

B-010. 3-Phase Step Modulation Inverter $P_{OUT}=5kW$ for Motor Drive



ROHM Solution Simulator Schematic Information

2023. Feb
64UG106E Rev.005

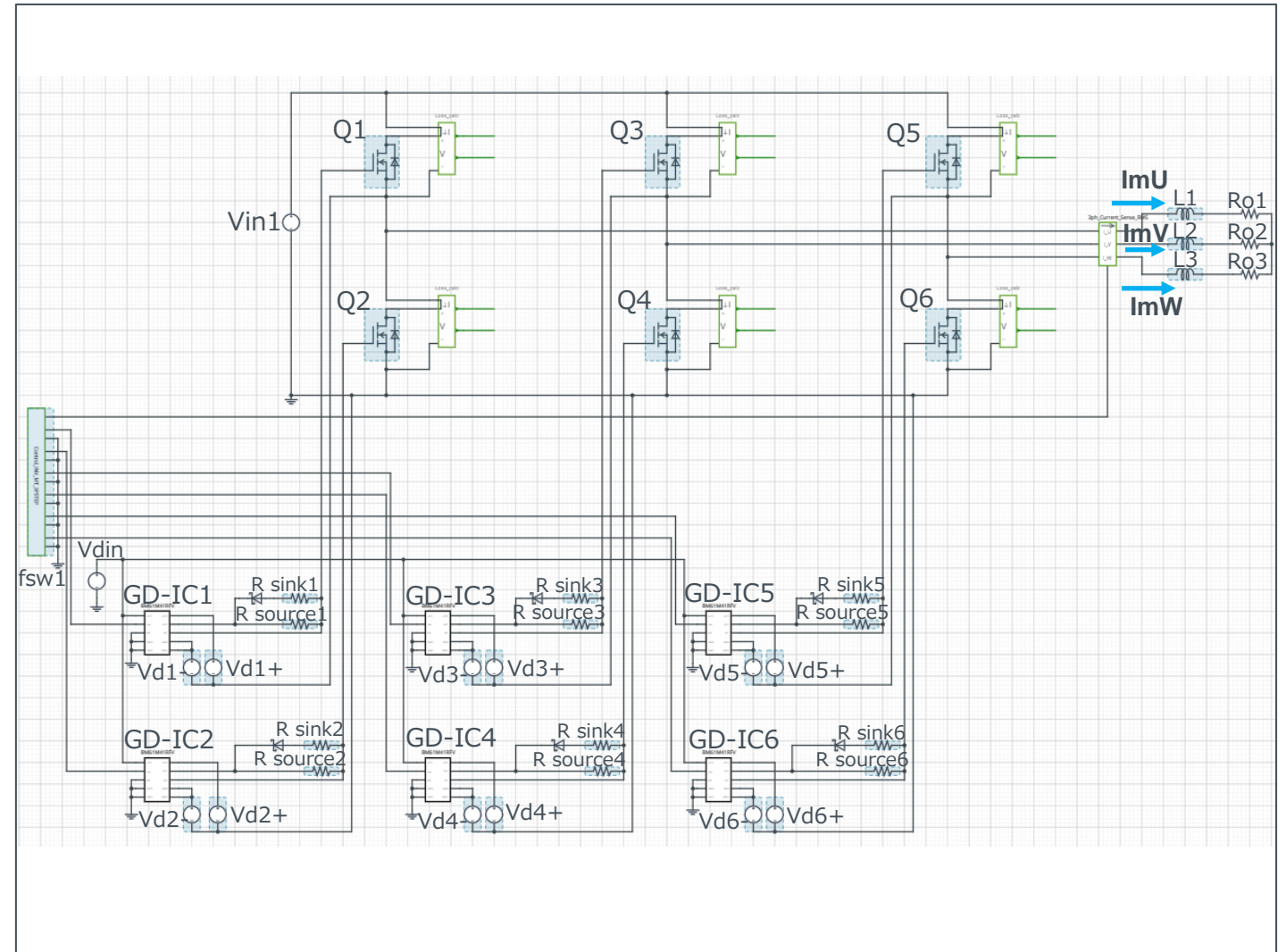
Simulation Parameters

Component name	Component	Default	Simulation Setting Range
Vin1	Input voltage	500Vdc	
fsw1	Switching frequency	20kHz	10k – 300kHz
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
Q1-6	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 -
L1-3	Inductor	500μH	10μH - 2mH
Ro1-3	Output Resistor	{Po/Im/Im/3}	

