

# B-007. 3-Phase 4-Wire Inverter $P_{OUT}=10kW$

ROHM Solution Simulator Schematic Information



2023. Feb  
64UG103E Rev.005

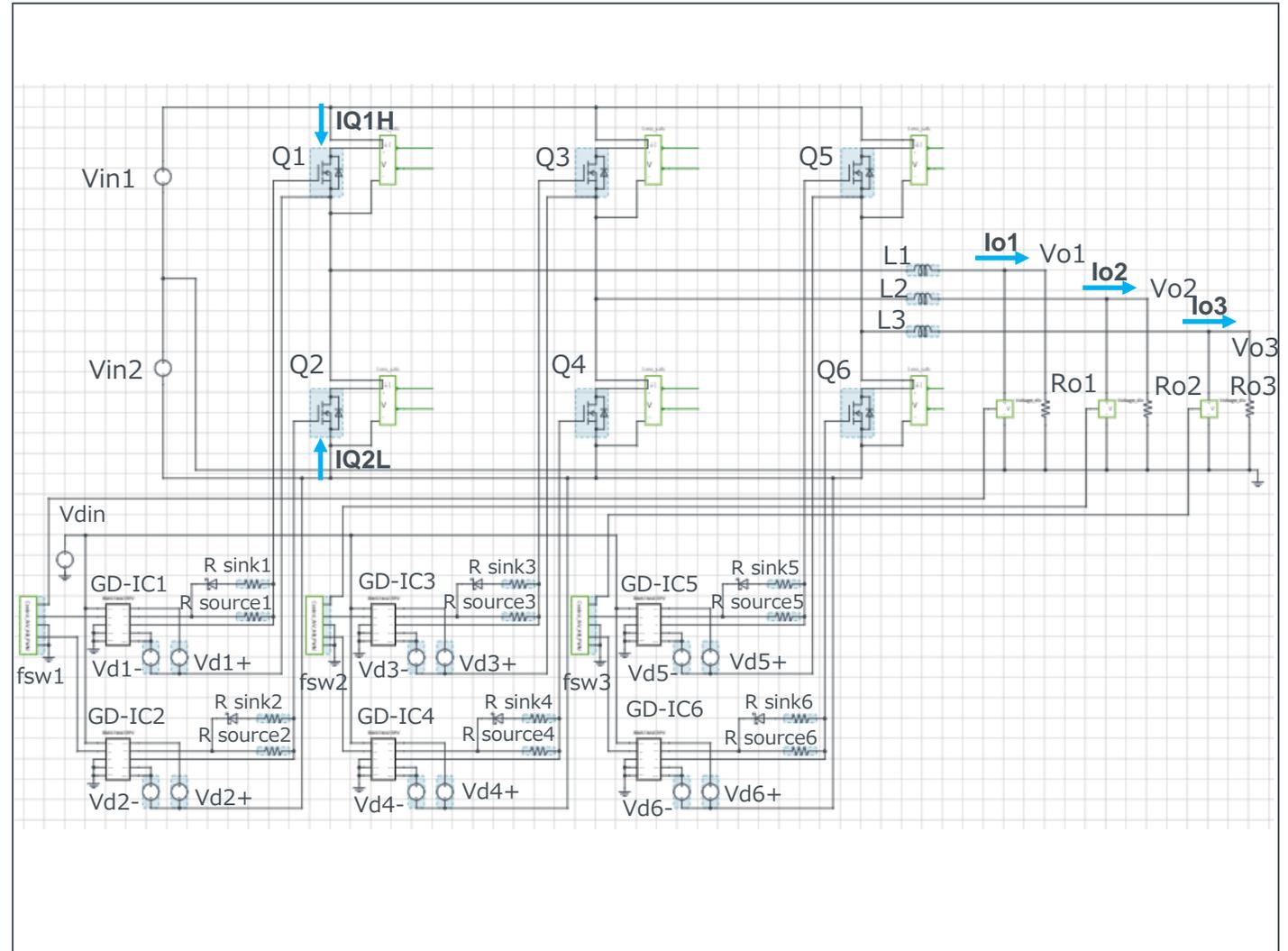
## Simulation Parameters

| Component name | Component            | Default   | Simulation Setting Range |
|----------------|----------------------|-----------|--------------------------|
| Vin1,2         | Input voltage        | 200Vdc    |                          |
| Vo1-3          | Output voltage       | 115Vac    |                          |
| Io1-3          | Output current       | {Po/Vo/3} |                          |
| fsw1-3         | Switching frequency  | 20kHz     | 10k – 300kHz             |
| Tj             | Temperature          | 100°C     |                          |
| Vd1-6+         | Gate Drive voltage H | 10V       | 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     | {Vo/Io}      |                          |

