

# A-007. Interleaved PFC $V_{in}=200V$ , $I_{in}=5A$ , CCM (Synchronous FETs)

ROHM Solution Simulator Schematic Information



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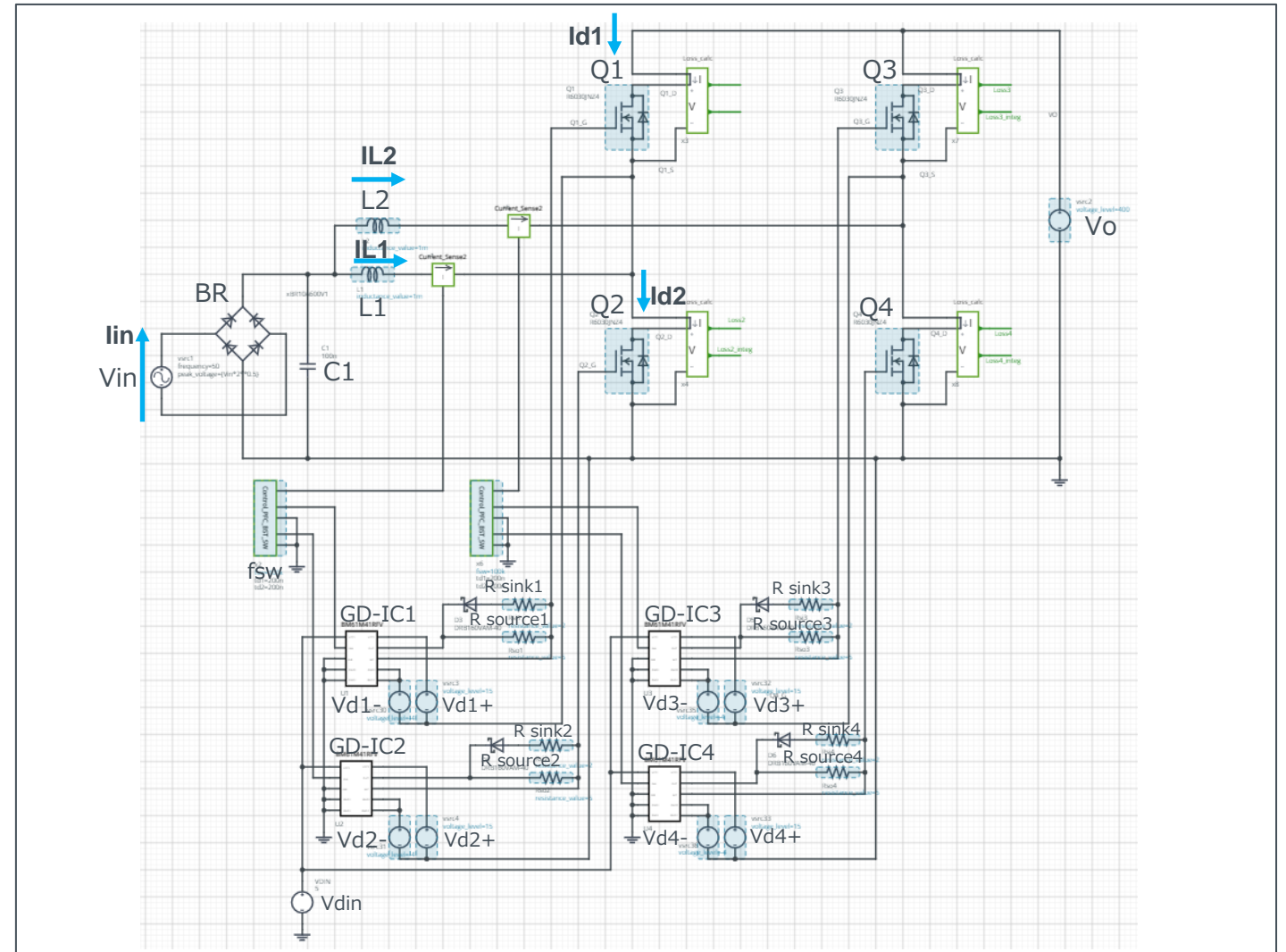
## Simulation Parameters

Parameters	Descriptions	Default	Simulation Setting Range
$V_{in}$	Input voltage	200Vac 50Hz	
$I_{in}$	Input current	5Aac	
$V_o$	Output voltage	400Vdc	300 – 500Vdc
fsw	Switching frequency	100kHz	10k – 300kHz
$T_j$	Temperature	100°C	
$V_{d1-4+}$	Gate Drive voltage H	15V	10 – 20V
$V_{d1-4-}$	Gate Drive voltage L	-4V	-4 – 0V
$V_{din}$	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 2Ω	0.1 -
R source1-4	Resistor for source	ESR18 5Ω	0.1 -
L1,2	Inductor	1mH	10μH - 2mH
C1	Capacitor	100nF	
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.

