IPOSIM - Getting started guide

November 2023

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IPOSIM is Infineon's online simulation platform for loss & thermal calculations of Infineon power modules, discrete 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®**
- **More than 25 topologies** for discs and modules available, clustered by power conversion type
- **Gate Driver recommendations** based on simulated components and application conditions with module topologies
- **Multi-selection of up to 5 Infineon products** for performance comparison
- Save and Share designs within your team using **deep-link**.

3 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

Lifetime estimation (LTE)
Expected lifetime calculation based on chosen parameters

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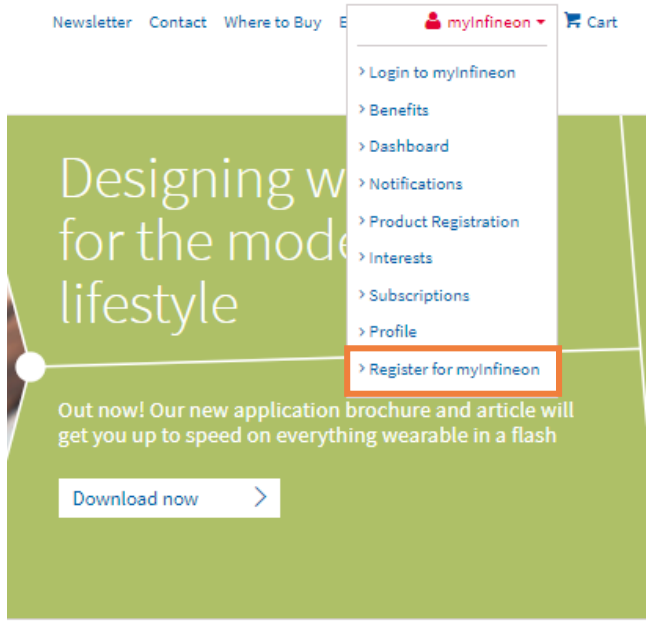
Start by setting up a myInfineon account in 3 easy steps

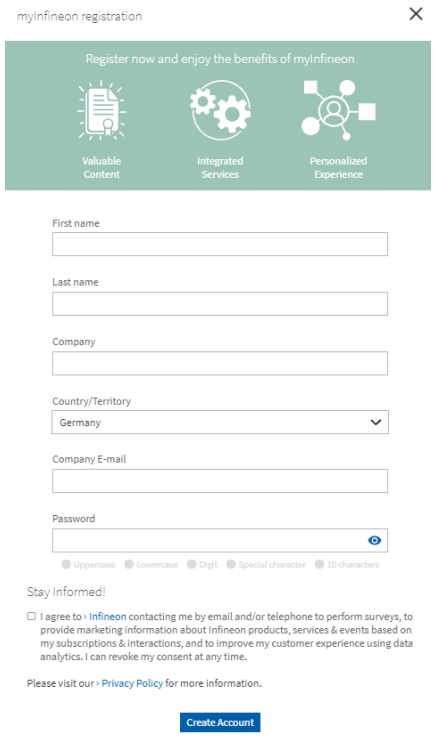
Step 1

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



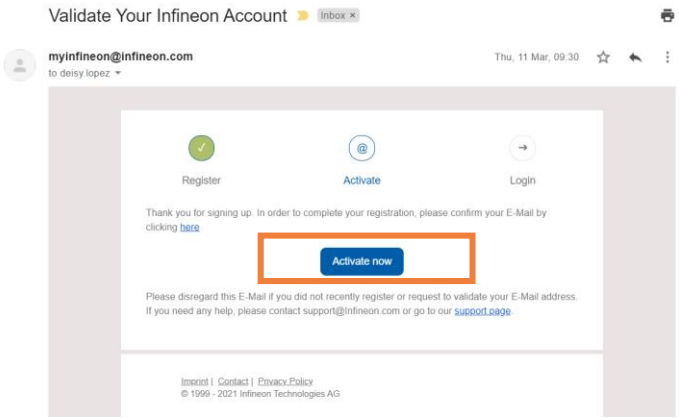
Step 2

Fill out the form



Step 3

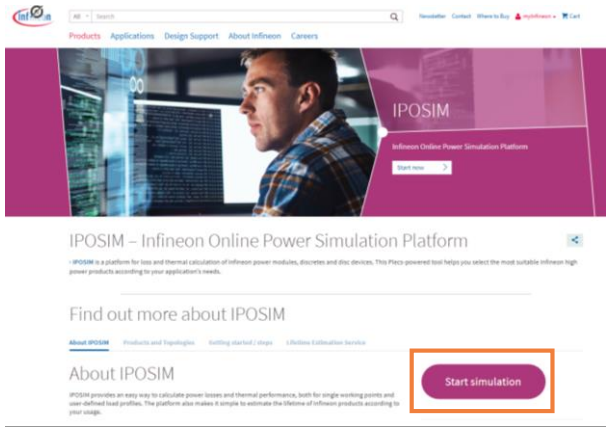
An email will be sent out to activate your account. Please click on the link and finalize registration

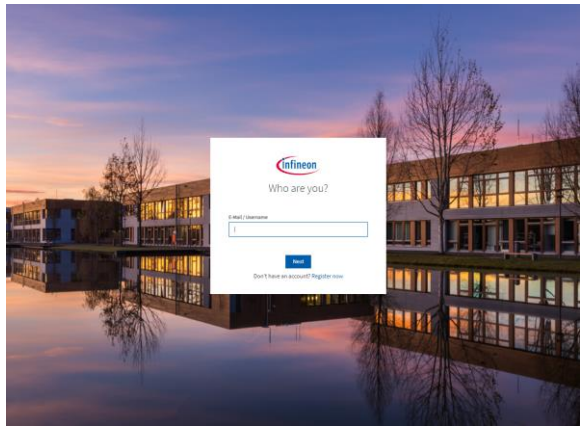


With your new myInfineon account, log into IPOSIM and follow the steps for your simulation.

Log into IPOSIM

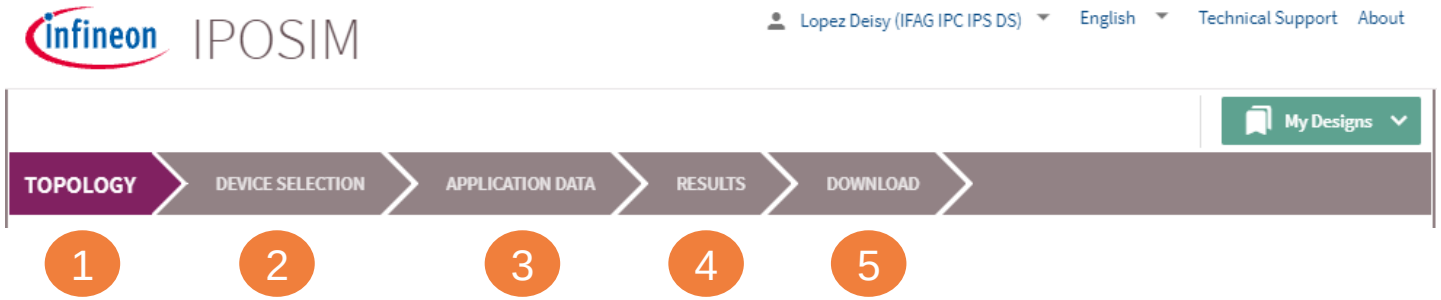
Go to www.Infineon.com/IPOSIM and click on “Start Simulation”
You will need to log into myInfineon account.



