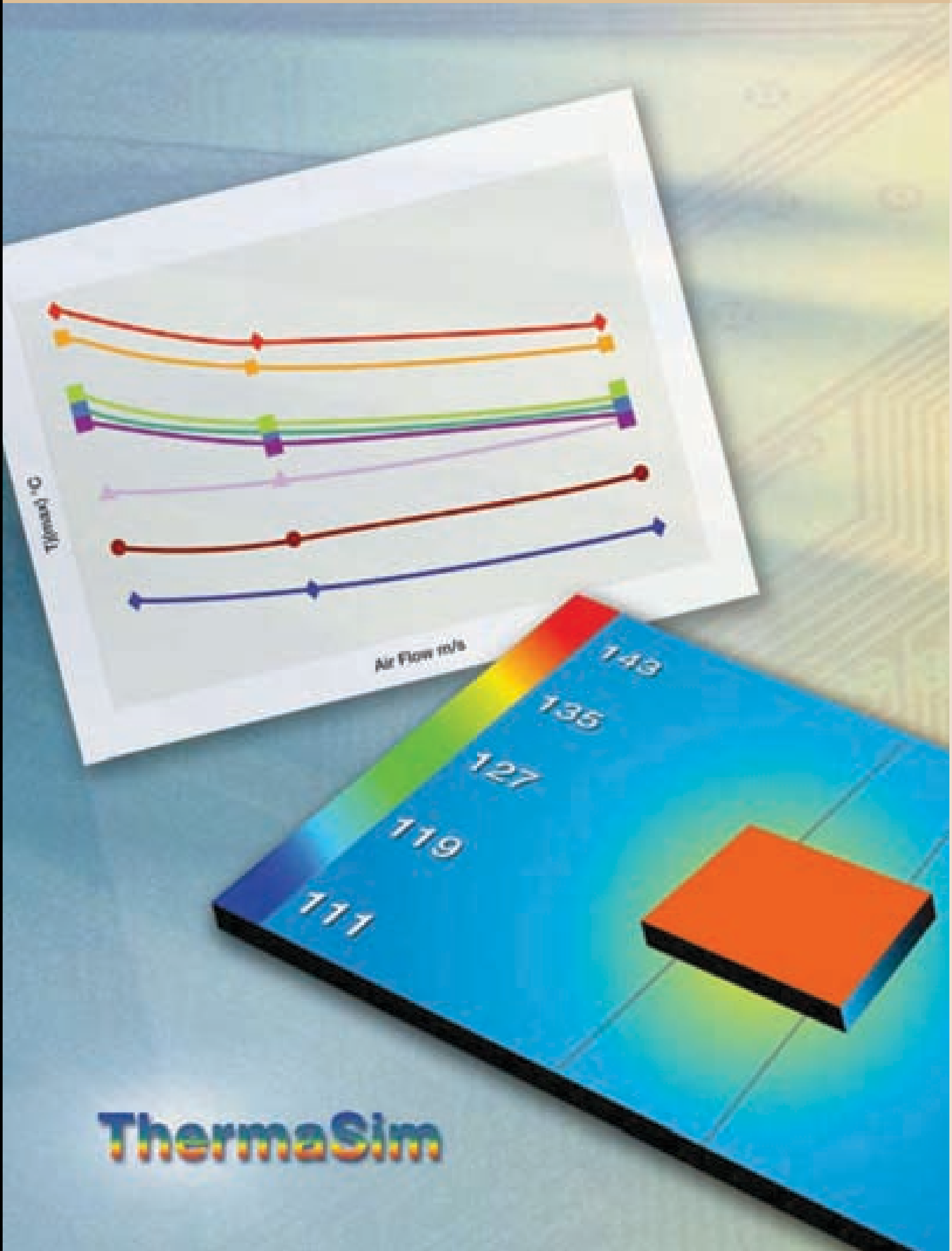
VISHAY INTERTECHNOLOGY, INC.

