C-002. DC-DC Boost Converter Vo=800V, Io=20A

ROHM Solution Simulator Schematic Information

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Simulation Parameters

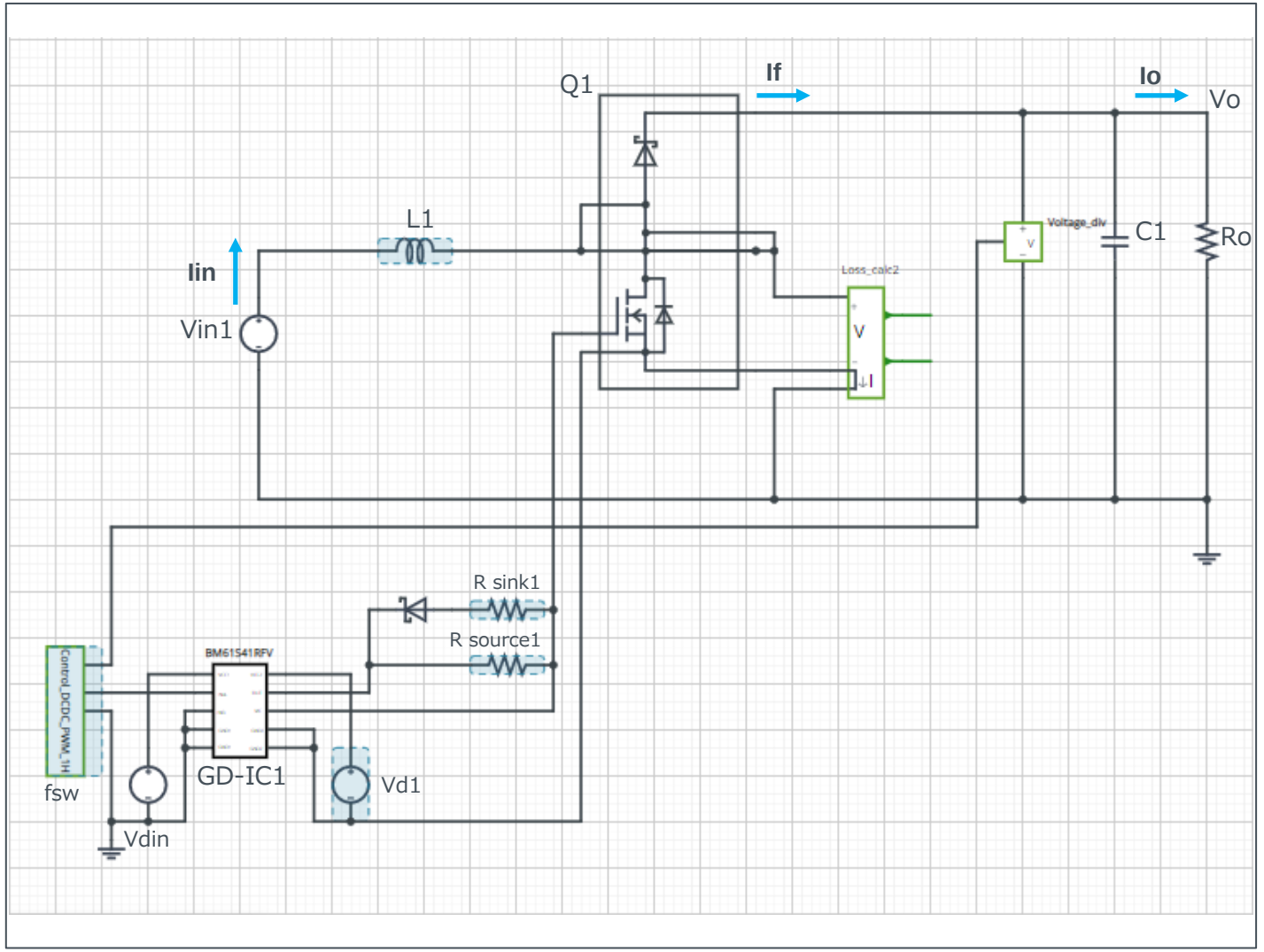
Component name	Component	Default	Simulation Setting Range
Vin1	Input voltage	250Vdc	
Vo	Output voltage	800Vdc	
Io	Output current	20Adc	
fsw	Switching frequency	50kHz	10k – 300kHz
Tj	Temperature	100°C	
Vd1	Gate Drive voltage H	18V	10 – 20V
Vdin	Signal voltage level	5V	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1	SiC Power Module	BSM120C12P2C201 (1200V, 134A, Chopper)	
GD-IC1	Gate Driver	BM61S41RFV-C	
R sink1	Resistor for sink	ESR18 1Ω	0.1 -
R source1	Resistor for source	ESR18 2Ω	0.1 -
L1	Inductor	20µH	10µH - 2mH
C1	Capacitor	20µF	1µF - 1mF
Ro	Output Resistor	{Vo/Io}	

