

EASYLOGIX.DE



PCB-Investigator Physics

07/2015

Schindler & Schill GmbH
Bruderwöhrdstr. 15b
93055 Regensburg
Deutschland

Tel: +49 941 604 889 719
Email: info@easyLogix.de
Web: www.easyLogix.de



PCBi - Physics

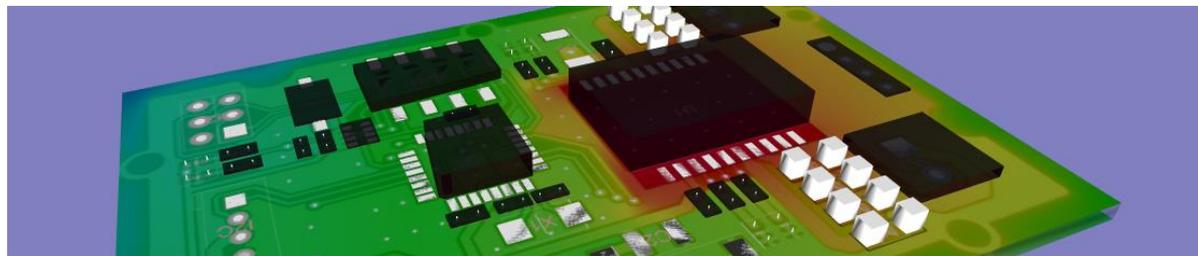
Why do I need PCBi - Physics?

PCB-Investigator Physics is the perfect tool to simulate the **physical behaviour** of your Printed Circuit Boards during development phase.

It enables you to find **thermal hotspots**, critical trace **resistances** and **voltage drops** that are too high, even before prototyping begins!

With the built-in editing functions of PCB-Investigator Physics it's even possible to **optimize the layout** and stack-up to achieve the best possible physical behaviour with only a few clicks!

Save valuable time and prototype costs with the simulations of PCBi-Physics!



Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?



PCBi - Physics

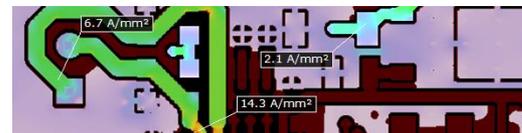
Why do I need PCBi - Physics?

To get information about the physical behaviour of your Printed Circuit Board during operation, PCB-Investigator Physics enables you to simulate the following physical properties:

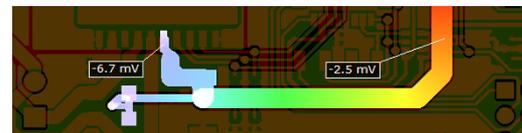
- The **Temperature** raise at each location of the PCB caused by power loss of components or by high currents



- The **Current Density**, e.g. at copper bottlenecks or in drills



- The **Voltage Drop** and **Copper Resistance** between any pins on any layer



Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?



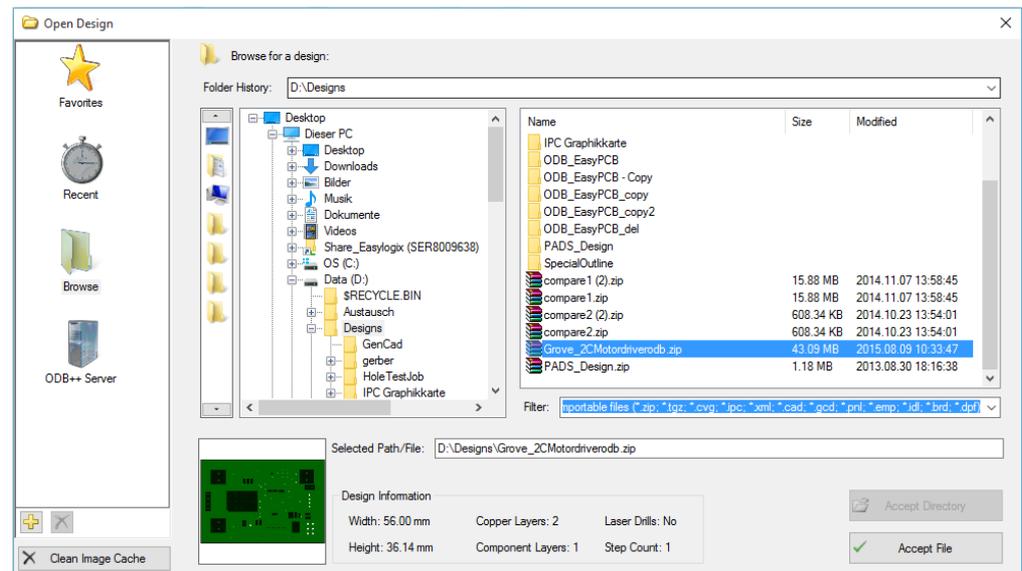
PCBi - Physics

Which data is needed?

