



life.augmented



# STPOWER Studio Overview

# Introduction



**A powerful simulation software helps developers select the most suitable device to fit complex and extensive application mission profiles**

**Provides comprehensive power and thermal analysis that eliminates long, complex, and expensive application testing**

**Returns accurate estimations of power loss and junction and case temperatures, along with data on nontestable parameters and support for heatsink sizing**

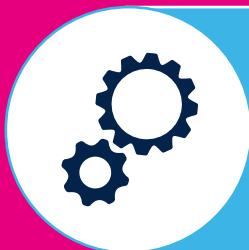
**Now integrated in the eDesignSuite platform and ready to deliver extensive analyses with a single click**

## Dynamic electro-thermal simulation software dedicated to STPOWER devices, now online on eDesignSuite



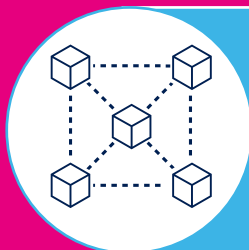
### Features:

- Available online on ST eDesignSuite platform
- Supports SLLIMM & ACEPACK families
- Enables DC/AC 3-phase 2-level applications
- Desktop and mobile version



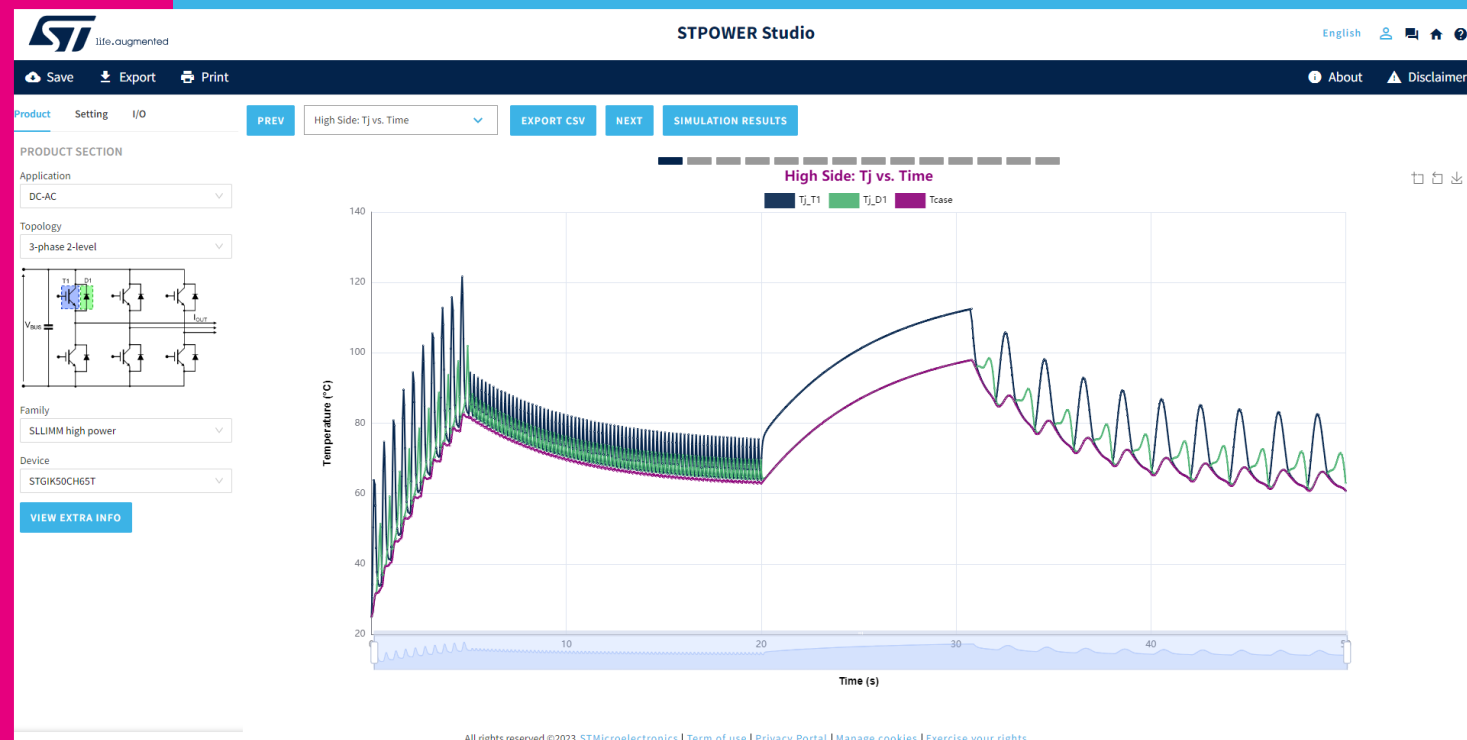
### Comprehensive analysis:

