

Master Project

Development of Novel Joining Techniques for Power Semiconductor Packaging

The development of new wide-bandgap semiconductors also demands novel approaches for integration of the semiconductor dies into power electronic modules (see Figure 1). A key technology is the joining of semiconductor, substrate and base plate. With regard to increasing restrictions on solder types, as well as to increasing demands on temperature stability and on efficient cooling, several new joining techniques are currently being developed.

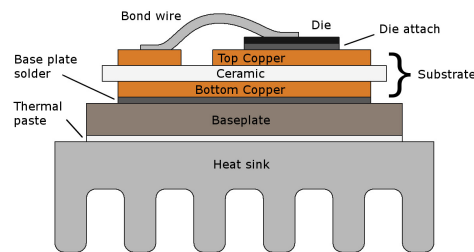


Figure 1: typical power electronic module

Scope of the thesis

The thesis will include the adaption of a novel joining technique for semiconductor die attachment in power electronics. It'll give the student the chance to work on an interdisciplinary topic which combines electrical engineering with materials science and engineering. The practical work will predominantly be executed at Empa in Dübendorf.

- Literature research: joining technologies for power electronic modules (10 %)
- Adaption of the novel joining technique for die attachment, fabrication of a prototype (60 %, Empa)
- Characterisation and testing of the prototype (30 %, ETH)
- Duration: 6 months (master thesis)

This thesis is offered in cooperation with the Advanced Power Semiconductor Laboratory, ETH Zürich.

Contact

If you are interested or want to learn more, please contact Dr. B. Rheingans (bastian.rheingans@empa.ch) Empa Dübendorf (daily supervisor), or Prof. Dr. U. Grossner (ulrike.grossner@ethz.ch), ETH (supervising professor).