As input data you can select any CAD format supported by PCB-Investigator.

Supported formats are:

- ODB++
- GenCAD
- IPC2581
- IDF 2.0 / 3.0
- Gerber274x
- ...



Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?



PCBi - Physics

How to run the Simulation?

1) Enter general Project parameters

Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?

The screenshot shows the 'PCBi-Physics - Simulation' dialog box with the following settings:

- Project Settings:**
 - Projectname: New Simulation
 - CAD Data Step: cad-step
- Standard Color Settings:**
 - Color of Source Pins: Green
 - Color of Sink Pins: Orange
 - Color of Power Dissipation Components: Cyan
- Calculation Settings:**
 - Tasks: Voltage Drop, Temperature
 - Area: Complete Board, Area of used Nets
 - Accuracy: Standard, Very Fine, Fine, User (75 μm)

Buttons at the bottom: Save Setting, Import Setting, Export Setting, and Close.



PCBi - Physics

How to run the Simulation?

2) Enter Stack-Up information (Copper foils, Prepregs)

Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?

The screenshot shows the PCBi-Physics - Simulation software interface. The Board Info panel on the left lists the stack-up layers: 1 TOP, PREPREG_1, 2 BOTTOM, and DRILL. The Stack-Up configuration dialog is open, showing the following table:

Layername	Context	Type	Layer Height	Plating
COMP+_TOP		Component		
SOLDERPASTE_TOP		Solderpaste	0.00 µm	
SOLDERMASK_TOP	other	Soldermask	0.00 µm	
1 TOP	Copper;35	Signal	35.00 + 25.00 µm	
PREPREG_1	other	Dielectric	1308.00 µm	
2 BOTTOM	Copper;35	Signal	35.00 + 25.00 µm	
SOLDERMASK_BOTTOM	other	Soldermask	0.00 µm	
SOLDERPASTE_BOTTOM		Solderpaste	0.00 µm	
DRILL		Drill		

The dialog also shows settings for Drill Layer (Start Layer, End Layer, Layer Height, Plating) and a table of materials for each layer.



PCBi - Physics

How to run the Simulation?

3) Enter Current Sources / Sinks for each important net

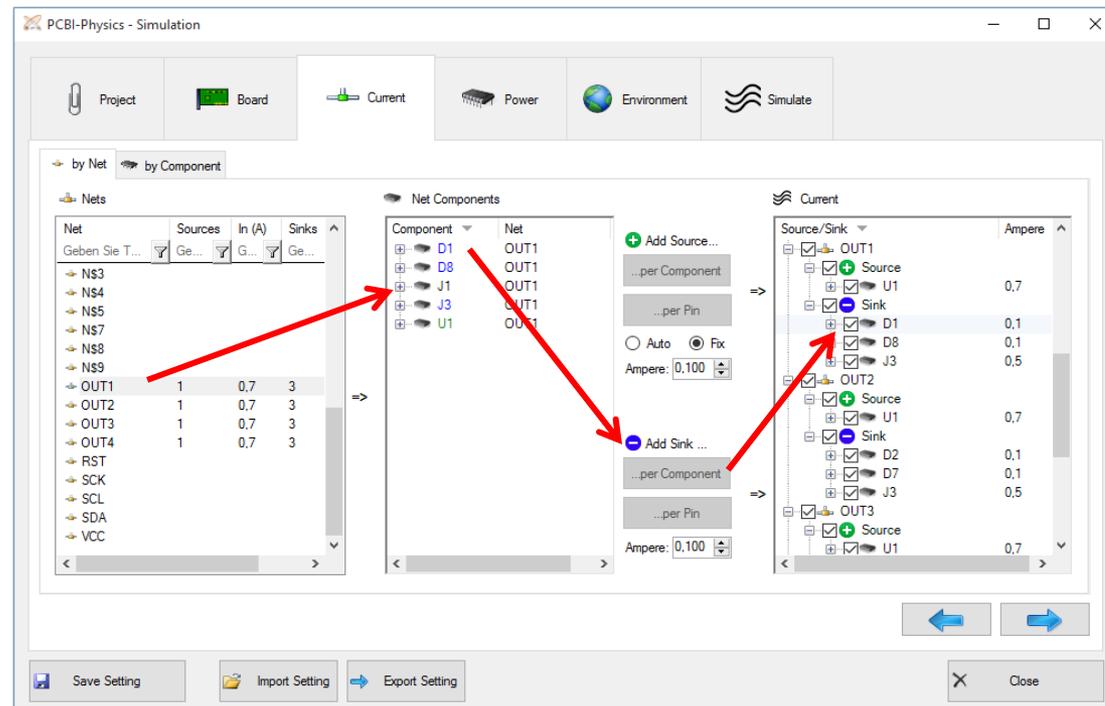
Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?