POWER MOSFETs

ONLINE THERMAL SIMULATION

ThermaSim

PRODUCT OVERVIEW



www.vishay.com

Thermal Design Solutions

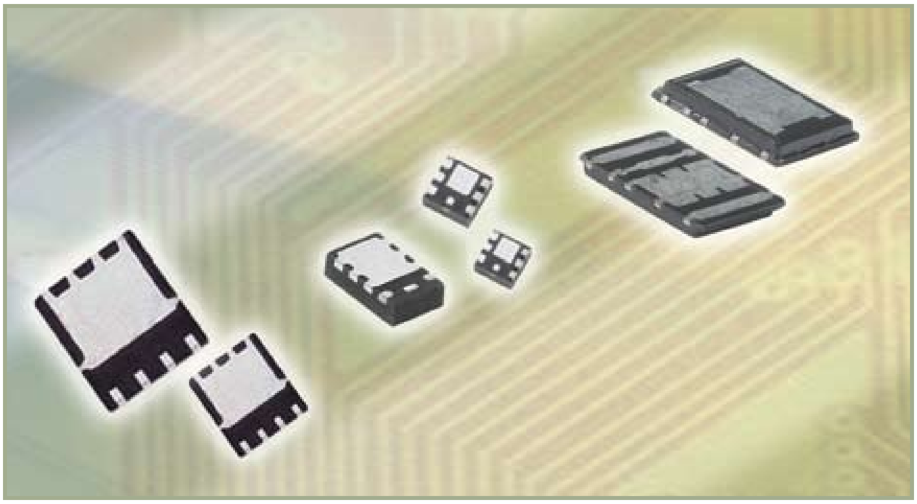
As electronic devices become smaller while adding more functionality, thermal management is becoming an increasingly important design issue. Understanding the thermal characteristics of power MOSFETs is particularly significant for a wide range of systems.

Vishay's ThermaSim™ is a free on-line tool that helps designers speed time to market by allowing detailed thermal simulations of Vishay Siliconix power MOSFETs to be performed before prototyping. Appropriate for any power MOSFET application, ThermaSim will be especially useful in high-current, high temperature applications such as automotive, fixed telecom systems and desktop and laptop computers.

In a first for on-line MOSFET simulation, ThermaSim's extensive model library uses structurally detailed models of Vishay Siliconix power MOSFETs created using Finite Element Analysis (FEA) techniques to increase simulation accuracy. The tool also allows designers to define other heat-dissipating components and simulate their effect on the MOSFET's thermal operation.

ThermaSim is available to registered users of Vishay.com and can be accessed from Vishay's website, on the MOSFET gateway: **http://www.vishay.com/mosfets**

Thermal Design Solutions



The Vishay Siliconix power MOSFET portfolio features devices in advanced thermal packaging including the PolarPAK® and the PowerPAK® families. PolarPAK is the first power MOSFET package to combine double-sided coolng with an industry standard leadframe and plastic encapsulation construction, ideal for increased power density applications with air flow. PowerPAK increases power density and is available in footprint / form factors ranging in size from SO-8 (5 mm x 6 mm) down to SC-75 (1.6 mm x 1.6 mm).

ThermaSim supports these thermal packages and all other Vishay Siliconix power MOSFET packages as well. For more information, see **http://www.vishay.com/mosfets.**

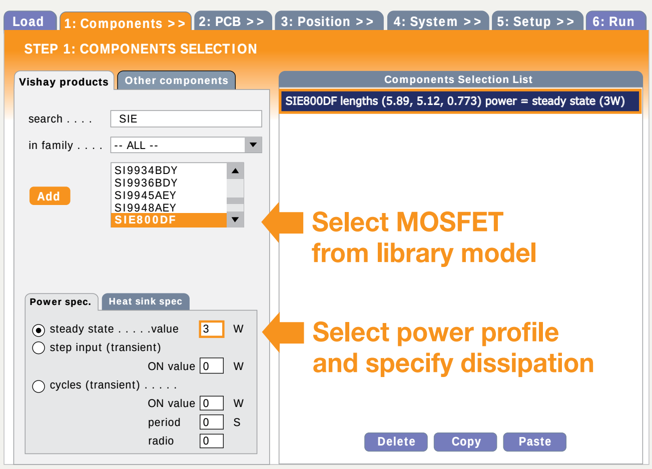
VISHAY

Thermal Design Solutions

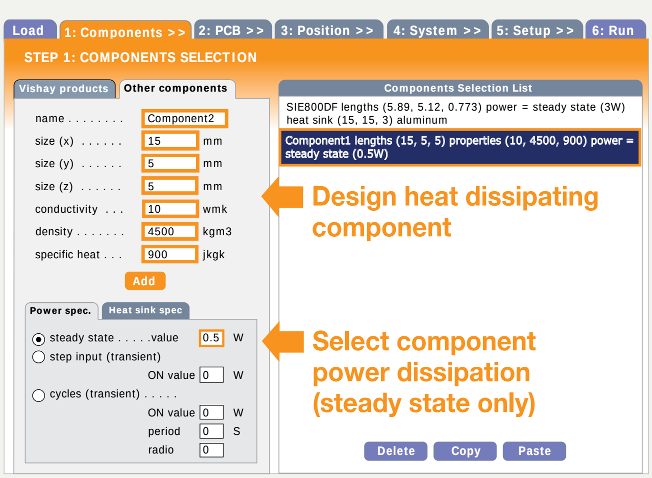
Online Thermal Simulation for Power MOSFETs