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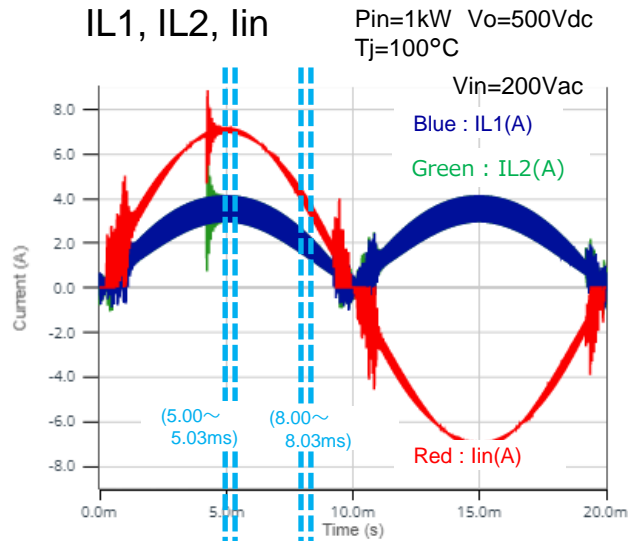


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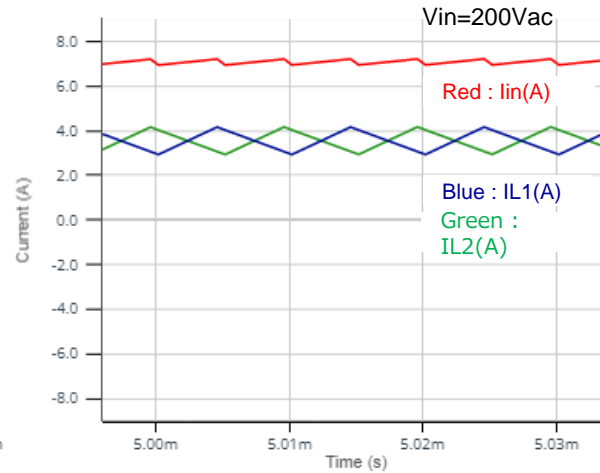
## Selectable Devices

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

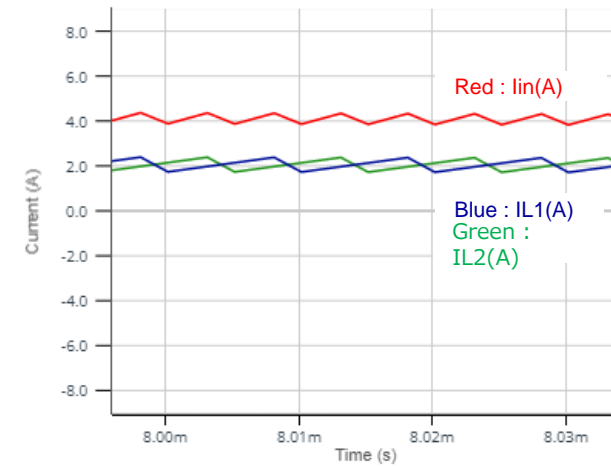
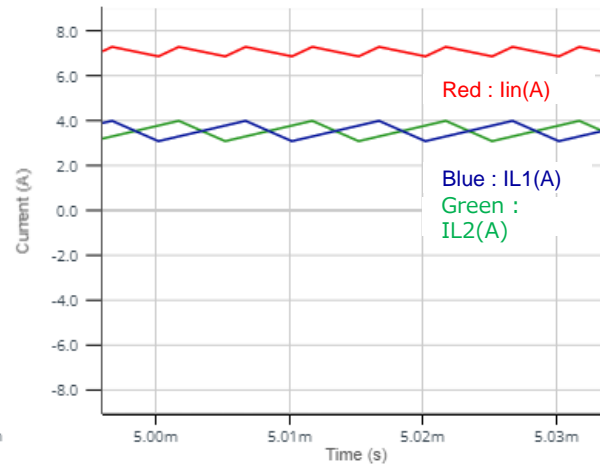
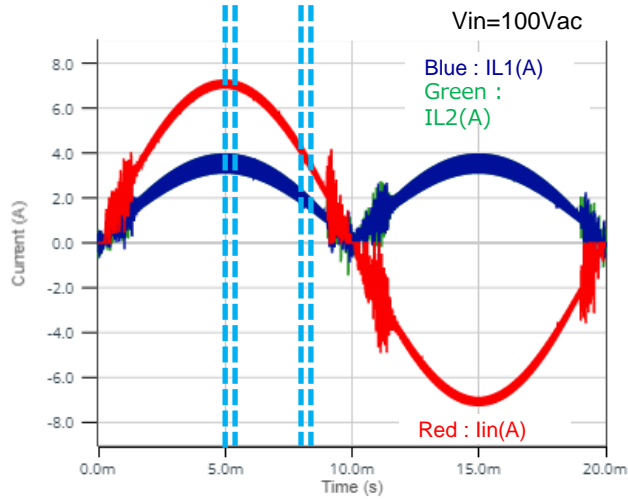
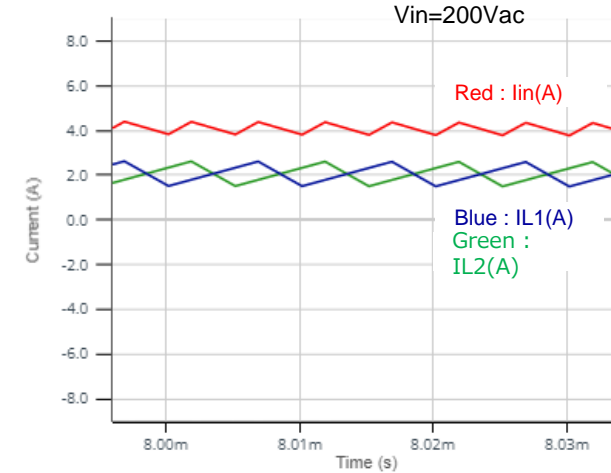
\* Default device