## 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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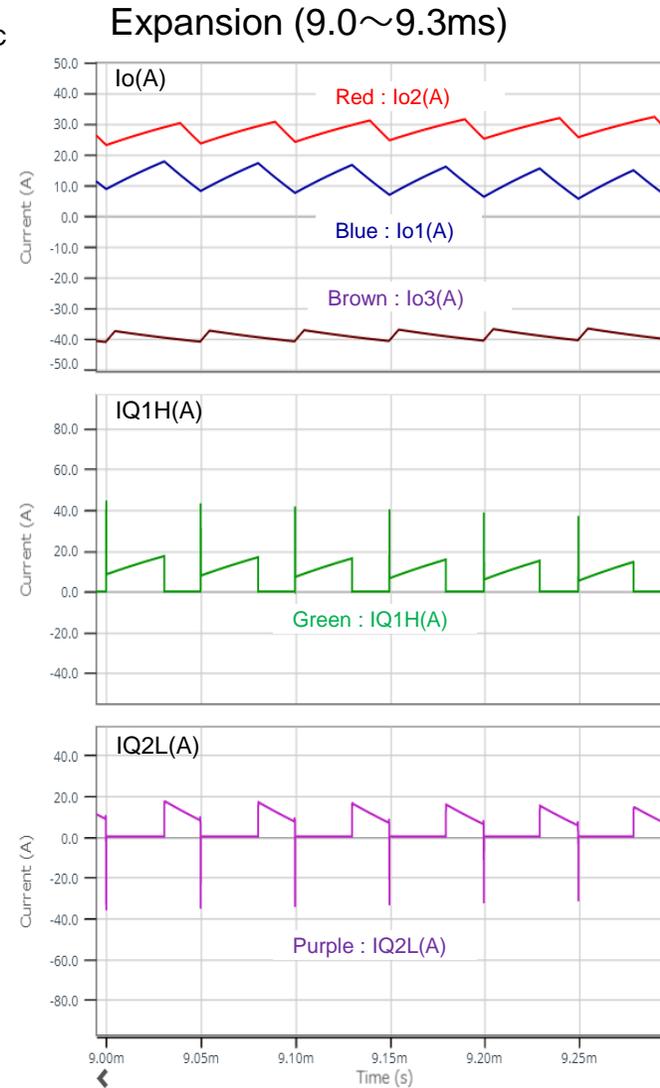
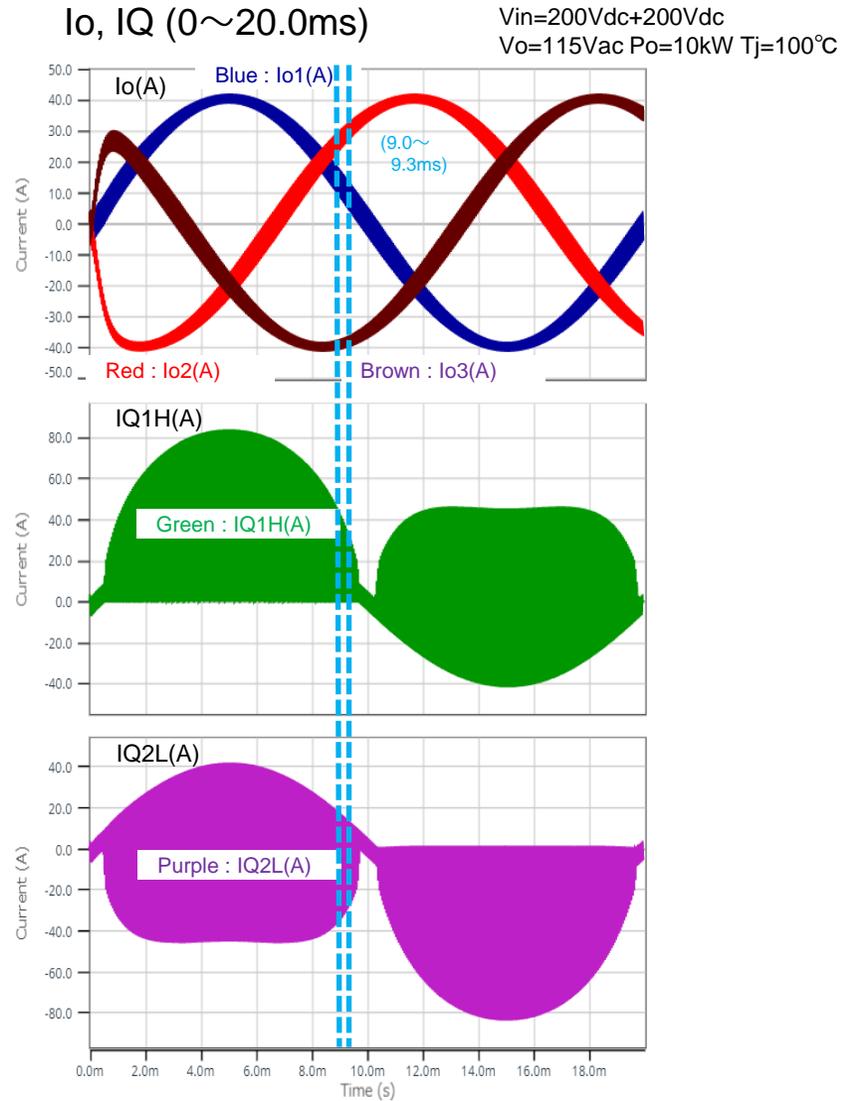