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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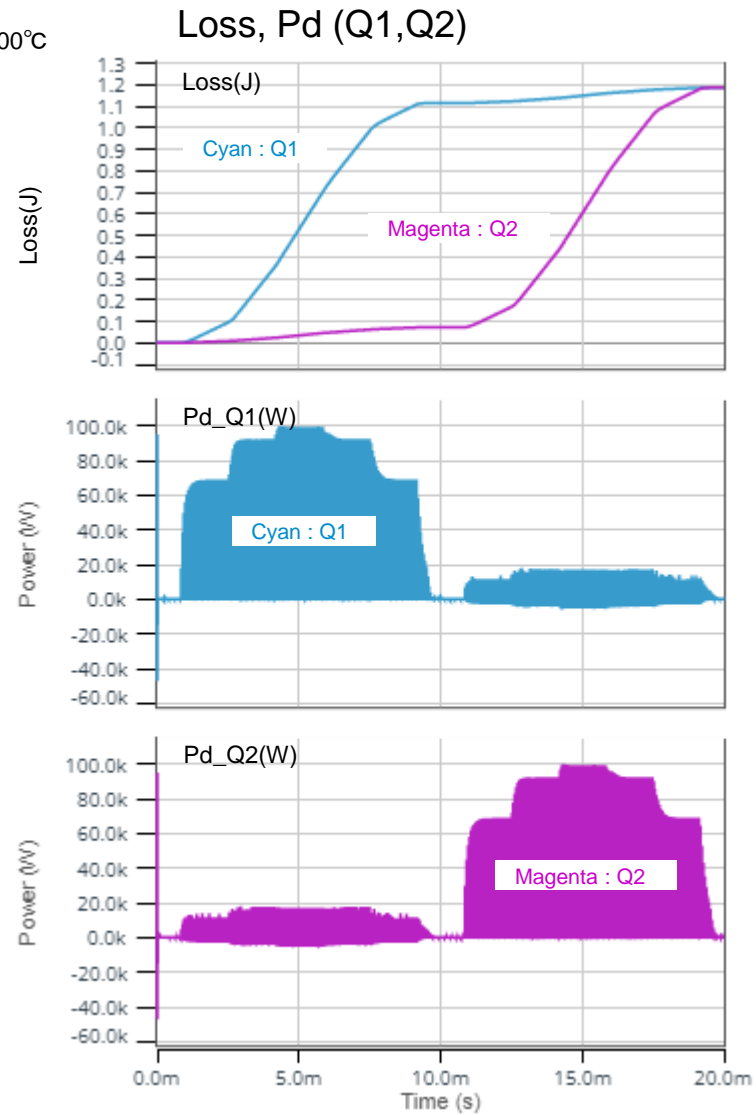