- Multistep mission profile
- Several thermal setup options
- Deep analysis of junction temperatures and power loss
- Very fast computational calculation



### High versatility:

- Multilingual interface (English, Chinese, Japanese)
- Link with product folder and datasheet
- Project save and export options
- Output report generation



## Output storage & print

## Input data setting

### Product section:

- Application
- Topology
- Family
- Device

### Thermal section:

- Without heatsink
- Fixed T case
- Fixed heatsink Rth
- Fixed heatsink Zth

### Mission profile section:

- Multistep input
- PWM modulations
- Input conditions



Multilanguage

Documentation minisite

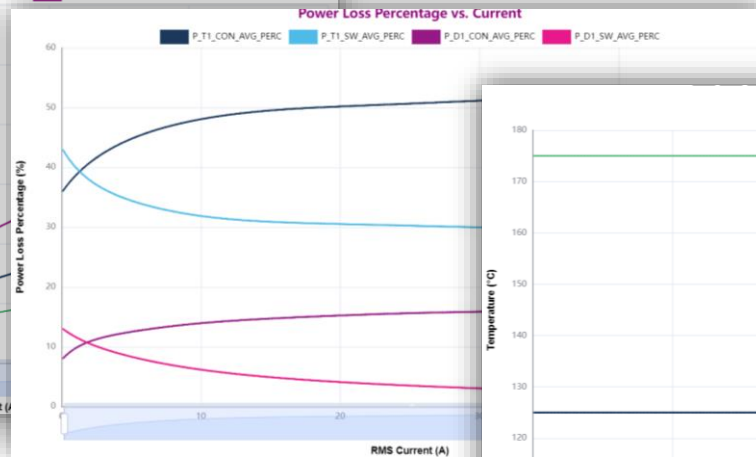
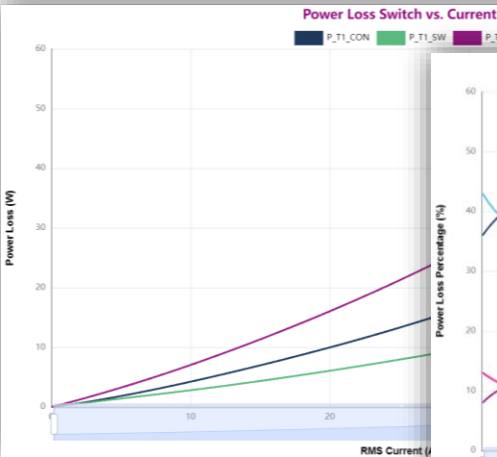
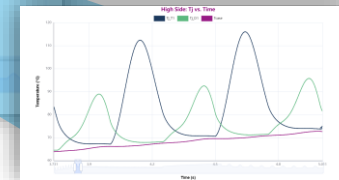
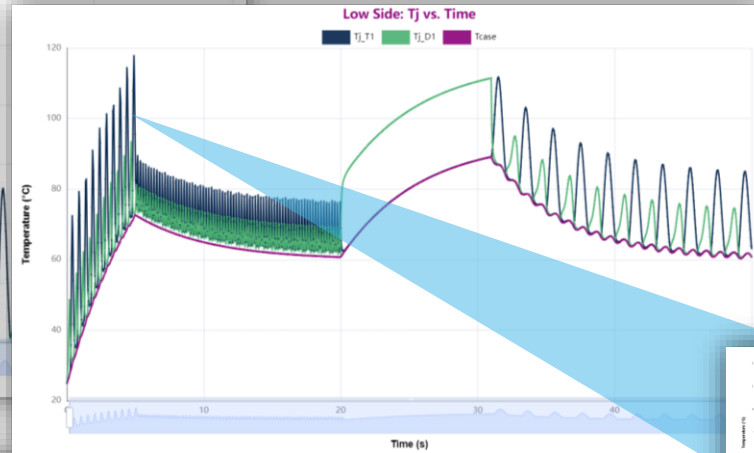
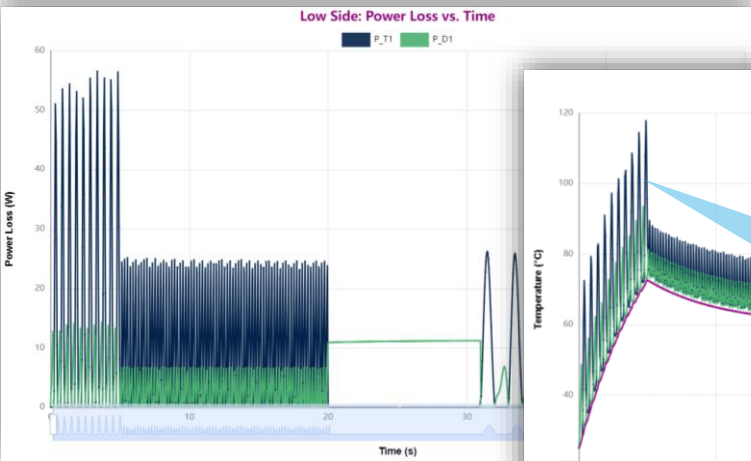
Graph selection & results

