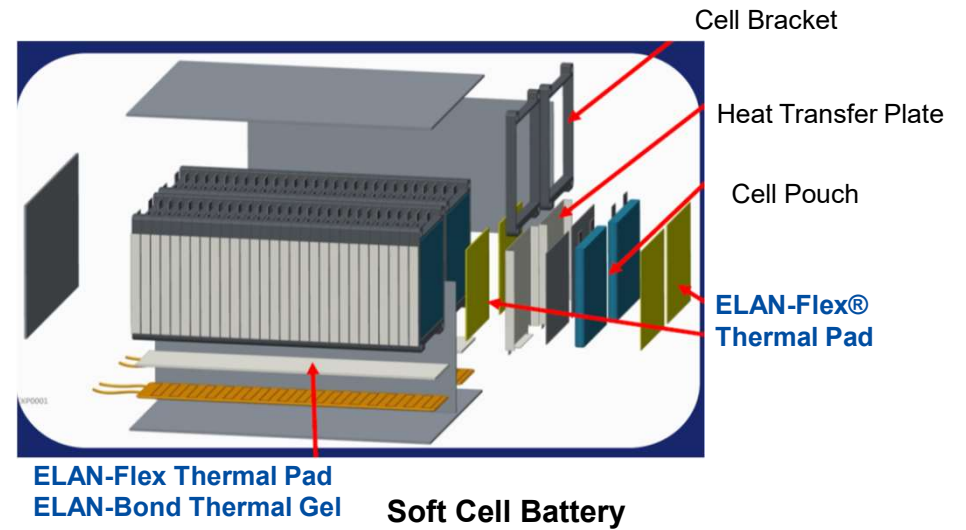
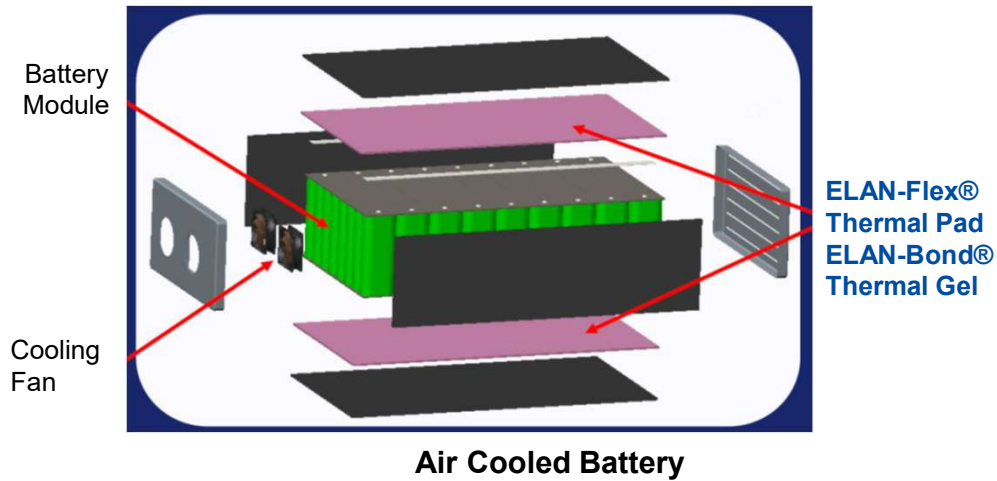
- **ELAN-Flex® Thermal Pad**
 - TC: 1.0-8.0 W/m.k.
- **ELANTAS PU Thermal Pad**
 - TC: 1.0-4.0 W/m.k.
- **ELAN-Bond® Thermal Gel**
 - TC: 1.2-3.5 W/m.k.
- **ELAN-Bond® Thermally Conductive Adhesive**
 - TC: 1.2-2.0 W/m.k.
- **ELAN-Flex® Thermally Conductive Insulator**
 - TC: 1.6-3.5 W/m.k
- **ELAN-Tron® Thermally Conductive Potting Material**
 - TC: 0.85-2.0 W/m.k
- **ELAN-Flex® Thermal Tape**
 - TC: 0.85 W/m.k



