EMBEDDING TECHNOLOGY

Indicators for technology use

SOLDER.embedding

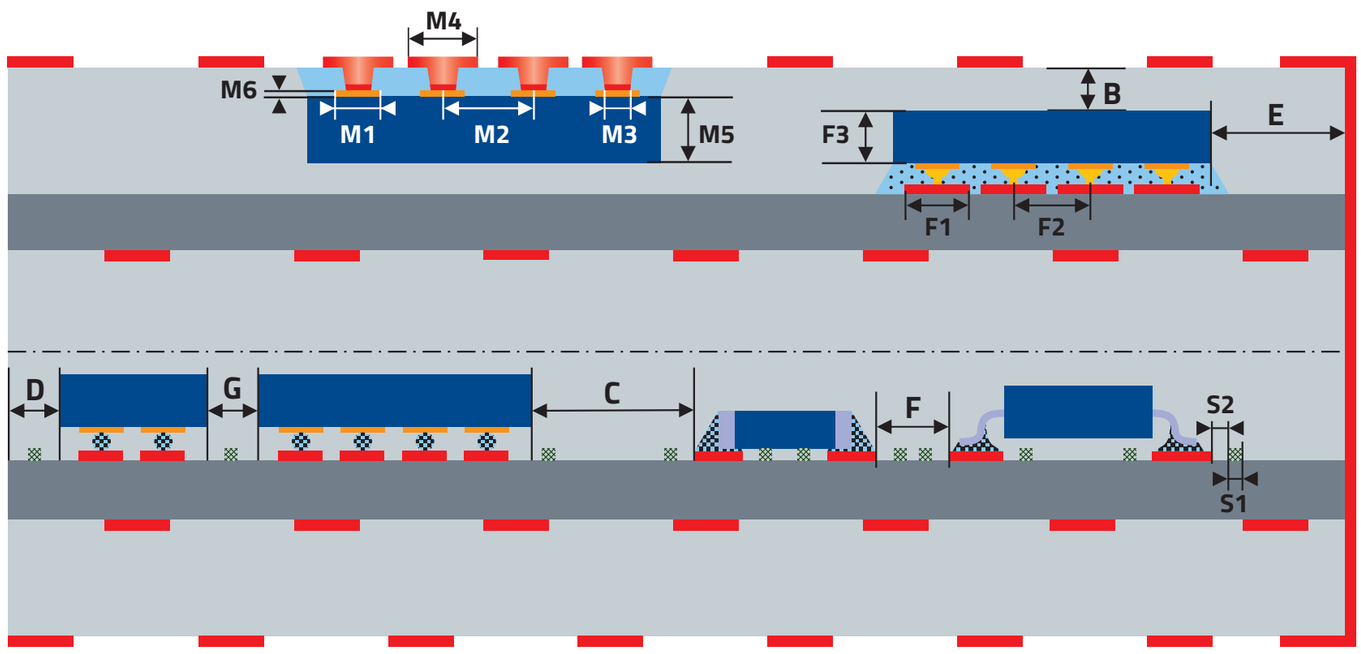
- Active components that are not available as a bare die
- Active and passive components
- Range of the solid SMD components can be used (with restrictions)

MICROVIA.embedding

- Combination of active and passive components
- Highly reliable assembly and packaging technology
- Copper or nickel-palladium pad metallisation on the components

FLIP-CHIP.embedding

- Active components, which were previously wire-bonded
- Components need to be bumped (Nickel Gold or Gold stud bumps) or can be bumped at WE (Gold bumps)
- No passive components possible
- Active components with pitch < 250 µm possible



SOLDER.embedding
- **S1** Solder resist frames: 100 µm (advanced: 75 µm)
- **S2** Solder resist clearance: 75 µm (advanced: 50 µm)

