

# (C-010-D) DC-DC Flyback Converter (Discrete)

## Simulation Parameters (Dialog)

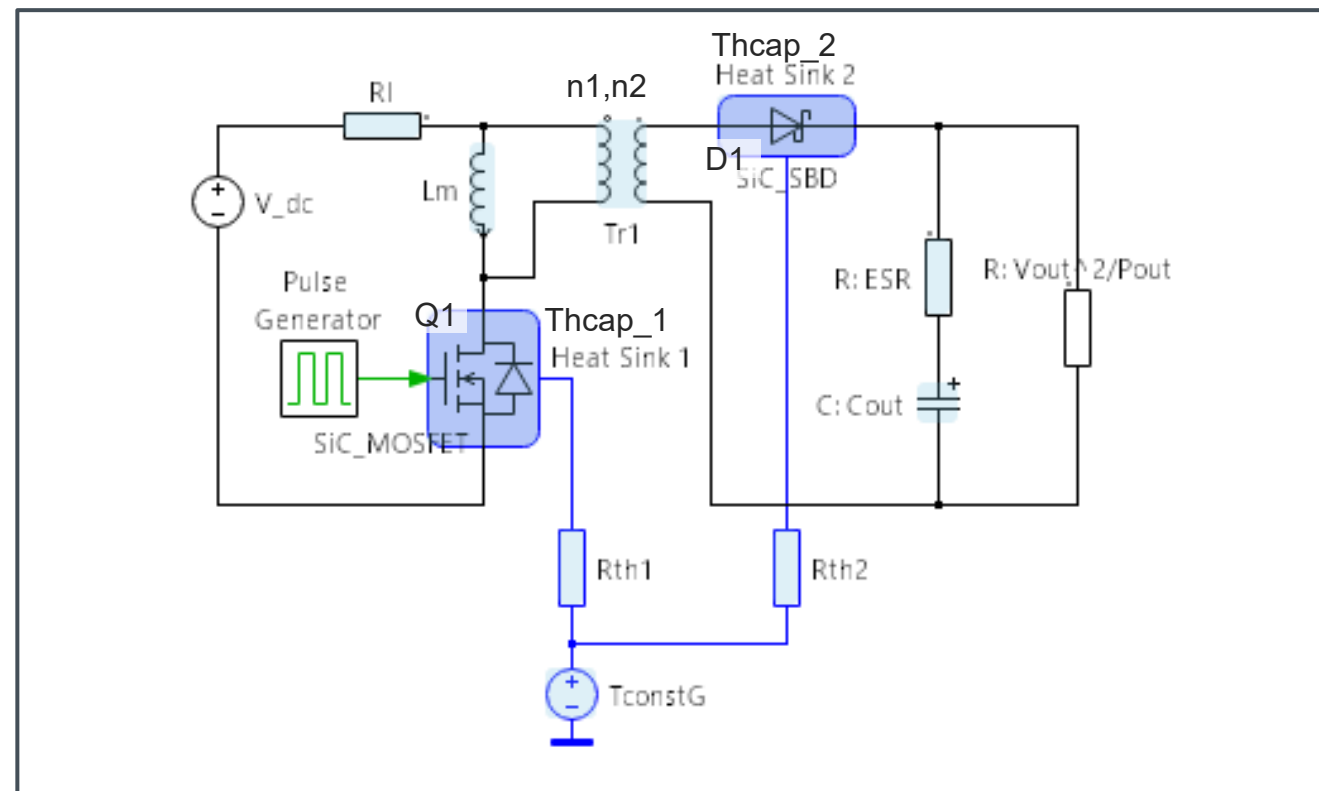
Name	Content	unit	Default Value	Variable Range
Lm	Magnetizing Inductance	H	3m	1n ~ 1
Rl	Parasitic Resistance	$\Omega$	5m	1u ~ 100m
Cout	Output Capacitor	F	500u	1n ~ 1
ESR	Equivalent Series Resistance	V	0.01	1u ~ 100m
n1	Primary coil	turns	15	1~100
n2 *	Secondary coil	turns	-2	-100~-1
Rc	Parasitic Resistance	$\Omega$	10m	1u ~ 100m
Rth1,2	Thermal Resistance	K/W	0.3	1m ~ 100
Thcap_1,2	Thermal Capacitance	J/K	1m	1m ~ 100
TGND	Thermal GND Temperature	$^{\circ}\text{C}$	25	-40 ~ 175

\* For the secondary coil parameters, negative values must be entered.

