GDS Import Wizard V5.2 Manual

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About GDS Import Wizard

A smart tool to translate GDSII to 3DLayout EDB quickly:

- Extract nets from GDS and import to EDB
- Extract accurate material property from IRCX
- Extract accurate layer thickness and stackup from IRCX
- Automatic generate control xml for AEDT GDSII Importing
- Automatic create Via Group and SnapViaGroups
- Automatic generate components on top and bottom layer for easier port setup
- Automatic generate TSV Insulation coating
- Synchronous import to AEDT when EDB prepared
- Automatic detect and fix of small gaps between layers to avoid mesh Issue (New in V4.0)
- Support sheet layers to simplify thinner metal layer mesh e.g. 0.001um (New in V4.0)
- support to generate temperature dependent material (New in V5.0)
- Add CSV input template to provide more flexible input for other Technology File (New in V5.0)
- Support New TSV Layer feature in 3D Layout 2022R1 (New in V5.0)
- Support ConvertPolygonToCircle Feature to reduce mesh(New in V5.0)
- More flexible setting options and enhanced command line(No-GUI) support(windows and Linux)



ANSYS workflow for 2.5D/3D SI Interpower Simulation

Integrated with ANSYS AEDT

Option1:

- ✓ TSMC IRCX
- ✓ GDS File

Option2:

- ✓ Customized Tech file (CSV)
- ✓ GDS File

GDSImportWizard

- ✓ Net name extract
- √ Stackup
- ✓ Layer thickness
- ✓ Material properties
- ✓ Via Groups
- ✓ Snap Primitives
- ✓ More...



HFSS 3D Layout

- ✓ S-parameter Extraction
- ✓ Crosstalk
- ✓ SSN
- ✓ Eye opening
- ✓ PDN
- ✓ Thermal-EM Co-simulation

