Lab 3
Differential Amplifier

09/19/2022

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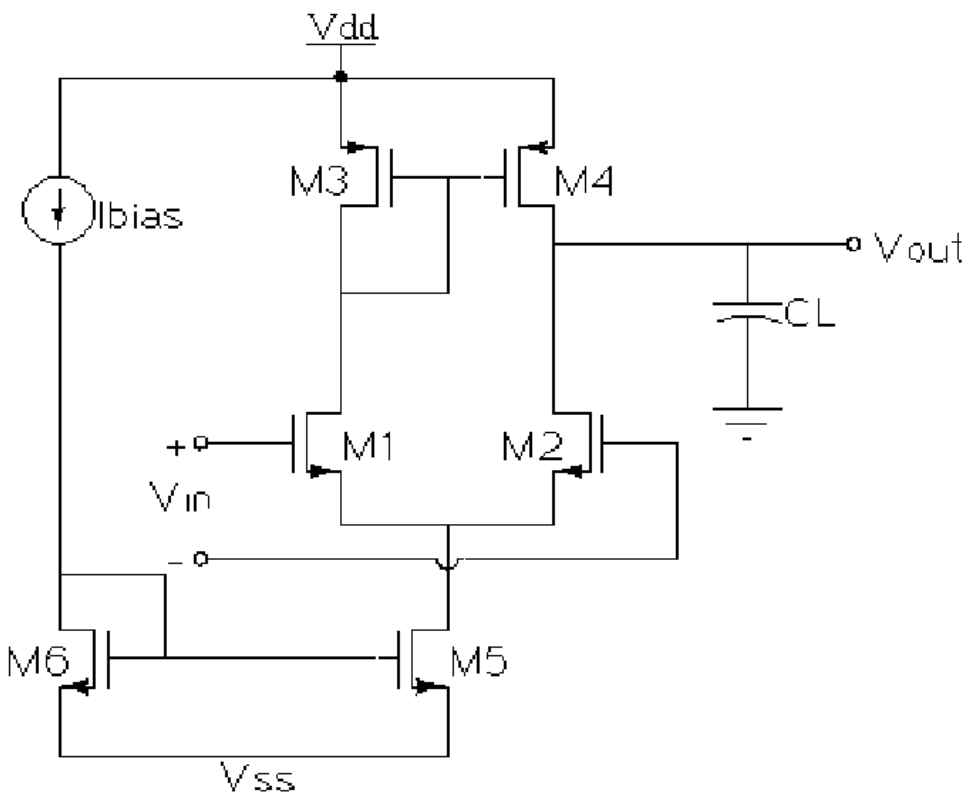
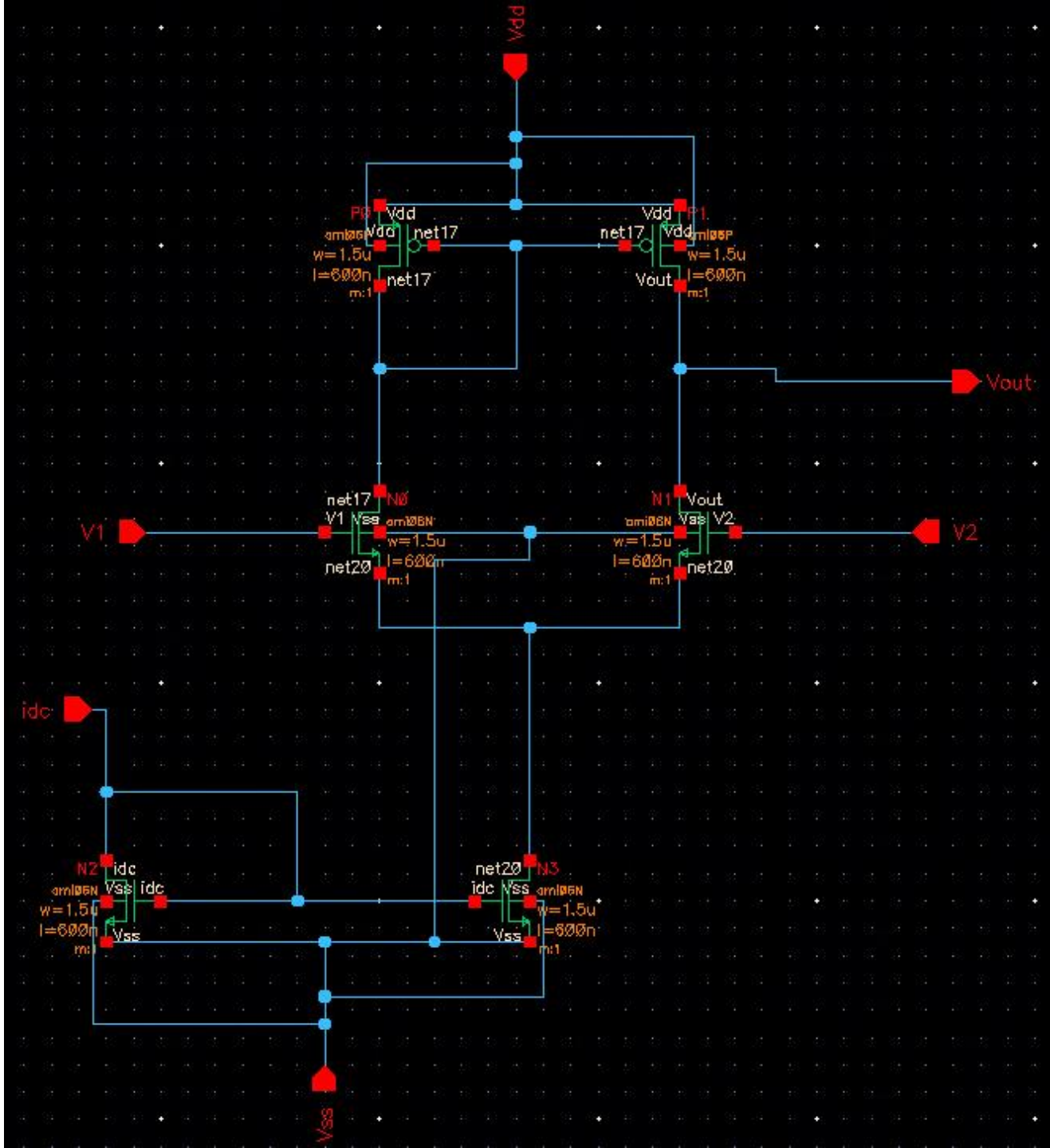
Differential Amplifier



