C-021. DC-DC Active Clamp Forward Converter Vin=400V, Vo=24V, Io=10A

ROHM Solution Simulator Schematic Information

2026 Feb.
68UG085E Rev.001

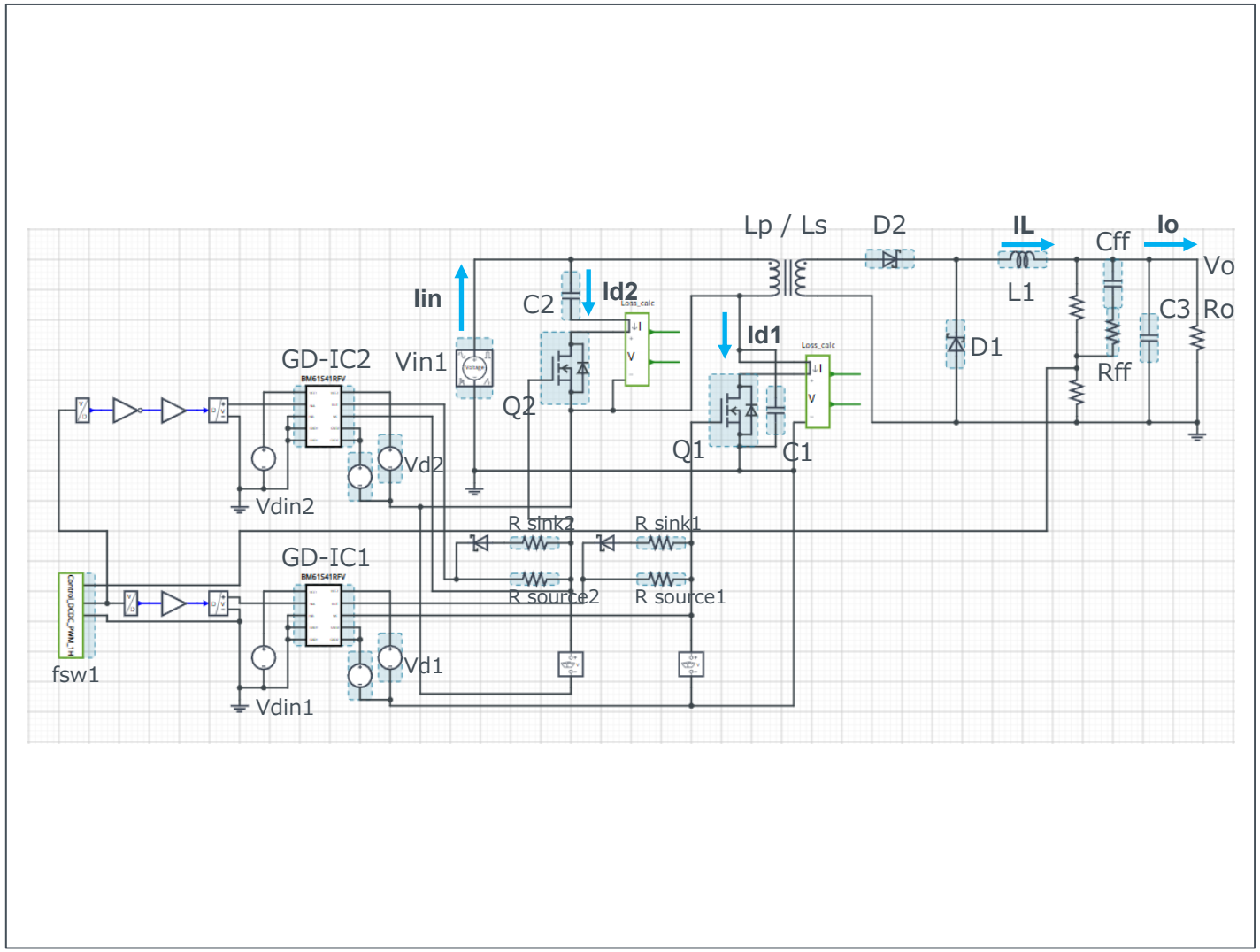
Simulation Parameters

Component name	Component	Default	Simulation Setting Range
Vin1	Input voltage	400Vdc	
Vo	Output voltage	24Vdc	
Io	Output current	10Adc	
fsw1	Switching frequency	50kHz	10k - 300kHz
Tj	Temperature	100°C	
Vd1,2	Gate drive voltage H	18V	10 - 20V
Vdin1,2	Signal voltage level	5V	
Lp / Ls	Transformer	200µH / 8µH K=0.98	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1,2	SiC MOSFET SJ MOSFET	Selectable	
D1,2	SiC SBD	Selectable	
GD-IC1,2	Gate driver	Selectable	
R sink1,2	Resistor for sink	ESR18 2Ω	0.1 -
R source1,2	Resistor for source	ESR18 5Ω	0.1 -
L1	Inductor	100µH	10µH - 2mH
C1 / C2 / C3	Capacitor	1nF / 1µF / 200µF	
Ro	Output resistor	{Vo/Io}	
Cff	Feed-forward capacitor	2.2nF	
Rff	Feed-forward resistor	0Ω	

Simulation Circuit



Note: The Loss_calc component is a utility module to support power loss calculation and does not affect the simulation results of circuit operation or performance.

