A-018. 3-Phase Interleaved PFC Vin=200V, Iin=7.5A, DCM (Synchronous FETs)

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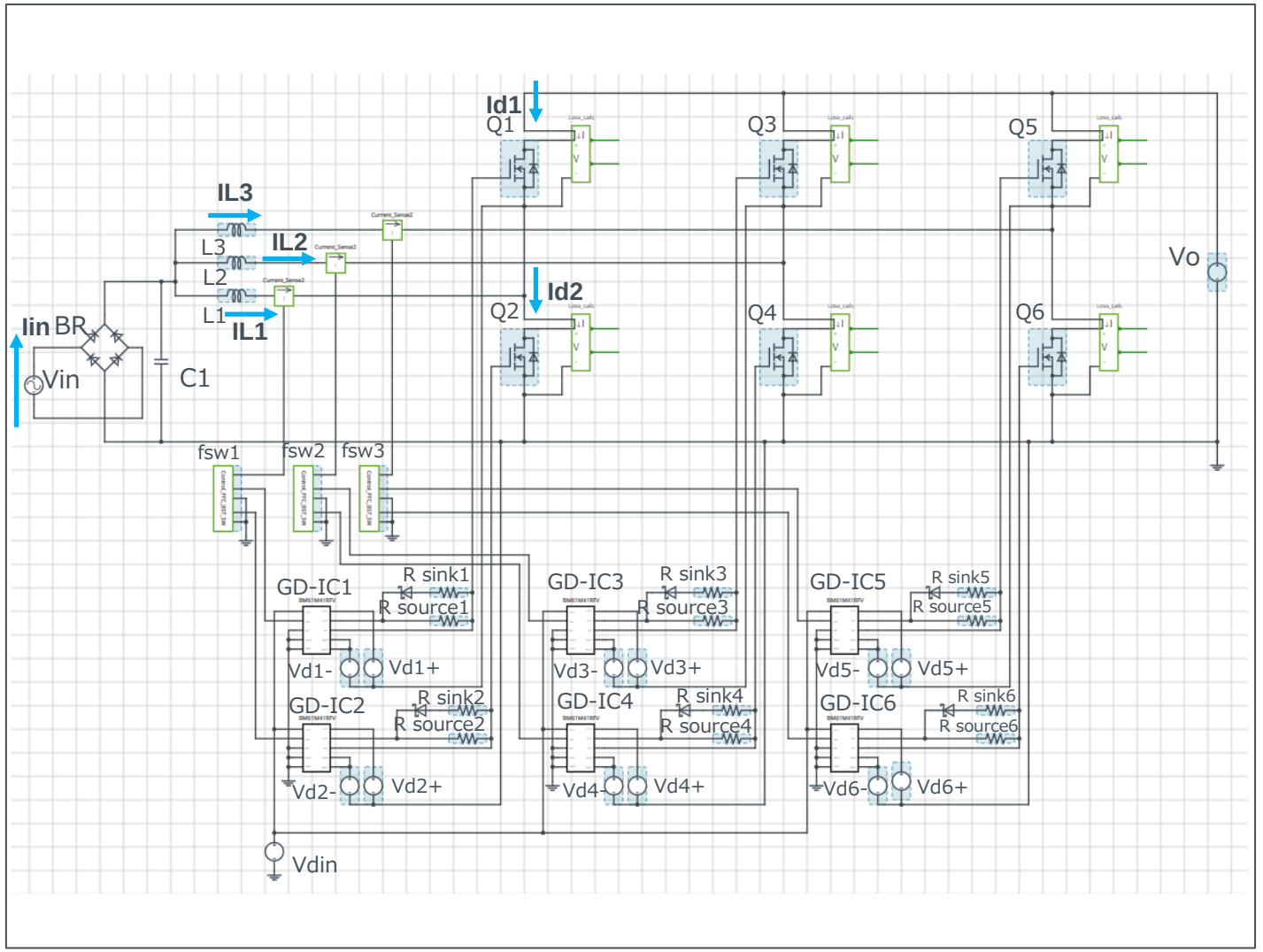
Simulation Parameters