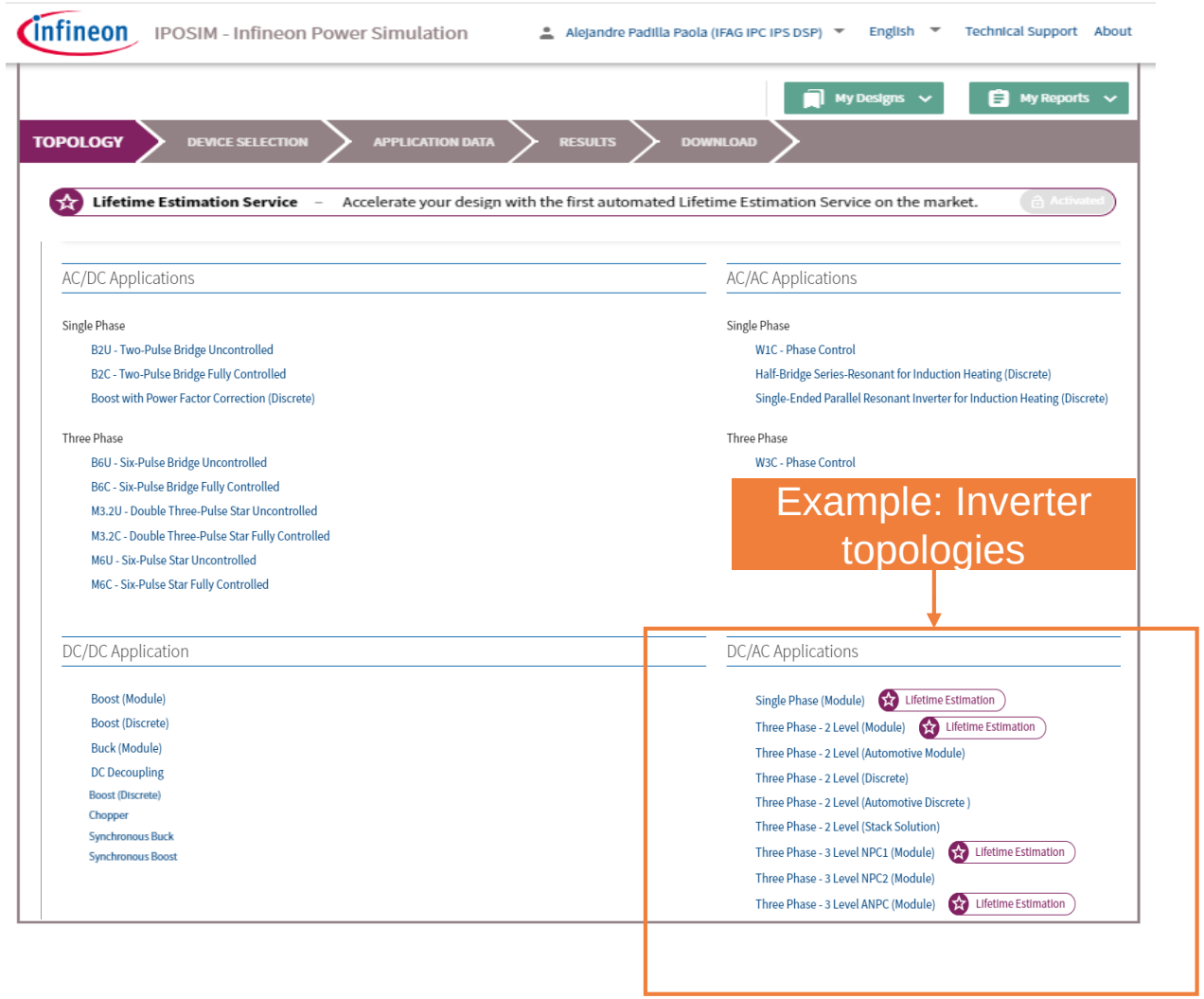


Follow the process in IPOSIM

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

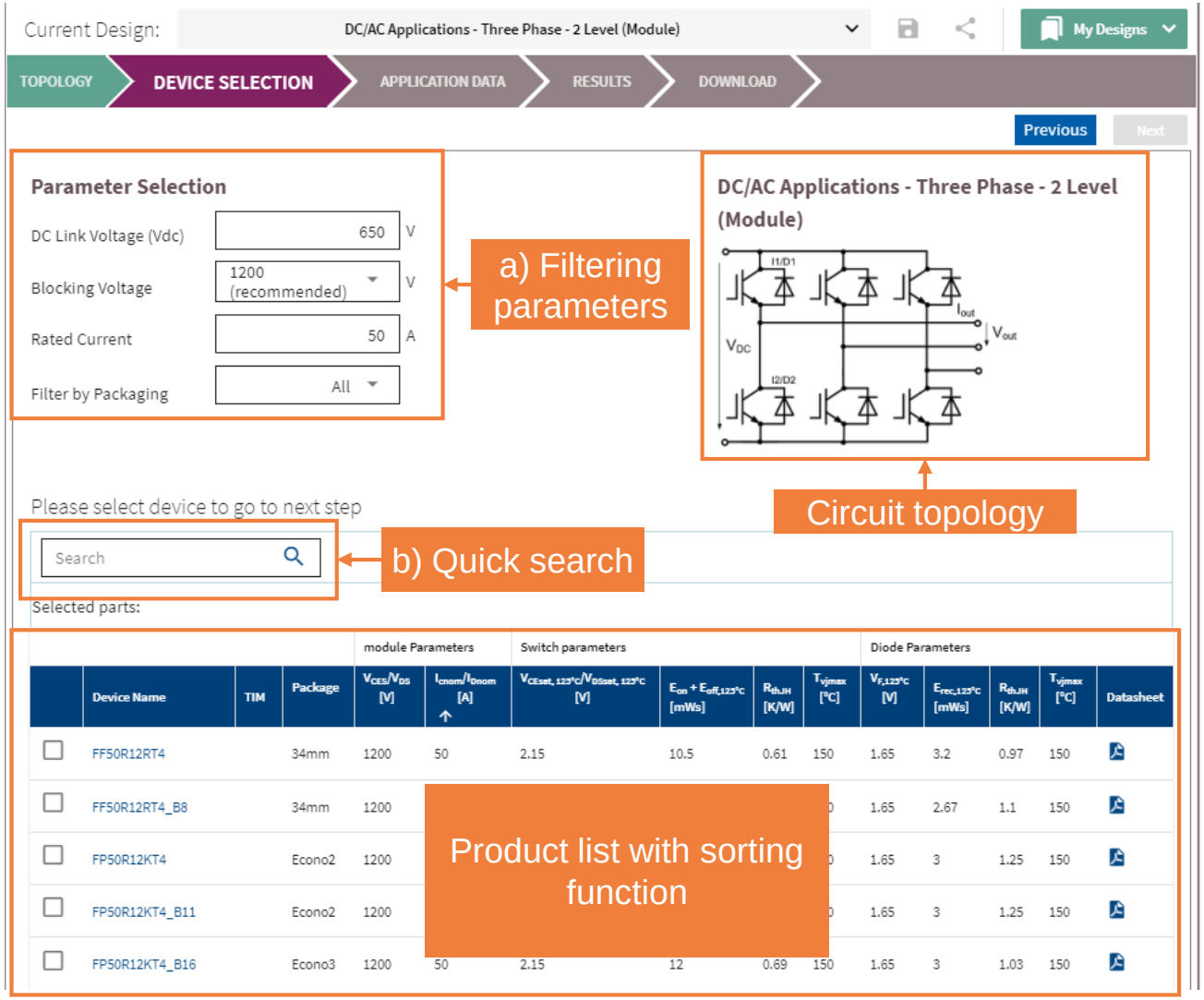


Step 1: Select your prefered topology



IPOSIM offers **more than 25 different topologies** to choose from, clustered according to the power conversion type.

