

D-007. Igniter $V_{in}=14V$, $V_o=-20kV$

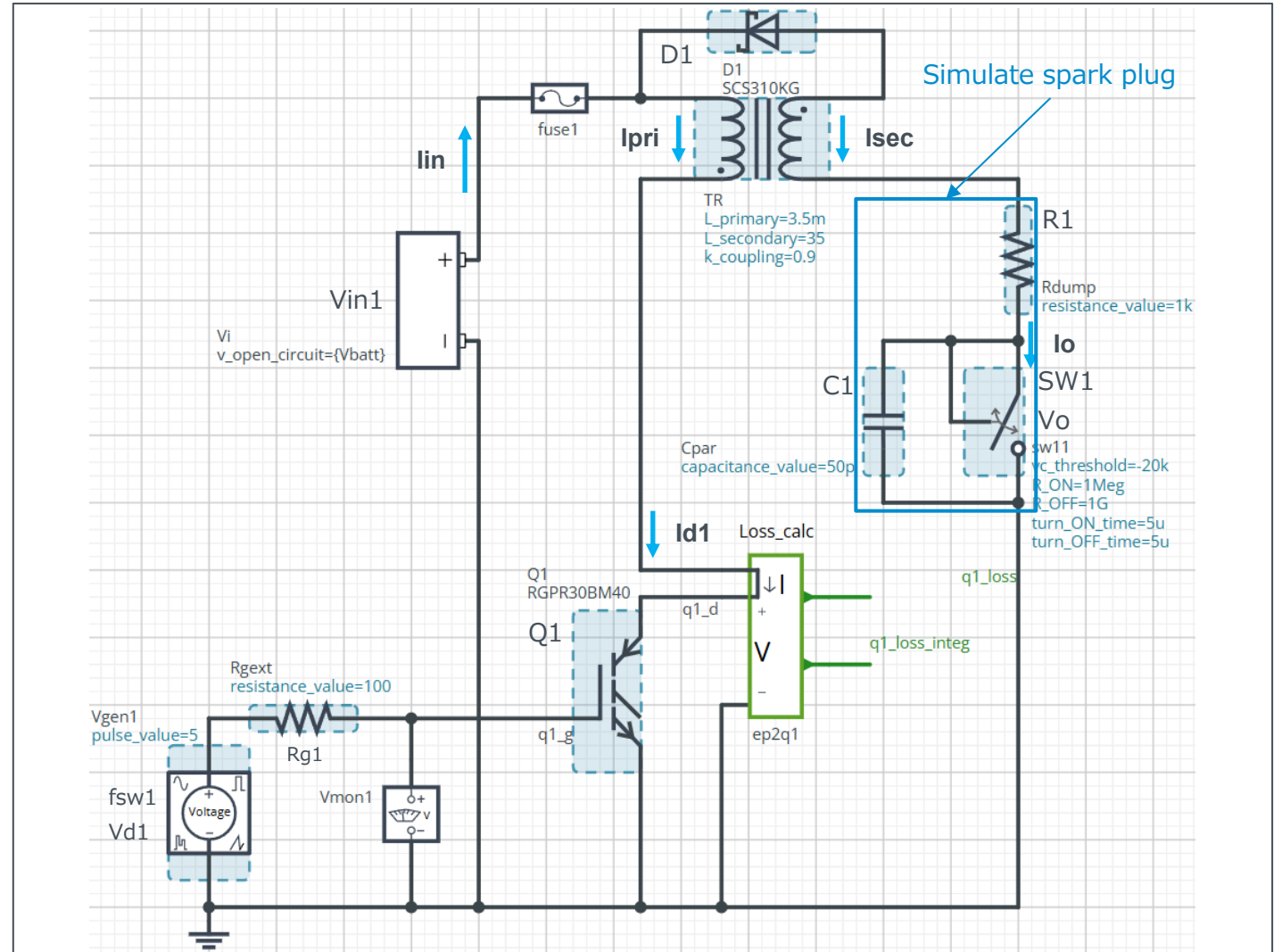
Simulation Parameters

Component name	Component	Default	Simulation Setting Range
Vin1	Input voltage	14V	
fsw1	Switching frequency	16.7Hz	
	Pulse ON time	1ms	
Tj	Temperature	25°C	
Vd1	Gate drive voltage H	5V	
Lp / Ls	Transformer	3.5mH / 35H K=0.90	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1	Ignition IGBT	Selectable	
D1	SiC SBD	Selectable	
Rg1	Gate resistor	100Ω	
SW1	Ignition switch	-20kV	
R1	Dumping resistor	1kΩ	
C1	Parasitic capacitor	50pF	