PCBi - Physics

How to run the Simulation?

4) Enter Power Dissipation for each Component

Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?

The screenshot shows the 'PCBi-Physics - Simulation' window with the 'Power' tab selected. The 'Power Dissipation' section is active, displaying two tables: 'All Components' and 'Components with Power Dissipation'. A red arrow points from the 'D1' row in the 'All Components' table to the 'Power Loss' input field, which is set to '0.100 Watt'. Another red arrow points from this input field to the 'D1' row in the 'Components with Power Dissipation' table, where the 'Power Loss (W)' is '0.100' and 'Height (mm)' is '1.5'. The 'Components with Power Dissipation' table also shows other components like D2-D9, I2C, and U1 with their respective power loss and height values.

Component	Watts
C9	
D1	0.1
D2	0.1
D3	0.1
D4	0.1
D5	0.1
D6	0.1
D7	0.1
D8	0.1
D9	0.5
I2C	
IC1	

Component	Power Loss (W)	Height (mm)
<input checked="" type="checkbox"/> D1	0.100	1.5
<input checked="" type="checkbox"/> D2	0.1	1.5
<input checked="" type="checkbox"/> D3	0.1	1.5
<input checked="" type="checkbox"/> D4	0.1	1.5
<input checked="" type="checkbox"/> D5	0.1	1.5
<input checked="" type="checkbox"/> D6	0.1	1.5
<input checked="" type="checkbox"/> D7	0.1	1.5
<input checked="" type="checkbox"/> D8	0.1	1.5
<input checked="" type="checkbox"/> D9	0.5	2.7
<input checked="" type="checkbox"/> U1	4	3



PCBi - Physics

How to run the Simulation?

5) Enter environmental Temperatures and Heat Exchange values

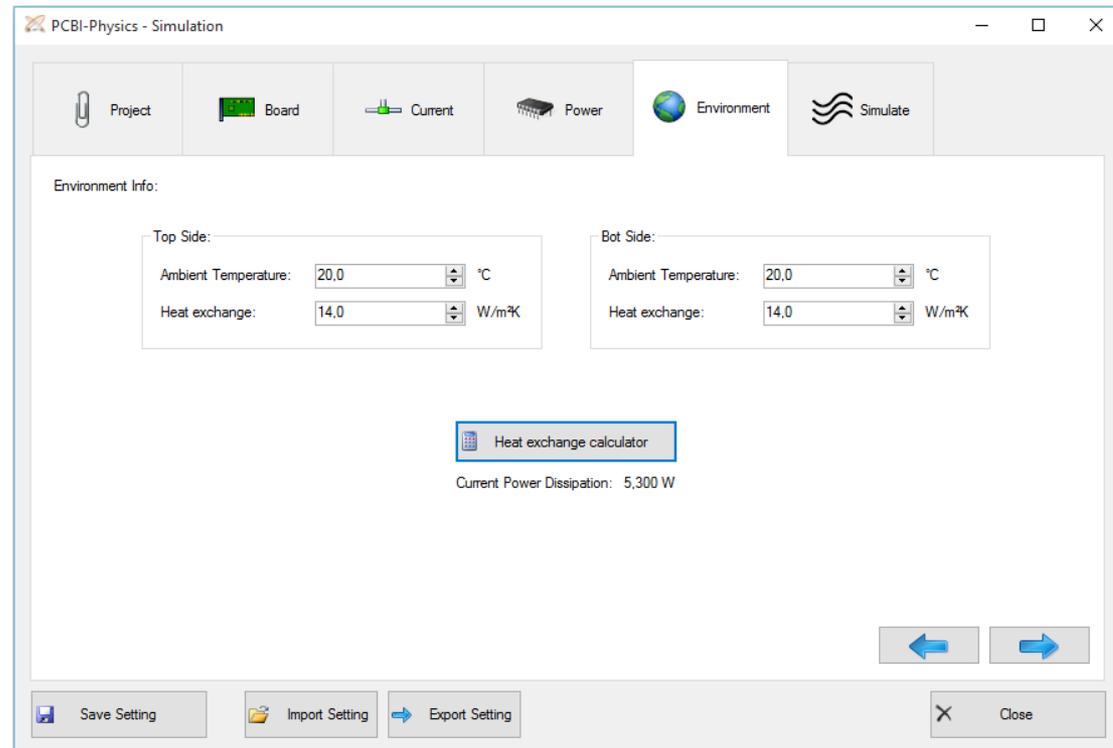
Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?