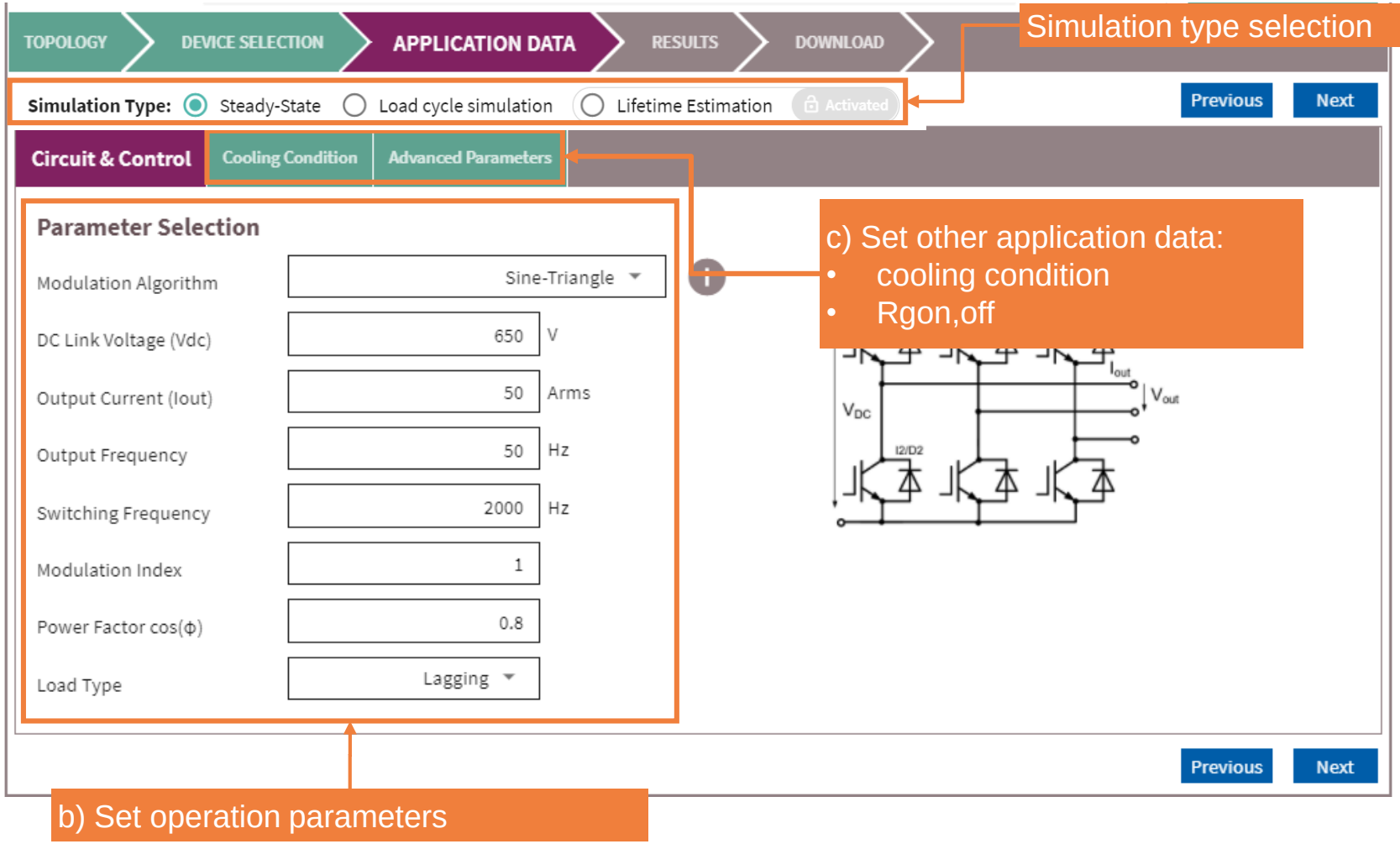
Step 2: Choose Your Devices



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



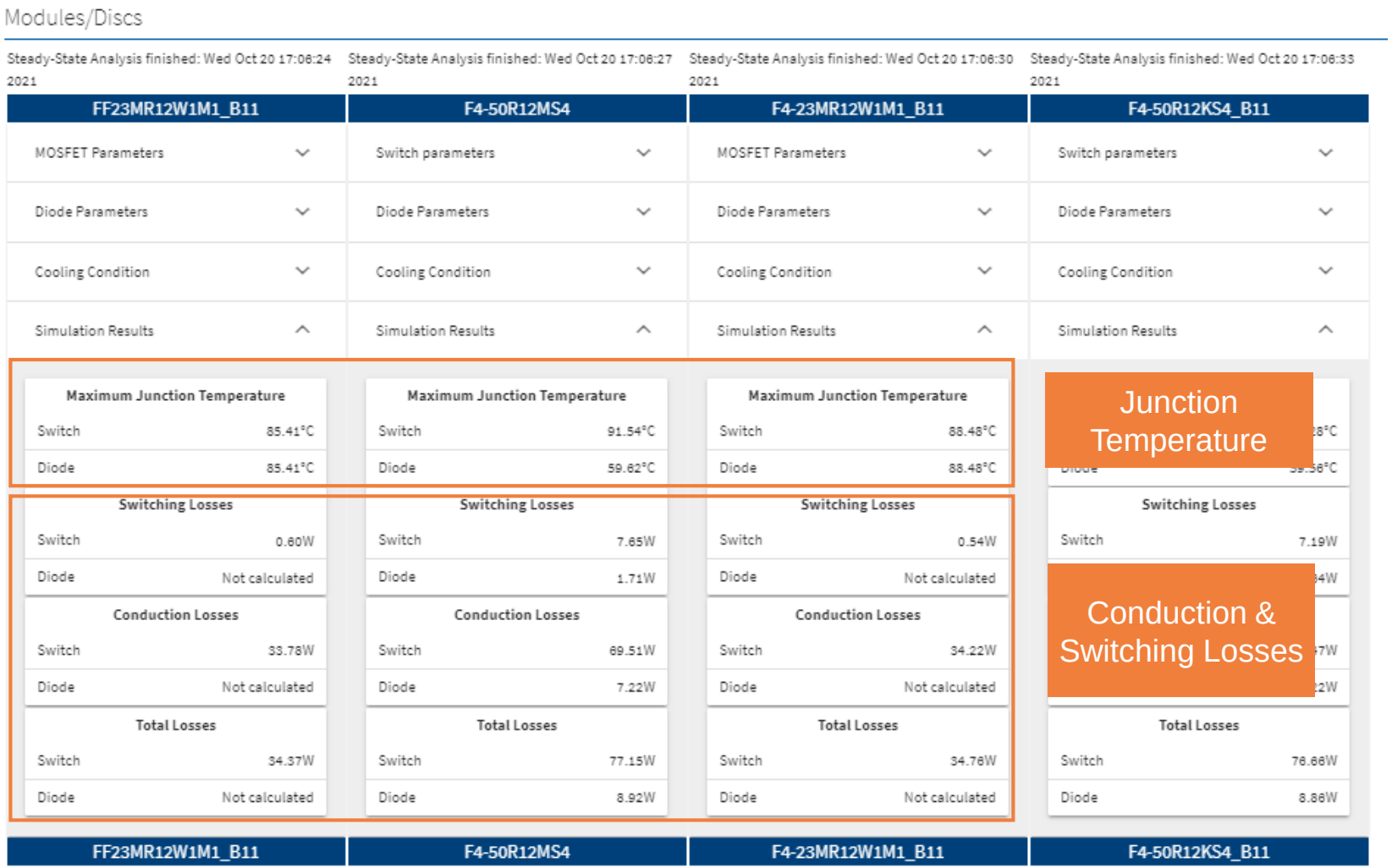
a) You can select the type of simulation to use, **Steady state** for simulating a single working point, **Load cycle** for simulating a user defined load profile or **Lifetime Estimation***.

b) Set the desired operating parameters

c) In the next tabs you can set cooling conditions and values for gate resistance.

*Lifetime Estimation is currently available for the topology: Three-phase Two-level