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## Selectable Devices

| 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 |

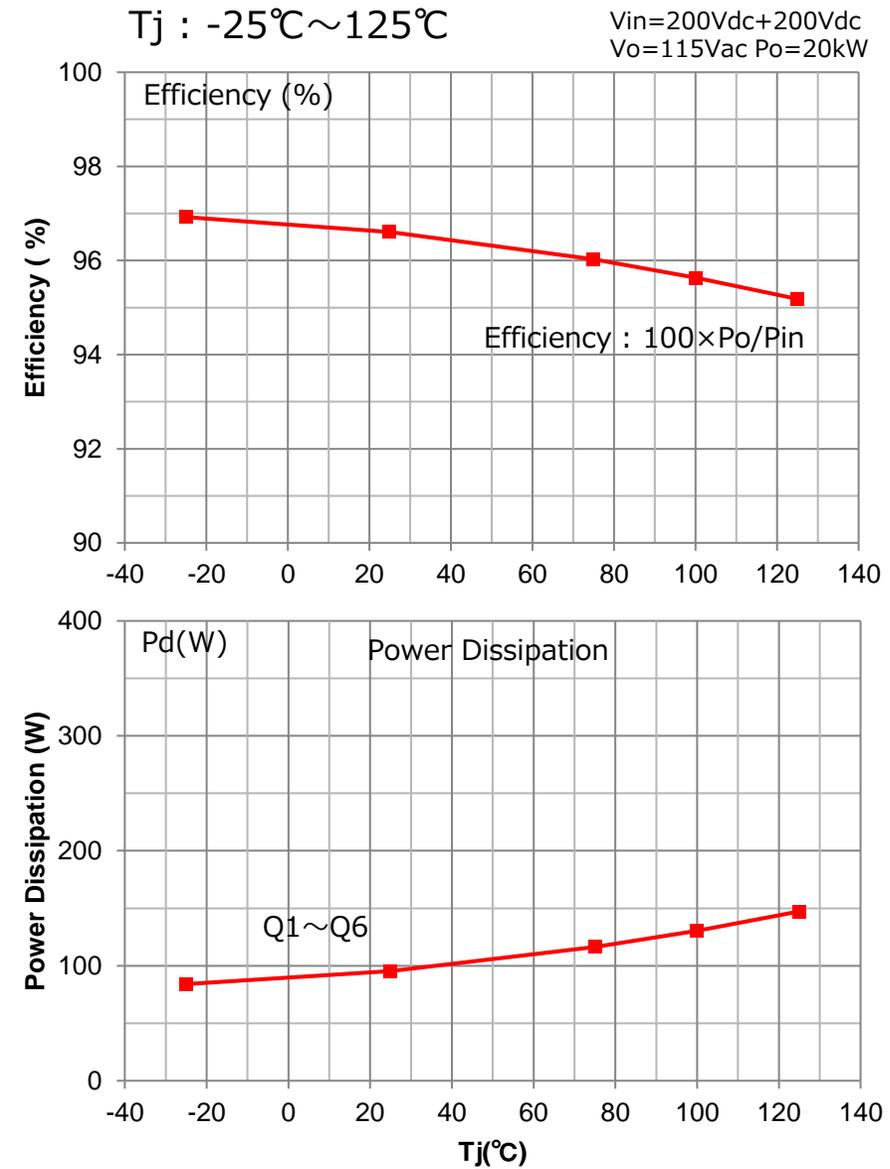
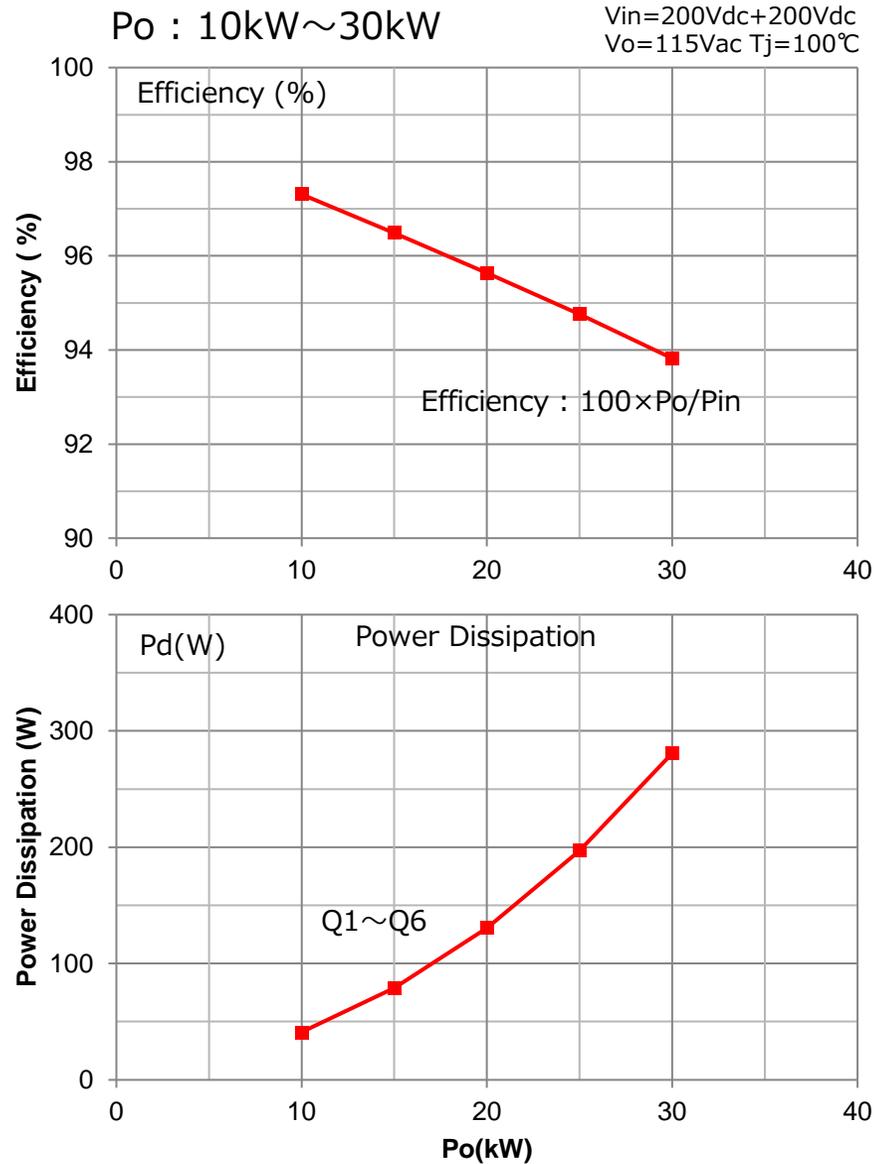
\* Default device



