



# IPOSIM

The Infineon Power Simulation program for loss and thermal calculation of Infineon Power Modules and Disk Devices

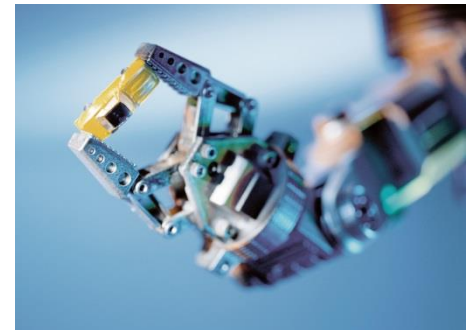
Step by Step Guide (April 2015)

[www.infineon.com/Infineon-IPOSIM](http://www.infineon.com/Infineon-IPOSIM)



# What is the benefit of IPOSIM?

- IPOSIM is an easy to use yet sophisticated online simulation tool for loss and thermal calculation of Infineon Power Modules and Disk Devices. Just copy-paste the following link to your browser (Internet Explorer, Chrome, Firefox, etc.) and get started:  
[www.infineon.com/Infineon-IPOSIM](http://www.infineon.com/Infineon-IPOSIM)
- IPOSIM helps you to select the right Infineon bipolar modules or disk devices for your rectifier (B2, B6, M3.2 and M6) or AC switch (W1C and W3C) applications as well as suited IGBT modules for your inverter (single & three phase in 2-Level as well as 3-Level) or DC converter (buck and boost) applications.
- IPOSIM performs a calculation of switching and conduction losses for all components, taking into account conduction and switching characteristics as well as thermal ratings. Where applicable, different control algorithms can be applied.
- Thermal conditions can be adapted by user defined or predefined heat sinks. Beside single operation points complete load cycles may be calculated. Results will be shown in tabular and graphic representation and can be saved for later revision or printed as .pdf file



# Registration: Welcome to IPOSIM

1. Start the application with: [www.infineon.com/Infineon-IPOSIM](http://www.infineon.com/Infineon-IPOSIM)
2. If not yet done, please registrate in order we can inform you when the simulation is finished



## Login



Forgot password?

Login

## Register for Free










☐ General Opt-In \*

I agree that my personal data maintained above can be gathered, processed and used for sales promotion as market research by Infineon Technologies AG and its licensed distribution partners.

☐ Privacy Policy \*

I have read the privacy policy and agree with it.

☐ I agree to terms of use \*

Register

# Home: Getting Started

1. Click on the home screen button to open this Step-by-Step Guide or to learn more about the tool



2. Start the tool

- Select the right Infineon bipolar modules or disk devices for your rectifier or AC switch applications
- Simulate IGBT modules for your inverter/ DC converter applications
- Calculate switching and conduction losses for all components, counting in conduction/switching losses and thermal ratings
- Results are shown in tabular and graphic presentation and can be saved for later revision or printed as .pdf file

Feedback

3. [Please Feed-back if you need help](#)

**SCREENSHOTS**

**STEP-BY-STEP GUIDE**

Step-by-Step Guide

Short introduction how to use the online design tool

**IPOSIM OFFLINE EXCEL VERSION**

IPOSIM offline Excel version

Stacks Selection and Calculation using Web-based IPOSIM Tool

**Supported Parts**

<b>IGBT Modules:</b>	up to 600V / 650V	up to 1200V	up to 1600V / 1700V	up to 3300V	up to 4500V / 6500V
<b>Bipolar Modules and Discs:</b>	Bridge Rectifier / AC-Switches	Thyristor / Diode Modules	Thyristor / Diode Discs		