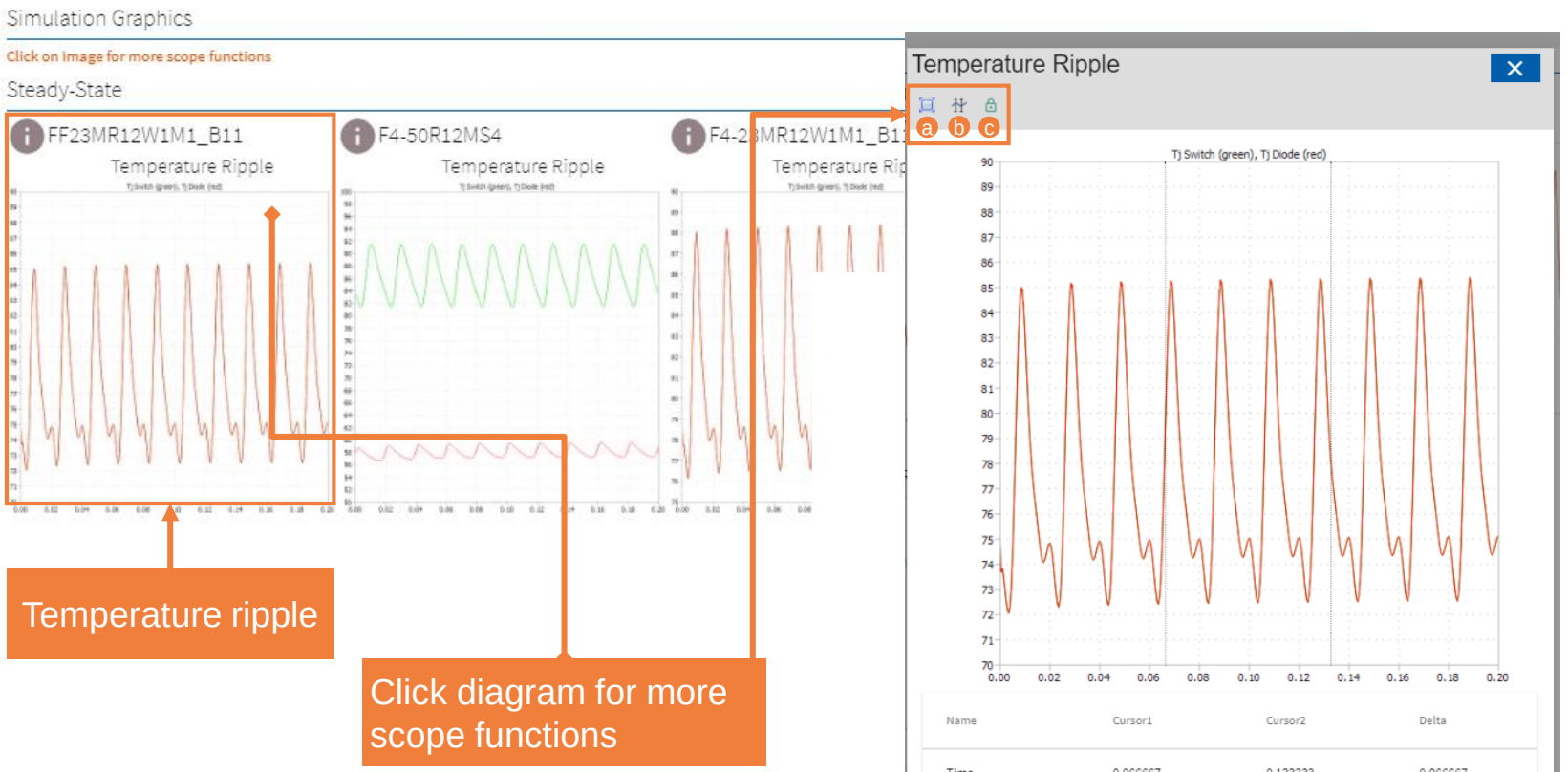
Step 4: Compare Simulation Results

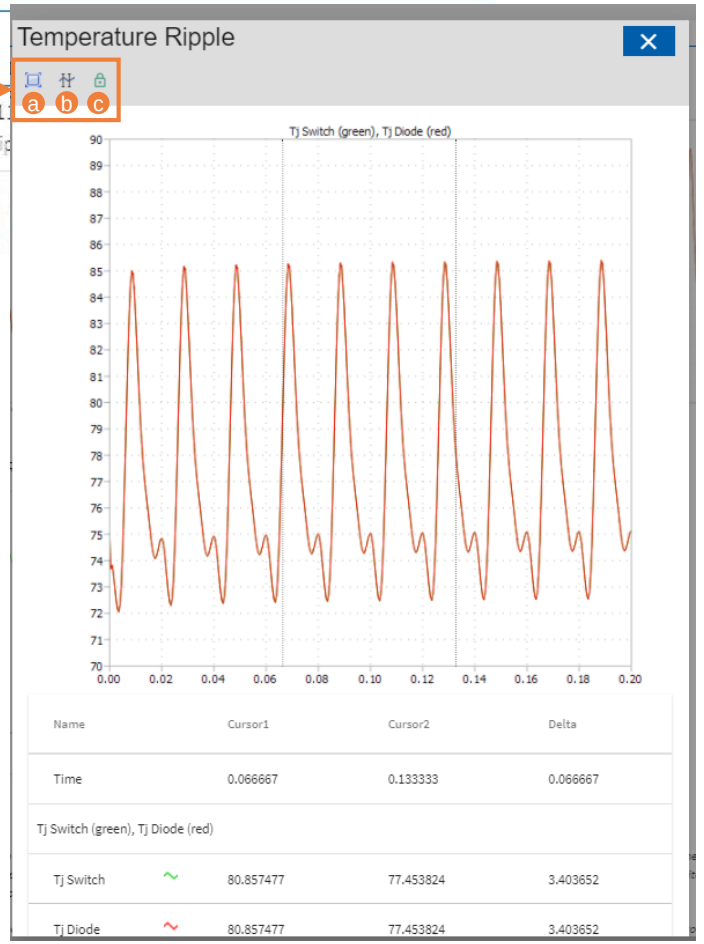


The section Modules/Disks displays among others the calculated values for maximum junction temperature, switching and conducting losses.

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

Step 4: Compare Simulation Results



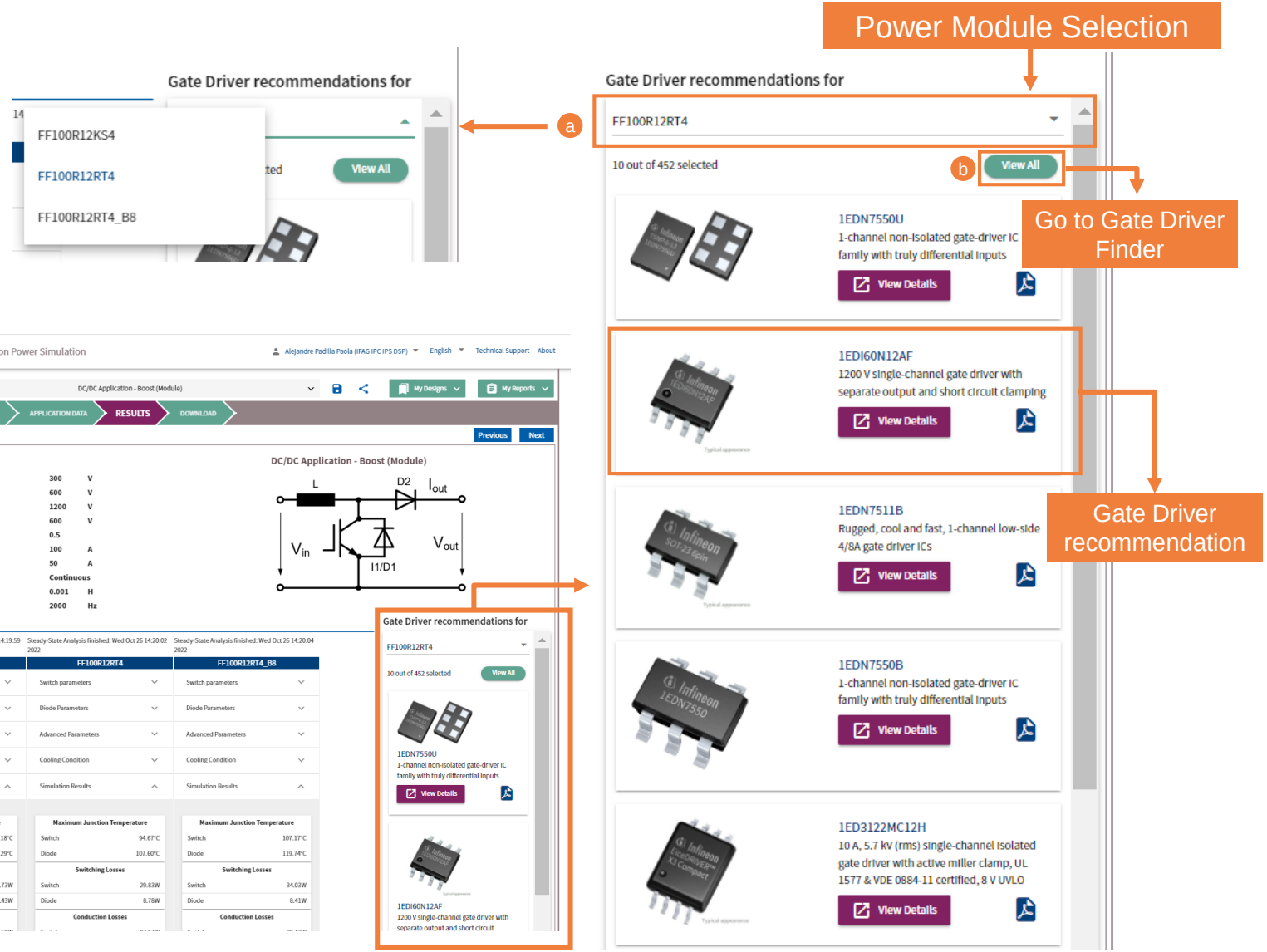


In **Simulation Graphics** you can view and inspect the temperature ripple resulting from operating the selected devices under specified working point.

