



IPOSIM - Getting started guide

November 2021



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IPOSIM is Infineon's online simulation platform for loss & thermal calculations of Infineon power modules, discretes and disk devices.



IPOSIM helps you to select the most suitable Infineon's high power product according to the needs of your application.

Main Features

- › **User-friendly flow**, designed to guide you step by step in simulating with power devices
- › Fast online simulation **powered by PLECS®**
- › **19 topologies** for discs and modules available, clustered by power conversion type
- › **Multi-selection of up to 5 Infineon products** for performance comparison
- › Save and Share designs within your team using **deep-link**.

2 types of simulation offered:



Steady-state simulation

Power and thermal calculation of a single cycle



Load cycle simulation

Power and thermal calculation of multiple operating points



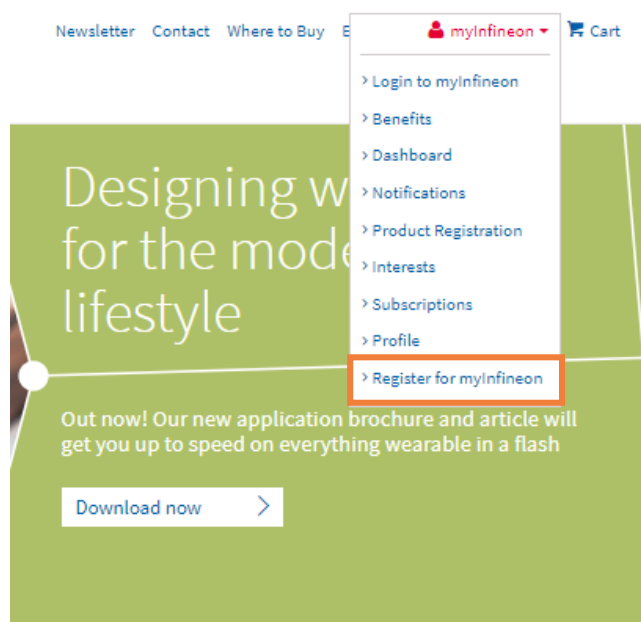
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Start by setting up a myInfineon account in 3 easy steps

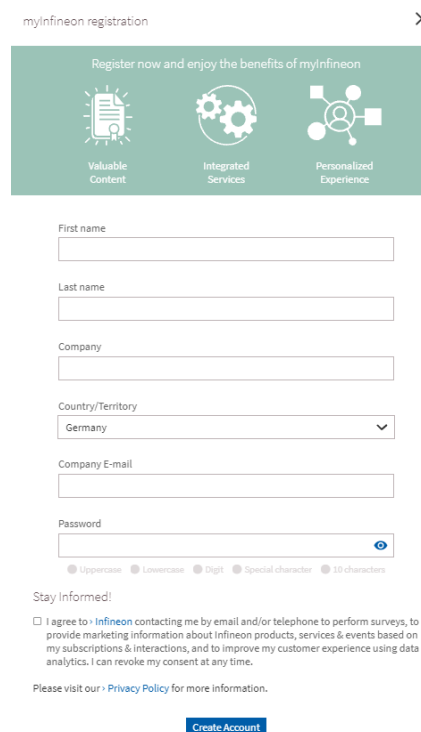
Step 1

In www.infineon.com click on the upper right corner “myInfineon” and select the option “Register for myInfineon”



Step 2

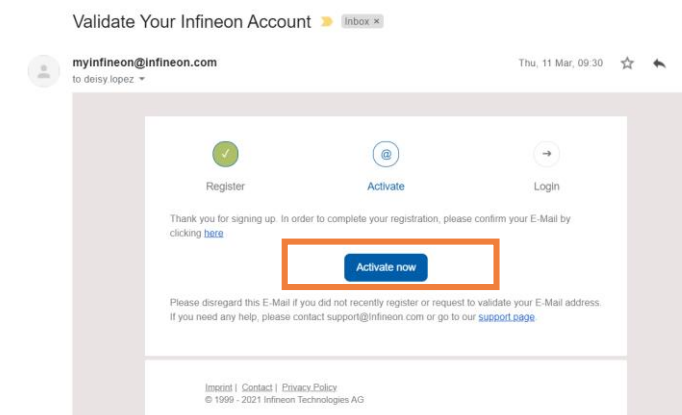
Fill out the form



The screenshot shows the 'myInfineon registration' form. It includes fields for First name, Last name, Company, Country/Territory (set to Germany), Company E-mail, and Password. There are icons for Valuable Content, Integrated Services, and Personalized Experience. A 'Create Account' button is at the bottom. Below the form, there is a 'Stay Informed!' section with a checkbox for agreeing to Infineon contacting the user for surveys and marketing information, and a link to the Privacy Policy.