Simulation Circuit

Run simulation DC-DC Converter / Boost



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.

Simulation Waveform

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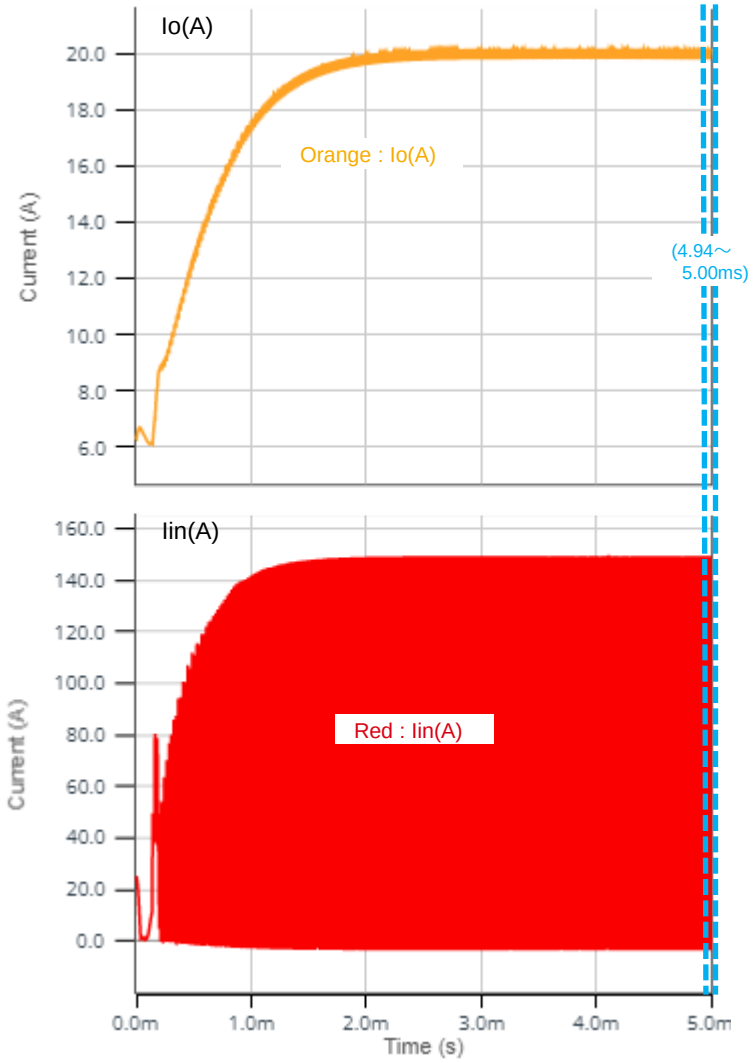
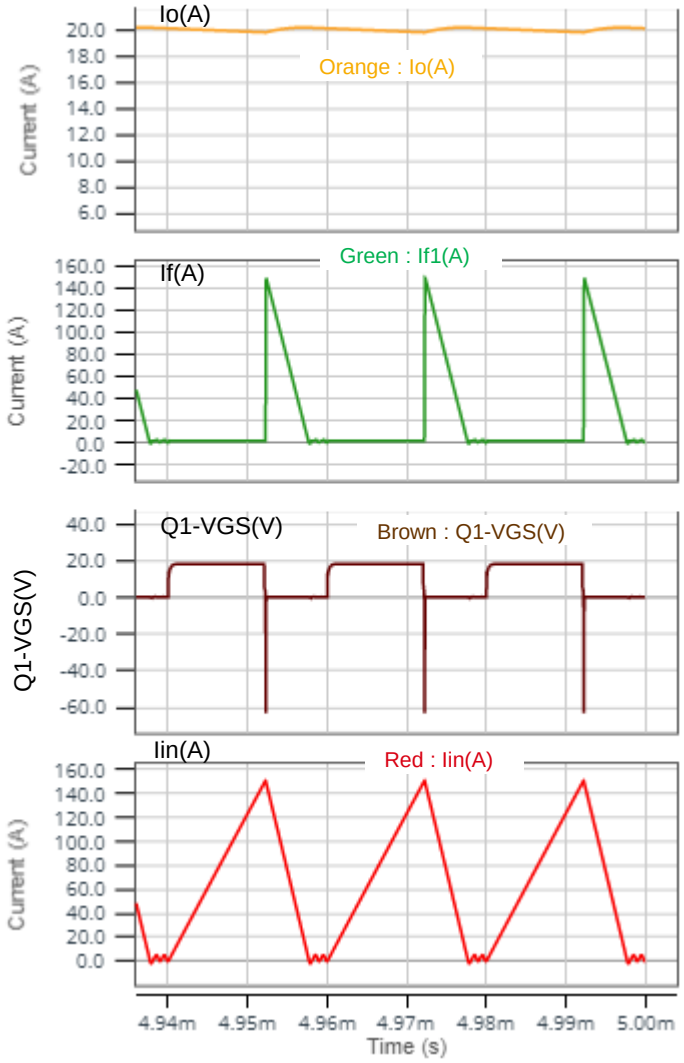
Io, Iin (0～5ms)