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

New! - Gate driver recommendations

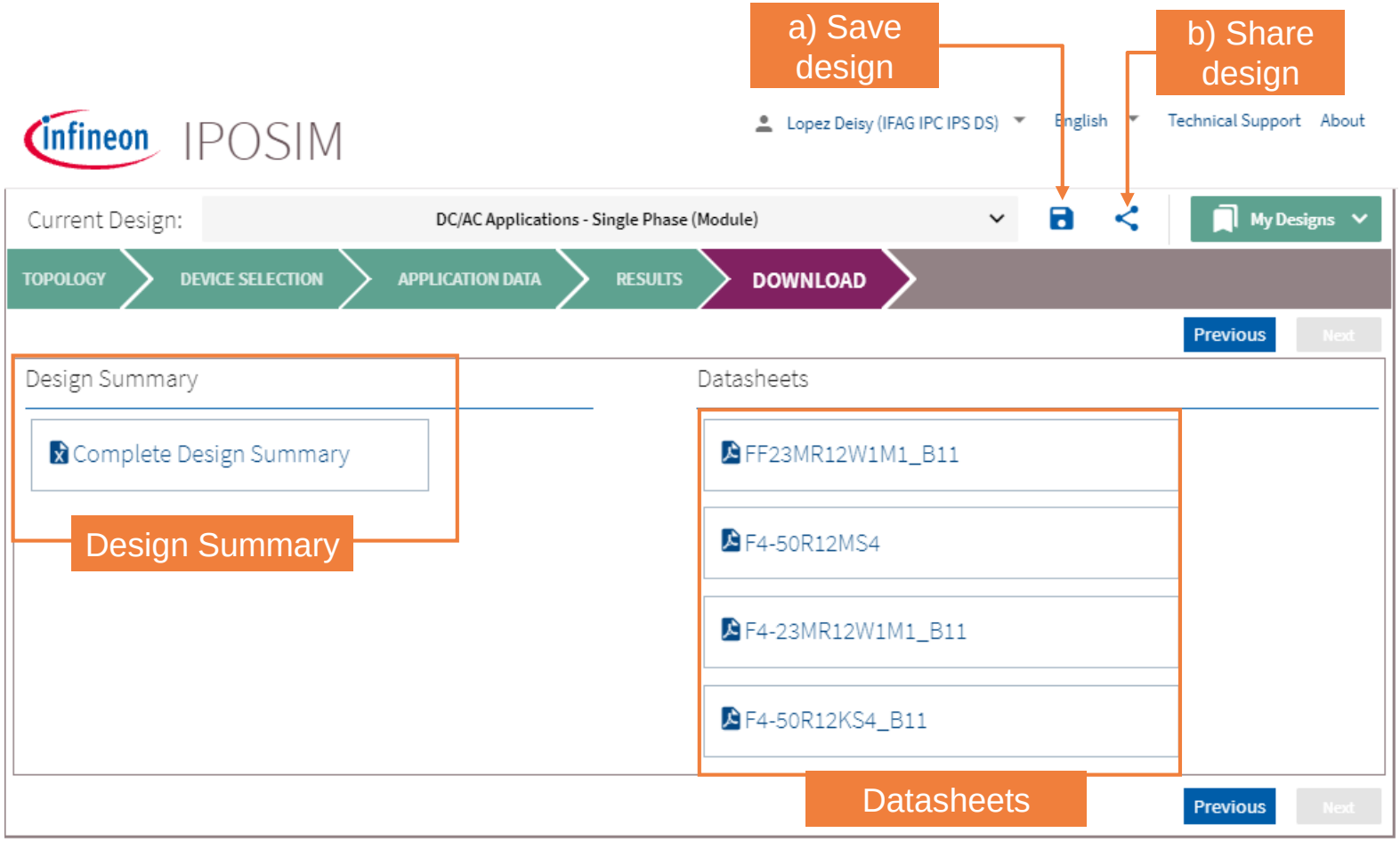


Under **Gate Driver recommendations** you can scroll down and see a preselection of Gate Driver devices suitable for your specific simulation parameters and selected power devices.

a) Click on the drop down list to select another power module used in the simulation.

b) Click on the tab 'View All' to redirect to Infineon´s Gate Driver Finder for further support on your design.

Step 5: Download Results and Share Design



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.

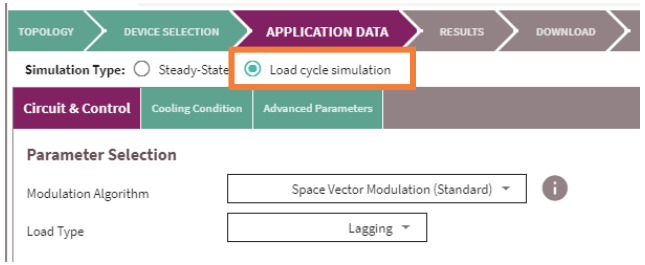
Load Cycle Simulation

Back to Step 3: Set Application data

Load Cycle: upload your desired mission profile

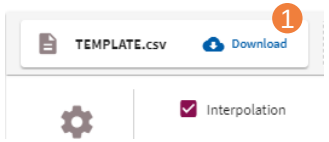
1. Select Load Cycle as simulation type

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



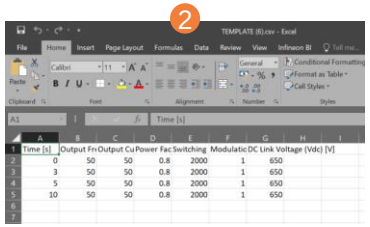
2.a. Use the excel format

1) Download the CSV template

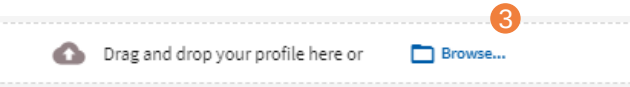


2) Fill out the template and save the document

Input decimals using a dot

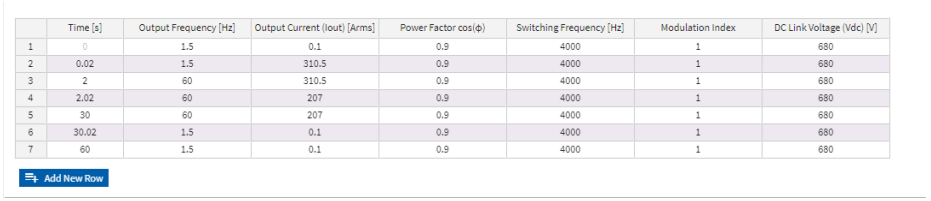


3) Upload the CSV file, or dag and drop the file.



2.b. Use directly the table available online

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



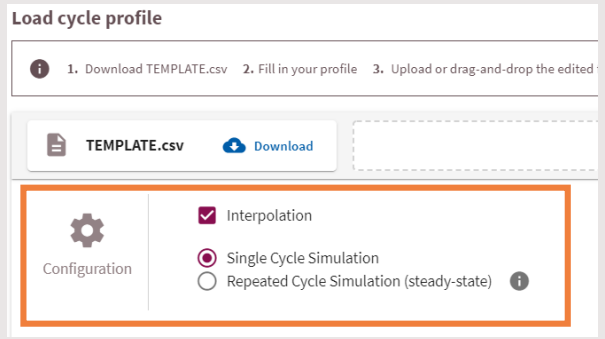
	Time [s]	Output Frequency [Hz]	Output Current (Iout) [Arms]	Power Factor cos(ϕ)	Switching Frequency [Hz]	Modulation Index	DC Link Voltage (Vdc) [V]
1	0	1.5	0.1	0.9	4000	1	680
2	0.02	1.5	310.5	0.9	4000	1	680
3	2	60	310.5	0.9	4000	1	680
4	2.02	60	207	0.9	4000	1	680
5	30	60	207	0.9	4000	1	680
6	30.02	1.5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

Add New Row

Load Cycle: upload your desired mission profile

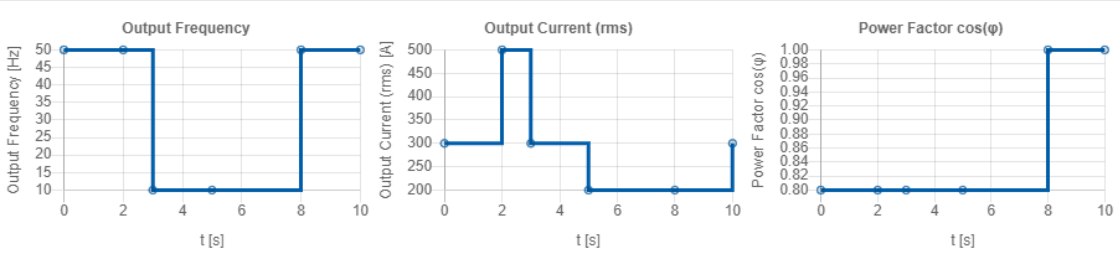
More Load Cycle features

- 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)

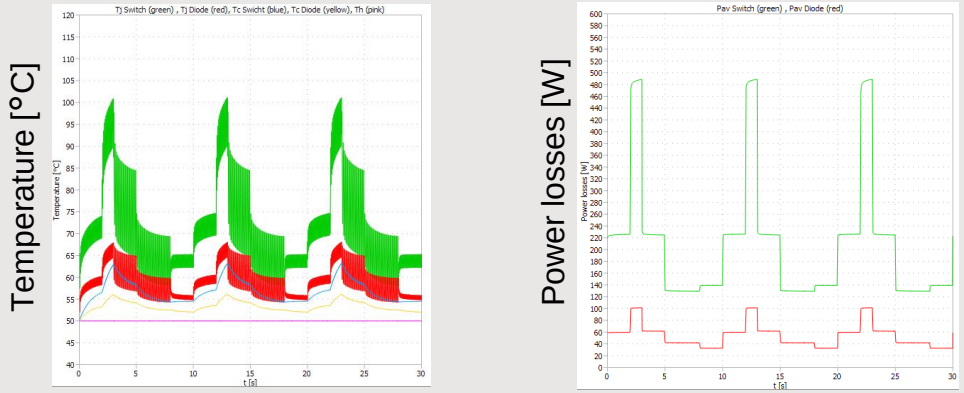


Load Cycle Example: DC-AC 3-Phase 2-Level

- Constant inputs: VDC = 650 V, fsw = 2 kHz, Modulation Index = 1
- Load Profile with 3 cycles repeated
- Click here to recall the simulation in IPOSIM.



