B-002. 1-Phase 2-level Full Bridge Inverter P_{OUT}=20kW

ROHM Solution Simulator Schematic Information

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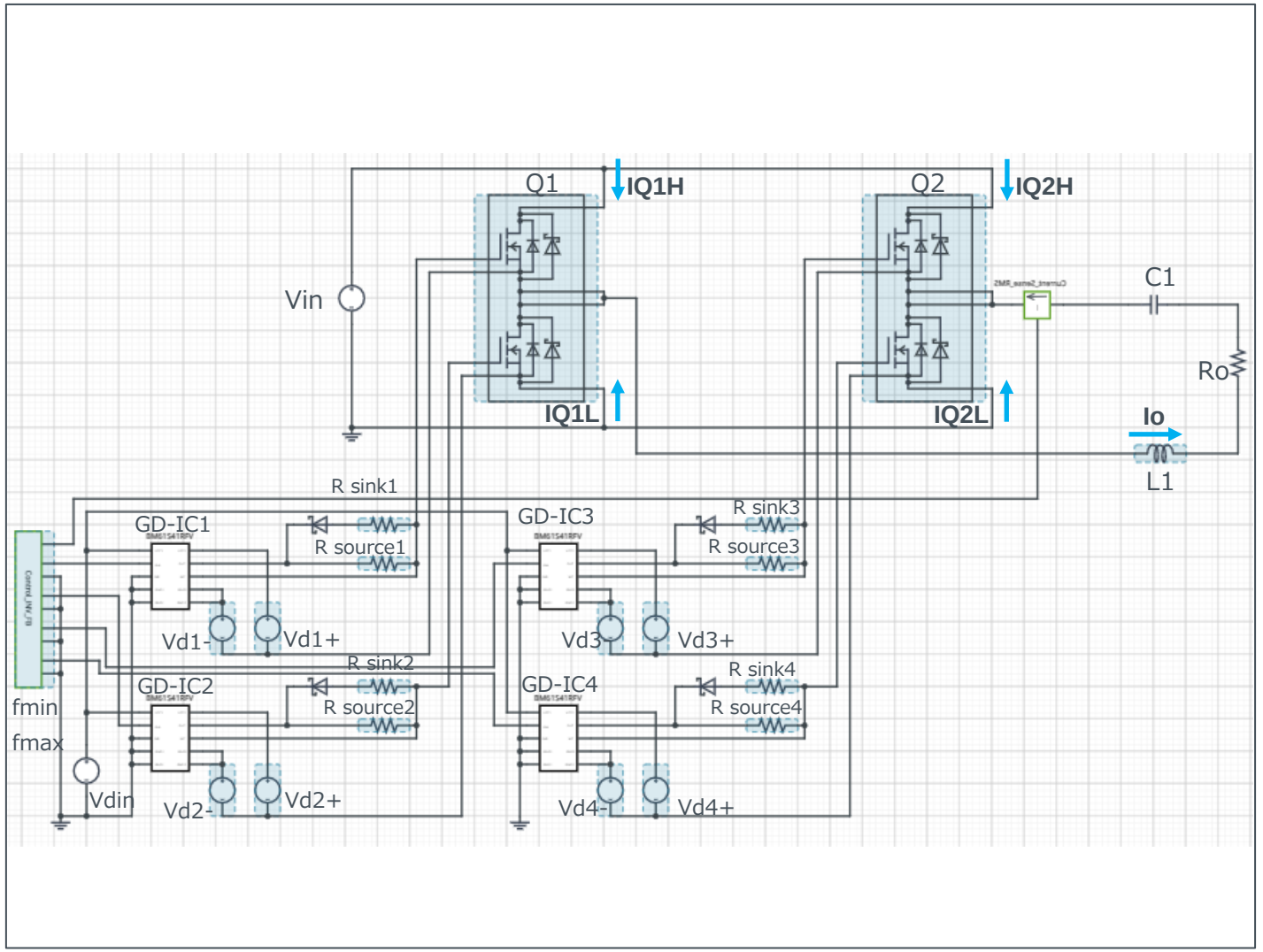
Simulation Parameters