Step 1

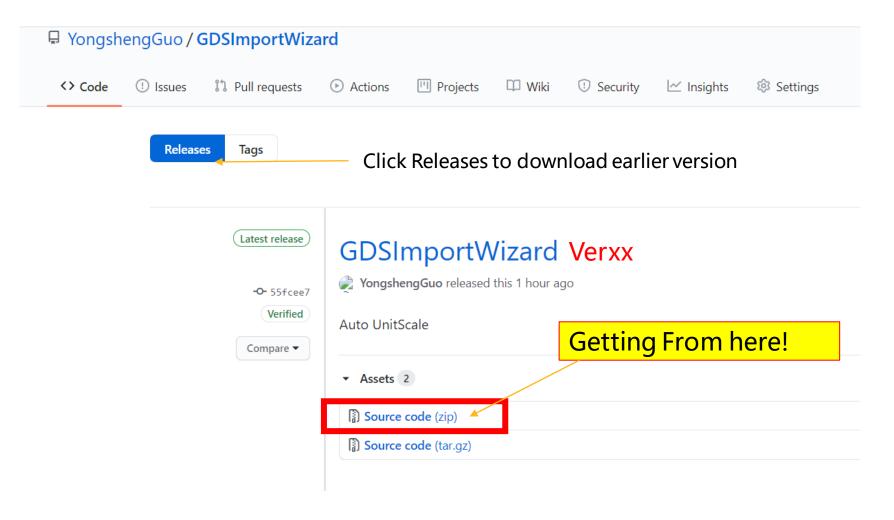
Step 2

Step 3

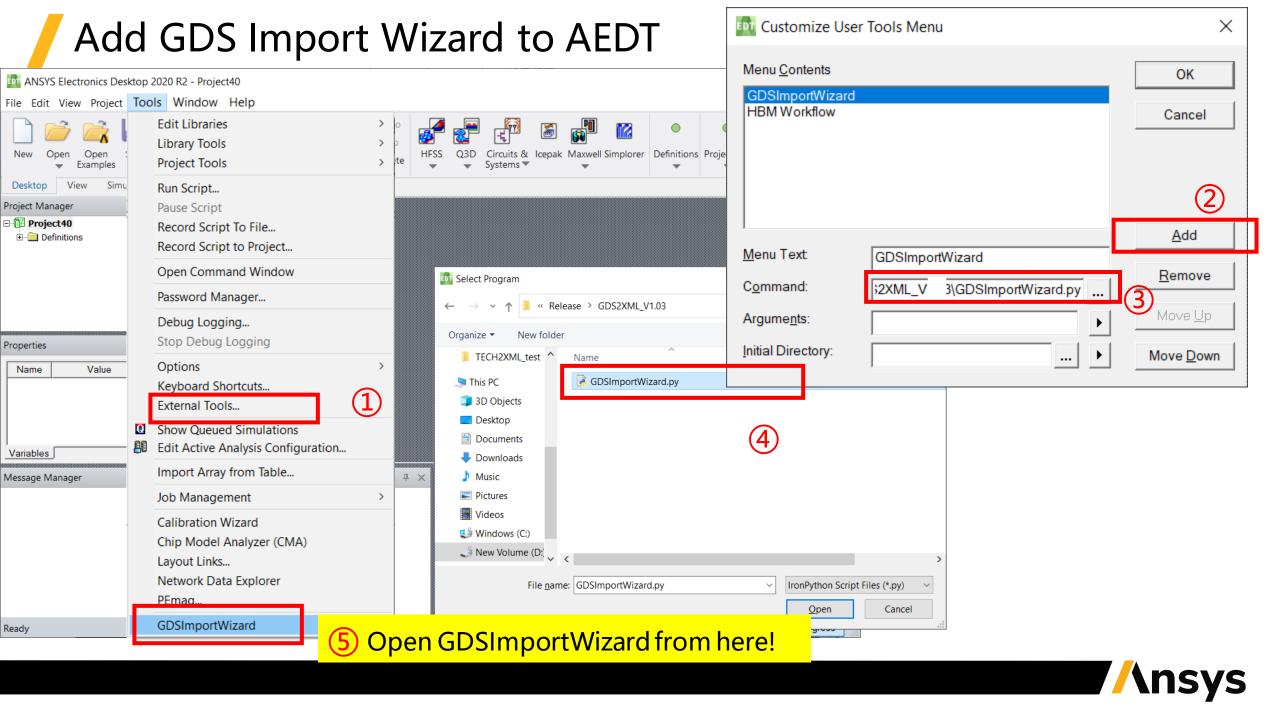


Get the latest GDSImportWizard Tool

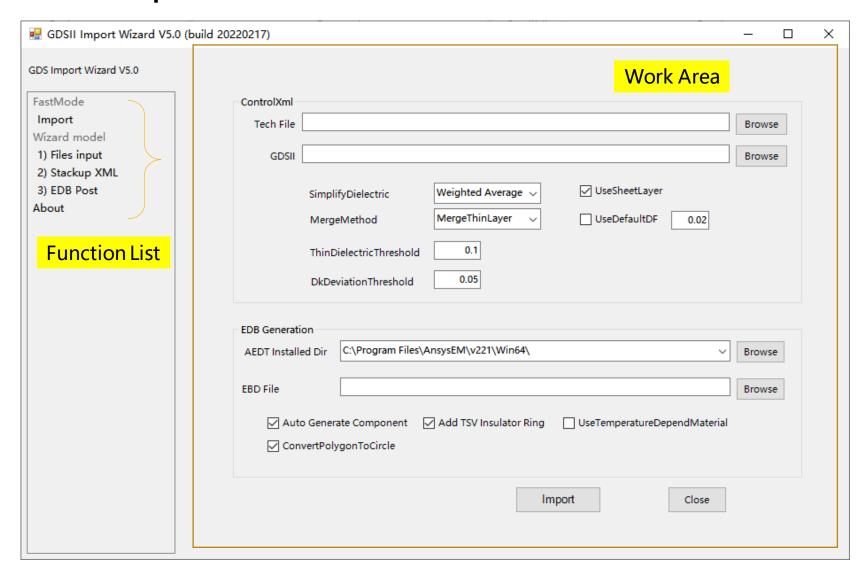
https://github.com/YongshengGuo/GDSImportWizard/releases/latest







