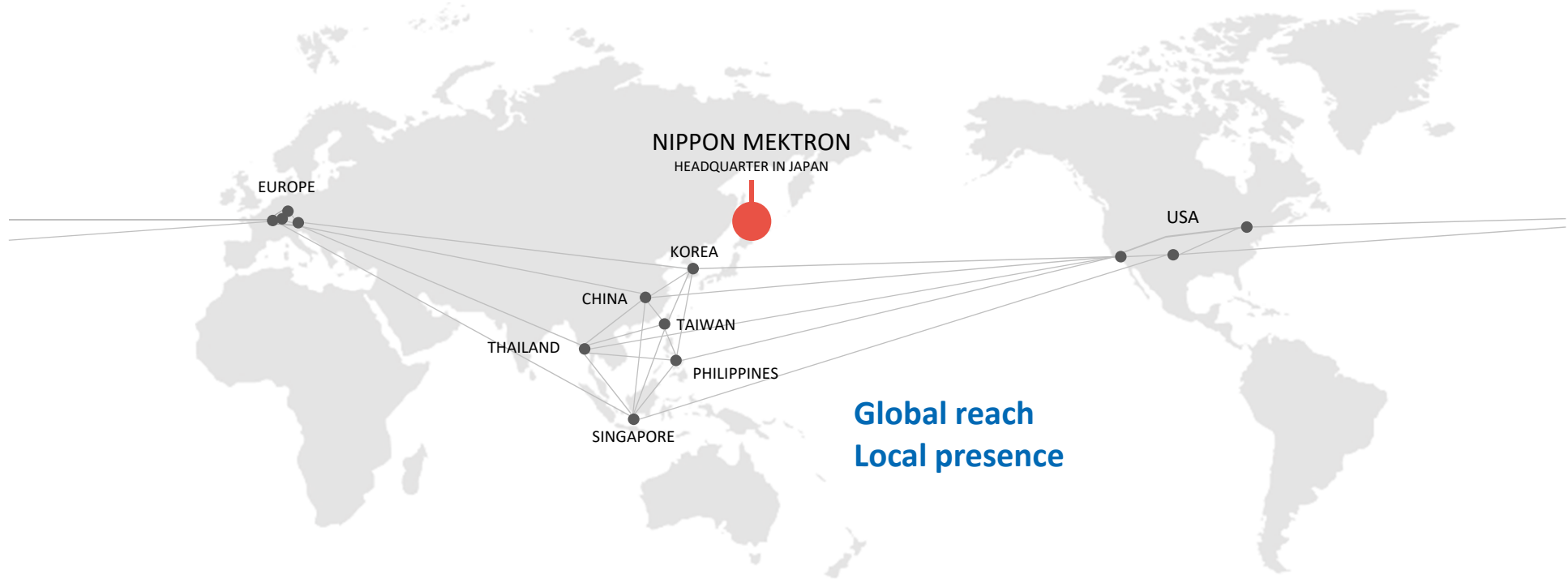




Mektec :
Driver for automotive Innovation

2019

2016 Integration of enmech in to the Global Mekttec Group



