

IPOSIM Getting Started



Online Engineering & Tools
2020-06-25



IPOSIM – Online Power Simulation Tool

www.infineon.com/iposim



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

Selected Topology: DC/AC Applications - Three Phase - 2 Level

Circuit & Control | Cooling Condition | Advanced Parameters | Load Cycle

Control Algorithm: Sine-Triangle ⓘ

DC Link Voltage (Vdc): 650 V

Output Current (Iout): 50 Arms

Output Frequency: 50 Hz

Switching Frequency: 2000 Hz

Modulation Index: 1

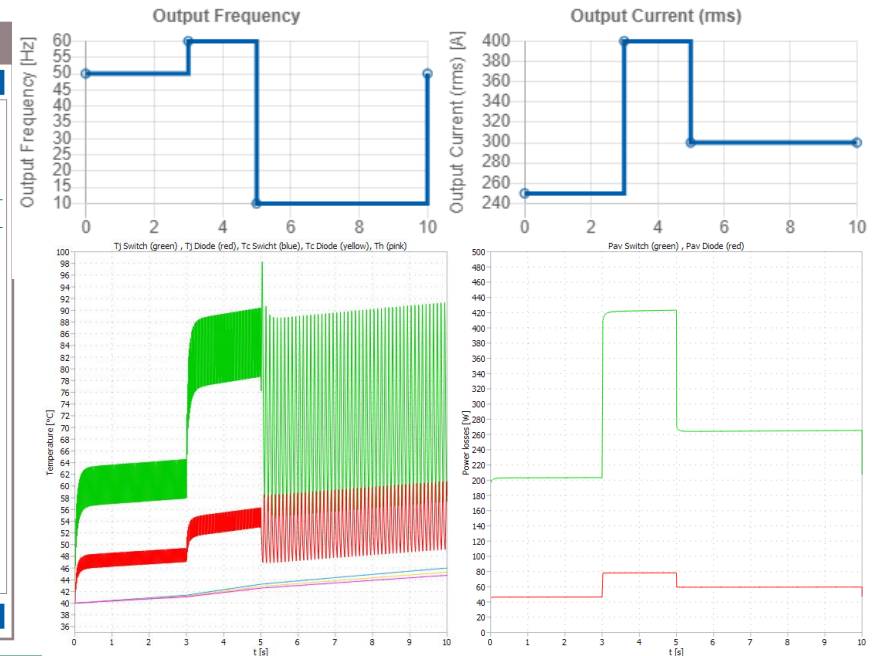
Power Factor cos(φ): 0.8

Load Type: Inductive Load ▾

☒ Do you want to define a load cycle?

DC/AC Applications - Three Phase - 2 Level

Previous Next



Key Features

- › Fast but accurate online power loss and temperature simulation powered by PLECS engine
- › Easy to use with clear flow and user interface, quick to share and archive with deep-link
- › 19 topologies for discs and modules, multi-selection of up to 5 products for easy comparison
- › New control algorithms including Discontinuous PWM and new parameter of load type selection
- › Sophisticated load cycle simulation using interpolated or discontinuous load profile with number of cycles
- › New products such as IGBT7 and SiC modules available, more are coming...

New DPWM Control Algorithms

- › New: DPWM0, DPWM1, DPWM2 and DPWM3 control algorithms (DC-AC 3-Phase 2-Level topology)
- › Coming soon:
 - › DPWMMIN and DPWMMAX
 - › For more topologies

Load Type Selection

- › New: Selection between inductive and capacitive loads
- › Available for all DC-AC topologies

New Load Cycle Features

- › Uploading load cycle profile (excel) of up to 200 line
- › Selection simulation behaviors between temperature ripple or average temperature
- › Save individual load profile setting under “My Design”
- › New: interpolated or discontinuous load profiles
- › New: possibility to repeat the load profile cycles (up to 10 cycles)

IPOSIM – Online Power Simulation Tool

New Features



**Live
since
June 15**



Advanced parameter-sweep simulations:

- › T_j & power losses versus I_{rms}
- › Maximum allowed I_{rms} versus switching frequency f_{sw}

Advanced scope functions: cursors, zoom-in/out

Load cycle for more topologies including AC-DC

More topologies including Automotive and more products with new technologies

Optimized flow separation for device selection and application data settings

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Landing Page: www.infineon.com/iposim



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1

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be smart.
prototype
online.

Download Getting Started IPOSIM Guide
01_00 | Oct 01, 2018 | PDF | 1.09 mb

IPOSIM – Infineon Online Power Simulation Tool

Thank you for using > IPOSIM, the online power simulation program for loss and thermal calculation of Infineon power modules and disk devices. It supports you in

- selecting the right product for a given application topology
- simulating the switching and conduction losses including assessment of the thermal performance based on your given cooling conditions including performance comparison of various products and input specifications and saving the results

New: ANPC topology including CoolSiC™ MOSFET Modules

- EV charging: > simulate DC/AC - Single Phase topology using 1200 V CoolSiC™ MOSFET EasyPACK™ Module F4-23MR12W1M1_B11
- Solar and Energy Storage Systems (ESS):
> simulate DC/AC - Three Phase - 3 Level ANPC topology using 3-Level 1200 V CoolSiC™ Module F3L11MR12W2M1_B65

3

Step 1: register first



Please register here to myInfineon. Here you will find exclusive information to speed up your projects.

Step 2: login & select



Login and select your target application including the preferred circuit topology.

Step 3: choose your device



Based on your input the tool will provide the best recommended products in a tabular form.