### Output graphs:

- Tj, Tcase vs time
- Power loss vs time
- Power loss vs current
- Power loss vs frequency
- Temperature vs current
- Temperature vs frequency

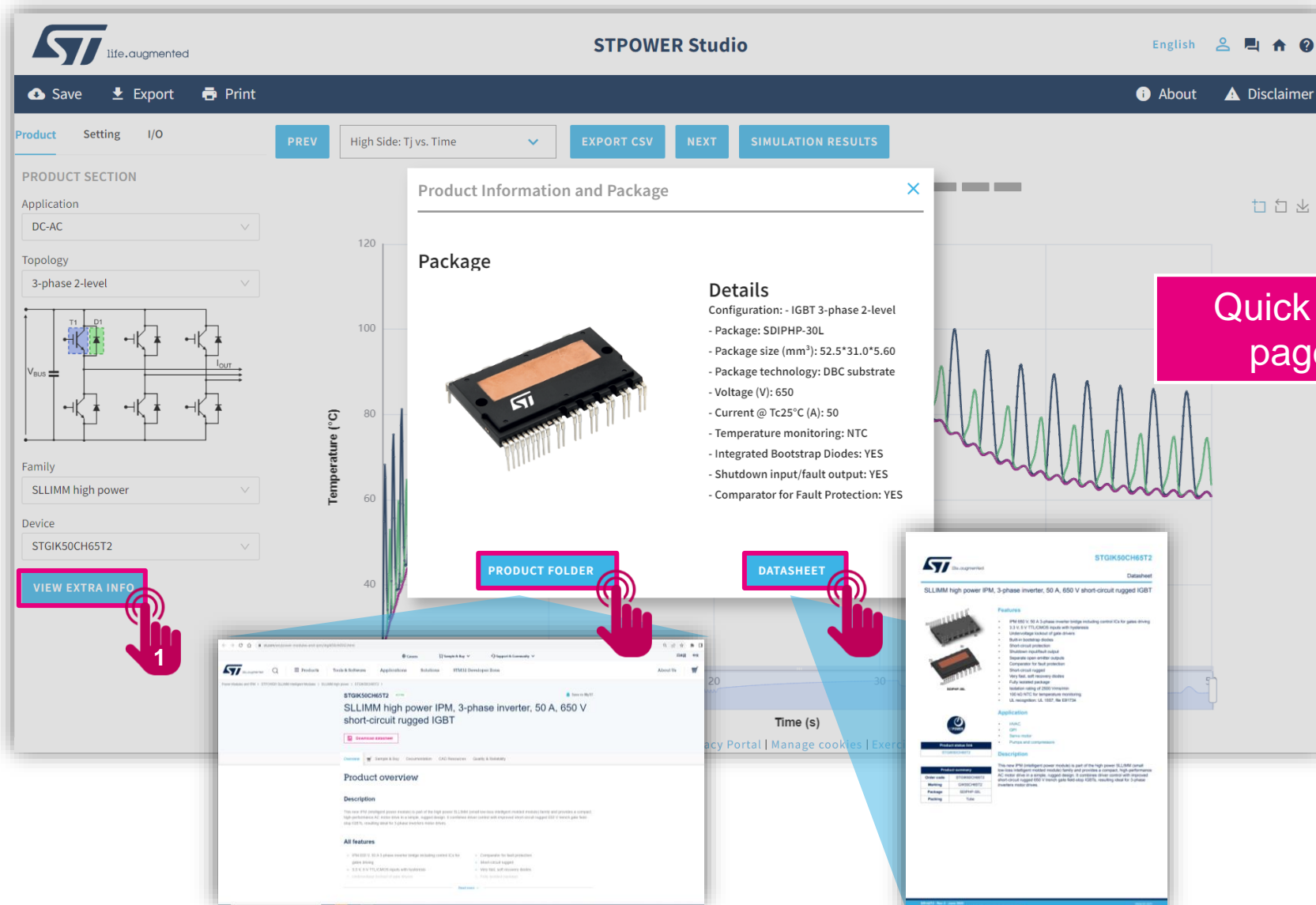
Zoomable graphs for temperatures and power loss, as function of time, frequency and current