PCBi - Physics

How to run the Simulation?

6) Click "Start" to initiate the simulation process

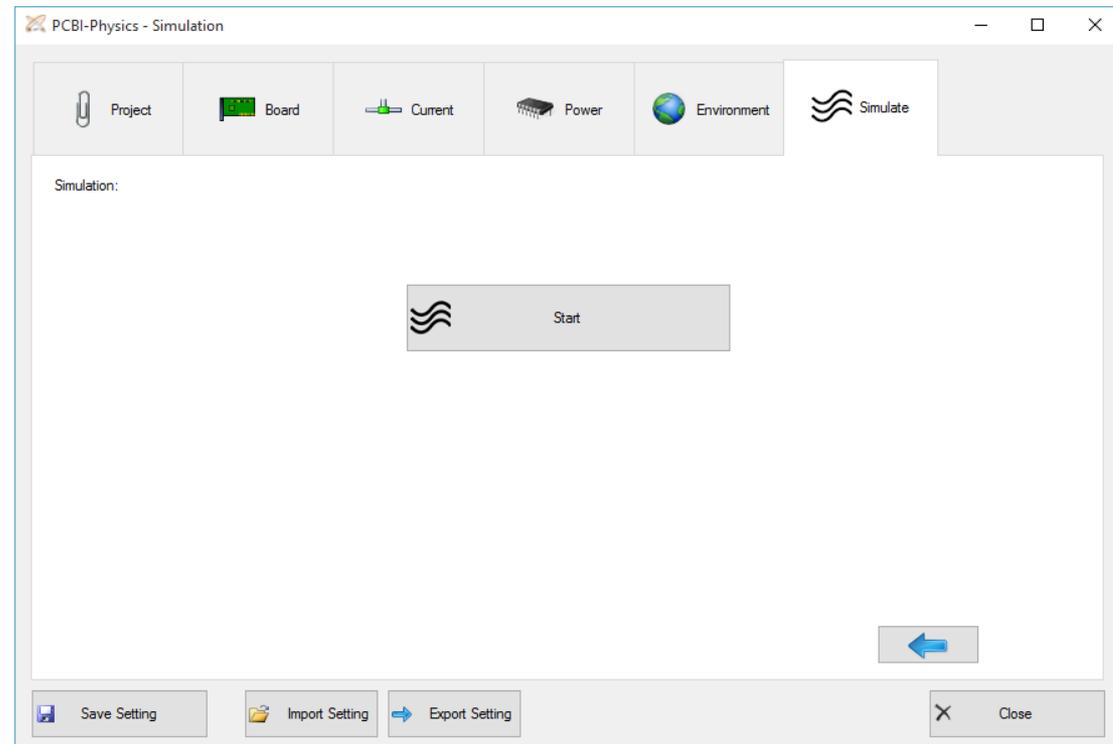
Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?





PCBi - Physics

What does the result look like?

The simulation result can be evaluated in the "Result Viewer" by a graphical overlay on the CAD data or with the help of a report.

For documentation issues it is possible to add Notes showing the simulated values at important locations.

