

A-015. Bridgeless PFC $V_{in}=200V$, $I_{in}=20A$, CCM (Full-Bridge)

ROHM Solution Simulator Schematic Information



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64UG109E Rev.004

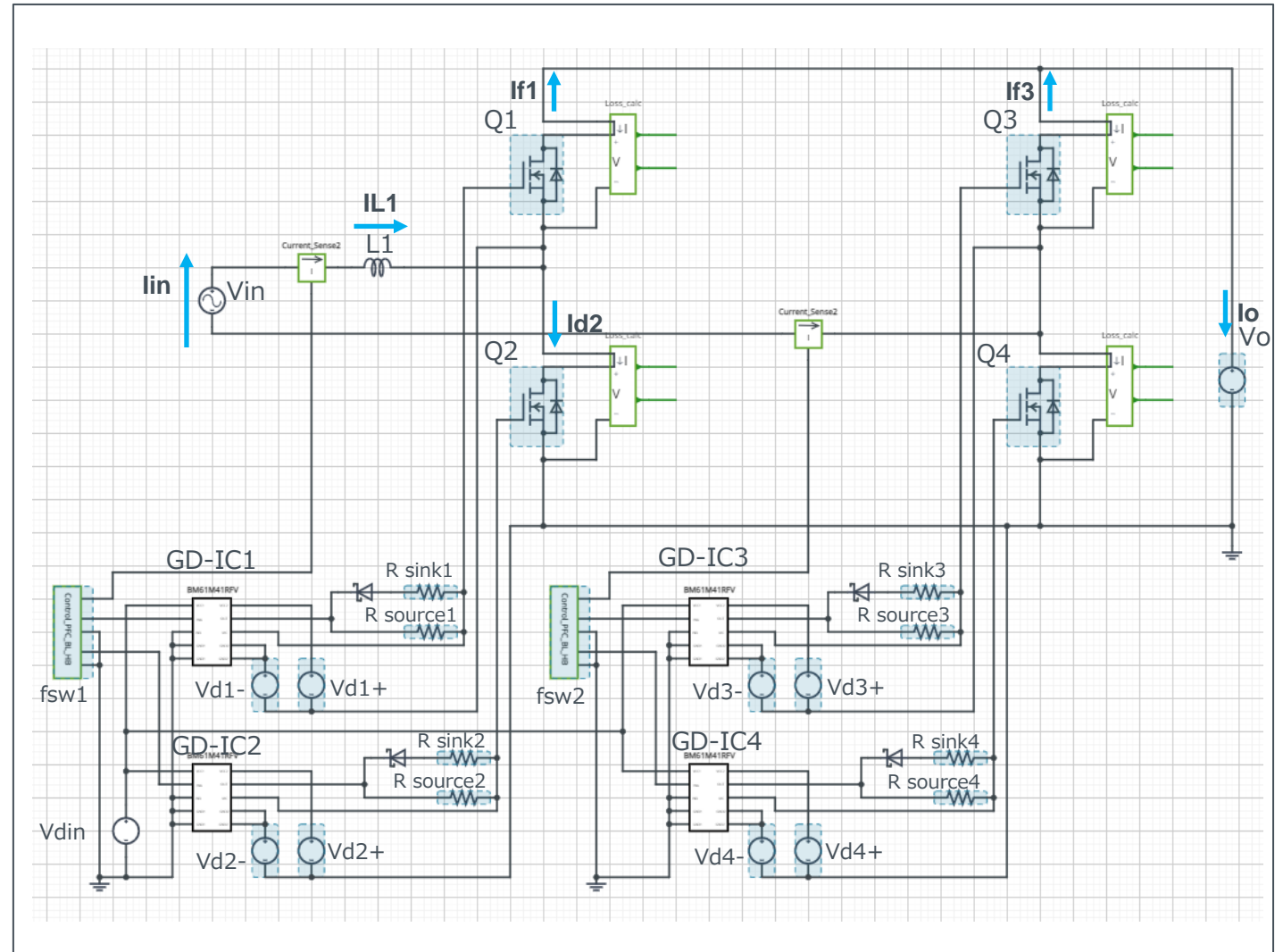
Simulation Parameters

Parameters	Descriptions	Default	Simulation Setting Range
V_{in}	Input voltage	200Vac 50Hz	
I_{in}	Input current	20Aac	
V_o	Output voltage	500Vdc	300 – 500Vdc
fsw1,2	Switching frequency	50kHz	10k – 300kHz
T_j	Temperature	100°C	
Vd1-4+	Gate Drive voltage H	15V	10 – 20V
Vd1-4-	Gate Drive voltage L	-4V	-4 – 0V