Simulation Results

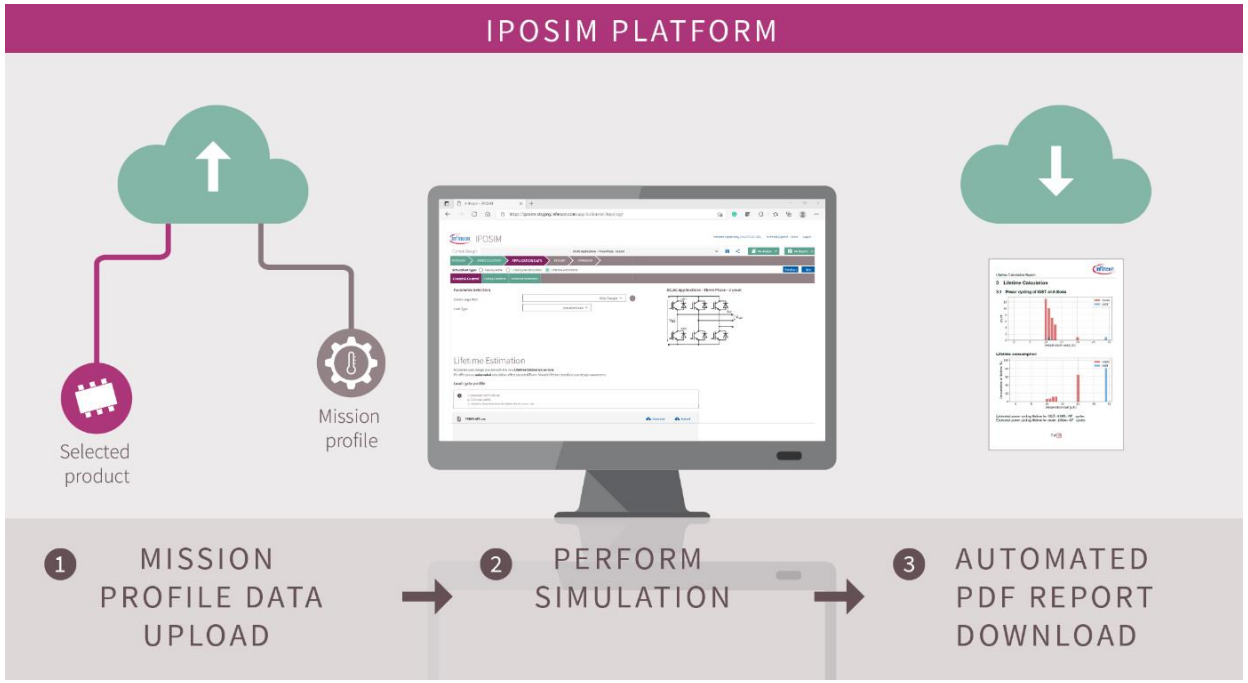


Lifetime Estimation service

Back to Step 3: Set Application data

Lifetime Estimation service provides online access to Infineon‘s unique know-how to ease your design process

Automated Lifetime Estimation service:



Digitally estimate the lifetime of IFX modules in your application.

Once logged into IPOSIM, ❶ select an Infineon power module and upload your desired mission profile. Considering this information, ❷ IPOSIM will perform the lifetime estimation. Once the calculations finalize, ❸ you can download the report, including the possible number of cycles for the selected device (see report sample).

Lifetime Estimation service main features designed to minimize your time to market

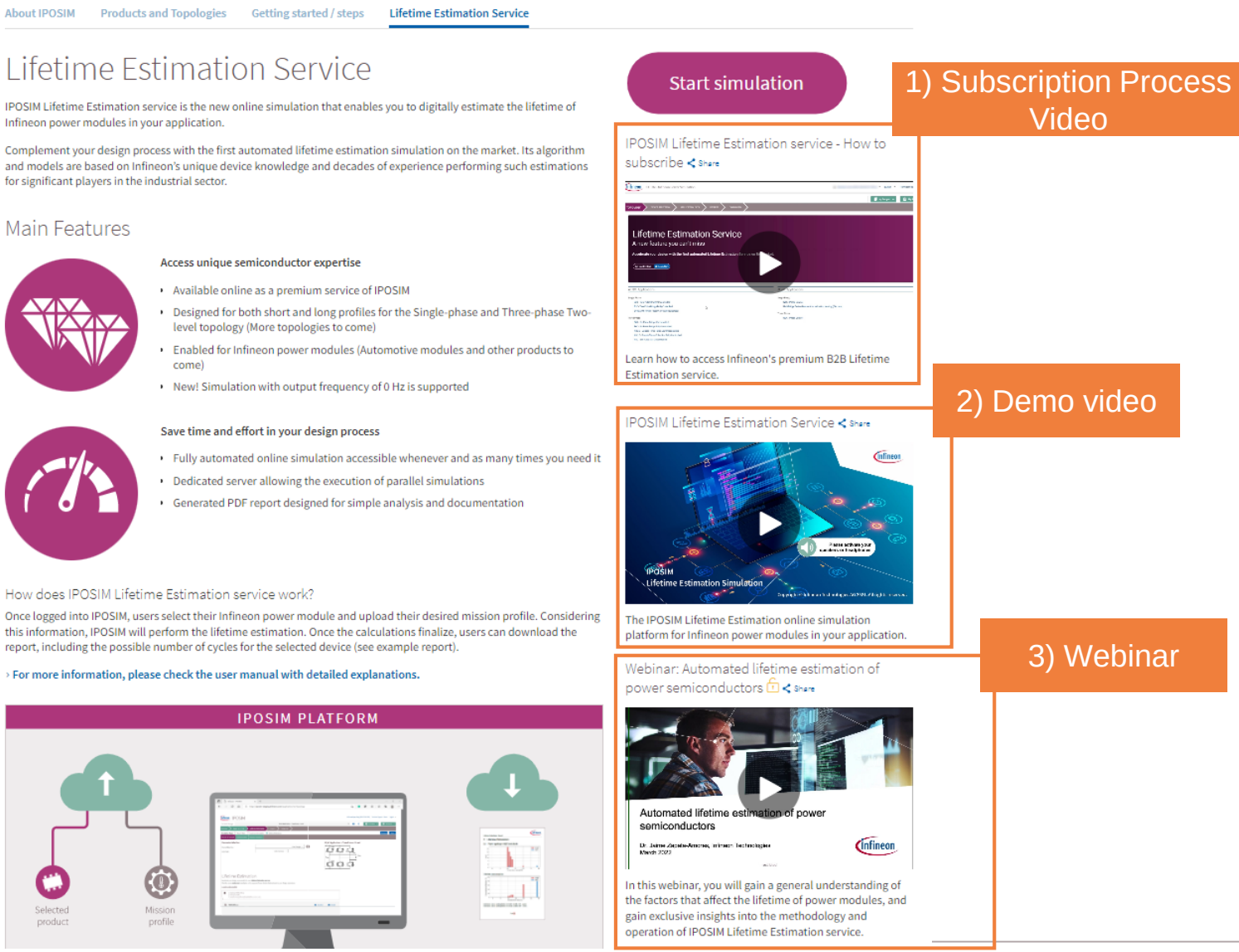
24/7 Access to unique know-how

- Algorithm and models based on Infineon's unique device knowledge and decades of experience performing such estimations.
- Designed for both short and long profiles for the **Single Phase, Three-phase Two-level, NPC1 / NPC2 (Module) and ANPC topologies** (More topologies to come).
- New! - Simulation with **output frequency of 0 Hz is now supported**
- Available online as a premium service of IPOSIM

