

A-017. 3-Phase Interleaved PFC $V_{in}=200V$, $I_{in}=7.5A$, DCM

ROHM Solution Simulator Schematic Information



2021. Dec
64UG111ERev.003

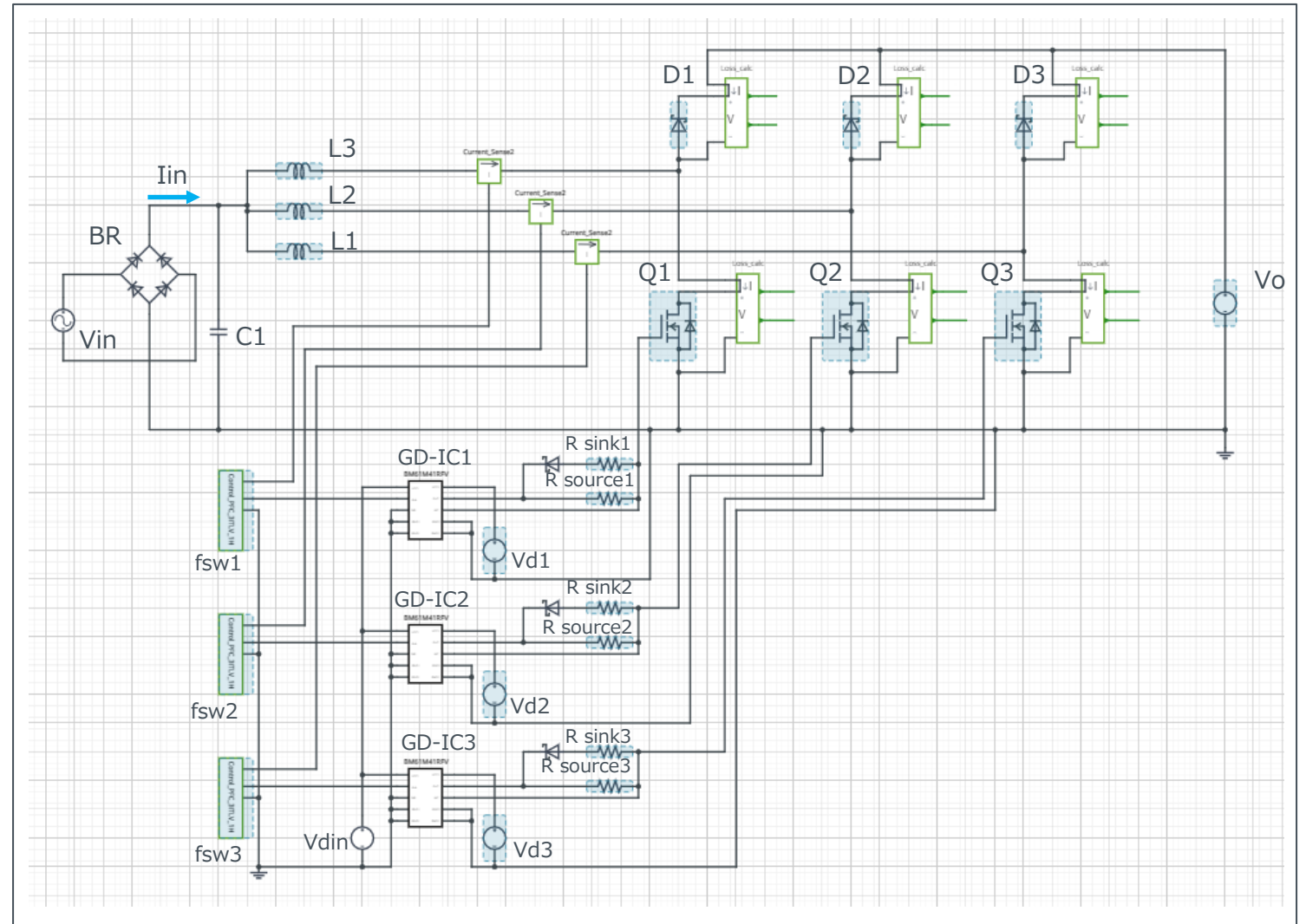
Simulation Parameters

Parameters	Descriptions	Default	Simulation Setting Range
V_{in}	Input voltage	200Vac 50Hz	
I_{in}	Input current	7.5Aac	
V_o	Output voltage	500Vdc	300 – 500Vdc
fsw1,2,3	Switching frequency	50kHz	10k – 300k
T_j	Temperature	100°C	
$V_{d1,2,3}$	Gate Drive voltage	15V	10 – 20V
V_{din}	Signal voltage level	5V	

Devices

Component Name	Component	Default	Simulation Setting Range
Q1, Q2, Q3	SJ-MOSFET	Selectable	
D1, D2, D3	SiC SBD	Selectable	
GD-IC1,2,3	Gate Driver	BM61M41RFV-C	
R sink1,2,3	Resistor for sink	1Ω	0.1 -
R source1,2,3	Resistor for source	2Ω	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.

