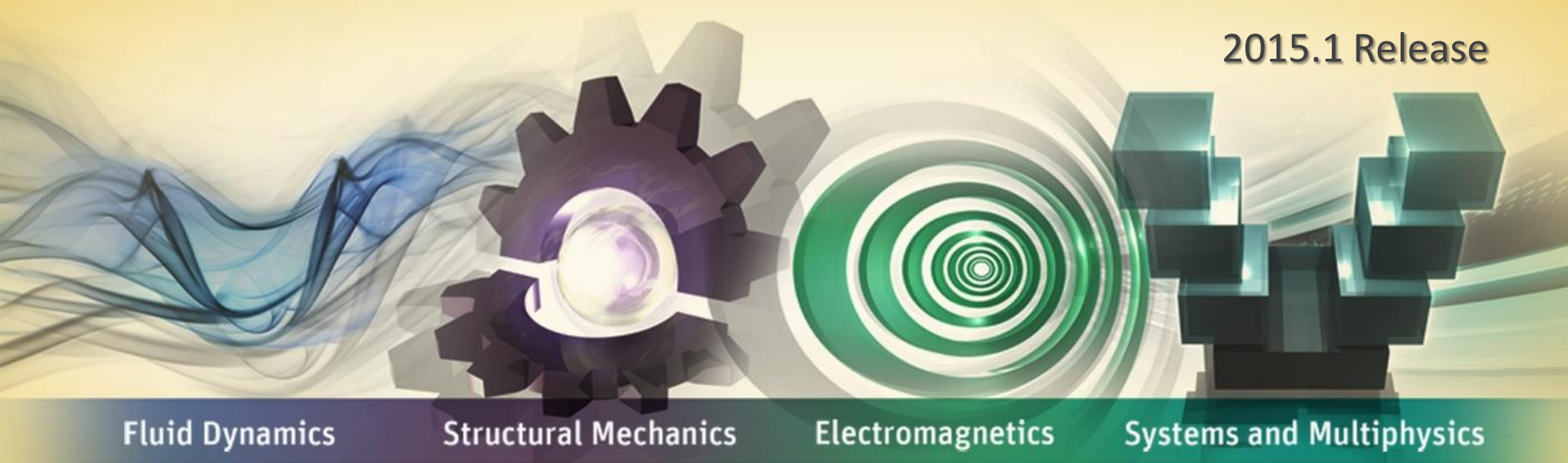


Workshop 4: Custom Bondwires

2015.1 Release



Introduction to ANSYS SIwave

Custom Bondwire Drawing Example

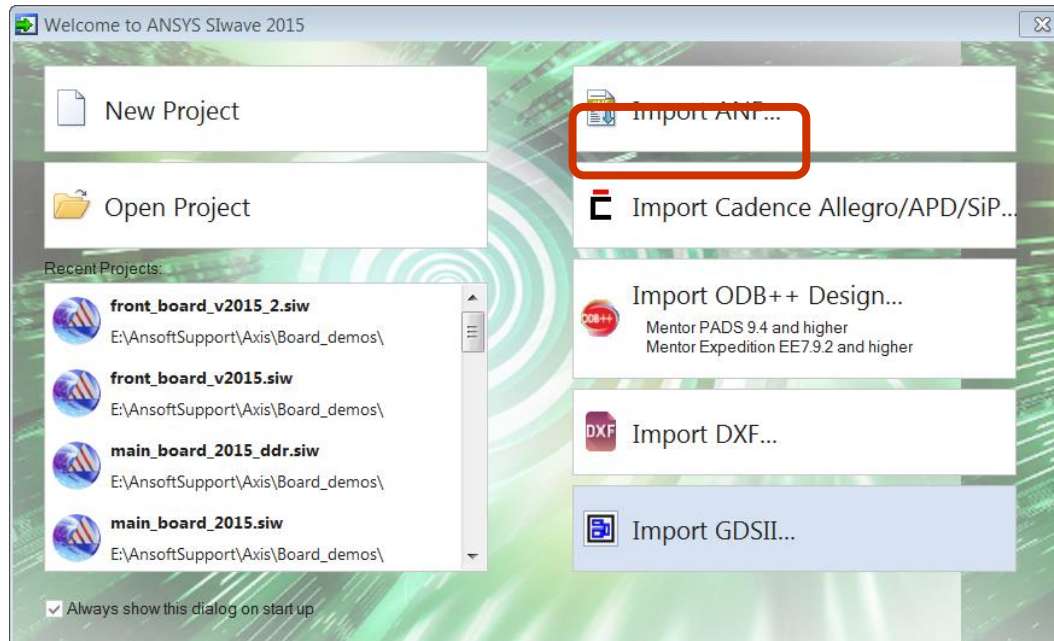
- **Custom Bondwires**

- The example is intended to show you how to draw and create different bond wire profiles on a package structure using SIwave.
- You will use and learn the following skills:
 - Import ANF and CMP files
 - Edit bond wires
 - Create bond wires

Example – Custom Bondwires

• Starting SIwave

- To launch SIwave, click the Microsoft **Start** Button, select: **All Programs > ANSYS Electromagnetics > ANSYS Electromagnetics Suite 16.1 > ANSYS SIwave 2015.1**
- The Welcome Window will appear