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2026 Feb.
68UG085E Rev.001

Selectable Devices

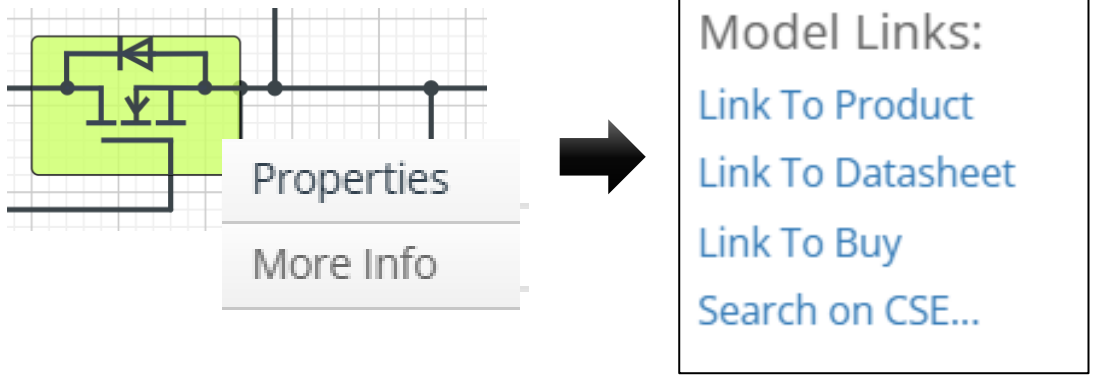
Component name	Component
Q1,2	SiC MOSFET

SiC MOSFET part number information

S C T 4 0 3 6 K R

- Part No.
- **Product category 1**
  - SC: SiC discrete device
- **Product category 2**
  - T: MOSFET
- **Product generations**
  - 2: 2nd Generation
  - 3: 3rd Generation
  - 4: 4th Generation
- **ON-resistance (Typ.)**
  - 013: 13 mΩ
  - 017: 17 mΩ
  - 018: 18 mΩ
  - 022: 22 mΩ
  - 026: 26 mΩ
  - 030: 30 mΩ
  - 036: 36 mΩ
  - 040: 40 mΩ
  - 045: 45 mΩ
  - 060: 60 mΩ
  - 062: 62 mΩ
  - 080: 80 mΩ
  - 105: 105 mΩ
  - 120: 120 mΩ
  - 160: 160 mΩ
  - 280: 280 mΩ
  - H12: 1150 mΩ
- **Rated voltage**
  - A: 650 V
  - D: 750 V
  - K: 1200 V
  - N: 1700 V
- **Package**
  - E: TO-247 (TO-247N) Other than 3rd generation
  - L: TO-247 (TO-247N) 3rd generation only
  - R: TO-247-4L
  - W7: TO-263-7L
  - WA: TO-263-7LA
  - Z: TO-3PFM
  - * JEDEC code. Parentheses indicate ROHM packages.