Component name	Component	Default	Simulation Setting Range
Vin	Input voltage	800Vdc	
Io	Input current	70Aac	
fmin	Switching frequency	50kHz	10k – 300kHz
fmax	Switching frequency	100kHz	10k – 300kHz
Tj	Temperature	100°C	
Vd1-4+	Gate Drive voltage H	18V	10 – 20V
Vd1-4-	Gate Drive voltage L	0V	-4 – 0V
Vdin	Signal voltage level	5V	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1, Q2	MOSSBDx2	Selectable	
GD-IC1-4	Gate Driver	BM61S41RFV-C	
R sink1-4	Resistor for sink	ESR18 1Ω	0.1 -
R source1-4	Resistor for source	ESR18 2Ω	0.1 -
L1	Inductor	60µH	10µH - 2mH
Ro	Output Resistor	{Po/Io/Io}	

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 No.	feature
Q1, Q2	MOSSBDx2	BSM080D12P2C008 (*)	800V, 120A
		BSM120D12P2C005	1200V, 120A

* Default device

Simulation Waveform1

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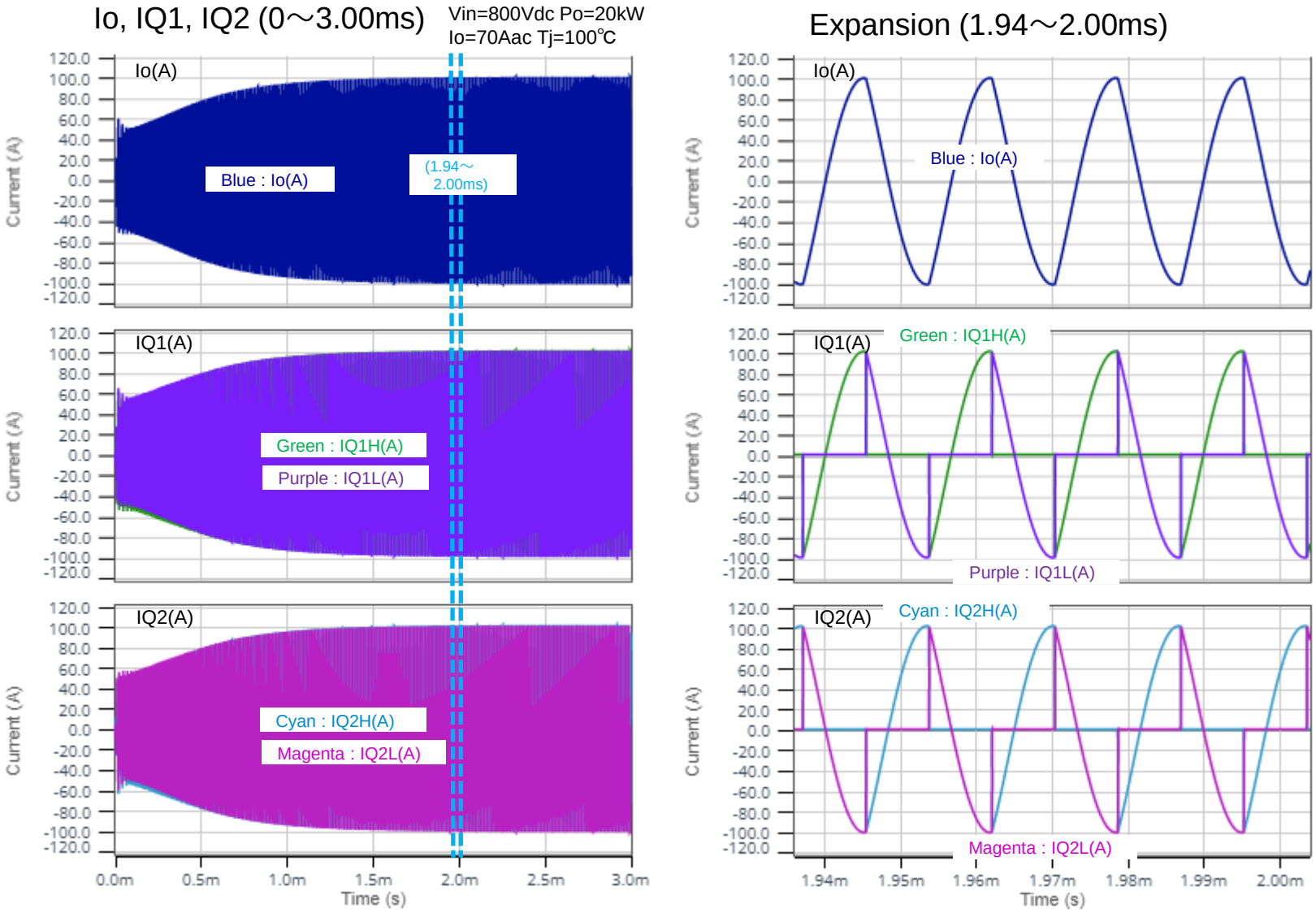