GDS Import Wizard V5.0

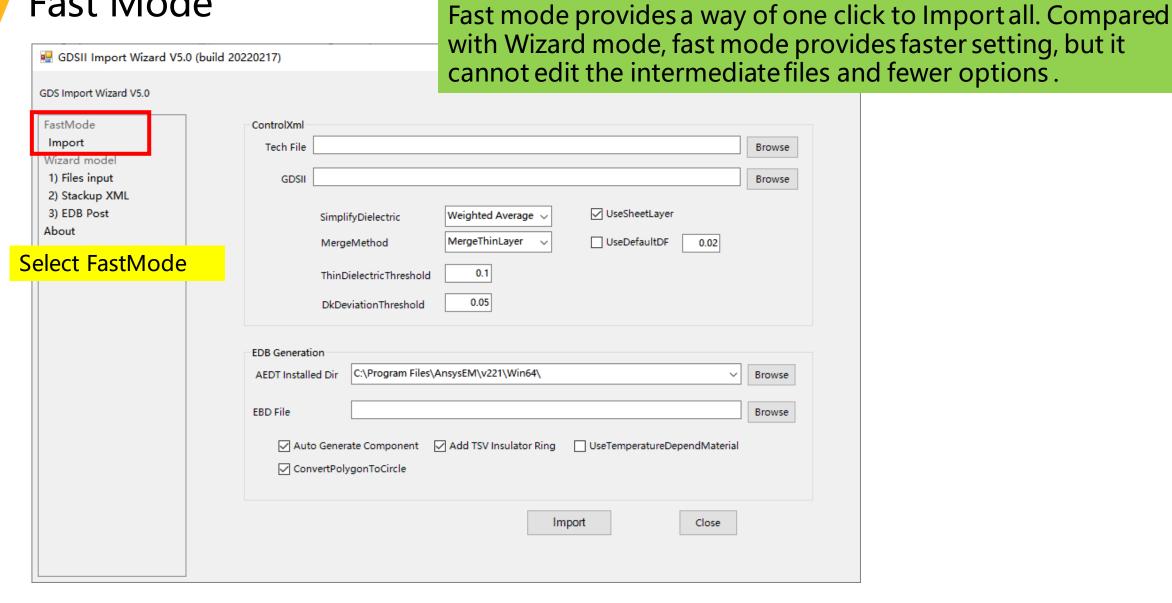




Running in Fast Mode

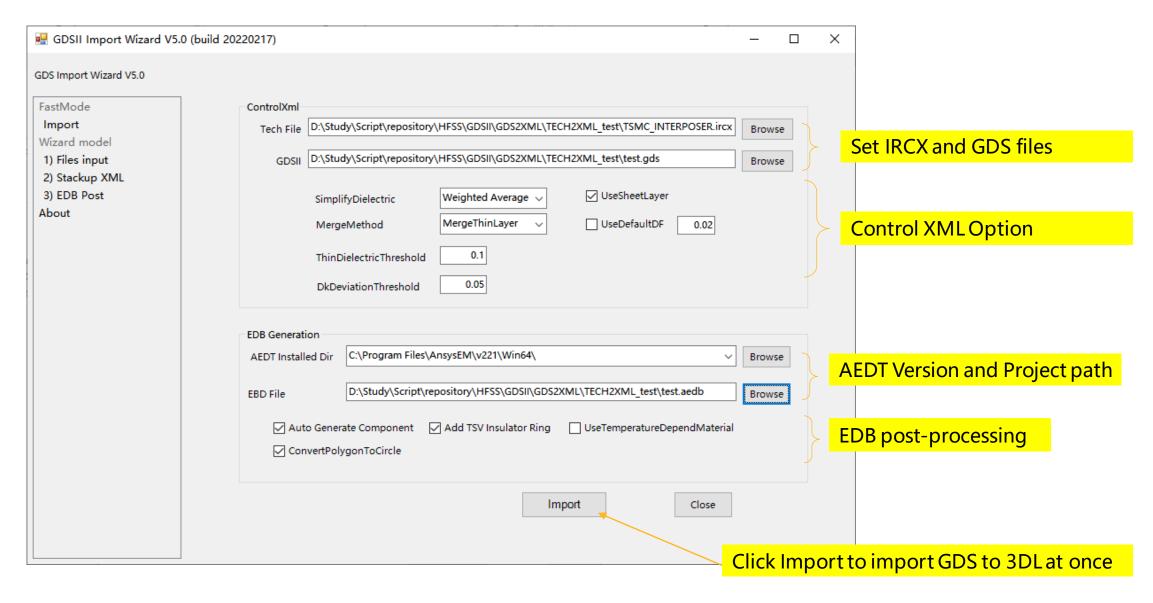


Fast Mode





Fast Mode

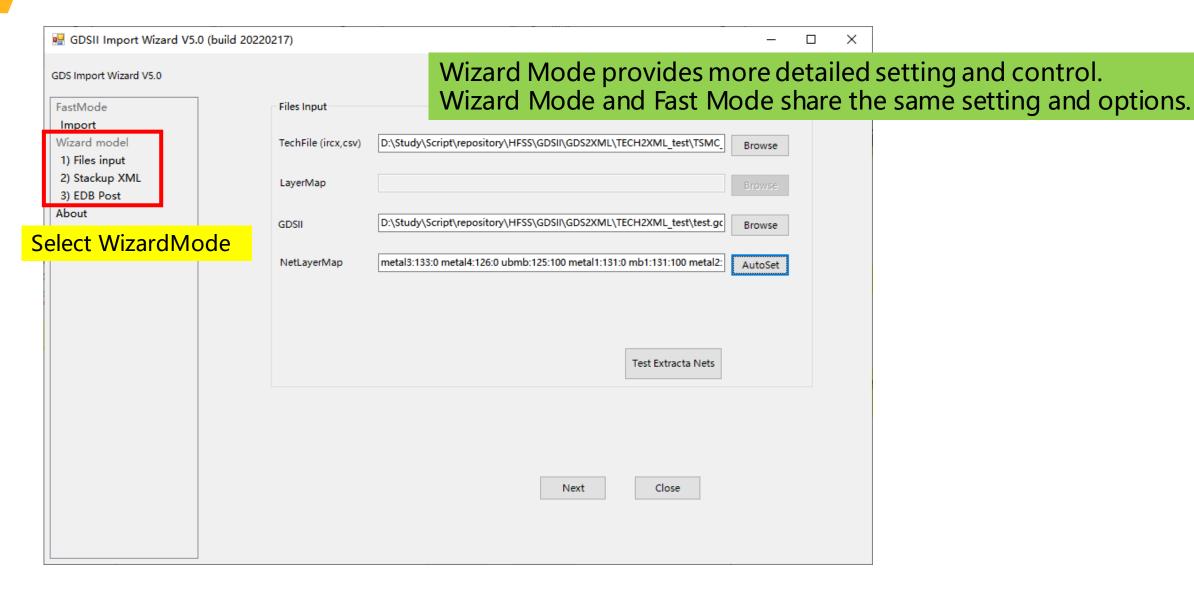




Running in Wizard Mode

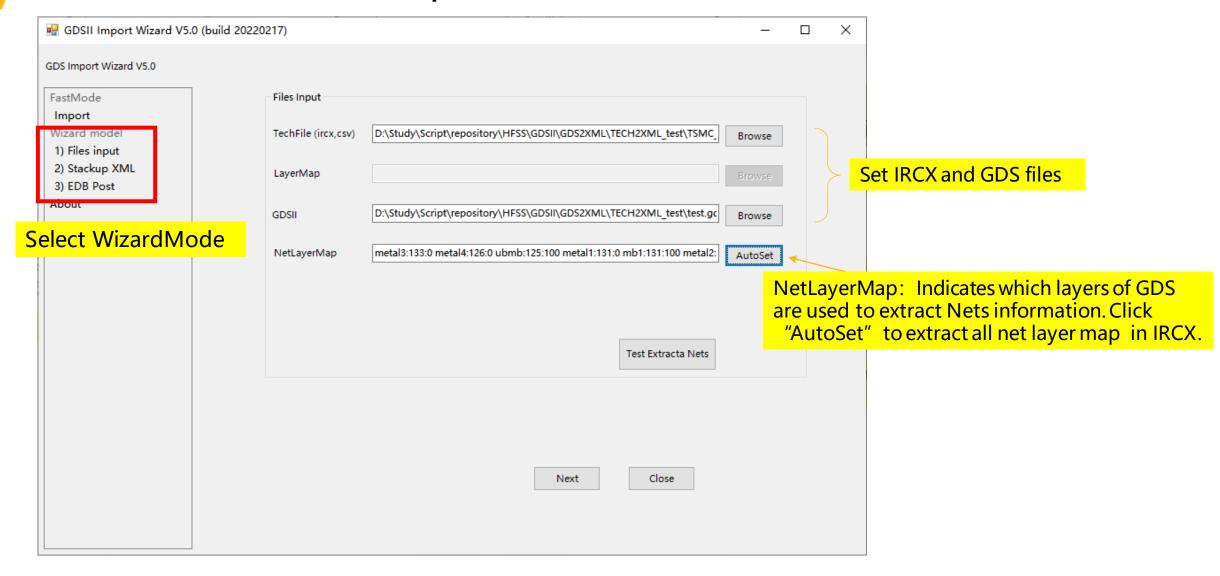


Fast Mode



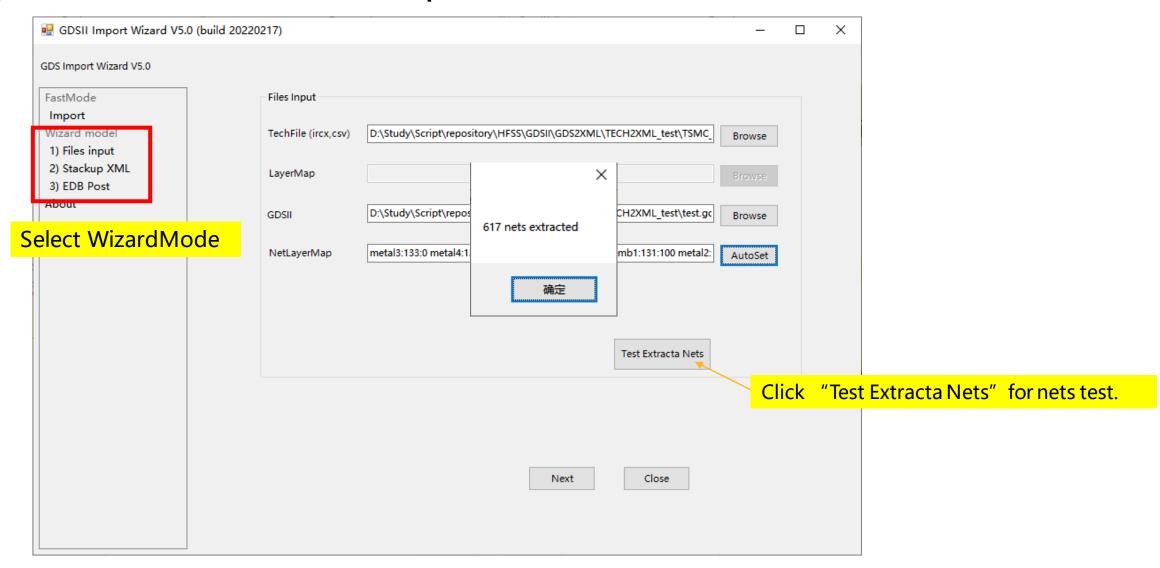


Fast Mode – 1) Files input



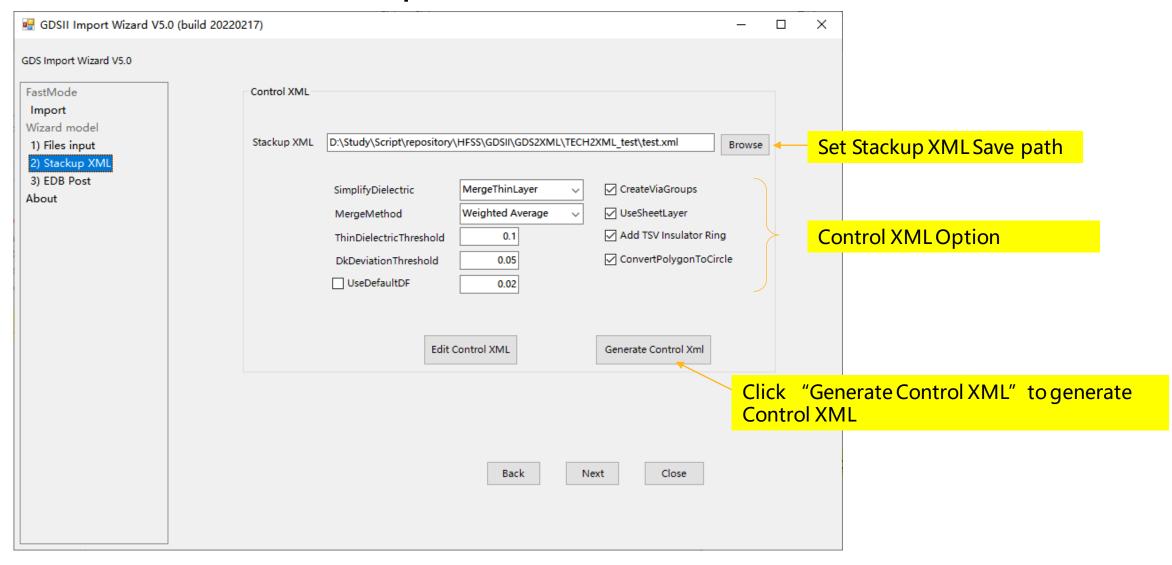


Fast Mode – 1) Files input



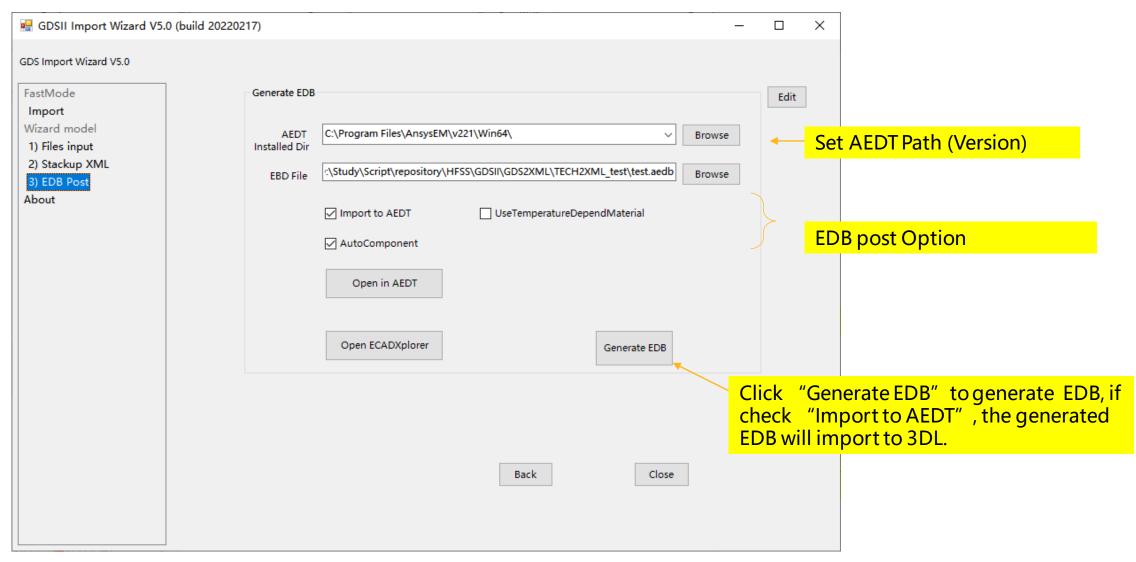


Fast Mode – 2) Stackup XML





Fast Mode – 3) EDB Post





Running in windows command line



Running in batch mode - Windows

Eg1. Configure from system environment:

- set AedtInstallDir=C:\Program Files\AnsysEM\AnsysEM21.1\Win64
- set GdsFile=D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds
- set TechFile=D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx
- set path=% AedtInstallDir %\common\IronPython;%path%
- ipy64 GDSImportWizard.py -batch

Eg2. Configure from command arguments:

- set AedtInstallDir=C:\Program Files\AnsysEM\AnsysEM21.1\Win64
- set path=% AedtInstallDir %\common\IronPython;%path%
- $ipy64\,GDSImportWizard.py\,-GdsFile \ "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" \ TechFile \ "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"$

Note: system environment and command arguments could be mixed.



