# **241111**

<https://www.eejournal.com/article/20140106-interposers/>

# **241107**

<https://indico.cern.ch/event/403299/attachments/808021/1107372/CERNSeminar_IvanPericV1.pdf>

<https://www.macrofab.com/blog/escaping-bgas-methods-routing-traces-bga-footprints/>

# [**https://resources.altium.com/p/which-bga-pad-and-fanout-strategy-right-your-pcb**](https://resources.altium.com/p/which-bga-pad-and-fanout-strategy-right-your-pcb)

<https://semiengineering.com/knowledge_centers/packaging/redistribution-layers-rdls/>

# **241106**

# [**https://jlcpcb.com/blog/pcb-trace-widths-in-pcb-design**](https://jlcpcb.com/blog/pcb-trace-widths-in-pcb-design)

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# **Fundamental Principles of Optical Lithography : The Science of Microfabrication**

Pg18

This accumulation is called an edge bead , which usually exists within the outer 1– 2 mm of the wafer and can be 10– 30 times thicker than the rest of the resist ﬁlm. The existence of an edge bead is detrimental to the cleanliness of subsequent wafer processing. Tools which grab the wafer by the edge will ﬂake off the dried edge bead, resulting in very signiﬁcant particulate contamination.

Mack, Chris. *Fundamental Principles of Optical Lithography : The Science of Microfabrication*, John Wiley & Sons, Incorporated, 2008. *ProQuest Ebook Central*, http://ebookcentral.proquest.com/lib/utarl/detail.action?docID=470628.

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# 

# **Left off here:**

# Design, fabrication, and radio frequency property evaluation of a through-glass-via interposer for 2.5D radio frequency integration

Han Cai1, Jun Yan1, Shenglin Ma5,1, Rongfeng Luo1, Yanming Xia1, Jiwei Li1, Liulin Hu2, Shuwei He2, Zhongjun Tang2, Yufeng Jin

Madhavan Swaminathan and Ki Jin Han Design and Modeling for 3d Ics and Interposers

<https://ebookcentral.proquest.com/lib/utarl/reader.action?docID=1578321>

-The communication bandwidth between logic and memory is dictated by the number of input/output (I/O) terminals between the two chips used to transfer data. As the number of I/O terminals increases, the communication bandwidth increases as well.

Madhavan, Swaminathan, and Jin Han Ki. *Design And Modeling For 3d Ics And Interposers*, World Scientific Publishing Company, 2013. *ProQuest Ebook Central*, http://ebookcentral.proquest.com/lib/utarl/detail.action?docID=1578321.

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<https://hal.science/hal-02417965/document>

[Charge sensitive preamplifiers explained – Cremat Inc](https://www.cremat.com/why-use-csps/)

[Advancements in Glass Interposer Fabrication for Electronic Packaging](https://www.vajramicro.com/post/advancements-in-glass-interposer-fabrication-for-electronic-packaging)

[Radar sensors in glass](https://www.vitrion.com/en/radar-sensors-in-glass/)

<https://www-taylorfrancis-com.ezproxy.uta.edu/books/mono/10.1201/9780429399619/power-thermal-noise-signal-integrity-issues-substrate-interconnects-entanglement-yue-ma-christian-gontrand>

<https://www.design-reuse.com/articles/38480/designing-high-performance-interposers-with-3-port-and-6-port-s-parameters.html>

<https://mdpi-res.com/bookfiles/book/6847/Advanced_Interconnect_and_Packaging.pdf?v=1730513125>

# **Research of Vertical via Based on Silicon, Ceramic and Glass**

* low latency and low power consumption by shortening the interconnection length
* Through ceramic via (TCV) technology expands the volume of high-precision and high-power thin-film circuits with 3D planar distribution, significantly improves the structural density and reduces the device size through via interconnection and circuit redistribution.

# Composite interposer and method for producing a composite interposer

<https://patents.google.com/patent/US6521530B2/en>

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Mon Nov 4

Trace lines = Transmission lines

* Signal transmission
* Impedance matching
* Signal loss

<https://www.circuitinsight.com/uploads/2/development-si-interposers-3d-heterogeneous-integration-smta.pdf>

<https://www.mosaicmicro.com/wp-content/uploads/ITRI_Glass_Interposer_2013.pdf>

<https://www.protoexpress.com/blog/pcb-transmission-line/>

<https://www.nuvation.com/resources/article/closer-look-pcb-traces>

Characteristics

→ width, length and thickness of TL

→ Separation of pads

→ Size of pads

* Minimize noise
* Improve performance

<https://meridian.allenpress.com/ism/article/2015/1/000041/187590/2-5D-Interposers-and-Advanced-Organic-Substrates>

<https://www.wevolver.com/article/trace-pcb-a-comprehensive-guide>

Design

→ Line spacing

* Capacitance
* Inductance
* Crosstalk
* Delays

<https://www.pcbway.com/blog/PCB_Basic_Information/Things_to_Learn_Before_You_Learn_PCB_Designing_1.html>

<https://www.pcbcart.com/article/content/design-requirement-of-SMT-PCB-2.html>

Window

Border

Material properties regarding optimal ledge distance

Regions that must be exposed

Vias (large vs small)

<https://www.mouser.com/pdfDocs/IPDiA_WP_Silicon%20Interposers_%20260214.pdf>

<https://meridian.allenpress.com/ism/article/2015/1/000041/187590/2-5D-Interposers-and-Advanced-Organic-Substrates>

Zebra Connectors

* Pitch

Alignment marks

Resist (+/-)

Whole wafer glass interposers

1cm extending from chip

Low resolution/precision - cheaper

Glass

Good performance

Cost down potential

-immature via formation

-glass brittleness

Mask producer

<https://www.frontrangephotomask.com/>

Laser Cut Services

Resist issues

Spin Coating

Interposer

Heat issues (same for bumping)

Integration (same for bumping)

Conductivity → response (same for bumping)

Dielectric constant

Ball Bonder

Thermal sonication → M9

Al-W alloy

390C (limit)