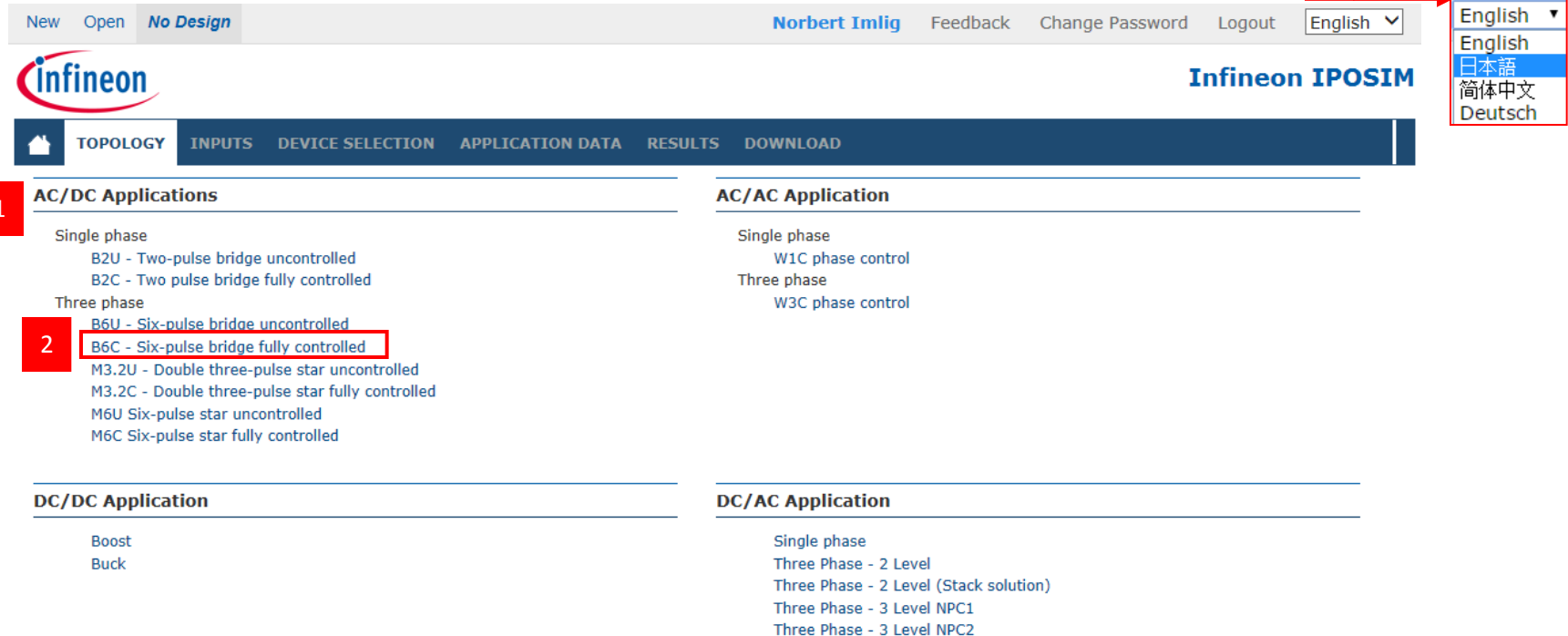
APPLICATION STATUS: OK

WebSIM® technology - sophisticated online design and support solutions for semiconductor and other products. For more information please visit [www.transim.com](http://www.transim.com)  
Version: 6.0.0-Beta.104284

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# Topology: select your Application

1. first step, please select your application & topology
2. In our example click on "B6C Six-pulse bridge fully controlled"
3. If not already done select your preferred language



The screenshot shows the Infineon IPOSIM web application interface. At the top, there is a navigation bar with links for 'New', 'Open', 'No Design', 'Norbert Imlig', 'Feedback', 'Change Password', 'Logout', and a language dropdown menu. The language dropdown is open, showing options for 'English', '日本語', '简体中文', and 'Deutsch'. A red box highlights the 'English' option, and a red arrow points to it from a red box containing the number '3'.

Below the navigation bar, there is a main menu with tabs for 'TOPOLOGY', 'INPUTS', 'DEVICE SELECTION', 'APPLICATION DATA', 'RESULTS', and 'DOWNLOAD'. The 'TOPOLOGY' tab is selected.