Simulation Circuit



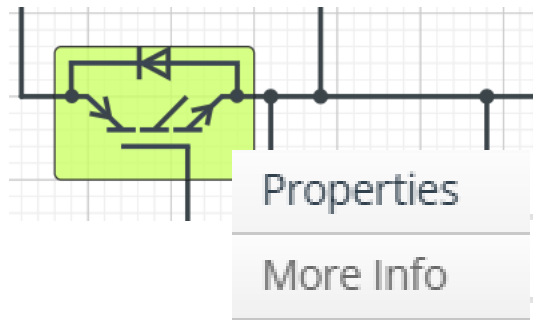
Note: The Loss_calc component is a utility module to support power loss calculation and does not affect the simulation results of circuit operation or performance.

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Selectable Devices

Component name	Component	Product
Q1	Ignition IGBT	RGP series

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



Model Links:

- [Link To Product](#)
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IGBT part number information

R G S 6 0 T S 6 5 D H R

Part No.

Product category
RG: IGBT

Product series
C: For voltage resonant, Reverse Conducting IGBT (RC-IGBT)
CL: Low $V_{CE(sat)}$
S: For Automotive Inverter, Short circuit capability guaranteed 8 to 10 μ s
T: For inverter, Short circuit capability guaranteed 5 μ s
TV: For converter / inverter, High speed switching, Short circuit capability guaranteed 2 μ s
TH: For converter, High speed switching
W: For converter, Ultra high-speed switching
WS: For converter, Ultra high-speed switching, Popular edition

Grade
G: Standard
GV: Standard
HR: Automotive (AEC-Q101)
HRB: Automotive (AEC-Q101)

Built-in diode configuration
None: Without diode
C: SiC Schottky barrier diode
D: Fast recovery diode
E: Larger size Fast recovery diode
R: Body diode with reverse conducting (RC) structure

Rated collector current $I_C(T_C=100^\circ C)$
8: 4 A
16: 8 A
20: 10 A
30: 15 A
40: 20 A
50: 25 A
60: 30 A
80: 40 A
00: 50 A
X2: 60 A
X5: 75 A
X6: 80 A

Package
BM: TO-252, TO-252GE
NS: TO-263S, TO-262
NL: TO-263L
TM: TO-220NFM
TS: TO-247N, TO-247GE
TK: TO-3PFM

Rated voltage V_{CES}
60: 600 V
65: 650 V
X2: 1200 V
X8: 1800 V

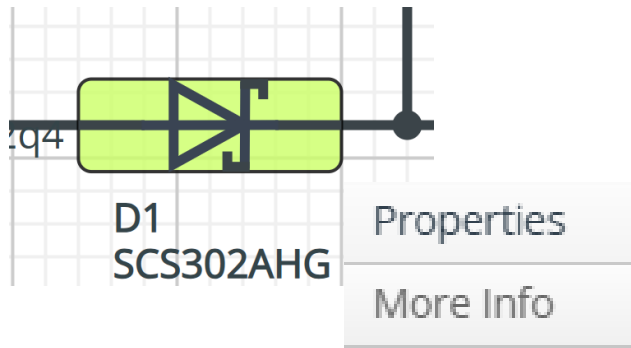
Product Lineup: [Field Stop Trench IGBT](#)

* See datasheet for current values that may differ in some cases.