Running in batch mode - Windows

- A short command is supported:
 - ipy64 GDSImportWizard.py gdspath
 - ipy64 GDSImportWizard.py gdspath edbpath
- Eg3. short command
 - ipy64 GDSImportWizard.py "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" —TechFile
 "D:\HFSS\GDSII\GDS2XML\TECH2XML test\TSMC INTERPOSER.ircx"



Running in Linux terminal command



Running in batch mode - Linux

Eg1. Configure from system environment:

- export AedtInstallDir='/home/ansys/app/AnsysEM20.1/Linux64'
- export GdsFile=/home/ansys/yguo/test/test.gds
- export TechFile=/home/ansys/yguo/test/TSMC_INTERPOSER.ircx
- export ipy64="\$AedtInstallDir/common/mono/Linux64/bin/mono \$AedtInstallDir/common/IronPython/ipy64.exe"
- \$ipy64 GDSImportWizard.py

Eg2. Configure from command arguments:

- export AedtInstallDir='/home/ansys/app/AnsysEM20.1/Linux64'
- export ipy64="\$AedtInstallDir /common/mono/Linux64/bin/mono \$AedtInstallDir /common/IronPython/ipy64.exe"
- \$ipy64 GDSImportWizard.py –GdsFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test.gds" TechFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"

Note: system environment and command arguments could be mixed.



Running in batch mode - Linux

- A short command is supported:
 - ipy64 GDSImportWizard.py gdspath
 - ipy64 GDSImportWizard.py gdspath edbpath
- Eg3. short command
 - export AedtInstallDir='/home/ansys/app/AnsysEM20.1/Linux64'
 - export ipy64="\$aedtInstallPath/common/mono/Linux64/bin/mono \$aedtInstallPath/common/IronPython/ipy64.exe"
 - \$ipy64 GDSImportWizard.py "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\test\gds" TechFile "D:\HFSS\GDSII\GDS2XML\TECH2XML_test\TSMC_INTERPOSER.ircx"



Options Setting



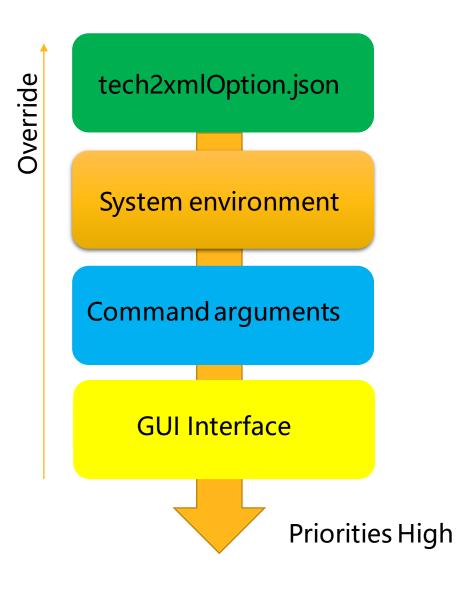
Options Parameters in GDS Import Wizard

- There are Four ways to set the options for GDS Import Wizard
 - 1) By configure file: tech2xmlOption.json (in same directory with toolkit)
 - 2) By system environment variables
 - 3) Set the parameters in command arguments.
 - 4) Set in GUI.

These three methods will achieve the same effect, but with different priorities.



Options Priorities



If the same parameter given in multiple places, the higher priority parameter will take precedence.

As one example, if one parameter is given in System environment and tech2xmlOption.json at the same time, System environment value will have high priorities and take precedence.

GUI Interface have the highest priority, Command arguments System environment and tech2xmlOption.json setting will be used as initial values of GUI input elements.



Options

Options	Defalut Value	Description
		Stackup XML Parameters
InputType	0	0: Ircx, others: not define
UseShortMergeLayerName	True	changing is not recommended
		0: NoSimplify, No Merge on Dielectric, exact layers in IRCX
SimplifyDieletricMethod	1,	1 : MergeThinLayer, Merge layer thinner than a specific value
		2:BlockMerge, use average DK on all layers except substrate
		0: Weighted Average
		1: Weighted Average
MergeDielectricMethod	0	2: Kraszewski equation
		3: Landau equation
		4: Lichtenecker equation
ThinDielectricThreshold	0.1	0.1: Merge layer when layer thickness<0.1um, default unit um
DkDeviationThreshold	0.05 or 5%	0.05: Merge layers when dk difference less then 10%
FixedSmallLayerGap	0.005	0.005: Fix small air gap between layers less then 0.005um, default unit um
UseDefaultDF	True	True: If not hav df value in technology, a default df value will be used
		false: If not hav df value in technology, will set df =0
DefaultDF	0.02	set for default df value
NotUseDfonSubstrate	True	True: default df value will never used on Substrate layer(Silicon material), it is recommended to set as True.
UseSheetLayer	Truce	True: set the layers as 0um when it small then "SheetLayerThreshold", which will avoid to generatelarge number
Osesileettayei	True	of tiny meshes
SheetLayerThreshold	0.0015	0.0015: if "UseSheetLayer" is True, layers which < 0.0015um will set to zero thickness(treat as 2D sheet object)
CreatViaGroups	True	True: ViaGroups will be implemented on via layers
IgnoreLayersReg	"air,ctm.*,cbm.*"dtce.*"	layers will not import into 3D Layout. Regular expressions are used, and ignoreLayerNames are seprate with comma or space
TextLayermap	None	Text layers indicate for net extraction, None will use all text layer in technology files. User could set it accrond the rule: "ubmb:125:100, "ubump:125:0"
ConvertPolygonToCircle	True	True: will convert all polygons on a layer to circles, only support from AEDT 2022R1
ConvertPolygonToCircleRatio	0.9	polygons with Circle Ratio 0.9 will convert to circles, valid when ConvertPolygonToCircle as True