For more information, go to **“More Info”** and click on **“Link to Datasheet”**.



Product Lineup: SiC MOSFETs

Note) We have not been able to confirm operation with all combinations. Please read the disclaimer carefully.

C-021. DC-DC Active Clamp Forward Converter Vin=400V, Vo=24V, Io=10A

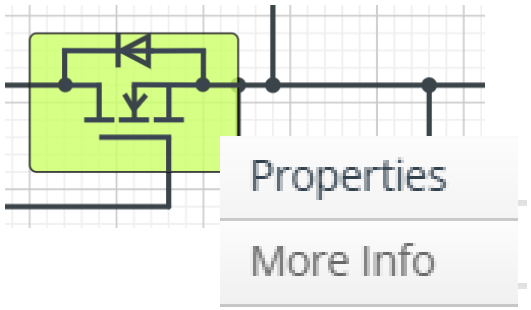
ROHM Solution Simulator Schematic Information

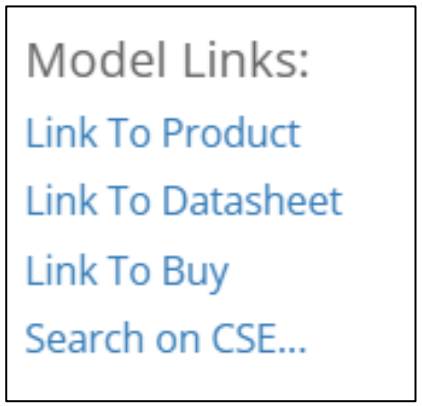
2026 Feb.
68UG085E Rev.001

Selectable Devices

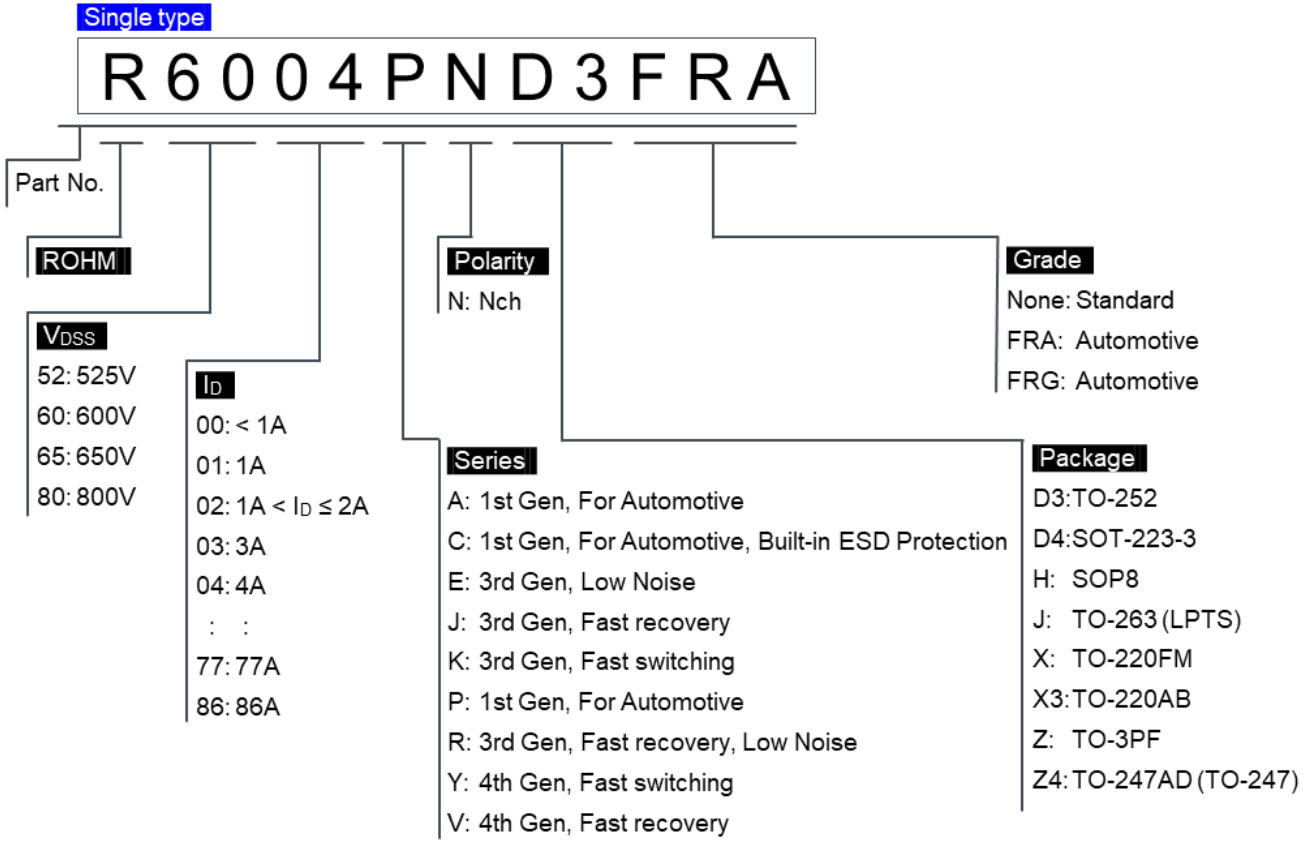
Component name	Component	Product
Q1,2	SJ MOSFET	RxxxxKN series RxxxxYN series