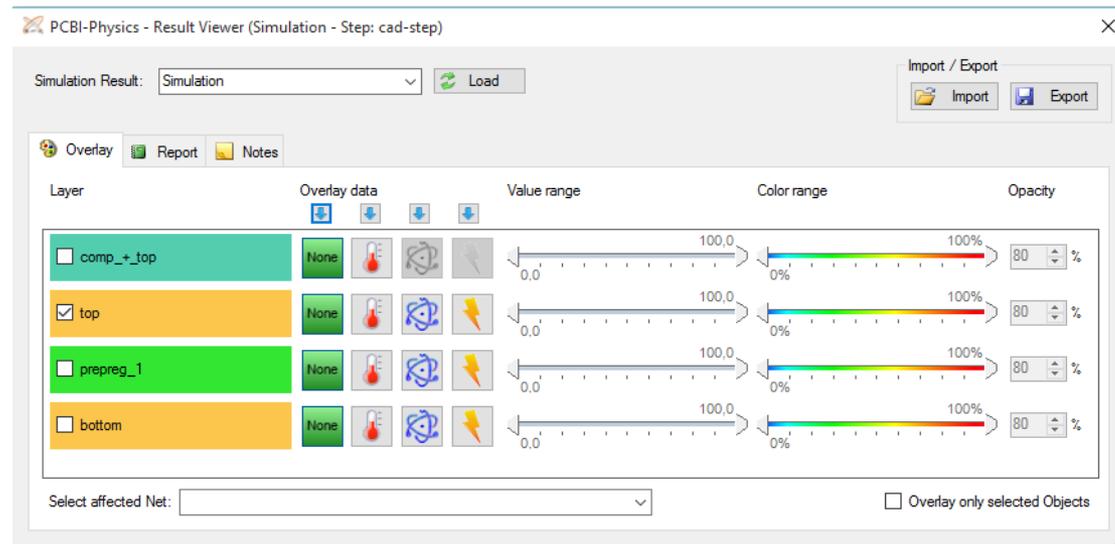
Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?



The following slides will give a few examples...



PCBi - Physics

What does the result look like?

Example 1: Temperature Overlay with Notes

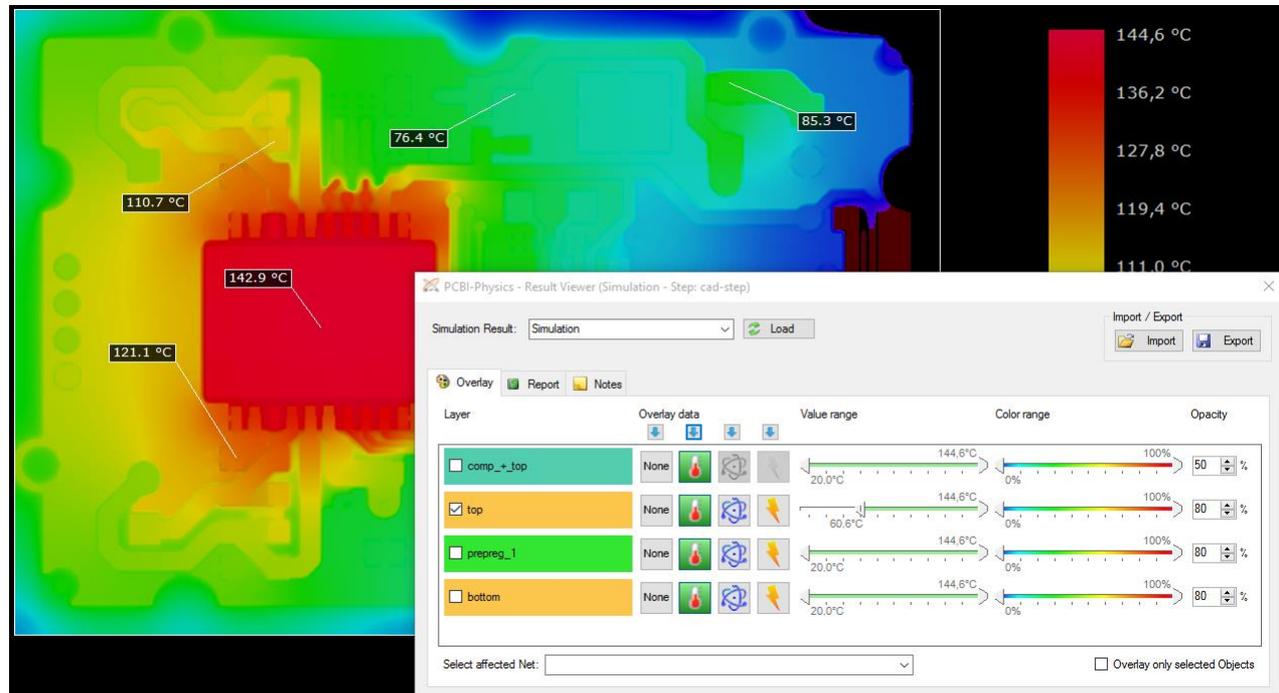
Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?