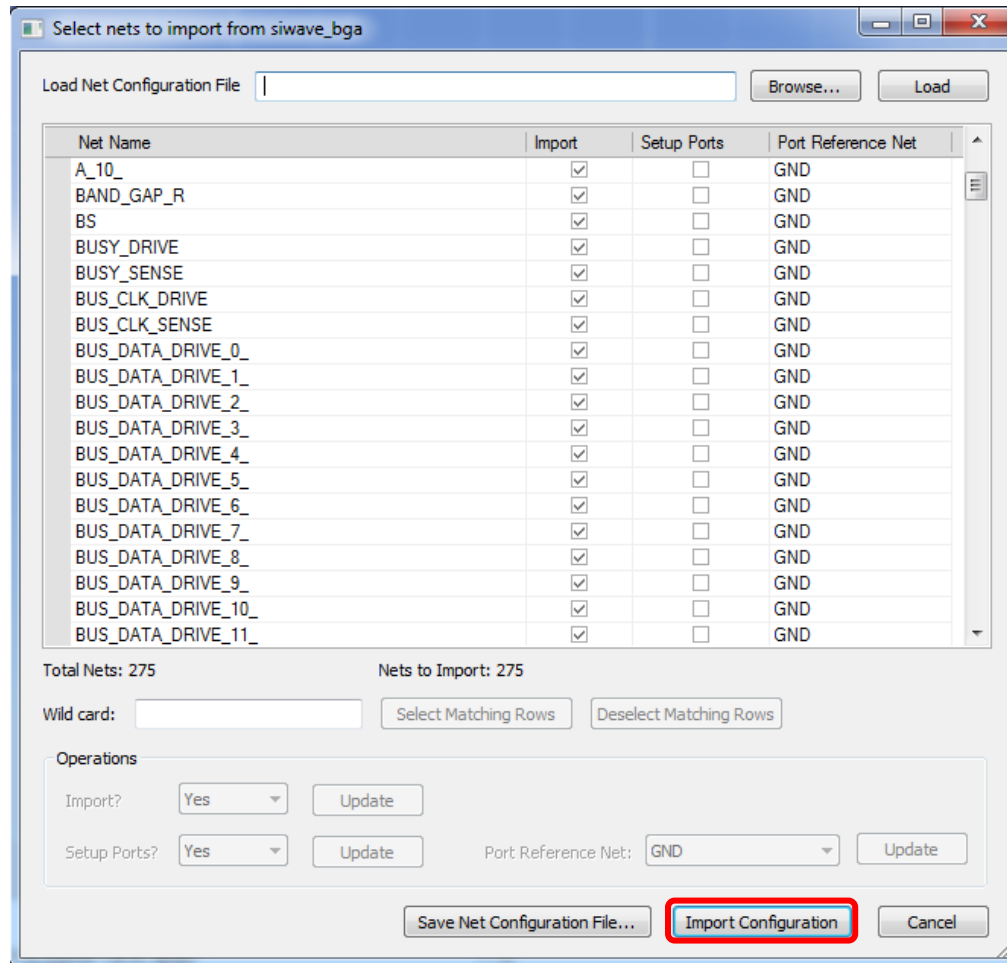


• Import the .ANF (Ansoft Neutral File) file

- Click the Import ANF... box
 - Navigate to the file named: **siwave_bga.anf**
 - Click the **Open** button

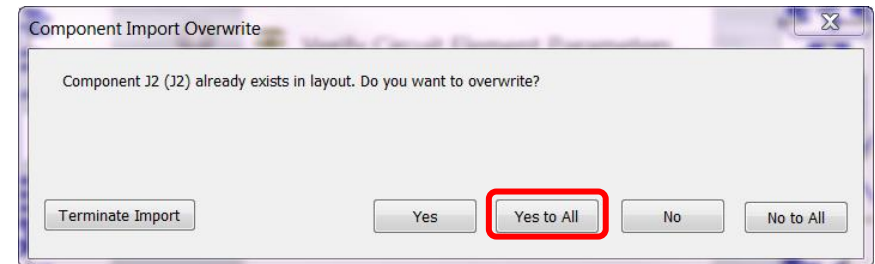
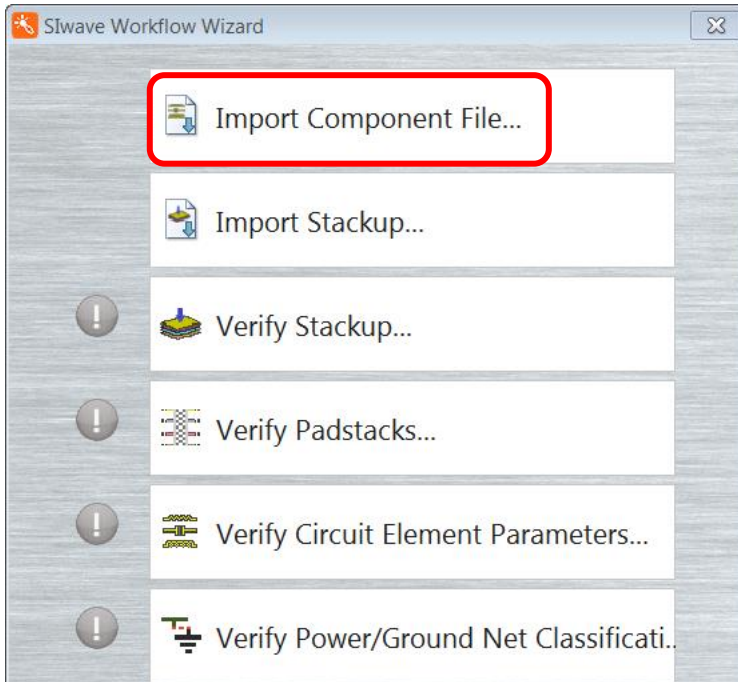
Example – Custom Bondwires