How to use Infineon IPOSIM



> How to use Infineon IPOSIM

Book - IGBT modules



1. myInfineon Registration

- new account required since old Transim accounts will not be transferred to the new IPOSIM platform

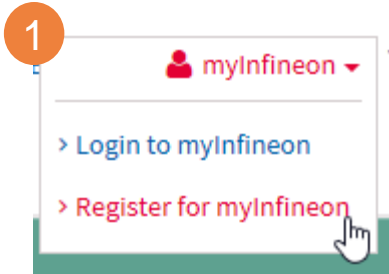
2. Getting Started

- Documents
- Videos

3. Steps by step guide with hyperlinks

Registration myInfineon

www.infineon.com



2

myInfineon registration

Register now and enjoy the benefits of myInfineon

Valuable Content

Integrated Services

Personalized Experience

E-mail

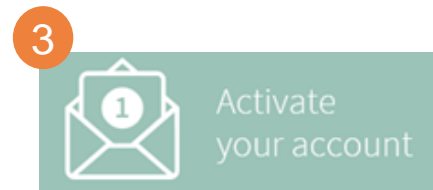
Please enter your business e-mail address to benefit from all myInfineon offerings.

Country / Territory

Please enter the country /territory you work in currently.

☐ I agree to the processing of my personal data according to the [privacy policy](#).

Already registered? [Login](#)



4

myInfineon account activation

Dear test1@mindfulgaming.org
Please complete your profile information to activate your account.

First name

Last name

Company

☐ I am not affiliated to any company

Password

☐ Stay informed: ☐ I agree - Infineon providing me newsletters and further marketing information about Infineon products, services & events by email and/or telephone and transmitting my data to its licensed distributors & partners exclusively for sales support purposes. I can withdraw my consent at any time.

Your myInfineon benefits in a nutshell

Valuable Content

Integrated Services

Personalized Experience

1. Click on icon on top of the page: "Register for myInfineon"
2. An overlay will pop-up to enter Email & company
3. An Email will be sent out (Double Opt-in) to activate your account
4. Click on link in Email and finalize registration

IPOSIM: Infineon Power Simulation Tool

Step By Step Guide



1

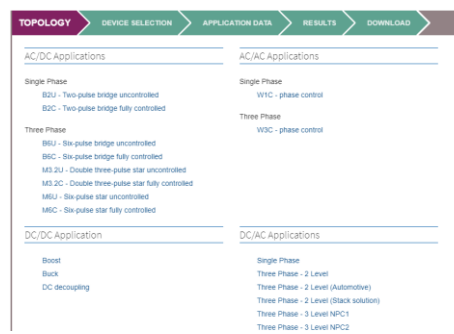
Step 1: register first



Please [register here](#) to myInfineon. Here you will find exclusive information to speed up your projects.

2

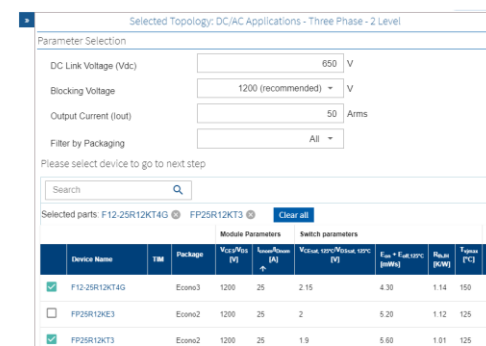
Step 2: login & select



Login and select your target application including the preferred circuit topology.

3

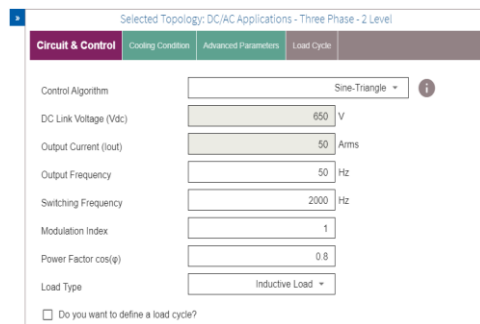
Step 3: choose your devices



Based on your input the tool will provide the best recommended products in a tabular form.

4

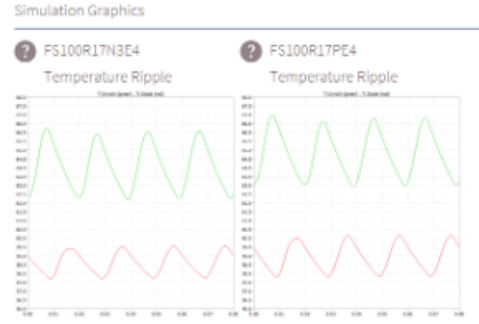
Step 4: define your parameters



In this step you define the input requirements for steady-state or load cycle simulation.

5

Step 5: simulate & compare



Check the simulation results. Click on the diagrams to zoom in and assess the details.