Selectable Devices

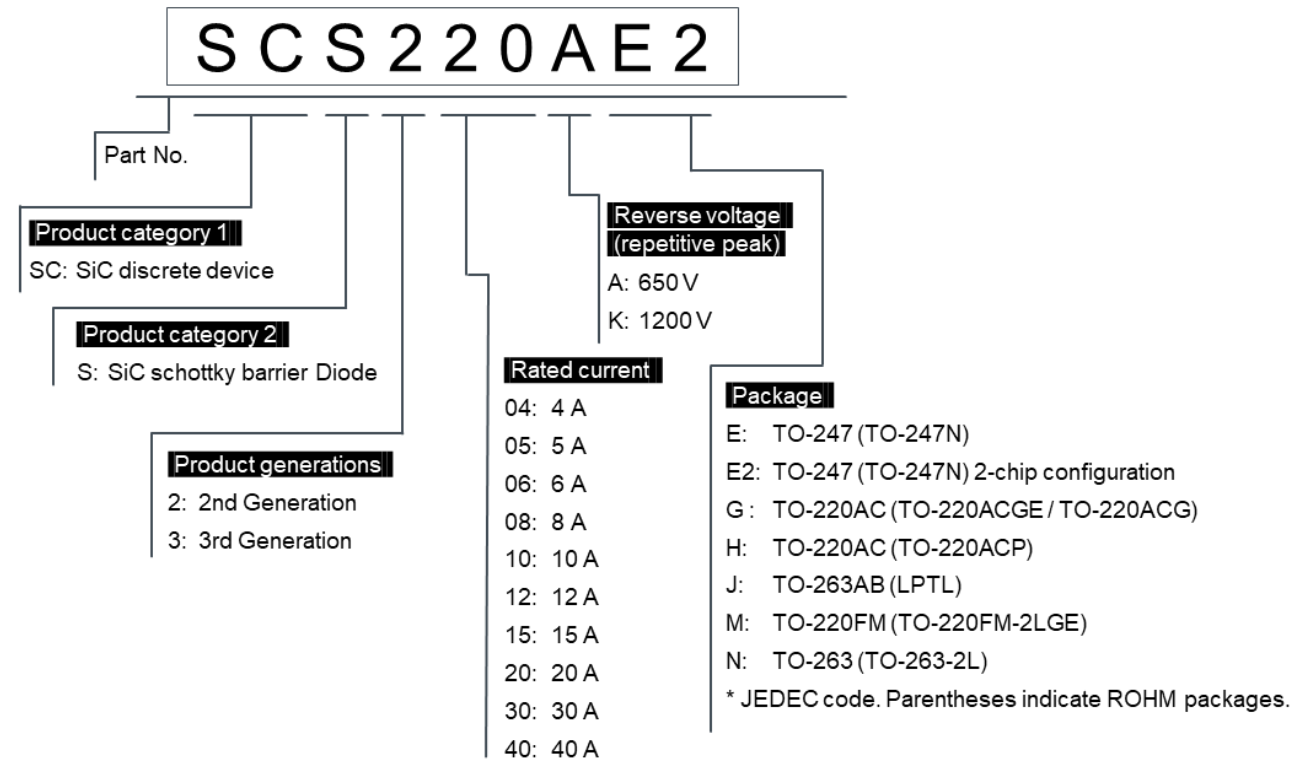
Component name	Component
D1	SiC Schottky Barrier Diode

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



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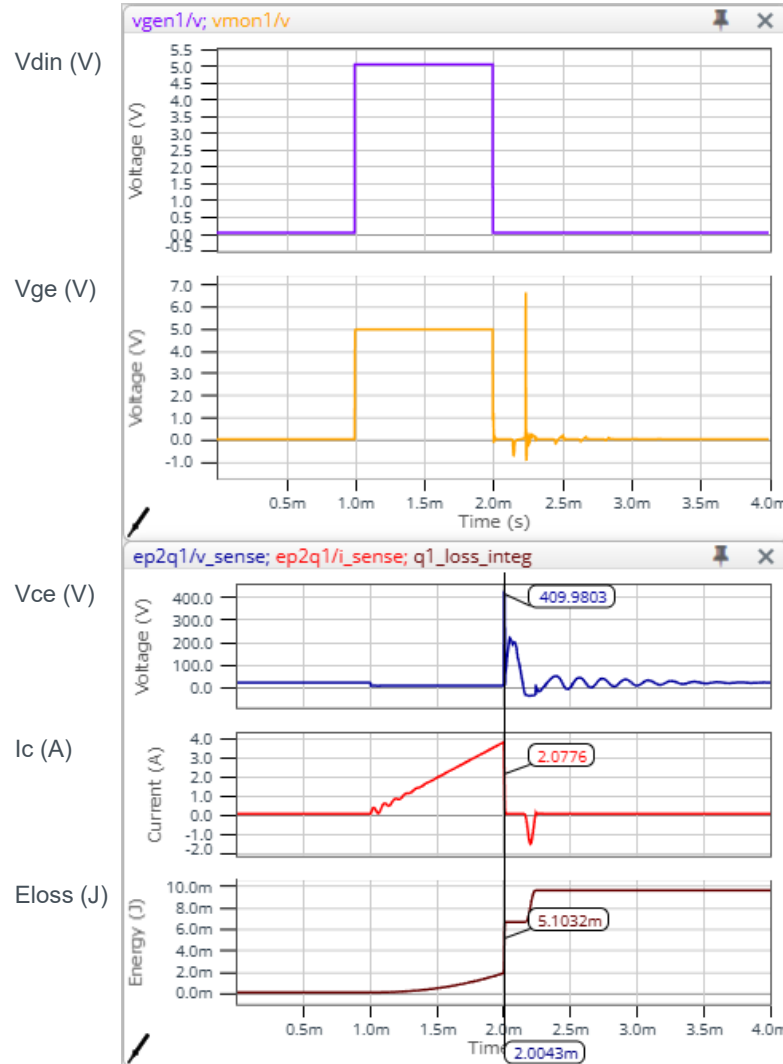
SiC Schottky Barrier Diode part number information