Vin=250V Vo=800V Io=20A
fsw=50kHz Tj=100℃



Io, If, Q1-VGS, Iin （4.94ms～5.00ms）



Efficiency, Power Dissipation 1

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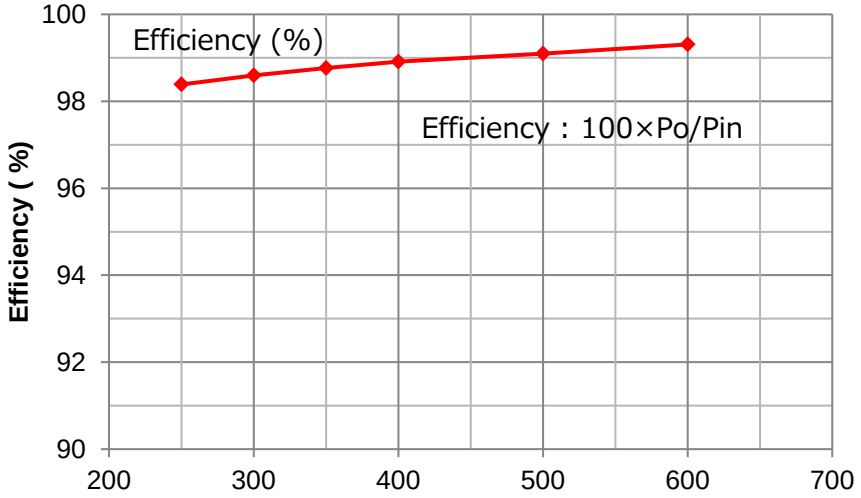
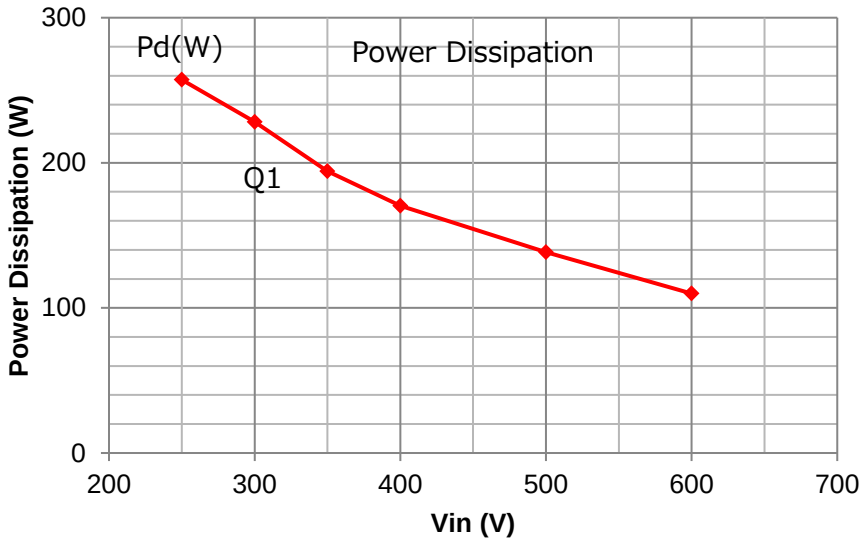
Vin : 250V～600V