Parameters	Descriptions	Default	Simulation Setting Range
Vin	Input voltage	200Vac 50Hz	
Iin	Input current	7.5Aac	
Vo	Output voltage	500Vdc	300 – 500Vdc
fsw1,2,3	Switching frequency	50kHz	10k – 300k
Tj	Temperature	100°C	
Vd1-6+	Gate Drive voltage H	15V	10 – 20V
Vd1-6-	Gate Drive voltage L	-4V	-4 – 0V
Vdin	Signal voltage level	5V	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1 – Q6	SJ-MOSFET	Selectable	
GD-IC1-6	Gate Driver	BM61M41RFV-C	
R sink1-6	Resistor for sink	ESR18 2Ω	0.1 -
R source1-6	Resistor for source	ESR18 5Ω	0.1 -
L1, L2, L3	Inductor	300µH	10µH - 2mH
C1	Capacitor	50nF	
BR	Bridge Diode	600V 10A ideal diode	

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.

A-018. 3-Phase Interleaved PFC Vin=200V, Iin=7.5A, DCM (Synchronous FETs)

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Selectable Devices

Component name	Component	Product No.	feature
Q1 – Q4	SJ-MOSFET	R6004JNX	600V, 4A
		R6006JNX	600V, 6A
		R6009JNX	600V, 9A
		R6018JNX	600V, 18A
		R6020JNX	600V, 20A
		R6025JNX	600V, 25A
		R6030JNZ4 (*)	600V, 30A
		R6050JNZ4	600V, 50A

* Default device

Selectable Devices

Simulation Waveform1

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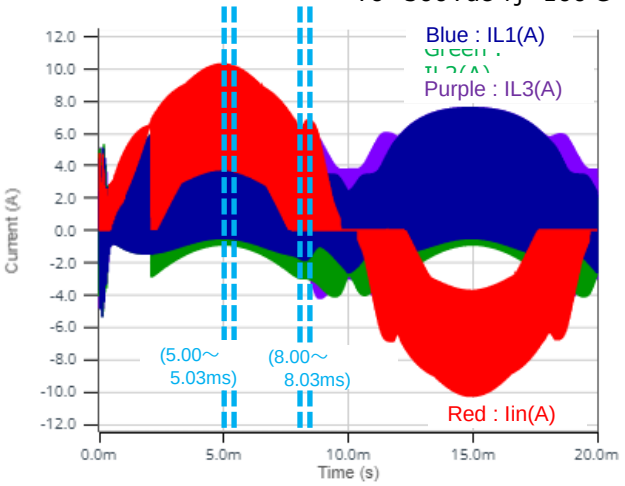
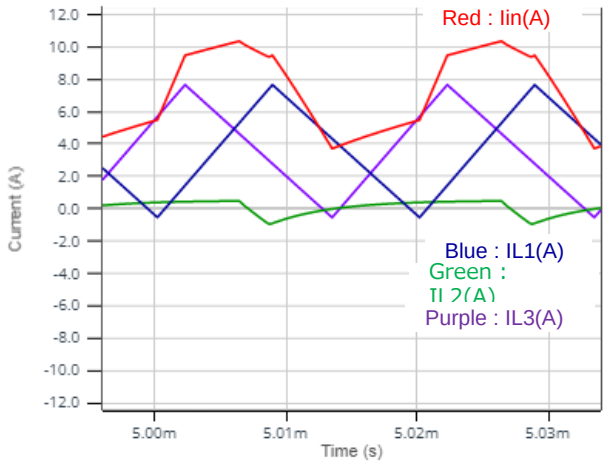
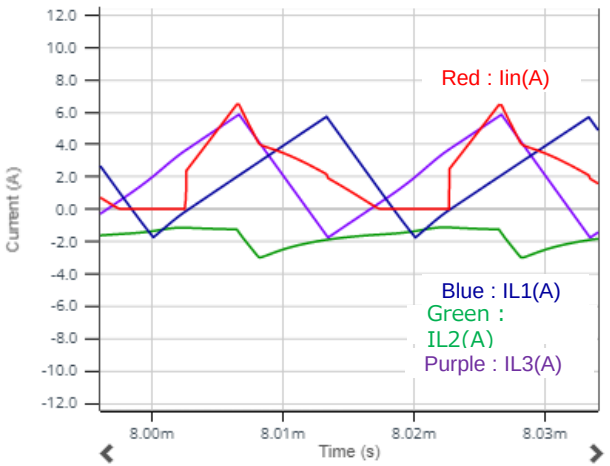
IL1, IL2, IL3, Iin Vin=200Vac Iin=7.5Aac Vo=500Vdc Tj=100℃