Efficiency, Power Dissipation

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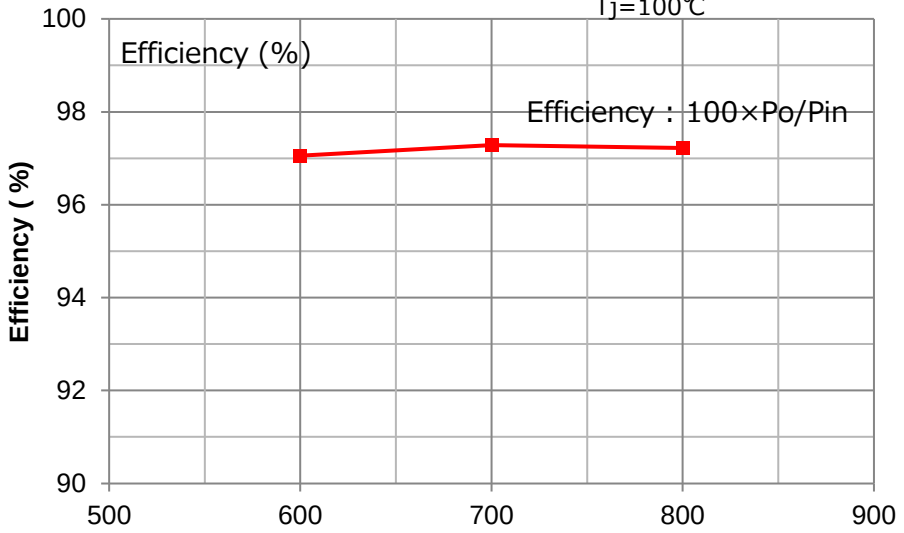
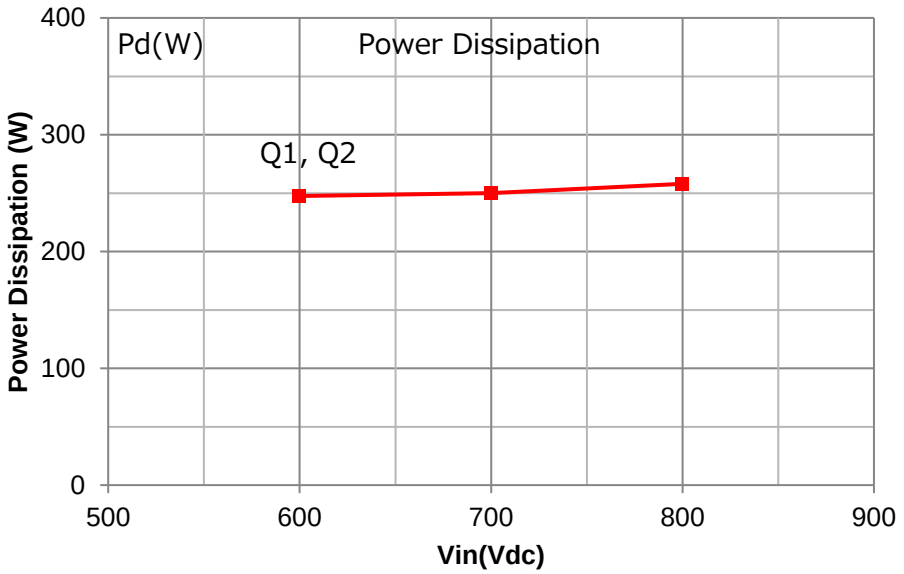