Step 3

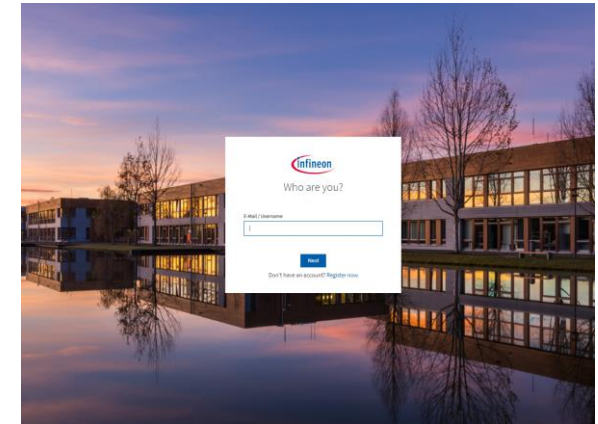
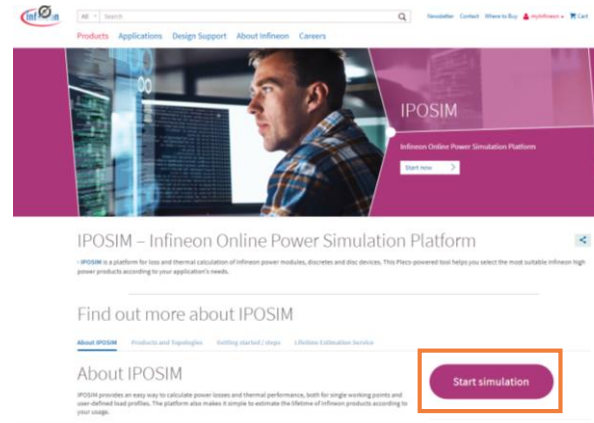
An email will be sent out to activate your account. Please click on the link and finalize registration



With your new myInfineon account, log into IPOSIM and follow the steps for your simulation.

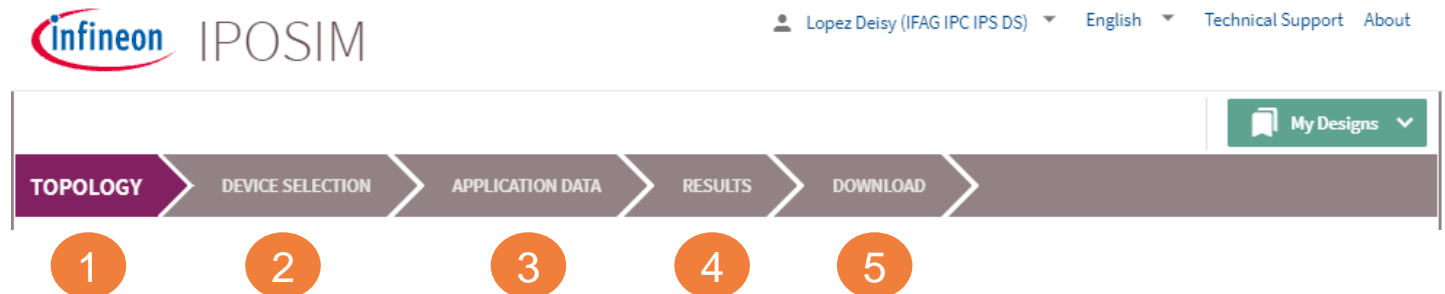
Log into IPOSIM

Go to www.infineon.com/IPOSIM and click on “Start Simulation”
You will need to log into myInfineon account.



Follow the process in IPOSIM

IPOSIM guides you through the set up of your simulation.
In the following pages you will find more information about every step.