Detailed table with power loss splitting, temperatures, and heatsink data



Simulation Results		
	T	D
Conduction Loss (avg)	328.07 mW	94.84 mW
Switching EON/Err Loss (avg)	381.95 mW	405.51 mW
Switching EOFF Loss (avg)	445.61 mW	-
Total Loss (avg)	1.16 W	500.35 mW
T+D Total Loss (avg) (W)	1.66 W	-
Junction temp (max)	91.87 °C	91.62 °C
Junction temp (avg)	91.09 °C	90.93 °C
Additional information		
Parameter	STEP_0	
System Total Loss (avg) (W)	9.94 W	
Case Temperature (max) (°C)	90 °C	
Heatsink Rth (°C/W)	4.03 °C/W	

Exportable output data in cvs format



The screenshot displays the STPOWER Studio web application. The top navigation bar includes 'Save', 'Export', and 'Print' buttons. The main interface is divided into a left sidebar for configuration and a central area for simulation results.

**Configuration Sidebar:**

- Product Section:** Application (DC-AC), Topology (3-phase 2-level), Family (SLLIMM high power), Device (STGIK50CH65T2).
- Buttons:** 'VIEW EXTRA INFO' (highlighted with a red box and hand icon), 'PREV', 'EXPORT CSV', 'NEXT', and 'SIMULATION RESULTS'.

**Simulation Results:** A graph showing Temperature (°C) vs. Time (s). The temperature peaks at approximately 120°C. A red box labeled 'PRODUCT FOLDER' with a hand icon points to the 'PRODUCT INFORMATION AND PACKAGE' pop-up window.

**Product Information and Package Pop-up:**

- Package:** SDIPHP-30L
- Details:**
  - Configuration: - IGBT 3-phase 2-level
  - Package: SDIPHP-30L
  - Package size (mm<sup>3</sup>): 52.5\*31.0\*5.60
  - Package technology: DBC substrate
  - Voltage (V): 650
  - Current @ Tc25°C (A): 50
  - Temperature monitoring: NTC
  - Integrated Bootstrap Diodes: YES
  - Shutdown input/fault output: YES
  - Comparator for Fault Protection: YES


A red box labeled 'DATASHEET' with a hand icon points to the 'STGIK50CH65T2' datasheet window.

**STGIK50CH65T2 Datasheet:**





- Product overview:** SLLIMM high power IPM, 3-phase inverter, 50 A, 650 V short-circuit rugged IGBT.
- Description:** This new IPM (intelligent power module) is part of the high power SLLIMM series, designed for high power applications.
- Features:**
  - IPM 650 V / 50 A 3-phase inverter bridge including control ICs for gate driving
  - 3.3 V x 3 V TTL/CMOS inputs with hysteresis
  - Undervoltage lockout of gate drivers
  - Built-in bootstrap diodes
  - Short-circuit protection
  - Shutdown input/fault output
  - Separate user enable/disable
  - Comparator for fault protection
  - Short-circuit rugged
  - Very fast soft recovery diodes
  - Fully mounted package
  - Isolation using all SiC components
  - 100 mV NTC for temperature monitoring
  - UL recognition, UL 1007, RoHS compliant




Quick link to the product page and datasheet


# Printable output report


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STPOWER Studio

English    

 Save
  Export
  **Print**

About  Disclaimer

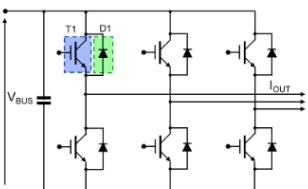
Product
 Setting
I/O

Low Side: Tj vs. Time
 EXPORT CSV
NEXT
SIMULATION RESULTS

PRODUCT SECTION

Application  
 DC-AC


Topology  
 3-phase 2-level




Family  
 SLLIMM high power

Device  
 STGIK50CH65T2

VIEW EXTRA INFO


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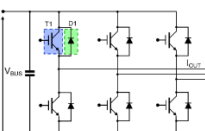
STPOWER Studio


Home 


Dynamic Electro-Thermal Simulation

Application: DC-AC  
 Topology: 3-phase 2-level  
 Family: SLLIMM high power

Device: STGIK50CH65T2







QRCode link on ST product page

Heatsink Type: Fixed T Case

**Product Information:**  
 Configuration: - IGBT 3-phase 2-level  
 - Package: SDIHP-30L  
 - Package size (mm<sup>3</sup>): 52.5\*31.0\*5.60  
 - Package technology: DBC substrate  
 - Voltage (V): 650  
 - Current @ Tc25°C (A): 50  
 - Temperature monitoring: NTC  
 - Integrated Bootstrap Diodes: YES  
 - Shutdown input/fault output: YES  
 - Comparator for Fault Protection: YES