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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

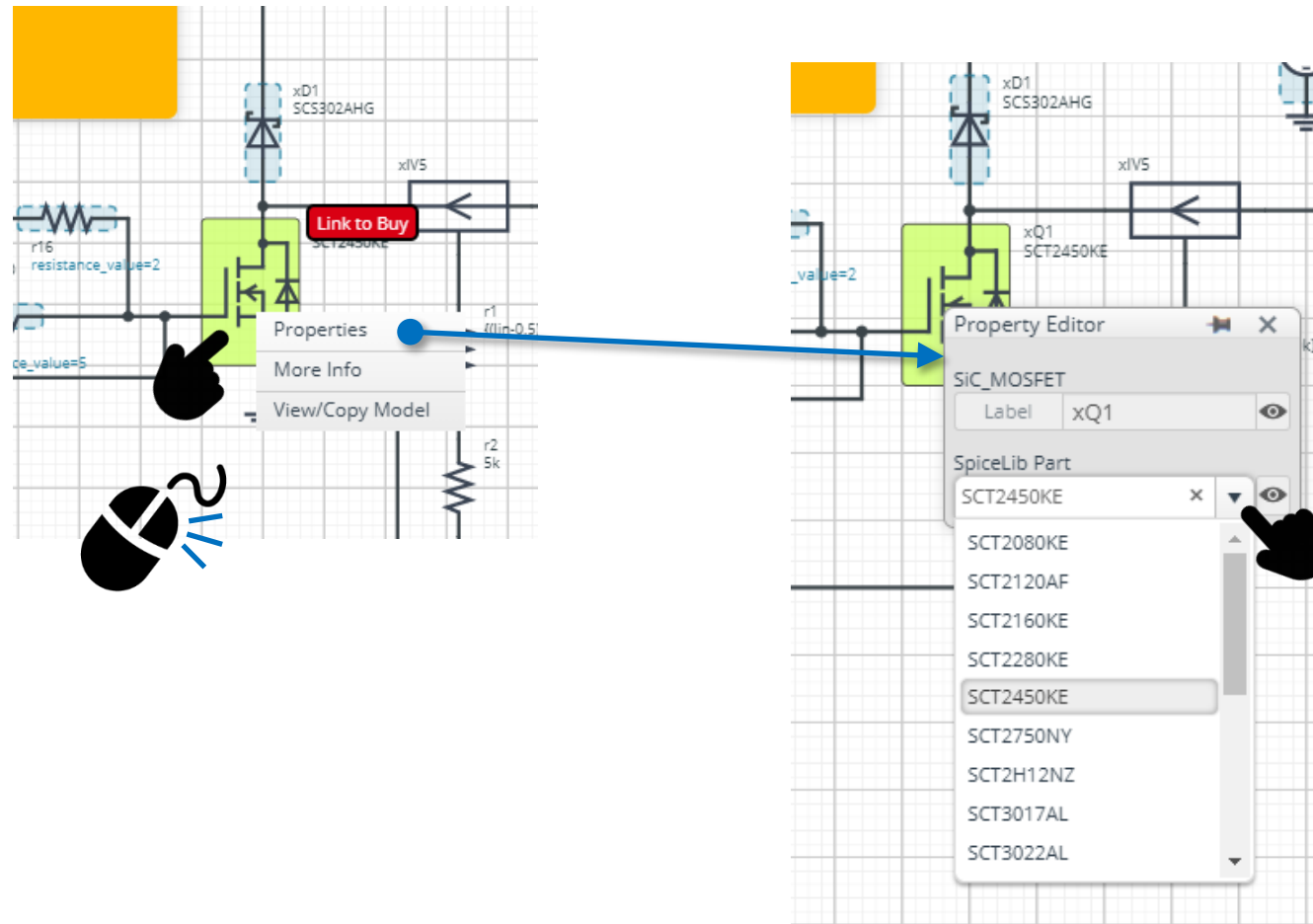
Selectable Devices

Component name	Component	Product No.	feature
D1, D2	SiC SBD	SCS205KG	1200V, 5A
		SCS206AG	650V, 6A
		SCS208AG	650V, 8A
		SCS210AG	650V, 10A
		SCS210KG	1200V, 10A
		SCS212AG	650V, 12A
		SCS215AG	650V, 15A
		SCS215KG	1200V, 15A
		SCS220AG	650V, 20A
		SCS220KG	1200V, 20A
		SCS302AHG (*)	650V, 2A, High surge resistance
		SCS304AHG	650V, 4A, High surge resistance
		SCS306AHG	650V, 6A, High surge resistance
		SCS308AHG	650V, 8A, High surge resistance
		SCS310AHG	650V, 10A, High surge resistance
		SCS312AHG	650V, 12A, High surge resistance
		SCS315AHG	650V, 15A, High surge resistance
		SCS320AHG	650V, 20A, High surge resistance