For more information, go to **“More Info”** and click on **“Link to Datasheet”**.





SJ MOSFET part number information



➧ Product Lineup: Super Junction MOSFETs

Note) We have not been able to confirm operation with all combinations. Please read the disclaimer carefully.

C-021. DC-DC Active Clamp Forward Converter Vin=400V, Vo=24V, Io=10A

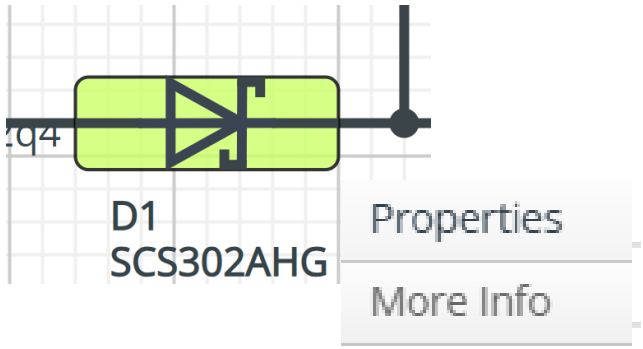
ROHM Solution Simulator Schematic Information

2026 Feb.
68UG085E Rev.001

Selectable Devices

Component name	Component
D1,2	SiC Schottky Barrier Diode

For more information, go to **“More Info”** and click on **“Link to Datasheet”**.



Model Links:
Link To Product
Link To Datasheet
Link To Buy
Search on CSE...

SiC Schottky Barrier Diode part number information

S C S 2 2 0 A E 2

- Part No.
- **Product category 1**
  - SC: SiC discrete device
- **Product category 2**
  - S: SiC schottky barrier Diode
- **Product generations**
  - 2: 2nd Generation
  - 3: 3rd Generation
- **Rated current**
  - 04: 4 A
  - 05: 5 A
  - 06: 6 A
  - 08: 8 A
  - 10: 10 A
  - 12: 12 A
  - 15: 15 A
  - 20: 20 A
  - 30: 30 A
  - 40: 40 A
- **Reverse voltage (repetitive peak)**
  - A: 650 V
  - K: 1200 V
- **Package**
  - E: TO-247 (TO-247N)
  - E2: TO-247 (TO-247N) 2-chip configuration
  - G : TO-220AC (TO-220ACGE / TO-220ACG)
  - H: TO-220AC (TO-220ACP)
  - J: TO-263AB (LPTL)
  - M: TO-220FM (TO-220FM-2LGE)
  - N: TO-263 (TO-263-2L)
  - * JEDEC code. Parentheses indicate ROHM packages.

➧ Product Lineup: SiC Schottky Barrier Diodes

Note) We have not been able to confirm operation with all combinations. Please read the disclaimer carefully.