Expansion (5.00~5.03ms)



Expansion (8.00~8.03ms)



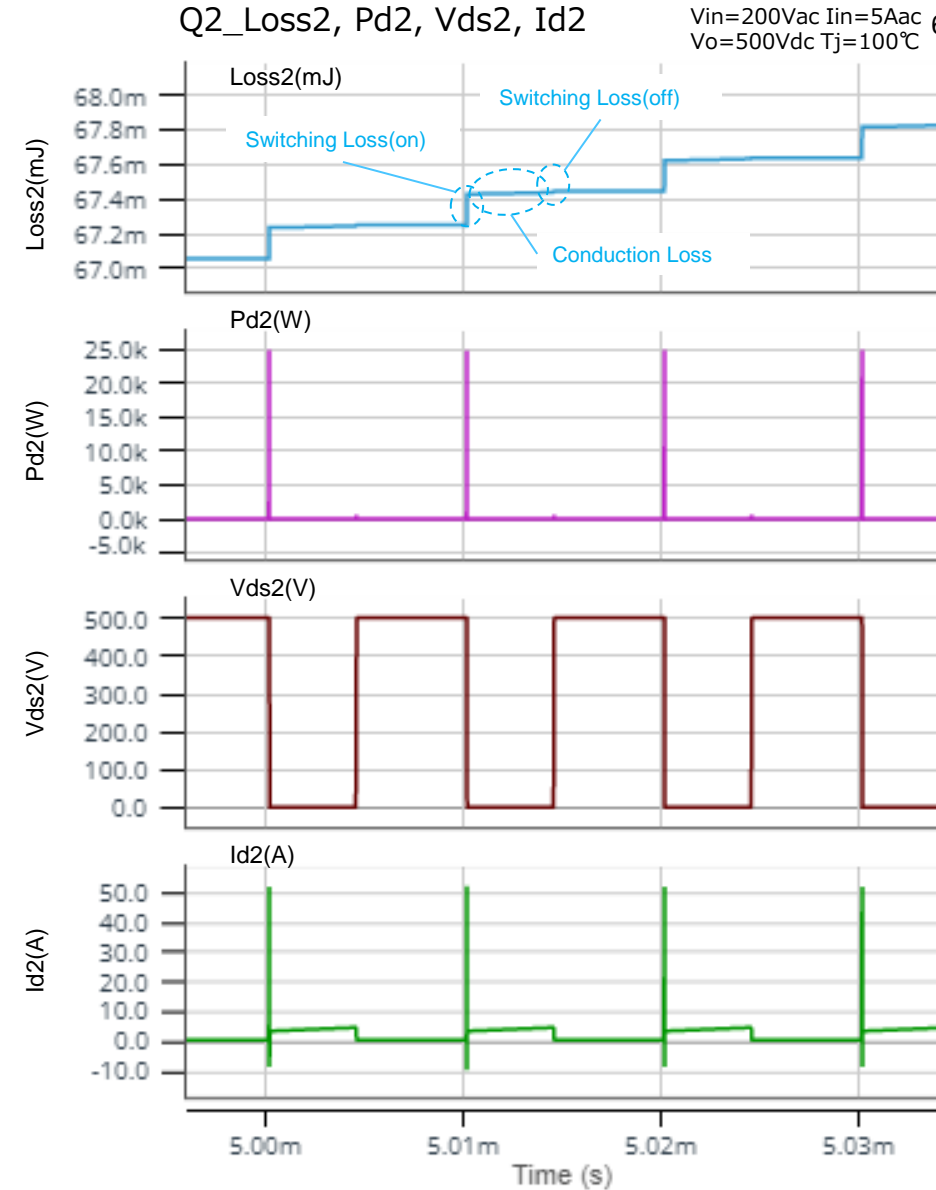