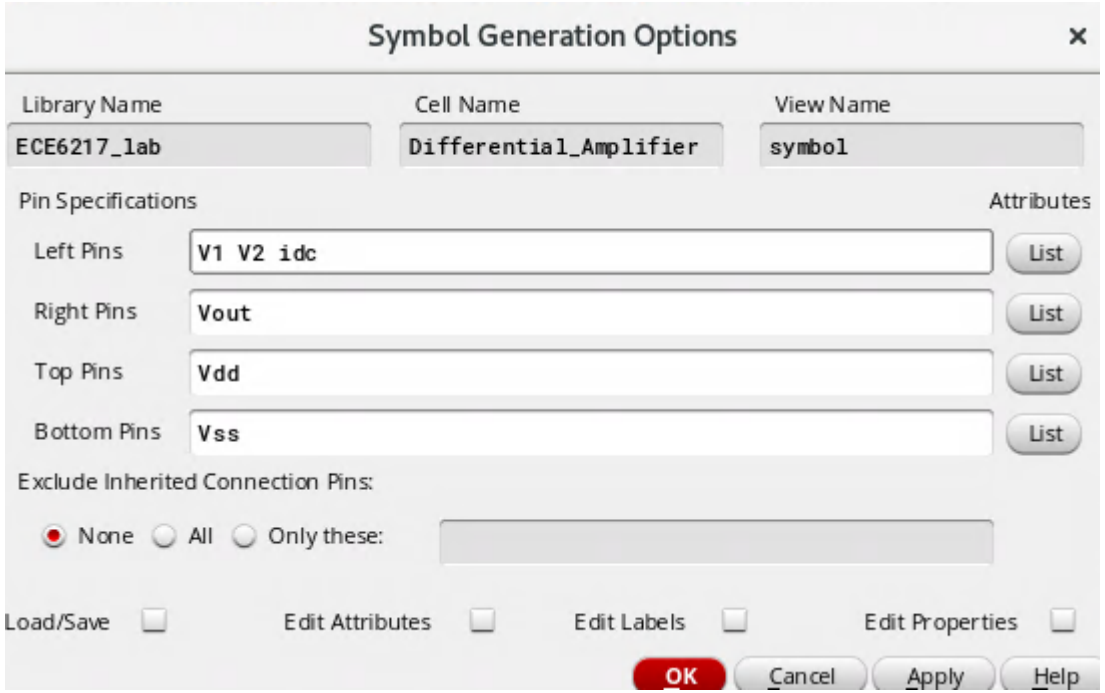
IEEE Press Series on Microelectronic Systems) R. Jacob Baker - CMOS_ Circuit Design, Layout, and Simulation -Wiley-IEEE Press (2010)
Chapter 21 & Chapter 22