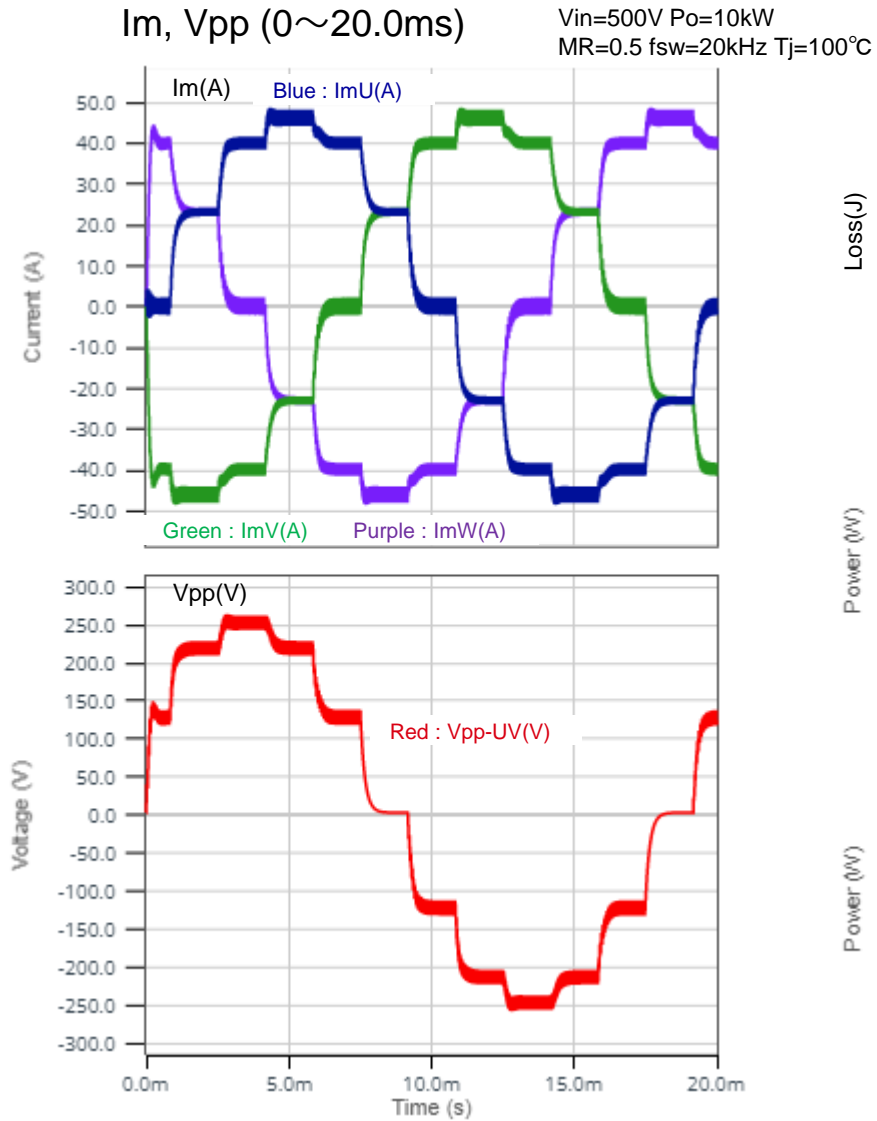
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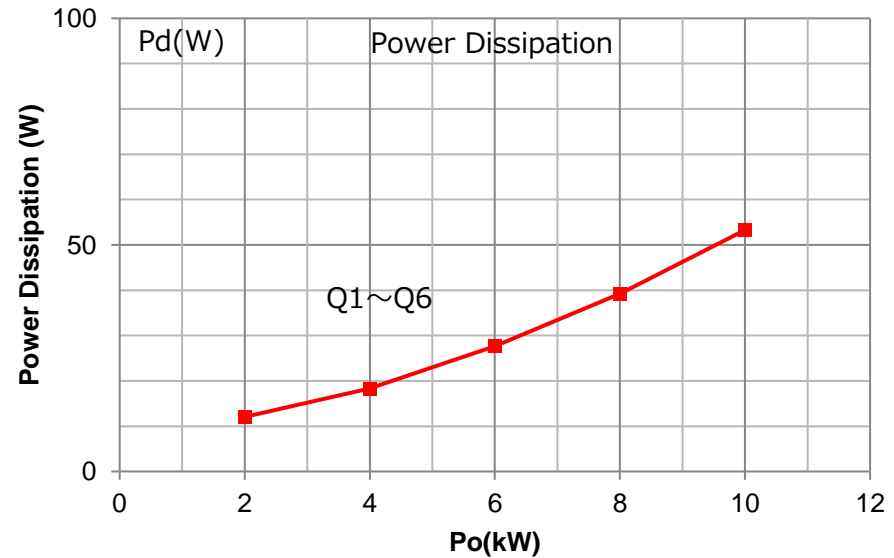