# Efficiency, Power Dissipation



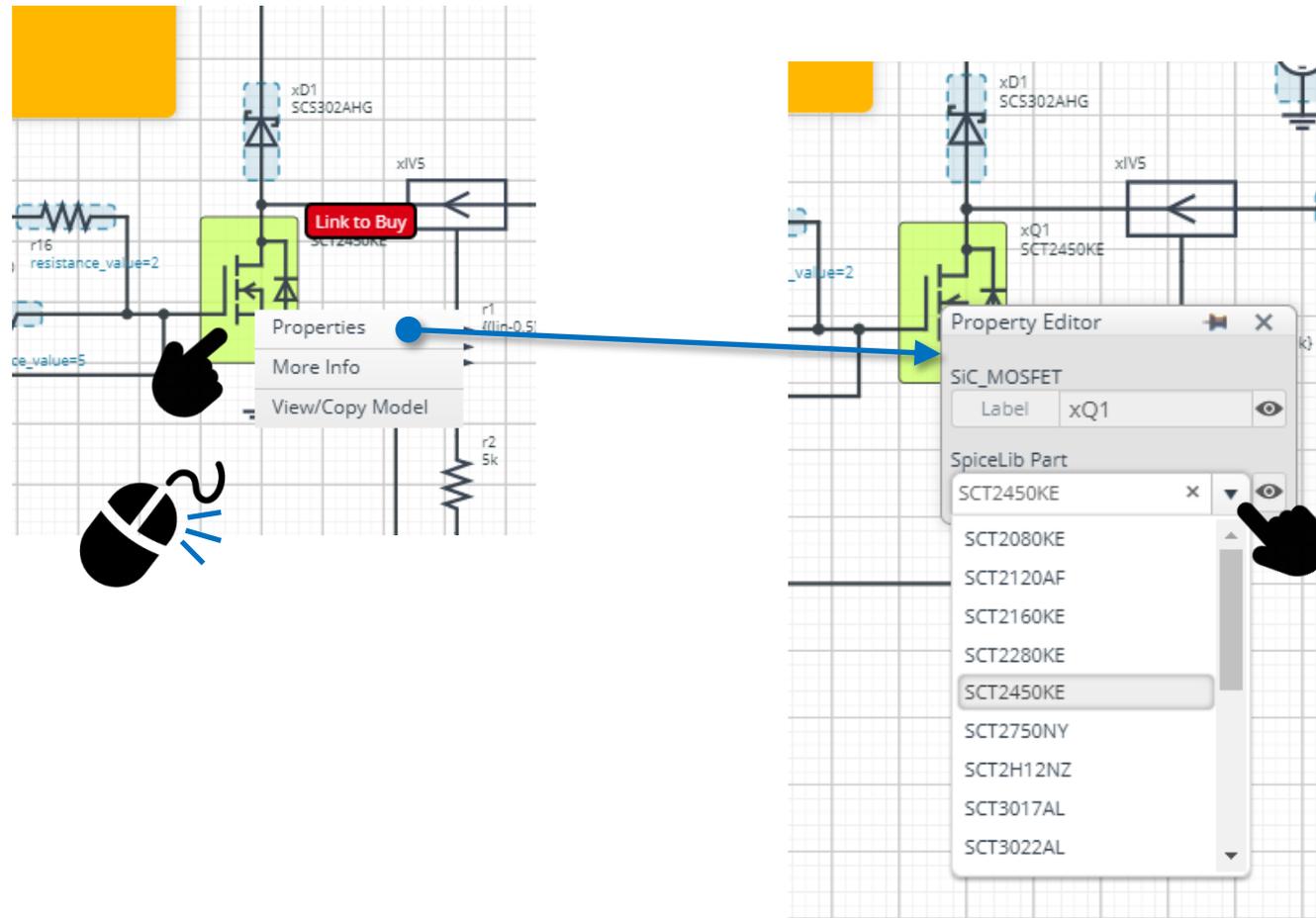
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# How to change the devices

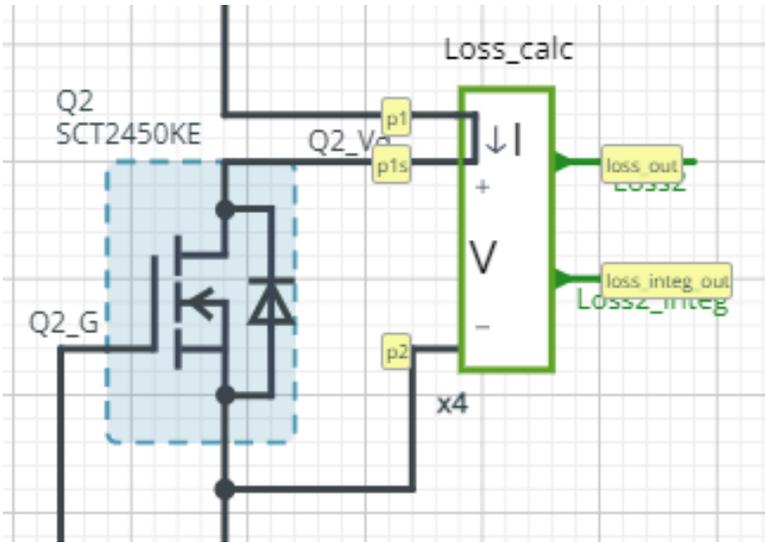
Right-click on the device → Select Properties → Pull down “SpiceLib Part” → Select the product