6

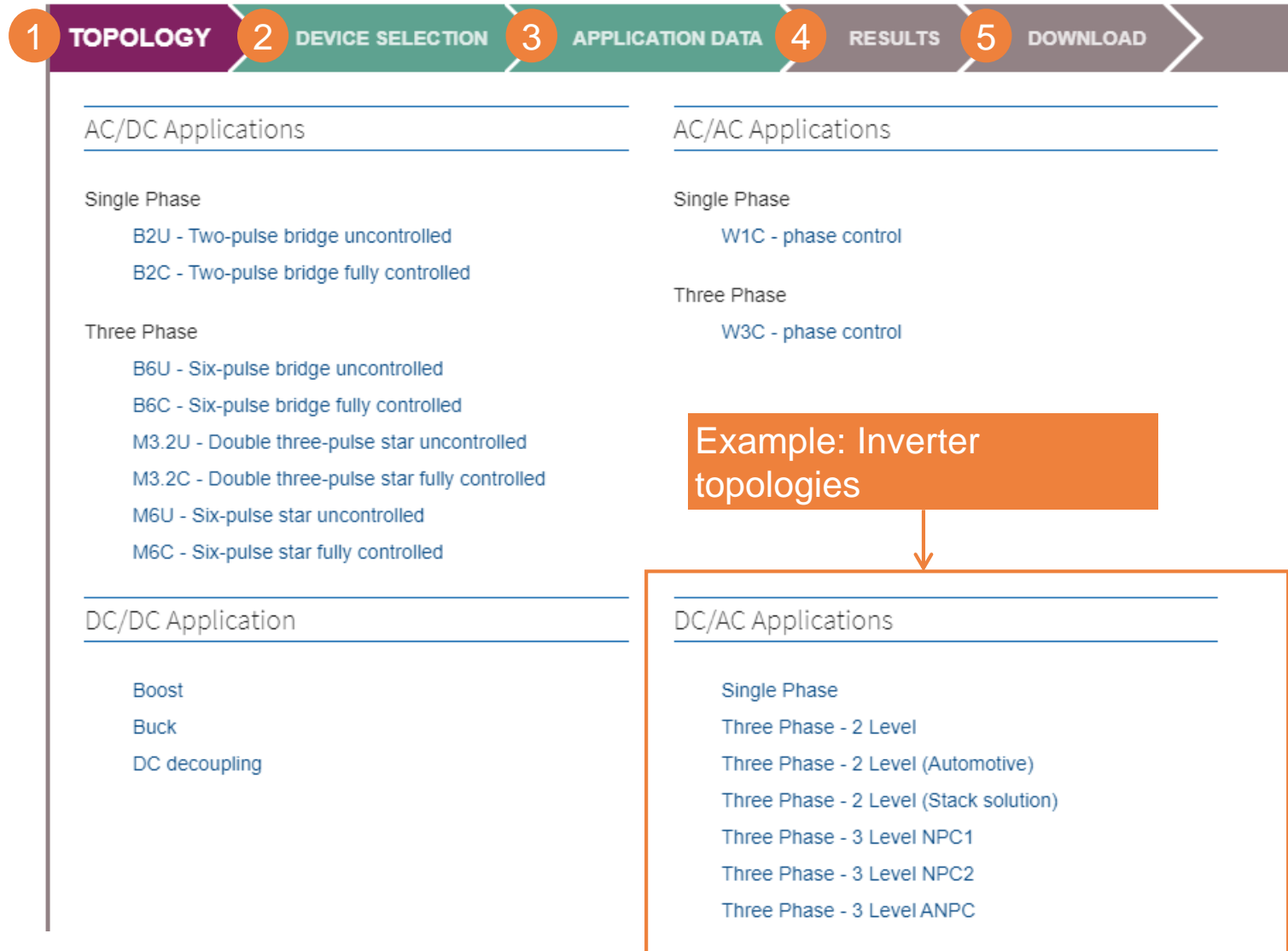
Step 6: learn & get support



Download our [Getting Started](#) guide, watch a tutorial video or contact support if needed.

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Step 1: Select Your Topology



IPOSIM: Infineon Power Simulation Tool

Step 2: Choose Your Devices

TOPOLOGY **DEVICE SELECTION** APPLICATION DATA RESULTS DOWNLOAD

Previous Next

Selected Topology: DC/AC Applications - Three Phase - 2 Level

Parameter Selection

DC Link Voltage (Vdc) V

Blocking Voltage V

Output Current (Iout) Arms

Filter by Packaging

DC/AC Applications - Three Phase - 2 Level

Please select device to go to next step

Search

Selected parts:

	Device Name	TIM	Package	Module Parameters		Switch parameters				Diode Parameters		
				V _{CES} /V _{DS} [V]	I _{nom} /I _{Donom} [A]	V _{CEsat} , 125°C/V _{DSsat} , 125°C [V]	E _{on} + E _{off} , 125°C [mWs]	R _{thJH} [K/W]	T _{vjmax} [°C]	V _F , 125°C [V]	E _{rec} , 125°C [mWs]	R _F [mΩ]
<input type="checkbox"/>	F12-25R12KT4G		Econo3	1200		2.15	4.30	1.14	150	1.75	1.50	1.
<input type="checkbox"/>	FP25R12KE3		Econo2	1200	25		20	1.12	125	1.65	2.00	1.
<input type="checkbox"/>	FP25R12KT3		Econo2	1200	25		60	1.01	125	1.65	1.80	1.
<input type="checkbox"/>	FP25R12KT4		Econo2	1200	25		60	1.31	150	1.75	1.80	1.
<input type="checkbox"/>	FP25R12KT4_B11		Econo2	1200	25	2.15	4.60	1.31	150	1.75	1.80	1.

3

Search

1

Set filtering parameters

2

Circuit topology

4

Product List
with sorting
function

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Step 3: Set Your Application Data

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

Previous Next

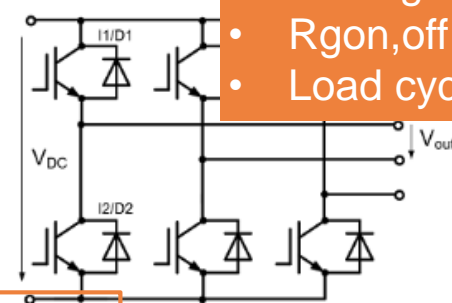
Selected Topology: DC/AC Applications - Three Phase - 2 Level

Circuit & Control Cooling Condition Advanced Parameters Load Cycle

2 Set other application data:

- cooling condition
- Rgon,off
- Load cycle

DC/AC Application



1 Set operation parameters, enable load cycle

Control Algorithm Sine-Triangle

DC Link Voltage (Vdc) 650 V

Output Current (Iout) 50 Arms

Output Frequency 50 Hz

Switching Frequency 2000 Hz

Modulation Index 1

Power Factor cos(ϕ) 0.8

Load Type Inductive Load

☐ Do you want to define a load cycle?