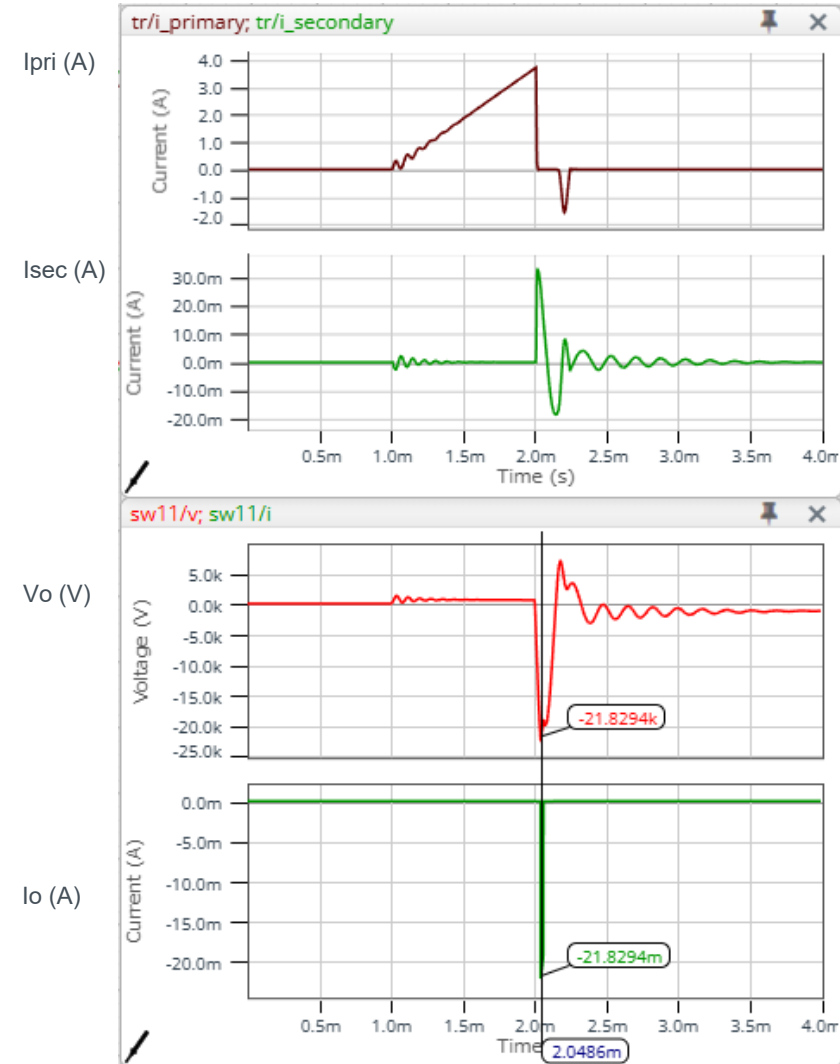
Product Lineup: [SiC Schottky Barrier Diodes](#)

Q1 : Ignition IGBT
RGPR30BM40
D1 : SiC SBD
SCS310KG

Vdin, Vge / Vce, Ic, Eloss (0~4ms)

