COVERLAY – MORE THAN A FLEXIBLE SOLDERMASK SUBSTITUTE

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WÜRTH ELEKTRONIK MORE THAN YOU EXPECT

AGENDA

Coverlay - more than a flexible soldermask substitute

1. Introduction
   - Coverlay
   - Insulation foils
2. Coverlay as insulation foil
   - Design rules
   - Cost optimization
   - Application
3. Summary

Verena Laukemann
Technical project management

SHORT SURVEY

Multiple choice with several answers

For what purpose do you use insulation foil so far?

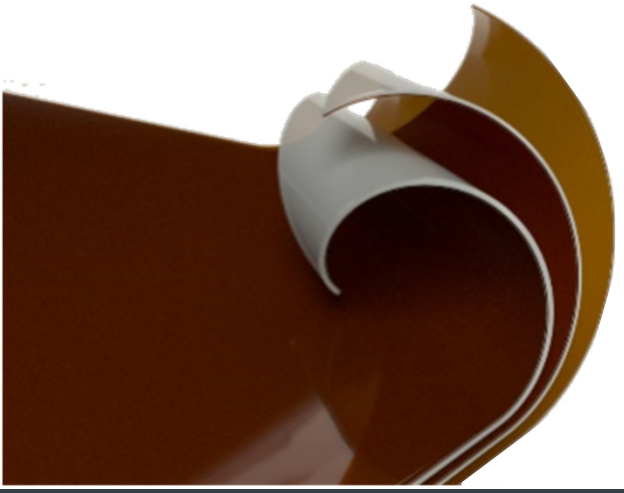
- Electrical insulation
- Mechanical protection
- Thermal protection
- Others
- Not in use so far

INTRODUCTION

Coverlay

What is Coverlay?

- Composite material consist of Polyimid and adhesive
- Typical: 25µm Polyimid
- Adhesive thickness: 25µm or 50µm
- Protection of copper areas and signals
- Save spanning of vias



What are its properties?

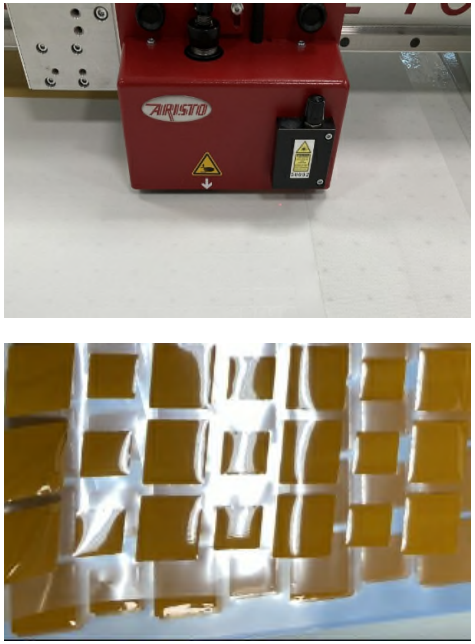
- Flame retardant V-0
- Thermal conductivity 0,2 W m^{-1} K^{-1}
- Dielectric strength ≥ 4kV/mil
- Small outgassing

How is Coverlay processed?

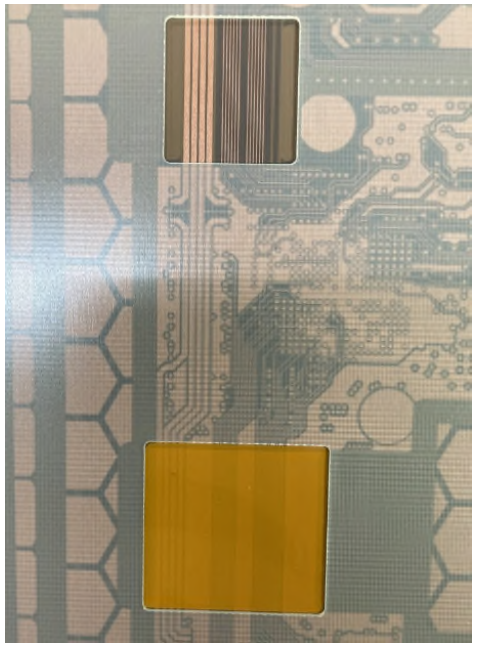
INTRODUCTION

Coverlay – How is it processed?