Options

		Path Parameters
TechFile	None	input: techFile path (Absolute), must set
LayerMapFile	None	input: layerMapFile path (Absolute), not used
GdsFile	None	input: gdsFile path (Absolute), must set
AedtInstallDir	None	input: AEDT installtion path (Absolute), must set to do edb post
ControlXmlPath	None	output: controlXmlPath (Absolute), optional
edbPath	None	output: edbPath (Absolute), optional
		Gds post Parameters
OpenInAedt	True	true: will open EDB when the conversion is completed
AutoComps	True	true: will automatic generation device, easy port creation
CompLayerList	1,-1	index for which layers will generate components, 1 indicate top layer, -1 indicate bottom layer, and so on.
ComponentPinsTolerance	10	Pins spacing less than 10 times pad diameter with each other will be considered as a component
AutoTSVCoat	True	true: will automatic generation tsv insulator
DissolveViaGroup	True	true: dussikve all groups or component before doing edb post processing
UseTemperatureDependMaterial	True	true: will generate temperature dependance material if TC1/TC2 given in material defintion



Custom Technology File (CSV)



CSV Format

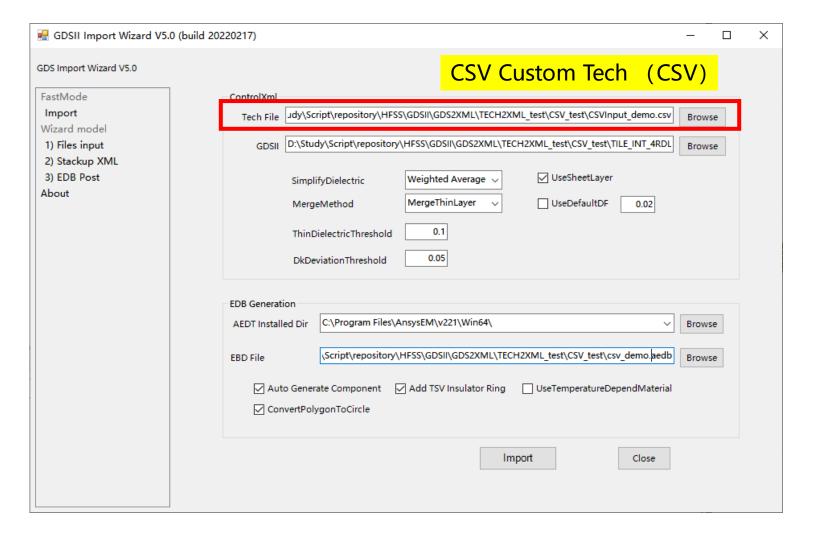
CSVInput demo.csv

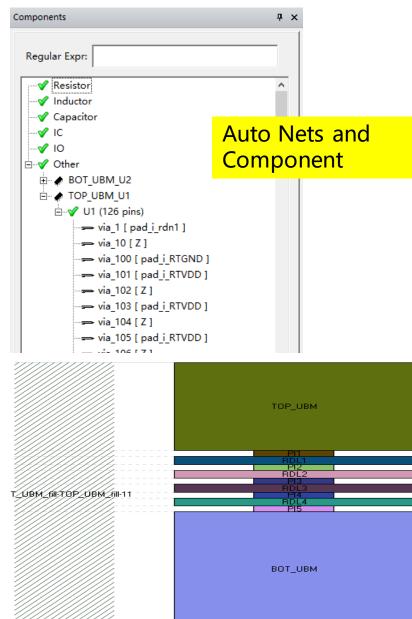
NO	LayerName	Туре	LayerMap	TextLayerMap	Thickness	Height	LowerLayer	UpperLayer	DK	DF	Cond	TC1	TC2
1	TOP_UBM	С	214;0	214;0	44.5				4	0.02	5.80E+07		
2	PI1	V	11;0		3				4	0.02	5.80E+07		
3	RDL1	С	1;0		4				4	0.02	5.80E+07		
4	PI2	V	12;0		3				4	0.02	5.80E+07		
5	RDL2	С	2;0		4				4	0.02	5.80E+07		
6	PI3	V	13;0		3				4	0.02	5.80E+07		
7	RDL3	С	3;0		4				4	0.02	5.80E+07		
8	PI4	V	14;0		3				4	0.02	5.80E+07		
9	RDL4	С	4;0		4				4	0.02	5.80E+07		
10	PI5	V	15;0		3				4	0.02	5.80E+07		
11	BOT_UBM	С	215;0	215;0	58				4	0.02	5.80E+07		

- 1. The highlighted column must be given.
- 2. Type: "C" indicate conductor, "V" indicate Via.
- 3. TextLayerMap used to trace nets information.
- 4. The default unit is um.
- 5. If setting DK/DF/Cond, accurate material will add to stackup
- 6. Via layer could be described using Thickness or LowerLayer/UpperLayer



CSV Custom Tech Import Demo







Additional remarks



Restore default settings

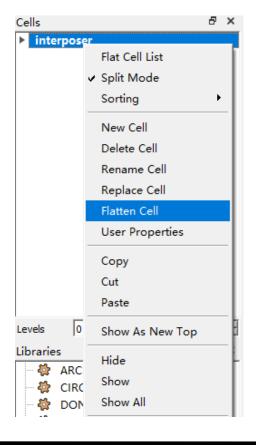
- If you have modified the configuration in tech2xmlOption.json and then want to restore to the
 default options. Just delete the file and run the toolkit again, tech2xmlOption.json will be made
 with default options.
- Don't forget that environment variables have higher priority. You need to check the settings in environment variables to make sure it is in purposeful.