Under the 'TOPOLOGY' tab, there are four sections for selecting applications:

- AC/DC Applications** (highlighted with a red box containing the number '1'):
  - 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** (highlighted with a red box containing the number '2')
    - 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
  - Buck
- AC/AC Application**:
  - Single phase
    - W1C phase control
  - Three phase
    - W3C phase control
- DC/AC Application**:
  - Single phase
  - Three Phase - 2 Level
  - Three Phase - 2 Level (Stack solution)
  - Three Phase - 3 Level NPC1
  - Three Phase - 3 Level NPC2

APPLICATION STATUS: Warning: Changing the topology will reset all inputs.

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Version: 6.0.0-Beta.104284

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**WebSIM**

# Input: define Circuit & Control Parameters

1. Now, please specify the application input & output parameters.
2. If you like, you can also specify a time depended load profile/cycle by checking the box.
3. Continue by clicking "Next".

New Open Save Share More **No Design**

Norbert Imlig

Feedback

Change Password

Logout

English ▼



Infineon IPOSIM

TOPOLOGY INPUTS DEVICE SELECTION APPLICATION DATA RESULTS DOWNLOAD

Next

Selected Topology: AC\_DC - B6C

## Circuit & Control Parameters

1

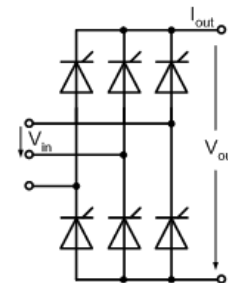
Topology	B6C - Six-pulse bridge fully controlled ▼	
Input Voltage	400	V
Blocking Voltage	1400 ▼	V
Line Frequency	50	Hz
Output Current (avg)	100	A
Output Current (rms)	100	A
Form Factor Of Device Current	1.732	

Do you want to define a load cycle? ☒

2

If checked, you will be required to enter values for load cycle.

## AC\_DC - B6C



3

Next

APPLICATION STATUS: OK

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Version: 6.0.0-Beta.104284

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# Device Selection: get the Right Parts

1. Now all available parts matching your criteria are displayed.
2. Switch to the "Recommended parts" tab to define additional environmental parameters, such as cooling method & ambient temperature.
3. You are given the option to select up to 5 devices in order to compare their individual performance. Additionally, you can access the respective datasheets with only one click.

New Open Save Share More · No Design
Norbert Imlig Feedback Change Password Logout English

Infineon IPOSIM

TOPOLOGY INPUTS **1** DEVICE SELECTION APPLICATION DATA RESULTS DOWNLOAD

Selected Topology: AC\_DC - B6C

All parts Recommended Parts **2**

Recommended Parts

Cooling Method Natural Air  
Cooling Condition Good  
Ambient Temperature 45 °C  
Show former used devices ☐

*Default settings are displayed – they can be changed to match your requirements*

DISPLAY 25 SOLUTIONS SEARCH:

Device Name	Package	ITSM[A] 10ms, Tvj,max	VT(TO) [V]	rT[mO]	RthJC[K/W] 180°el sin	Datasheet
<input checked="" type="checkbox"/> T300N	Disc Ø41mm	3400	0.90	0.00135	0.069	
<input checked="" type="checkbox"/> T390N	Disc Ø41mm	4250	0.85	0.00090	0.062	
<input checked="" type="checkbox"/> TT104N	Dual Module 20mm	1800	0.85	0.00215	0.185	
<input checked="" type="checkbox"/> TT142N	Dual Module 34mm	4100	0.90	0.00110	0.110	
<input type="checkbox"/> TT180N	Dual Module 34mm	4100	0.85	0.00090	0.100	

Showing 1 to 5 of 5 solutions

Previous Next

**4** Next

APPLICATION STATUS: OK

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Version: 6.0.0-Beta.104284

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# Application Data 1/2: set Thermal Requirements

1. First select the tab Thermal Requirements
2. Click on [Help \(?\)](#) for displaying possible combinations of Disc Devices and Heat sinks (details on next page)
3. Now you can define the heat sink by selecting a standard or user defined heat sink type.