## Simulation Parameters (Table)

Name	Content	unit	Default Value	Variable Range
Test_time	Test time in simulation	s	0.3	100u ~ 0.5
fs	Switching Frequency	kHz	100	10k ~ 100k
Vin	Input Voltage	V	400	1 ~ 1000
Vout	Output Voltage	V	12	10 ~ 1200
Pout	Output Power	W	100	1~10k
Rg_on	Gate Resistance (Source)	$\Omega$	4.7	0 ~ 100
Rg_off	Gate Resistance (Sink)	$\Omega$	2	0 ~ 100
T_init	Initial Junction Temperature	$^{\circ}\text{C}$	25	-40 ~ 175

## Simulation Circuit



## Default Deices

Name	Device Type	Part No.	Specification
Q1	SiC MOSFET	SCT4065DR	750V/ 25A/ 65m $\Omega$ / TO-247-4L
D1	SiC Schottky Barrier Diode	SCS320AG	650V/ 20A/ TO-220ACGE

# Simulation Screen Overview

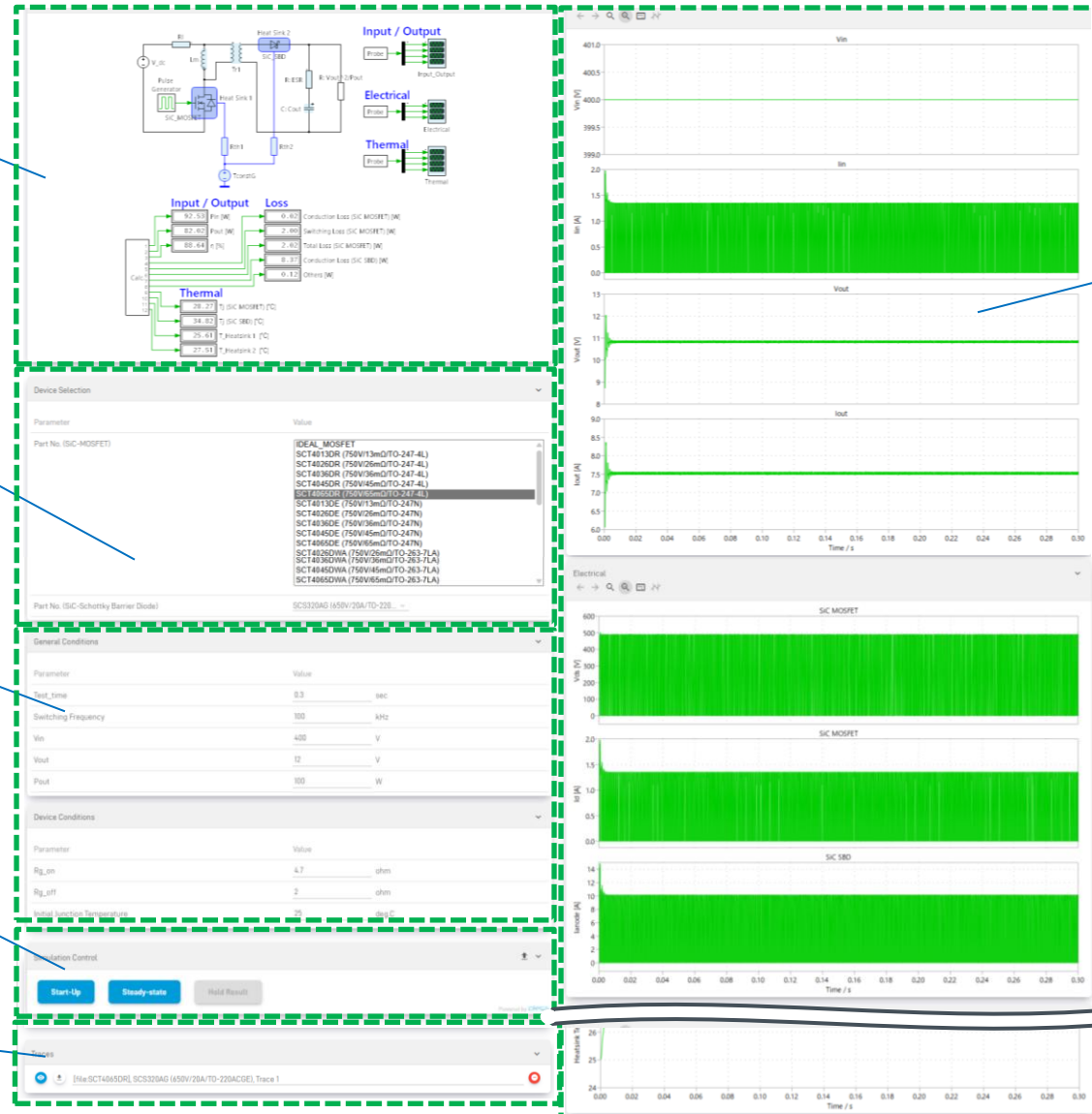
Schematic window  
• Dialog parameters setting  
• Results display