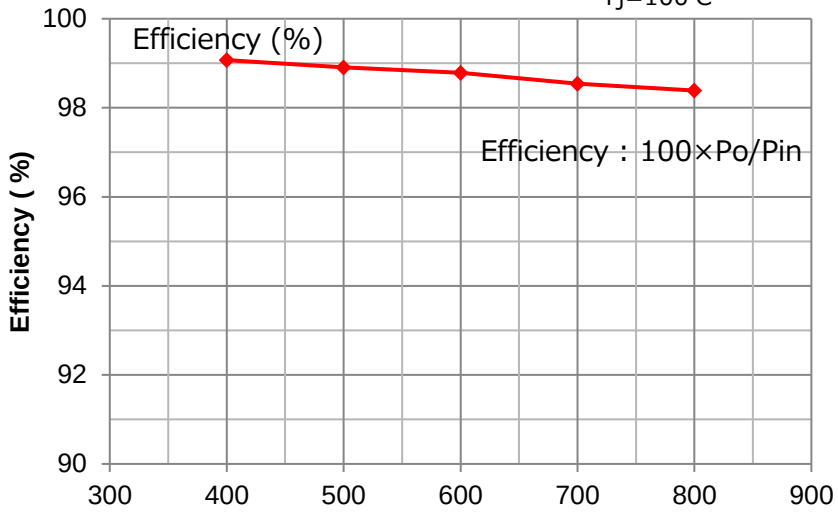
Vo=800V Io=20A
Tj=100℃

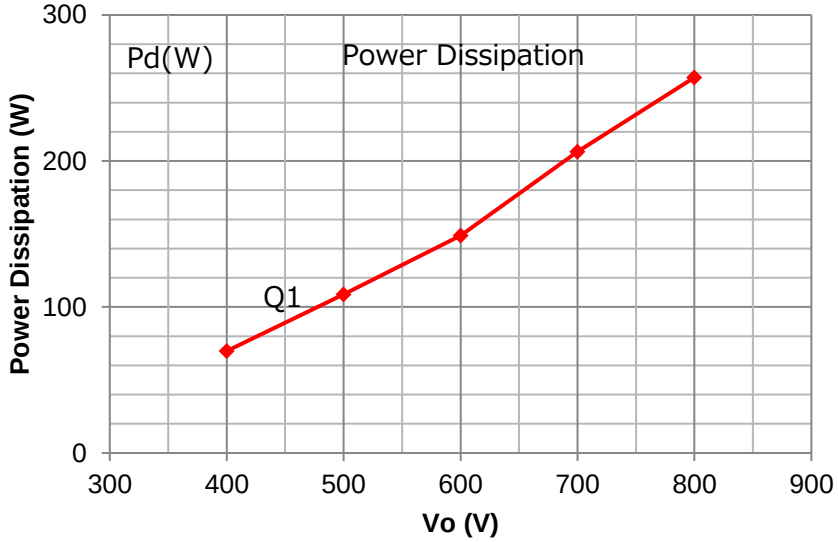




Vo : 400V～800V

Vin=250V Io=20A