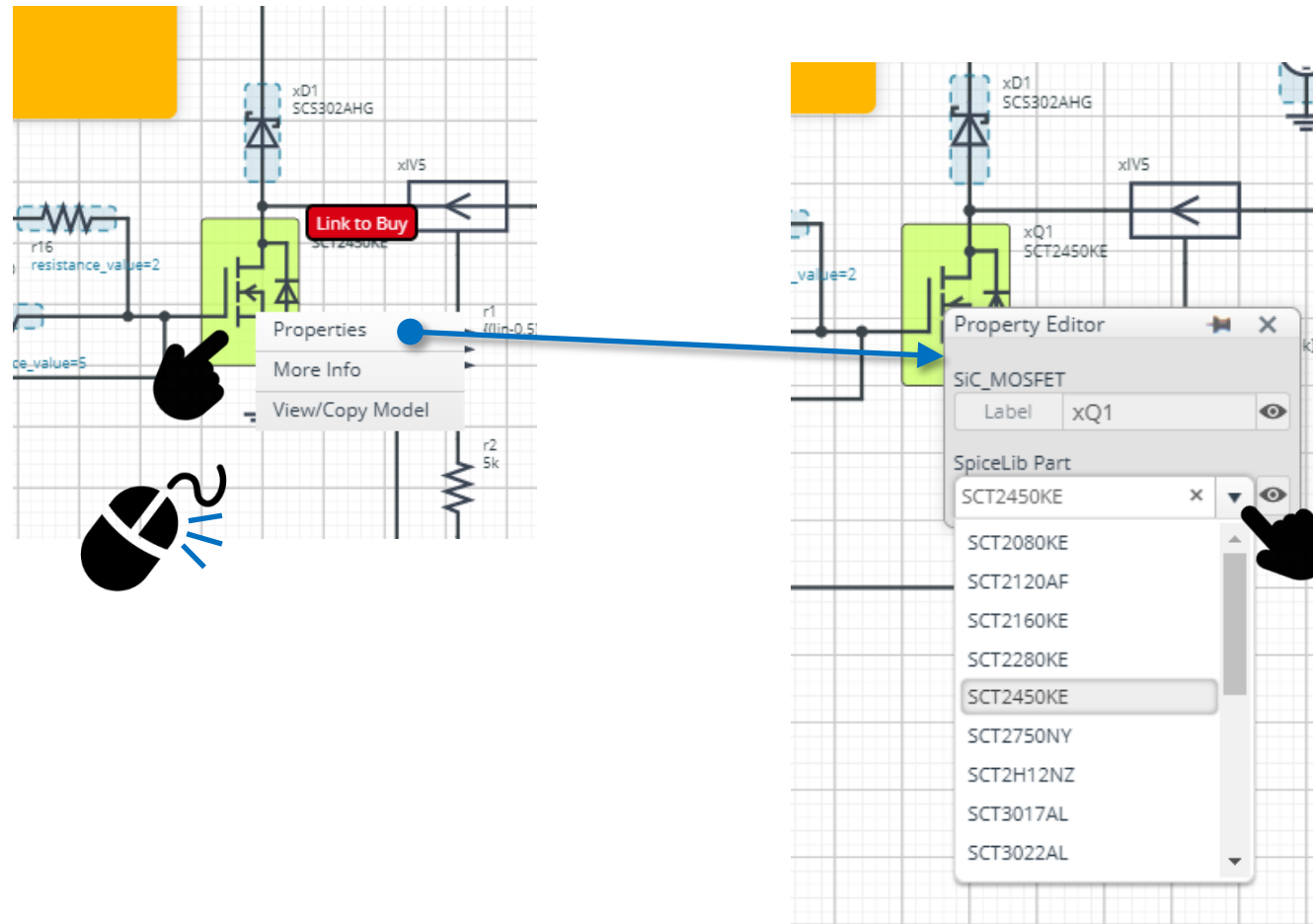


Ipri, Isec / Vo, Io (0~4ms)



How to change the devices

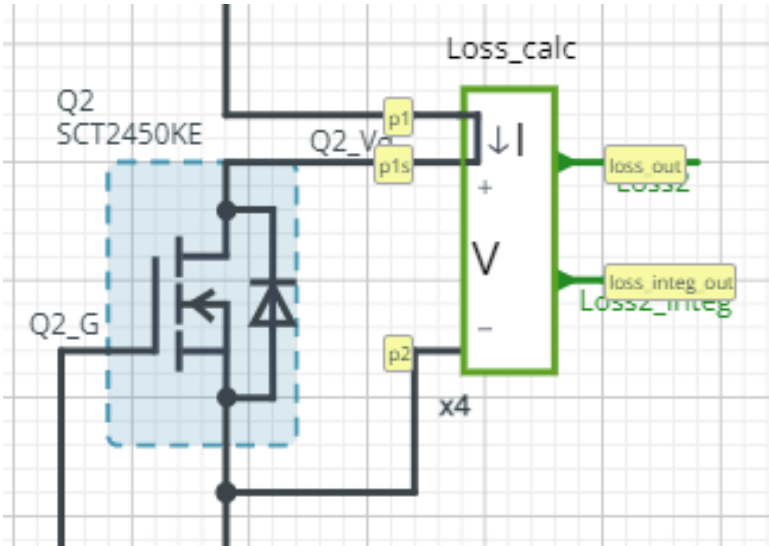
Right-click on the device → Select Properties → Pull down “SpiceLib Part” → Select the product