Step 1: Select the Component

Select one or more devices for thermal simulation from a list of Vishay Siliconix power MOSFETs. You may define other heat-dissipating components that will be on the printed circuit board. The power specification tab allows you to input the power dissipation profile for these components.

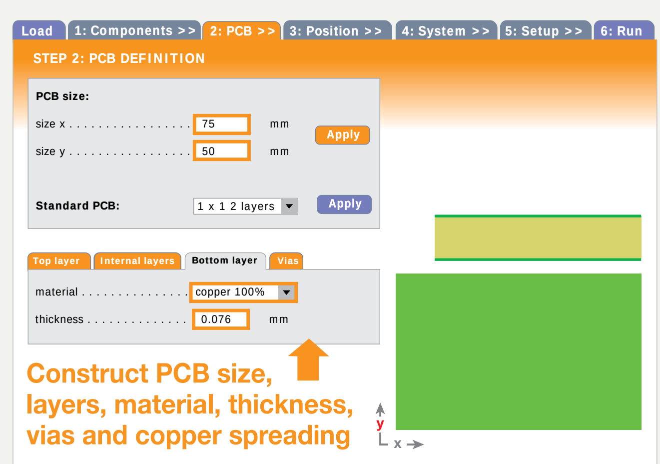


Step 1: Select the Component (Continued)



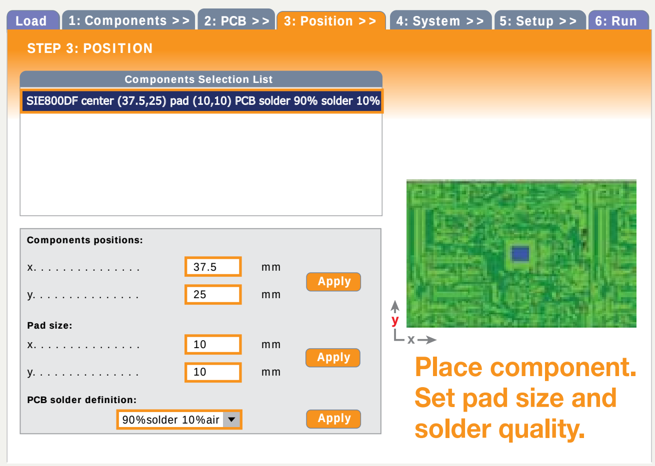
Step 2: Construct the PCB

A pull-down menu allows you to choose from several standard types of printed circuit boards, or you can input individual specifications for PCB size, material, thickness, layers, vias, and copper spreading.



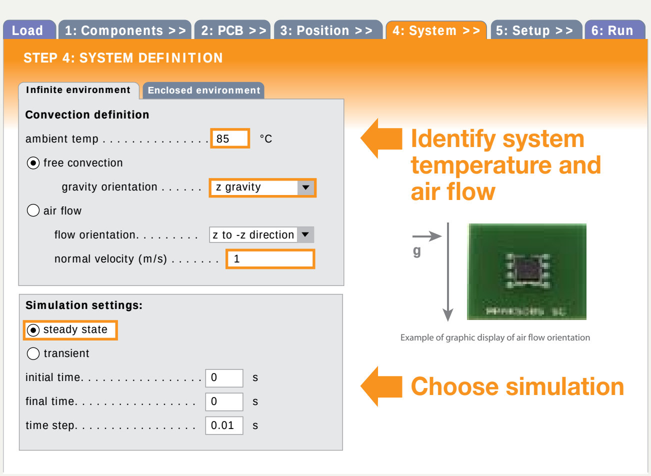
Step 3: Position the Components

Now place the components on the printed circuit board. First set the pad size for each component, then specify or drag and drop to move each component into place.