2026 Feb.
68UG085E Rev.001

Selectable Devices

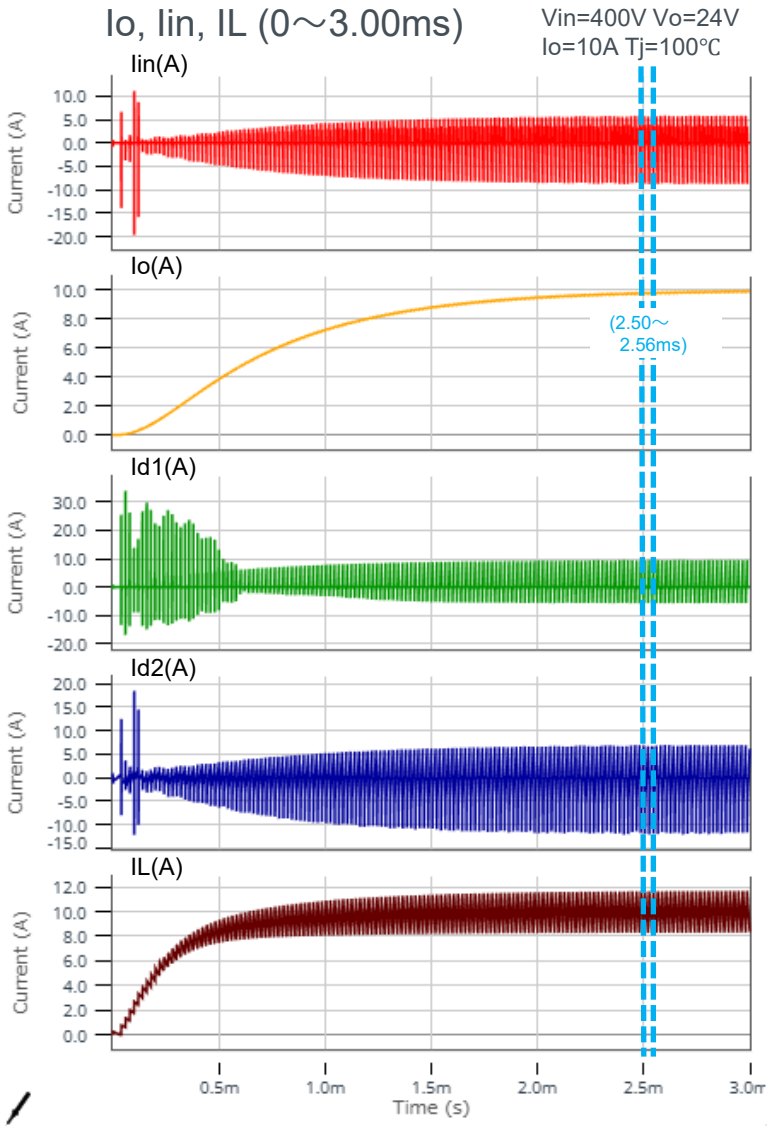
Component name	Component	Product No.	feature
GD-IC1,2	Gate Driver	BM61S41RFV-C (*)	**for SiC MOSFET** Isolation Voltage : 3750 Vrms I/O Delay Time (max) : 65ns Miller Clamp : Built-in UVLO : 14.5V
		BM61M41RFV-C	**for SJ-MOS / IGBT** Isolation Voltage : 3750 Vrms I/O Delay Time (max) : 65ns Miller Clamp : Built-in UVLO : 7.4V