ELANTAS TIM for Electronics



ELANTAS TIM for Batteries



ELANTAS TIM: ELAN-Flex® Thermal Pad

TCP Series

- Material: silicon resin + fiberglass
- Features: **Cost effective, soft gap filler**
- Applications: **Battery pack and battery casing; Electronics**

TCP R-series

- Material: silicon resin + ceramics
- Features: **Double side tack, better electrical insulation and better hardness**
- Applications: **Soft cell battery; Electronics and etc.**

TCH series (High Thermal Conductivity)

- Material: silicon resin + ceramics
- Features: **high thermal conductivity, low thermal resistance, conformable**
- Applications: **High thermal conductivity module, Network communication equipment and etc.**



ELANTAS TIM: ELAN-Flex® Thermal Pad

ELAN-Flex® Thermal Pad

Product Model	Color	Thickness (mm)	Hardness	TC (W/m.k)	Continuous Use Temperature (°C)	Flame Rating
TCP100-T10/H10	Brown Red + White	1.0	Shore OO 10	1.0	-40 to 150	UL 94 V0
TCP120R-T10/H10	Light Yellow	1,0	Shore A 10-15	1.2	-40 to 200	UL 94 V0
TCP200R-T10/H50	Gray	1.0	Shore A 45-55	2.0	-40 to 200	UL 94 V0
TCP300R-T10/H55	Light Blue	1.0	Shore A 50-60	3.0	-40 to 150	UL 94 V0
TCH600	Orange + Light Pink	0.5 – 6.5	Shore OO 45 - 55	6.0	-40 to 150	UL 94 V0
TCH800	Light Pink	0.5 – 6.5	Shore OO 45 - 55	8.0	-40 to 150	UL 94 V0



ELANTAS TIM: Silicone-free PU Thermal Pad

Applications

- Power Electronics for E-Mobility
- Lithium Ion Batteries
- Lighting
- General gap filling between hot elements and cooling plates

Features

- Provide Thermal conductivity of 1.0-4.0 W/m.k.
- Transfers heat effectively and spreads heat evenly
- Silicone-free
- Flexible hardness, 40-80 (Shore OO)
- Excellent electrical property
- Easy to handle
- No emissions problematic to electronics and batteries



ELANTAS PDG, Inc.
5200 North Second Street
St. Louis, MO 63147 USA
(314) 621-5700
www.elantas.com

Thermally Conductive Polyurethane Pads

Introducing the latest addition to the Electronic Protection line from ELANTAS



Applications

- Power Electronics for E-Mobility
- Lithium Ion Batteries
- Lighting
- General gap filling between hot elements and cooling plates

Thermographs of Pads on Hot Surface

$T_{\text{pad}} = 25^{\circ}\text{C}$ at start Left pad: 0.6 W/mK
 $T_{\text{surface}} = 100^{\circ}\text{C}$ Right pad: 3.4 W/mK



100°C hot plate: Start



100°C hot plate: After 30 seconds

Features

- Provide high range thermal conductivity of 1-4 W/mK
- Transfers heat effectively and spreads heat evenly
- Silicone-free
- Solvent-free
- Flexible hardness, 40 - 80 (Shore OO)
- Possible thickness of 0.5 - 3.0 mm
- Young's modulus 150 - 200 psi
- Volume resistivity $3.0 - 7.0 \times 10^{13}$
- Dielectric breakdown voltage of 350 - 400 volts/mil
- Easy to handle
- No emissions problematic to electronics and batteries

You Build It
We Protect It



A member of  ALTANA

ELANTAS TIM: ELAN-Bond® Thermal Gel (Liquid Gap Filler)

Applications:

- EV batteries
- Automotive electronics
- SSD
- Between any heat-generating semiconductor and a heat sink
- Telecommunications