Cutting

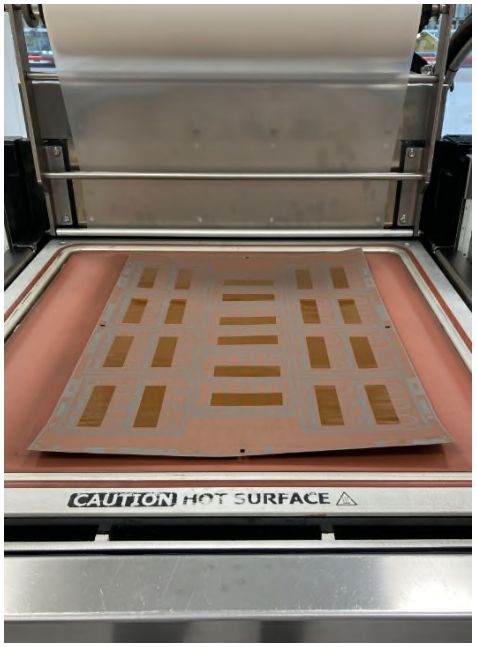


Registration



Fixation

Pressing



INTRODUCTION

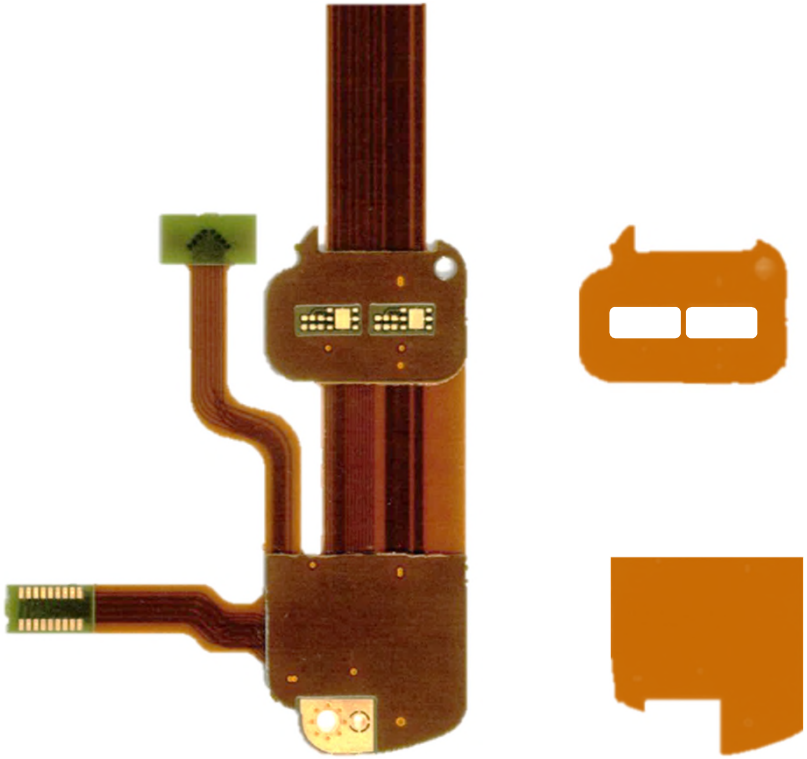
Insulation foil

Application areas

- Electrical Isolation
- Thermal protection
- Mechanical protection
- Limited space conditions