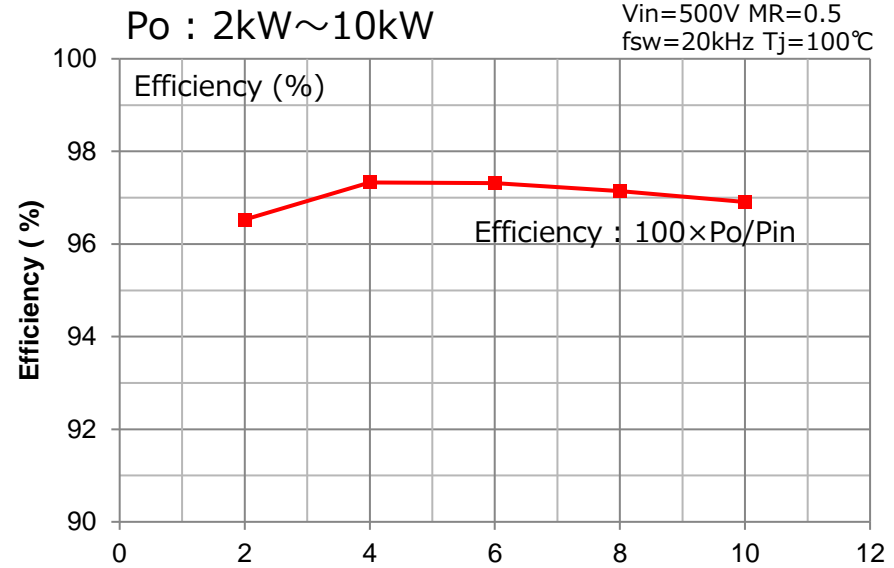
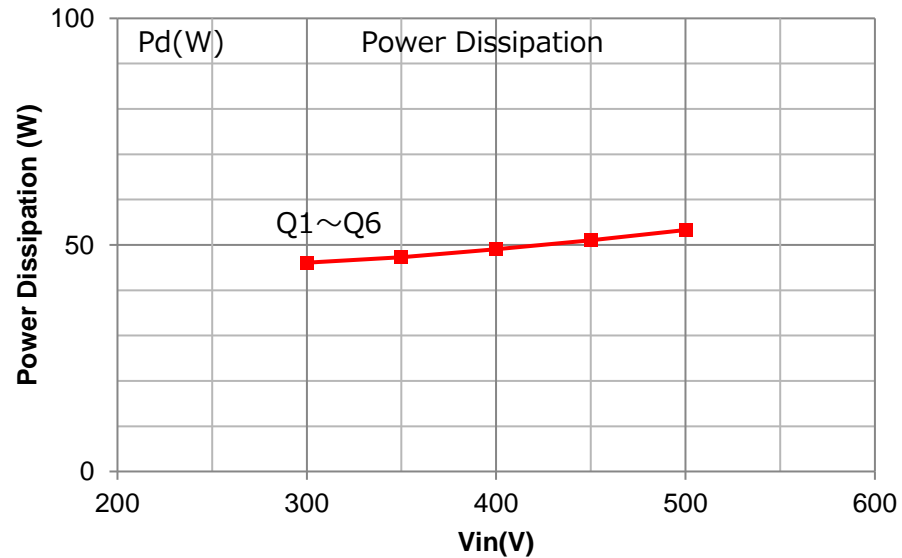
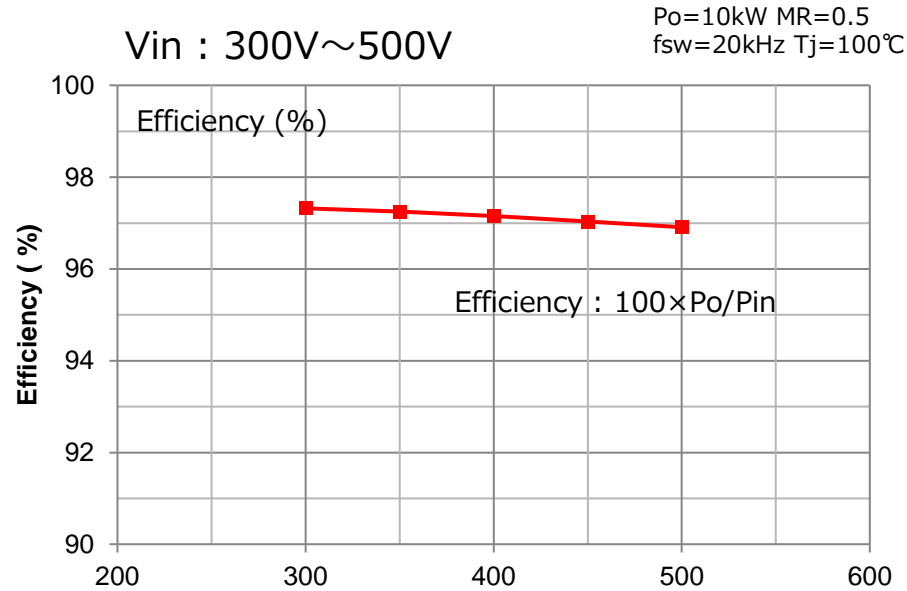
Selectable Devices