25.000+
Employees worldwide



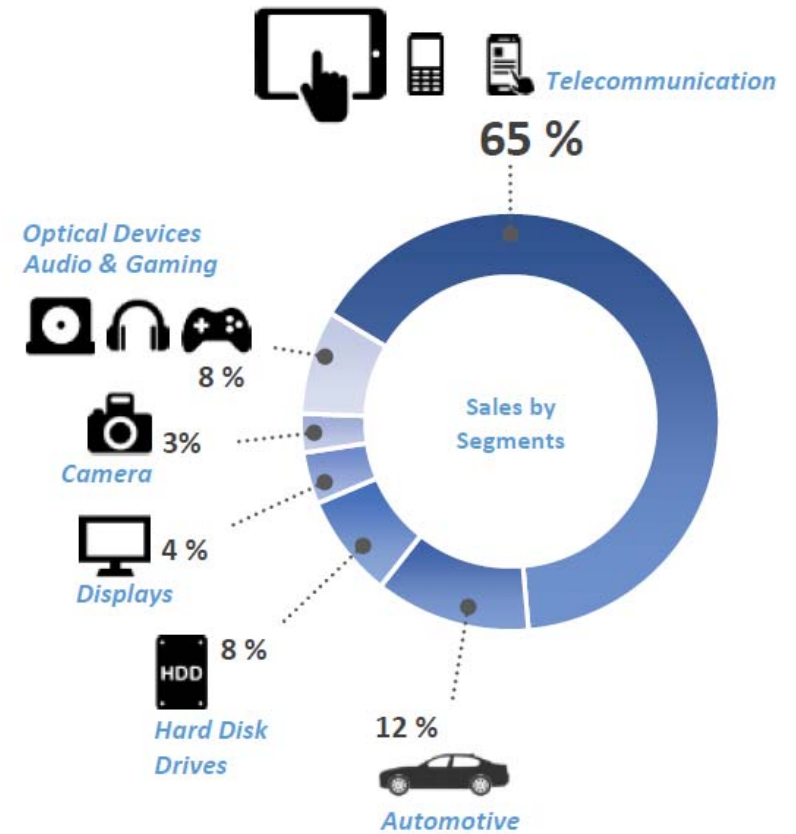
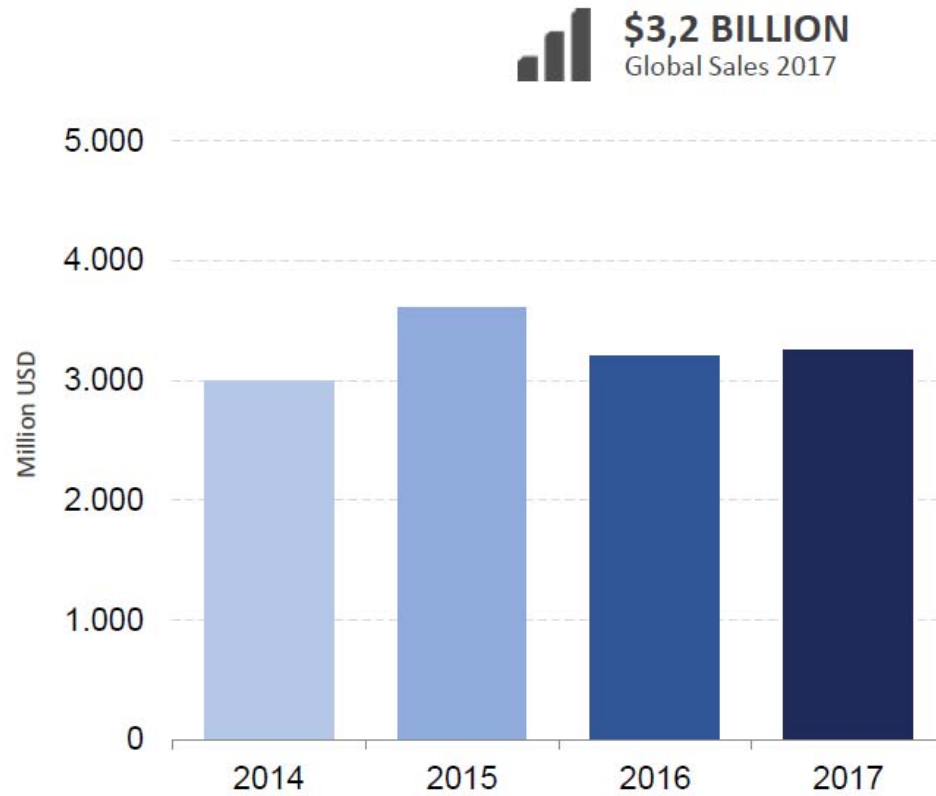
\$3,2 BILLION
Global sales 2017