New Open Save Share More **No Design** Norbert Imlig Feedback Change Password Logout English

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

Selected Topology: AC\_DC - B6C

1 Thermal Requirements Load Cycle

Need help defining heatsinks? ? 2

1. Heatsink model

**T300N**

3

☐ Predefined Heatsink  
☒ User Defined Heatsink  
☐ Fixed Heatsink Temperature

2. Heatsink parameter

$T_{amb}$  90 °C

$\tau$ [s]	$R_{th,hs}$ [K/W]
0.021	0.0002
1.59	0.063
15.477	0.0298
930	0.527
0	0

When selecting a User Defined Heat sink, please enter the values according to the following model:

**T390N**

☒ Predefined Heatsink  
☐ User Defined Heatsink  
☐ Fixed Heatsink Temperature

Cooling Method Natural Air  
 Heatsink K0,12F 150 W  
 $T_{amb}$  45 °C

**TT104N**

☐ Predefined Heatsink  
☐ User Defined Heatsink  
☒ Fixed Heatsink Temperature

$T_{heatsink}$  60 °C



# Application Data 2/2: Help for Heat Sink

1. As our main example is based on a selection of bipolar products, let's have a little side-track to show you this step with a selection of IGBTs.
2. Click on [Help \(?\)](#) for displaying possible combinations of Disc Devices and Heat sinks (details on next page)

Need help defining heatsinks? (?)

2

1. Heatsink model

**T300N**

☐ Predefined Heatsink  
☒ User Defined Heatsink  
☐ Fixed Heatsink Temperature

2. Heatsink parameter

$T_{amb}$   °C

$\tau$ [s]	$R_{th,hs}$ [K/W]
<input type="text" value="0.021"/>	<input type="text" value="0.0002"/>
<input type="text" value="1.59"/>	<input type="text" value="0.063"/>
<input type="text" value="15.477"/>	<input type="text" value="0.0298"/>

## Help Defining Heat sink Values

When entering data for a heat sink, please consider the following: Available heat sink values may be characterized based on the base plate size of the selected module - regardless of the implemented circuit configuration within the module itself (e.g. "FF..." --> two IGBT/Diode switches, "FS..." --> six IGBT/Diode switches).

Since IPOSIM will do the loss and temperature calculation per single IGBT and Free-Wheeling Diode, the entered  $R_{th,hs}$  values shall be given per single IGBT/Diode switch. Therefore available heat sink values have to be adapted to the circuit configuration of the selected module by a correction factor according to the following table:

Configuration	Correction Factor
FZ (single switch)	1
DZ (single diode)	1
FF (half bridge)	2
DD (dual diode)	2
FT (Tripack)	3
F4 (4-pack)	4
FD, DF (chopper)	2
FS (Sixpack)	6
FB, FP (PIM)	7

I.e. multiply the heat sink  $R_{th,hs}$  values by x1 for a single switch module, x2 for half bridge modules, ...). Time constants ( $\tau$  values) don't need to be changed.

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TOPOLOGY INPUTS DEVICE SELECTION APPLICATION DATA RESULTS DOWNLOAD

Selected Topology: AS\_DC - B6C

Thermal Requirements Load Cycle 1

Load Cycle Inputs

Form Factor 1.732

Interpolation ☐

User Defined Number of Load Cycles ☒ 2  
(A steady state simulation will be run if no number of load cycles is given.)