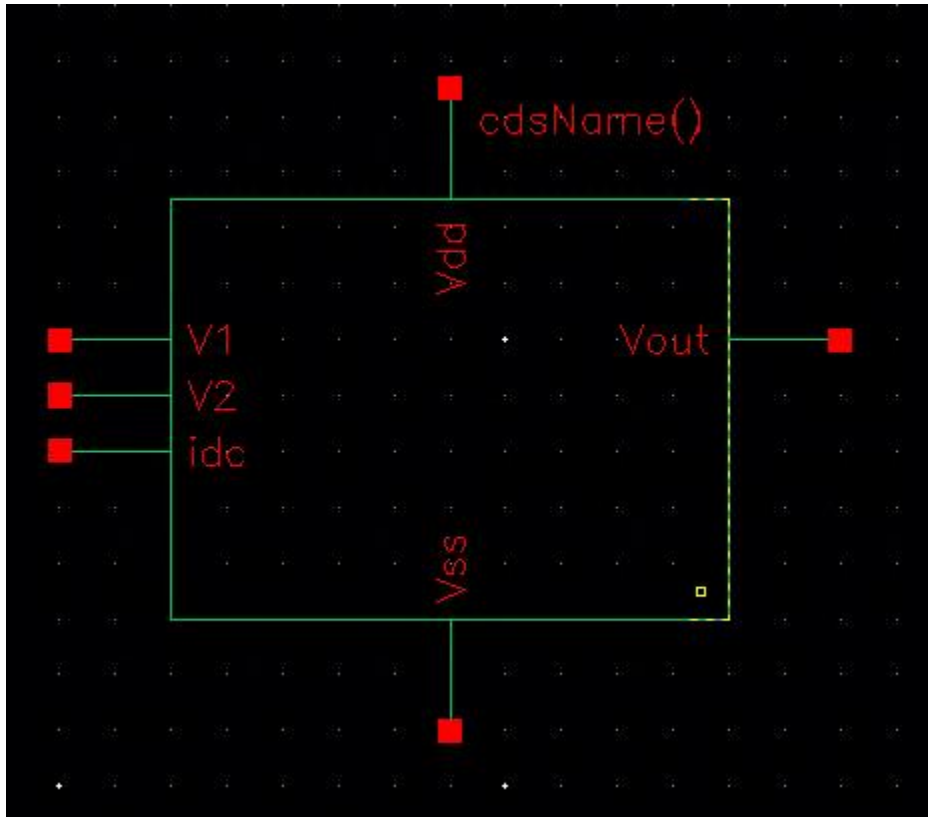
Schematic

1. Create 2 PMOS and 4 NMOS
2. Create input Pins: Vdd, Vss, idc, V1, V2
3. Create output Pins: Vout
4. Connect the components with wires
5. Save as symbol



