

# C-005. DC-DC Boost Synchro Converter 2-Phase

$V_o=500V$ ,  $I_o=10A$

ROHM Solution Simulator Schematic Information



2022. Feb  
64UG122E Rev.003

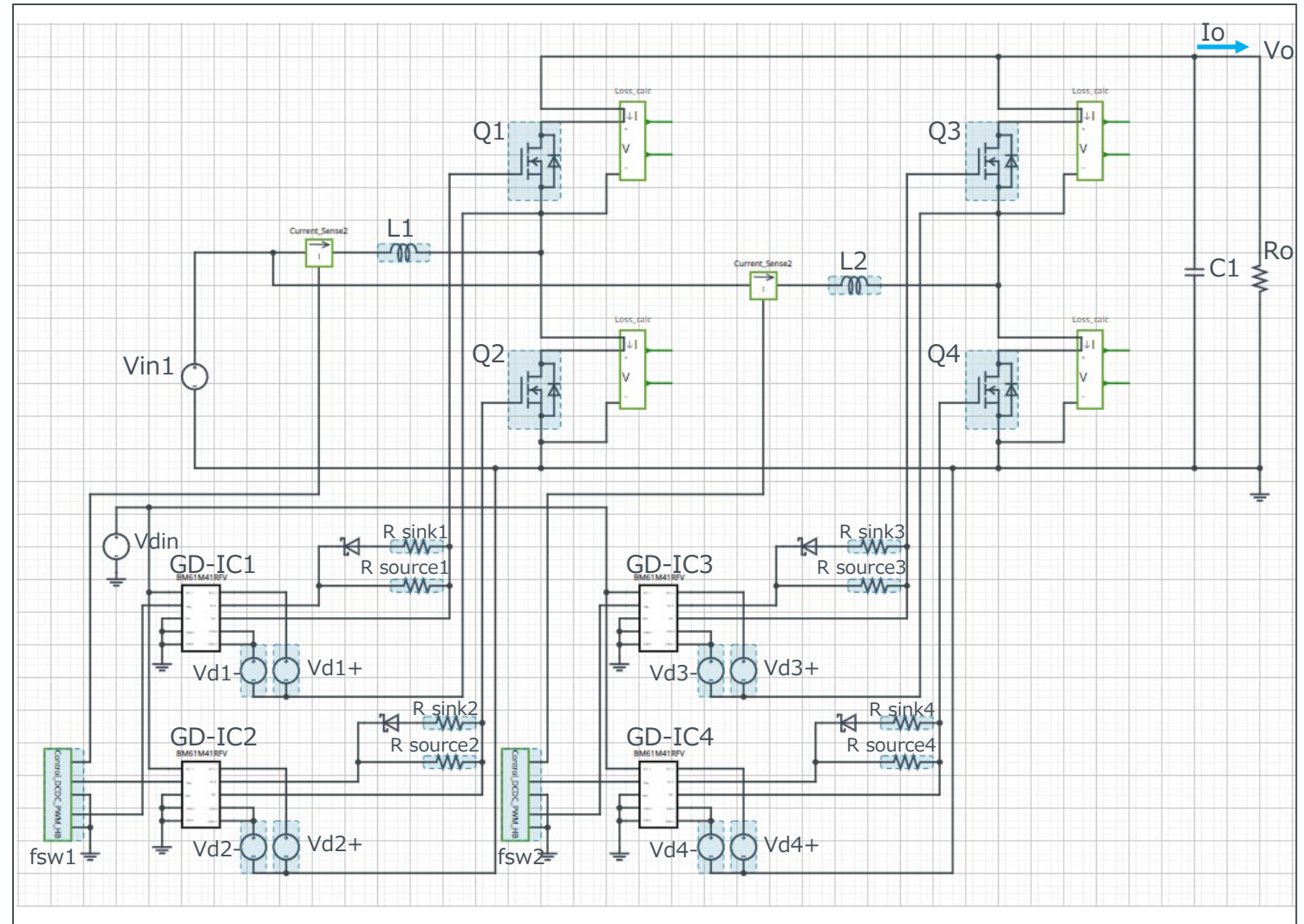
## Simulation Parameters

| Component name | Component            | Default | Simulation Setting Range |
|----------------|----------------------|---------|--------------------------|
| Vin1           | Input voltage        | 250Vdc  |                          |
| Vo             | Output voltage       | 500Vdc  |                          |
| Io             | Output current       | 10Adc   |                          |
| fsw1,2         | Switching frequency  | 50kHz   | 10k – 300kHz             |
| Tj             | 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 |