Step 1: Select your preferred topology

Lopez Deisy (IFAG IPC IPS DS)
English
Technical Support
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My Designs

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[APPLICATION DATA](#)
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AC/DC Applications

Single Phase

- B2U - Two-Pulse Bridge Uncontrolled
- B2C - Two-Pulse Bridge Fully Controlled

Three Phase

- B6U - Six-Pulse Bridge Uncontrolled
- B6C - Six-Pulse Bridge Fully Controlled
- M3.2U - Double Three-Pulse Star Uncontrolled
- M3.2C - Double Three-Pulse Star Fully Controlled
- M6U - Six-Pulse Star Uncontrolled
- M6C - Six-Pulse Star Fully Controlled

DC/DC Application

- Boost (Module)
- Buck (Module)
- DC Decoupling

AC/AC Applications

Single Phase

- W1C - Phase Control
- Half-Bridge Series-Resonant for Induction Heating (Discrete)

Three Phase

- W3C - Phase Control

DC/AC Applications

- Single Phase (Module)
- Three Phase - 2 Level (Module)
- Three Phase - 2 Level (Automotive Module)
- Three Phase - 2 Level (Discrete)
- Three Phase - 2 Level (Automotive Discrete)
- Three Phase - 2 Level (Stack Solution)
- Three Phase - 3 Level NPC1 (Module)
- Three Phase - 3 Level NPC2 (Module)
- Three Phase - 3 Level ANPC (Module)

Example: Inverter topologies

IPOSIM offers **19 different topologies** to choose from, clustered according to the power conversion type.

Step 2: Choose Your Devices

Current Design: DC/AC Applications - Three Phase - 2 Level (Module)

TOPOLOGY > **DEVICE SELECTION** > APPLICATION DATA > RESULTS > DOWNLOAD

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Parameter Selection

DC Link Voltage (Vdc) V

Blocking Voltage V

Rated Current A

Filter by Packaging

DC/AC Applications - Three Phase - 2 Level (Module)

Circuit topology

Please select device to go to next step

b) Quick search

Selected parts:

	Device Name	TIM	Package	module Parameters		Switch parameters				Diode Parameters				Datasheet
				V _{CES} /V _{DS} [V]	I _{nom} /I _{nom} [A]	V _{CESat, 125°C} /V _{DSat, 125°C} [V]	E _{on} + E _{off, 125°C} [mWs]	R _{ds, on} [K/W]	T _{vj, max} [°C]	V _{F, 125°C} [V]	E _{rec, 125°C} [mWs]	R _{ds, on} [K/W]	T _{vj, max} [°C]	
<input type="checkbox"/>	FF50R12RT4		34mm	1200	50	2.15	10.5	0.61	150	1.65	3.2	0.97	150	
<input type="checkbox"/>	FF50R12RT4_B8		34mm	1200						1.65	2.67	1.1	150	
<input type="checkbox"/>	FP50R12KT4		Econo2	1200						1.65	3	1.25	150	
<input type="checkbox"/>	FP50R12KT4_B11		Econo2	1200						1.65	3	1.25	150	
<input type="checkbox"/>	FP50R12KT4_B16		Econo3	1200	50	2.15	12	0.69	150	1.65	3	1.03	150	

Product list with sorting function

IPOSIM offers filtering by parameters (a) and a quick search option (b) in the product list.

You can select **up to 5 devices at the same time**, which allows you to compare their performance.

Step 3: Set Your Application Data

TOPOLOGY > DEVICE SELECTION > APPLICATION DATA > RESULTS > DOWNLOAD

Simulation Type: ☒ Steady-State ☐ Load cycle simulation

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Circuit & Control Cooling Condition Advanced Parameters

Parameter Selection

Modulation Algorithm	Sine-Triangle
DC Link Voltage (V _{dc})	650 V
Output Current (I _{out})	50 Arms
Output Frequency	50 Hz
Switching Frequency	2000 Hz
Modulation Index	1
Power Factor cos(φ)	0.8
Load Type	Lagging

Previous Next

c) Set other application data:

- cooling condition
- R_{gon},off

b) Set operation parameters

- You can select the type of simulation to use, **Steady state** for simulating a single working point or **Load cycle** for simulating a user defined load profile.
- Set the desired operating parameters
- In the next tabs you can set cooling conditions and values for gate resistance.