Device selection

General Conditions

Simulation control

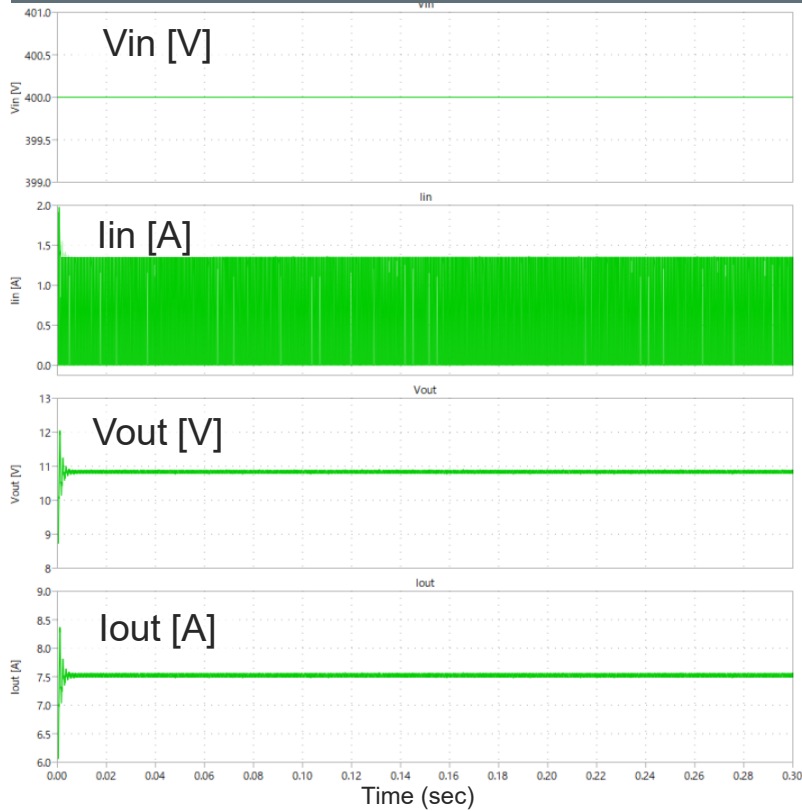
Trace selection



Waveforms

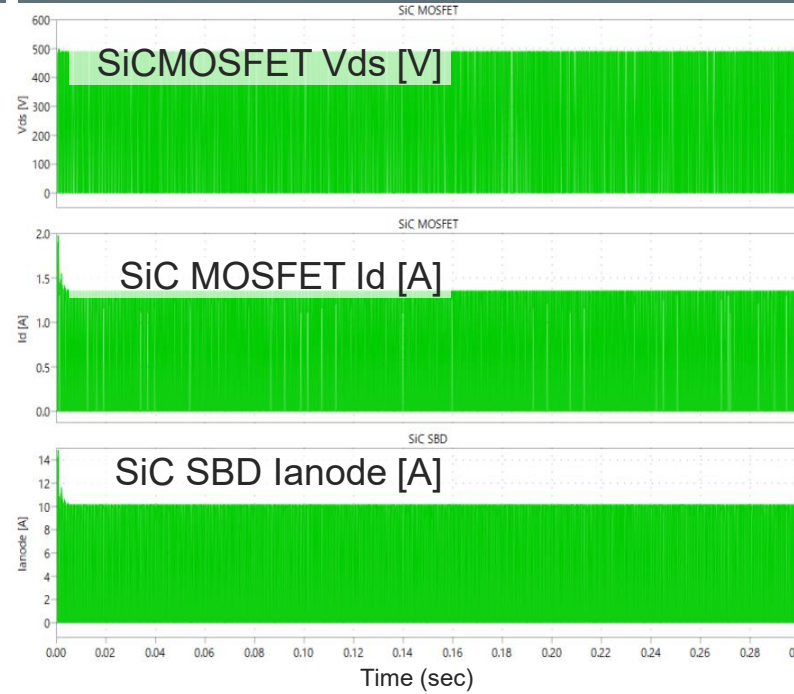
# Simulation Results

## Input and Output



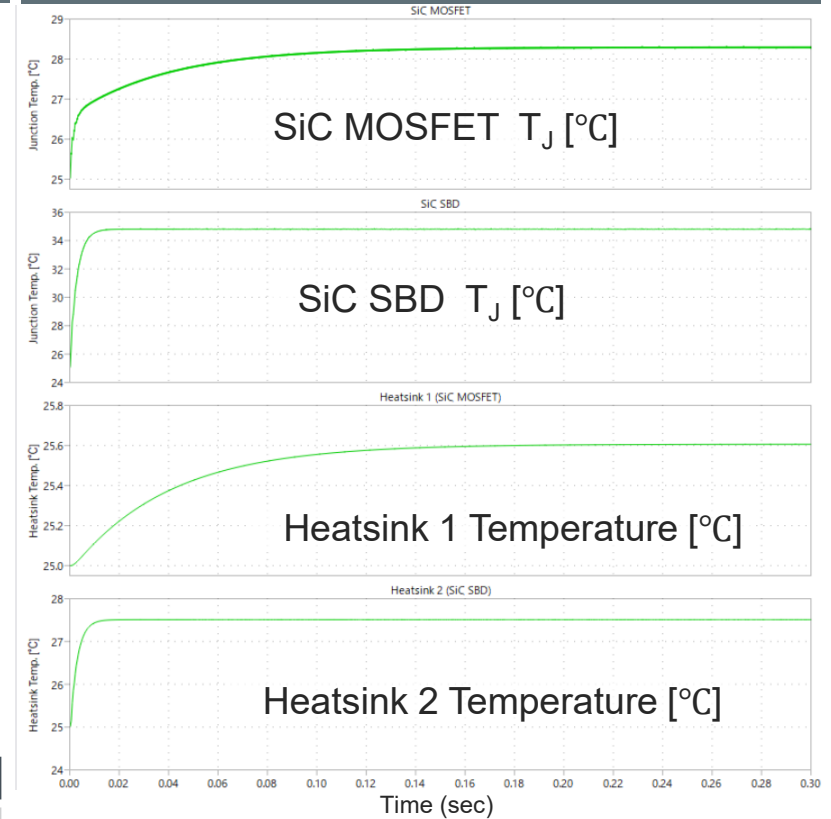
Contents	Results
Input Power : Pin	92.53 W
Output Power: Pout	82.02 W
Efficiency: $\eta$	88.64 %

## Electrical



Contents	Results
Conduction Loss (SiC MOSFET)	0.02 W
Switching Loss (SiC MOSFET)	2.00 W
Total Loss (SiC MOSFET)	2.02 W
Conduction Loss (SiC SBD)	8.37 W
Loss (Others)	0.12 W

## Thermal



Contents	Results
T <sub>j</sub> (SiC MOSFET)	28.27 °C
T <sub>j</sub> (SiC SBD)	34.82 °C
T_Heatsink 1	25.61 °C
T_Heatsink 2	27.51 °C

# How to change the devices

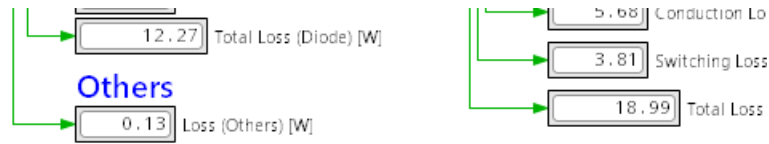
The figure of "(A-011-D) DC-AC Totem-Pole PFC Diode Rectification (Discrete)" is used as an example in this page.

ROHM PLECS Simulator  
Circuit Information



2026 March  
68UG113E Rev.001

## Device Selection



Device Selection	
Parameter	Value
Part No. (SiC-MOSFET)	<a href="#">SCT4065DR (750V/65mΩ/TO-220...</a>
Part No. (SiC-Schottky Barrier Diode)	<a href="#">SCS320AG (650V/20A/TO-220...</a>



Device Selection	
Parameter	Value
Part No. (SiC-MOSFET)	<a href="#">SCT4065DR (750V/65mΩ/TO-220...</a>
Part No. (SiC-Schottky Barrier Diode)	<a href="#">SCS320AG (650V/20A/TO-220...</a>

- SCT4036DWA (750V/36mΩ/TO-263-7LA)
- SCT4045DWA (750V/45mΩ/TO-263-7LA)
- SCT4065DWA (750V/65mΩ/TO-263-7LA)
- SCT4013DLL (750V/13mΩ/TOLL)**
- SCT4026DLL (750V/26mΩ/TOLL)
- SCT4036DLL (750V/36mΩ/TOLL)
- SCT4045DLL (750V/45mΩ/TOLL)

Over your mouse cursor to the device name that you want to change and click the left button of the mouse.