Vdin	Signal voltage level	5V	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1 – Q4	SJ-MOSFET	Selectable	
GD-IC1-4	Gate Driver	BM61M41RFV-C	
R sink1-4	Resistor for sink	ESR18 1Ω	0.1 -
R source1-4	Resistor for source	ESR18 2Ω	0.1 -
L1	Inductor	200μH	10μH - 2mH

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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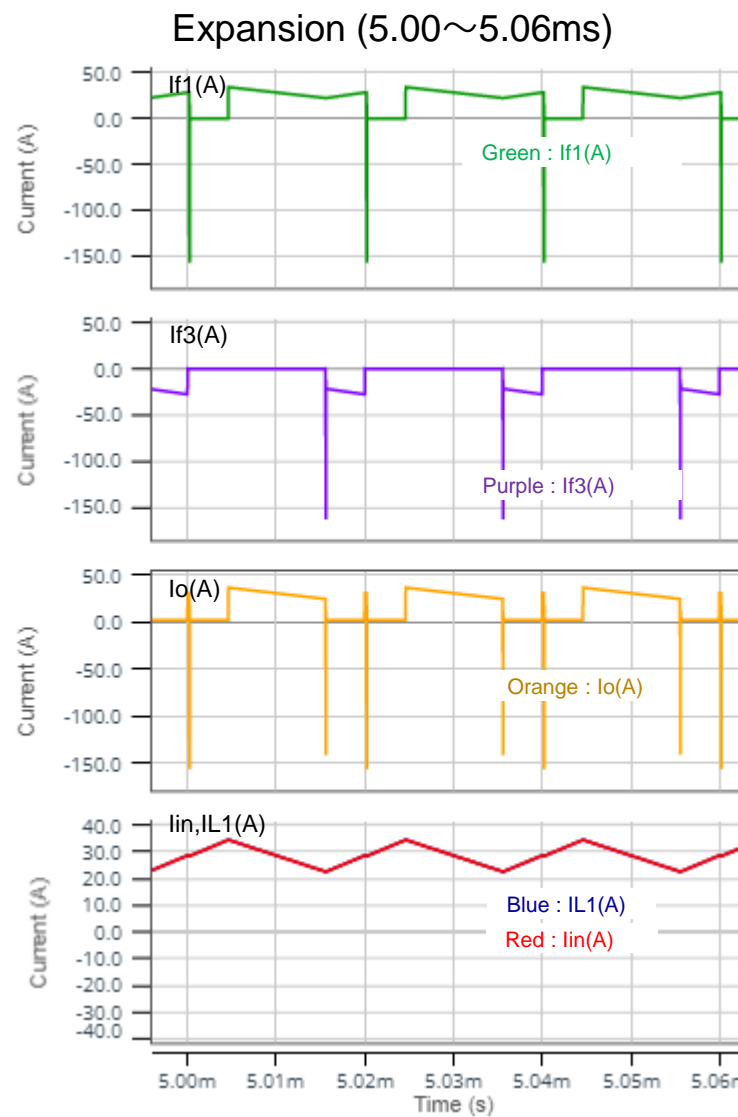
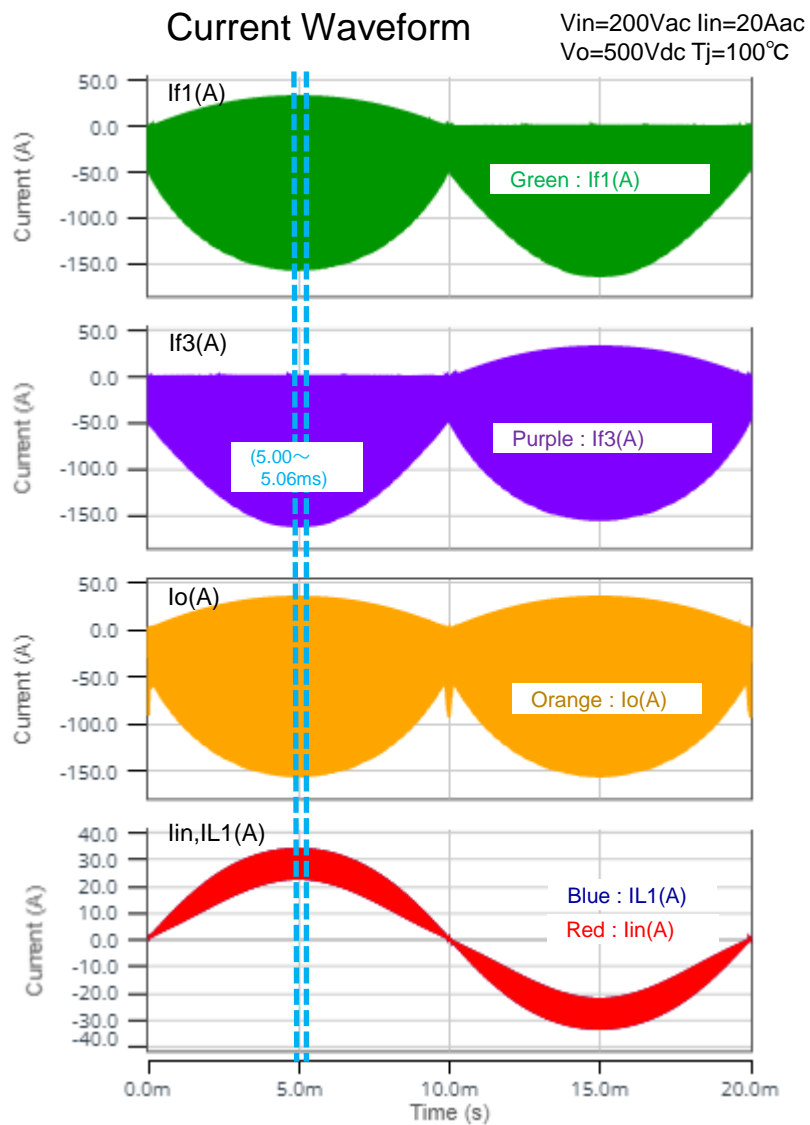
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Selectable Devices

