IPOSIM – Getting Started Guide

October 2024

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IPOSIM - Infineon's online simulation platform

Easy way to calculate power loss & thermal performance of Infineon power modules, discrete and disc devices

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

Main Features:

- ✓ **User-friendly flow,** designed to guide you step by step in your simulation
- ✓ Fast online simulation **powered by PLECS®**
- ✓ **More than 35 topologies** for discs and modules available, clustered by power conversion type. (Constant release of new topologies)
- ✓ **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

Power and thermal calculations at **a single operating point.**

Load-Cycle

Power and thermal calculations for **changing operating conditions.**

PREMIUM

Lifetime Estimation (LTE)

Expected **lifetime estimation** based on chosen parameters.

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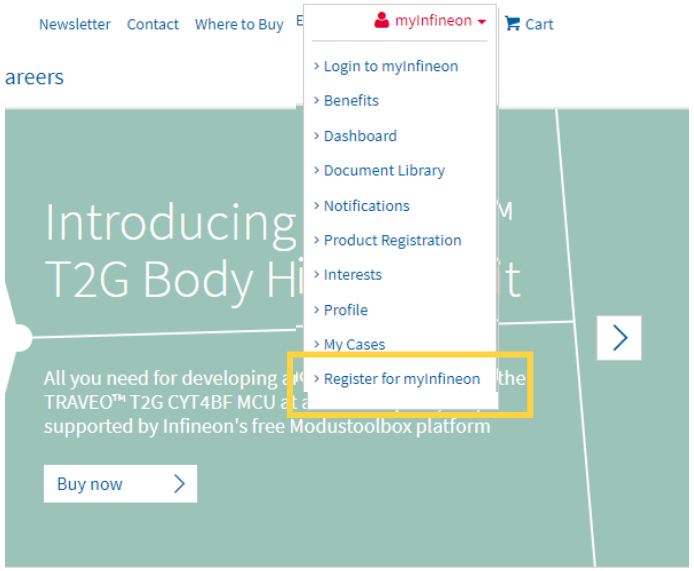
How to set-up an Infineon account

Start by setting up a myInfineon account in 3 easy steps

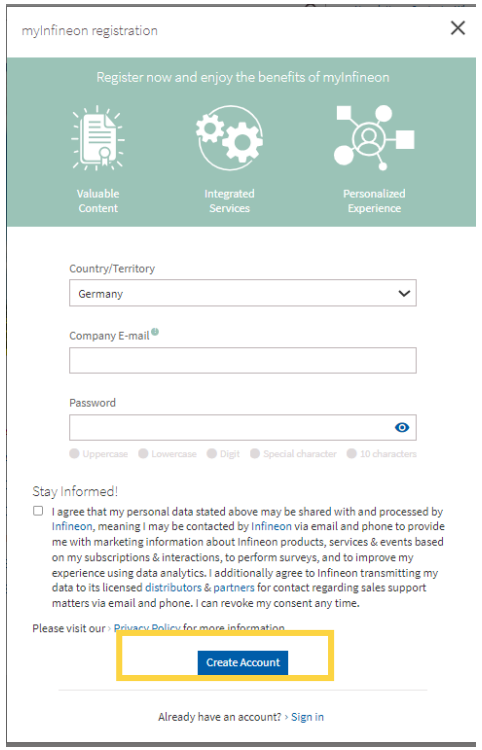
Step 1

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



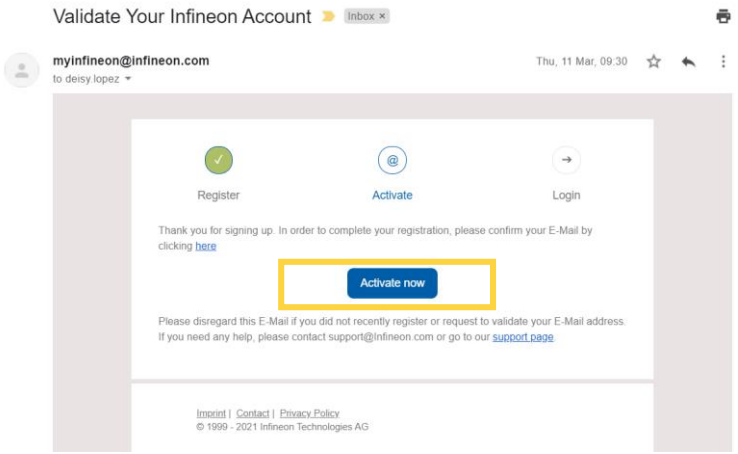
Step 2

Fill out the form and click on “Create Account”



Step 3

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



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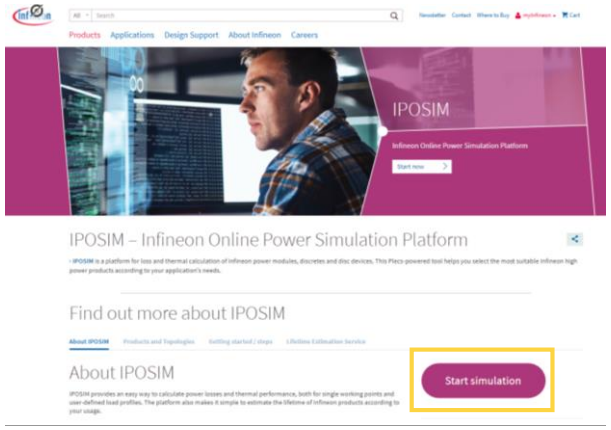
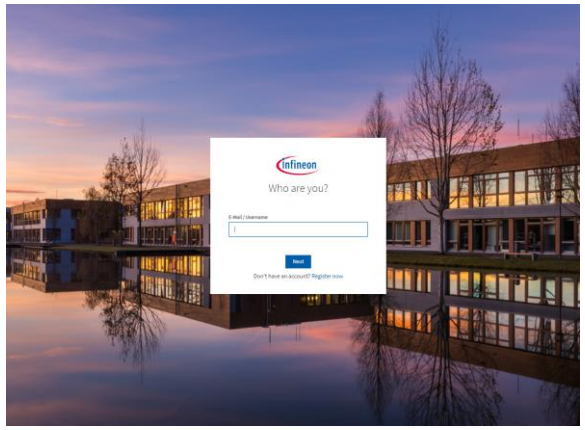
How to log into IPOSIM

With your “myInfineon” account activated, log into IPOSIM and follow the steps to start your simulation.

Log into IPOSIM

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



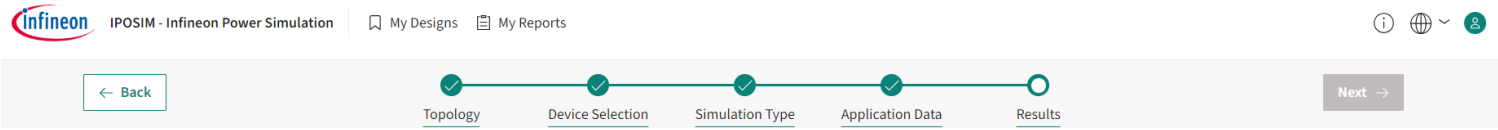


Follow the process in IPOSIM

You are all set!

IPOSIM guides you through every step of your simulation.

Find out more information on the simulation step-by-step journey in the following pages.