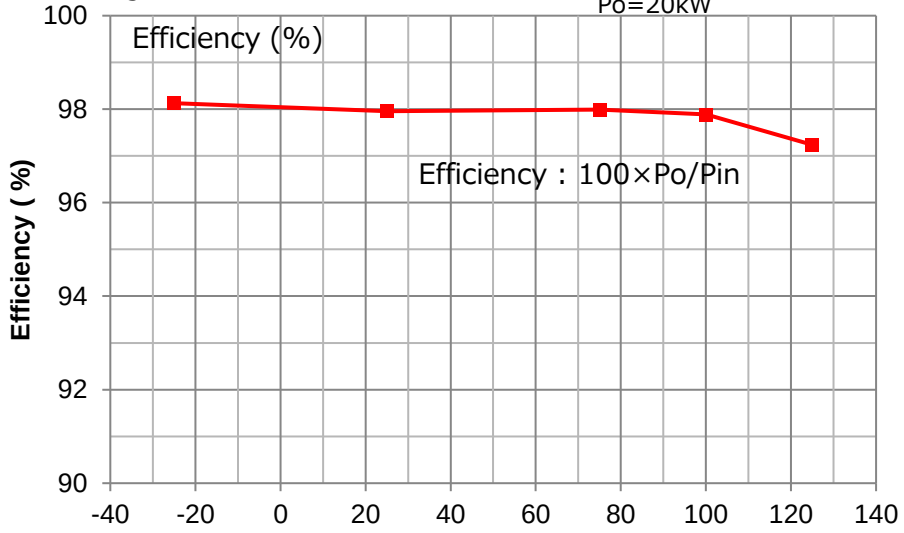
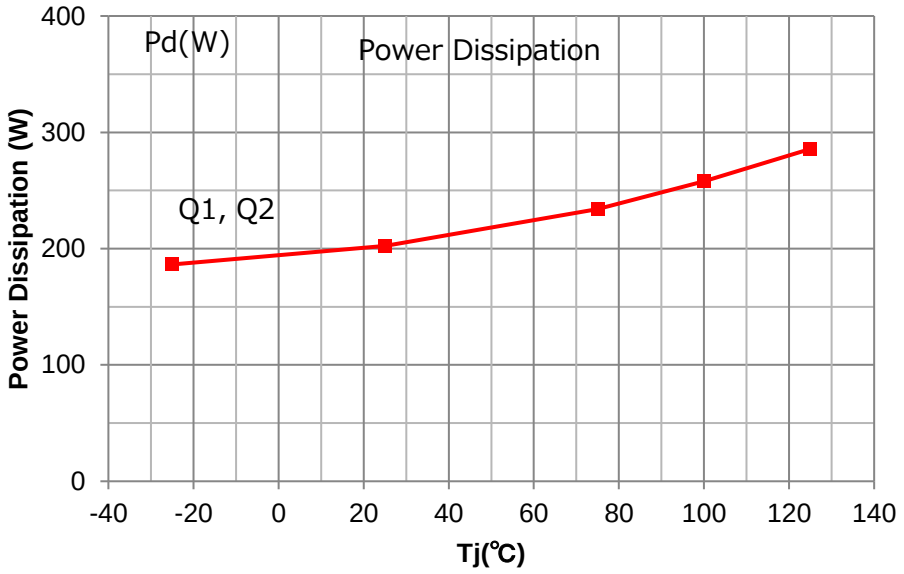
Vin：600Vdc～800Vdc　Io=70Aac Po=20kW Tj=100℃