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Step 4: Simulate Electrical & Thermal (PLECS)

1

Example: IGBT modules

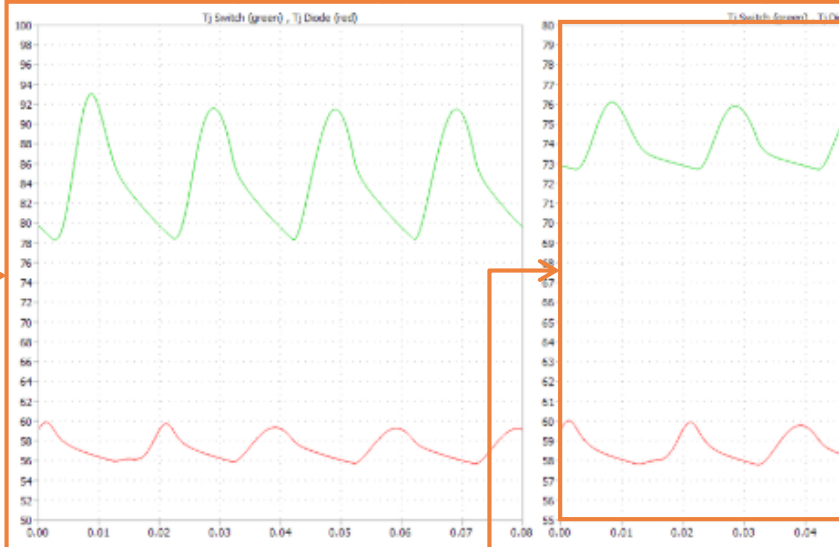
Steady-State Analysis

FP50R12KT4P_B11

FS100R12W2T7_

Temperature Ripple

Temperature

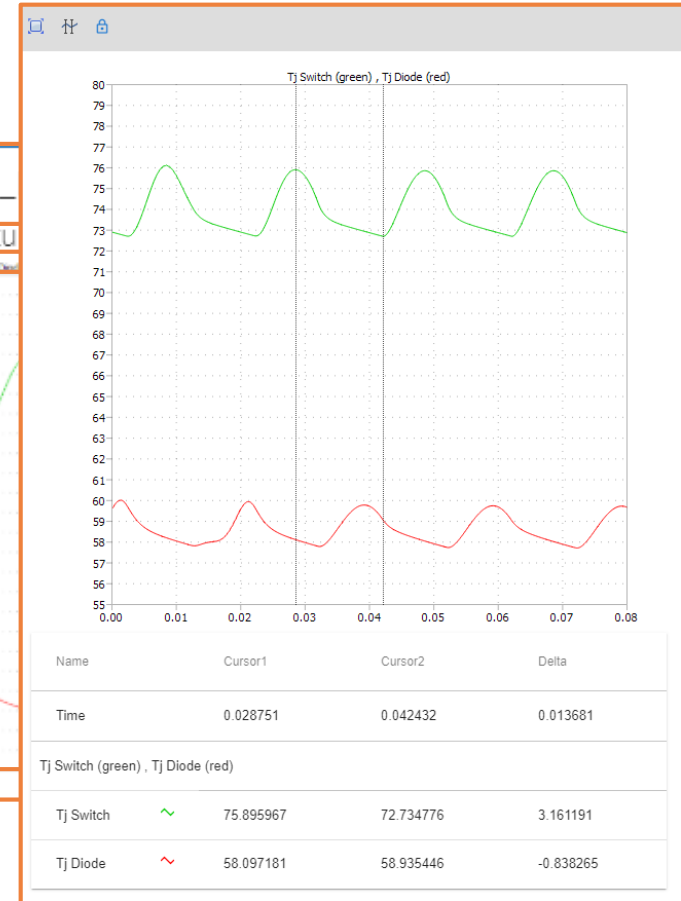


2

Temperature ripple

3

Click diagram for more scope functions



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Step 4.1: Compare Simulation Results

FP50R12KT4P_B11		FS100R12W2T7_B11	
Switch parameters	▼	Switch parameters	▼
Diode Parameters	▼	Diode Parameters	▼
Cooling Condition	▼	Cooling Condition	▼
Simulation Results	^	Simulation Results	^

Maximum Junction Temperature		Maximum Junction Temperature	
Switch	91.5°C	Switch	75.9°C
Diode	59.3°C	Diode	59.7°C