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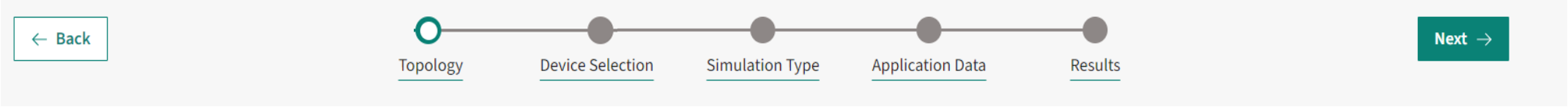
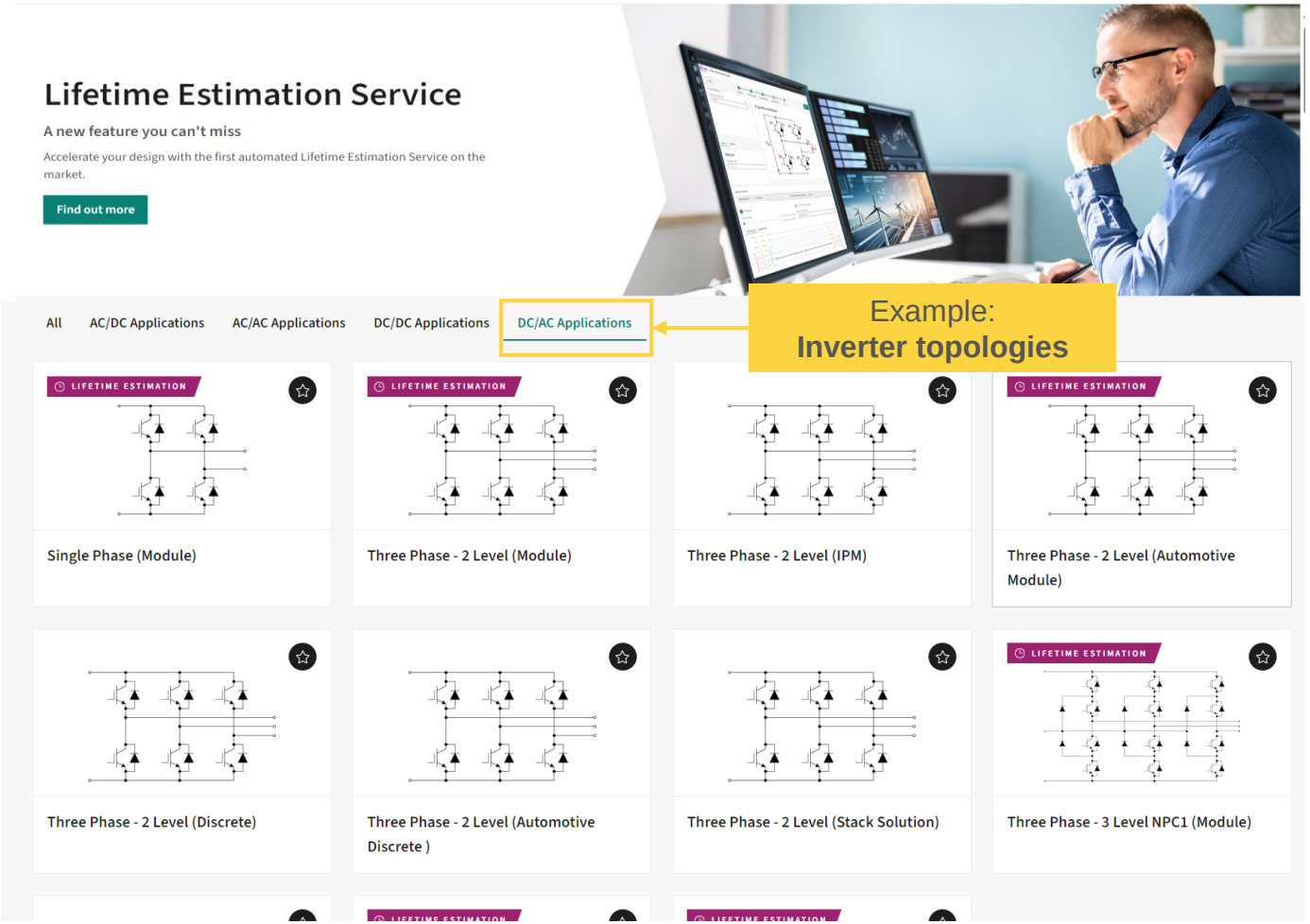
Step-by-step simulation

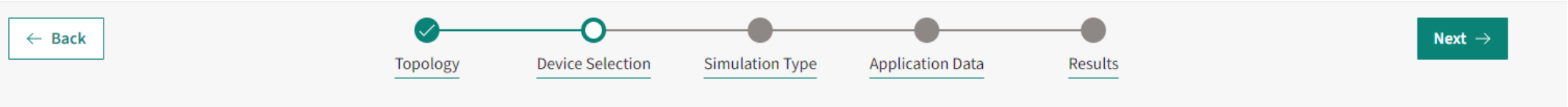


Step 1: Select your prefered topology

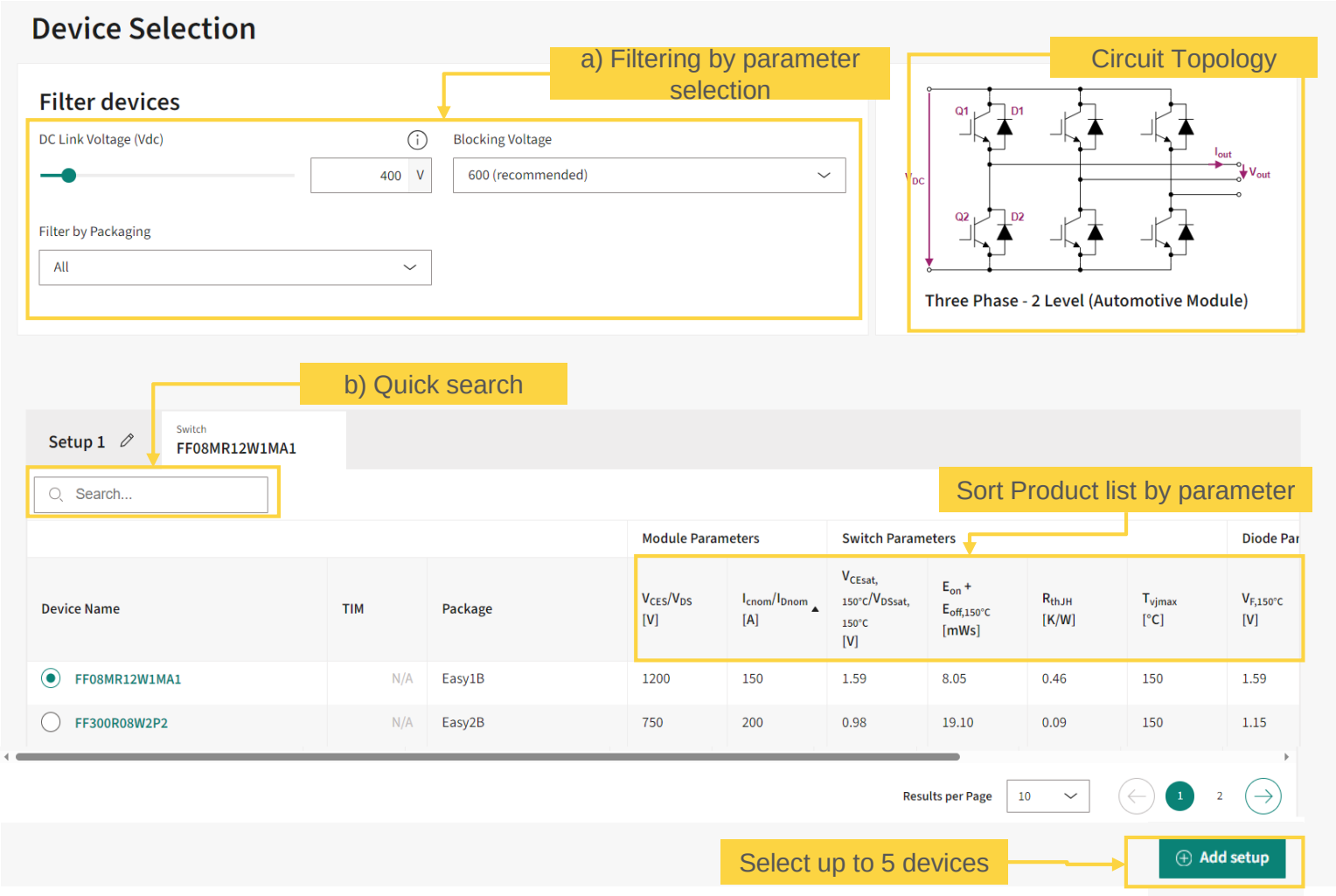


IPOSIM offers **more than 35 different topologies** to choose from, clustered by power conversion type.

New topologies are always coming up!