Expansion (5.00～5.03ms)



Expansion (8.00～8.03ms)



Simulation Waveform2

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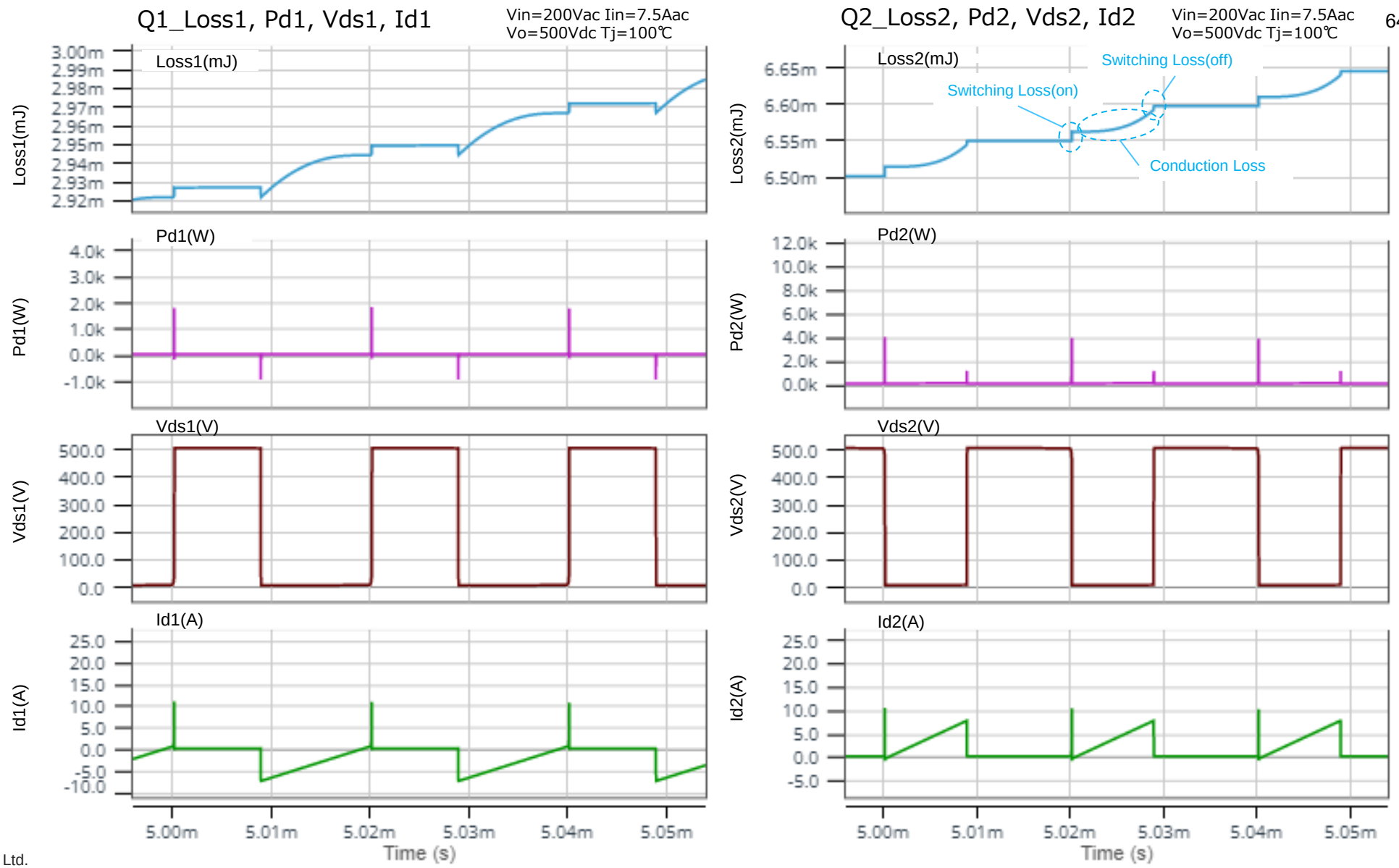