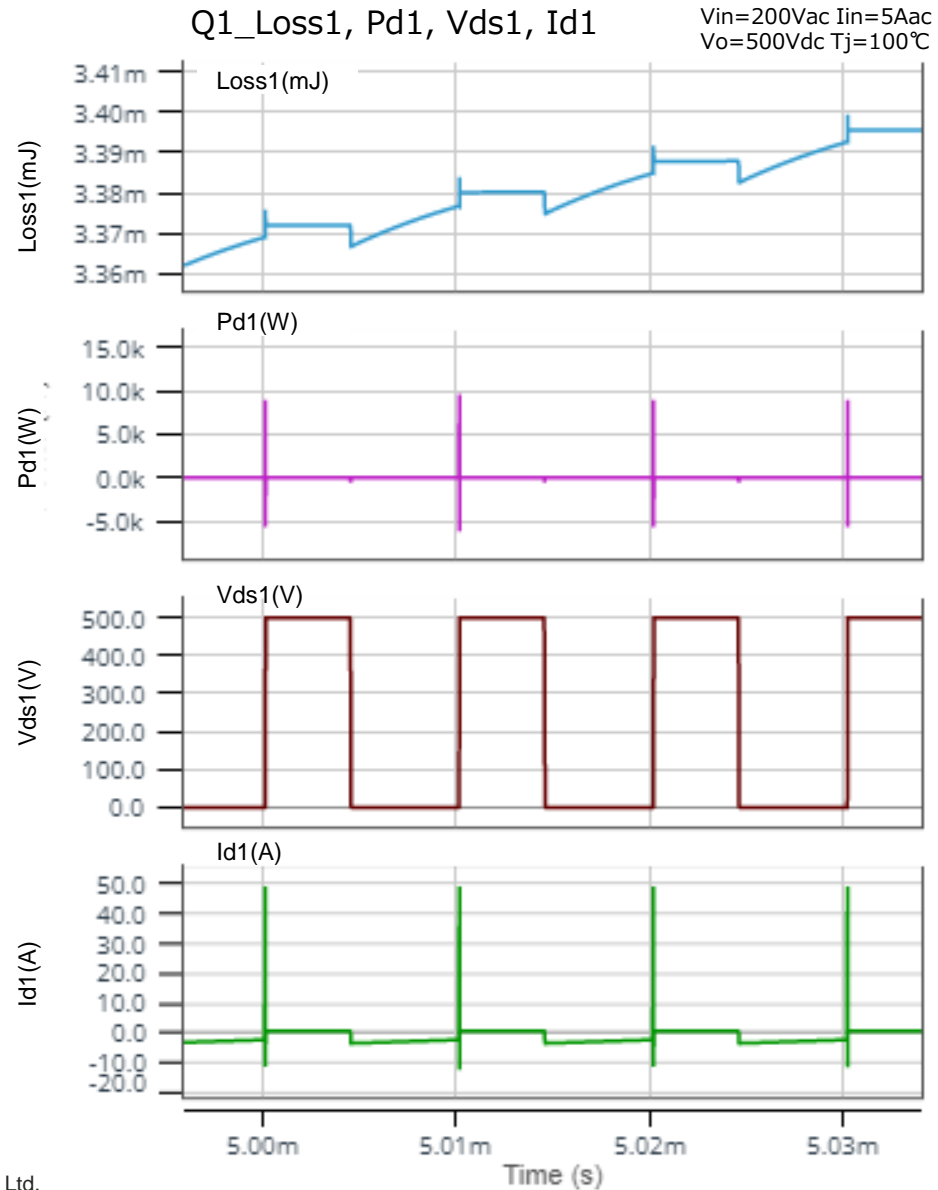
# Simulation Waveform2