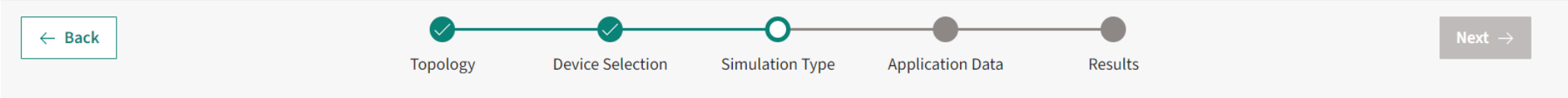


Step 2: Select your devices

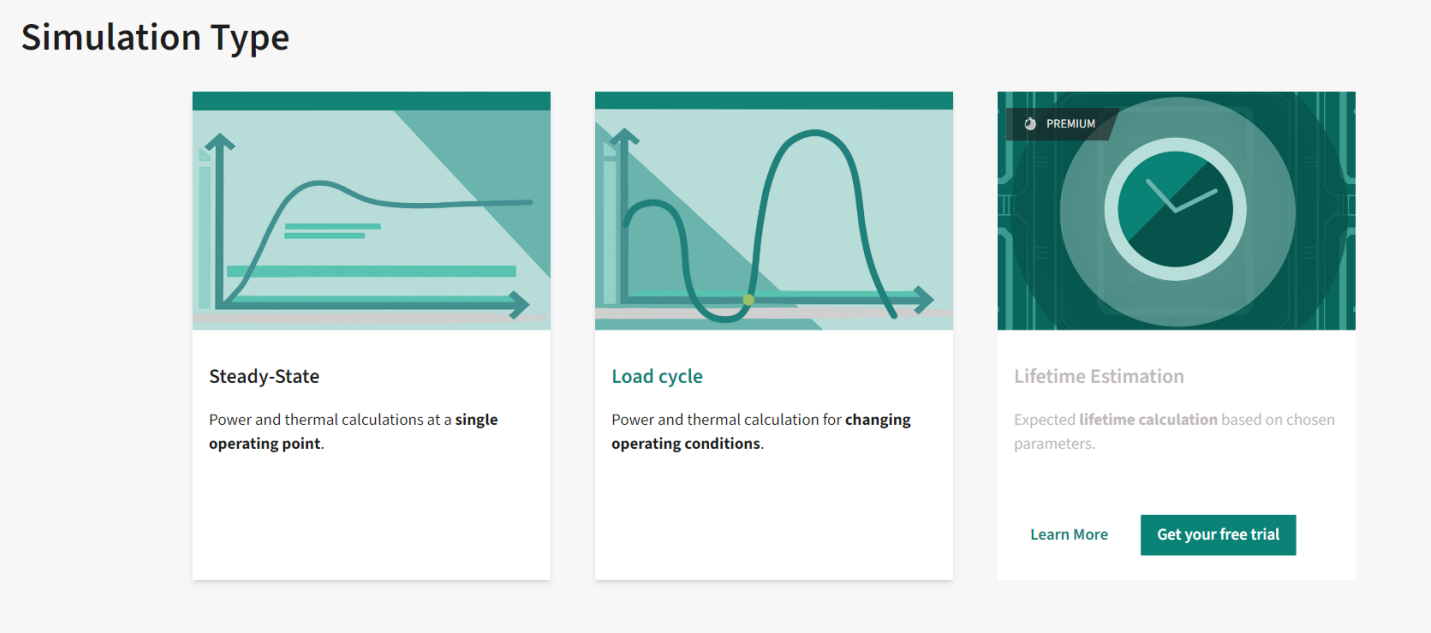


- IPOSIM offers **filtering by parameter of your selection (a)** and **a quick search option (b)** in the product list. You can also sort the product list by parameter.

- You can select **up to 5 devices at the same time**, which allows you to compare their performance simultaneously. Simply click on Add setup to select additional devices.

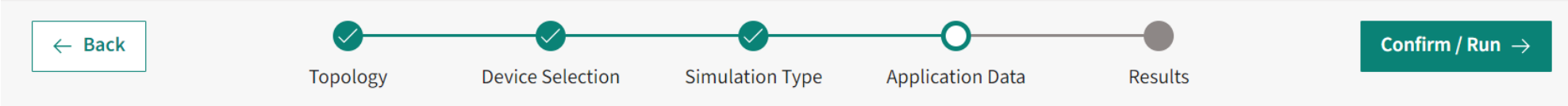


Step 3: Select the type of simulation you want to run

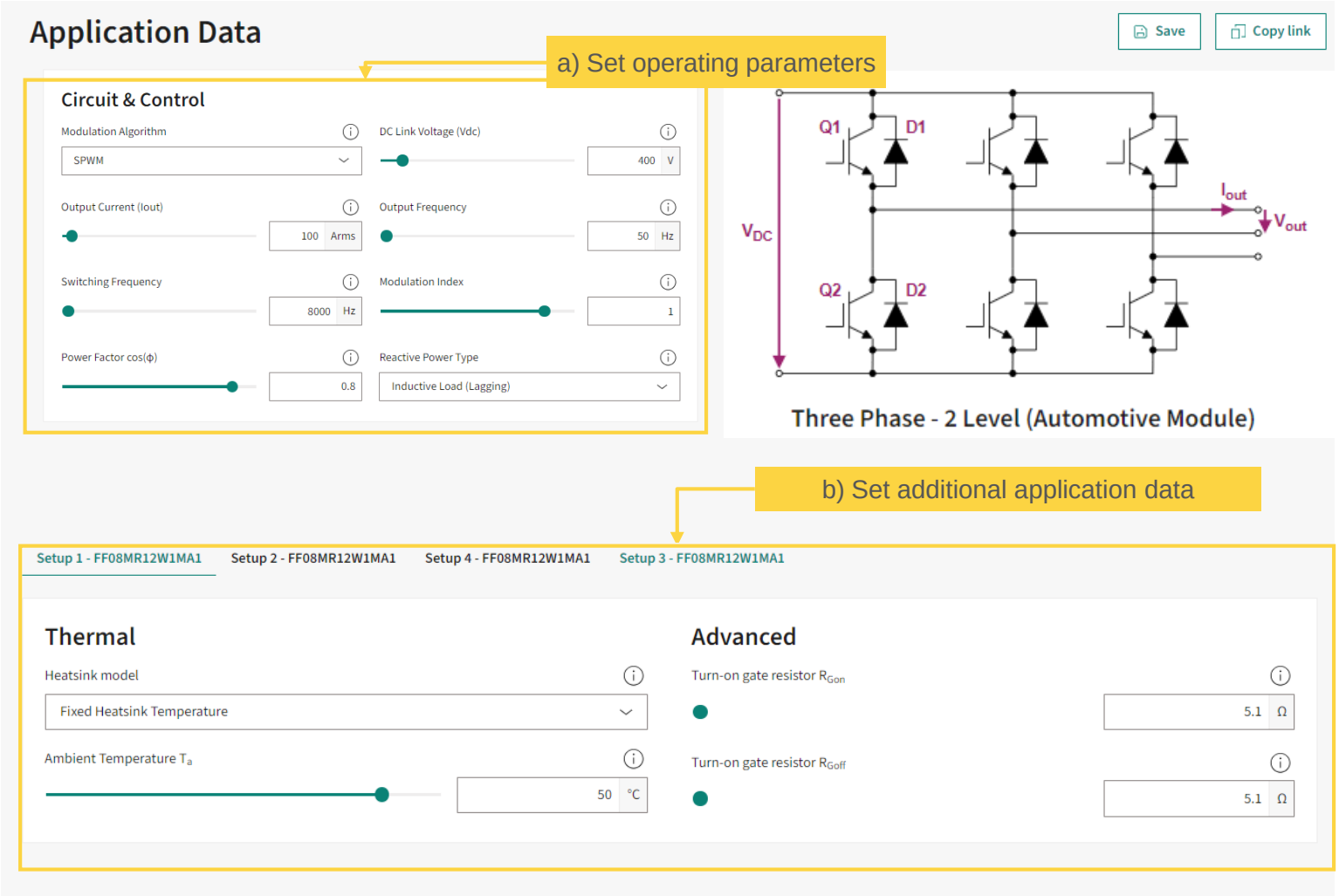


IPOSIM offers 3 types of simulation:

- **Steady state** to simulate at a constant operating condition.
- **Load cycle** to simulate a user defined load profile for changing operating conditions.
  (More on that on the following pages)
- **Lifetime Estimation** as a premium service with the possibility of free trial.
  (More on that on the following pages)



Step 4: Set your Application data



IPOSIM offers you the possibility to set-up additional parameters according to your system design:

a) Set the desired operating parameters

b) You can set cooling conditions and values for gate resistance.