Tj=100℃





Efficiency, Power Dissipation 2

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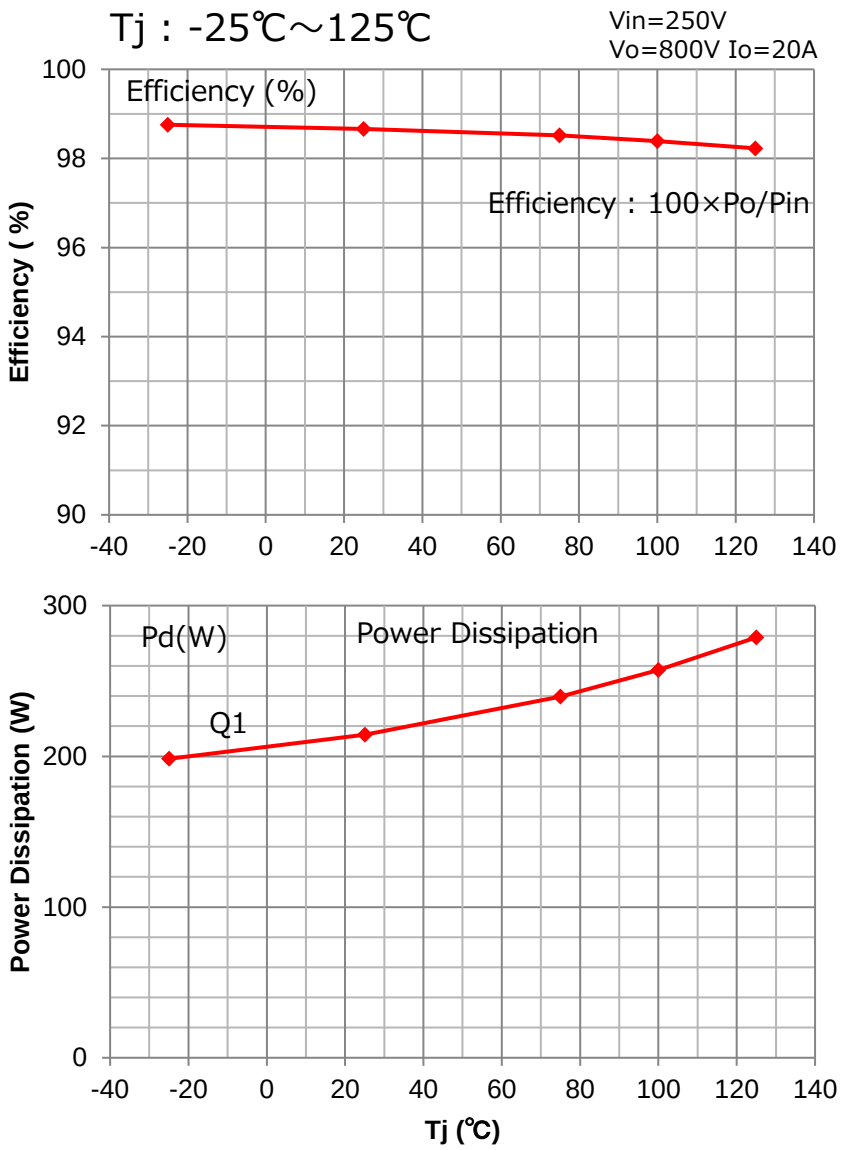