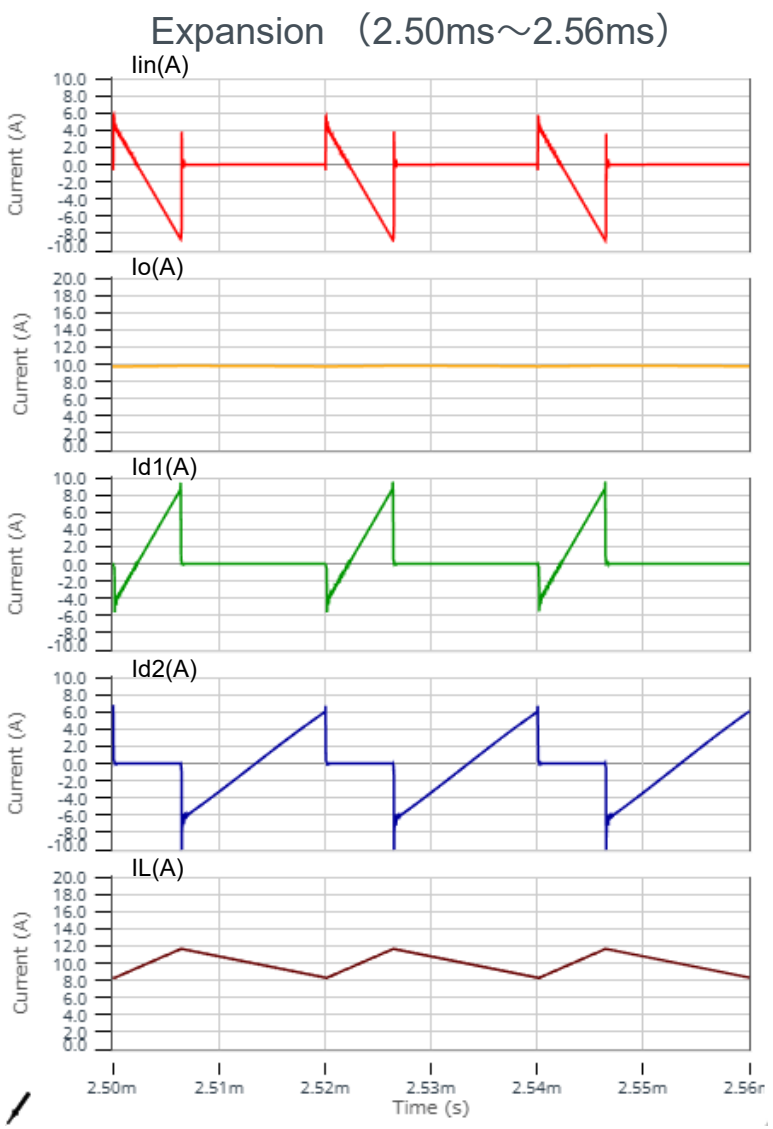
* Default device

Simulation Waveform

2026 Feb.
68UG085E Rev.001

Q1 : SiC MOSFET
SCT4062KE
Q2 : SiC MOSFET
SCT4090KE
D1,2 : SiC SBD
SCS320AG

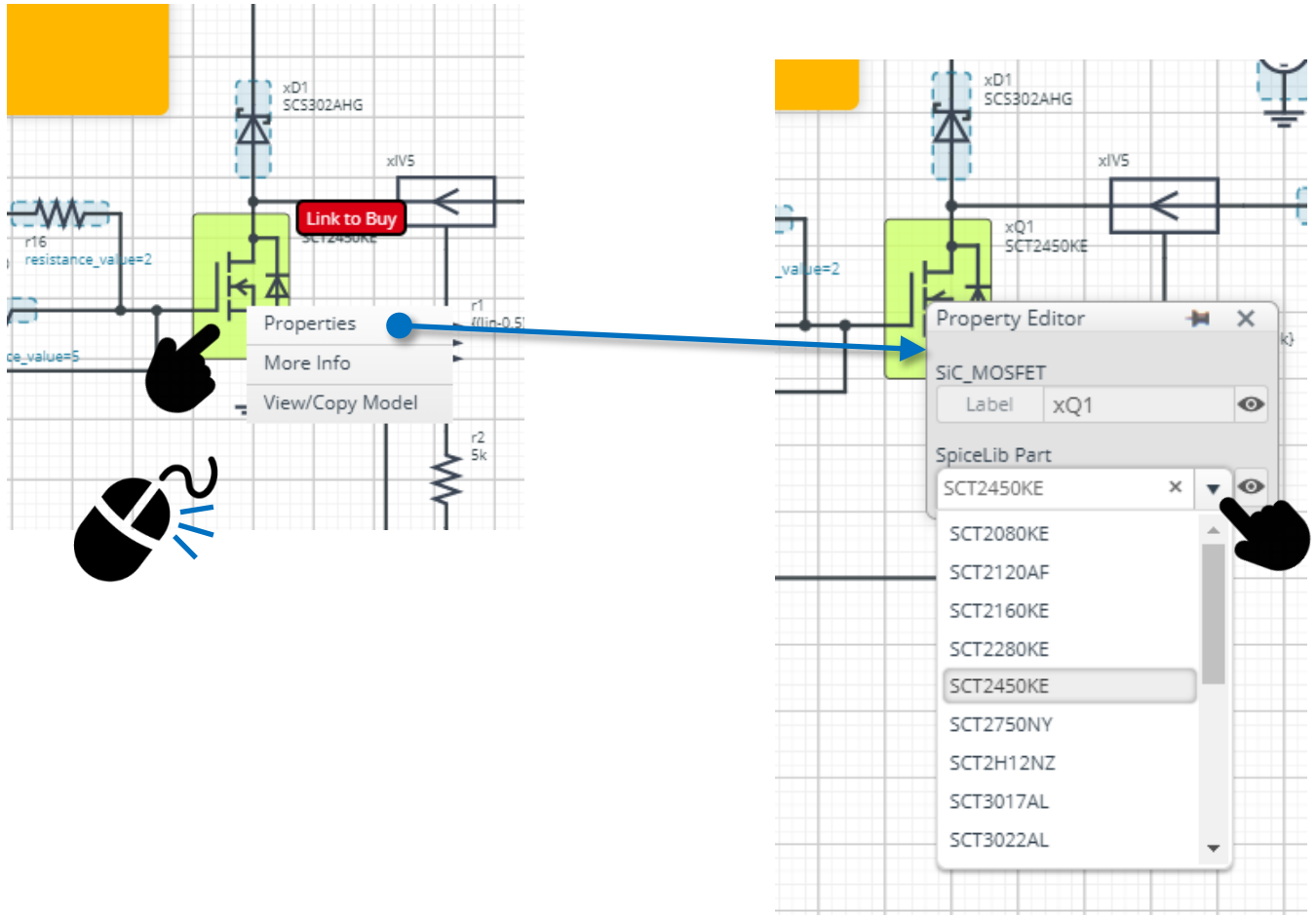




How to change the devices

2026 Feb.
68UG085E Rev.001