Save time and effort in your design process

- Fully automated online simulation
- Accessible **whenever and as many times as needed**
- Dedicated server enabling execution of **parallel simulations**
- Generated PDF report designed for simple analysis and documentation

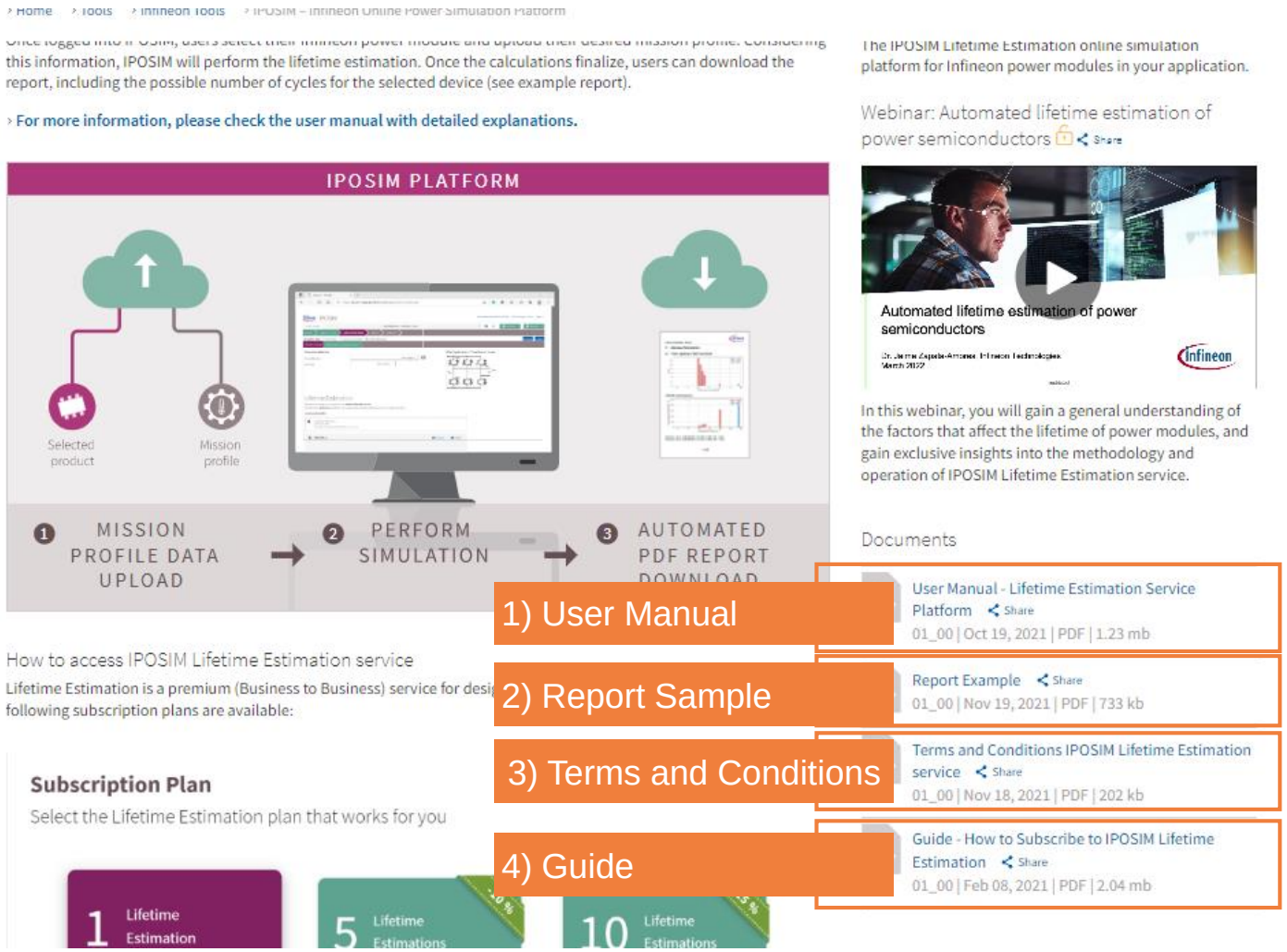
For detailed information about Lifetime Estimation please visit our Infopage. Here you can find our latest videos:



Here you can find:

1. **Subscription Process video** on how to access Lifetime Estimation Service.
2. **Demo video** of Lifetime Estimation online simulation platform.
3. **Webinar** of the general factors that affect the lifetime of power semiconductors.

For detailed information about Lifetime Estimation please visit our Infopage. Here you can find the most important documents:



1) User Manual

2) Report Sample

3) Terms and Conditions

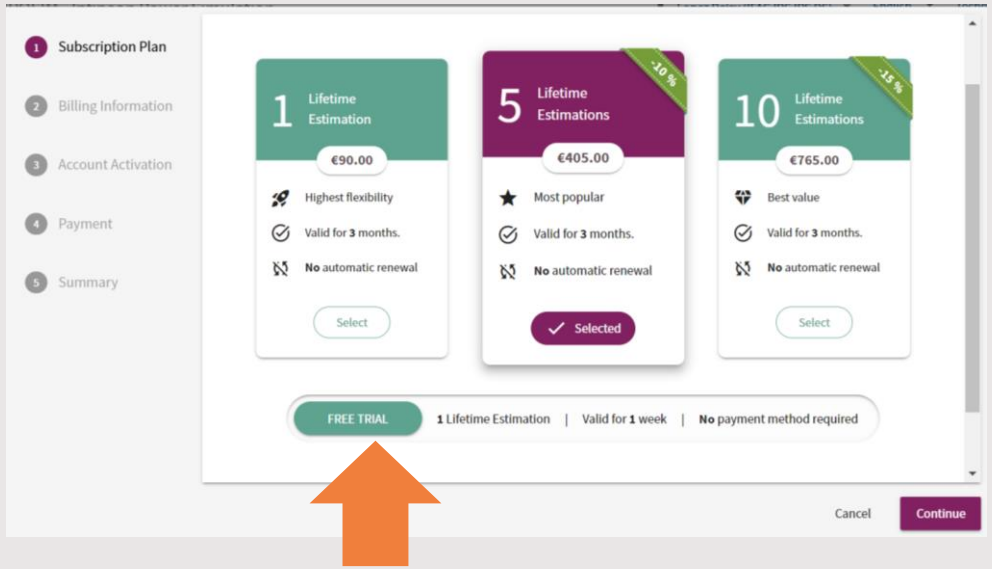
4) Guide

Here you can find:

1. **User manual** of Lifetime Estimation service with detailed information about methodology and how to execute this simulation.
2. A **report sample** for users to inspect the results from the lifetime estimation simulation.
3. **Terms and Conditions** for the use of the Lifetime Estimation Service of Infineon IPOSIM Online Tool
4. A Step-by-step **Guide** of the subscription process of IPOSIM Lifetime Estimation service and some general FAQ´s.

Lifetime Estimation simulations on the go, as often as needed during the design process. **Subscribe, pay and use, everything ONLINE**

Log into IPOSIM, select your prefered **Subscription plan** and follow the instructions



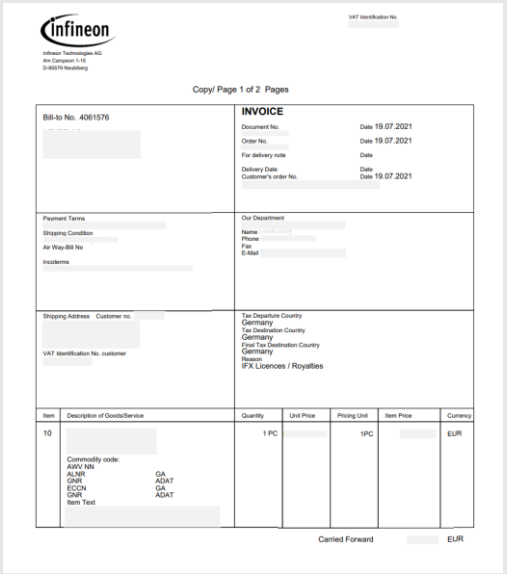
Not sure which plan?
Check out our FREE TRIAL

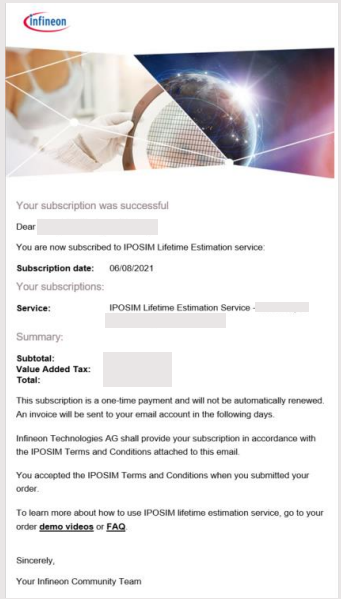
Required information: Company´s registered name, address, ZIP, city, country.
Example: Infineon Technologies AG, Am Campeon 1-15
85579 Neubiberg, Germany

Service Terms and Conditions apply

Pay online and start using Lifetime Estimation service immediately!