How to change the devices

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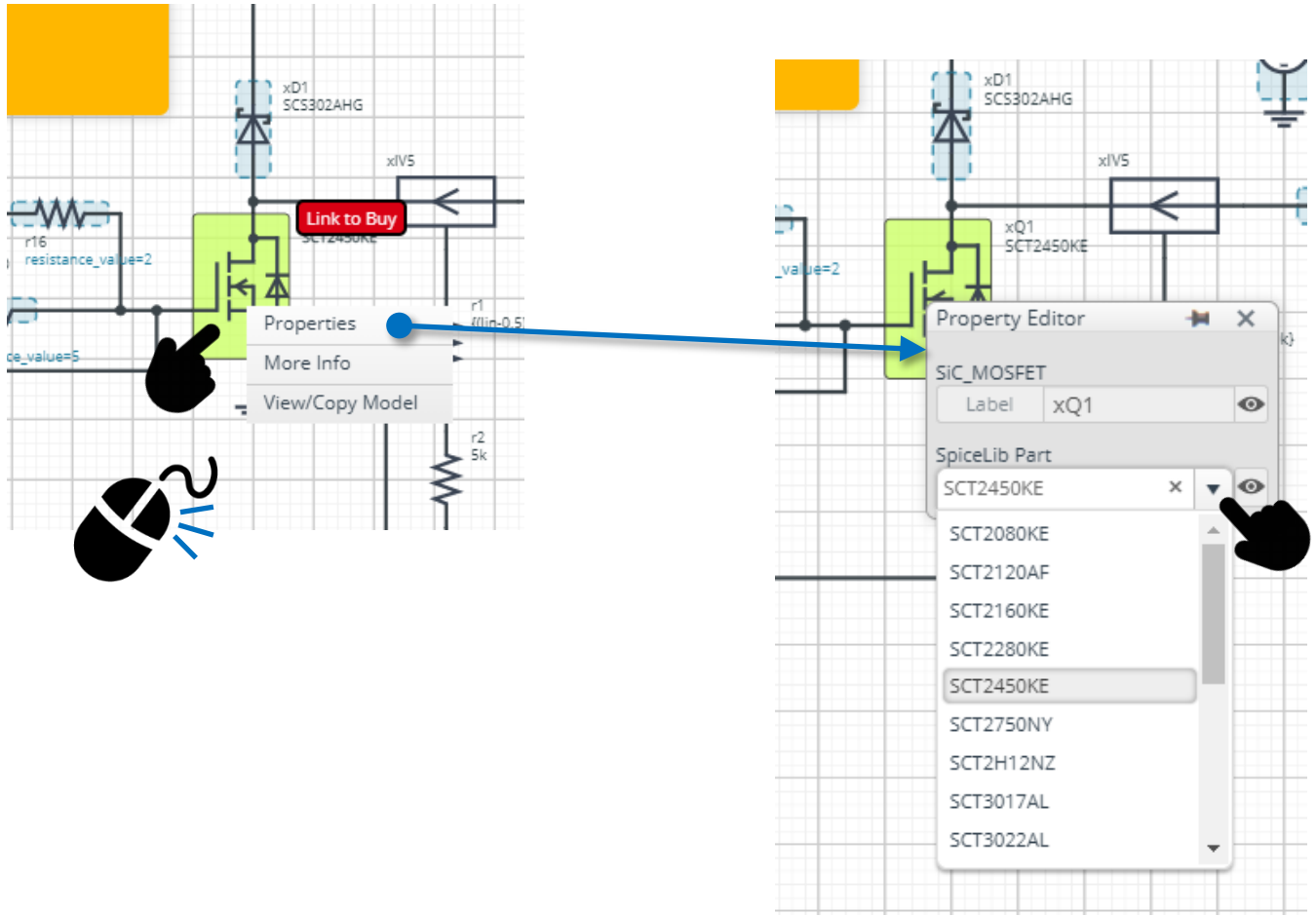
Right-click on the device ⇨ Select Properties ⇨ Pull down “SpiceLib Part” ⇨ Select the product



Loss Calculation Model

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

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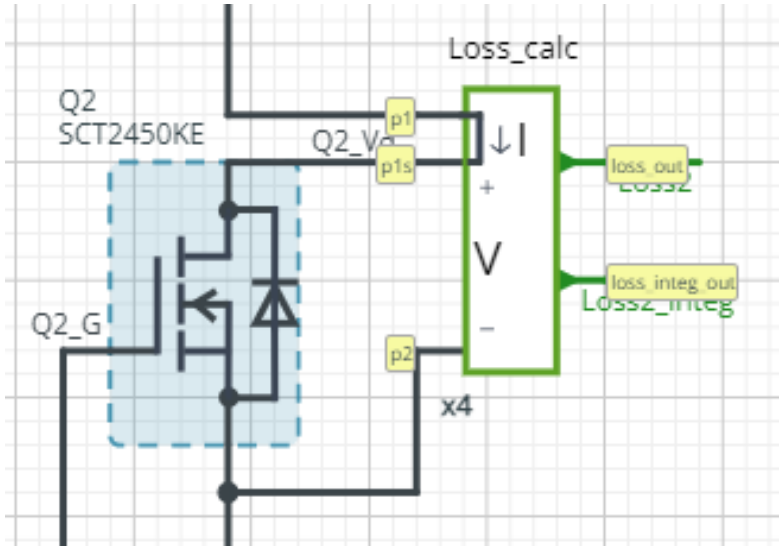
Loss calculation model ‘Loss_calc’