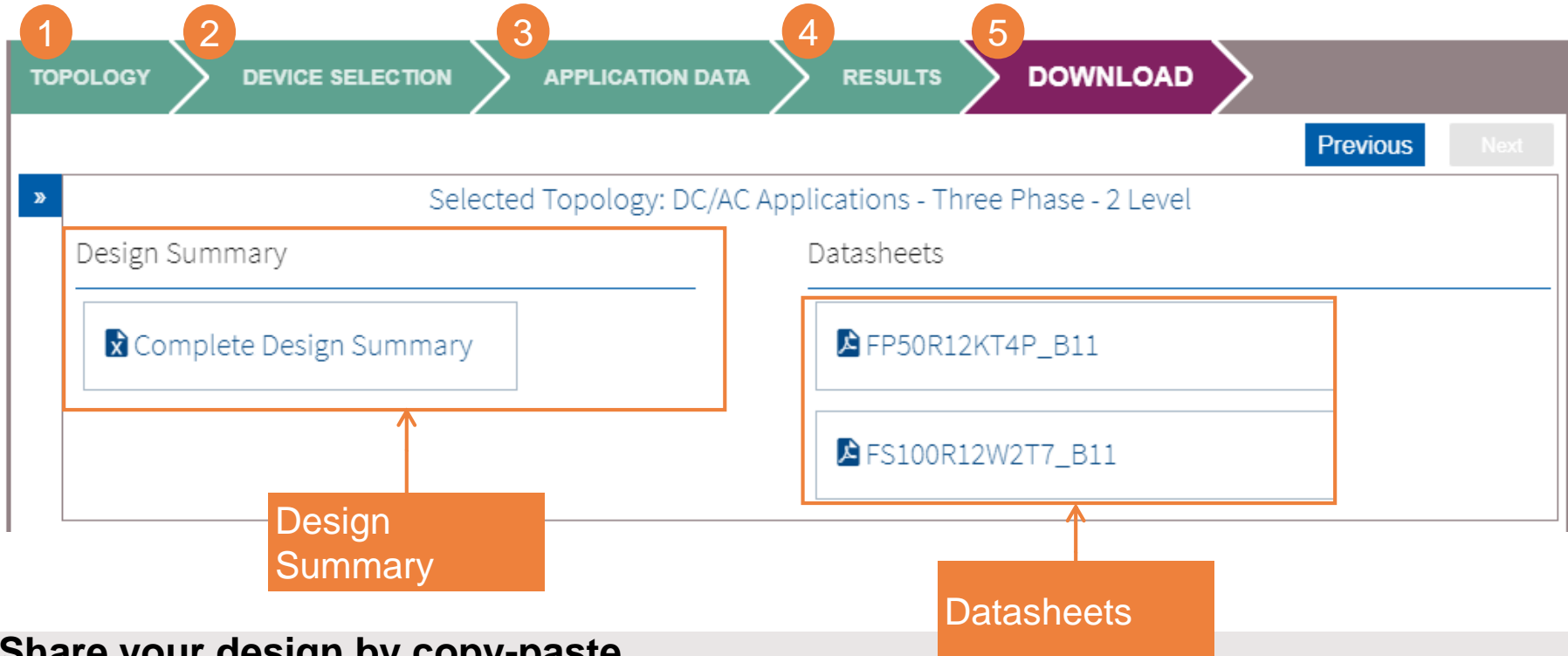
Switching Losses		Switching Losses	
Switch	10.7W	Switch	7.6W
Diode	1.7W	Diode	2.0W
Conduction Losses		Conduction Losses	
Switch	40.4W	Switch	24.3W
Diode	6.5W	Diode	5.1W
Total Losses		Total Losses	
Switch	51.1W	Switch	32.0W
Diode	8.2W	Diode	7.1W

1
Junction
Temperature

2
Conduction &
Switching
Losses

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Step 5: Download Results



Share your design by copy-paste

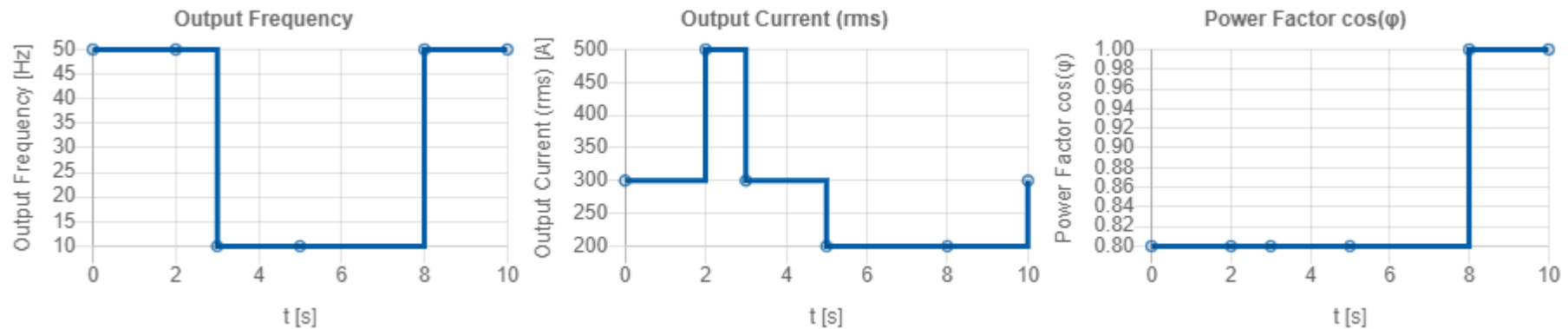
- › Copy the browser URL and share it with anybody to re-execute the simulation with same configuration.
- › Example: [https://iposim.infineon.com/application/en/download?topology:DC-AC_3P_2L,inputs:\(mod_scheme:1,Vdc:650,Vblock:1200,Irms:50,fout:50,fsw:2000,t_pulse:180,modi:1,cos_phi:0.8,cos_phi_sign:2,load_cycle:False\),devices:\(FP50R12KT4P_B11:\(thermal:\(model:3,Tc:50\),advanced:\(Rgon_1:15,Rgoff_1:15\)\),FS100R12W2T7_B11:\(thermal:\(model:3,Tc:50\),advanced:\(Rgon_1:1.8,Rgoff_1:1.8\)\)\),diode:\(\),loadcycle:\(lcp:none,interpolation:True,cycle_defined:True,cycle_count:1,sim_bvr:1\),package:All,search:none,isOld:0,appdatatab:tab-advanced,mode:normal](https://iposim.infineon.com/application/en/download?topology:DC-AC_3P_2L,inputs:(mod_scheme:1,Vdc:650,Vblock:1200,Irms:50,fout:50,fsw:2000,t_pulse:180,modi:1,cos_phi:0.8,cos_phi_sign:2,load_cycle:False),devices:(FP50R12KT4P_B11:(thermal:(model:3,Tc:50),advanced:(Rgon_1:15,Rgoff_1:15)),FS100R12W2T7_B11:(thermal:(model:3,Tc:50),advanced:(Rgon_1:1.8,Rgoff_1:1.8))),diode:(),loadcycle:(lcp:none,interpolation:True,cycle_defined:True,cycle_count:1,sim_bvr:1),package:All,search:none,isOld:0,appdatatab:tab-advanced,mode:normal)

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



- › Constant inputs: $V_{DC} = 650 \text{ V}$, $f_{sw} = 2 \text{ kHz}$, Modulation Index = 1
- › Load Profile with 3 cycles repeated