#1

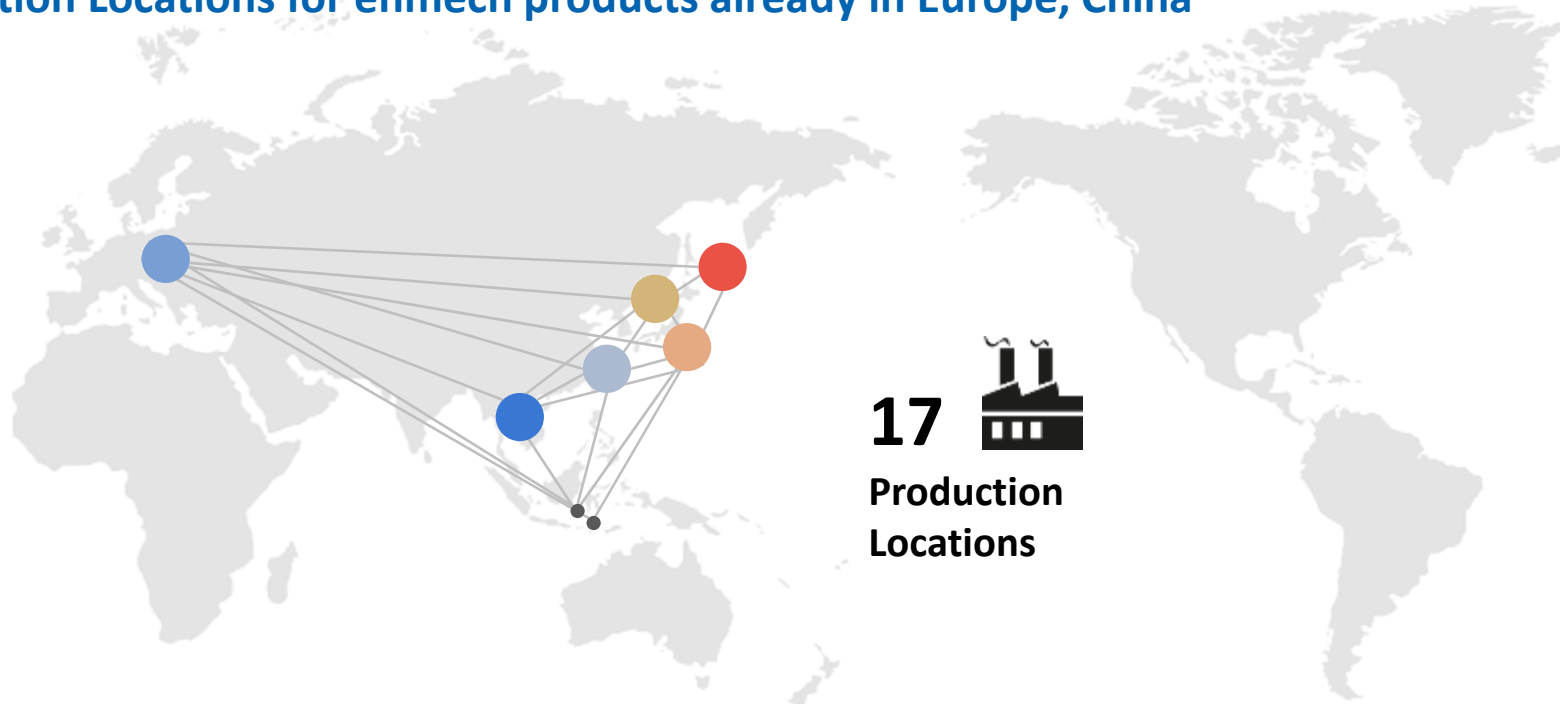
Manufacturer
of Flexible Printed Circuits



PLANTS
Worldwide (17)



Production Locations for enmech products already in Europe, China



EUROPE

- Erkelenz, Germany
- Berlin, Germany
- Pécel, Hungary
- Budweis, Cechia

CHINA

- Xiamen
- Zhuhai 1
- Suzhou
- Zhuhai 2

TAIWAN

- Tainan
- Kaoshiung
- Dafa

JAPAN

- Okuhara
- Kashima
- Shirasawa

THAILAND

- Ayutthaya

ANDERE

- Singapur
- Indonesien

Sites producing according automotive standards



FRONT END PRODUCTION



HEADQUARTER
SALES & DEVELOPMENT



BACK END
PRODUCTION & ASSEMBLY



4 PLANTS
in Europe



1200+
Employees in Europa



PRODUCTION & DEVELOPMENT



BACK END
PRODUCTION & ASSEMBLY

Certifications

- DIN EN ISO 9001 Quality Management System
- DIN EN ISO 14001 Environmental Management Systems
- BS OHSAS 18001 Occupational Health and Safety System
- DIN ISO 50001 Energy Management System
- ISO TS (IATF) 16949 Quality Management for Automotive Products