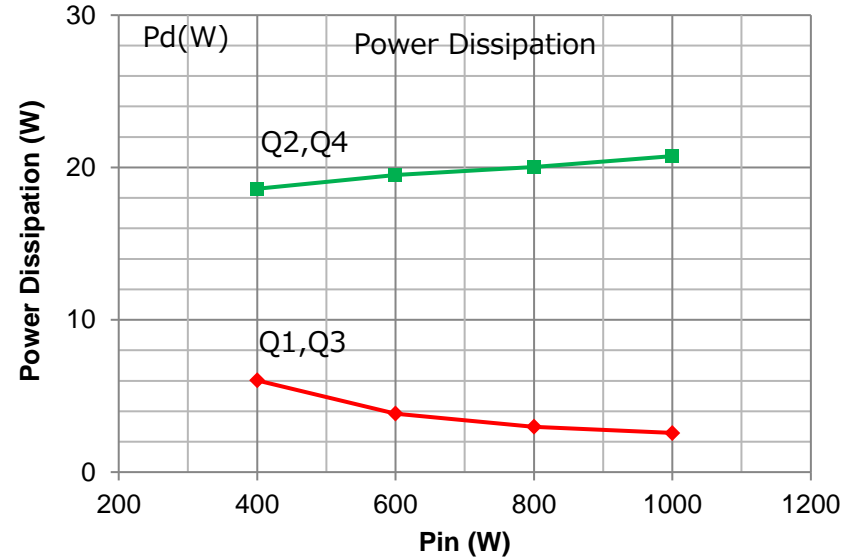
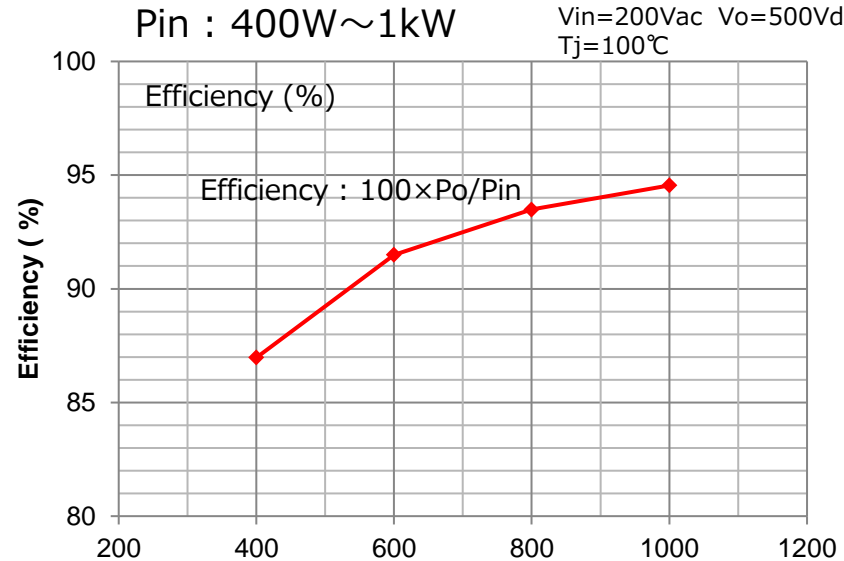
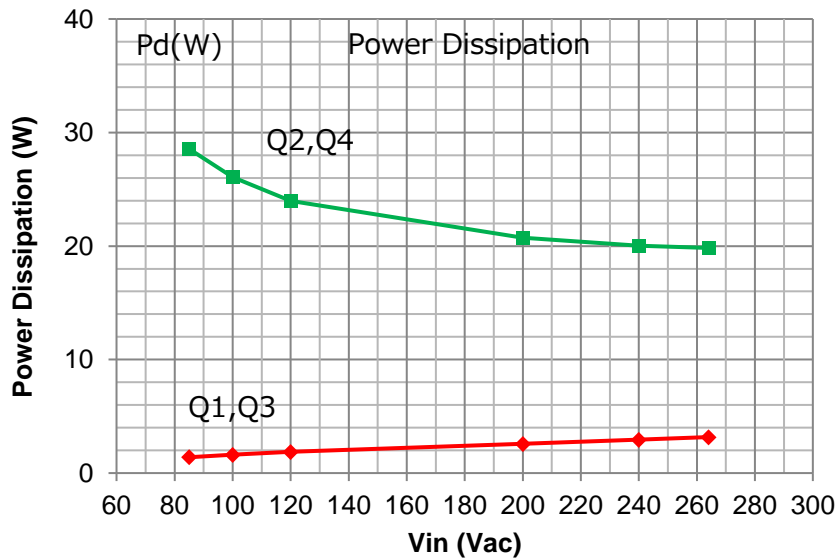
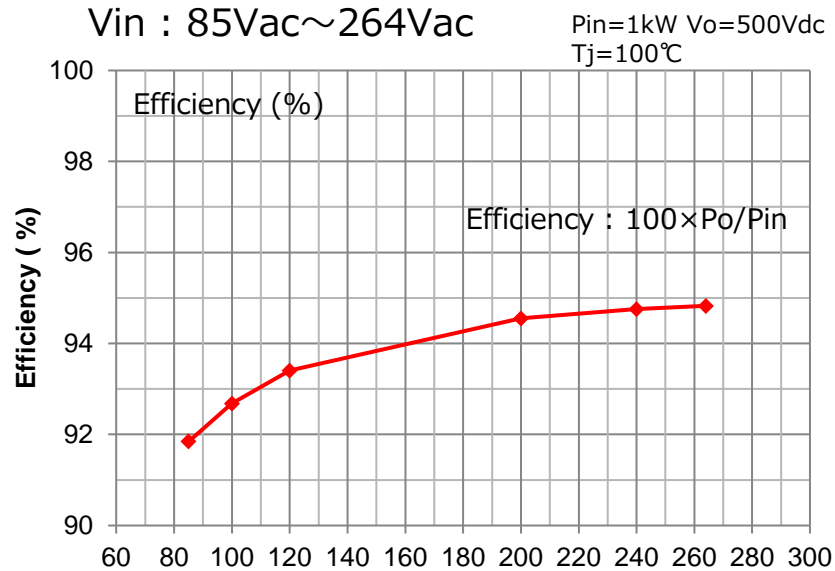
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# Efficiency, Power Dissipation 1