|----------------|---------------------|--------------|--------------------------|
| Q1-4           | SJ-MOSFET           | Selectable   |                          |
| GD-IC1-4       | Gate Driver         | BM61M41RFV-C |                          |
| R sink1-4      | Resistor for sink   | 2Ω           | 0.1 -                    |
| R source1-4    | Resistor for source | 5Ω           | 0.1 -                    |
| L1,2           | Inductor            | 500μH        | 10μH - 2mH               |
| C1             | Capacitor           | 10μF         | 1μF - 1mF                |
| Ro             | 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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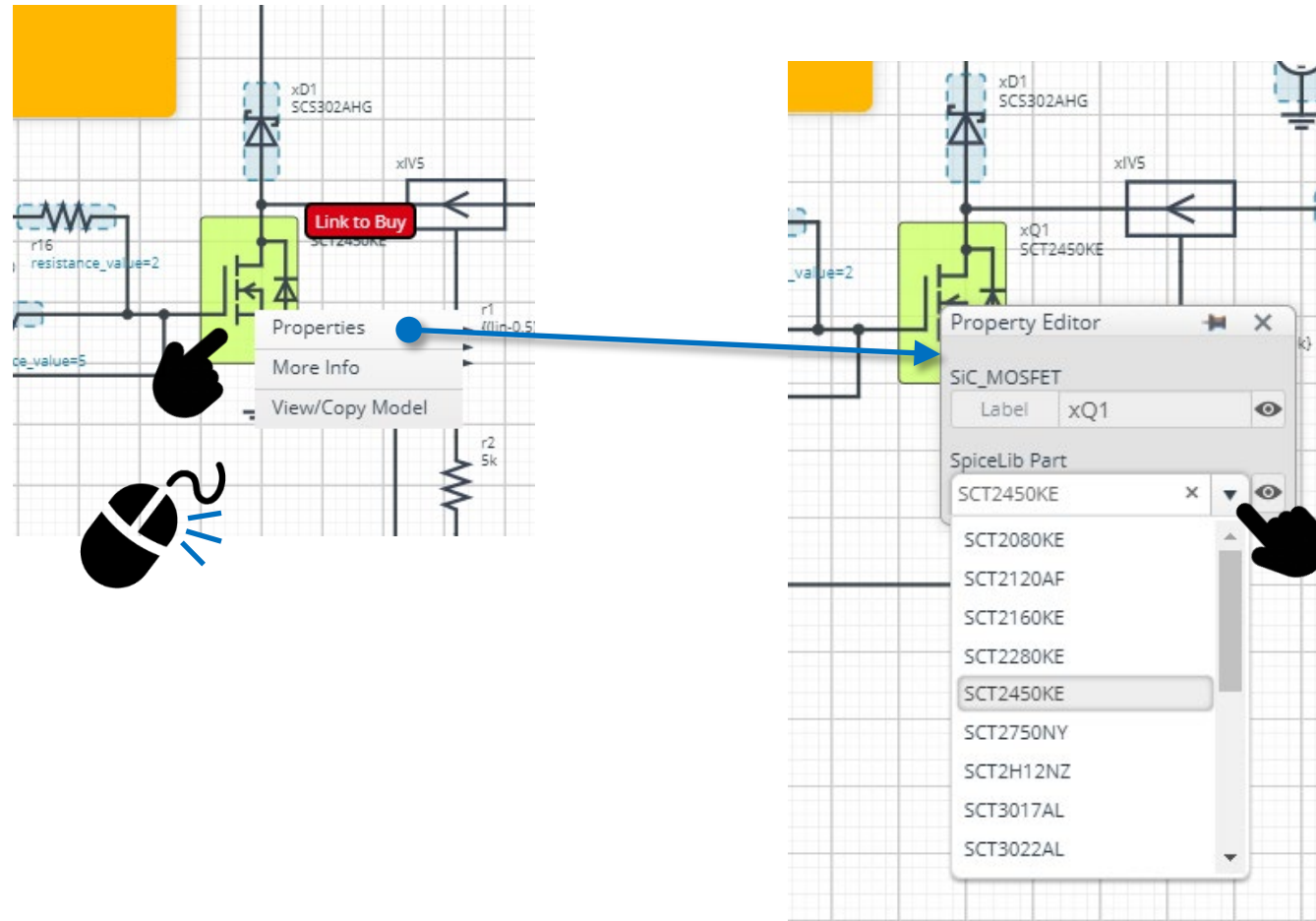
### Selectable Devices