← Back

Topology ✓ — Device Selection ✓ — Simulation Type ✓ — Application Data ✓ — Results ○

Next →

Step 5: Compare your results:

Simulation Results

Download | Save | Copy link

	SETUP 1 - FF08MR12...	SETUP 2 - FF08MR12...	SETUP 4 - FF08MR12...	SETUP 3 - FF08MR12...
Device Parameters				
Gate Resistance				
Cooling Conditions				
Simulation Results				
Maximum Junction Temperature				
Switch	80.04 °C	80.04 °C	80.04 °C	80.04 °C
Diode	80.04 °C	80.04 °C	80.04 °C	80.04 °C
Switching Losses				
Switch	9.99 W	9.99 W	9.99 W	9.99 W
Diode	1.44 W	1.44 W	1.44 W	1.44 W
Conduction Losses				
Switch	38.03 W	38.03 W	38.03 W	38.03 W
Diode	5.93 W	5.93 W	5.93 W	5.93 W
Total Losses				
Switch	48.02 W	48.02 W	48.02 W	48.02 W
Diode	7.36 W	7.36 W	7.36 W	7.36 W

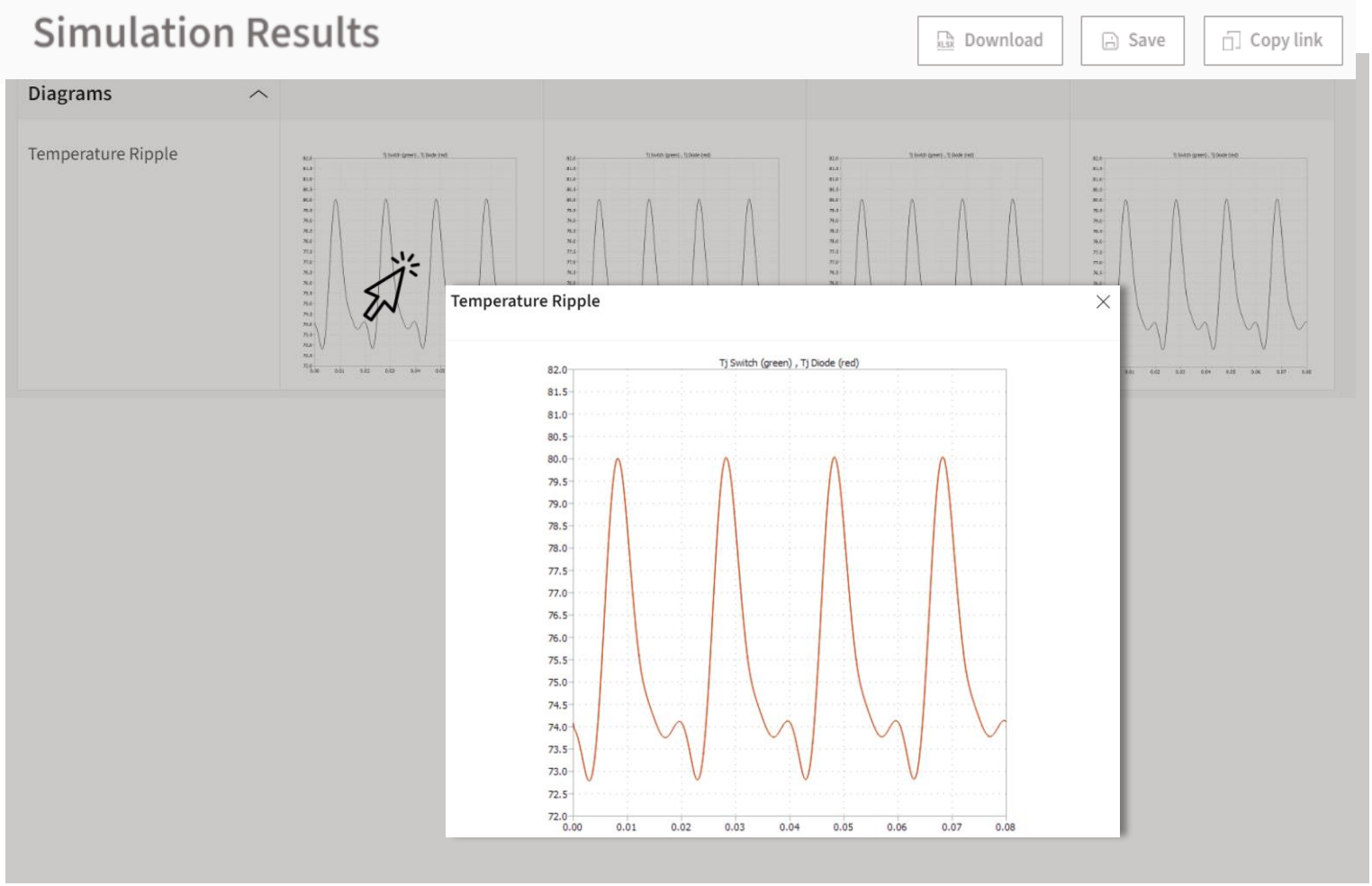
Junction Temperature

Conduction & Switching Losses

–In the section Modules/Discs, you can find among others results the **calculated values for maximum junction temperature, switching and conducting losses**.

It is presented in a way that allows you to simultaneously compare between your selected devices

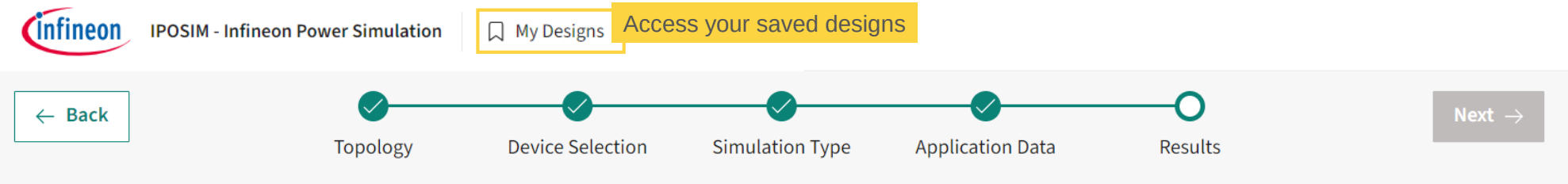
Step 5: Compare your results:



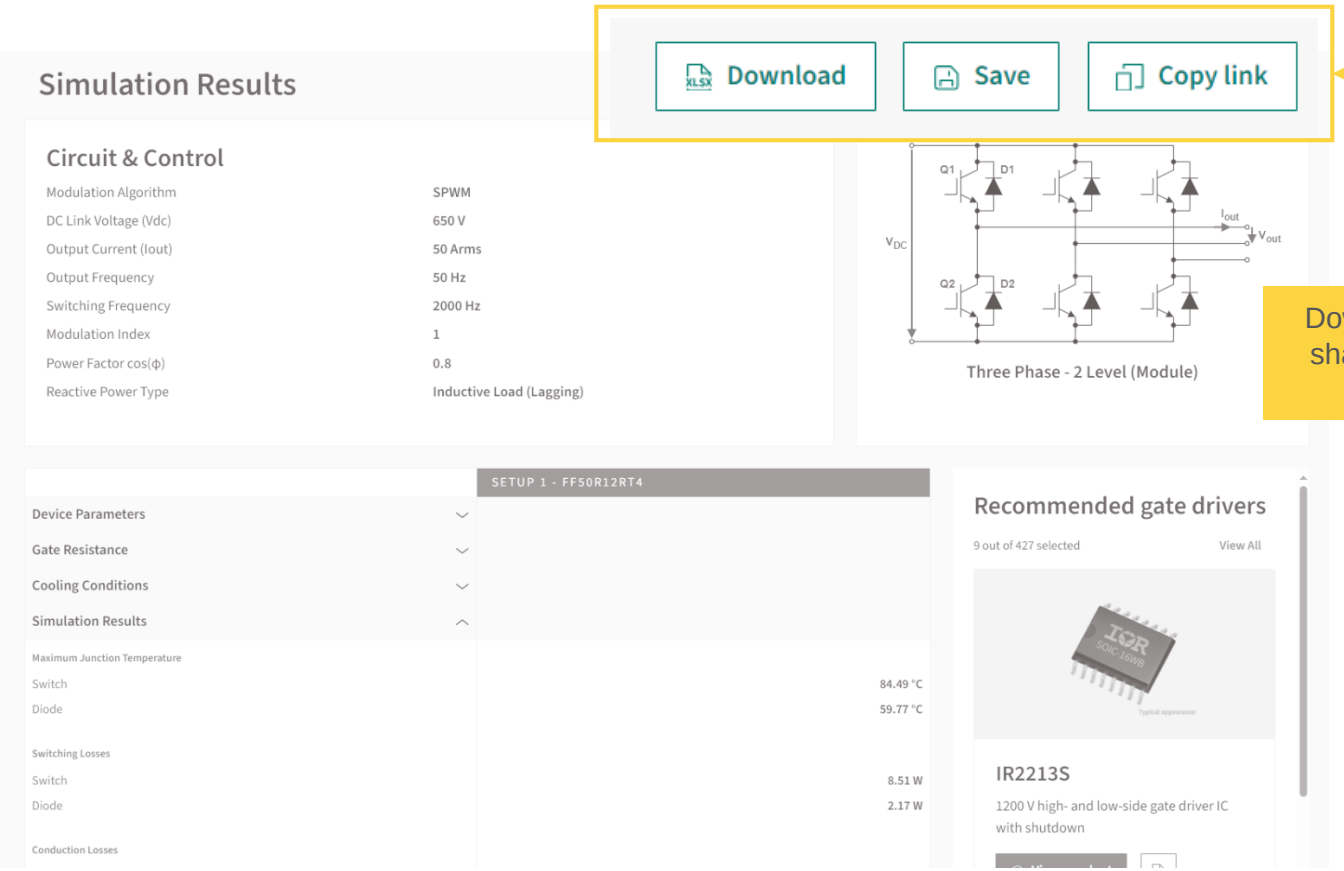
In the **Diagrams** section of the result page, you can view and inspect the temperature ripple resulting from operating the selected devices under specified working point.