Step 4: Compare Simulation Results

Modules/Discs

Steady-State Analysis finished: Wed Oct 20 17:08:24 2021

Steady-State Analysis finished: Wed Oct 20 17:08:27 2021

Steady-State Analysis finished: Wed Oct 20 17:08:30 2021

Steady-State Analysis finished: Wed Oct 20 17:08:33 2021

FF23MR12W1M1_B11	F4-50R12MS4	F4-23MR12W1M1_B11	F4-50R12KS4_B11
MOSFET Parameters ▾	Switch parameters ▾	MOSFET Parameters ▾	Switch parameters ▾
Diode Parameters ▾	Diode Parameters ▾	Diode Parameters ▾	Diode Parameters ▾
Cooling Condition ▾	Cooling Condition ▾	Cooling Condition ▾	Cooling Condition ▾
Simulation Results ▴	Simulation Results ▴	Simulation Results ▴	Simulation Results ▴
<div>Maximum Junction Temperature</div> <div>Switch 85.41°C</div> <div>Diode 85.41°C</div>	<div>Maximum Junction Temperature</div> <div>Switch 91.54°C</div> <div>Diode 59.62°C</div>	<div>Maximum Junction Temperature</div> <div>Switch 88.48°C</div> <div>Diode 88.48°C</div>	<div>Junction Temperature</div> <div>Switch 88.48°C</div> <div>Diode 59.56°C</div>
<div>Switching Losses</div> <div>Switch 0.60W</div> <div>Diode Not calculated</div> <div>Conduction Losses</div> <div>Switch 33.78W</div> <div>Diode Not calculated</div> <div>Total Losses</div> <div>Switch 34.37W</div> <div>Diode Not calculated</div>	<div>Switching Losses</div> <div>Switch 7.65W</div> <div>Diode 1.71W</div> <div>Conduction Losses</div> <div>Switch 69.51W</div> <div>Diode 7.22W</div> <div>Total Losses</div> <div>Switch 77.15W</div> <div>Diode 8.92W</div>	<div>Switching Losses</div> <div>Switch 0.54W</div> <div>Diode Not calculated</div> <div>Conduction Losses</div> <div>Switch 34.22W</div> <div>Diode Not calculated</div> <div>Total Losses</div> <div>Switch 34.76W</div> <div>Diode Not calculated</div>	<div>Conduction & Switching Losses</div> <div>Switch 7.19W</div> <div>Diode 0.54W</div> <div>Conduction Losses</div> <div>Switch 34.22W</div> <div>Diode Not calculated</div> <div>Total Losses</div> <div>Switch 76.66W</div> <div>Diode 8.86W</div>
FF23MR12W1M1_B11	F4-50R12MS4	F4-23MR12W1M1_B11	F4-50R12KS4_B11

The section Modules/Discs displays among others the calculated values for maximum junction temperature, switching and conducting losses.