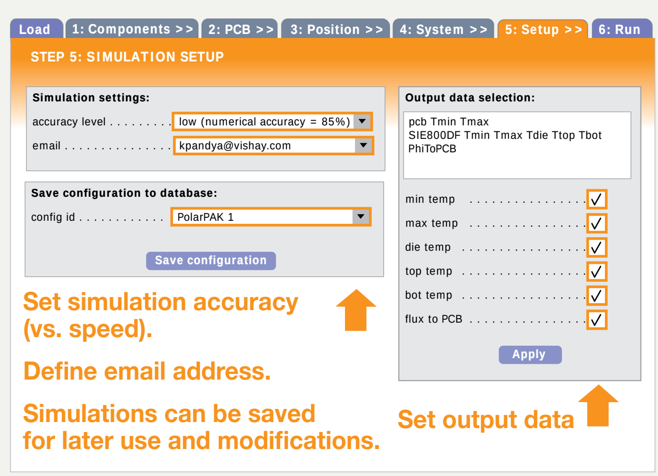
Step 4: Define the Environmental System

Next, define convection and simulation settings. The enclosed environment option will be offered in a future version of ThermaSim.



Step 5: Setup and Save the Simulation Run

For the set-up of your simulation run, you can select between steady-state or transient runs, specify the desired accuracy level, and input the E-mail address to which results will be sent. This page allows allows you to save configurations into a database.



Step 6: Get the Results

Thermal images and temperature data results will be E-mailed to you directly in pdf and text form.

Temperature Data Results

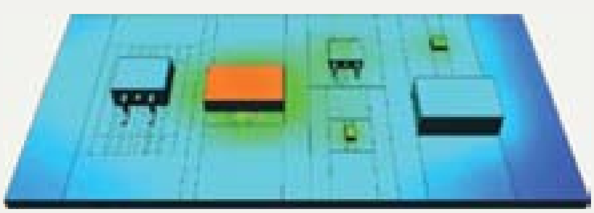
Global Output Results				
Min Temp	Max Temp	Flux Inside PCB	Min PCB Temp	Max PCB Temp
94.75°	139.95°	5.57 W	94.75°	138.21°

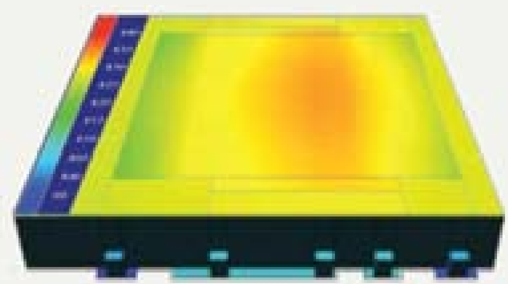
Temperature (°C) *Powered by Rebeca3D*

MOSFET Temperature Data (SiE800DF)					
Min Temp	Max Temp	Die Temp	Top Temp	Bot Temp	Flux to PCB
138.10°	145.79°	145.68°	145.72°	144.98°	2.44W

Temperature (°C) *Powered by Rebeca3D*

Thermal Image Example





Step 7: Analyze the Results

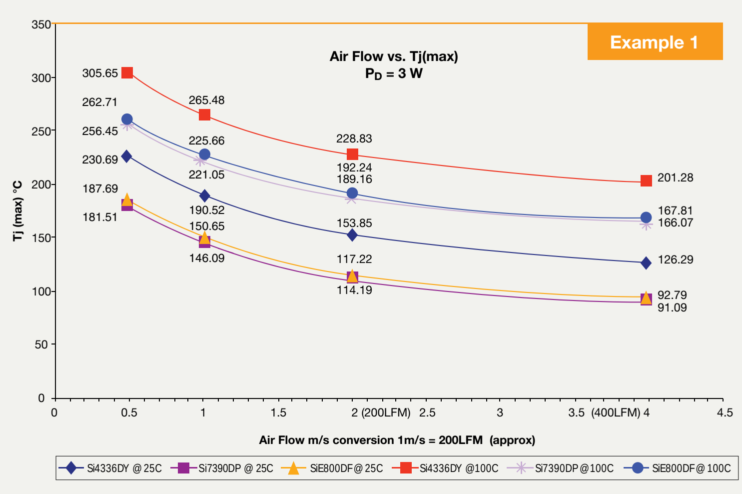
Download temperature txt data into Excel. You can run multiple simulations in which the product, package or other input data varies, then merge the results within Excel to compare and examine trends. We show four examples below, but the full range of possibilities is limited only by your imagination.