Features

- 2 component with mix ratio 1: 1
- Thermal conductivity: 1.5 - 3.5 W/m-K
- Cured at room temperature or elevated temperature
- Thixotropic nature makes it easy to dispense
- Ultra-conforming, designed for fragile and low-stress applications
- Excellent low and high temperature mechanical and chemical stability
- Replace grease or potting compounds



ELANTAS TIM: ELAN-Bond® Thermal Gel

ELAN-Bond® Thermal Gel

Product Model		Color	Viscosity (cps)	Hardness	TC (W/m.k)	Continuous Use Temperature (°C)	Flame Rating
TF150	Part A	White	300,000	Shore OO 50	1.5	-40 to 200	UL 94 V0
	Part B	Khaki	300,000				
TF200	Part A	White	350,000	Shore OO 50	2.0	-40 to 200	UL 94 V0
	Part B	Gray	400,000				
TF300	Part A	White	1,500,000	Shore OO 40	3.0	-40 to 200	UL 94 V0
	Part B	Blue	1,500,000				



ELANTAS TIM: ELAN-Bond® Thermally Conductive Adhesive

ELAN-Bond® Adhesive/Sealant

Product Model	Structure	Appearance	Curing	TC (W/m.k)	Hardness (Shore A)
7203-RV12	Silicone 1K	White/Grey/Black	Moisture Cure	1.2	58
7204-RV20	Silicone 1K	White	Moisture Cure	2.0	90

Distinctive Properties

- One component adhesive/sealant
- Cures at room temperature when exposed to moisture in the air
- Tough and flexible rubber
- Excellent adhesion to many substrates including ABS/PC/FR4 without use of primer
- Stable and flexible from -55°C to 200°C
- No solvent or other hazardous substances released during usage
- Full compliance to WEEE, RoHS and REACH safety and environmental regulations



Heat Dissipation

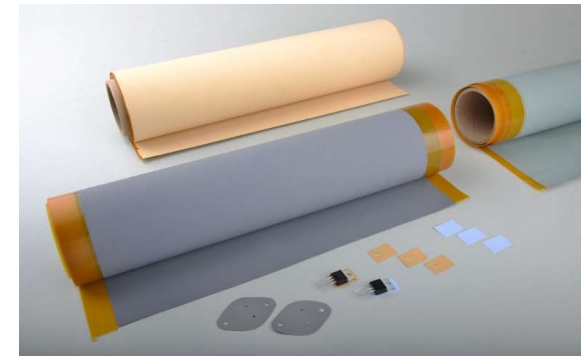
ELANTAS TIM: ELAN-Flex® Thermally Conductive Insulator

ELAN-Flex® Thermally Conductive Insulator

Product Model	Composite	Appearance	Thermal Resistance (°C-in ² /W)	TC (W/m.k)	Hardness (Shore A)
TCI 900S	Silicone + fiberglass	Brown Red	0.95 @ 10 psi 0.75 @ 25 psi 0.47 @ 100 psi	1.6	92
TCI 1200	Silicone + fiberglass	Black	0.71 @ 10 psi 0.62 @ 25 psi 0.47 @ 100 psi	1.8	80
TCI 2000	Silicone + fiberglass	White	0.35 @ 10 psi 0.30 @ 25 psi 0.25 @ 100 psi	3.5	70

Distinctive Properties

- Low thermal resistance
- Excellent electrical insulation
- Low thermal impedance in low shrinkage
- UL94 V0
- Suitable use in heating power device / heating mode vehicle



ELANTAS TIM: Thermally Conductive Potting Material

ELAN-Tron® Potting/Encapsulant Material

Product Model	Viscosity (mPa.s)	TC (W/m.k)	Max Operating Temperature (°C)	Hardness (Shore D)	Flame Rating
MC62/W363	1400-2200	0.85-0.95	155	85-87	UL 94 V0
MC622/W360	1800-2300	1.10-1.20	155	85-87	UL 94 V0