| 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

# How to change the devices

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

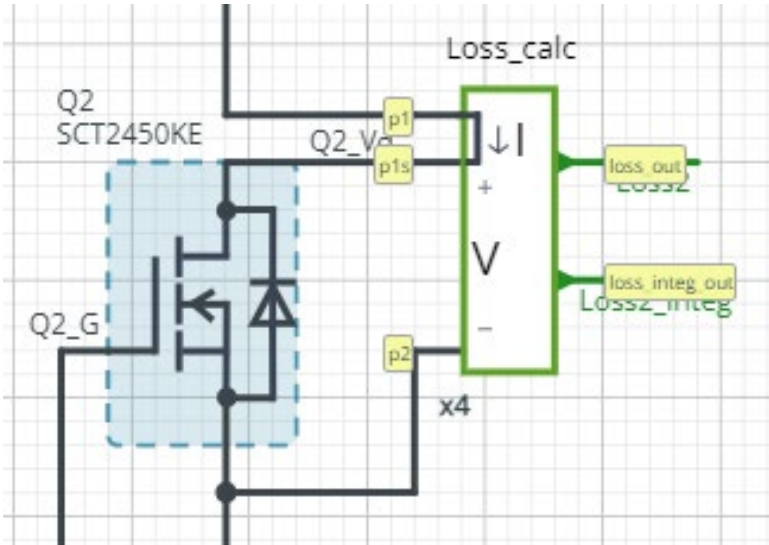


# Loss Calculation Model

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

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## Loss calculation model 'Loss\_calc'



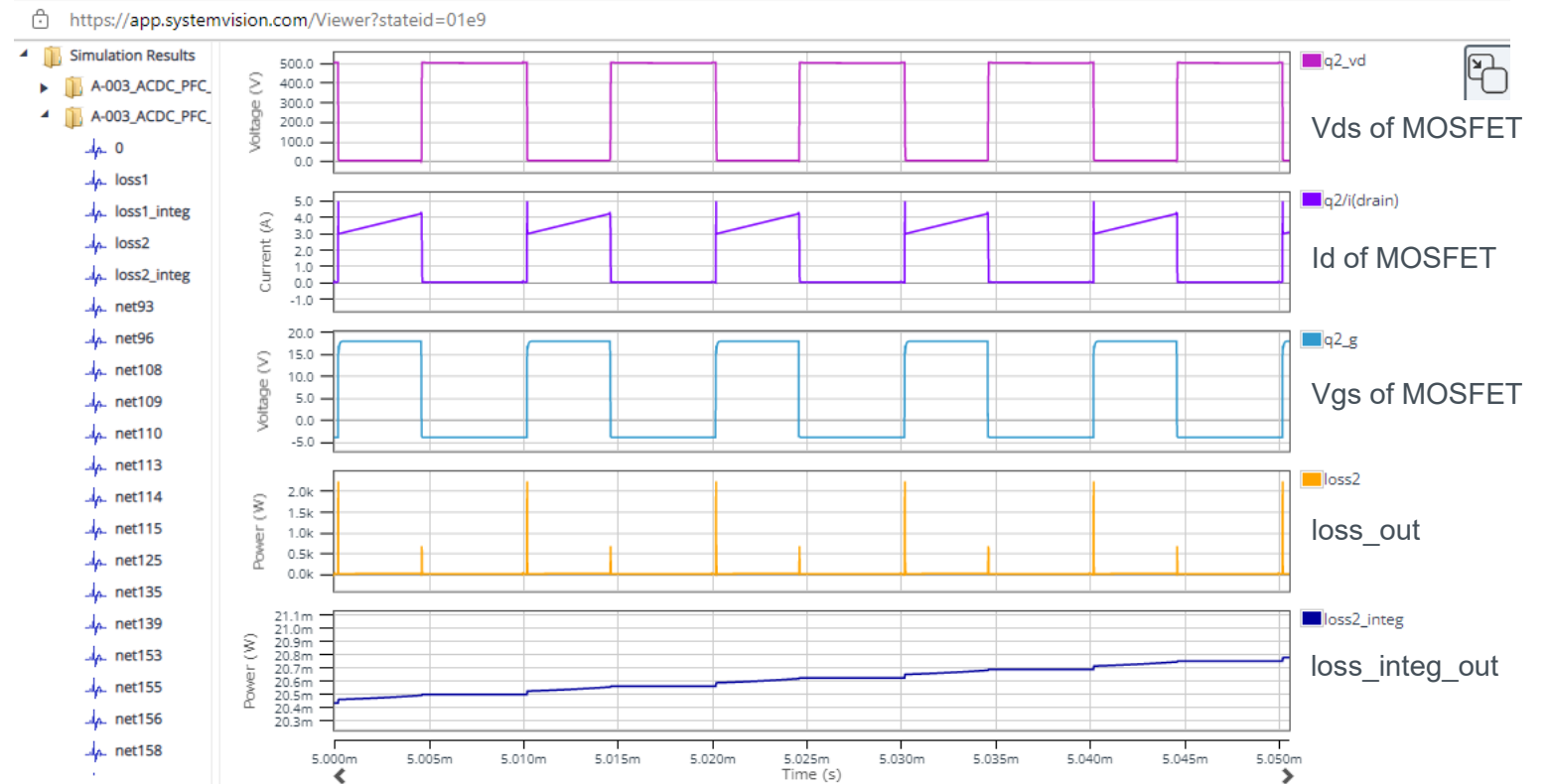
$$loss\_out(t) = I(t) \times V(t)$$

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

I : Current through p1 to p1s

V : Voltage between p1s and p2

## Waveform example



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