resu.txt - Notepad

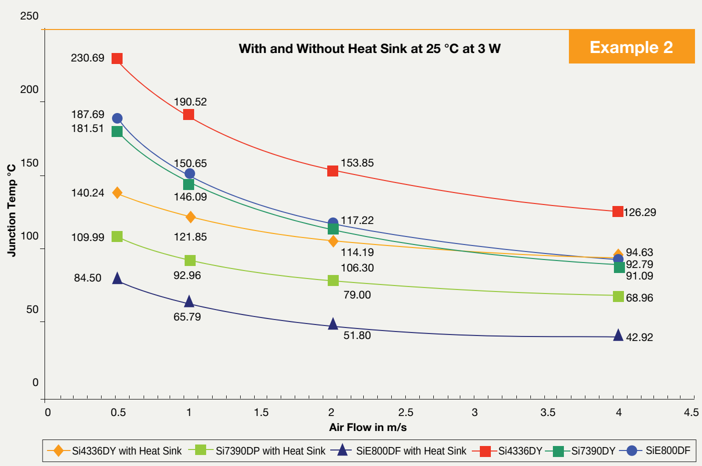
File Edit Format Help

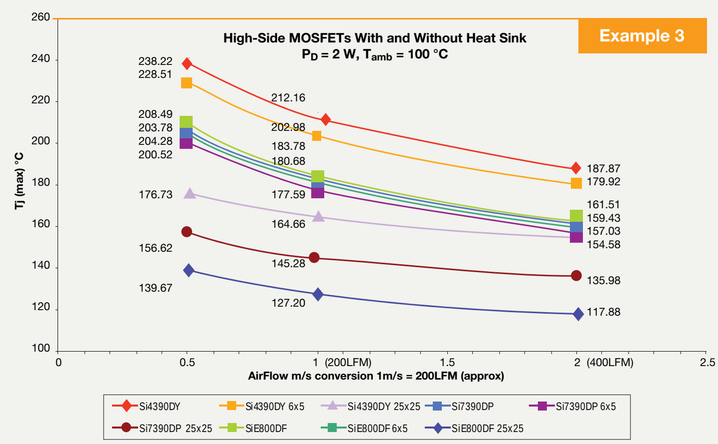
```
Minimum system temperature = 110.78°C
Maximum system temperature = 146.79°C
Tot flux PCB = 2.44W Tmin PCB = 110.78°C Tmax PCB = 145.00°C

Number of components = 1
SIE800DF Tmin = 138.10°C
SIE800DF Tmax = 146.79°C
SIE800DF Tdie = 146.68°C
SIE800DF Ttop = 145.72°C
SIE800DF Tbot = 144.98°C
SIE800DF PhitoPCB = 2.44W
```

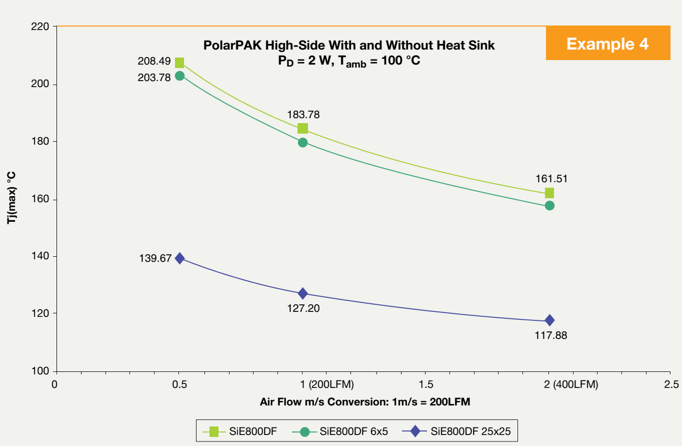


Step 7: Analyze the Results (Continued)

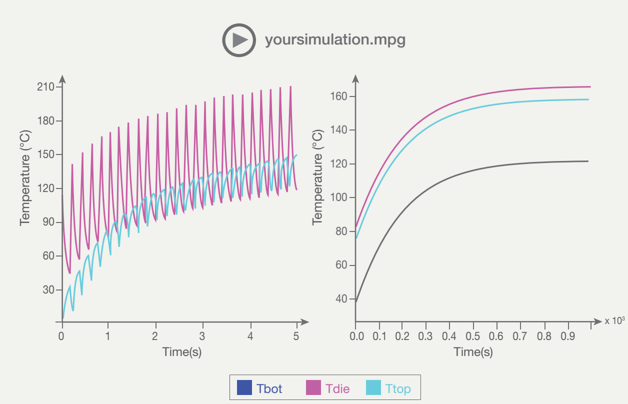




Step 7: Analyze the Results (Continued)



Transient simulation results include a transient step and transient cycle temperature curves, and an MPEG (.mpg) video clip of the transient simulation.



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