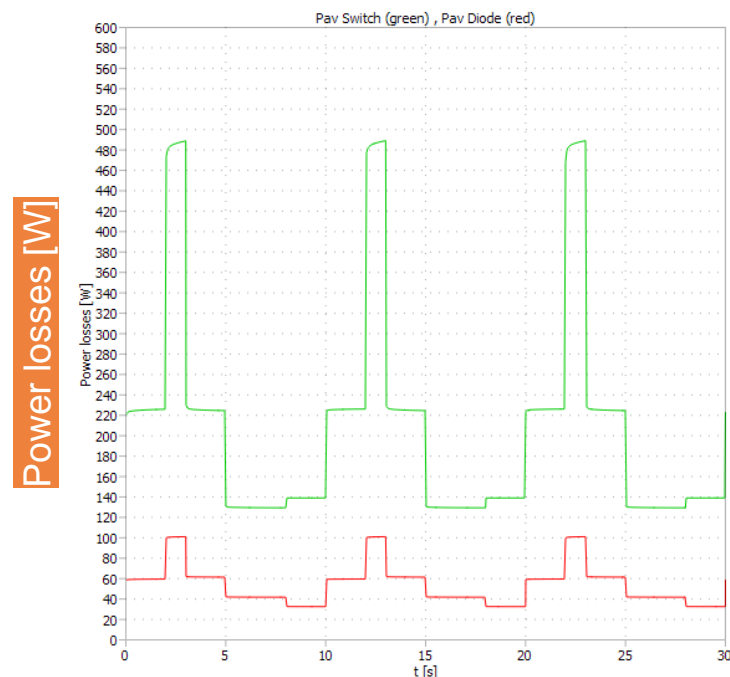
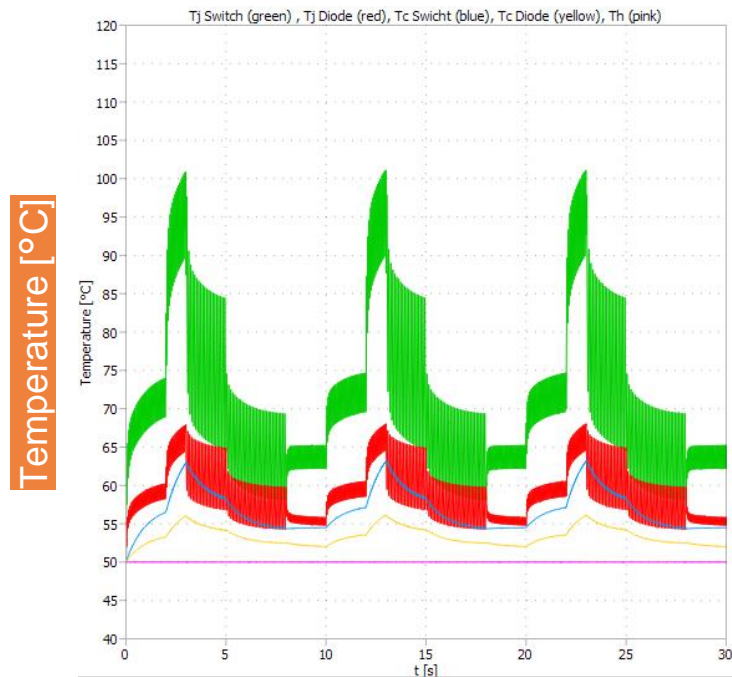
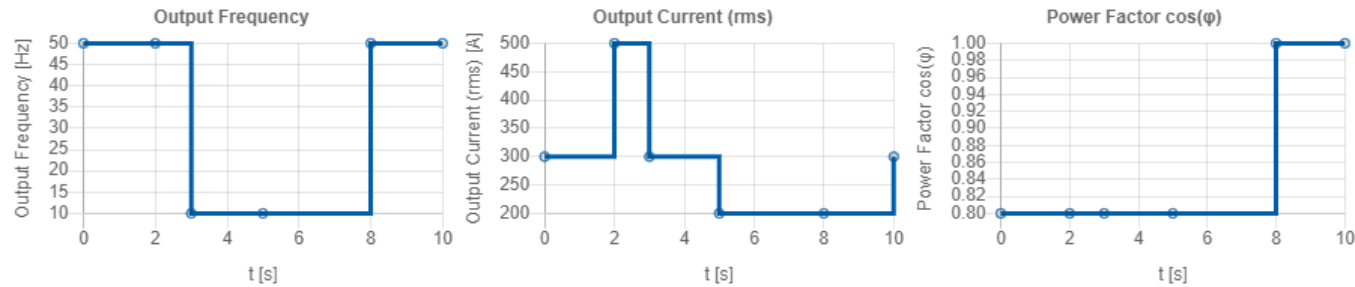
- › Deep-link to recall the simulation:

[https://iposim.infineon.com/application/en/results?topology:DC-AC_3P_2L,inputs:\(mod_scheme:1,Vdc:650,Vblock:1200,Irms:300,fout:50,fsw:2000,t_pulse:180,modi:1,cos_phi:0.8,cos_phi_sign:2,load_cycle:True\),devices:\(FF450R12ME4_B1_1:\(thermal:\(model:3,Tc:50\),advanced:\(Rgon_1:1.3,Rgoff_1:1.3\)\)\),diode:\(\),loadcycle:\(lcp:2020061526836,interpolation:False,cycle_defined:True,cycle_count:3,sim_bvr:1\),package:All,search:none,isOld:0,appdatatab:tab-loadcycle,mode:normal](https://iposim.infineon.com/application/en/results?topology:DC-AC_3P_2L,inputs:(mod_scheme:1,Vdc:650,Vblock:1200,Irms:300,fout:50,fsw:2000,t_pulse:180,modi:1,cos_phi:0.8,cos_phi_sign:2,load_cycle:True),devices:(FF450R12ME4_B1_1:(thermal:(model:3,Tc:50),advanced:(Rgon_1:1.3,Rgoff_1:1.3))),diode:(),loadcycle:(lcp:2020061526836,interpolation:False,cycle_defined:True,cycle_count:3,sim_bvr:1),package:All,search:none,isOld:0,appdatatab:tab-loadcycle,mode:normal)