–**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, Save and Share your design



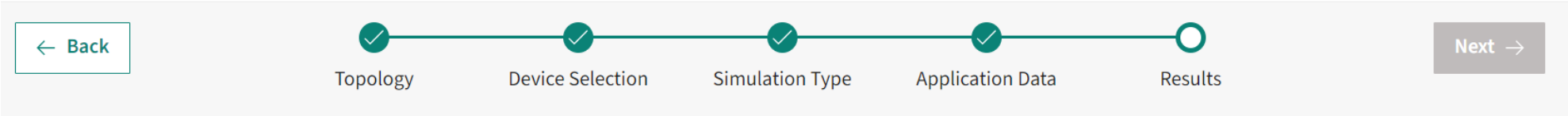
Download, save or share your design results.

– You can **download the simulation results in a excel file** format as shown in the Download button.

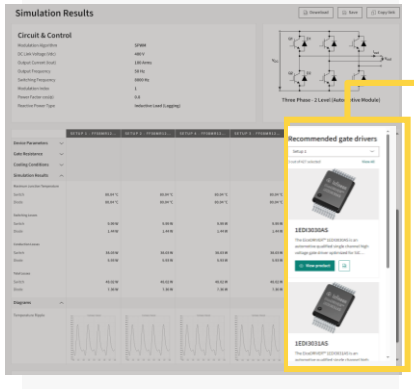
–You can also find the data sheets of selected devices for your detailed analysis and decision making.

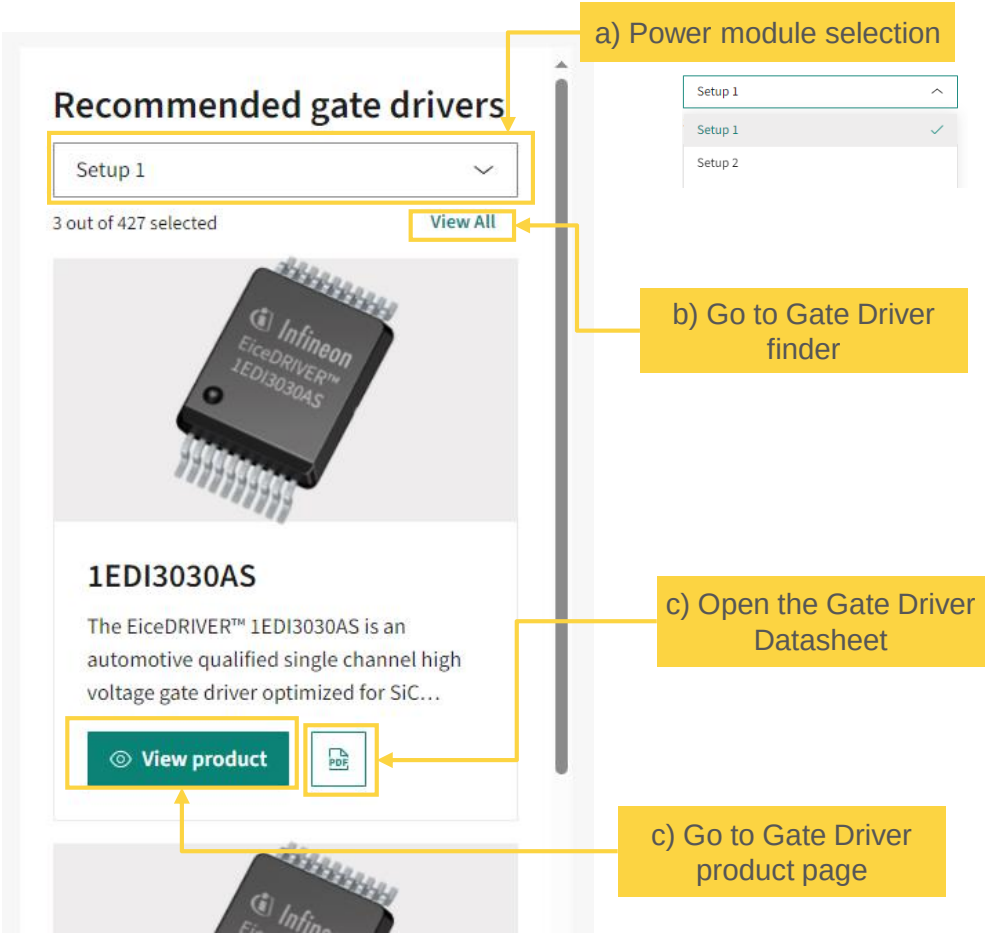
– **Save your design** to refer to it later. Find your saved designs under My Designs button at the top of the page**.**

–**Share your design**. 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.



NEW! - Gate drivers recommended for your simulation!





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.

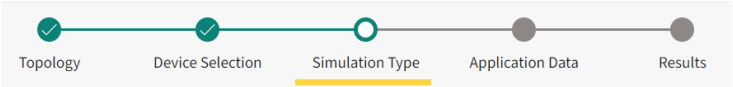
b) Click on the tab 'View All' to redirect to Infineon´s Gate Driver Finder for further support on your design.

c) Open the Datasheet or redirect to the product page of the recommended Gate Driver.

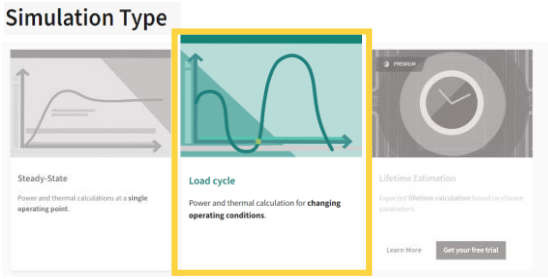
Load-Cycle Simulation

Load Cycle: upload your desired mission profile

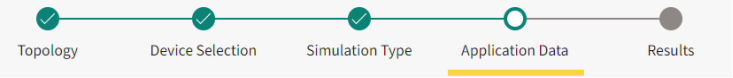
1. Select Load Cycle as simulation type



In the Simulation Type step select the option:
Load cycle simulation

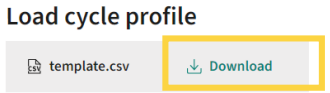


2.a. Use the excel format

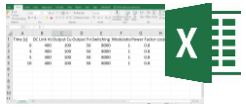


In the Application Data step:

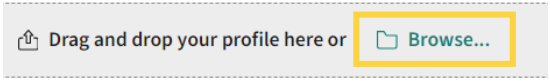
1. Download the CSV template



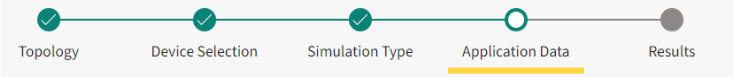
2. Fill out the template and save the document



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



2.b. Use directly the table available online



Alternatively, you can input your desired mission profile values directly on the table displayed at the button of the page.