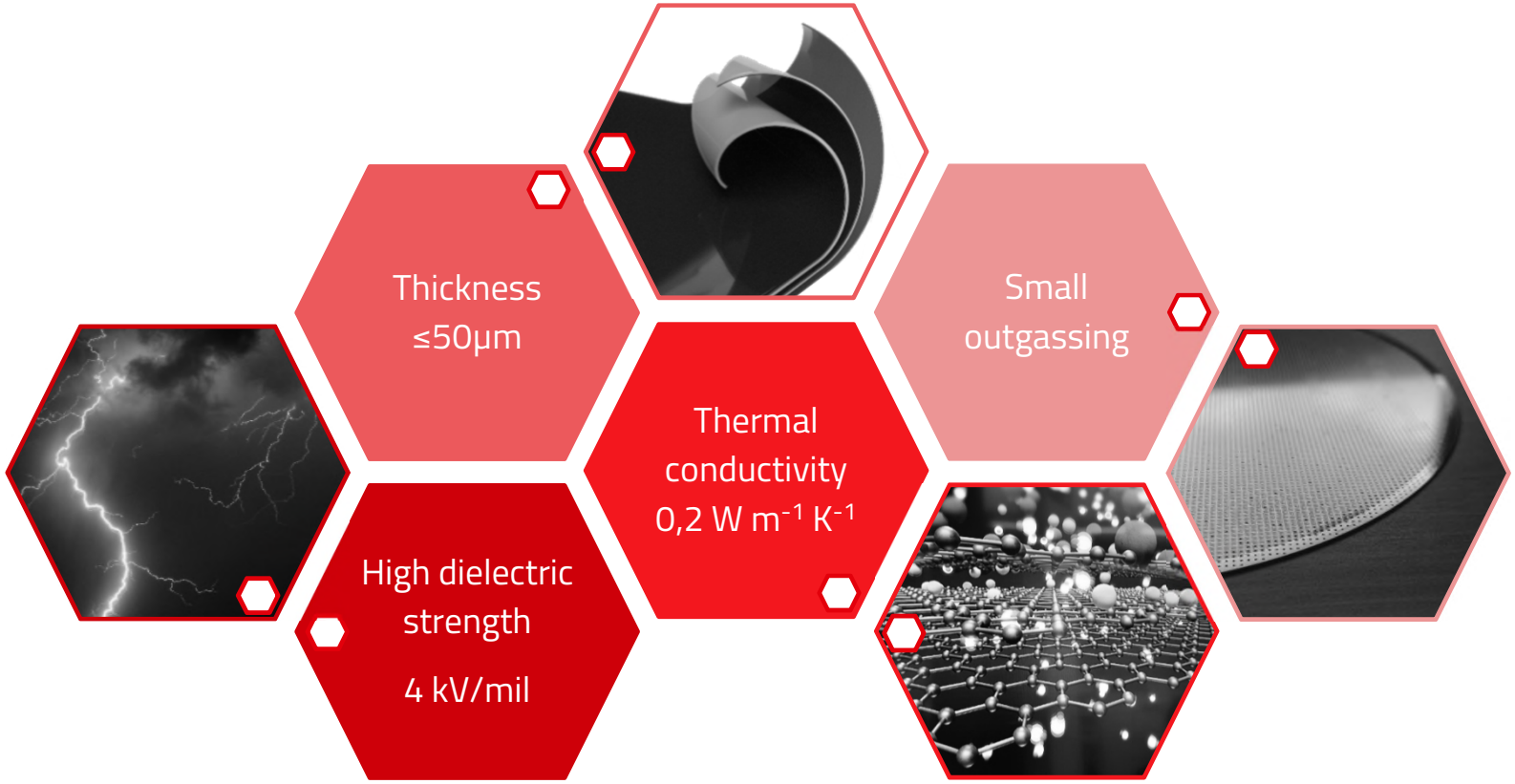
Applications

- Control units
- Busbars
- High voltage
- Sensorics



INTRODUCTION

Advantages of Coverlay as insulation foil

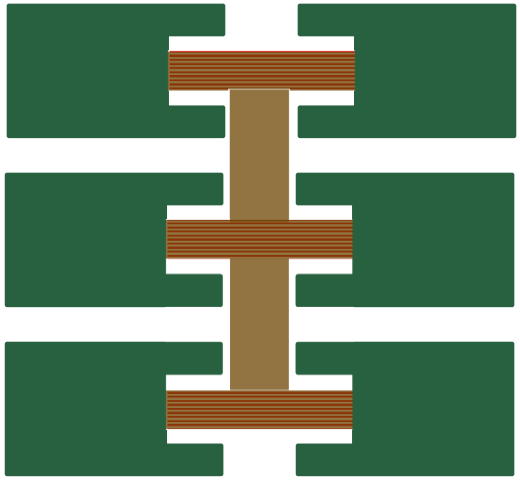


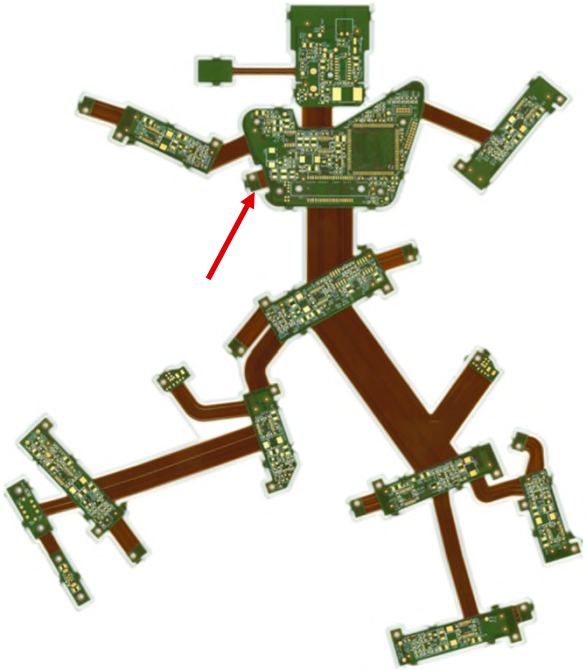
COVERLAY AS INSULATION FOIL

Design Rules

Shape

- Minimum size: 10mm x 15mm