Right-click on the device ⇨ Select Properties ⇨ Pull down “SpiceLib Part” ⇨ Select the product

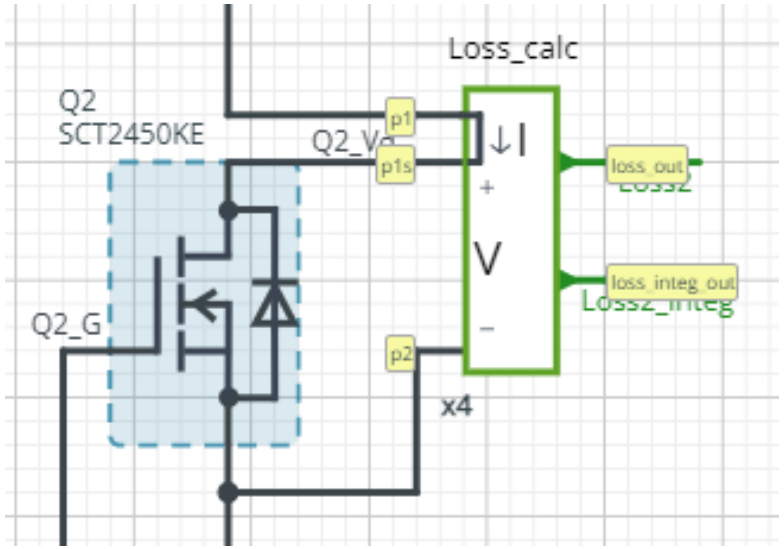


Loss Calculation Model

2026 Feb.
68UG085E Rev.001

Loss Calculation Model outputs the instantaneous value of power loss and its integration.