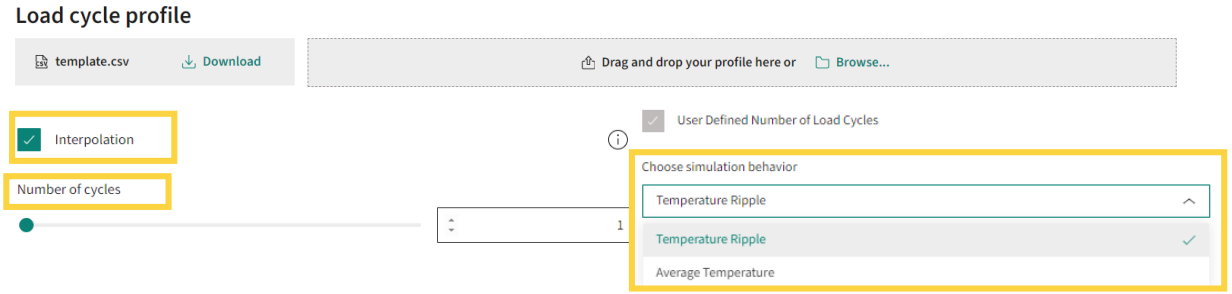
Add new row Delete selected row

	Time [s]	DC Link Voltage (Vdc) [V]	Output Current (Iout) [Arms]	Output Frequency [Hz]	Switching Frequency [Hz]	Modulation Index	Power Factor cos(ϕ)
1	0	400	100	50	8000	1	0.8
2	3	400	100	50	8000	1	0.8
3	5	400	100	50	8000	1	0.8
4	10	400	100	50	8000	1	0.8

Load Cycle: upload your desired mission profile

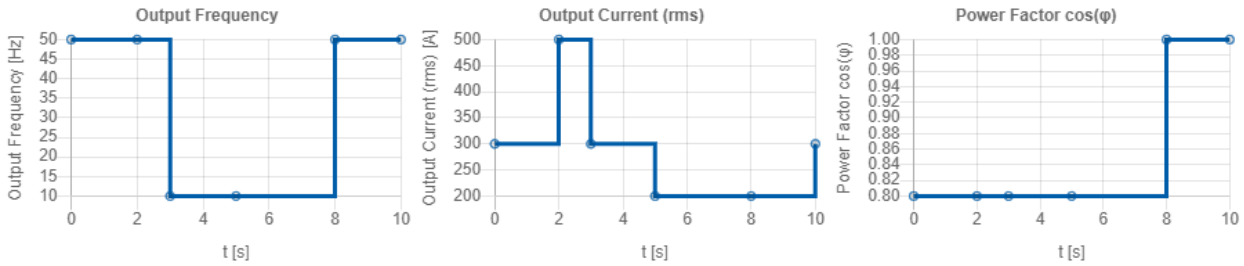
More Load Cycle features

- 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)

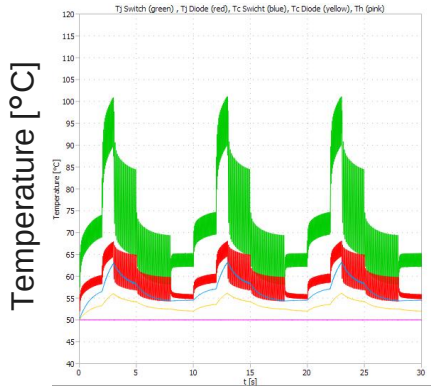


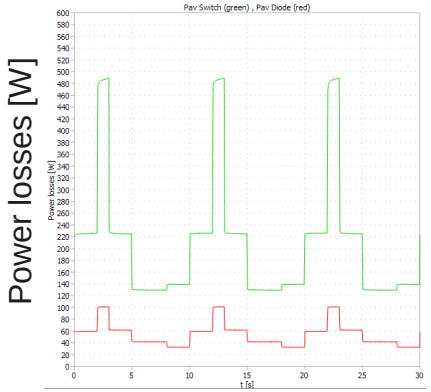
Load Cycle Example: DC-AC 3-Phase 2-Level

- 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





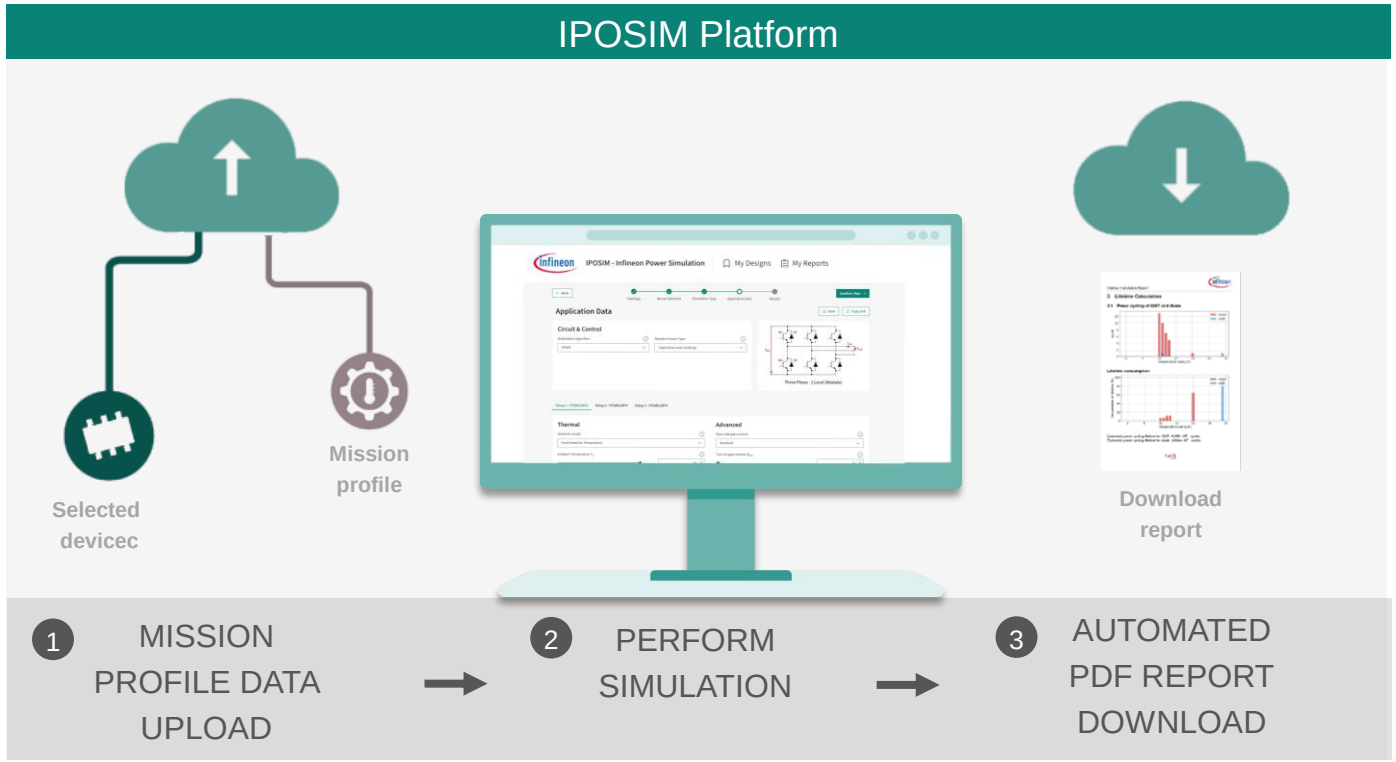
Lifetime Estimation Service (LTE)

Lifetime Estimation (LTE)

Get online access to Infineon‘s unique know-how to ease your design process

Automated Lifetime Estimation service:

Digitally estimates the lifetime of IFX modules in your application.