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

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## Loss calculation model 'Loss\_calc'



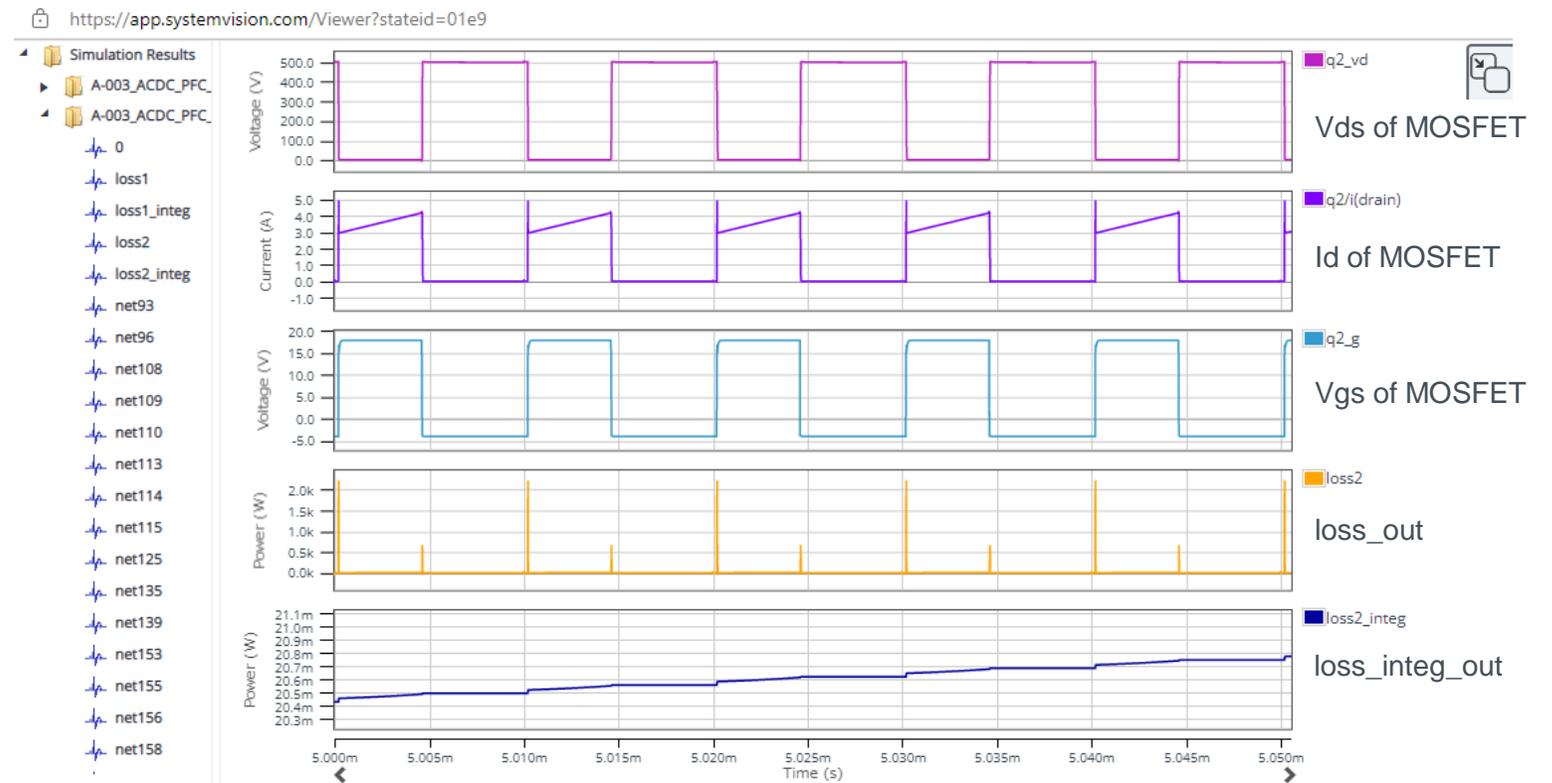
$$loss\_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

## Waveform example



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