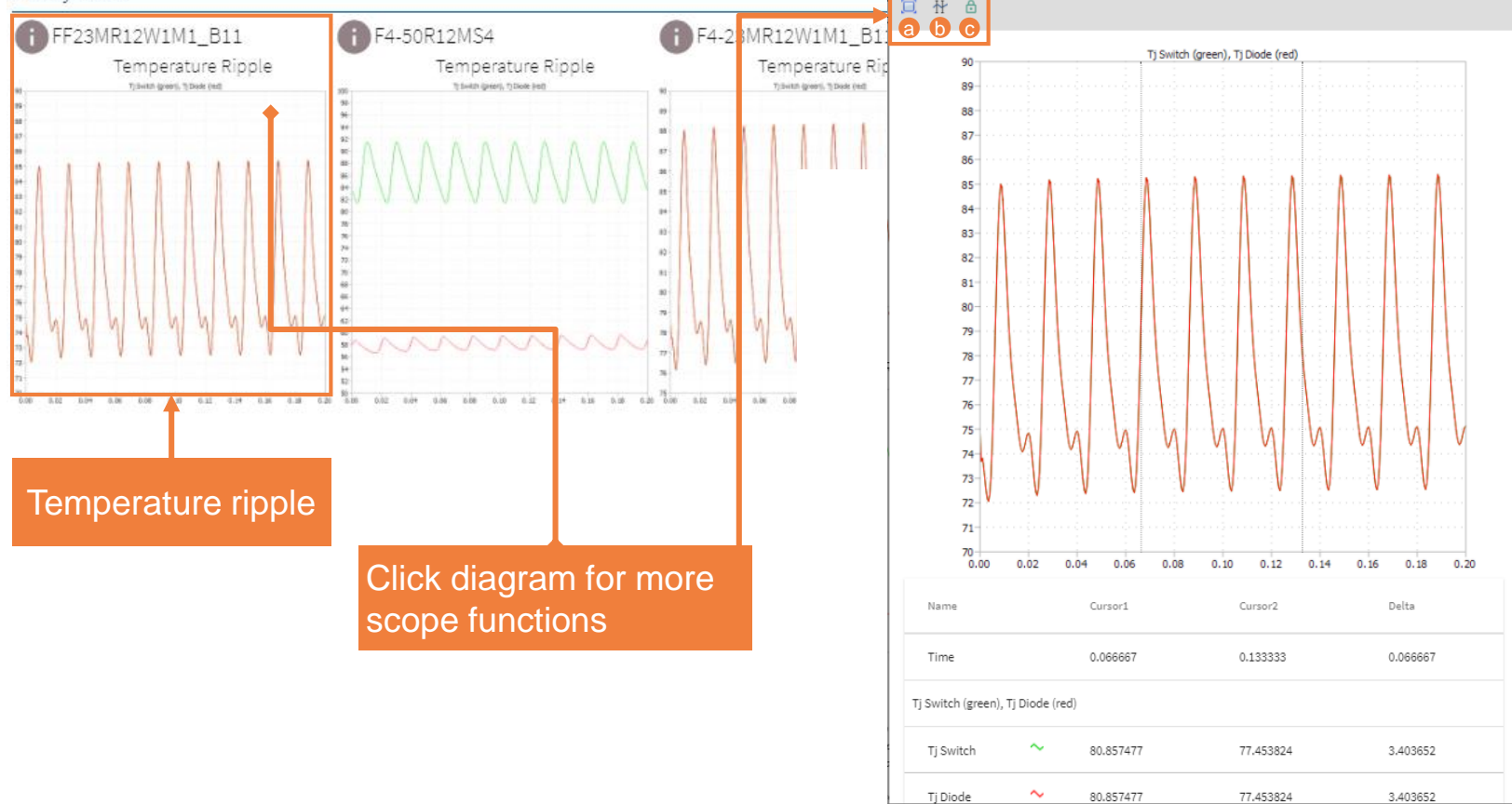
Is presented in a way that allows you to compare between various selected devices.

Step 4: Compare Simulation Results

Simulation Graphics

Click on image for more scope functions

Steady-State



In **Simulation Graphics** you can view and inspect the temperature ripple resulting from operating the selected devices under specified working point.

Click on the diagram for more scope functions like:

- a) Zoom-in by dragging with mouse
- b) Switch on cursors to measure signals
- c) Freeze the cursor distance for better measurement experience

Step 5: Download Results and Share Design

[infineon](#) IPOSIM

a) Save design b) Share design

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Current Design: DC/AC Applications - Single Phase (Module)

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Design Summary

[Complete Design Summary](#)

Datasheets

[FF23MR12W1M1_B11](#)

[F4-50R12MS4](#)


[F4-23MR12W1M1_B11](#)


[F4-50R12KS4_B11](#)