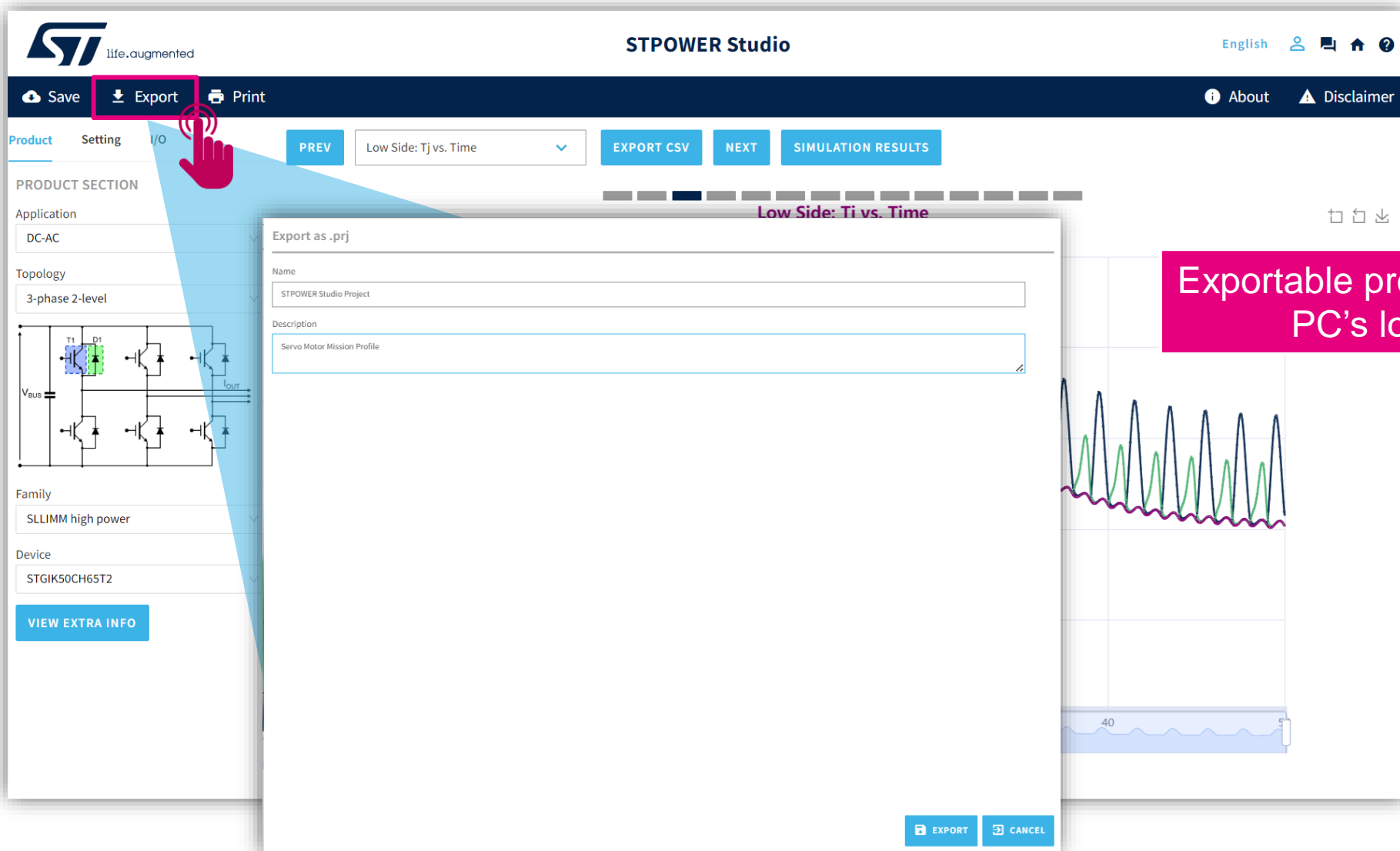
**Easy to save and print the output report**

Input Data

Simulation Parameter	STEP_0	STEP_1	STEP_2	STEP_3
PWM Modulation	Sine Triangle PWM	Sine Triangle PWM	Rotor Stall	Sine Triangle PWM
Steady State	false	false	false	false
Simulation Time	5 s	15 s	11 s	19 s