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

› Results:



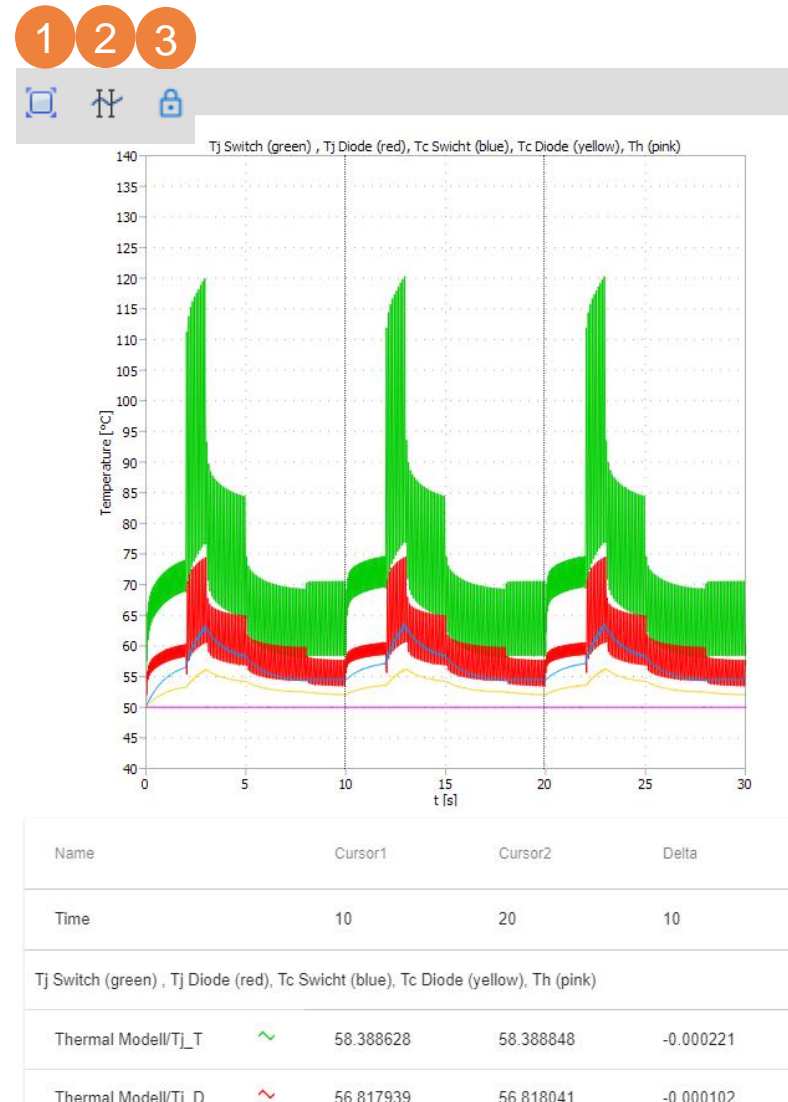
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Scope Functions: Cursors, Zoom-In/Out

1. Zoom-in by dragging with mouse

2. Click to switch on cursors to measure signals

3. Click lock to freeze the cursor distance for better measurement experience

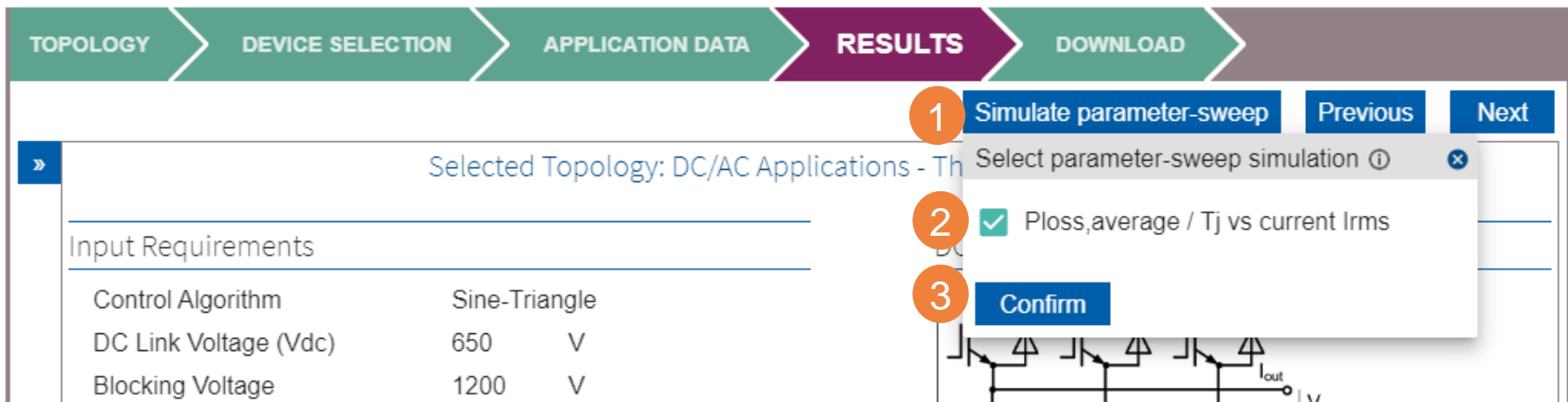


IPOSIM – Online Power Simulation Tool

Parameter Sweep: Ploss,average / Tj versus Irms

- › Find out the maximum allowed Irm current @ given condition
- › Start immediately after steady state simulation
- › Deep-link to recall the simulation:

[https://iposim.infineon.com/application/en/results?topology:DC-AC_3P_2L,inputs:\(mod_scheme:1,Vdc:650,Vblock:1200,Irms:50,fout:50,fsw:2000,t_pulse:180,modi:1,cos_phi:0.8,cos_phi_sign:2,load_cycle:False\),devices:\(FP50R12KT4P_B11:\(thermal:\(model:3,Tc:50\),advanced:\(Rgon_1:15,Rgoff_1:15\)\),FS100R12W2T7_B11:\(thermal:\(model:3,Tc:50\),advanced:\(Rgon_1:1.8,Rgoff_1:1.8\)\)\),diode:\(\),loadcycle:\(lcp:none,interpolation:True,cycle_defined:True,cycle_count:1,sim_bvr:1\),package:All,search:none,isOld:0,appdata:tab-advanced,mode:normal](https://iposim.infineon.com/application/en/results?topology:DC-AC_3P_2L,inputs:(mod_scheme:1,Vdc:650,Vblock:1200,Irms:50,fout:50,fsw:2000,t_pulse:180,modi:1,cos_phi:0.8,cos_phi_sign:2,load_cycle:False),devices:(FP50R12KT4P_B11:(thermal:(model:3,Tc:50),advanced:(Rgon_1:15,Rgoff_1:15)),FS100R12W2T7_B11:(thermal:(model:3,Tc:50),advanced:(Rgon_1:1.8,Rgoff_1:1.8))),diode:(),loadcycle:(lcp:none,interpolation:True,cycle_defined:True,cycle_count:1,sim_bvr:1),package:All,search:none,isOld:0,appdata:tab-advanced,mode:normal)



The screenshot shows the IPOSIM web interface with the 'RESULTS' tab selected. A modal dialog titled 'Select parameter-sweep simulation' is open, showing a list of simulation results. The first result, 'Ploss,average / Tj vs current Irms', is selected with a green checkmark. The dialog has buttons for 'Simulate parameter-sweep', 'Previous', 'Next', and 'Confirm'. The background interface shows the 'TOPOLOGY' tab with a table of input requirements.

Input Requirements	
Control Algorithm	Sine-Triangle
DC Link Voltage (Vdc)	650 V
Blocking Voltage	1200 V

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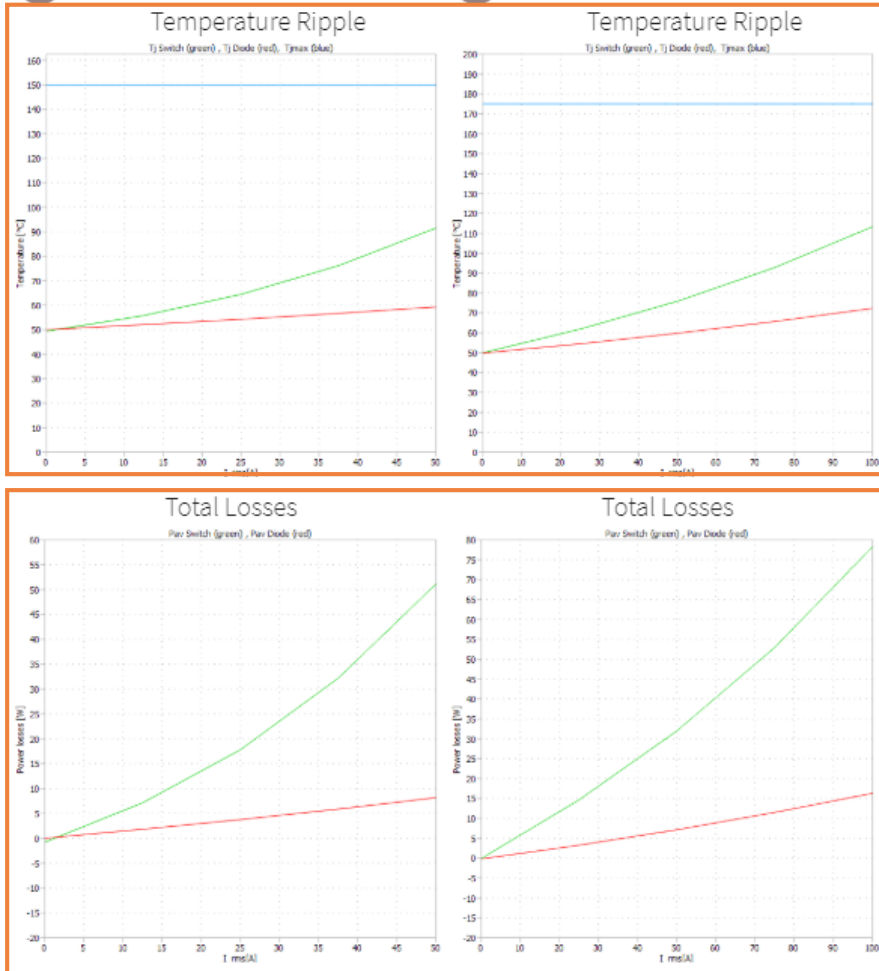
Parameter Sweep: Ploss,average / Tj versus Irms

Results

Parameter-sweep simulation

FP50R12KT4P_B11

FS100R12W2T7_B11



1

Tj versus Irms
@given
condition

2

Average power
losses versus
Irms @ given
condition

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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

More features offline

- › Upgrade to industry leading PLECS engine, available at our partner's website: www.plexim.com

Support

› www.infineon.com/support

Support Page

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

Live Chat Online
在线支持



› Start chat session with our support team

Technical Assistance Center
技术支持中心 (TAC)



› Get product support from our technical experts

Call us Toll Free
免费热线联系我们



› Call us toll-free 24/7

Find an answer to your question

Please state your question (with at least 3 words)

FAQ

1. Radar chips [CN] [DE]
2. Technical Support [CN] [DE]
3. Chip Card and Security Distis [CN] [DE]
4. Product Counterfeit Step 1 [CN] [DE]
5. Supplier Service, Supplier Page, page registration [CN] [DE]
6. Green Products [CN] [DE]

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