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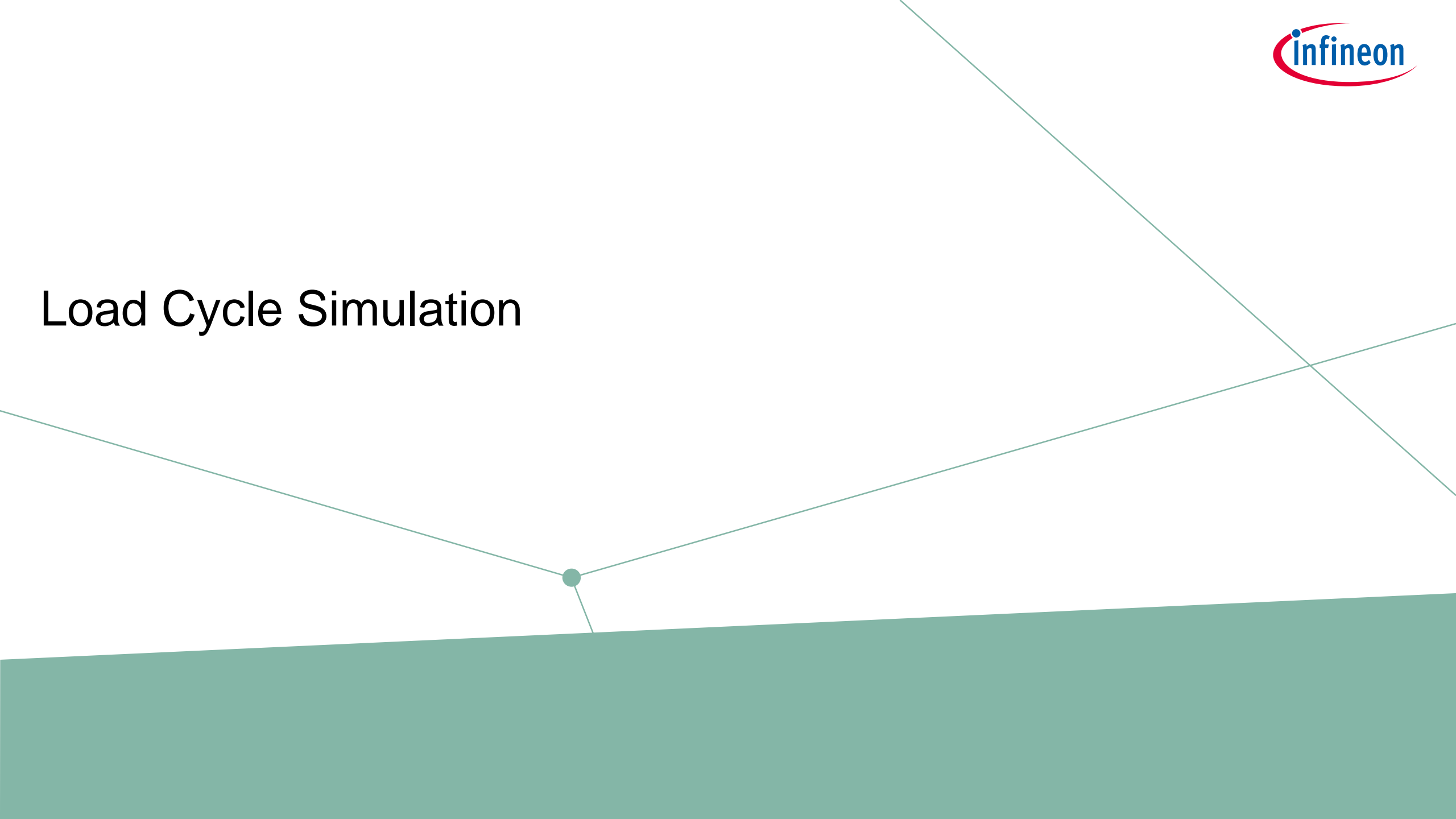
In the last step, you can download the simulation results in a excel file format as shown in the **Design summary** section.

You can also find the data sheets of selected devices for your detailed analysis and decision making.

You can also Save your design by clicking  (a). You will find the design information by clicking [My Designs](#)

Share your design by clicking  (b). The page link will be copied to your clipboard, so you can share it with anybody to re-execute the simulation with same configuration. See an example [here](#).

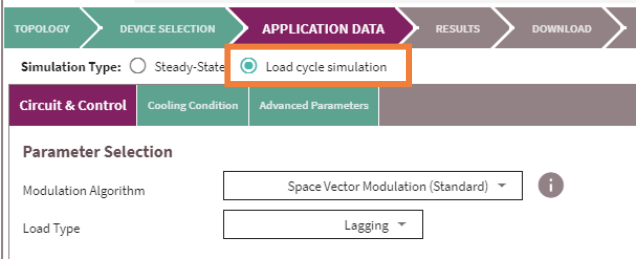
Load Cycle Simulation



Load Cycle: upload your desired mission profile

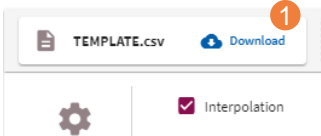
1. Select Load Cycle as simulation type

In the Application Data step select the option: **Load cycle simulation**



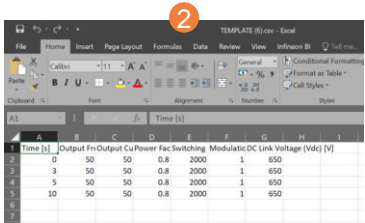
2.a. Use the excel format

1) Download the CSV template

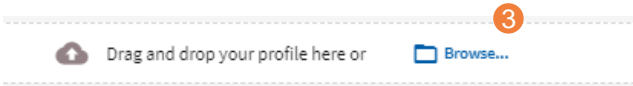


2) Fill out the template and save the document

Input decimals using a dot



3) Upload the CSV file, or drag and drop the file.