Plant Berlin



enmech – Berlin, Germany

Frontend Production and Engineering Center

Employees

~100

Space

1900m² production / 900m² prototype workshop

Capacity

800.000m²/year

Serial processes

- Roll to roll bare flex production (print, exposure, etching, laminate, contour)
- Double sided accessible copper (laser ablation and punch-technology)

Extract of prototype processes:

- Welding
- Soldering
- Coating
- Crimping
- Assembly

Extract of laboratory analysis:

- X-Ray
- EDX
- HV-Test
- Cross-Section
- Temperature / Humidity

Plant Pecel



enmech – Pecel, Hungary

Backend Production

Employees

~700

Space

4500m² production

Greenfield

New plant with 11.000m² will be ready mid of 2019

- SMT technology (e.g. connector, fuses, NTC, LED, ASICs, welding terminals)
- Wave soldering for connector assembly
- Light beam soldering
- Crimping line for connector assembly and welding terminals
- Ultrasonic welding for bus bars
- Riveting line for bus bars
- Automated applying of adhesives
- Plastic carrier assembly incl. hot stacking processes
- Conformal coating line (e.g. fuses and welding areas)
- LASER processes for contour cut and welding
- Resistance welding
- Milling, Drilling, Stamping
- EOLT

Als Bestandteil der Kabelwerke Reinshagen, mit Hauptsitz in Wuppertal, hat sich das Berliner Werk immer schon mit alternativen Verbindungstechnologien beschäftigt und hat bereits in den 80 ern Applikationen mit Flachleitern, insbesondere Folien, hergestellt.



Dashboard 1985



Dachhimmelverkabelung 2001



SMD 1985



Multilayer 2001



SMD 2001
LASER gelötet
SnPb / 42.000 LEDs pro Tag

Ende der 90 er wurde das Berliner Werk in Delphi umfirmiert.
2006 erfolgte dann der Verkauf an die Fa. Freudenberg NOK Mechatronic.
Seit 2016 ist die enmech 100% teil der Mektec Group.
Mit dem Zugewinn des ungarischen Werkes wurde die Fertigung neu strukturiert.