Tj：-25℃～125℃　Vin=800Vdc Io=70Aac Po=20kW





How to change the devices

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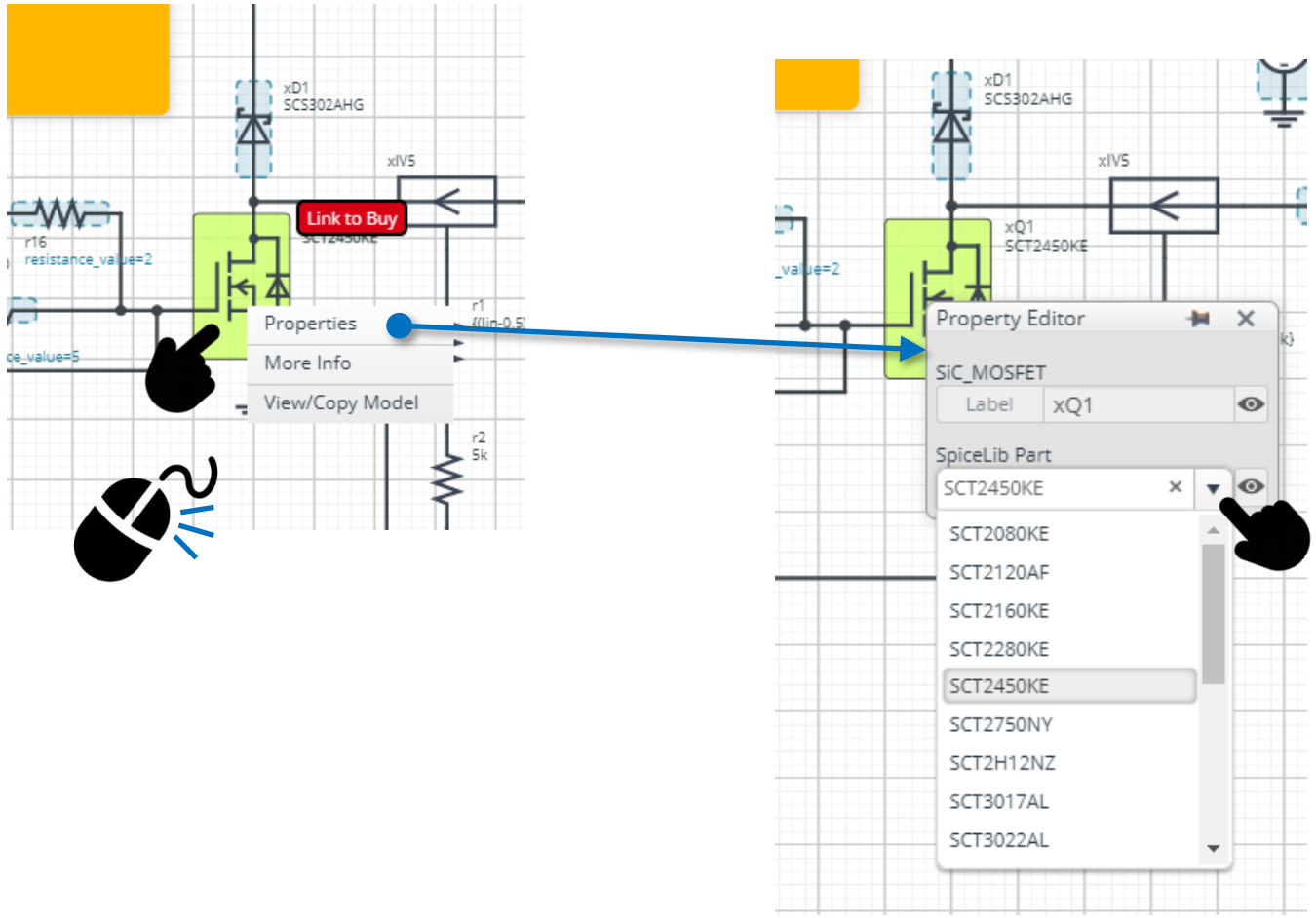
Right-click on the device ⇨ Select Properties ⇨ Pull down “SpiceLib Part” ⇨ Select the product



Loss Calculation Model

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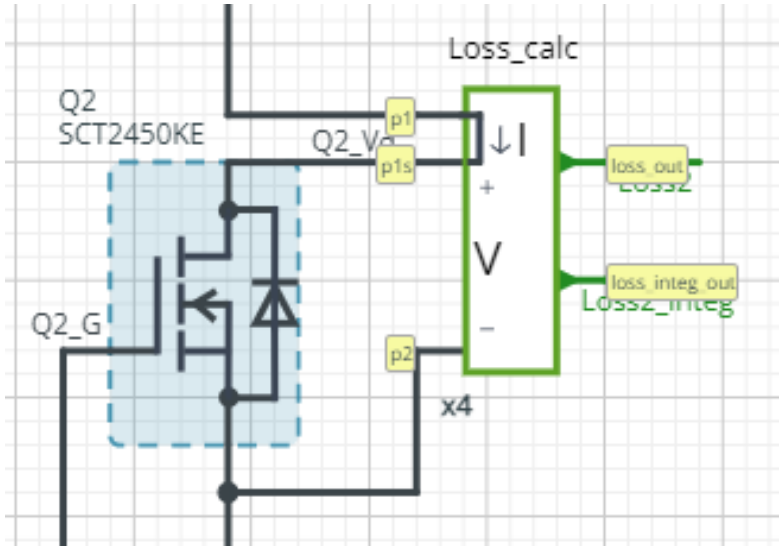
Loss Calculation Model outputs the instantaneous value of power loss and its integration.