* Default device

How to change the devices

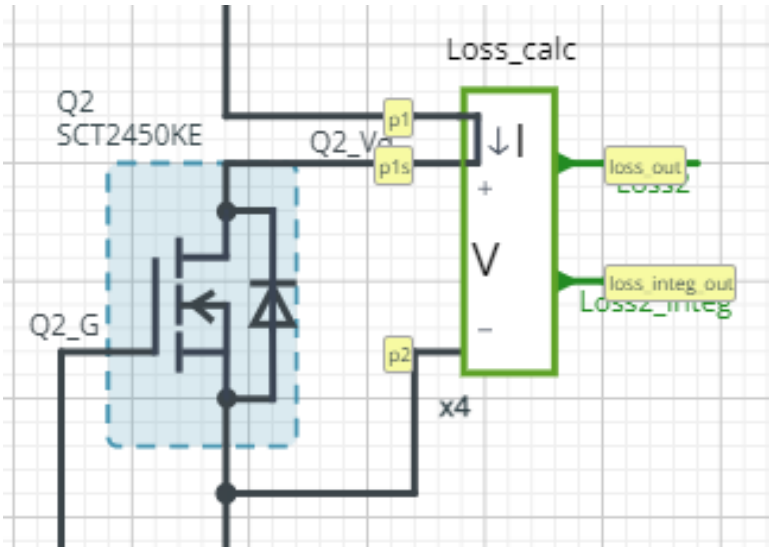
Right-click on the device → Select Properties → Pull down “SpiceLib Part” → Select the product



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

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Loss calculation model 'Loss_calc'



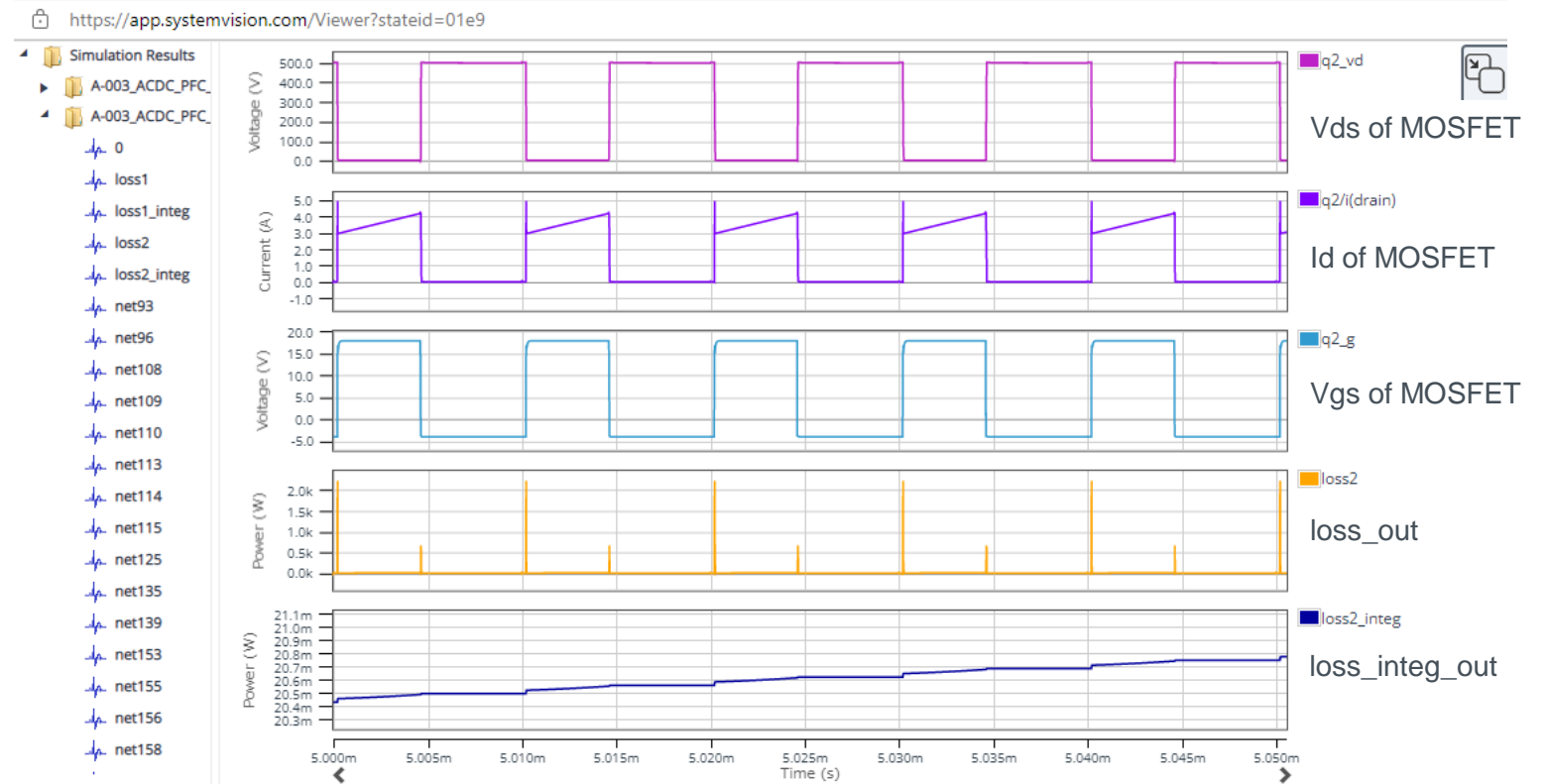
$$loss_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

Waveform example



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