Efficiency, Power Dissipation

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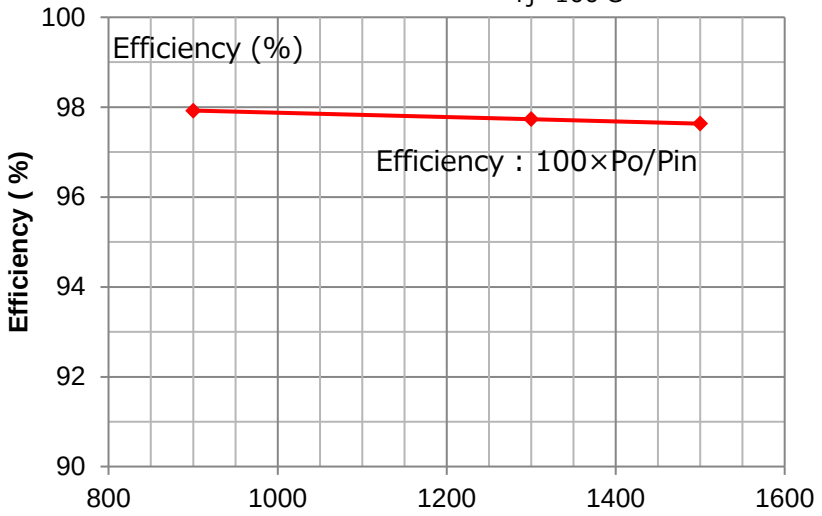
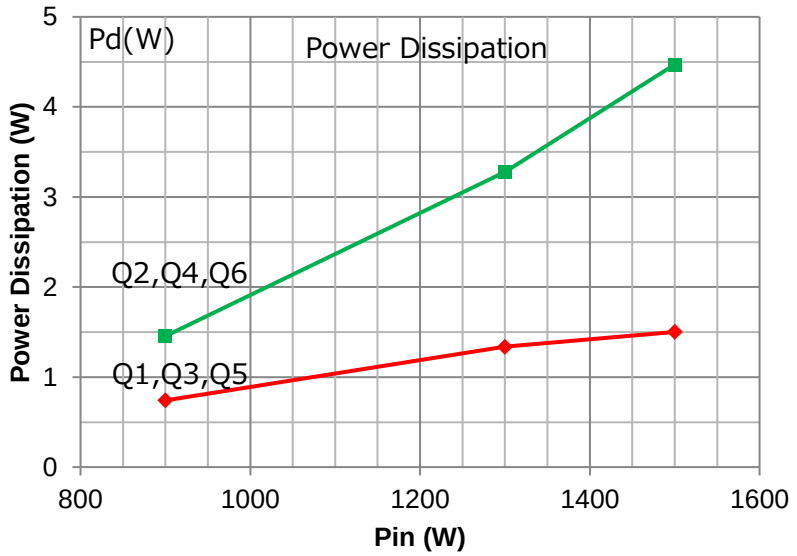