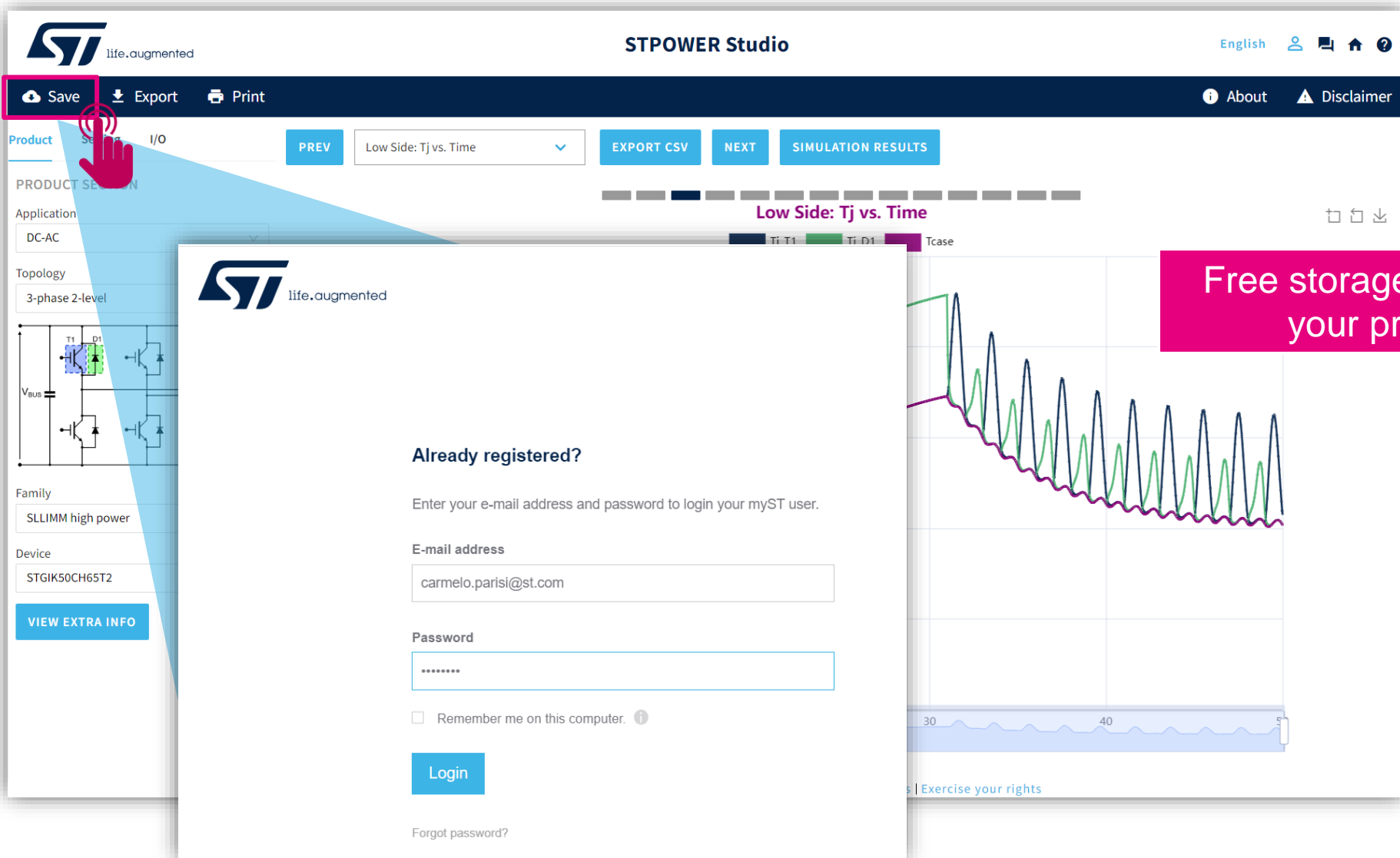
# Exportable project



The screenshot displays the STPOWER Studio web application interface. The top navigation bar includes the ST logo, the text "life.augmented", the application name "STPOWER Studio", and user controls for language (English), profile, chat, home, and help. Below this, a secondary bar contains "Save", "Export" (highlighted with a red box and a hand icon), and "Print" buttons. The main content area is divided into a left sidebar and a central workspace. The sidebar, titled "PRODUCT SECTION", contains fields for "Application" (DC-AC), "Topology" (3-phase 2-level), a circuit diagram, "Family" (SLLIMM high power), and "Device" (STGIK50CH65T2), along with a "VIEW EXTRA INFO" button. The central workspace shows a plot titled "Low Side: Tj vs. Time" with a blue bar chart and a red line graph. An "Export as .prj" dialog box is open in the foreground, featuring input fields for "Name" (STPOWER Studio Project) and "Description" (Servo Motor Mission Profile), and "EXPORT" and "CANCEL" buttons at the bottom.