Load Cycle

Define here your Load Cycle

ts [s]	Iout,rms [A]	
0	100	
90	25	-
180	50	-
270	50	-
0	0	+

Excel handling

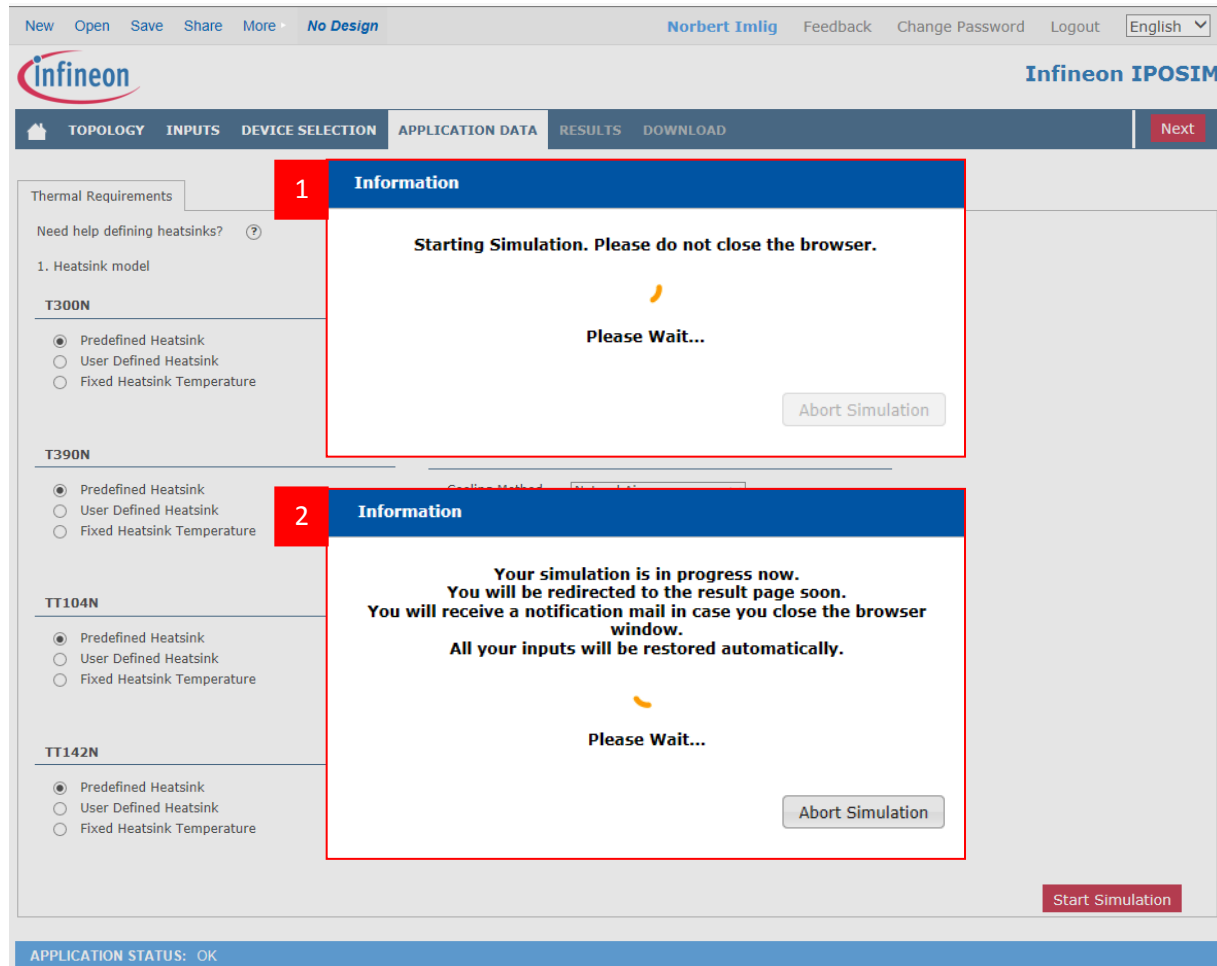
Get Load Cycle as excel file  
To upload a load cycle please select excel file first!

Please select a file!

Download Upload

# Start the Simulation

1. If a simulation runs fast you can wait for the results
2. However, if it takes a bit longer, we will notify you by your email you registered



New Open Save Share More **No Design** Norbert Imlig Feedback Change Password Logout English

**Infineon IPOSIM**

TOPOLOGY INPUTS DEVICE SELECTION APPLICATION DATA RESULTS DOWNLOAD Next

Thermal Requirements

Need help defining heatsinks? ?