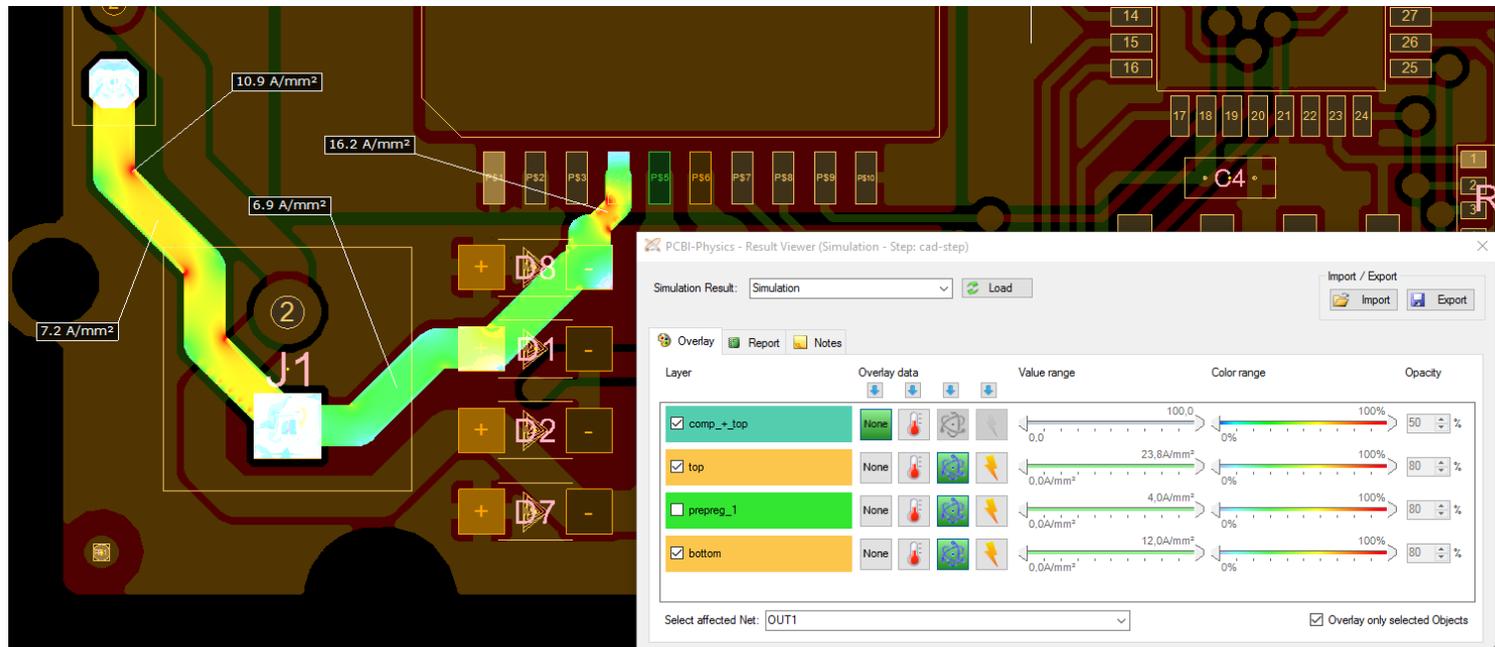
Temperature on the top signal layer (Filter: Temperature > 60°C)



PCBi - Physics

What does the result look like?

Example 2: Current Density in the net "OUT1"