Available device lists are appeared like the above, and you can select a favorite device from these.

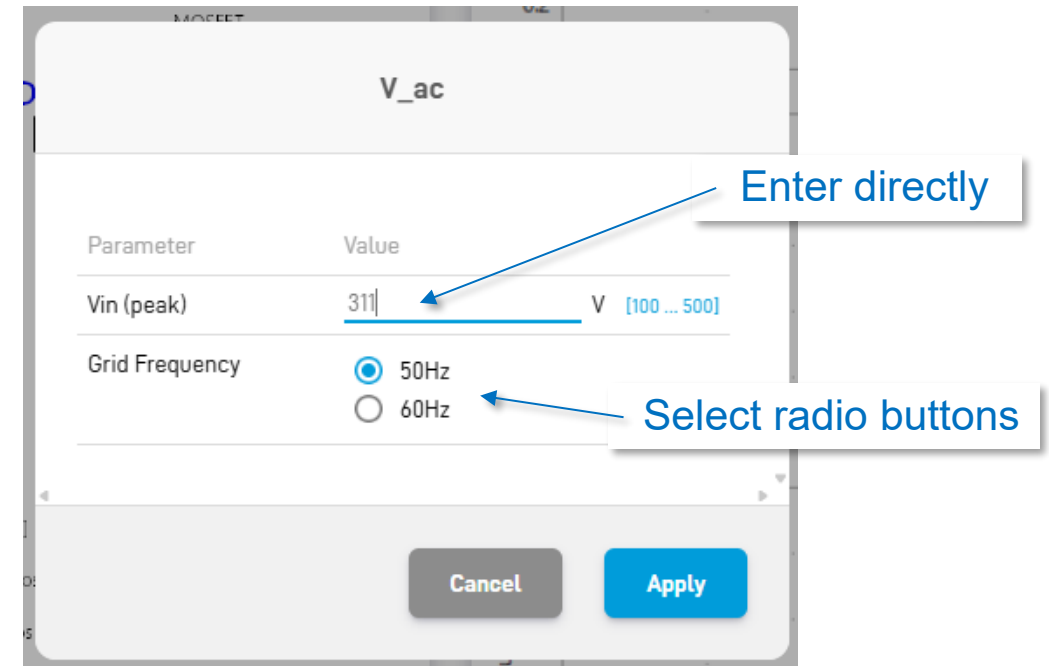
# How to change Dialog parameters

The figure of "(A-011-D) DC-AC Totem-Pole PFC Diode Rectification (Discrete)" is used as an example in this page.

- Symbols whose parameters can be changed are colored light-blue in the circuit diagram.
- Over your mouse cursor to the symbol that you want to change the parameter and the symbol color is turned to blue (e.g. "V\_ac" symbol in the below).
- Click the mouse's left button.



- A new window like the below is opened.
- You can change the parameters by entering the value directly\* or selecting radio buttons.
- Push "Apply" button after changing all parameters.



\*Note: Parameters can be entered directly are limited by Min. and Max. values to avoid unexpected system errors.  
(e.g. "Vin(peak)" is limited between 100 and 500V in the above.)

# How to change Table parameters

The figure of "(A-011-D) DC-AC Totem-Pole PFC Diode Rectification (Discrete)" is used as an example in this page.

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## Table parameters

General Conditions

Parameter	Value
Test_time	1 sec
Switching Frequency	60000 Hz

Device Conditions

General Conditions

Parameter	Value
Test_time	1 sec
Switching Frequency	<u>20000</u> Hz [10000 ... 100000]

Device Conditions

Choose the parameter that you want change on the parameter tables (e.g. "60kHz" of Switching Frequency in the left figure.)

- A blue under-line and variable range of the parameter are appeared.
- Then, you can change the parameters by entering the value directly " (e.g. "60kHz" was changed to "20kHz").

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