Component name	Component	Product No.	feature
Q1 – Q6	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



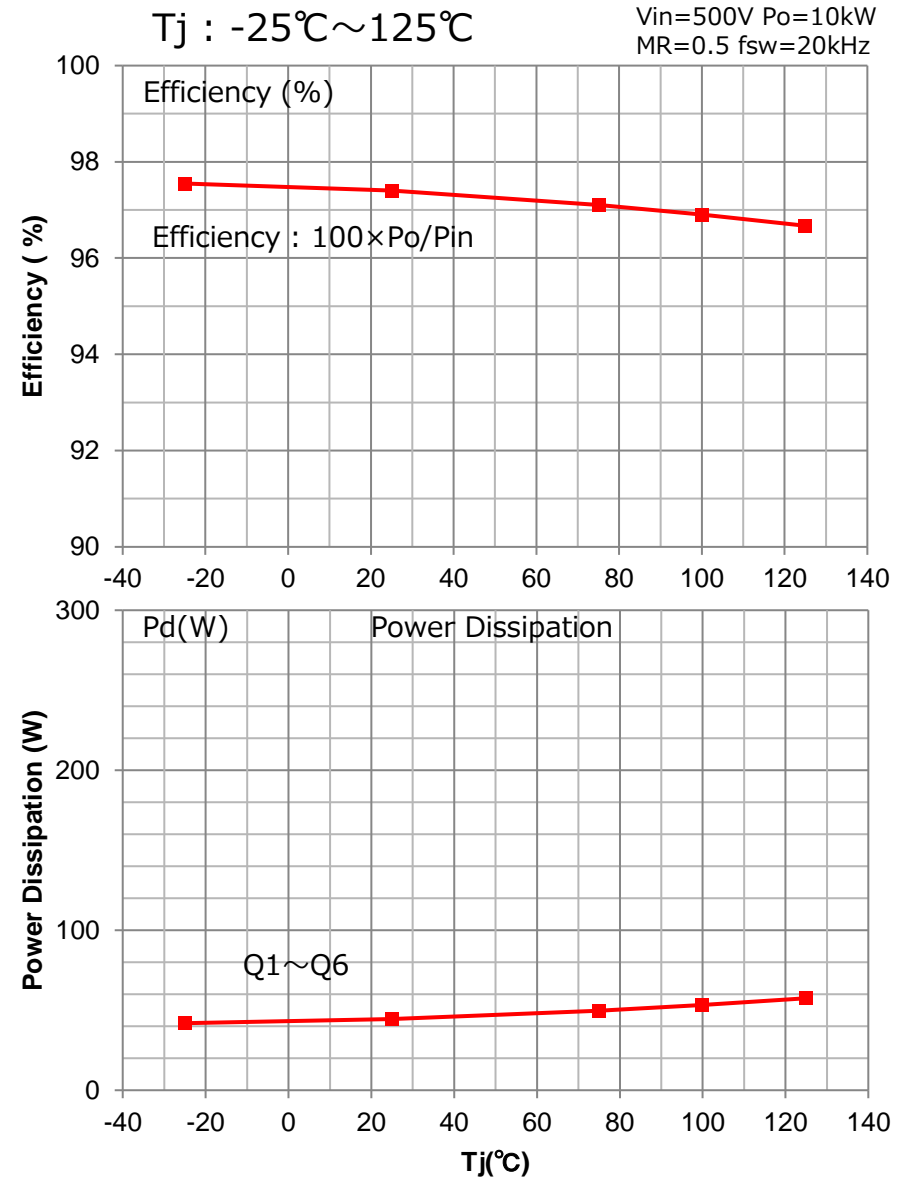
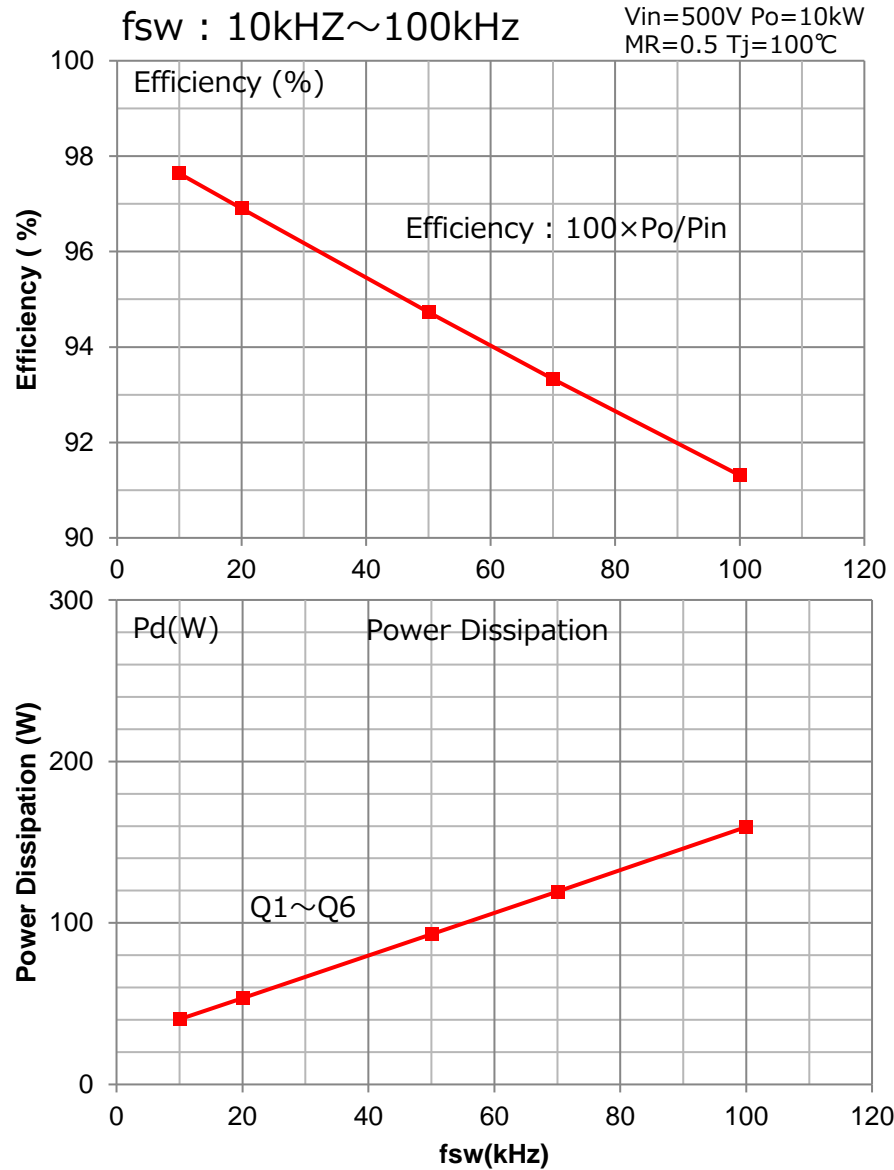
Efficiency, Power Dissipation 1