- Combine



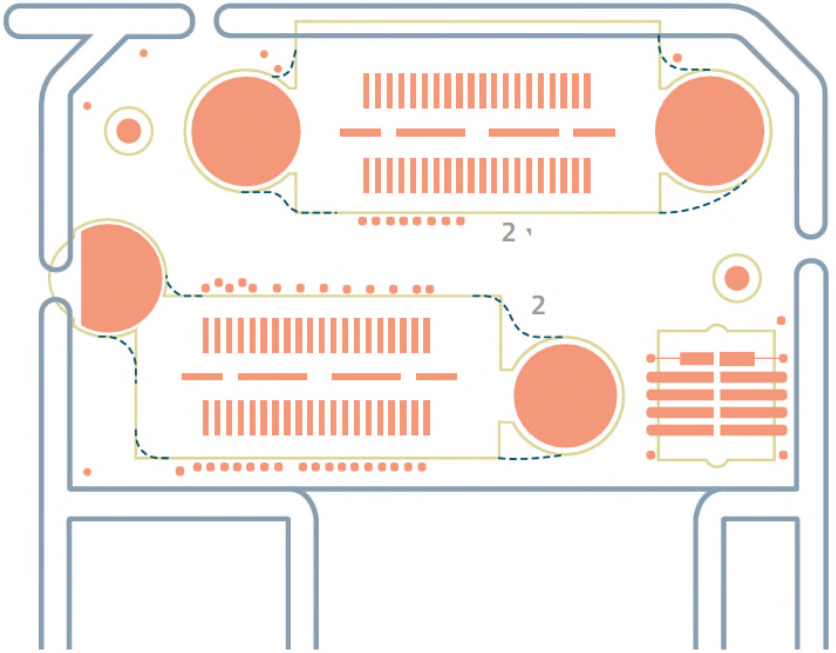


COVERLAY ALS ISOLATIONSFOLIE

Design rules

Shape

- Avoid sharp corners
- Avoid radii ≥ 2mm

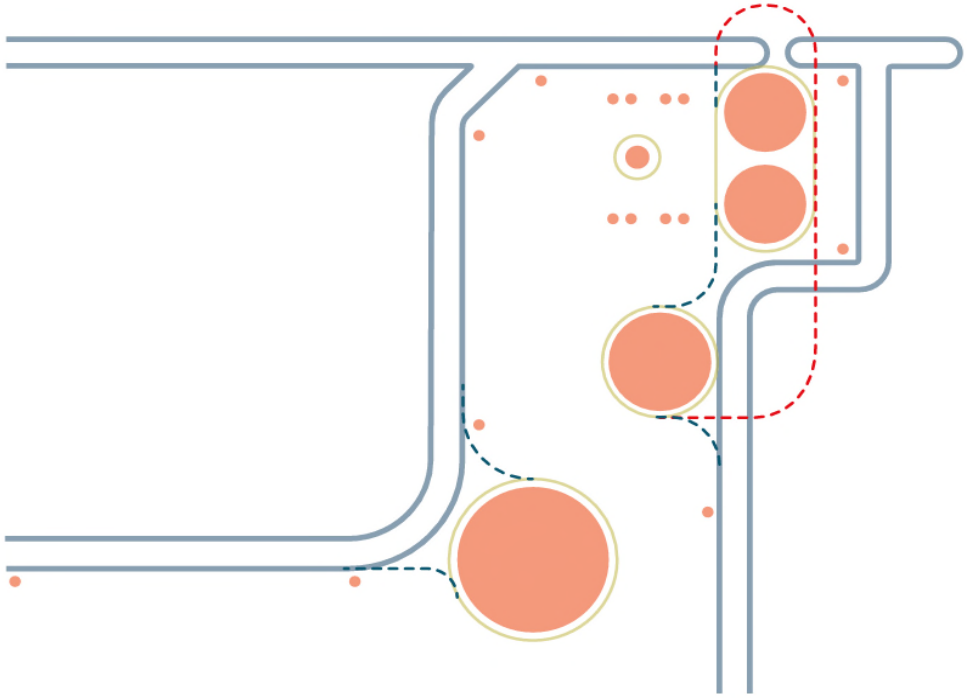


COVERLAY ALS ISOLATIONSFOLIE

Design rules

Shape

- Avoid sharp corners
- Avoid radii ≥ 2mm
- Avoid small webs



COVERLAY AS INSULATION FOIL