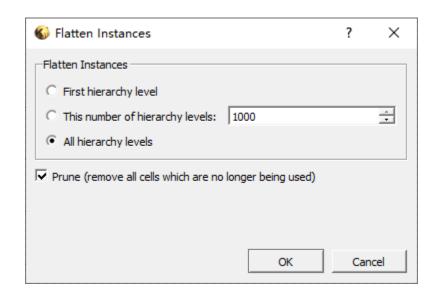
名称	修改日期	类型	大小
GDS Import Wizard V5.0 Manual-202.	2/21/2022 12:19 PM	Foxit Reader PD	848 KB
📴 GDSImportWizard.py	2/18/2022 9:14 AM	Python File	2 KB
gdslib.dll	3/6/2022 4:20 PM	应用程序扩展	1,334 KB
	3/6/2022 4:24 PM	JSON File	2 KB



About nets loss or error

- A known issue, hierarchy cells may bring wrong net coordinates and cause net lost or wrong (short or not right). Flatten Cells and then import will solve this issue.
- Below is a demo, how to use KLayout to flatten the cells.

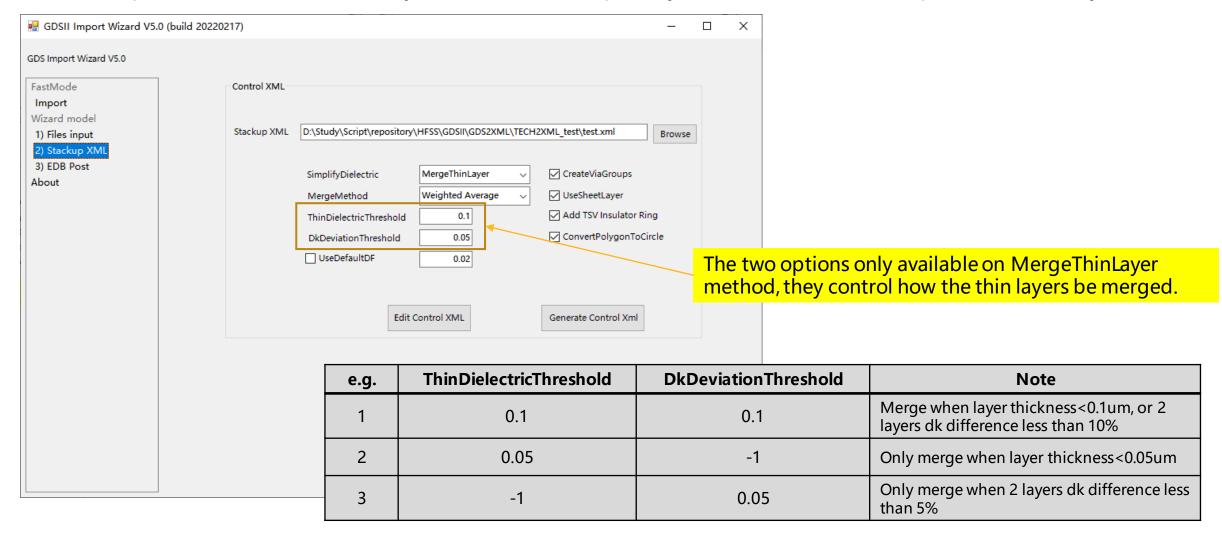






About Stackup simplification

Stack simplification can effectively reduce the complexity of the model and improve efficiency