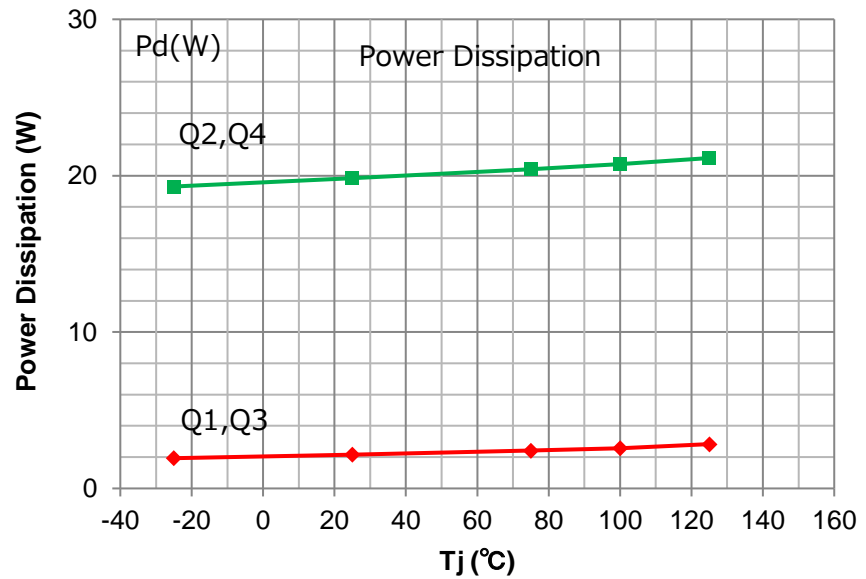
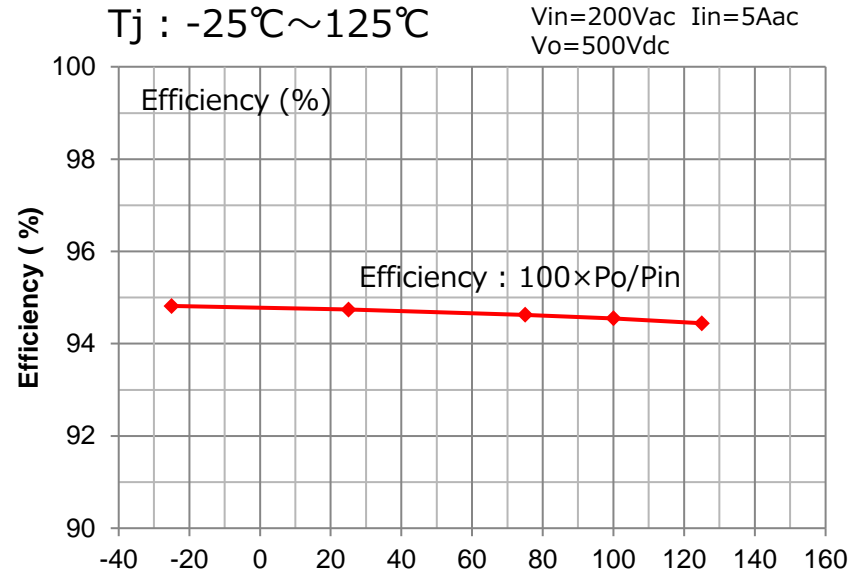
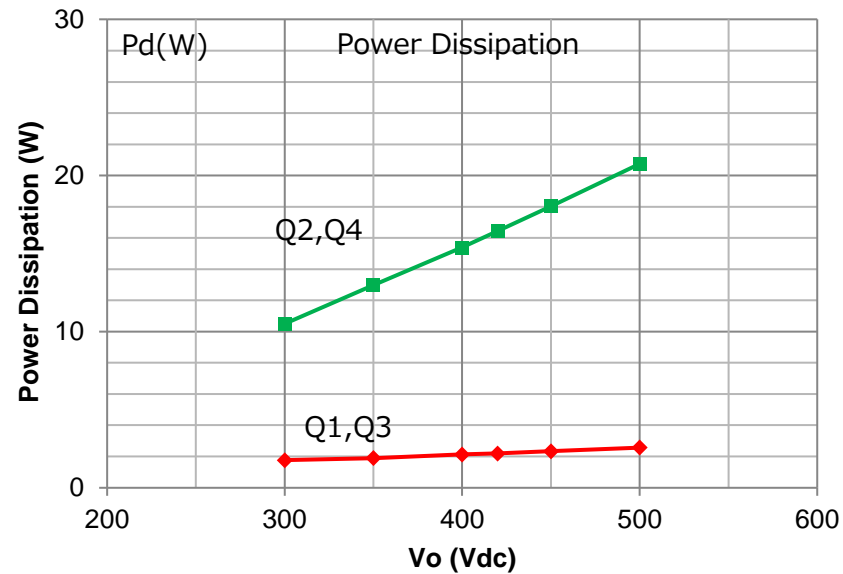
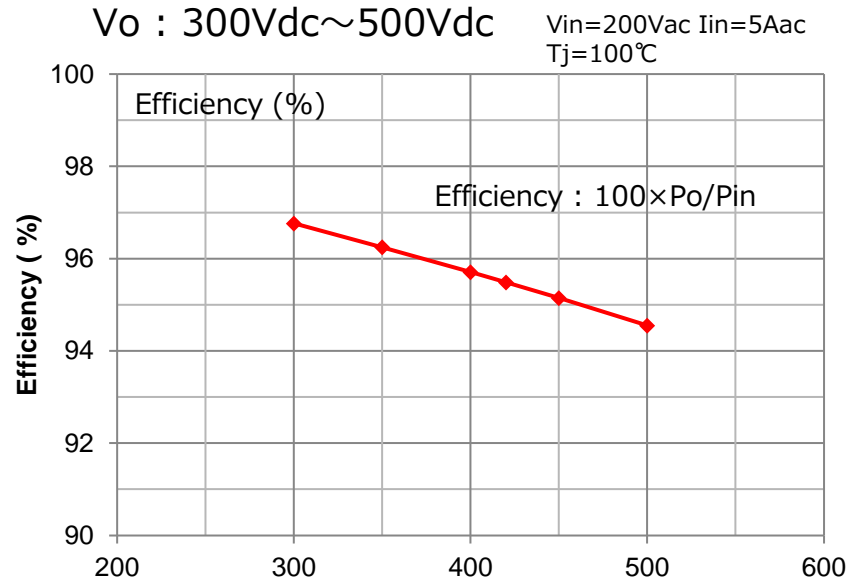