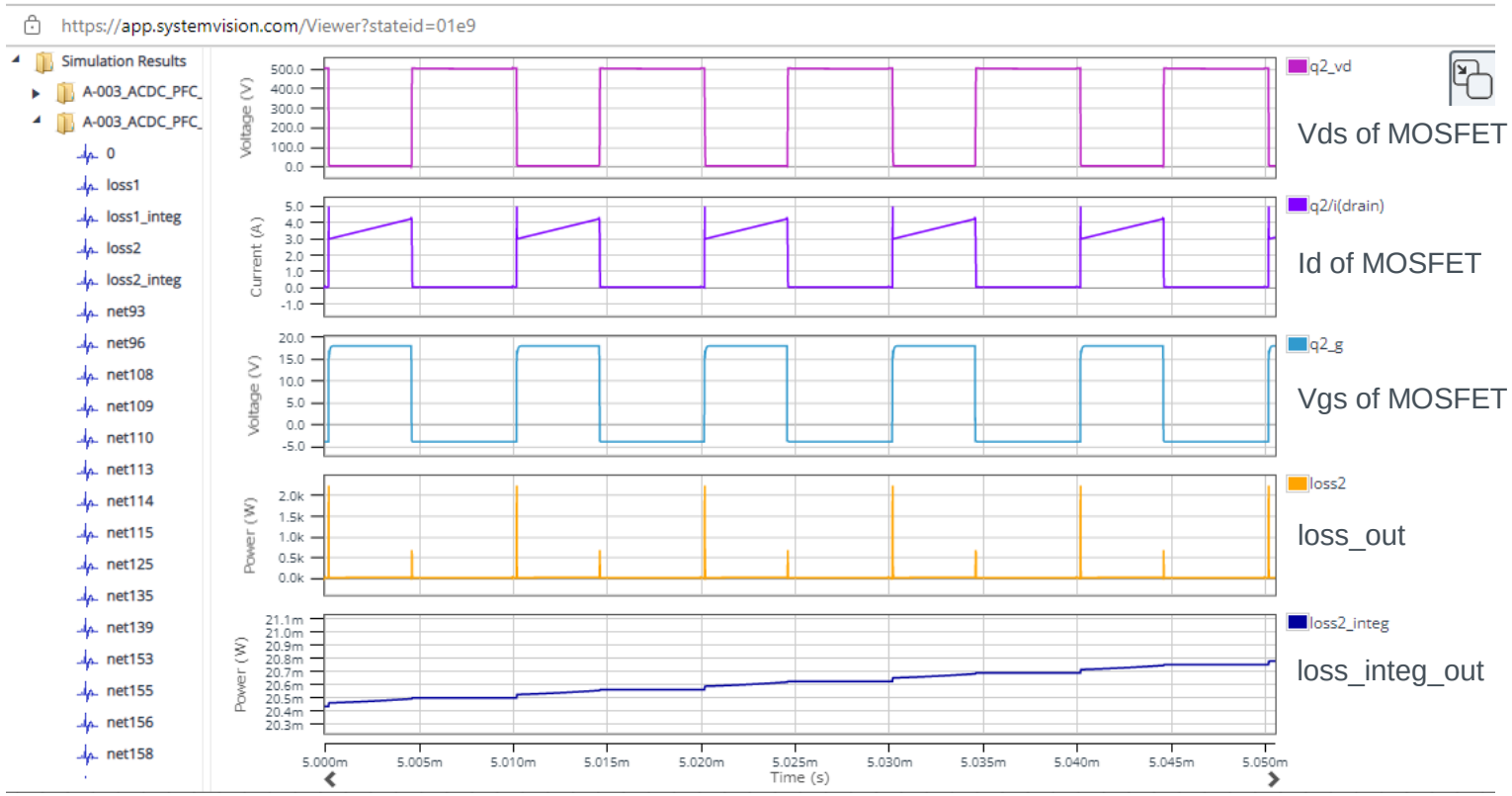
$$loss\_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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