Produktportfolio 2017



Exterior Lighting



Ambient Lighting



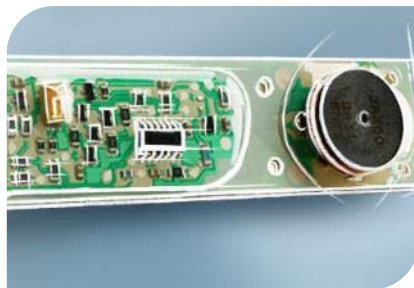
Interconnection Boards for Batteries



Foil Antennas



Heating Modules



Seat and Sensors

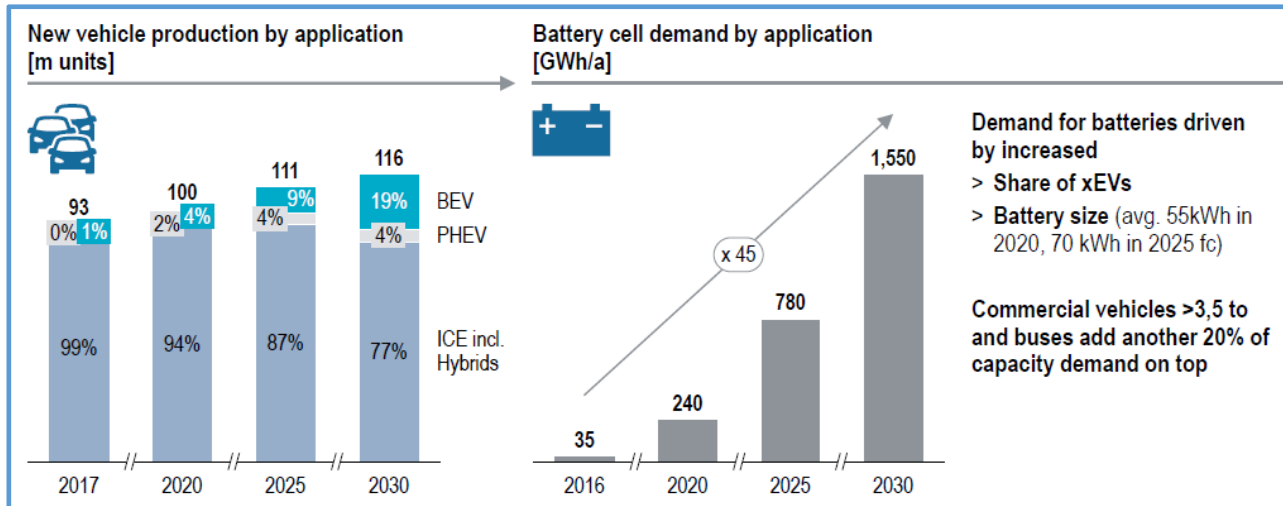


Window Connectors



Other Electronics

Was sind die Trends im Automotive Segment ?



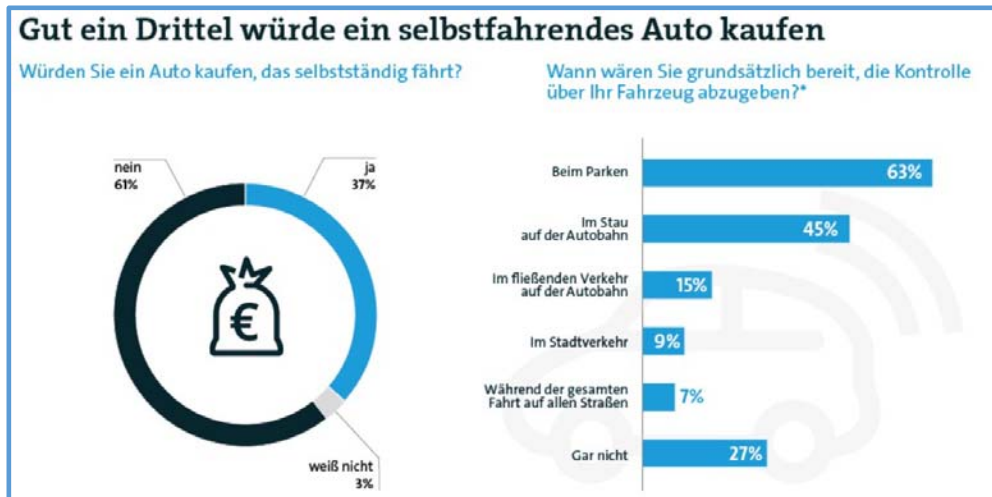
Trend Battery

Demand for batteries driven by increased

- > Share of xEVs
- > Battery size (avg. 55kWh in 2020, 70 kWh in 2025 fc)

Commercial vehicles >3,5 to and buses add another 20% of capacity demand on top

Trend Autonomous driving



Trend Connectivity



2030 → 40% off all cars with Car to X Communication

Is enmech prepared for the future ?

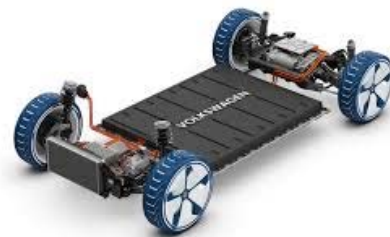
Needs...

- Exterieur Light
- Collision Warner
- Camera Heater
- Radom Heater
- Seat Sensors



Needs...

- Battery Cell Sensoric
- Cell Connection
- Battery Heater
- Leakage Sensor
- ...

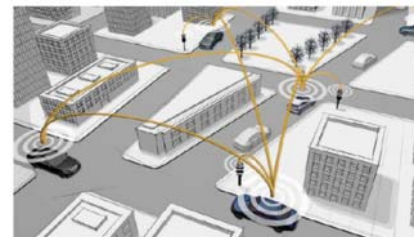


Needs...

- Beltsensor
- Interieur Illumination
- 3D Sensor
- Seat Sensors
- Ambiete Heater
- ...



“The car interior becomes the ‘next living space’.” (VDI Nachrichten, 2017 Nr. 37)



Needs...

- Antennas
- Antenna Moduls
- Antenna Connectors
- ...