Efficiency, Power Dissipation 2



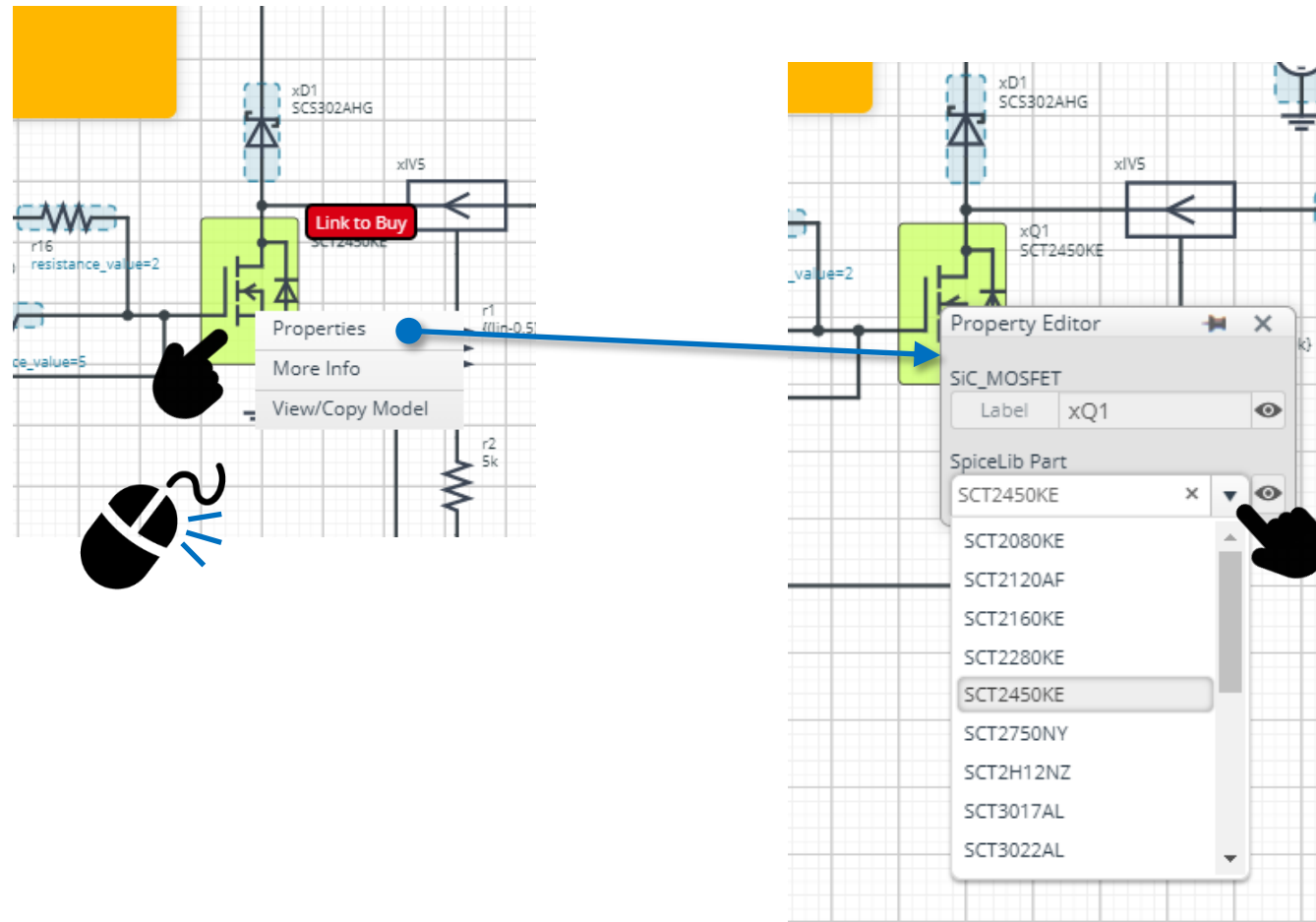
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How to change the devices

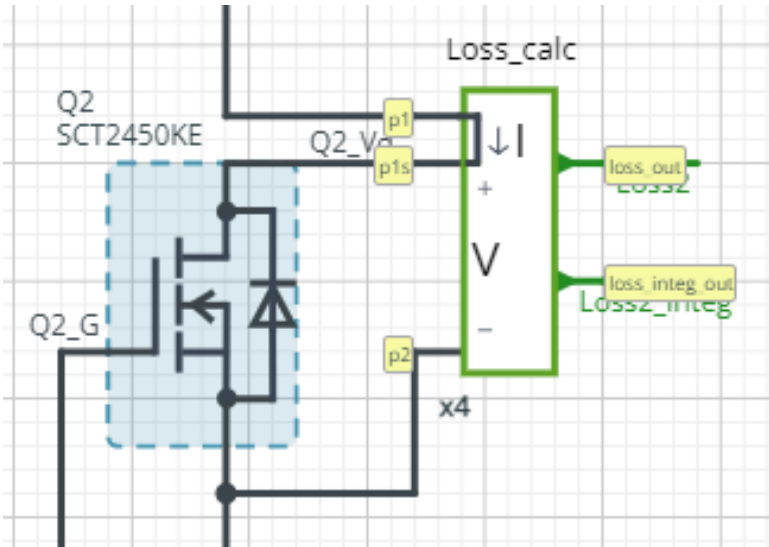
Right-click on the device → Select Properties → Pull down “SpiceLib Part” → Select the product



