

process optimisation thanks to imec guidelines

Thanks to its early involvement services with Design for eXcellence, tbp electronics achieves the best results for its clients. In order to continue to optimise its own processes, tbp utilises the expertise of knowledge institute imec: as a partner of imec's center for Electronics Design and Manufacturing (cEDM).



Imec, situated in Heverlee in Belgium, develops technical solutions for industry in the field of nanoelectronics. The Electronic Assembly Group is part of this with 14 scientists and engineers under the leadership of Geert Willems. Together, they implement the services of the cEDM.

benefit

'Our aim is to support companies in the design and production of pcb's and electronic assemblies (pcba's), resulting in better quality, greater reliability and lower costs, even if these are produced in Europe', according to Geert Willems.

'One of the ways we do this is by issuing guidelines for their design, specifications and production processes, based on scientific models. This is combined with industry experience, also outlined in globally-applied industry standards (IPC, JEDEC and others).

The main benefit is that they are universally applicable as a result, throughout the entire chain, and not just for one specific situation, production environment or supplier.' imec has developed eleven guidelines for Design for eXcellence and three integration guidelines (see table).

practical link

Willems: 'Our research projects are subsidised by the Flemish government or Europe. We work closely with twenty or so partners, including tbp and NEVAT-EMS, who make a substantial contribution to current projects and form the industrial touchstone for the directives. They assess the guidelines for industrial feasibility before we publish them. This is how we keep in touch with everyday practices. Our partners are given access as early as the preparation phase. The guidelines, along with a number of design tools, are available free of charge to all

DfX Guidelines	Title
EDM-D-000	Good Design-for-X Practice
EDM-D-001	PCB Specification
EDM-D-002	Component Specification
EDM-D-003	PBA Assembly Material Specification
EDM-D-004	Design-for-Assembly
EDM-D-005	Rigid PCB Build-Up and Density Classification
EDM-D-006	Layout Solutions
EDM-D-007	Quality and Test Coverage Quantification Design-for-Test
EDM-D-008	Technology and Manufacturing Capability Mapping of PBA Designs
EDM-D-009	Signal Integrity
EDM-D-010	Power Integrity
EDM-I-001	Mechanical Integration
EDM-I-002	Thermal design
EDM-I-003	EMC Interaction

the DfX- and integration guidelines of imec

partners and members (more than 100 European companies). Other interested parties can purchase the guidelines via our website.'

'On the one hand, imec has a collective function by enhancing knowledge in the industry and resolving difficulties', adds imec project manager Boris Leekens. We do this with our projects, from which the guidelines and design tools are generated, using seminars and training. We also provide a consultancy service which focuses on individual businesses. This allows them to acquire specific expertise in-house. We offer a reduced rate to our members and partners. Thanks to simulations and failure

analyses, we can trace the causes of problems in the process and help to resolve them. We also incorporate these experiences into our guidelines. In this way, we develop technological solutions which are relevant to the entire industry.'



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Through early involvement at the design stage of a pcba, tbp electronics achieves the highest product quality and product reliability, full custom work, maximum delivery flexibility and the lowest overall costs. Clients, including Innoseis, know how to utilise this value for their products.

success projects thanks to early involvement services

'With our early involvement services we are already cooperating with designers in the design phase and making them aware of the testability, manufacturability and reliability of supply', according to Marcel Swinnen, managing director test & DfX at tbp. 'We want to do everything right at one attempt and only do what is necessary: 'right first time'. We achieve this thanks to our early involvement services which have been structured according to Design for eXcellence (DfX), consisting of three phases and the components Design for Test (DfT), Design for Manufacturing (DfM) and Design for Logistics (DfL). As the sole EMS supplier, the excellent results we achieve with this, expressed in production yield (first pass yield) and product quality (slip through), are included as results commitments in our proposals.'

Innoseis

Innoseis has developed instruments for the measurement of seismic vibrations which can communicate wirelessly. The pcba's required for this are produced by tbp. 'We assessed the data and the designs and made recommendations which Innoseis (innoseis.com) incorporated in full', relates Geert Gielis, sr. DfM consultant at tbp. 'These mainly related to components and also the manufacturability of the pcba. We always recommend the use of as many category A components as possible, as we always have them on stock, in a conditioned environment. We also have at our disposal all of the production and test details for them. By selecting the right components at an early stage, you prevent faults and the ensuing high costs.'

In the meantime Innoseis has carried out tests with the instruments containing the pcba's from tbp electronics. The results were very positive. Tbp's early

involvement services have led to quality products and a satisfied client.

early involvement services

Early involvement is of great value to clients. 'We meet each other to optimise the design and production of the pcba in every phase of the process. This really benefits the end result', according to Swinnen.

'Our clients have very high standards: 1,000 ppm or even 700 ppm for specific applications', emphasises Frans Geerts, business development executive at tbp. 'Ppm stands for 'parts per million' and relates to the error percentage for pcba's which are not covered by the selected test strategy. With our high delivery quality we dive well below this standard, even as low as 200 ppm.'

'We analyse the designs for testability and test accessibility, along with other criteria', explains Steven Van Hout. He is the senior test & DfT consultant at tbp. 'We make recommendations, including for the number of test points on the boards. Due to the restricted space, this is often a challenge which we resolve due to our good partnership with the designers. By selecting the correct test strategy, we influence the result positively. With the extended boundary scan test solution we developed, we can also automatically test the pcba's functionally and can therefore validate the operation of the most important



extended boundary scan test

components. This extended boundary scan is a mixed signal solution - analogue and digital - which avoids costly functional test solutions at the client and guarantees high product quality. We are currently testing some 25 types of boards for a number of clients using the extended boundary scan. The partnership is working very well and we are now able to utilise our early involvement services in full. We are very happy with this, as are our clients.'

Want to know more about our early involvement services?

We will be happy to inform you! Call or email us for a bespoke presentation.

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