# Efficiency, Power Dissipation 2



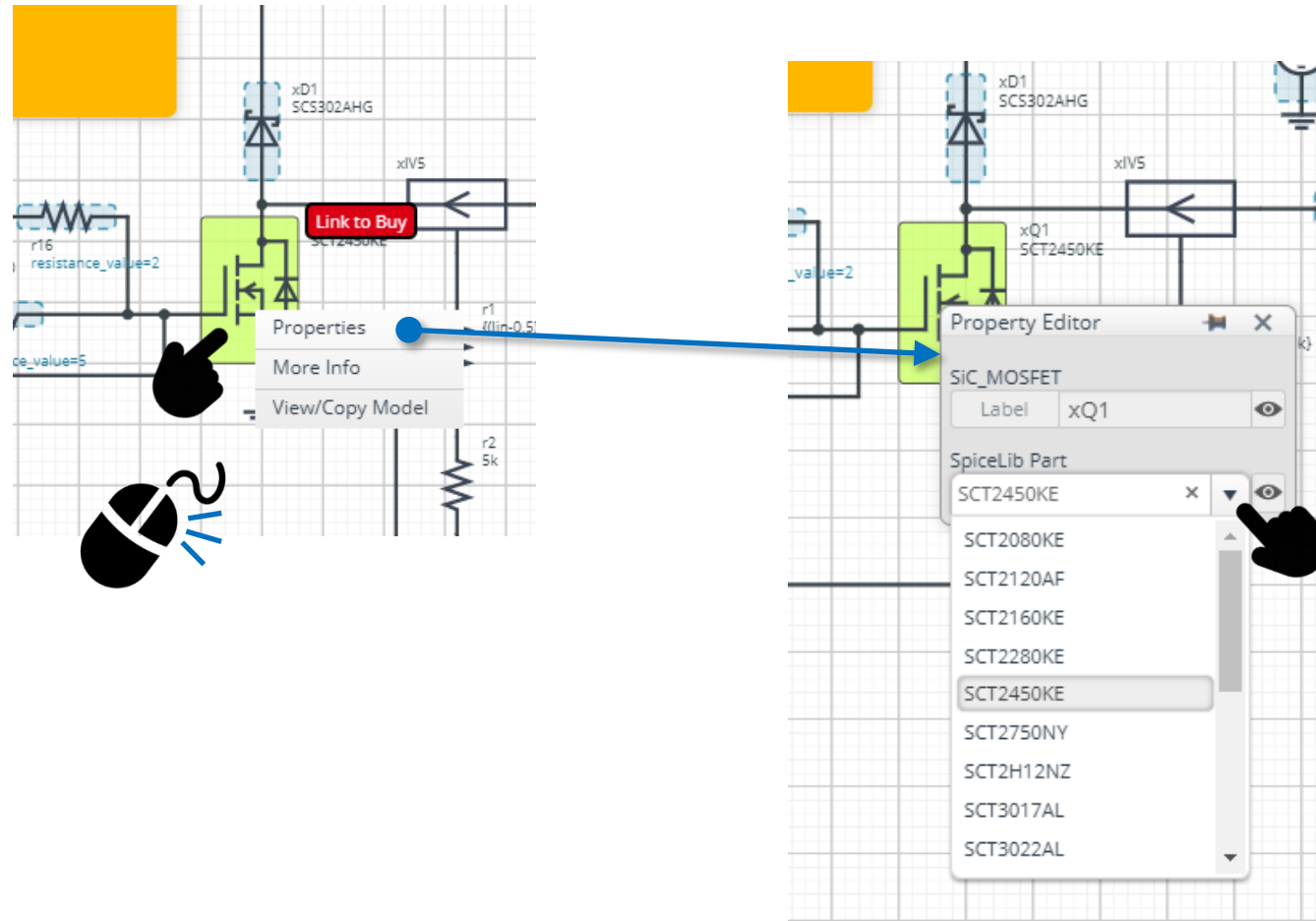
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# How to change the devices