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

Simulation Waveform1

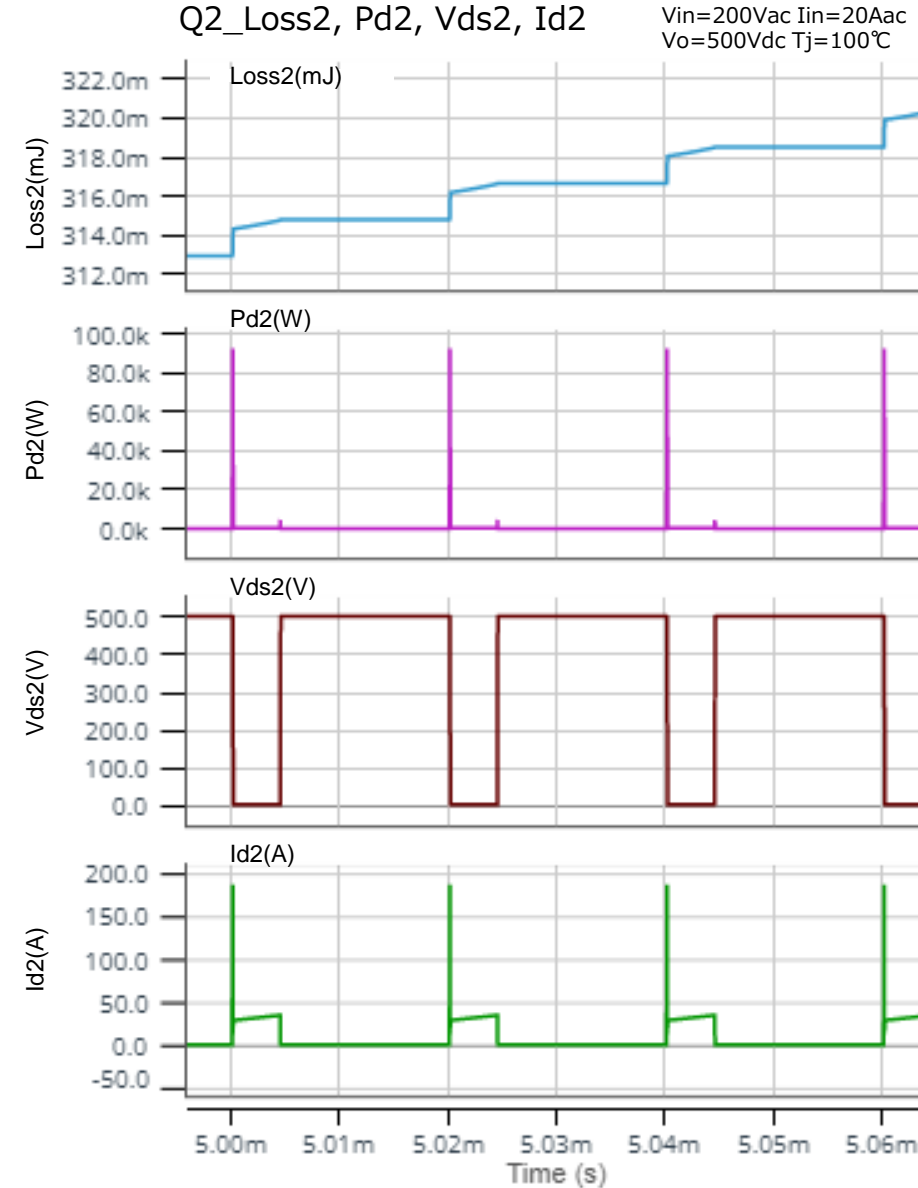
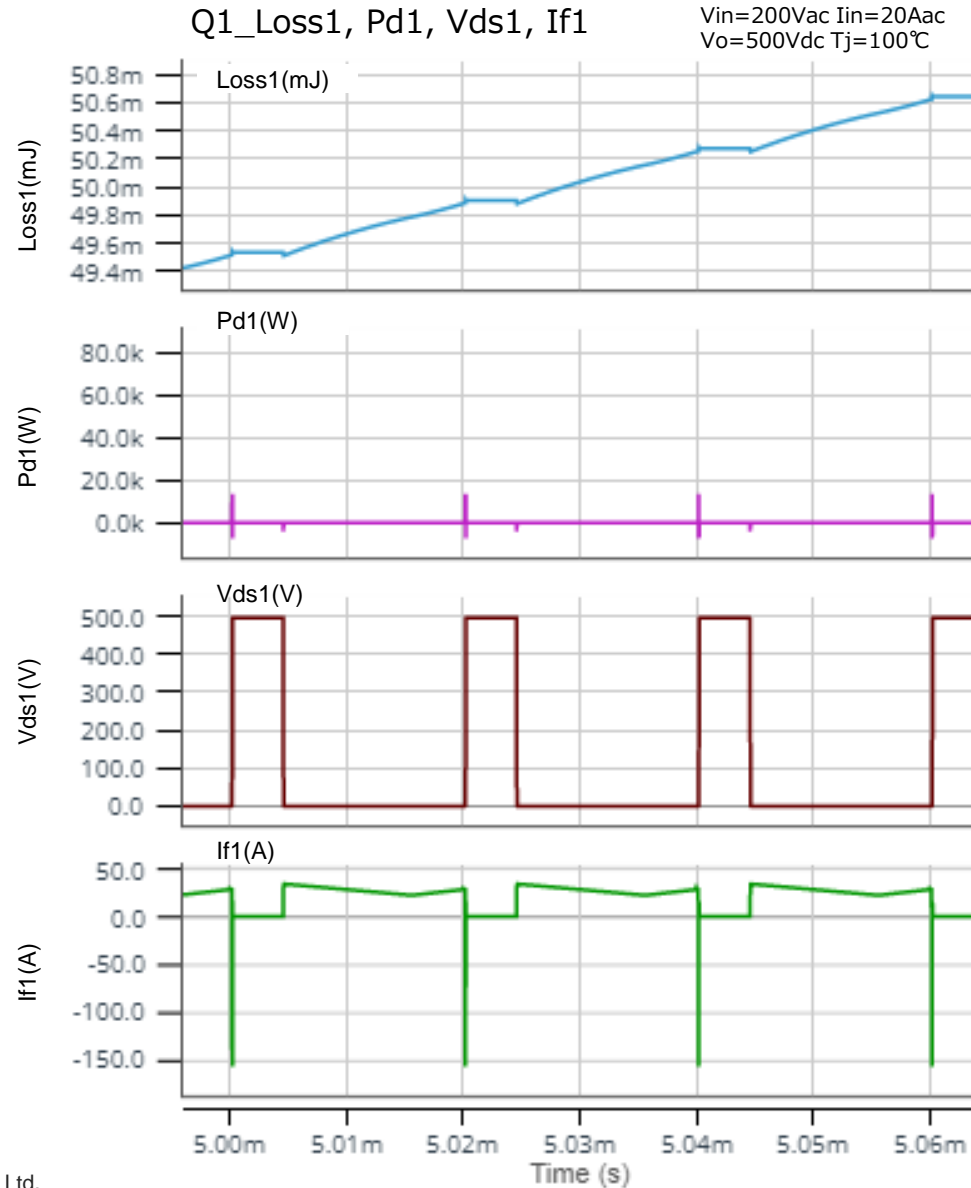