1. Heatsink model

**T300N**

- ☒ Predefined Heatsink
- ☐ User Defined Heatsink
- ☐ Fixed Heatsink Temperature

**T390N**

- ☒ Predefined Heatsink
- ☐ User Defined Heatsink
- ☐ Fixed Heatsink Temperature

**TT104N**

- ☒ Predefined Heatsink
- ☐ User Defined Heatsink
- ☐ Fixed Heatsink Temperature

**TT142N**

- ☒ Predefined Heatsink
- ☐ User Defined Heatsink
- ☐ Fixed Heatsink Temperature

**1 Information**

Starting Simulation. Please do not close the browser.

Please Wait...

Abort Simulation

**2 Information**

Your simulation is in progress now.  
You will be redirected to the result page soon.  
You will receive a notification mail in case you close the browser window.  
All your inputs will be restored automatically.

Please Wait...

Abort Simulation

Start Simulation

APPLICATION STATUS: OK

# Results: Is your configuration OK?

1. ✗ means that your configuration is not OK, please re-design your application and test again
2. ✓ mark shows you that the junction temperature is within the range
3. If you defined a load cycle a graph with the temperature and losses is shown

[New](#) [Open](#) [Save](#) [Share](#) [More](#) No Design

[Norbert Imlig](#) [Feedback](#) [Change Password](#) [Logout](#) English ▼

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[HOME](#) [TOPOLOGY](#) [INPUTS](#) [DEVICE SELECTION](#) [APPLICATION DATA](#) [RESULTS](#) [DOWNLOAD](#)
Next

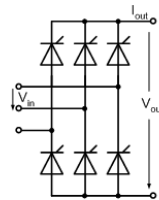
Selected Topology: AC\_DC - B6C

## Input Requirements

[Change Inputs & Re-run Analysis](#)

AC\_DC - B6C

Input Voltage	400	V
Blocking Voltage	1400	V
Input Frequency	50	Hz
Average Output Current	100	A
RMS Output Current	100	A
Form Factor	1.732	
Average Input Current per Arm	33.3333	A
RMS Input Current per Arm	57.735	A
RMS Input Current per Phase	81.6497	A



## Modules

### Heatsink Parameters

T300N		
T <sub>amb</sub>	90	°C
User Defined Heatsink		
R <sub>th</sub>	2.944	K/W

### Heatsink Parameters

T390N		
T <sub>amb</sub>	45	°C
Predefined Heatsink		
K0,365		
Cooling Method	natural	
R <sub>th</sub>	0.411	K/W

### Heatsink Parameters

TT104N		
T <sub>amb</sub>	45	°C
Predefined Heatsink		
KM14 1 module		
Cooling Method	natural	
R <sub>th</sub>	1.21	K/W

### Heatsink Parameters

TT142N		
T <sub>amb</sub>	45	°C
Predefined Heatsink		
KM14 1 module		
Cooling Method	natural	
R <sub>th</sub>	1.06	K/W

## Simulation Results

1

Junction Temperature		
Calculated	194 °C	✗
Maximum	125 °C	
P <sub>arm</sub>	34.50 W	
P <sub>tot</sub>	207 W	
T <sub>heatsink</sub>	191.57 °C	

## Simulation Results

2

Junction Temperature		
Calculated	60.37 °C	✓
Maximum	125 °C	
P <sub>arm</sub>	31.33 W	
P <sub>tot</sub>	188 W	
T <sub>heatsink</sub>	57.89 °C	

## Simulation Results

Junction Temperature		
Calculated	103 °C	✓
Maximum	140 °C	
P <sub>arm</sub>	35.50 W	
P <sub>tot</sub>	213 W	
T <sub>heatsink</sub>	88.07 °C	

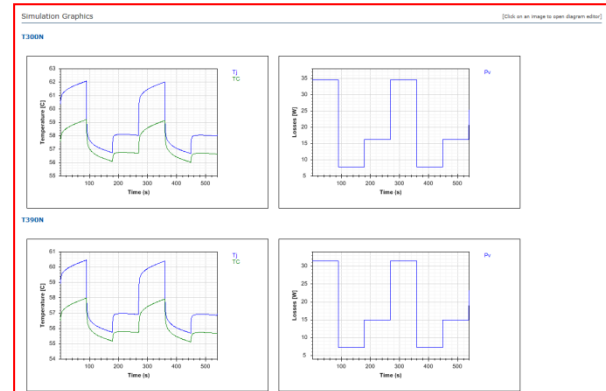
## Simulation Results

Junction Temperature		
Calculated	88.67 °C	✓
Maximum	125 °C	
P <sub>arm</sub>	33.67 W	
P <sub>tot</sub>	202 W	
T <sub>heatsink</sub>	80.62 °C	

- ✓ Calculated junction Temperature is within range.
- ✗ Calculated junction Temperature is greater than maximum junction temperature.