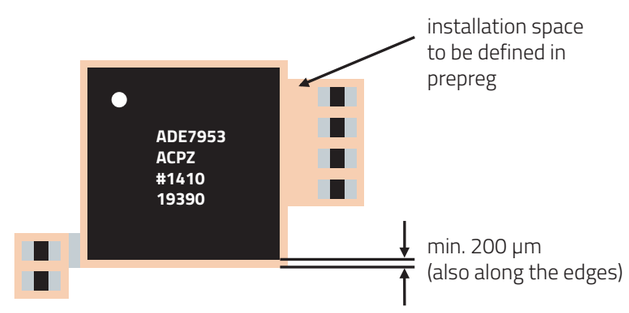
MICROVIA.embedding
- **M1** Pad size of component: ≥ 150 µm
- **M2** Pitch on component/PCB: ≥ 250 µm
- **M3** Microvia onto component: ≥ 50 µm
- **M4** Pad size PCB: ≥ 175 µm
- **M5** Thickness of component: ≥ 150 µm
- **M6** Thickness of pad metal: ≥ 8 µm

FLIP-CHIP.embedding
- **F1** Pad size PCB: ≥ 75 µm
- **F2** Pitch on component/PCB: ≥ 250 µm
- **F3** Thickness of component: ≥ 150 µm

Components in general
- All components must fit into the actual layer stack-up
- No component may protrude in the z-axis
- Max. component size: 10 × 10 mm²
- Components must not contain cavities (e.g. Quartz Crystal devices) or liquids (e.g. liquid electrolytes).

Placement of components
- Occupation of an inner layer with components
  - max. 40 % of the available are
  - Individual clarification necessary with > 40 % occupancy
- Components should be grouped
- Max. size of the group: each point in the group must be reachable from the group edge within 5 mm to ensure the resin flow into the cavity of each group

Component positioning – resin flow



The following applies to the cut-outs milled in prepreg:
All points within the cut-out must be accessible at a distance of ≤ 5.0 mm from the boundary of the cut-out.

A **PCB thickness – according to our general PCB specification.**
- Standard: 2,4 mm
- Upon request: 3,2 mm
- In special cases: > 3,2 mm (needs to be evaluated for specific applications)

B **Layer stack-up**
- At least one layer of prepreg should always be inserted between the component and the copper layer above, or it must be ≥ 100 µm (smaller on request).
- Based on assembly technology and layer stack, the max. thickness of the components is calculated
- The WE layer stack-up proposal specifies the maximum possible component height – or references the maximum component height.

C **Distance group to group or component to group:**
- Min. 1.000 µm
- 700 µm also possible upon request (700 µm ≙ 300 µm material + 2 × 200 µm clearance)

D **Distance component to PCB edge**
≥ 500 µm
(less possible upon request and after clarification)

E **Distance via to component edge**
≥ 500 µm
(less possible upon request and after clarification)

F **Distance component to component**
- Condition: pad of the footprint extends beyond the component.
- ≥ 300 µm between the pads
- Smaller distances upon request and after clarification

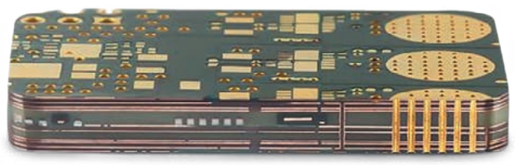
G **Distance between component and component**
- Condition: component extends beyond pads
- ≥ 200 µm between component outlines
- Smaller distances upon request and after clarification

Unless otherwise agreed, IPC-7092 applies to all products with embedded components.
The associated PCB production corresponds to IPC-A-600 Class II and the assembly to IPC-A-610 Class II.

Depending on the design and final build-up of the PCB with embedded components, the design rules/design guides currently valid at Würth Elektronik „Basic Design Guide", „Flex-Rigid Design Guide", „Heat Management Design Guide" and the „HDI Design Guide" apply. If you have different requirements, please contact us directly!

Embedding Technology

EMERGING TECHNOLOGIES FOR INNOVATIVE SOLUTIONS



Miniaturisation
- Package replacement
- Space savings of assembly area on the outer layers

Performance/Function
- Integrated shielding
- Short signal paths
- Protection against plagiarism

Reliability
- Protection against environmental influences
- Secure and full-surface fixing
- Thermal management

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