

Abstract Submitted  
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**Organic photodiodes with fast photoresponse integrated on printed circuit boards for biochip applications**<sup>1</sup> SEBASTIAN VALOUCH, SIEGFRIED KETTLITZ, CELAL ÖGÜN, WIEBKE SITTEL, NICO CHRIST, SIMON ZÜFLE, ULI LEMMER, Karlsruhe Institute of Technology (KIT), Light Technology Institute (LTI) — Photodiodes based on organic semiconductors have the potential to provide cost effective optical detection and easy integration in biosensing applications. Polymer photodiodes with response times on the order of 10 ns have been used for optical interconnects showing the feasibility of high-speed applications for these devices [1]. To avoid the degradation of the devices by humidity and oxygen we have developed an encapsulation technique to integrate high-speed organic photodiodes onto standard printed circuit boards (PCBs). This technique uses stencil printing and capillary underfill, both methods widely used in the industry. As a result the devices are protected from ambient air by a 35  $\mu\text{m}$  copper layer. Using this method we are able to build stable high-speed organic photodiodes with response times in the 10 ns range. This opens up a way for the integration of fast organic detectors for applications such as particle based lab-on-chip systems, optical flow cytometers and integrated x-ray detectors. [1] M. Punke, S. Valouch et al., IEEE Journal of Lightwave Technology 26, 816 (2008).

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