- The Select nets box will appear. (If desired, the user can filter nets to be imported. For this example, all nets will be imported)
- Click the Import Configuration button



Example – Custom Bondwires

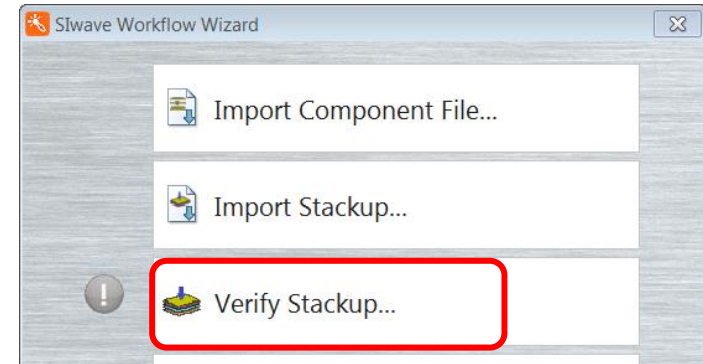
- The SIwave Workflow Wizard will appear
- Import the .CMP (Ansoft Component File)
 - Click on the Import Component File button
 - Navigate to the file named: **siwave_bga.cmp**
 - Click the **Open** button
 - If there is a warning message click the **Yes to All** button to overwrite existing names



Example – Custom Bondwires

• Verify the Layer Stackup

- From the SIwave Workflow Wizard dialog, click Verify Stackup...
- Double-check the values with those shown in the table below
- Click OK when finished



Layer Stack-up Editor

Color	Name	Type	Thickness (mils)	Material	Conductivity (S/m)	Dielectric Fill	Dielectric constant	Loss tangent	Translucency	Elevation (mils)	Roughness (mils)
	UNNAMED_1	DIELECTRIC	0	air	0		1.0006	0		16.76	
	SURFACE	WIREBOND	0	copper	5.8E+07		1.0006	0		16.76	
	TOP_COND	METAL	1.44	copper	5.8E+07	air	1.0006	0	65	15.32	HJ: 0, HJ: 0
	UNNAMED_4	DIELECTRIC	3	FR-4	0		4.5	0.035		12.32	
	VCC	METAL	1.44	copper	5.8E+07	FR-4	4.5	0.035	65	10.88	HJ: 0, HJ: 0
	UNNAMED_6	DIELECTRIC	5	FR-4	0		4.5	0.035		5.88	
	GND	METAL	1.44	copper	5.8E+07	FR-4	4.5	0.035	65	4.44	HJ: 0, HJ: 0
	UNNAMED_8	DIELECTRIC	3	FR-4	0		4.5	0.035		1.44	
	BASE	METAL	1.44	copper	5.8E+07	air	1.0006	0	65	0	HJ: 0, HJ: 0
	UNNAMED_10	DIELECTRIC	0	air	0		1.0006	0		0	

Add / Delete Layer(s)

Add Above Selected Layer

Add Below Selected Layer

Delete Selected Layers

Edit Selected Layer(s)

