

# A-011. Totem-Pole Bridgeless PFC $V_{in}=200V$ , $I_{in}=100A$ , Diode Rectification on low frequency leg

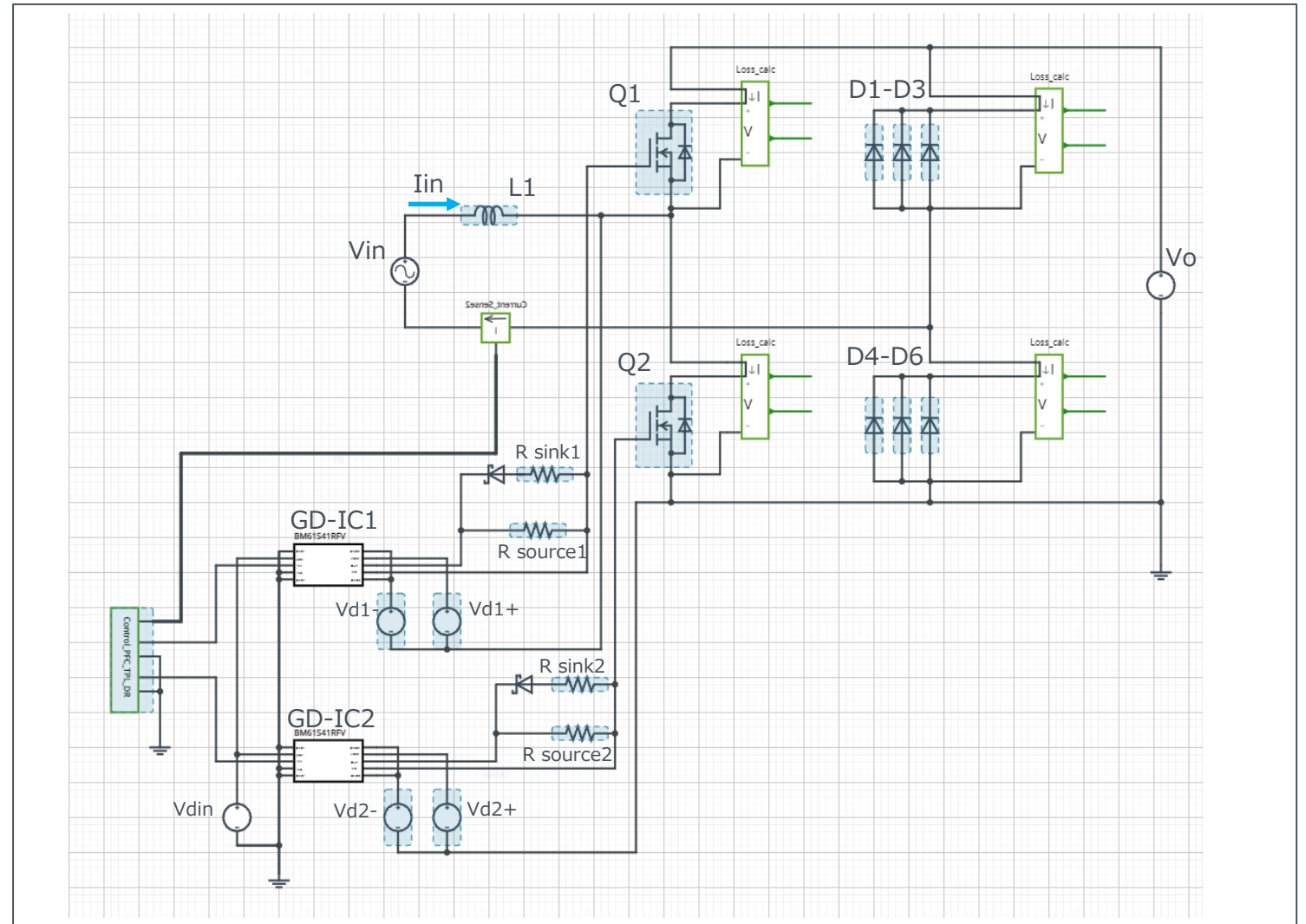
## Simulation Parameters

| Component name | Component            | Default        | Simulation Setting Range |
|----------------|----------------------|----------------|--------------------------|
| $V_{in}$       | Input voltage        | 200Vac<br>50Hz |                          |
| $I_{in}$       | Input current        | 100Aac         |                          |
| $V_o$          | Output voltage       | 400Vdc         | 300 – 500Vdc             |
| fsw            | Switching frequency  | 50kHz          | 10k – 300kHz             |
| $T_j$          | Temperature          | 100°C          |                          |
| $V_{d1,2+}$    | Gate Drive voltage H | 18V            | 10 – 20V                 |
| $V_{d1,2-}$    | Gate Drive voltage L | -4V            | -4 – 0V                  |
| $V_{din}$      | Signal voltage level | 5V             |                          |

## Devices

| Component name | Component           | Default      | Simulation Setting Range |
|----------------|---------------------|--------------|--------------------------|
| Q1, Q2         | SiC MOSFET          | Selectable   |                          |
| D1 – D6        | SiC SBD             | Selectable   |                          |
| GD-IC1,2       | Gate Driver         | BM61S41RFV-C |                          |
| R sink1,2      | Resistor for sink   | 1Ω           | 0.1 -                    |
| R source1,2    | Resistor for source | 2Ω           | 0.1 -                    |
| L1             | Inductor            | 100μH        | 10μH - 2mH               |