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

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Loss calculation model 'Loss_calc'



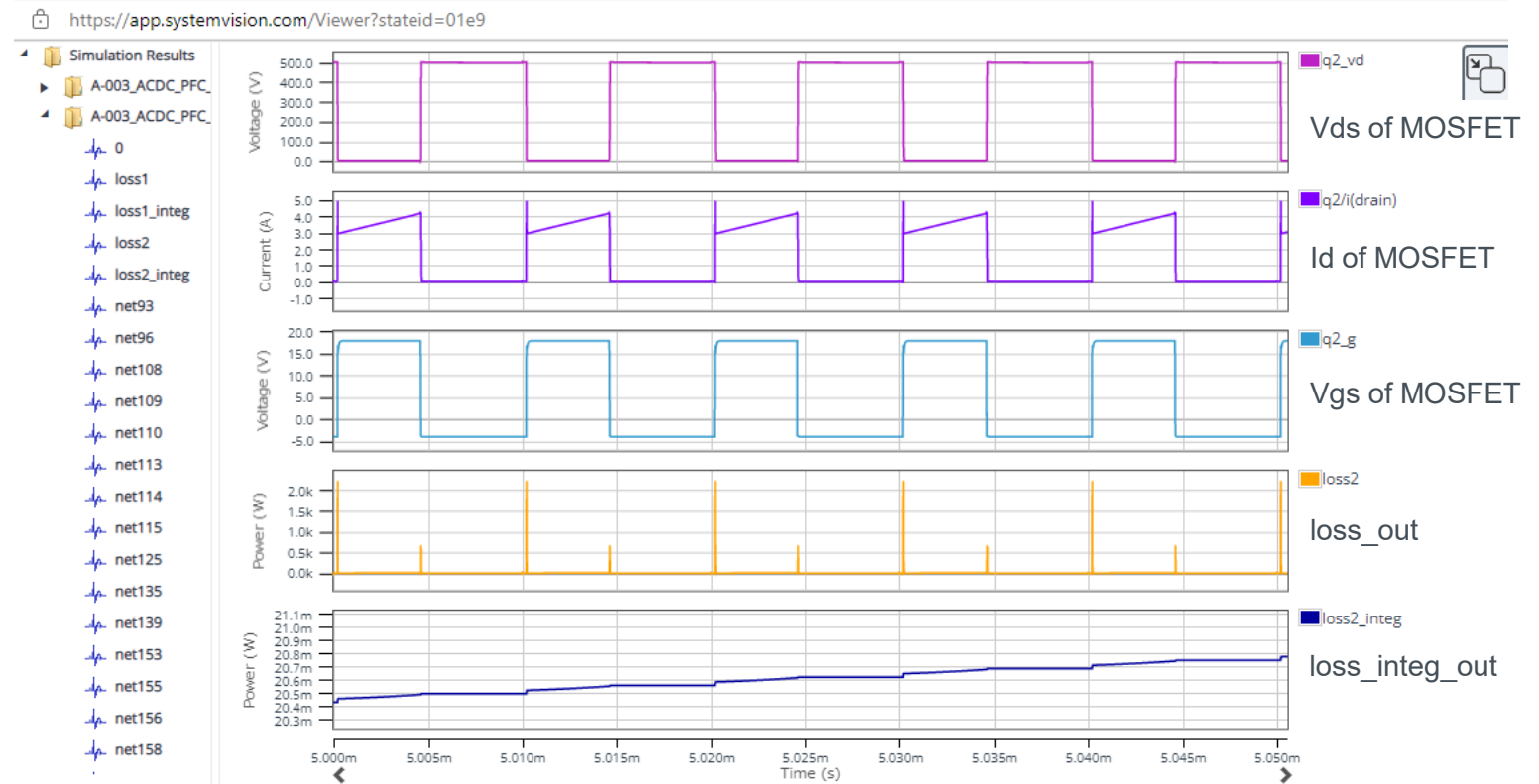
$$loss_out(t) = I(t) \times V(t)$$

$$loss_integ_out = \int_0^t loss_out(t)dt$$

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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