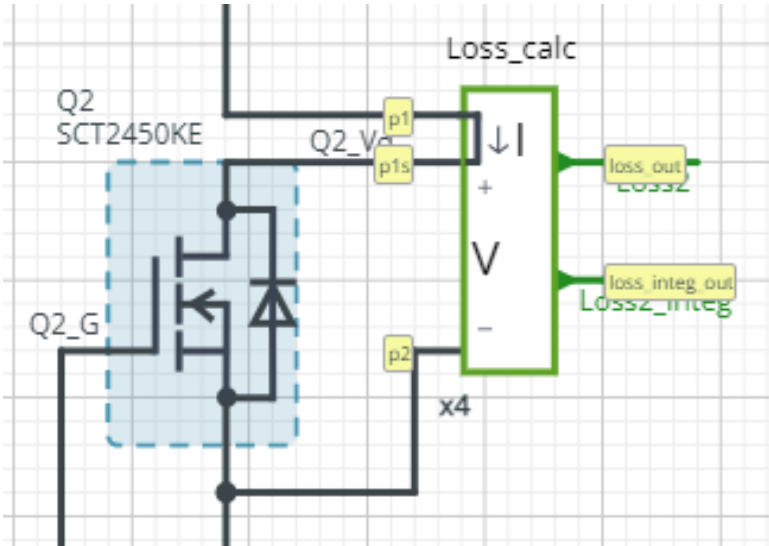
Right-click on the device → Select Properties → Pull down “SpiceLib Part” → Select the product



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

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## Loss calculation model 'Loss\_calc'



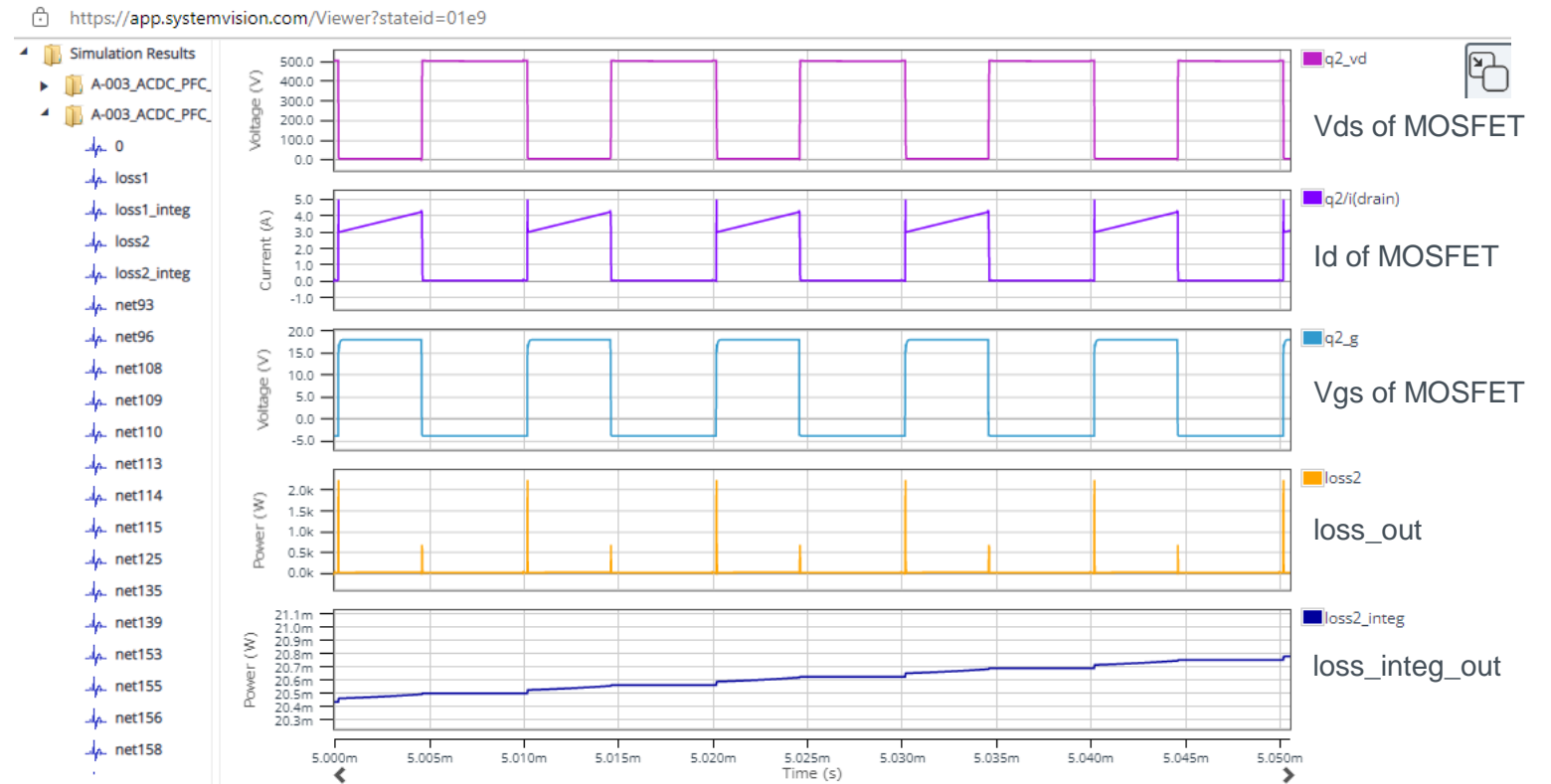
$$loss\_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

## Waveform example





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