Loss calculation model 'Loss_calc'



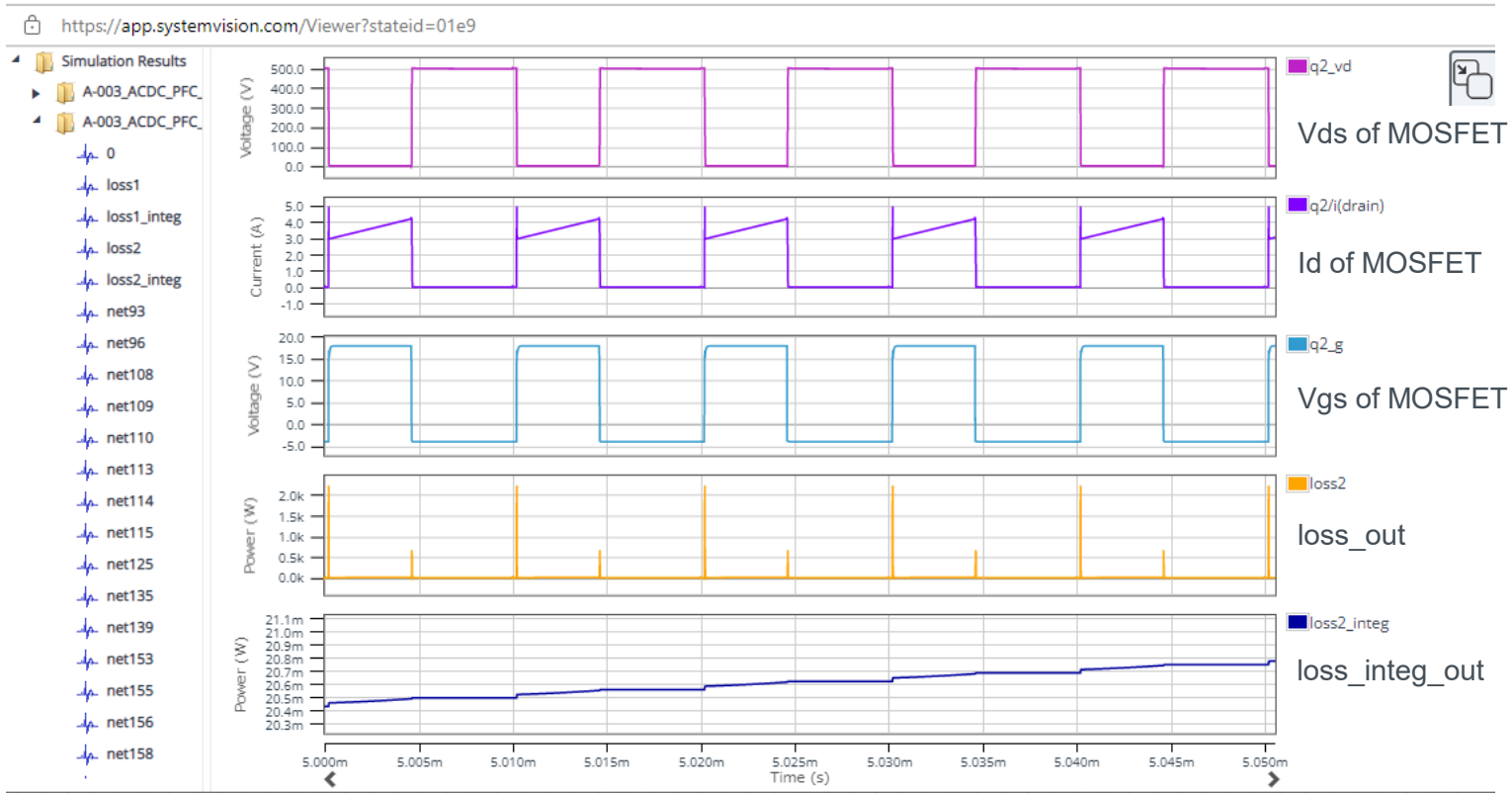
$$loss\_out(t) = I(t) \times V(t)$$

$$loss\_integ\_out = \int_0^t loss\_out(t)dt$$

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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