Current Density in the net "OUT1" over all layers

Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

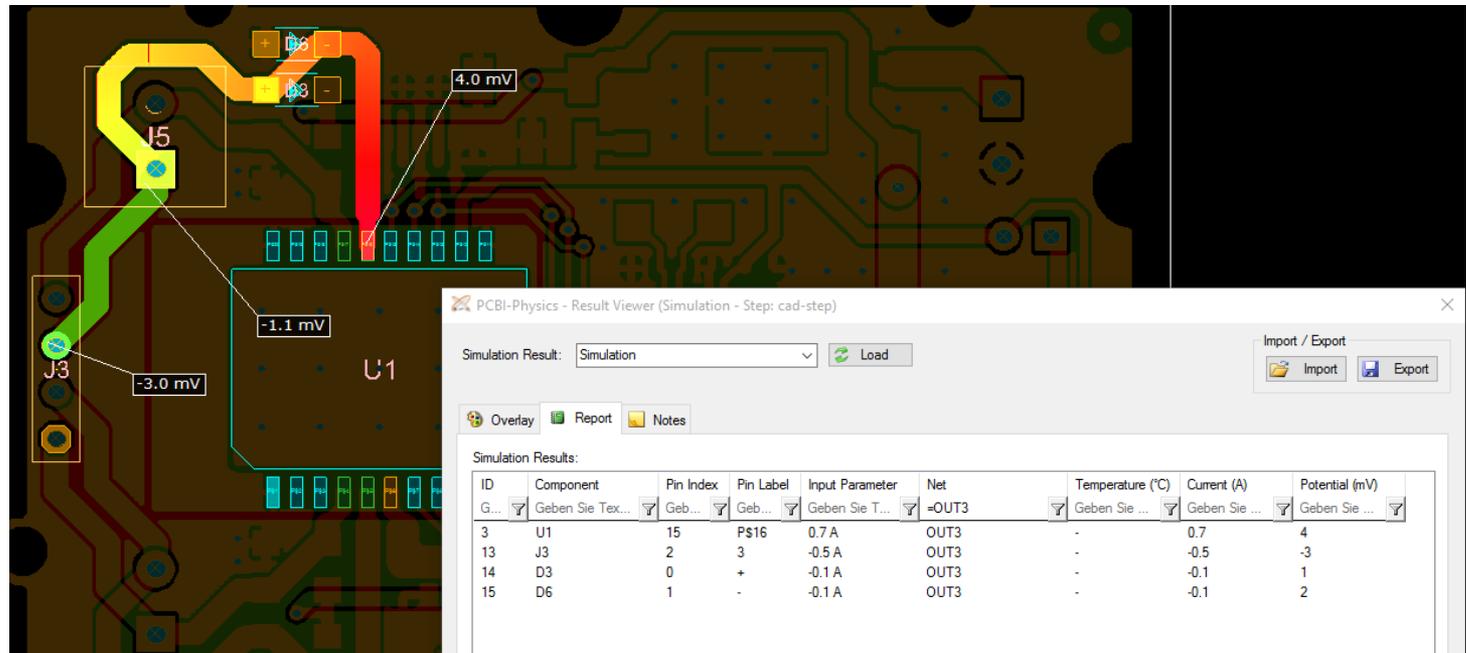
We piqued your interest?



PCBi - Physics

What does the result look like?

Example 3: Voltage Drop in the net "OUT3"



Voltage Drop in the net "OUT3" (Graphically and as Report)
With this information the Resistance between e.g. U1 and J3 can be calculated ($R = U/I$)

Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

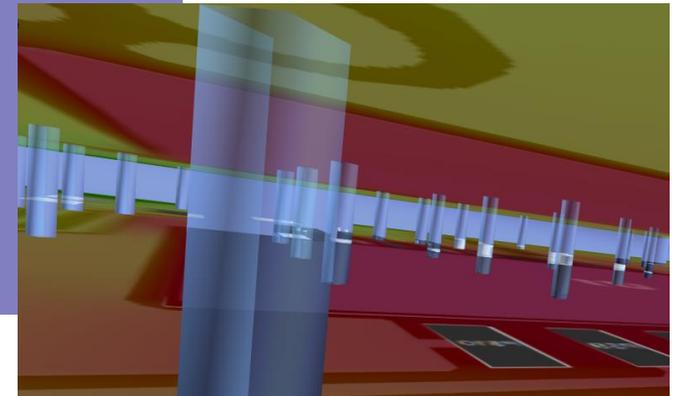
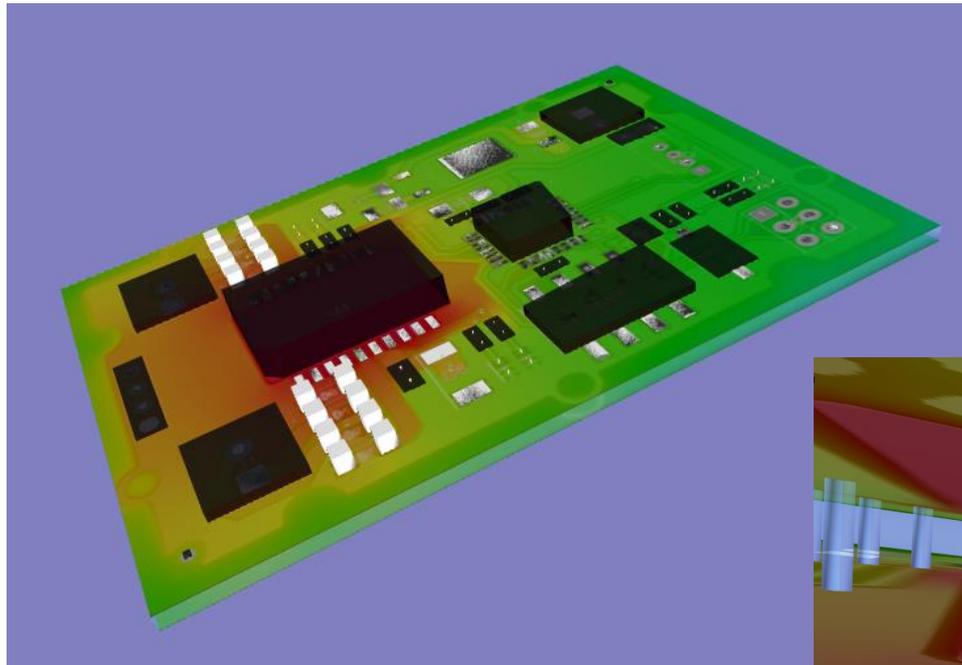
We piqued your
interest?