3

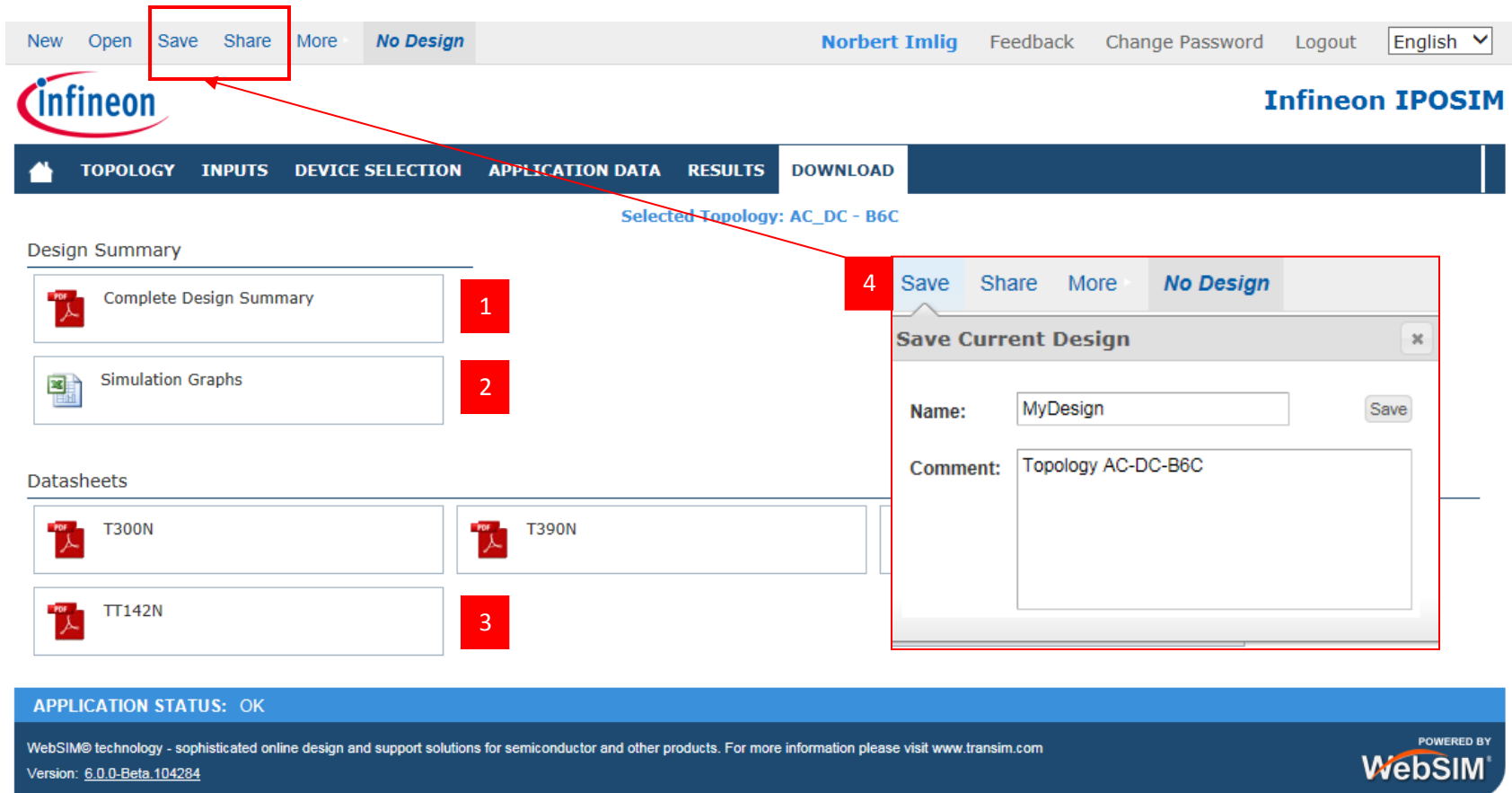
## Simulation Graphs showing Temperature & Losses