Design rules

Clearances – recommendation of IPC

- Clearance: min. 0,25mm
- Web: min. 0,25mm

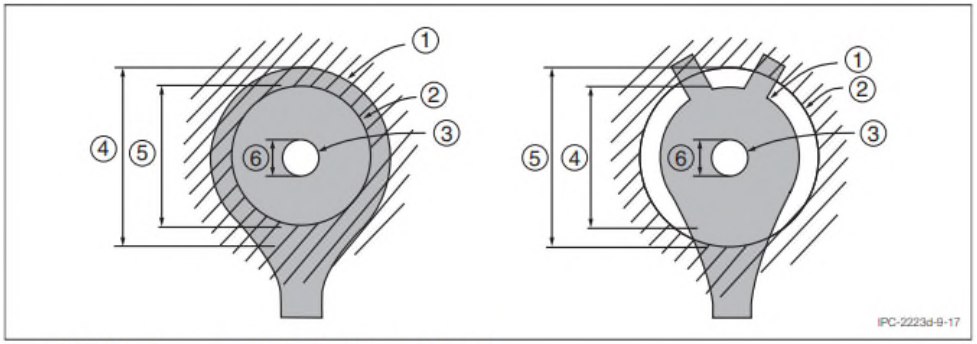


Figure 9-17 Coverlay Access Opening for Unsupported Lands
Note 1: Land.
Note 2: Coverlay.
Note 3: Product Aperture.
Note 4: Dimension "L".
Note 5: Dimension "C".
Note 6: Dimension "D".