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

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Loss calculation model 'Loss_calc'



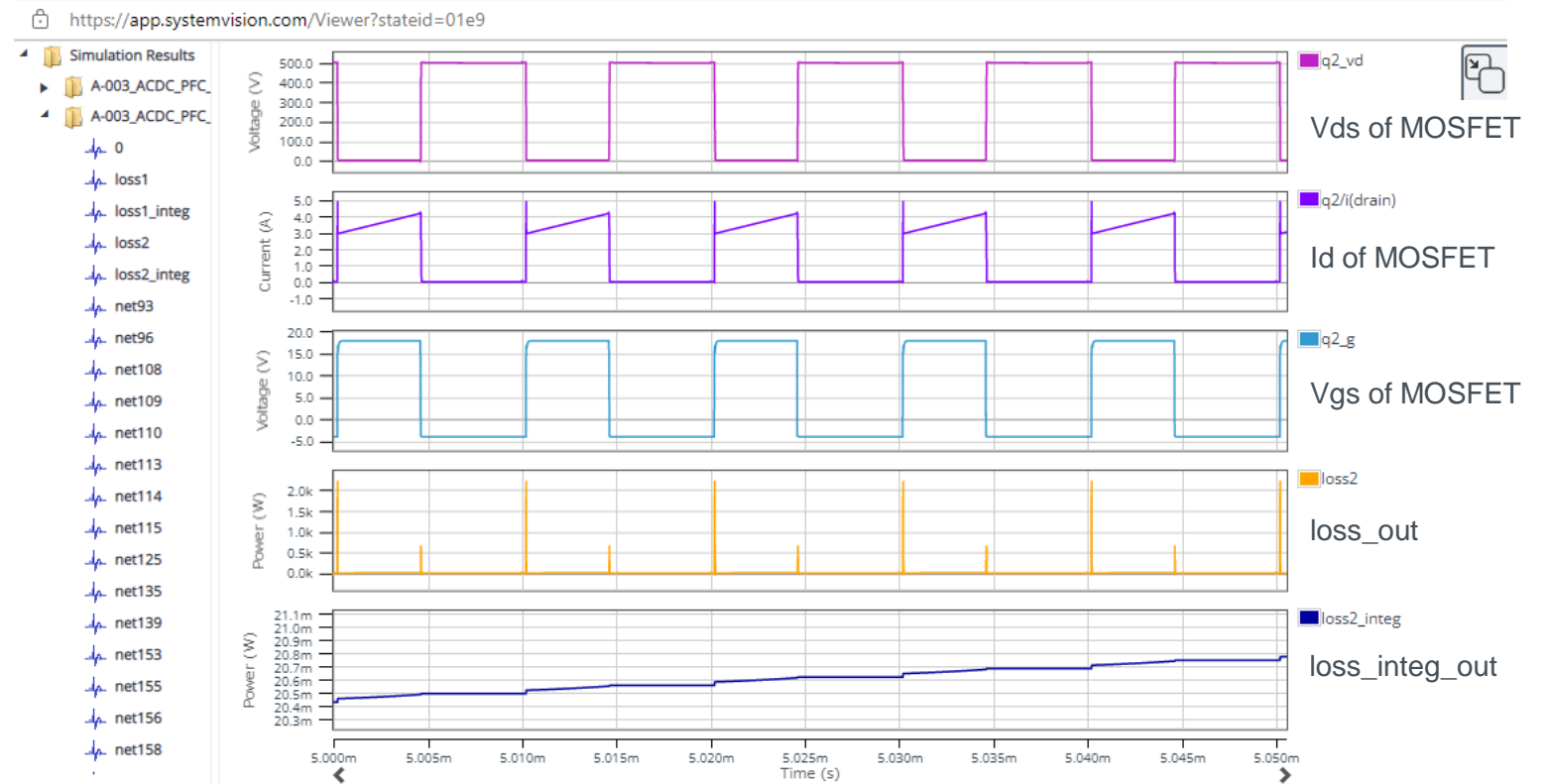
$$loss_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



Notes

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