SIMULATION BY  
**Portunus**

# Download: get the results saved

1. Here, you can download a Complete Design Summary
2. And the Simulation Graphs in Excel format
3. Also the datasheet of your configuration is available
4. You can save your design and share it with your peers



The screenshot displays the Infineon IPOSIM web application interface. At the top, a navigation bar includes links for 'New', 'Open', 'Save', 'Share', 'More', and 'No Design'. The 'Save' and 'Share' buttons are highlighted with a red box. Below this, the 'Infineon IPOSIM' logo is visible. The main navigation menu includes 'TOPOLOGY', 'INPUTS', 'DEVICE SELECTION', 'APPLICATION DATA', 'RESULTS', and 'DOWNLOAD'. The 'DOWNLOAD' tab is selected, showing a 'Design Summary' section with links to 'Complete Design Summary' (1), 'Simulation Graphs' (2), and 'Datasheets' (3). A 'Save Current Design' dialog box is open, showing a 'Name' field with 'MyDesign' and a 'Comment' field with 'Topology AC-DC-B6C'. The dialog box is also highlighted with a red box. The bottom of the page shows the 'APPLICATION STATUS: OK' and the Infineon logo.

# Thank you for using IPOSIM!



Feedback

[We are looking forward to your Feedback!](#)

## Other Resources

1. [Solution Finder](#)
2. [Stack and Assembly](#)
3. [Evaluation Boards](#)

### Product Finders

IGBT Discretes
 Voltage Regulators

IGBT Modules
 Smart Switches

MOSFETs
 ESD Protection

Bipolar Transistors
 Microcontrollers (MCU)

Diodes (Rectifiers)
 Transceivers

All Products (List)
 All Products (PDF)

Infineon Solution Finder
IGBT Module Finder

Cross reference search
Help

**Parameter Selection**

Voltage Class: Select  $V_{CES} / V_{RRM}$  [V]
Configuration: Select Configuration
Rated Current: [ ] - [ ] [A]

**Feature Selection**

Select Features
Select Technology
Select Application

**Qualification**

☐ Automotive ☐ Industrial
☐ Traction ☐ Any
Select Housing
Select Product Status

Stacks & Assemblies  
[Datasheets & more](#)

Evaluation Boards  
[Appnotes & more](#)

Gate Driver EiceDRIVER™  
[Datasheets & more](#)

Reset
Total Results: 566

Only 50 out of 566 results shown [show all](#)
[Download Spreadsheet](#)
[Show all Parameters](#)

Product	Product Status	Green	$V_{CES} / V_{RRM}$	Configuration	$I_{C(nom)} / f_{(nom)}$	Technology	Housing
FD600R06ME3_B11_S2	in production		600.0 V	Chopper	600.0 A	IGBT3 - E3	EconoDUAL™ 3
FD600R06ME3_S2	in production		600.0 V	Chopper	600.0 A	IGBT3 - E3	EconoDUAL™ 3
FF600R06ME3	in production		600.0 V	Dual	600.0 A	IGBT3 - E3	EconoDUAL™ 3
FF400R06KE3	in production		600.0 V	Dual	400.0 A	IGBT3 - E3	62 mm
FF450R06ME3	in production		600.0 V	Dual	400.0 A	IGBT3 - E3	EconoDUAL™ 3
FD300R06KE3	in production		600.0 V	Chopper	300.0 A	IGBT3 - E3	62 mm



# ENERGY EFFICIENCY MOBILITY SECURITY

Innovative semiconductor solutions for energy efficiency, mobility and security.