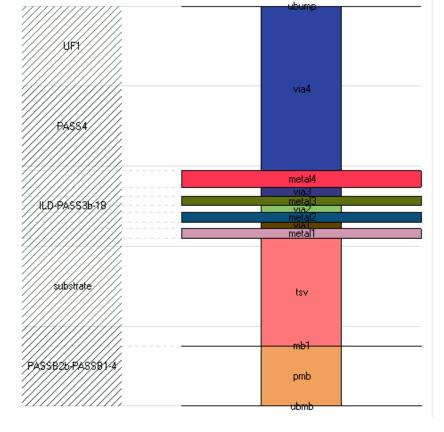


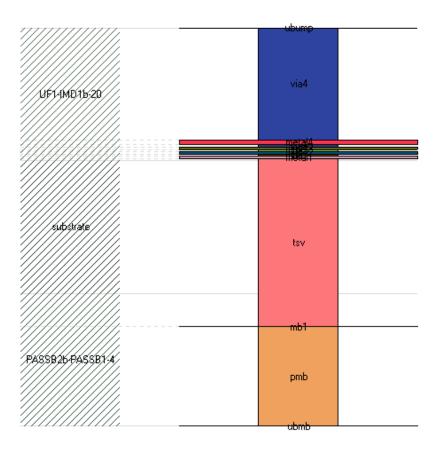


About Stack simplification

Merge Method Compare







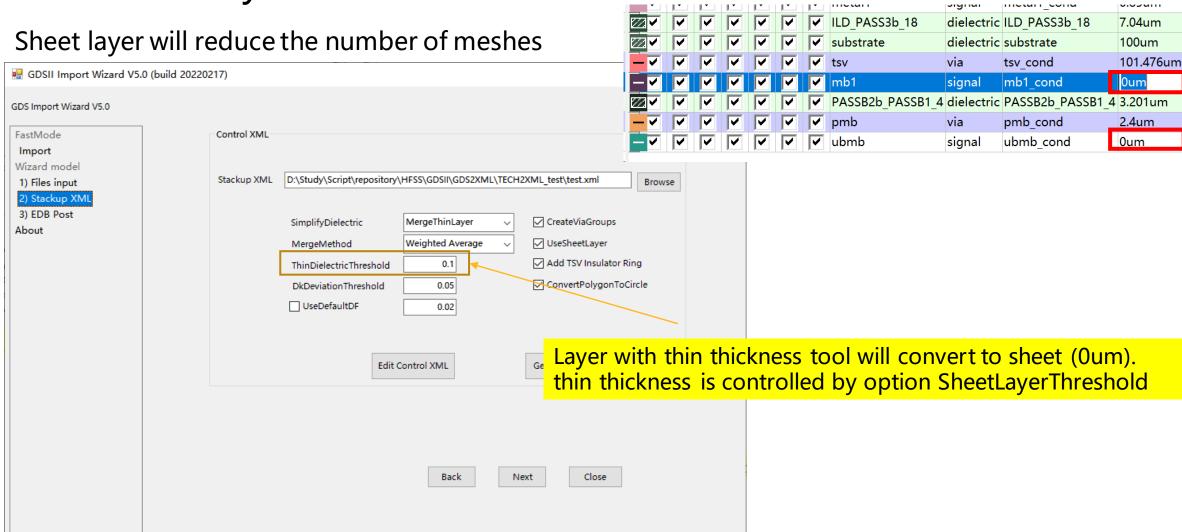
NoSimplify

MergeThinLayer

BlockMerge









New in 2022R1

TSV insulation is realized using layer TSV new property

Padstack Usage and Definition

General
Name: GDSViaR12.30

Via material
tsv_Insulating
Plating percent: 100

Before 2021R2

TSV insulation is realized using 2 overlapping vias



GDS Import Wizard V5.0 will automatically choose the best way according to which AEDT version you run it.

ICap (integrated capacitors)

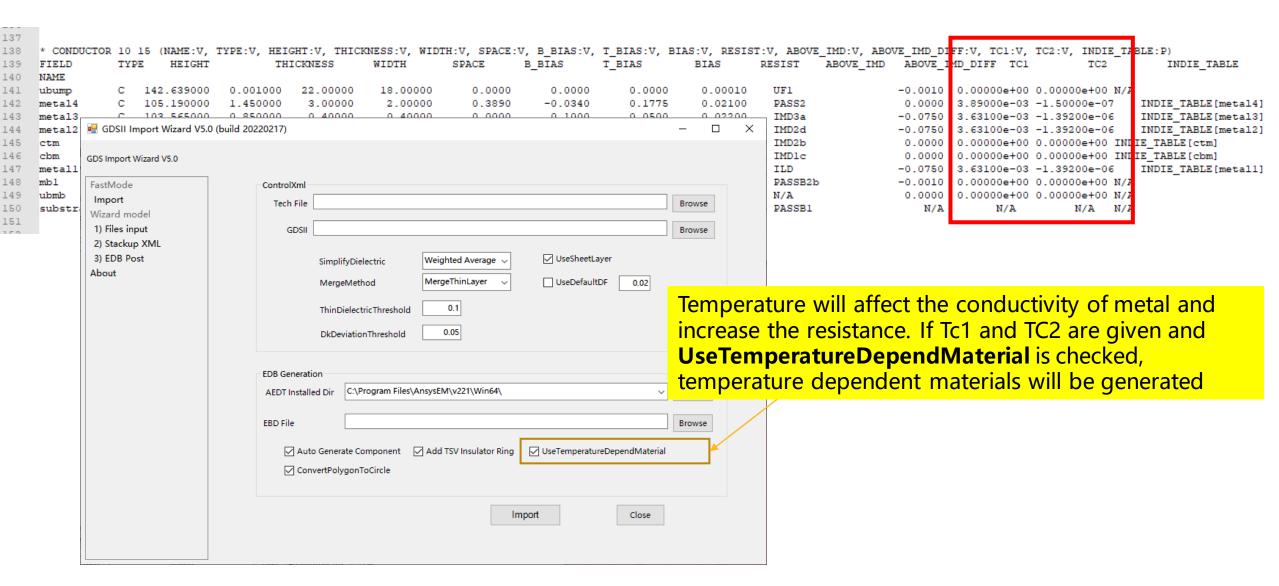


ICAP layers are ignored by default because it is thin and not have effect most of the time.

ICAP layers could be imported by setting IgnoreLayersReg to "air"

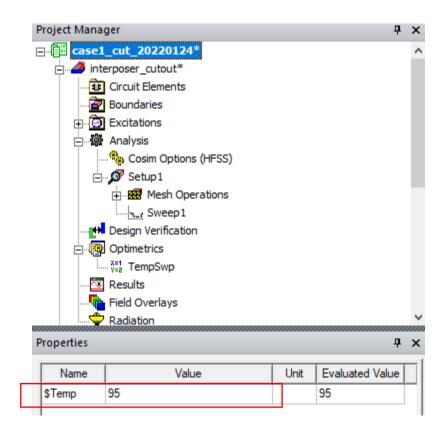


Temperature dependent material

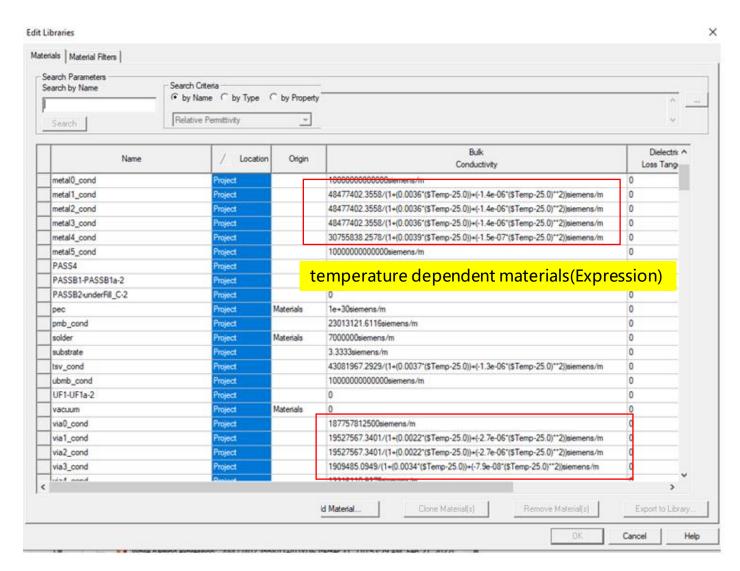




Temperature dependent material



Sweep the \$Temp variable will get the corner results at different temperatures





Ansys