Color: 80ffff

Name: TOP_COND

Type: METAL

Material: copper

Dielectric Fill: air

Translucency: 65%

Thickness: 1.44 mils

Roughness: HJ: 0, HJ: 0 mils

Select all: DIELECTRIC layers

Apply

Edit Material Properties

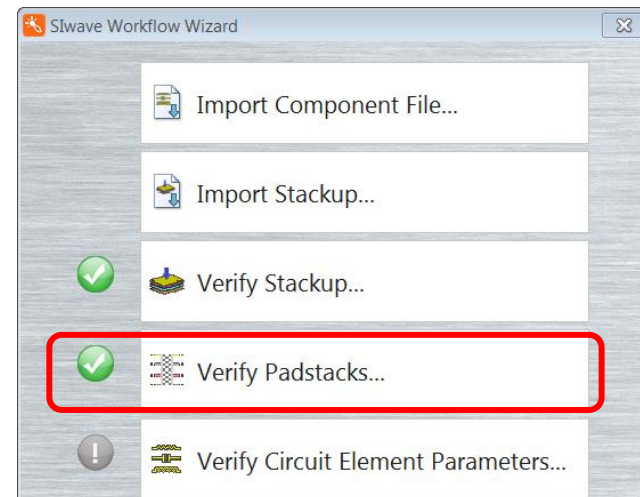
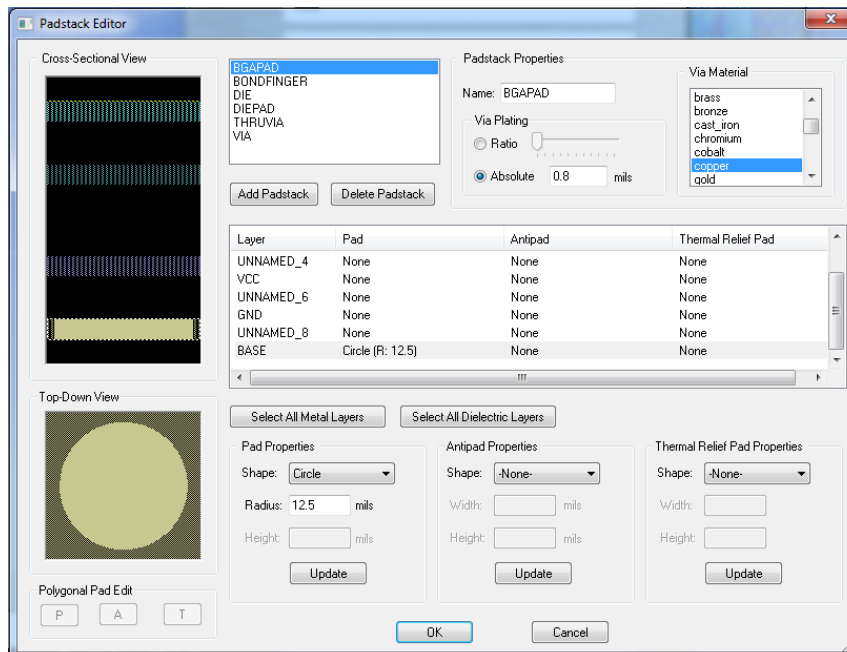
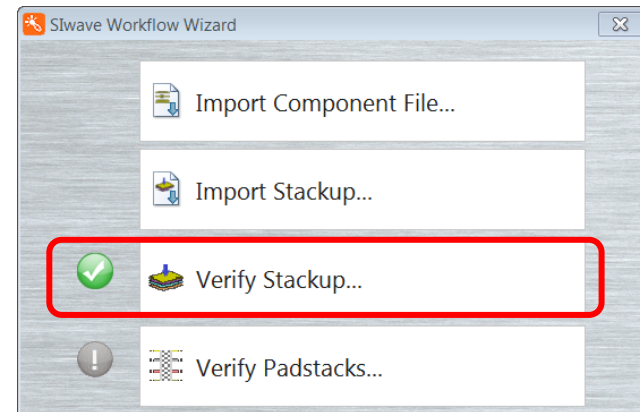
Units: mils

OK

Cancel

Example – Custom Bondwires

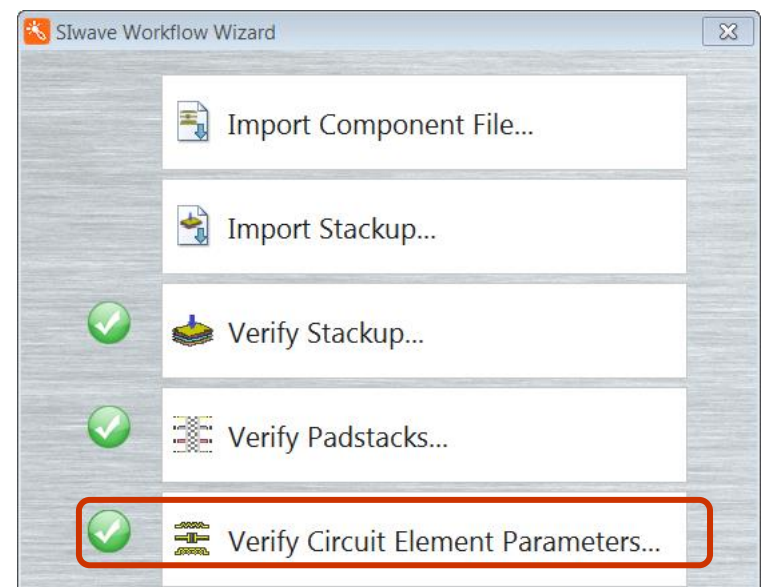
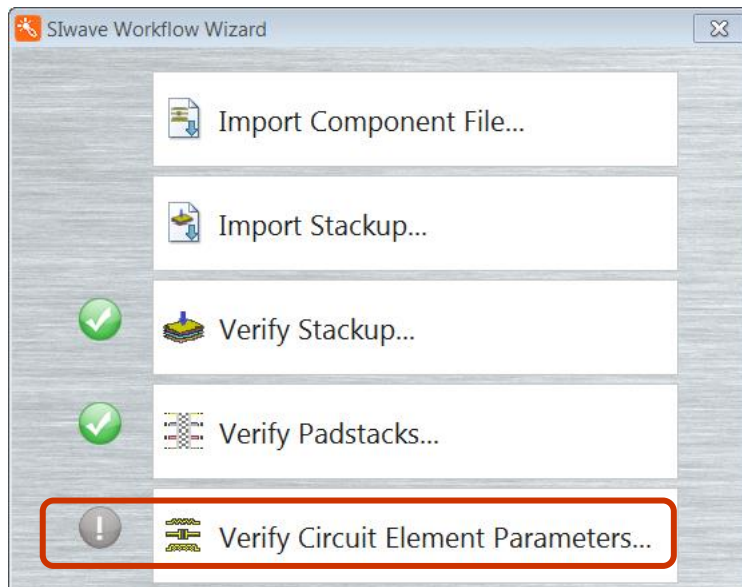
- **Verify the Layer Stackup**
 - There should be a green check mark next the to Verify Stackup
- **Verify Padstacks**
 - Click on Verify Padstacks to view
 - View some of the Padstacks
 - Click OK when finished
 - There should be a green check mark next to Verify Padstacks