## 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, Q2         | SiC MOSFET | SCT2080KE     | 1200V, 80mΩ, 40A    |
|                |            | SCT2120AF     | 650V, 120mΩ, 29A    |
|                |            | SCT2160KE     | 1200V, 160mΩ, 22A   |
|                |            | SCT2280KE     | 1200V, 280mΩ, 14A   |
|                |            | SCT2450KE     | 1200V, 450mΩ, 10A   |
|                |            | SCT2750NY     | 1700V, 750mΩ, 6A    |
|                |            | SCT2H12NZ     | 1700V, 1150mΩ, 3.7A |
|                |            | SCT3017AL (*) | 650V, 17mΩ, 118A    |
|                |            | SCT3022AL     | 650V, 22mΩ, 93A     |
|                |            | SCT3022KL     | 1200V, 22mΩ, 95A    |
|                |            | SCT3030AL     | 650V, 30mΩ, 70A     |
|                |            | SCT3030KL     | 1200V, 30mΩ, 72A    |
|                |            | SCT3040KL     | 1200V, 40mΩ, 55A    |
|                |            | SCT3060AL     | 650V, 60mΩ, 39A     |
|                |            | SCT3080AL     | 650V, 80mΩ, 30A     |
|                |            | SCT3080KL     | 1200V, 80mΩ, 31A    |
|                |            | SCT3105KL     | 1200V, 105mΩ, 24A   |
|                |            | SCT3120AL     | 650V, 120mΩ, 21A    |
|                |            | SCT3160KL     | 1200V, 160mΩ, 17A   |

\* Default device

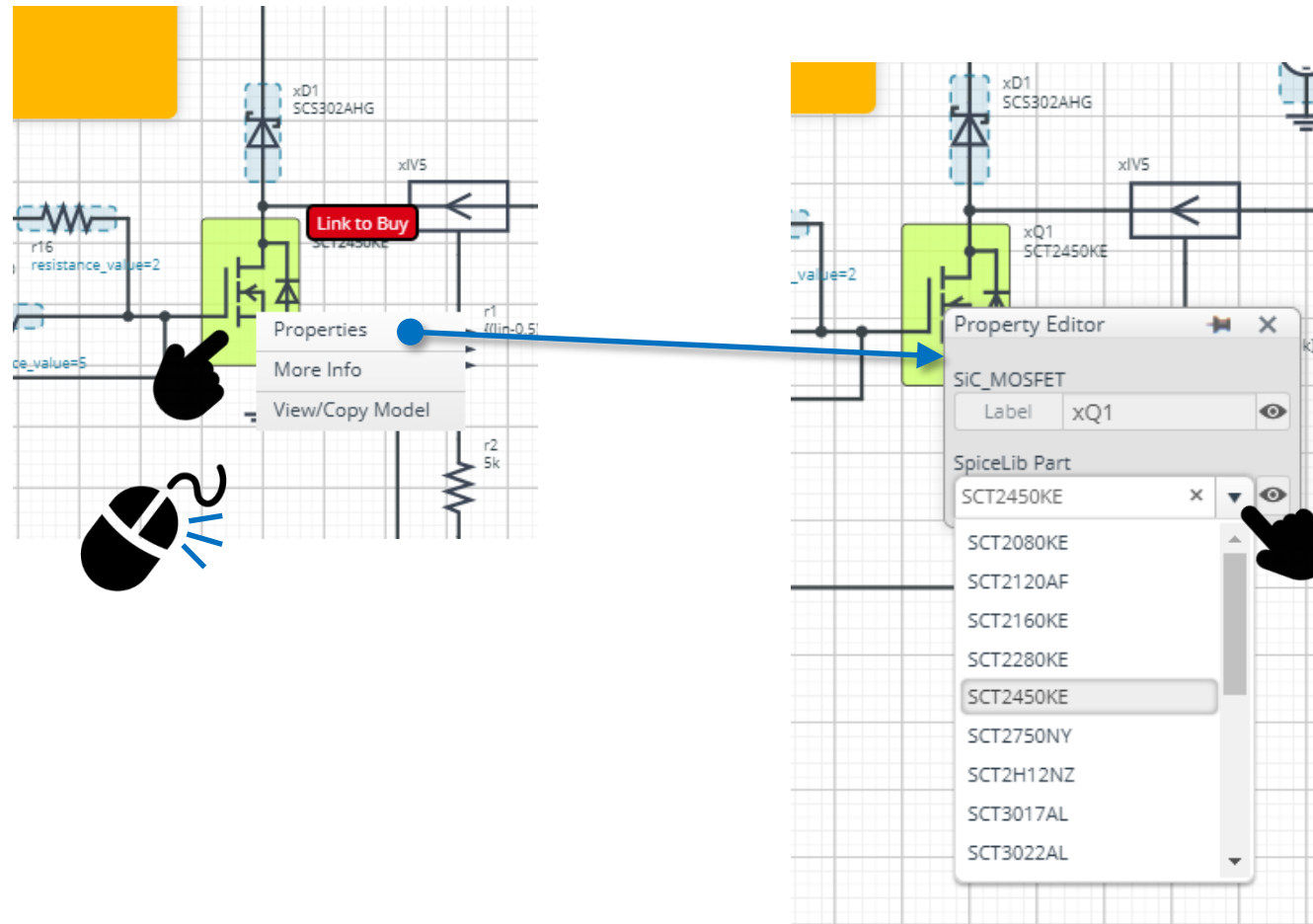
## Selectable Devices

| Component name | Component | Product No.   | feature   |
|----------------|-----------|---------------|-----------|
| D1-D6          | Si-FRD    | RFN10TF6S     | 600V, 10A |
|                |           | RFN20TF6S     | 600V, 20A |
|                |           | RFN20TJ6S (*) | 600V, 20A |
|                |           | RFNL10TJ6S    | 600V, 10A |
|                |           | RFNL15TJ6S    | 600V, 15A |
|                |           | RFNL20TJ6S    | 600V, 20A |

\* Default device

# How to change the devices

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



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