Once logged into IPOSIM:

1. Select an Infineon power module and upload your desired mission profile.
2. Considering this information, IPOSIM will perform the lifetime estimation.
3. Once the calculations finalize, 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

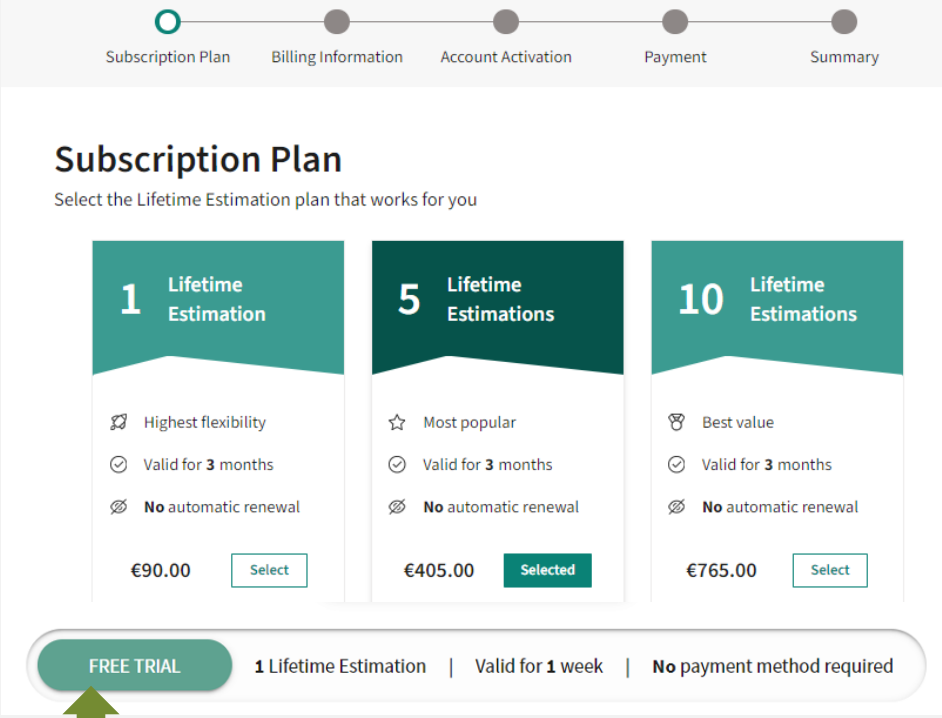
- Algorithm and models based on Infineon's unique device knowledge and decades of experience performing such estimations.
- Designed for both short and long profiles for the **Single Phase, Three-phase Two-level, NPC1 (Module) and ANPC topologies** (More topologies to come).
- New! - Simulation with **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

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?

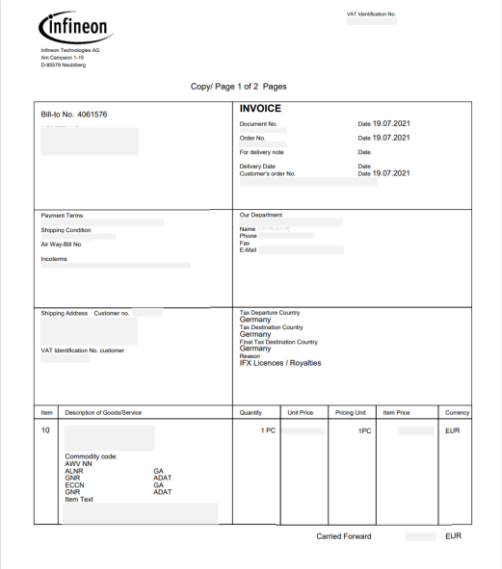
Check out our FREE TRIAL

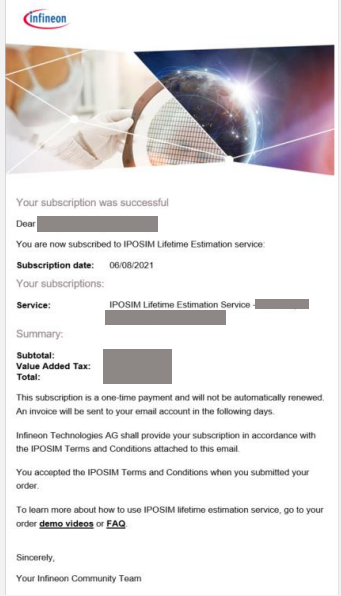
Required information: Company´s registered name, address, ZIP, city, country.
Example: Infineon Technologies AG, Am Campeon 1-15
85579 Neubiberg, Germany

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.

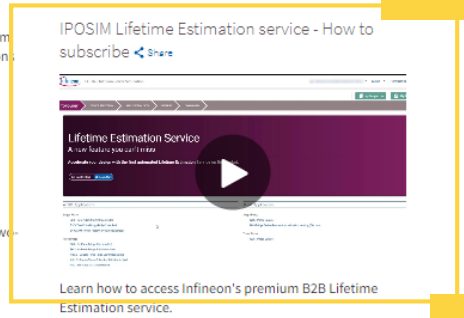




For detailed information about Lifetime Estimation please visit our Infopage. Here you can find our latest videos:

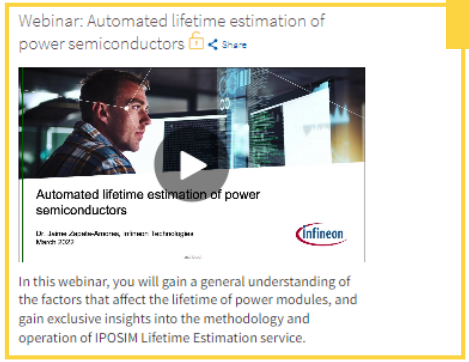
Start simulation

1) Subscription Process Video



2) Demo video

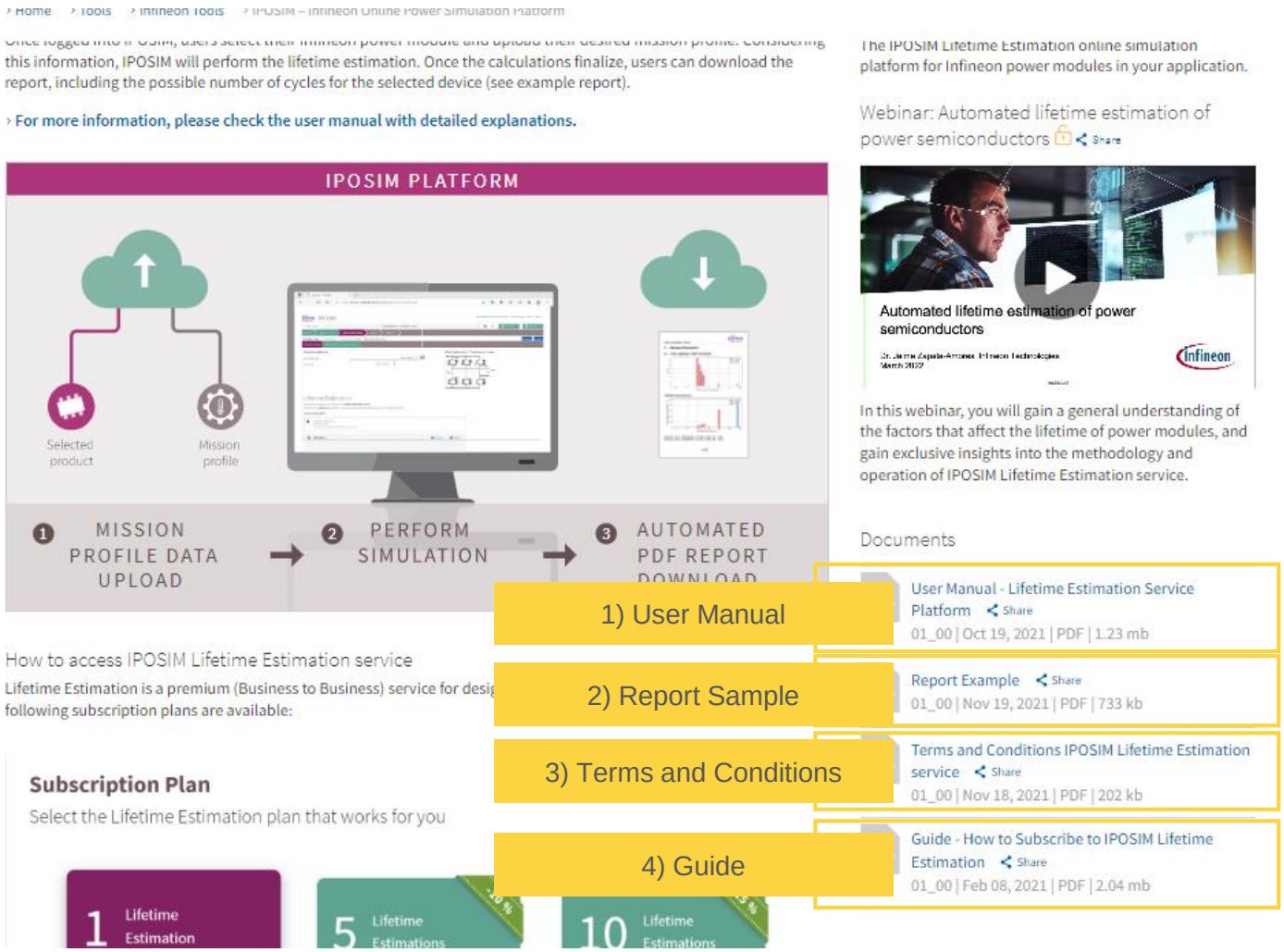
3) Webinar



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:



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.