ELAN-Bond® Potting/Encapsulant Material

GF200	10000	2.0	155	65 (shore 00)	UL 94 V0
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Distinctive Properties

- Good thermal conductivity
- Good heat dissipation
- Flame retardant and RTI listed
- Easy processing



ELANTAS TIM: ELAN-Flex® Thermal Tape

ELAN-Flex® Thermal Tape

Product Model	Tape Thickness (mm)	Peel Strength @180°C (N/in)	Enduring Adhesive @25°C (hrs)	TC (W/m.k)	Continuous Use Temperature (°C)
TC-150	0.15	>12	48	0.85	-20 to 120
TC-250	0.25	>16	48	0.85	-20 to 120



Distinctive Properties

- Excellent thermal conductivity
- Excellent adhesion property
- Environmental protection (Halogen free)

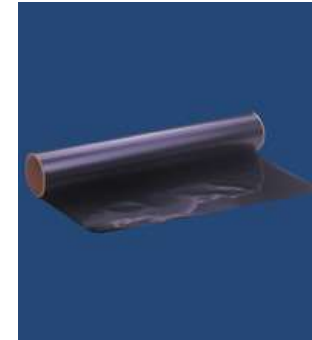


ELANTAS New Projects for Enhanced Thermal Conductivity

Thermal Conductive ELAN-Film and ELAN-Flex



partially disassembled module with cooling device



Formulation of functional fillers

Ceramic Filler



and/or

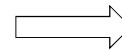


 **ECKART**

+



+ Polymer



**ELANTAS High
Thermally Conductive
TIM**


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ELANTAS Materials for Electric Vehicle Components

Motors

- *Wire Enamels*
- Electrical Insulation
- *ELAN-Film; ELAN-Flex*
- **TIM**

(Power) Electronics

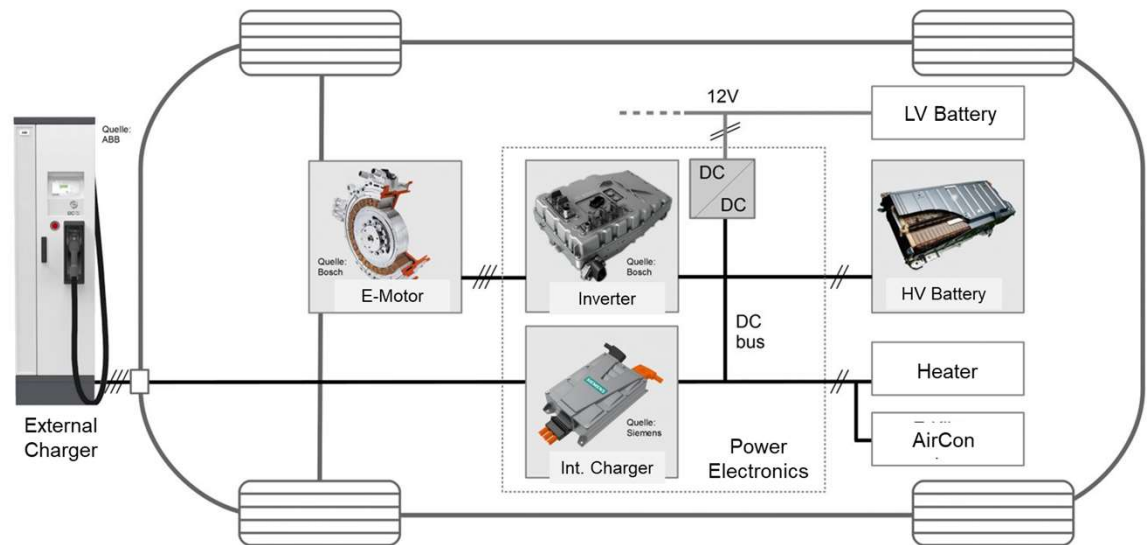
- PCB and Electronics Protection
- **TIM**

Batteries

- **TIM**
- Electronic Protection

External Chargers

- **TIM**
- Electronic Protection





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