Autonomous driving

Exterior lighting

- Less current consumption
- Clear distinctive look for each e-mobility OEM design
- Adaptive illumination
- No blind zone

Major applications

- LED Matrix headlamp (high beam, low beam)
- LED Day Time Running and Static Bending Light
- Mirror lighting indication (side marker, puddle light, side blind zone)
- LED rear lamp (tail, stop, back-up and indicator lights)
- Center high mount stop lamp (CHMSL)





Autonomous driving

Ambient light

- Adjust the color and intensity before you drive and during driving autonomous “Wellness – Light”
- Automated change of light profile based on weather situation
- Search your car by using the interior lighting

Major applications

- LED functional lighting (reading lights, footwell illumination, dome lights)
- LSM door and headliner ambient lighting
- Interior illumination integrated into headliner
- PU based sealed Side LED stretchable





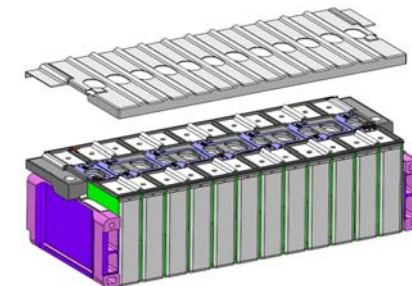
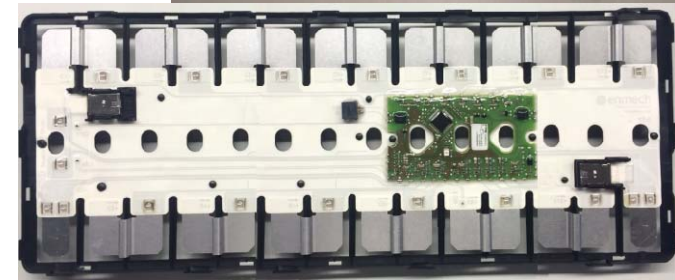
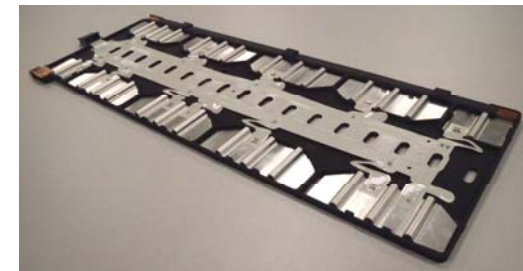
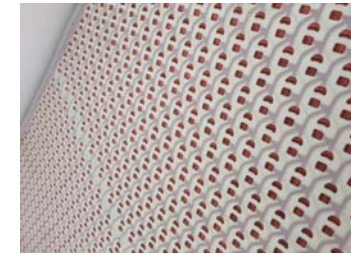
E Mobility

Battery Applications

- Customized battery monitoring and power distribution systems for hybrid and electric vehicles
- Including voltage and temperature sensing
- Cell connection

Major applications

- Cell connector/sensing board
- Temperature sensors
- Harness
- Heater
- Crash sensor
- Smart cell
- Solutions for pouch cells for prismatic cells cylindrical cells





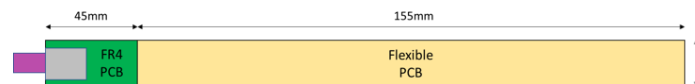
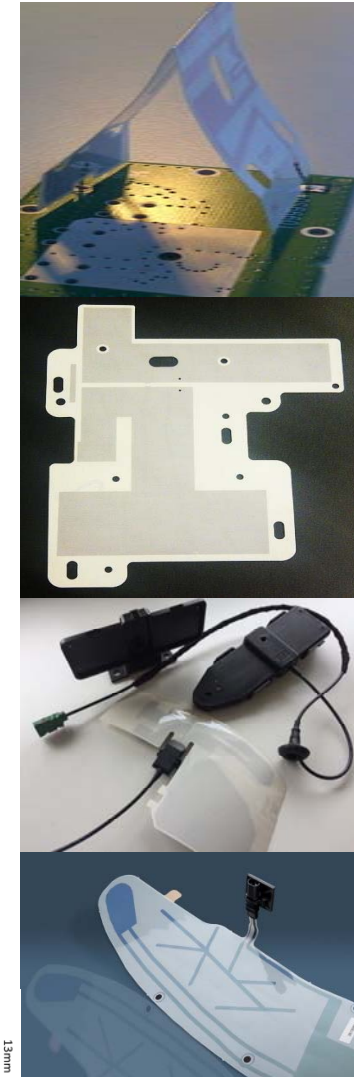
Connectivity