Example – Custom Bondwires

- **Verify and Reassign Circuit Element Parameters**

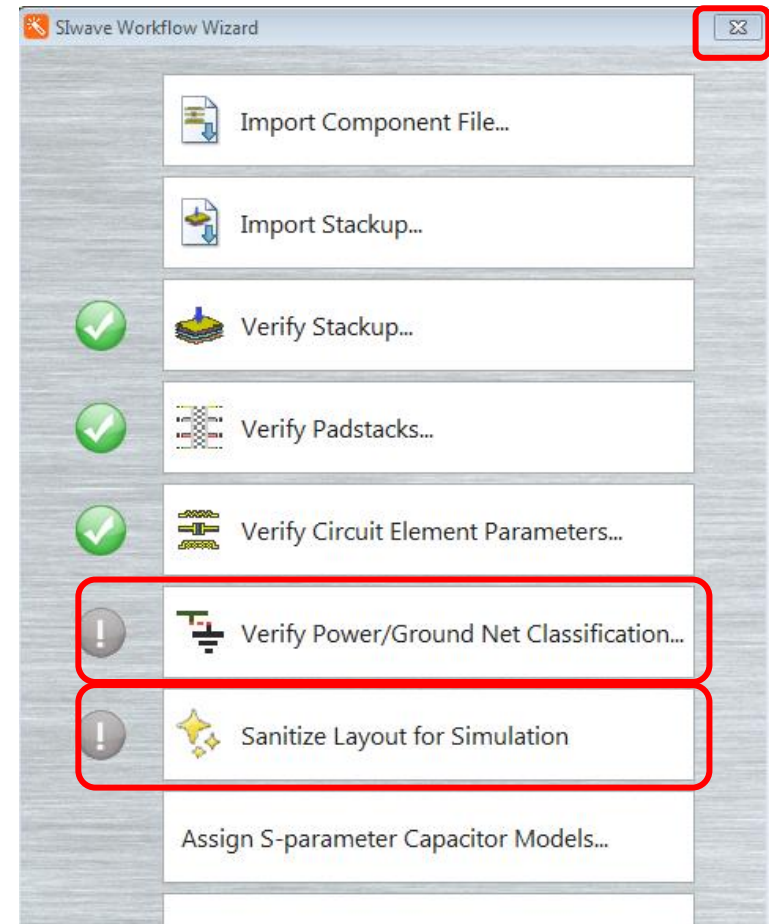
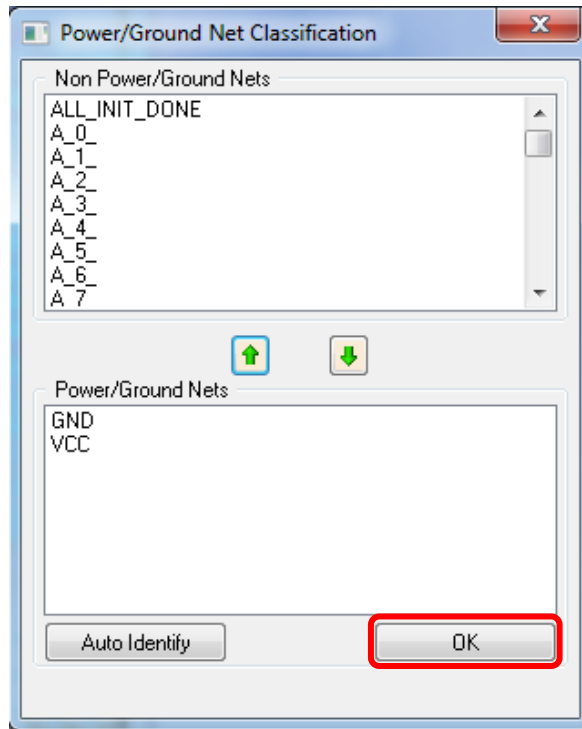
- Click on Verify Circuit Element Parameters
 - In this example the components list is empty as the design is used for bondwires setup.
 - So just Click OK at the Verify Circuit Parameters window.