Simulation Waveform2

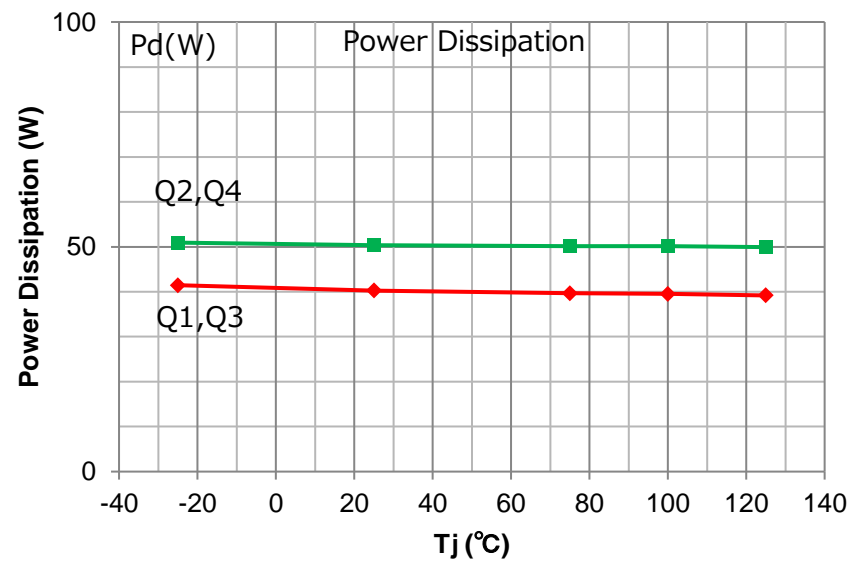
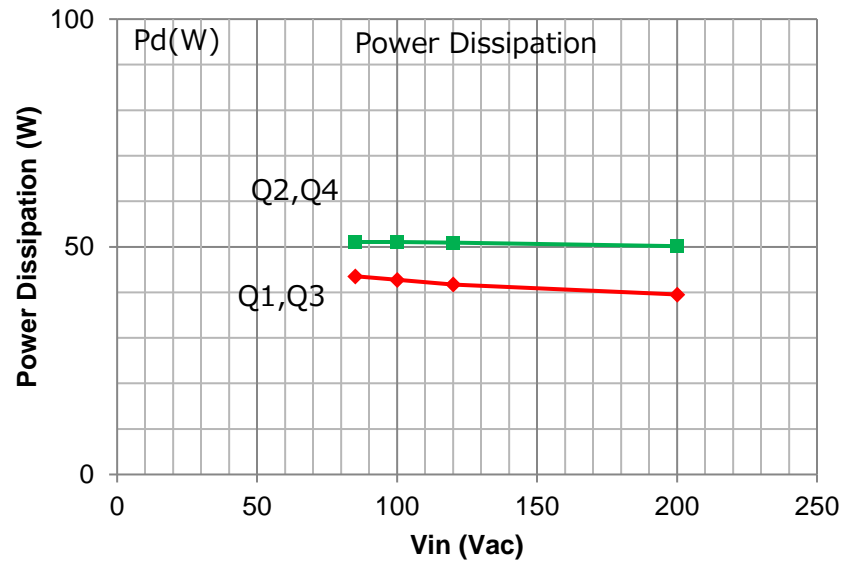