PCBi - Physics

What does the result look like?

Example 4: 3D Views with Temperature Overlay



3D Views with Temperature Overlay

Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?



PCBi - Physics

What does the result look like?

Example 5: PDF Documentation

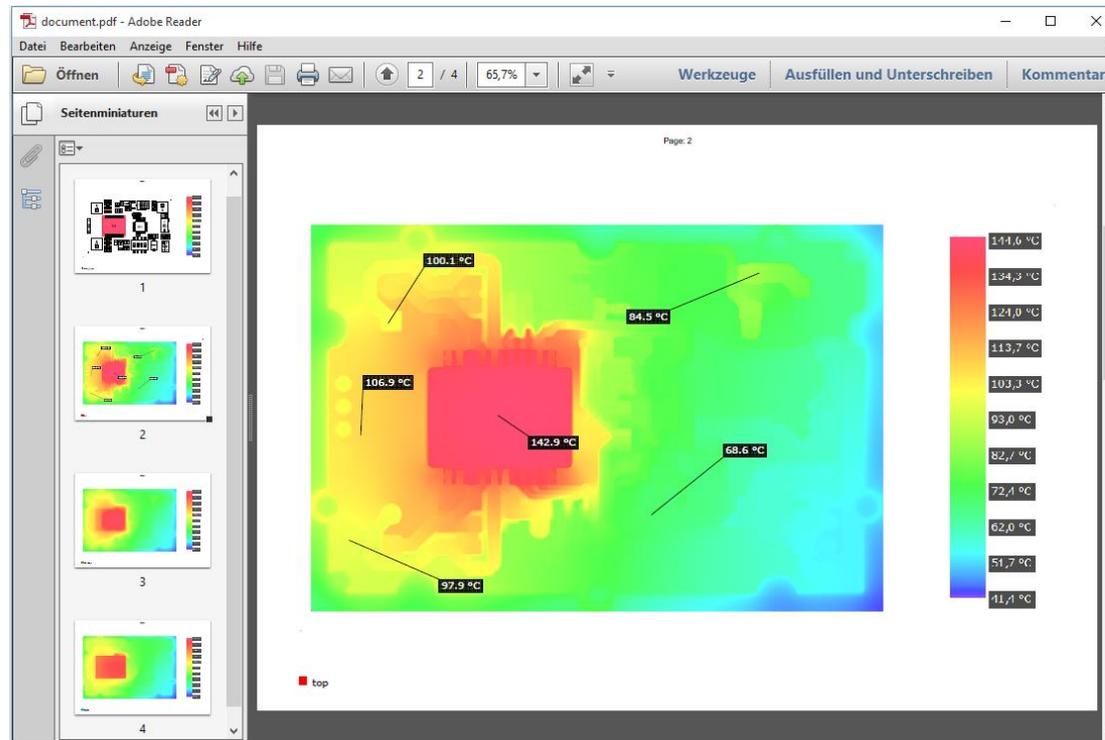
Why do I need PCBi-Physics?

Which data is needed?

How to run the Simulation?

What does the result look like?

We piqued your interest?



PDF Document with Temperature for each layer



PCBi - Physics

We piqued your interest?

Why do I need
PCBi-Physics?

Which data is
needed?

How to run the
Simulation?

What does the
result look like?

We piqued your
interest?

Get in touch!

info@easylogix.de

Günther Schindler

Tel. +49 941 604 889 719

or find more information here:

www.PCBi-Physics.com



Useful Links:

PCBi-Physics

www.PCBi-Physics.com

PCB-Investigator

www.pcb-investigator.com

Native Board Import (3D Interface to CATIA, SiemensNX, SolidWorks, SolidEdge)

www.sts-development.biz

GerberLogix

www.gerberLogix.com

Online Gerber Viewer

www.Gerber-Viewer.com

Software Development, CAD Converter, data connection

www.easyLogix.de