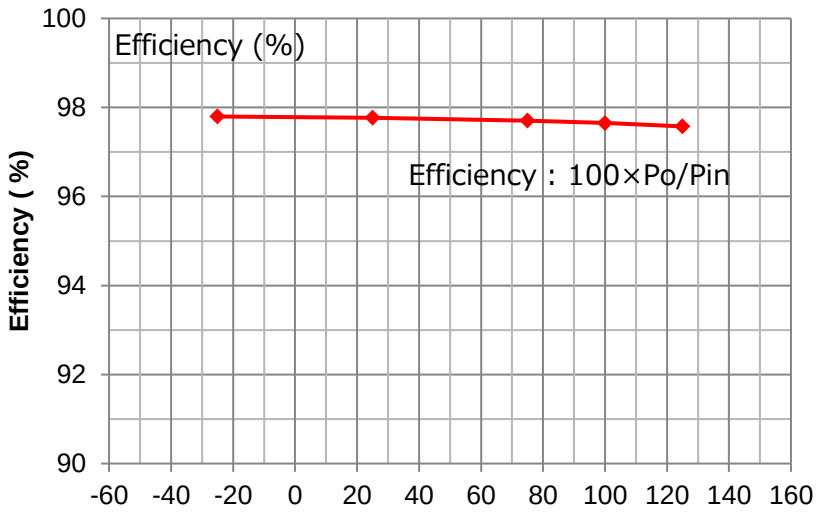
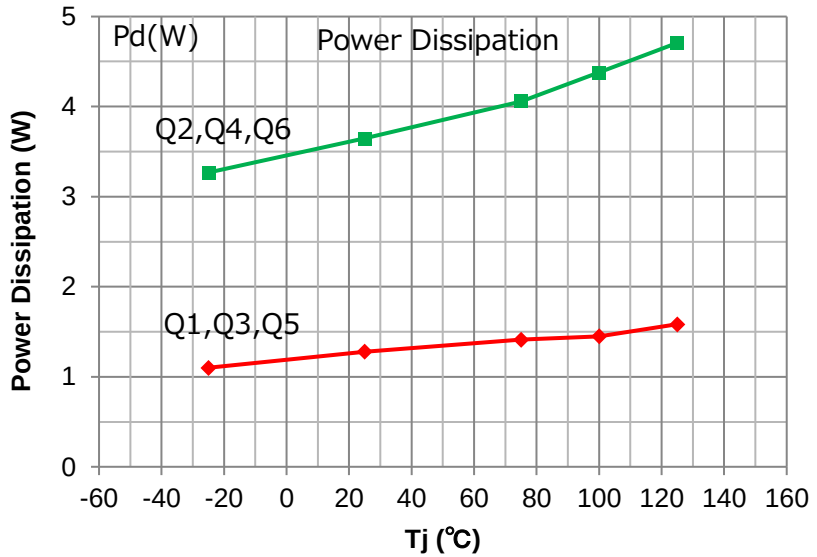
Pin：900W～1.5kW　Vin=200Vac　Vo=500Vdc　Tj=100℃