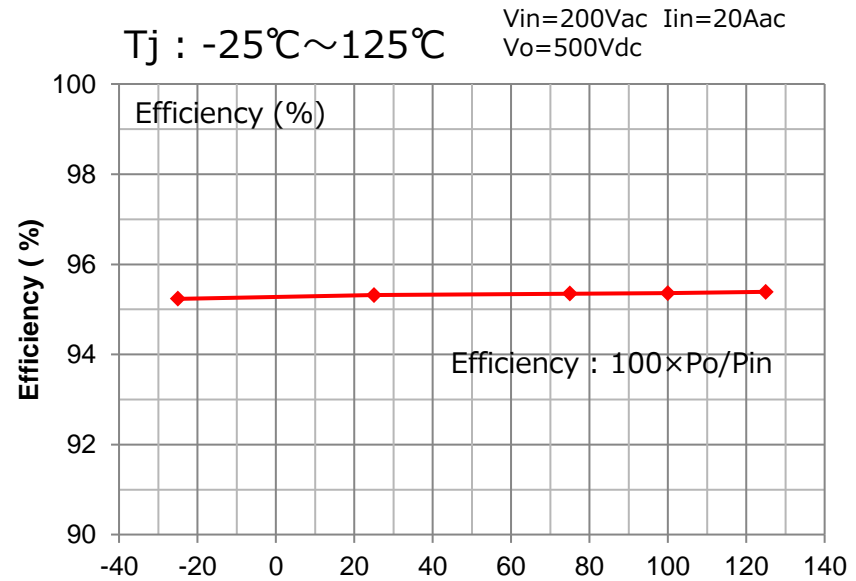
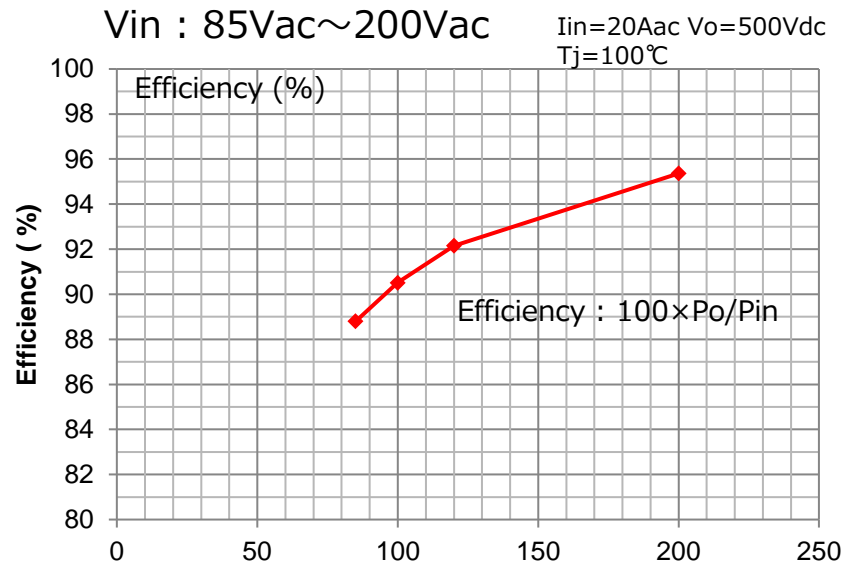