Antenna

- Antennas for mobile services of all global standards: Digital and analogue radio, data and TV services as well as remote control functions
- Send information via smartphone to your car
- Car-to-x communication

Major applications

- Antennas for use outside (e.g. roof, mirror, bumper, spoiler)
- Antennas for use inside (e.g. door, ceiling, arm rest)
- Antennas with integrated amplifier, diagnostic resistor, capacitor

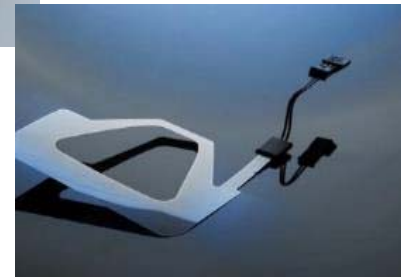




Autonomous driving

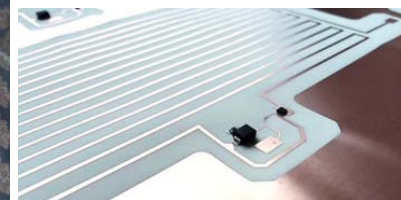
Heater

- Avoid fogging and icing of sensors and cameras for autonomous driving
- Reduce system cost and weight by using heaters with constant wattage, integrated temperature control or PTC temperature control
- Safety during driving with permanent clean windshield



Major applications

- Heaters for vision systems (e.g. de-icing of camera vision area in front screen)
- Heaters for RADAR sensing
- Heaters for Wiper
- Mirror heaters with blind spot warning
- Armrest and covers heater
- Single segment heating





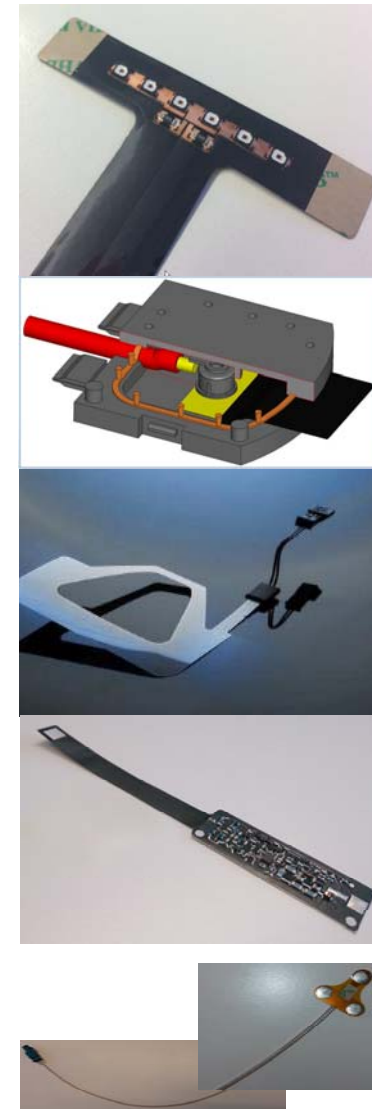
Autonomous driving

Glass

- Glasses are carrier for Heaters and Antenna
- Glasses are in view Smart Antenna Connector to improve Antenna performance
- Smart Interconnection Antenna to Amplifier
- Illuminated Glass as Warning Lamp , CHMSL
- Heater for thin glass and vision systems

Major applications

- Warning lamp
- 3rd-Brake Light
- Smart Interconnection Antenna to Amplifier
- Heaters for Wiper Park