Tj：-25℃～125℃　Vin=200Vac　Iin=7.5Aac　Vo=500Vdc





How to change the devices

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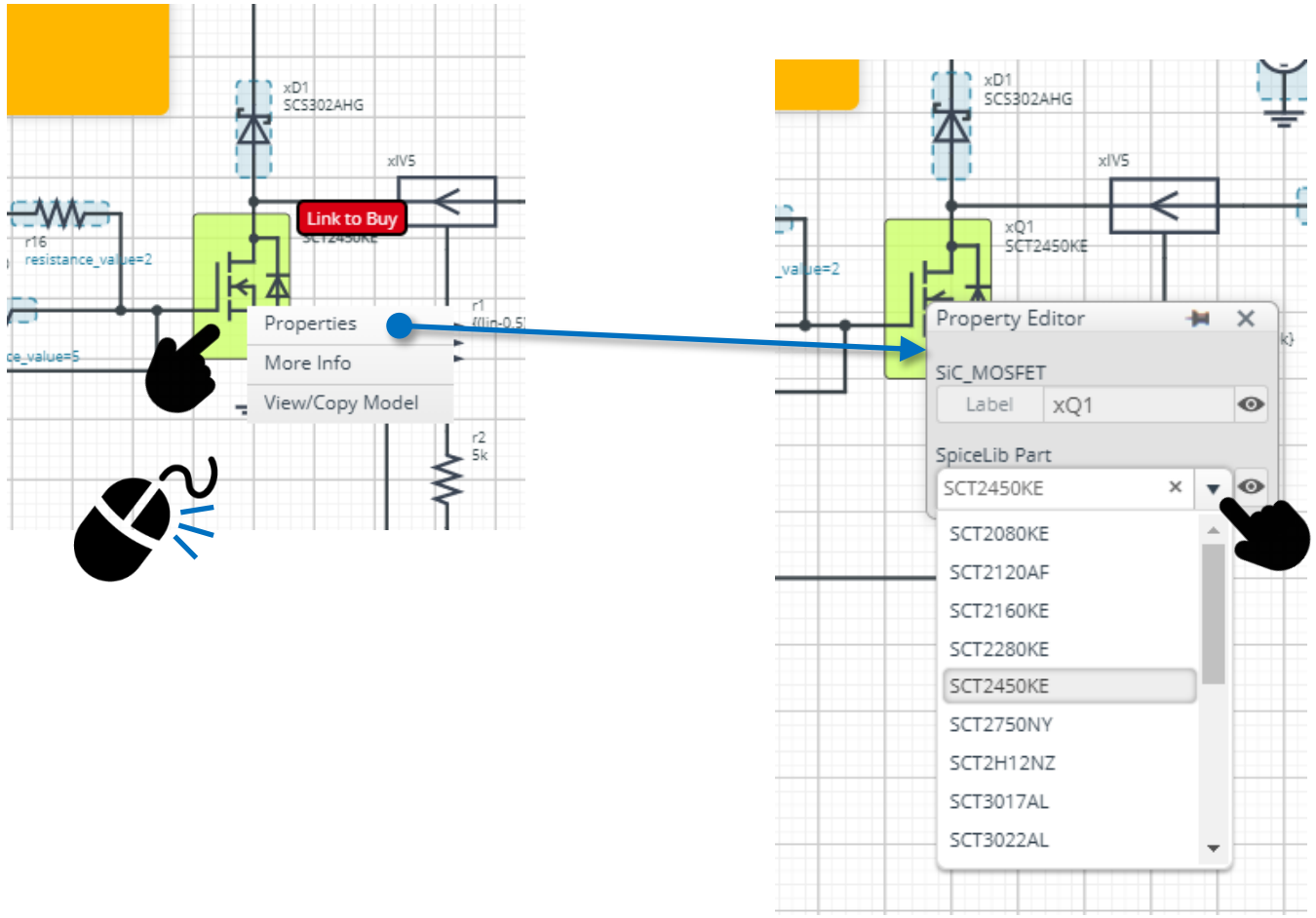
Right-click on the device ⇨ Select Properties ⇨ Pull down “SpiceLib Part” ⇨ Select the product



Loss Calculation Model

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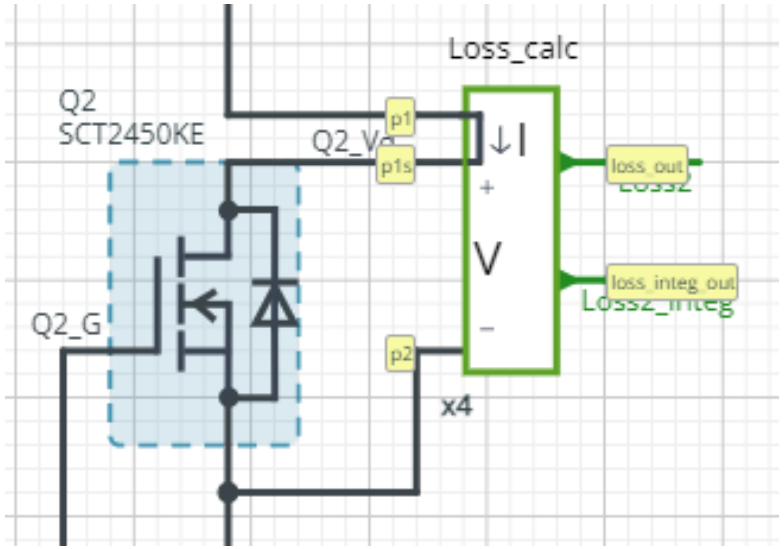
Loss Calculation Model outputs the instantaneous value of power loss and its integration.