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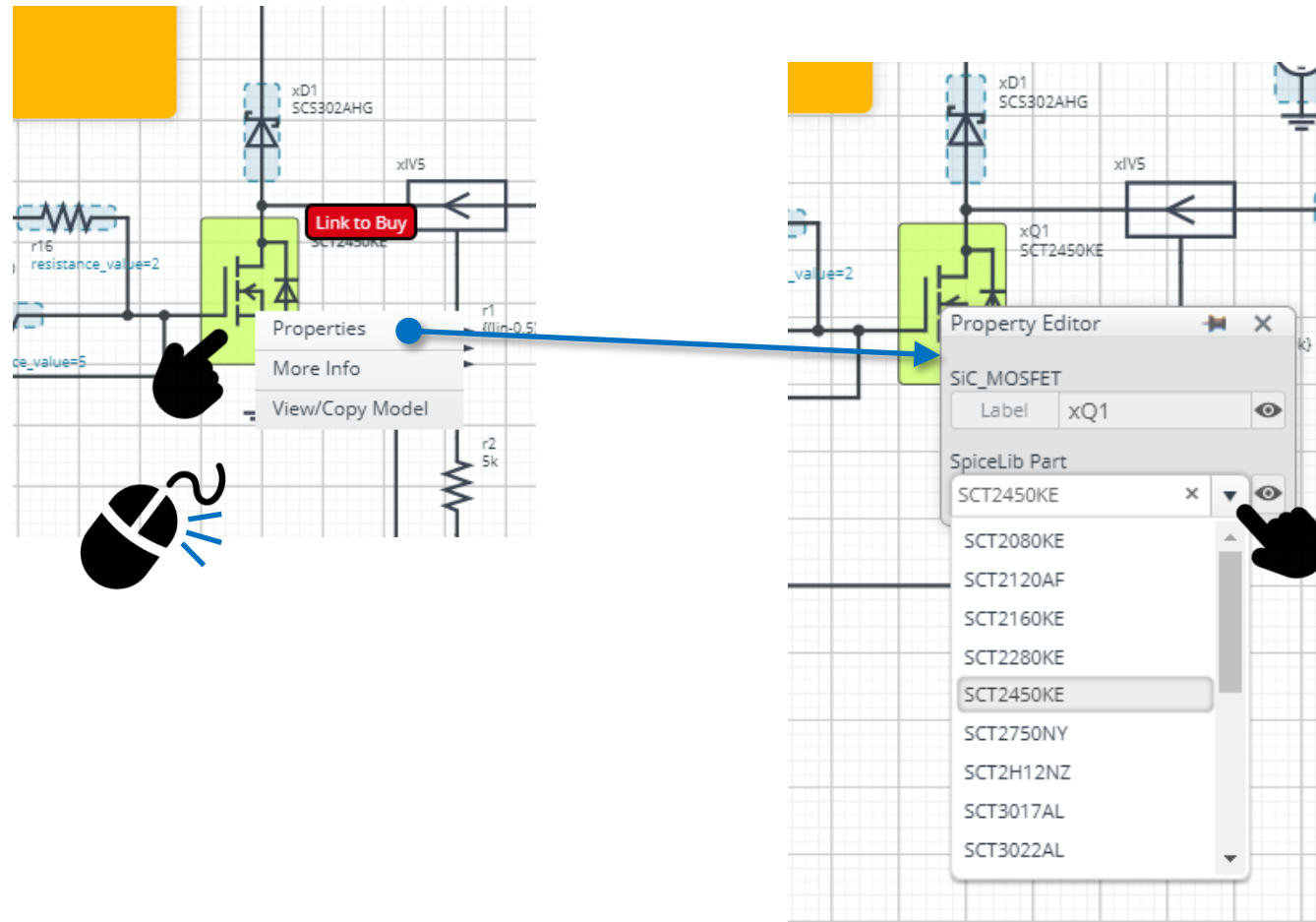


Efficiency, Power Dissipation



How to change the devices

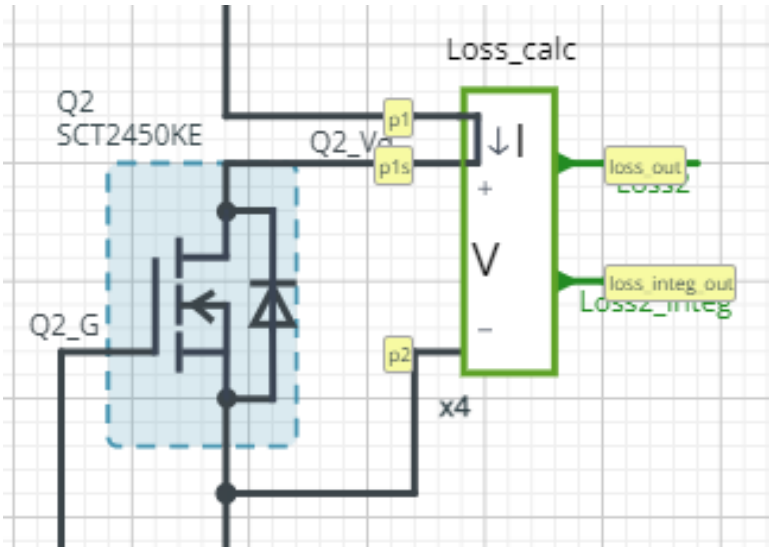
Right-click on the device → Select Properties → Pull down “SpiceLib Part” → Select the product