2.b. Use directly the table available online

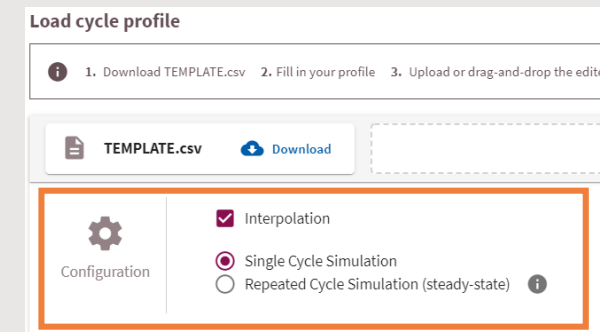
Insert your desired mission profile values directly on the table displayed in IPOSIM

	Time [s]	Output Frequency [Hz]	Output Current [out] [A]	Power Factor cos(φ)	Switching Frequency [Hz]	Modulation Index	DC Link Voltage [Vdc] [V]
1	0	1.5	0.1	0.9	4000	1	680
2	0.02	1.5	310.5	0.9	4000	1	680
3	2	60	310.5	0.9	4000	1	680
4	2.02	60	207	0.9	4000	1	680
5	30	60	207	0.9	4000	1	680
6	30.02	1.5	0.1	0.9	4000	1	680
7	60	1.5	0.1	0.9	4000	1	680

Load Cycle: upload your desired mission profile

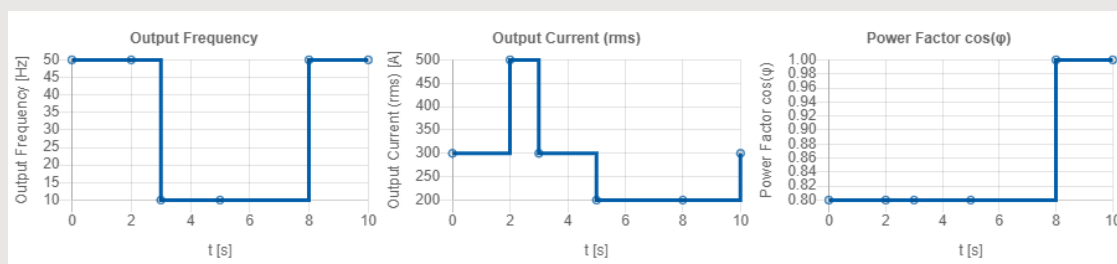
More Load Cycle features

- › Selection simulation behavior between temperature ripple or average temperature
- › Interpolated or discontinuous load profiles available
- › Possibility to repeat the load profile cycles (up to 10 cycles)



Load Cycle Example: DC-AC 3-Phase 2-Level

- › Constant inputs: $V_{DC} = 650$ V, $f_{sw} = 2$ kHz, Modulation Index = 1
- › Load Profile with 3 cycles repeated
- › Click [here](#) to recall the simulation in IPOSIM.



Simulation Results

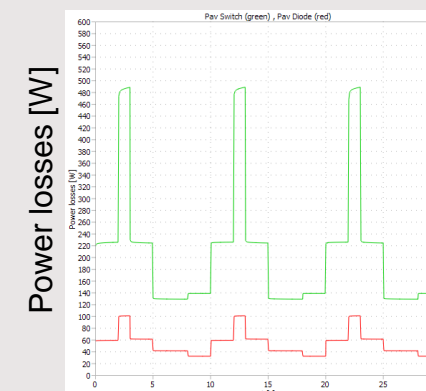
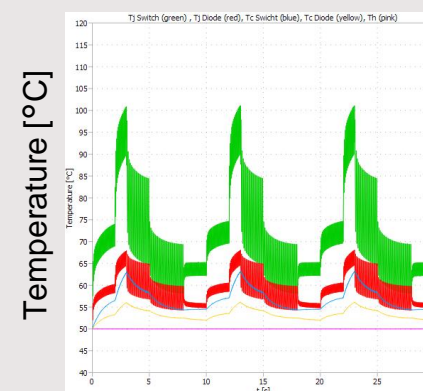


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Parameter Sweep: Ploss, average / Tj versus Irms