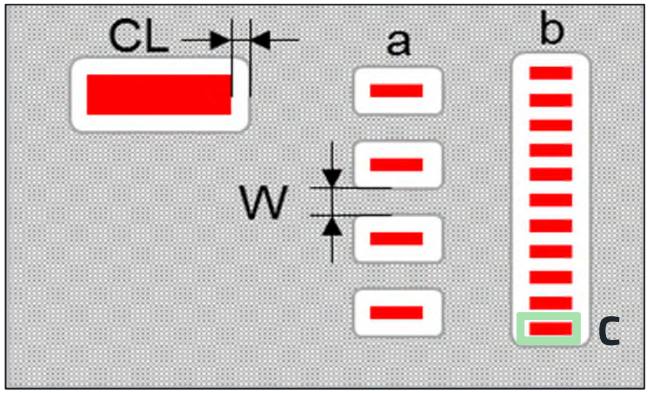
Source: Vgl. IPC 2223D

COVERLAY AS INSULATION FOIL

Design rules

Clearances

Symbol	Description	Technical Standard	Advanced
	Minimum size insulation foil	15mm x 15mm	10mm x 15mm
a	Single clearance SMD Pad	-	-
b	Window clearance SMD Pad	-	-
c	Solder mask frame	-	-
CL	Coverlay clearance	500µm	-
W	Minimal web width	500µm	-
-	a: minimum spacing Pad-Pad	1500µm	-
-	b: minimum spacing Pad-Pad	100µm	-



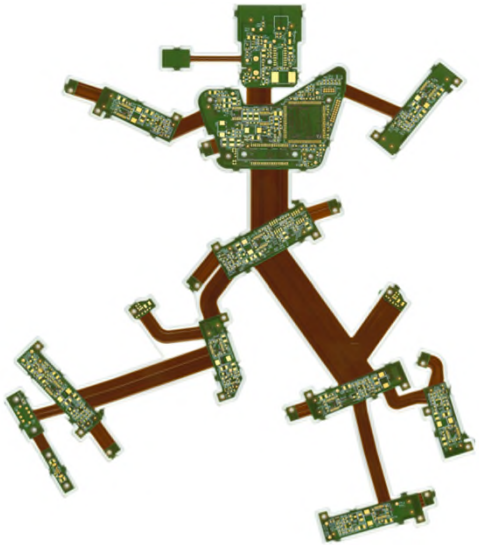
More information:
Insulation foil Design Rules

COVERLAY AS INSULATION FOIL

Cost optimization

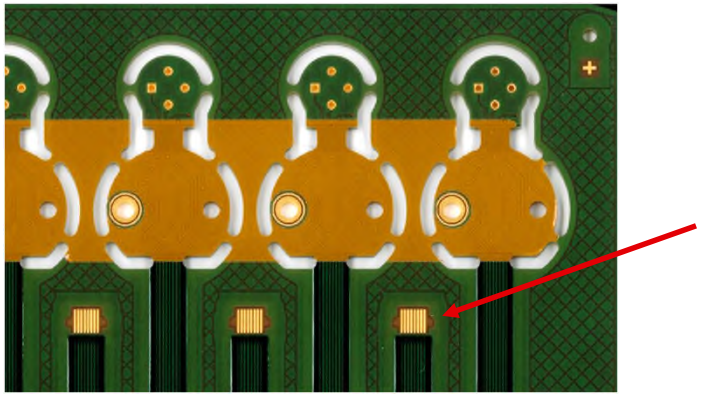
Cost drivers

- Small Coverlay parts
- Many single parts
- Small clerances



Cost optimization

- Less is more
- Combine single parts
- Big clearances if necessary as window
- Nested delivery panel



SHORT SURVEY

Please answer in the QUESTIONS field

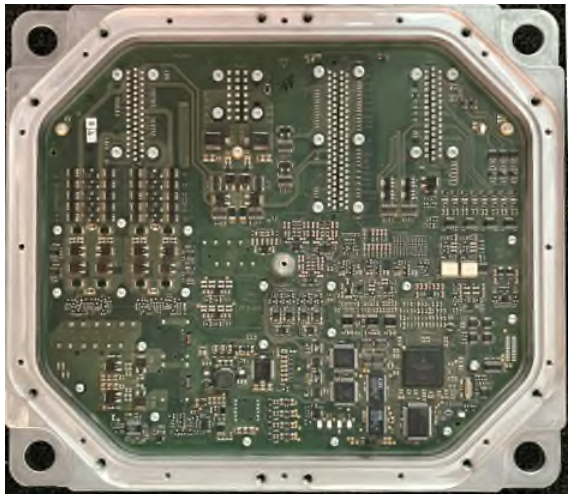
For which application can you use Coverlay as insulation film?