Loss calculation model ‘Loss_calc’



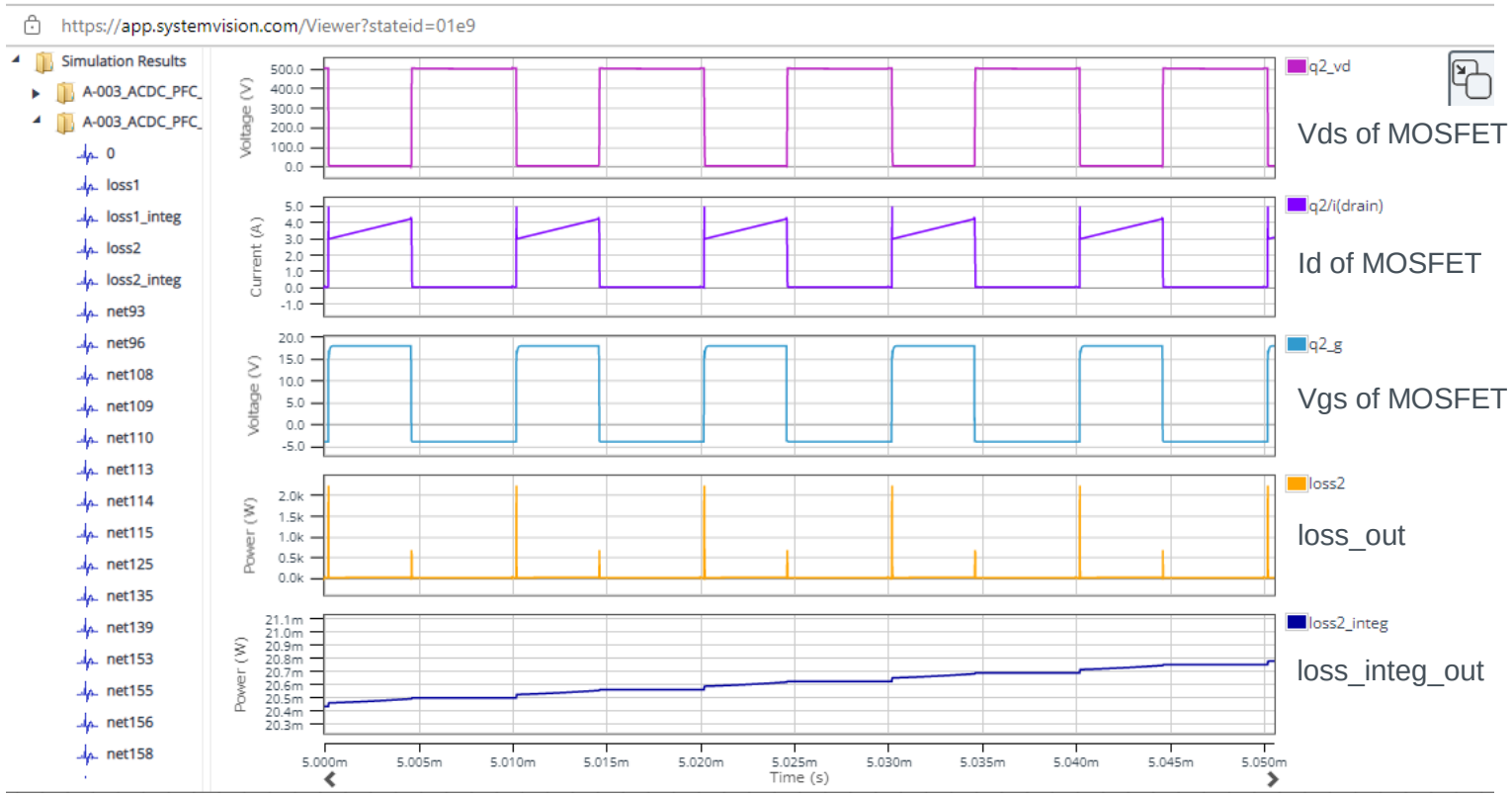
$$loss\_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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