Exportable project file in your PC's local area





The screenshot displays the STPOWER Studio web application. The top navigation bar includes the ST logo, the text "life.augmented", the application name "STPOWER Studio", and user interface elements like "English", a user profile icon, a home icon, a help icon, and links for "About" and "Disclaimer". A secondary bar contains "Save", "Export", and "Print" buttons. The main interface is divided into a left sidebar with configuration options (Product, Application: DC-AC, Topology: 3-phase 2-level, Family: SLLIMM high power, Device: STGIK50CH65T2, and a "VIEW EXTRA INFO" button) and a central workspace. The workspace shows a circuit diagram and a simulation graph titled "Low Side: Tj vs. Time". A modal window is overlaid on the workspace, asking if the user is "Already registered?". It contains a login form with fields for "E-mail address" (pre-filled with "carmelo.parisi@st.com") and "Password", a "Remember me on this computer" checkbox, a "Login" button, and a "Forgot password?" link. A pink callout box on the right side of the modal contains the text: "Free storage on myST for your project file".

STPOWER Studio

English

About Disclaimer

Save Export Print

PREV Low Side: Tj vs. Time EXPORT CSV NEXT SIMULATION RESULTS

PRODUCT SECTION

Application: DC-AC

Topology: 3-phase 2-level

Family: SLLIMM high power

Device: STGIK50CH65T2

VIEW EXTRA INFO

Low Side: Tj vs. Time

Tj T1 Tj D1 Tcase

Already registered?

Enter your e-mail address and password to login your myST user.

E-mail address: carmelo.parisi@st.com

Password: .....

☐ Remember me on this computer.

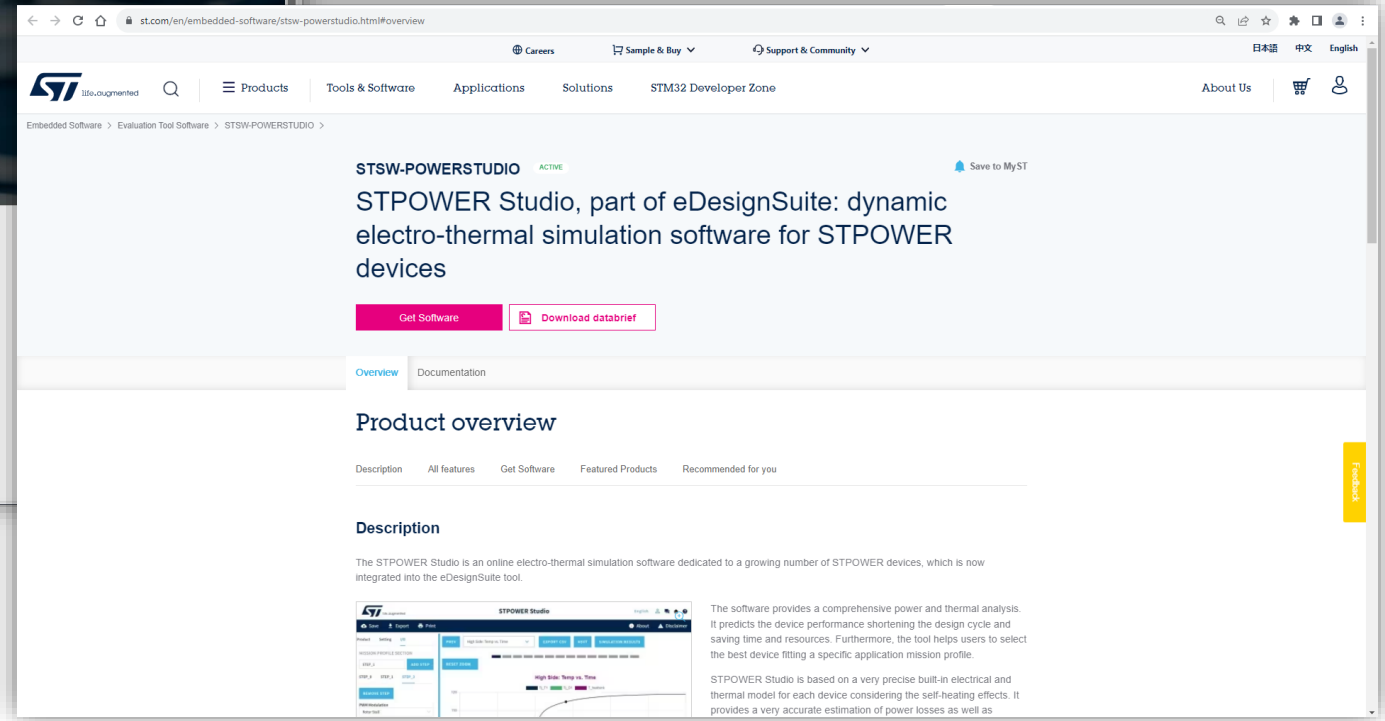
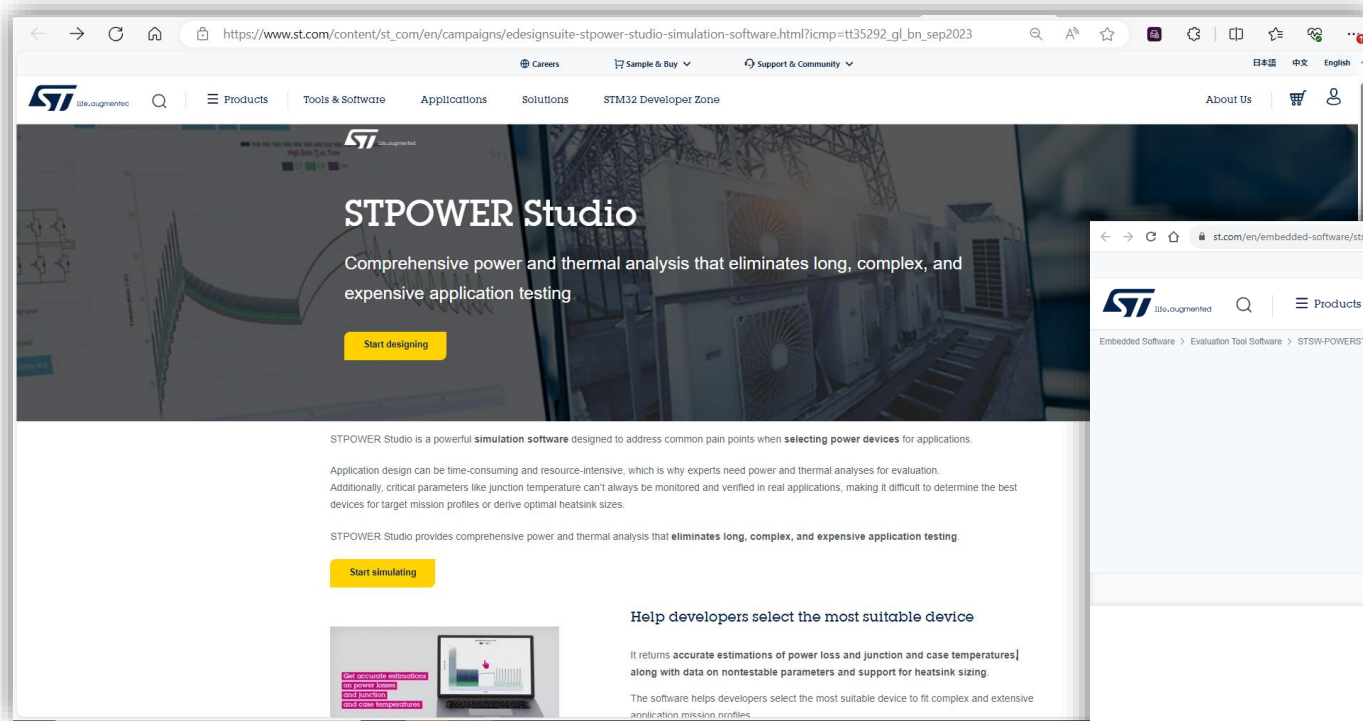
Login