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

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Loss calculation model 'Loss_calc'



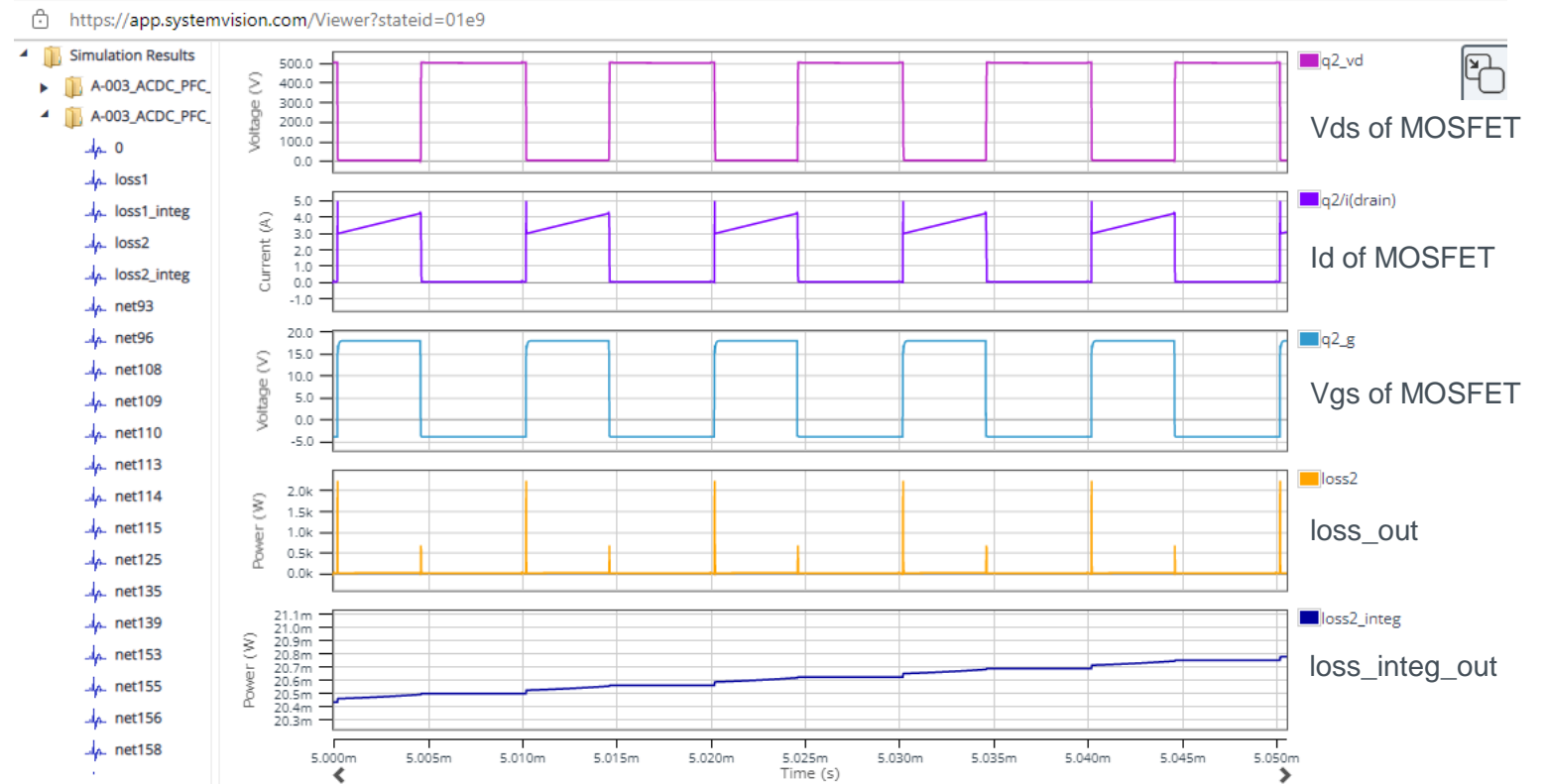
$$loss_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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