Loss calculation model ‘Loss_calc’



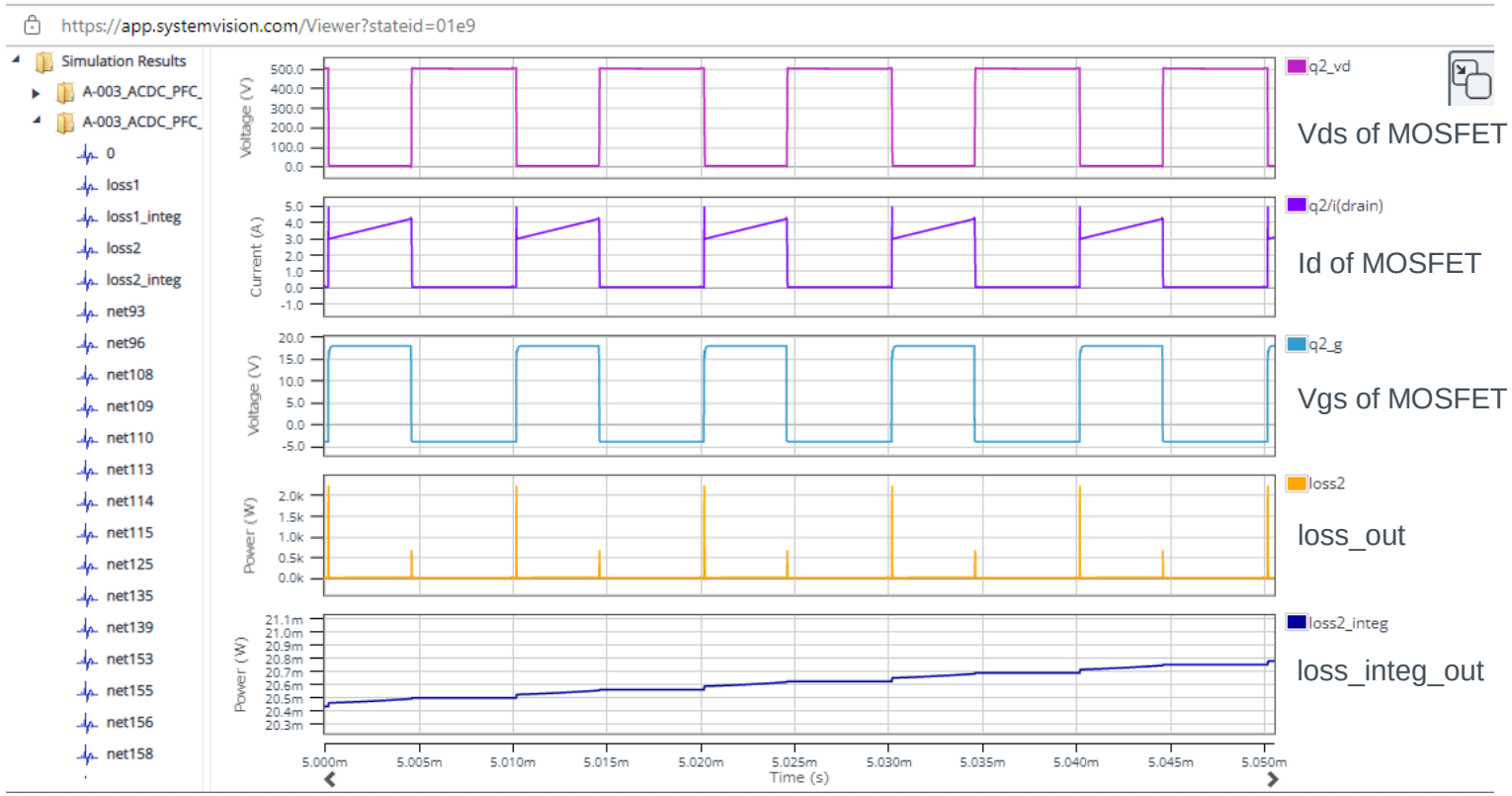
$$loss\_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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