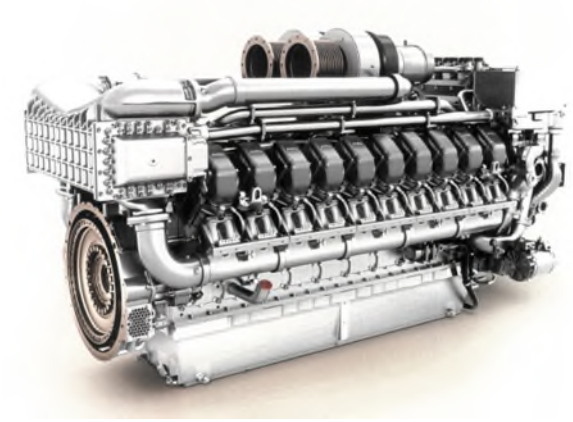
COVERLAY AS INSULATION FOIL

Application example

Motor control unit

- **Requirements**
  - Heat sink by an aluminium housing
  - Very good electrical isolation
  - Filling of vias
  - High abrasion resistance
  - Use at shock and vibration may not cause damages



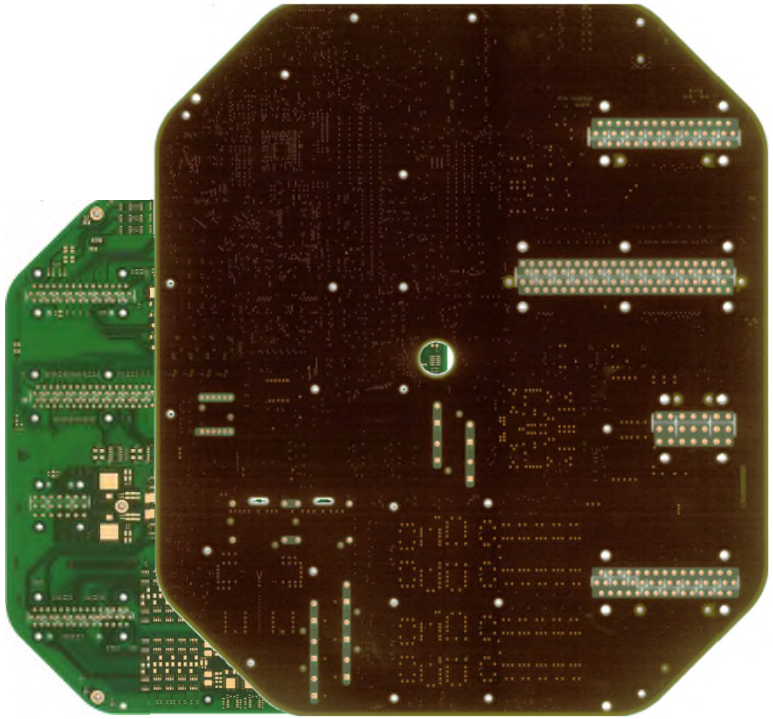


COVERLAY AS INSULATION FOIL

Application example

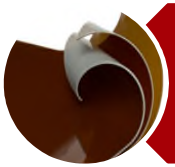
Motor control unit

- **Coverlay as insulation foil**
  - PCB screwed on a heat sink housing
  - Very good isolation with low thermal resistance at the same time
  - Save filling of vias
  - High abrasion resistance
  - Use at shock and vibration may not cause damages

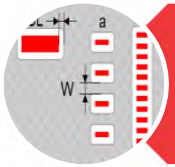


COVERLAY AS INSULATION FOIL

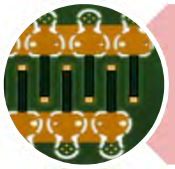
Summary



Coverlay as mechanical and electrical protection



Recommendation for shape and clerance in design rules



Less is more!

Versatile application areas, e.g. motor control or vacuum environment

THANK YOU FOR YOUR ATTENTION

Coverlay – more than a flexible soldermask substitute