Use Corporate credit card, or pay with WeChat and Alipay.
You will receive an official invoice for reimbursement purposes.





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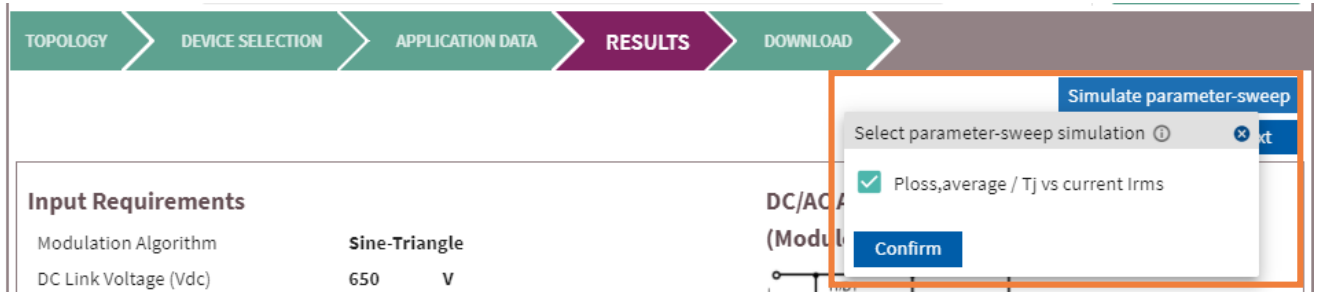
Parameter Sweep: Ploss, average / Tj versus Irms

Feature selection

With this feature you can find out the maximum allowed Irm 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 Irmsoption and click Confirm

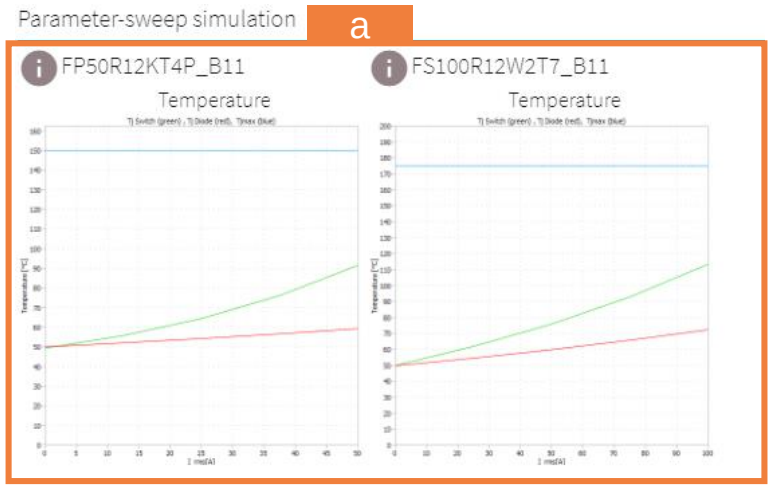
Recal an example of this feature here.

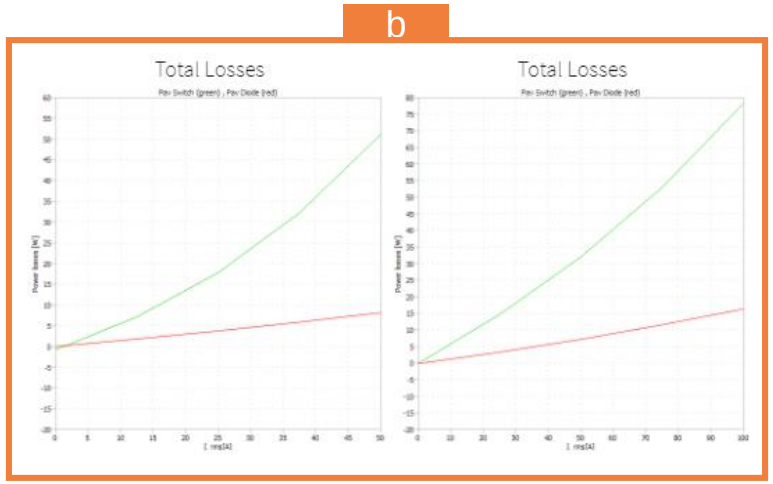


⚠ Available only for Steady State simulations

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 fout = 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 Tj	› Our thermal models of the products are not designed for overheated Tj › In case of Tj > 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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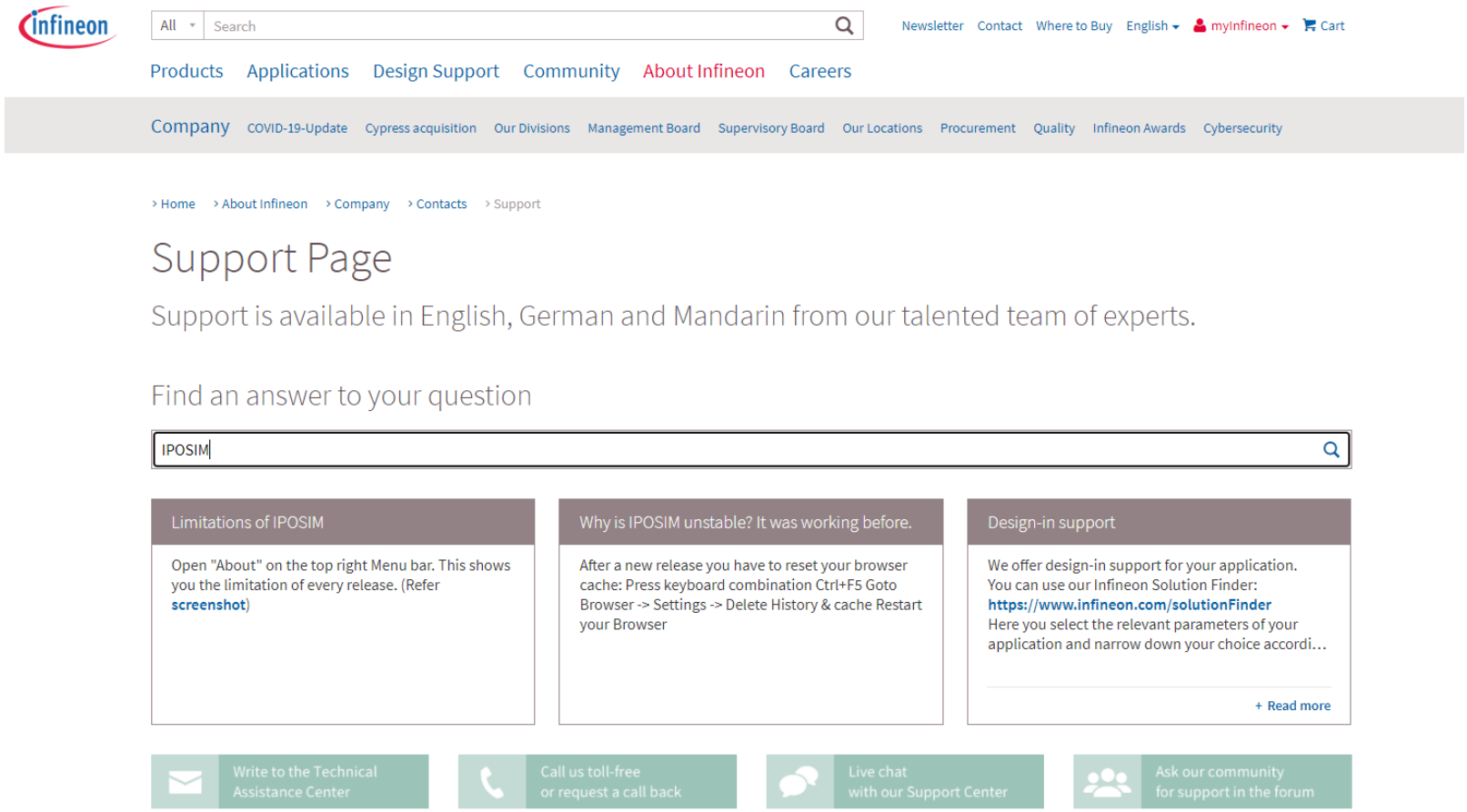
Support

For support and questions visit: www.infineon.com/support



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Part of your life. Part of tomorrow.