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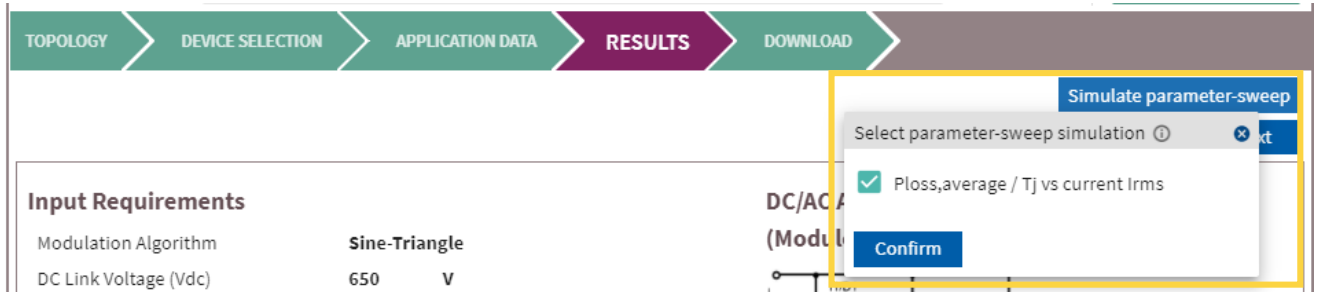
Parameter Sweep: Ploss, average / Tj versus Irms

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

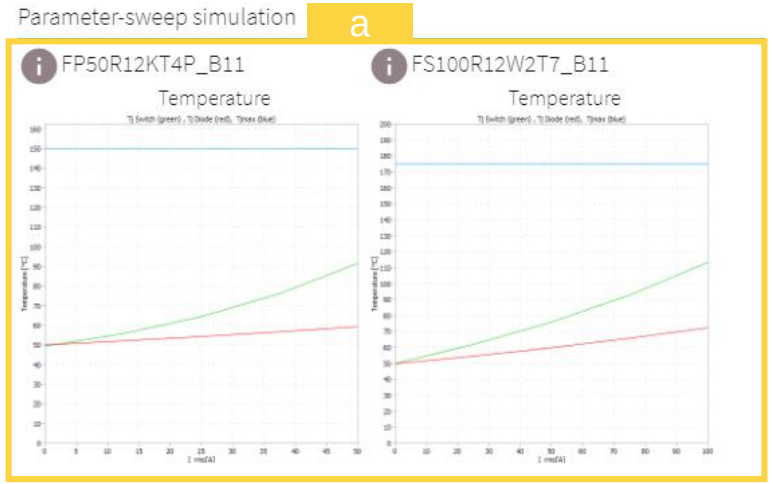
Recal an example of this feature here.

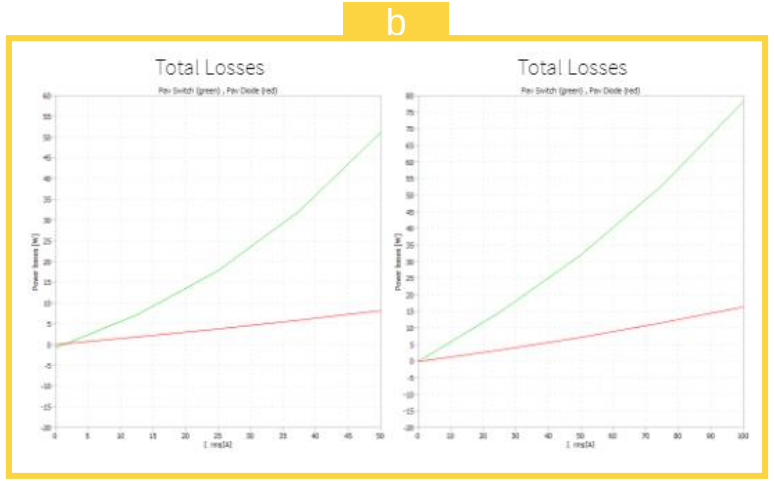


Available only for Steady State simulations

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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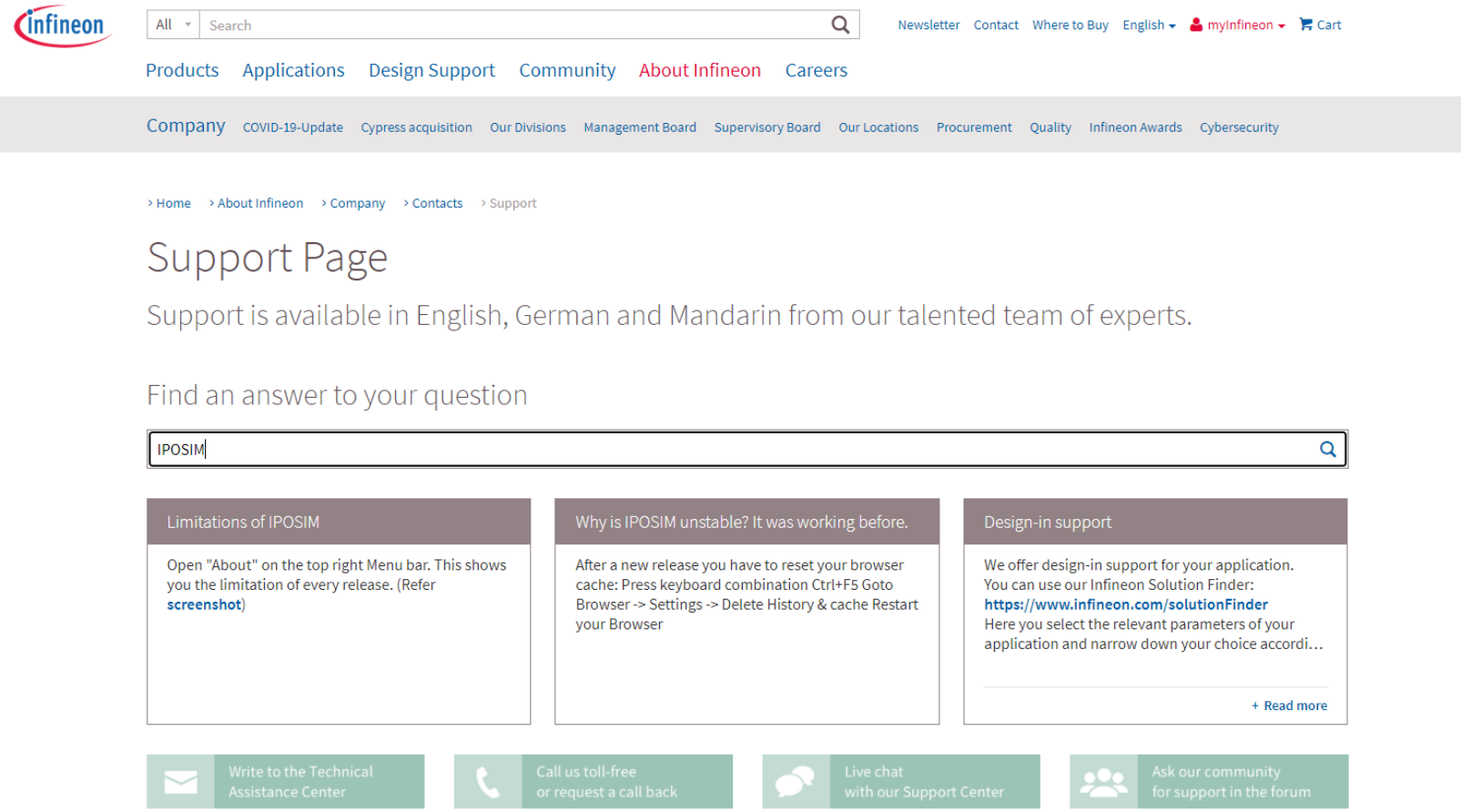
Support

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



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