Example – Custom Bondwires

- **Verify Power/Ground Nets Classification**

- Click on Verify Power/Ground Nets Classification...
 - In the newly open window verify that the nets GND and VCC are listed under “Power/Ground Nets”
 - Click OK when finished
- Click on Sanitize Layout for Simulation
 - Save the file if requested
- Close the window with the “X”



Custom Bondwires

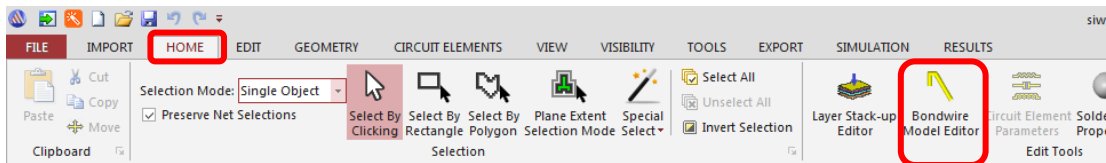
• Set Units

- Bottom right before the taskbar, set the Model Units to **microns**



• Procedure for Creating Bondwires

- Under the HOME Tab select the Bondwire Model Editor



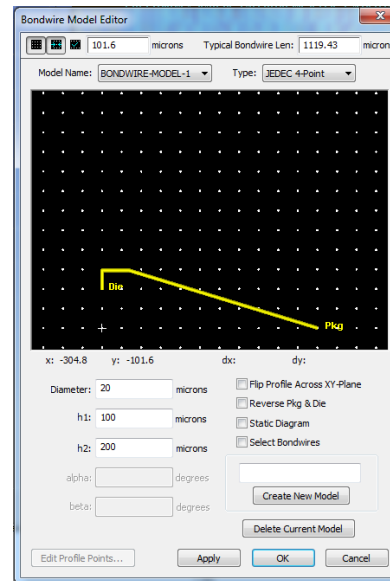
- Layer: <select the bondwire layer from the list>

- Model: <choose correct bondwire model>





- Sketched
- Stub
- JEDEC-4
- JEDEC-5
- Low Profile

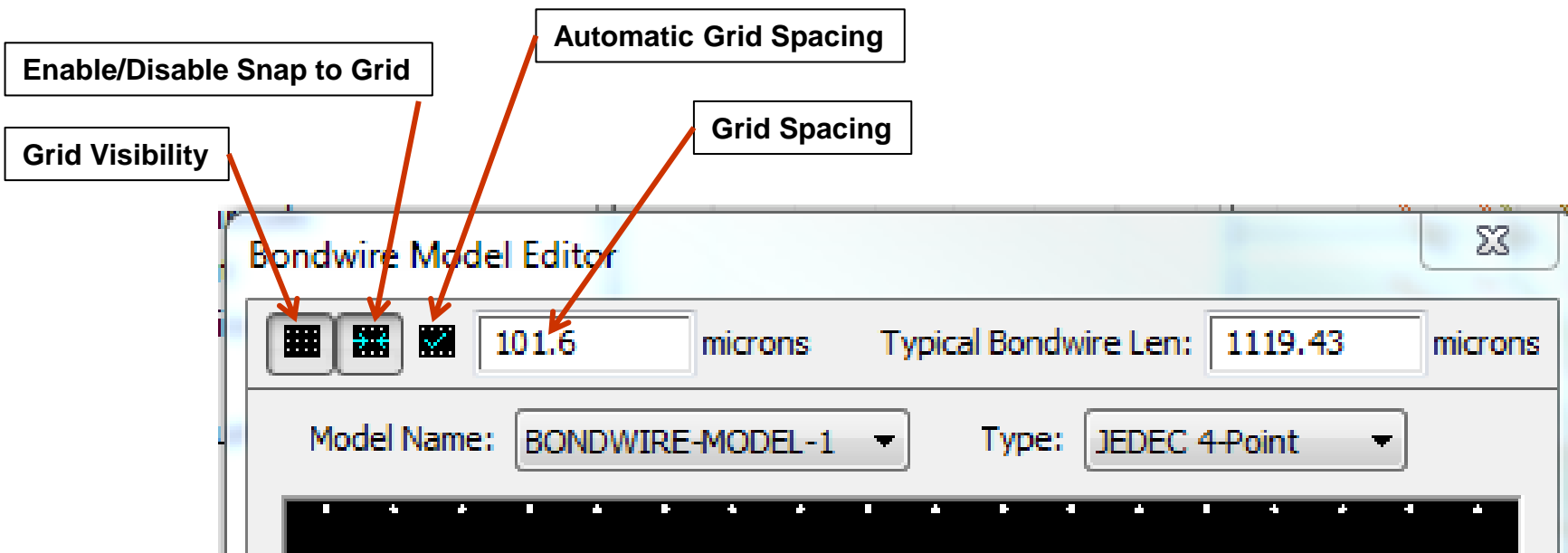
- Most commonly used bondwire models are:

- JEDEC-4
- JEDEC-5
- Sketched model



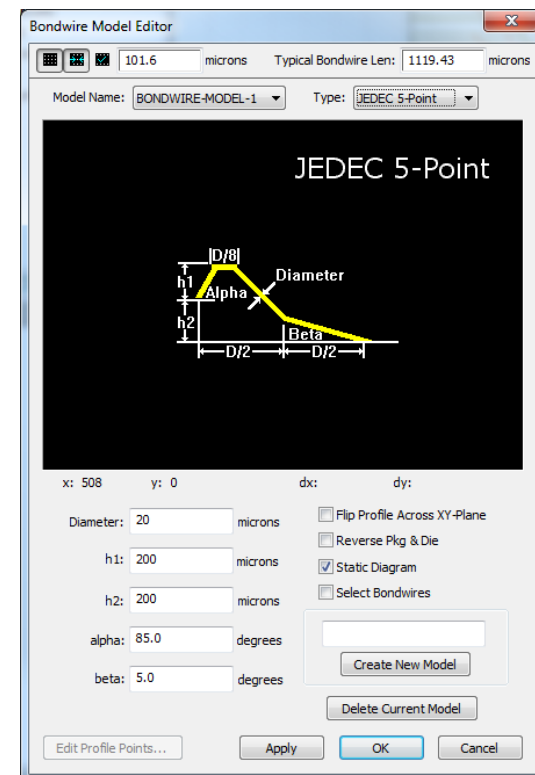
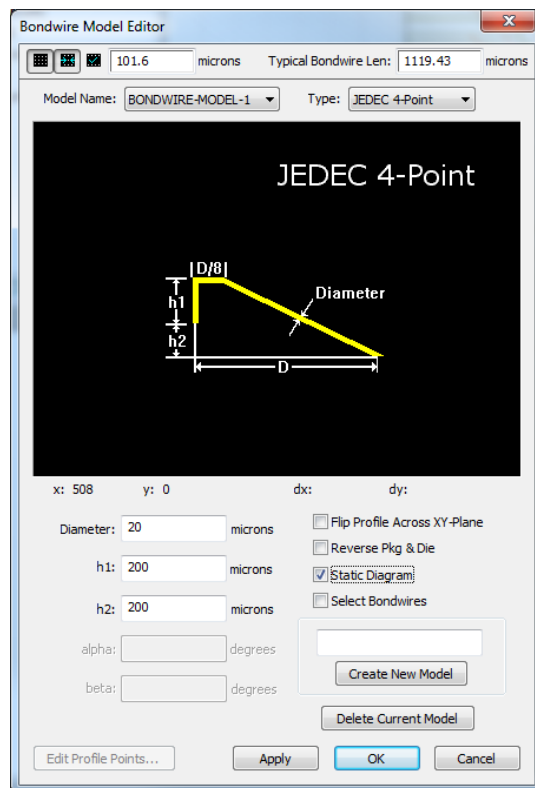
- **Using the Bondwire Editor – Toolbar**

- To turn grid visibility off/on click on: 
- To enable or disable grid snapping click on: 
- To automatically set the grid spacing click on: 
- To change the grid spacing enter a new measurement in the grid spacing box: 



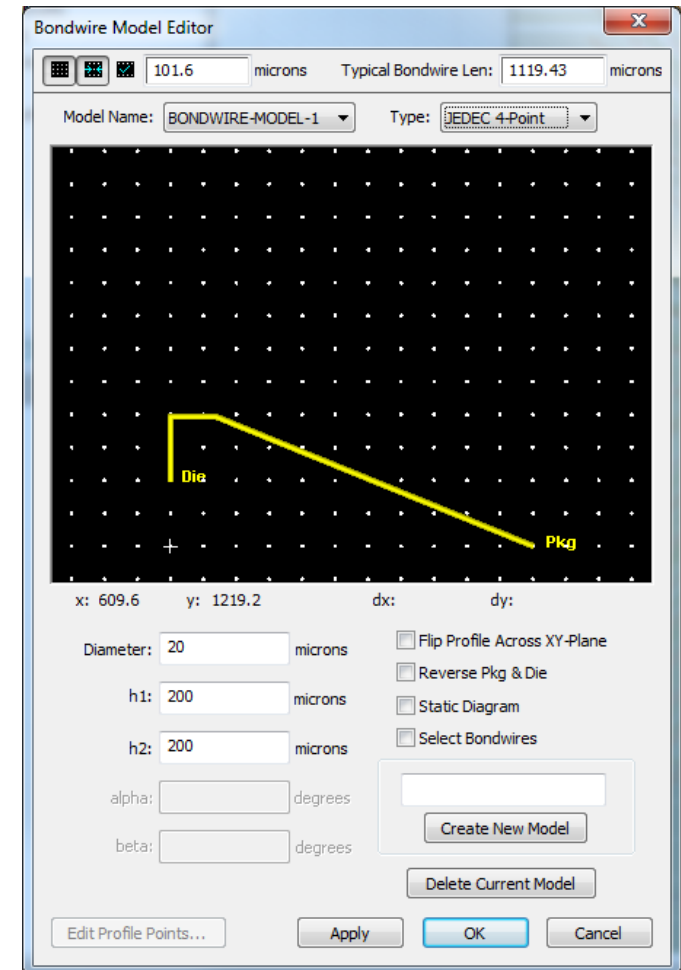
• Using the Bondwire Editor – Model Type

- Under Model choose appropriate bondwire model
 - JEDEC-4 or
 - JEDEC-5
- Static Diagram: ☒ Checked
 - JEDEC 4-point and JEDEC 5-point static diagram will display with bondwire dimensions. These are the physical dimensions you would need to know in order to properly setup Siwave