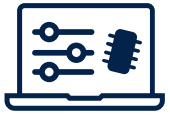
Forgot password?

Free storage on myST for your project file



# Dedicated web pages





# eDesignSuite

# Part of eDesignSuite

eds.st.com/console/#/home

ST life.augmented

eDesignSuite

English

Tools My Projects Help

Power Management Design Center

Thermal-electrical Simulators for Components

Signal Condition Design Tool

NFC/RFID Calculators

Choose design tool:

**AC Switches Simulator**

- ✓ Select ratings and application waveforms
- ✓ Get junction temperature and blocking voltage graphs
- ✓ Search and sort suitable devices

Start Design

**Rectifier Diodes Simulator**

- ✓ Select ratings and application waveforms
- ✓ Estimate power losses
- ✓ Search and sort suitable devices

Start Design

**STPOWER Studio**

- ✓ Supports long mission profiles
- ✓ Provides power loss and temperature graphs
- ✓ Helps define heatsink thermal properties

Start Design

**Twister Sim**

- ✓ Help select the right VIPOWER Automotive power device
- ✓ Supports load-compatibility, wiring harness optimization, fault condition impact and diagnostic analysis
- ✓ Supports various PCB configurations

Download App

**TVS Simulator**

eDesignSuite  
The smart design tool

eDesignSuite  
Release Note

2023.09.28

What's new

- Added a new digital solution based on the reference design STDES-DABBIDIR available on ST web site. The solution is named STM32G474RE Bidirectional Dual Active Bridge is part of the Digital Power Workbench section. It's a Dual Active Bridge DC/DC

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