Feature selection

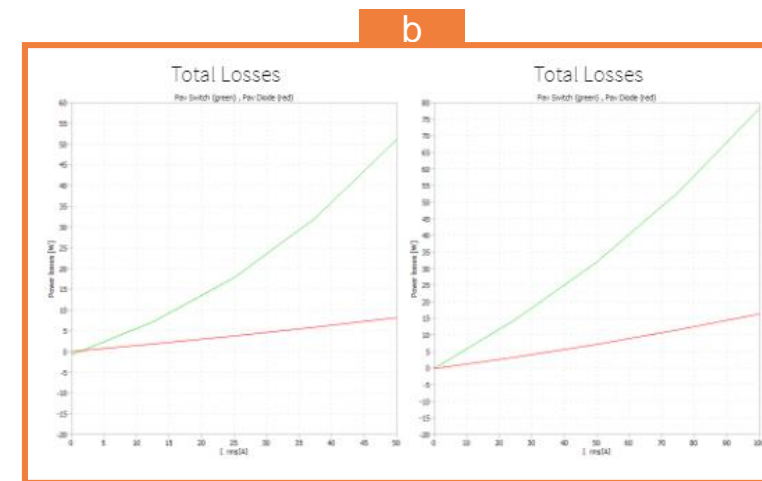
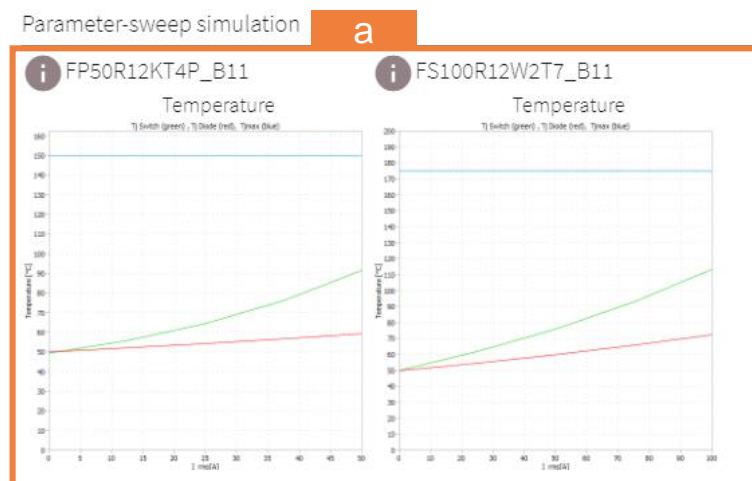
With this feature you can find out the maximum allowed Irms current at given condition.

In the upper right corner of **Results** you can find a button (a) to simulate parameter-sweep. Just select Ploss, average/Tj vs current Irms option and click **Confirm**

Recal an example of this feature [here](#).

Results display

The results portray the Tj versus Irms at given condition (a) and the average power losses versus Irms at given condition (b).



Tips & Tricks

Low Output Frequencies

- › 0-Hz Simulation not implemented, down to 0.1 Hz available
- › Load cycle simulation: for more accuracy put enough duration of low frequency section, e.g.: minimum of 10s for $f_{out} = 0.1$ Hz

Save & Share

- › Save your designs under My Designs incl. load cycle settings
- › Copy / paste browser URL (deep-link) to share your designs

Result Diagrams

- › Click result diagrams to enlarge
- › Discover signals with scope functions such as cursors, zoom-in/out

Too High T_j

- › Our thermal models of the products are not designed for overheated T_j
- › In case of $T_j > 200$ °C, check your input requirements, cooling condition or change to a bigger module

Solve artifacts


- › browser caching issues after new version updates
 - key combination [Ctrl] + [F5] to reset browser cache
 - or manually clear the browser caching


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Support

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Support Page

Support is available in English, German and Mandarin from our talented team of experts.

Find an answer to your question

IPOSIM 

Limitations of IPOSIM


Open "About" on the top right Menu bar. This shows you the limitation of every release. (Refer [screenshot](#))


Why is IPOSIM unstable? It was working before.


After a new release you have to reset your browser cache: Press keyboard combination Ctrl+F5 Goto Browser -> Settings -> Delete History & cache Restart your Browser


Design-in support

We offer design-in support for your application. You can use our Infineon Solution Finder: <https://www.infineon.com/solutionFinder> Here you select the relevant parameters of your application and narrow down your choice accordi...
[+ Read more](#)

 Write to the Technical Assistance Center

 Call us toll-free or request a call back

 Live chat with our Support Center

 Ask our community for support in the forum

2021-11-17

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Infineon Proprietary

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Disclaimer

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