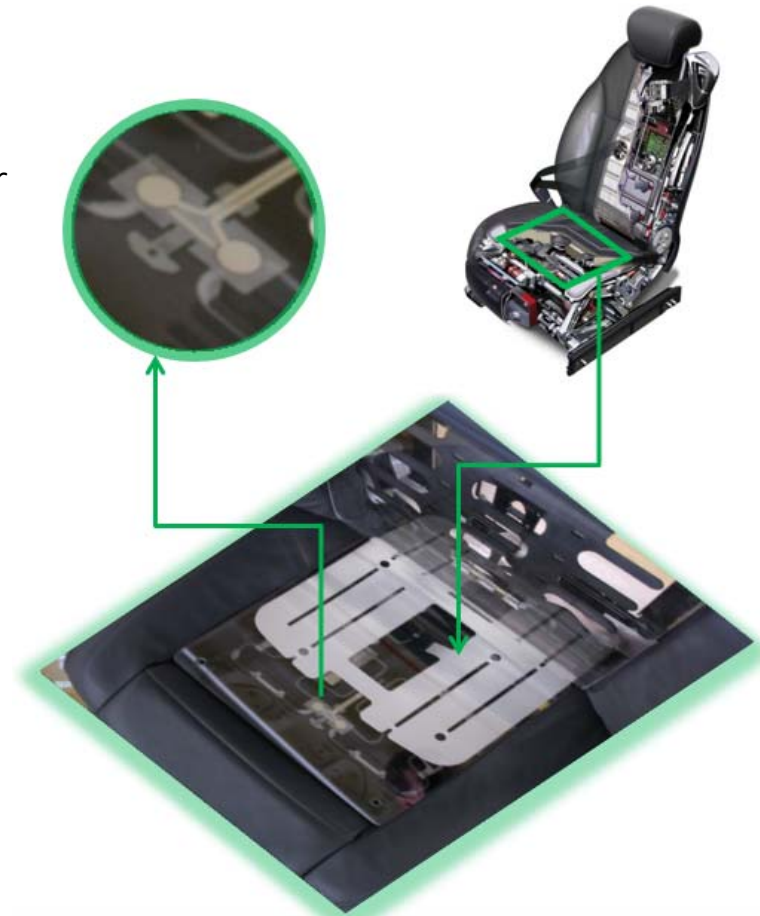
Autonomous driving

Seat occupation

- Switch off/on function related on seat occupation
- Reduce current consumption for electrical heaters or in general for air conditioning
- Low weight, small, thin and applicable between seat cover and foam or below the foam
- Measurement of capacitance or just a switch

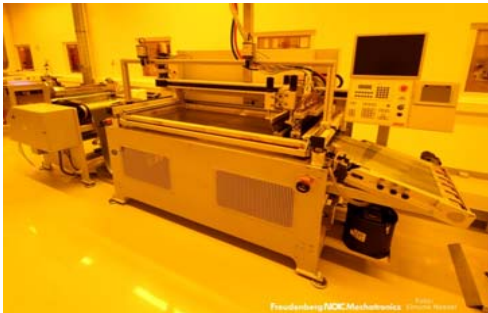
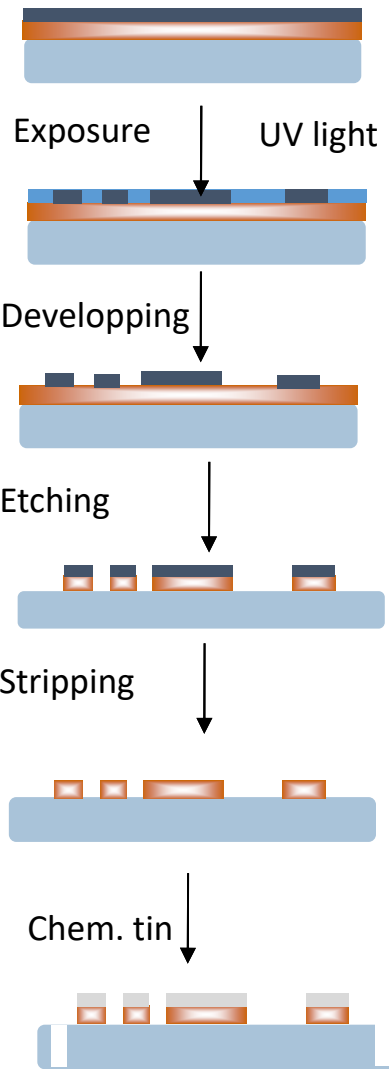
Major applications

- Front and back seat
- Removable seats
- Buckle switch





Lamination photo resist



Stamping



Laser





SMD Assembly



LASER welding



Crimping



EOL functional test