

GDSII

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GDSII stream format, common acronym **GDSII**, is a database file format which is the de facto industry standard for data exchange of integrated circuit or IC layout artwork. It is a binary file format representing planar geometric shapes, text labels, and other information about the layout in hierarchical form. The data can be used to reconstruct all or part of the artwork to be used in sharing layouts, transferring artwork between different tools, or creating photomasks.

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History of the GDSII format

GDS = Graphic Database System

Initially, GDSII was designed as a format used to control integrated circuit photomask plotting. Despite its limited set of features and low data density, it became the industry conventional format for transfer of IC layout data between design tools of different vendors, all of which operated with proprietary data formats.

It was originally developed by Calma for its layout design software, "Graphic Data System" ("GDS") and "GDSII".

GDSII files are usually the final output product of the IC design cycle and are given to IC foundries for IC fabrication. GDSII files were originally placed on magnetic tapes. This moment was fittingly called tape out though it is not the original root of the term.

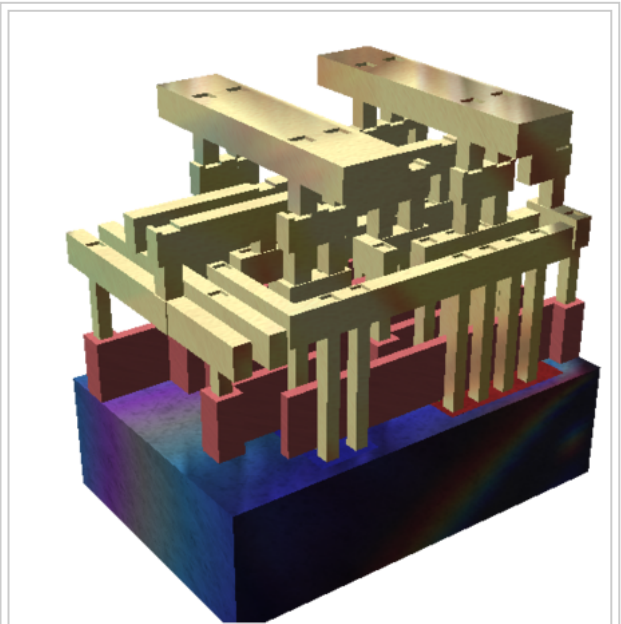
Objects contained in a GDSII file are grouped by assigning numeric attributes to them including a "layer number", "datatype" or "texttype". While these attributes were designed to correspond to the "layers of material" used in manufacturing an integrated circuit, their meaning rapidly became more abstract to reflect the way that the physical layout is designed.

As of October 2004, many EDA software vendors have begun to support a new format, OASIS, which may replace GDSII.^[1]

GDSII

Developed by

Calma



A rendering of a small GDSII standard cell with three metal layers (dielectric has been removed). The sand-colored structures are metal interconnect, with the vertical pillars being contacts, typically plugs of tungsten. The reddish structures are polysilicon gates, and the solid at the bottom is the crystalline silicon bulk.

GDSII utilities

As the GDSII stream format is a de facto standard, it is supported by nearly all EDA software. Besides the commercial vendors there are plenty of free GDSII utilities.^[2] These free tools include editors,^{[3][4][5]} viewers,^[6] utilities to convert the 2D layout data into common 3D formats,^{[7][8]} utilities to convert the binary format to a human readable ASCII format^[9] and program libraries.^{[10][11][12]}

See also

- Caltech Intermediate Form
- OASIS (Open Artwork System Interchange Standard)

Notes

- Going from GDSII to OASIS (<http://www.eetimes.com/design/eda-design/4018771/Going-from-GDSII-to-OASIS>), Philippe Morey-Chaisemartin (Xyalis) // EETimes 8/4/2008
- List of free GDSII utilities <http://www.layouteditor.net/links>
- LayoutEditor, a free GDSII editor <http://www.layouteditor.net>
- "KLayout" is a free GDSII, LEF/DEF, OASIS, Gerber, DXF, CIF editor with DRC <http://www.klayout.de>
- Glade, a free GDSII, LEF/DEF editor <http://www.peardrop.co.uk/glade>
- "nanoViewer" is a free GDSII viewer, <http://www.wxnanotech.com>
- gds2pov easily convert GDSII data into a nicely rendered 3D view. <http://www.atchoo.org/gds2pov>
- With GdsViewer tool, any portion of GDSII artwork can be exported to 3D VTK file. The latter can be viewed and manipulated with VTK compatible viewers, e.g. ParaView <http://www.gbresearch.com/gdsviewer>
- GDS Utilities can convert binary GDSII files to ASCII representation, <http://www.gbresearch.com/gdsutilities>
- Ruby GDSII Library for reading, manipulating, and writing GDSII data in the Ruby programming language <http://www.rubyforge.org/projects/gdsii>
- Python GDSII Library for creating and manipulating GDSII files with Python <http://gdspy.sourceforge.net/index.html>
- Octave and MATLAB toolbox for reading and writing GDSII layout files <https://sites.google.com/site/ulfgr/numerical/gdsii-toolbox>

References

* Clein, Dan. (2000). *CMOS IC Layout*. Newnes. ISBN 0-7506-7194-7

External links

- Computer Aids for VLSI Design - Appendix C: GDS II Format (<http://www.rulabinsky.com/cavd/text/chapc.html>) by Steven M. Rubin // Addison-Wesley, 1987
- The GDSII Stream Format (http://www.buchanan1.net/stream_description.html) by Jim R. Buchanan, 6/11/96
- GDSII™ Stream Format Manual (B97E060), Release 6.0 (http://bitsavers.informatik.uni-stuttgart.de/pdf/calma/GDS_II_Stream_Format_Manual_6.0_Feb87.pdf) // Calma, February 1987
- SPIE Handbook of Microlithography, Micromachining and Microfabrication, Vol. 1: Microlithography // Bellingham, Wash. : SPIE Optical Engineering Pr., 1997, 2.9 Appendix: GDSII Stream Format (http://www.cnf.cornell.edu/cnf_spie9.html)
- List of various layout editors/viewers (<http://www.layouteditor.net/links>)
- Details of GDSII format including illustrations (<http://boolean.klaasholwerda.nl/interface/bnf/gdsformat.html>)

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