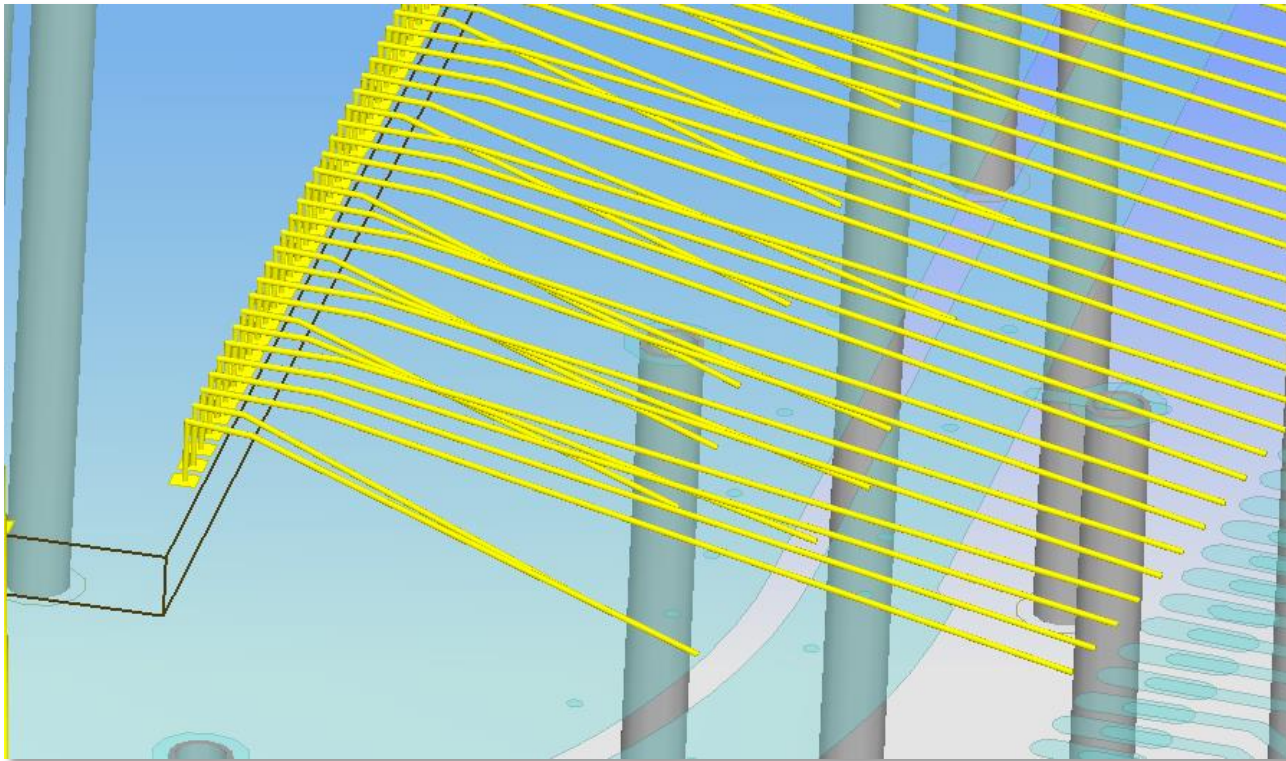
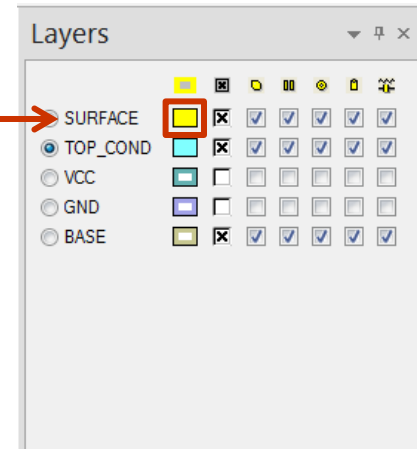
- **Creating Bondwires – JEDEC 4-point profile**

- Select:
 - Model Name: **BONDWIRE-MODEL-1**
 - Type: **JEDEC 4-Point**
 - Diameter: **20 microns**
 - h1: **200 microns**
 - h2: **200 microns**
 - Uncheck **Static Diagram** to see the real bondwire shape
 - Click the **OK** button to exit



- **View Bondwires in 3D with the Layout**

- You can rotate and zoom into the die area to view the bond wires
- To view bond wires with actual dimension, instead of a wire with zero thickness:
 - Fill the SURFACE layer display



• Creating Bondwires – Sketched

- In the Bondwire Model Editor select:
 - Model Name: **BONDWIRE-MODEL-1**
 - Type: **Sketched**
 - Then set:
 - Diameter: **20** microns
 - Left-click to add each segment
 - Start point: **Die**
 - End point: **Package**
 - Alternatively, click the **Edit Profile Points** button to enter the points directly
 - If no point has been added click on **Above** button under **Add new vertex**
 - Enter the (X, Z) pairs shown at right
 - Click **OK**
 - Click the **OK** button to exit

All coordinate values are in microns

Segment lengths in red are less than 3 times the specified bondwire radius and may cause meshing problems.

	X	Z	Segment Length
1	50	150	
2	50	300	150.000000
3	300	450	291.547595
4	900	450	600.000000
5	1250	100	494.974747
6	1250	-100	200.000000

Add new vertex

Above... Below...

Delete vertex(s)

Selected... All...

Update Bondwire Diagram

Export Profile... Import Profile...

OK Cancel