Place the Pins

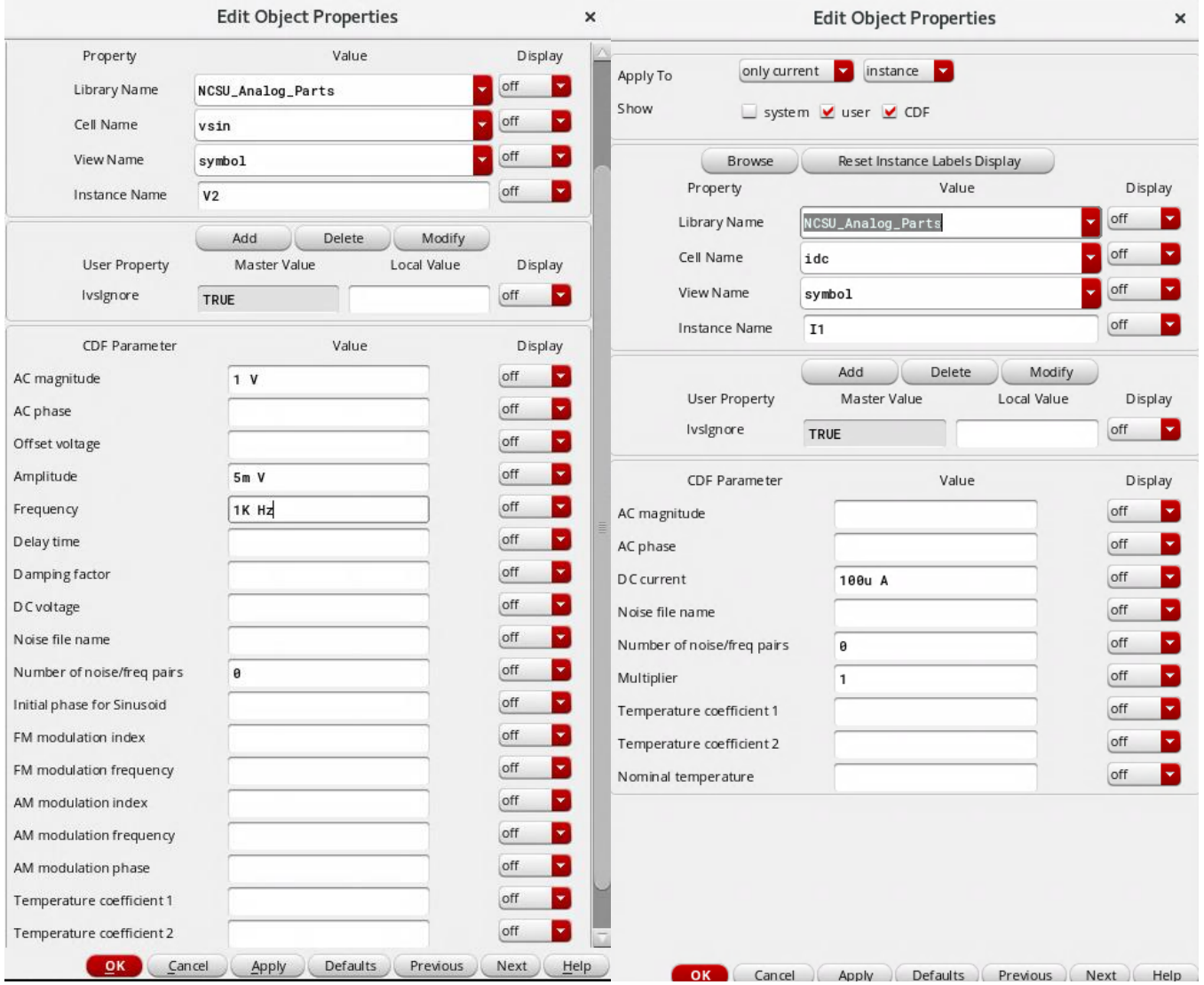


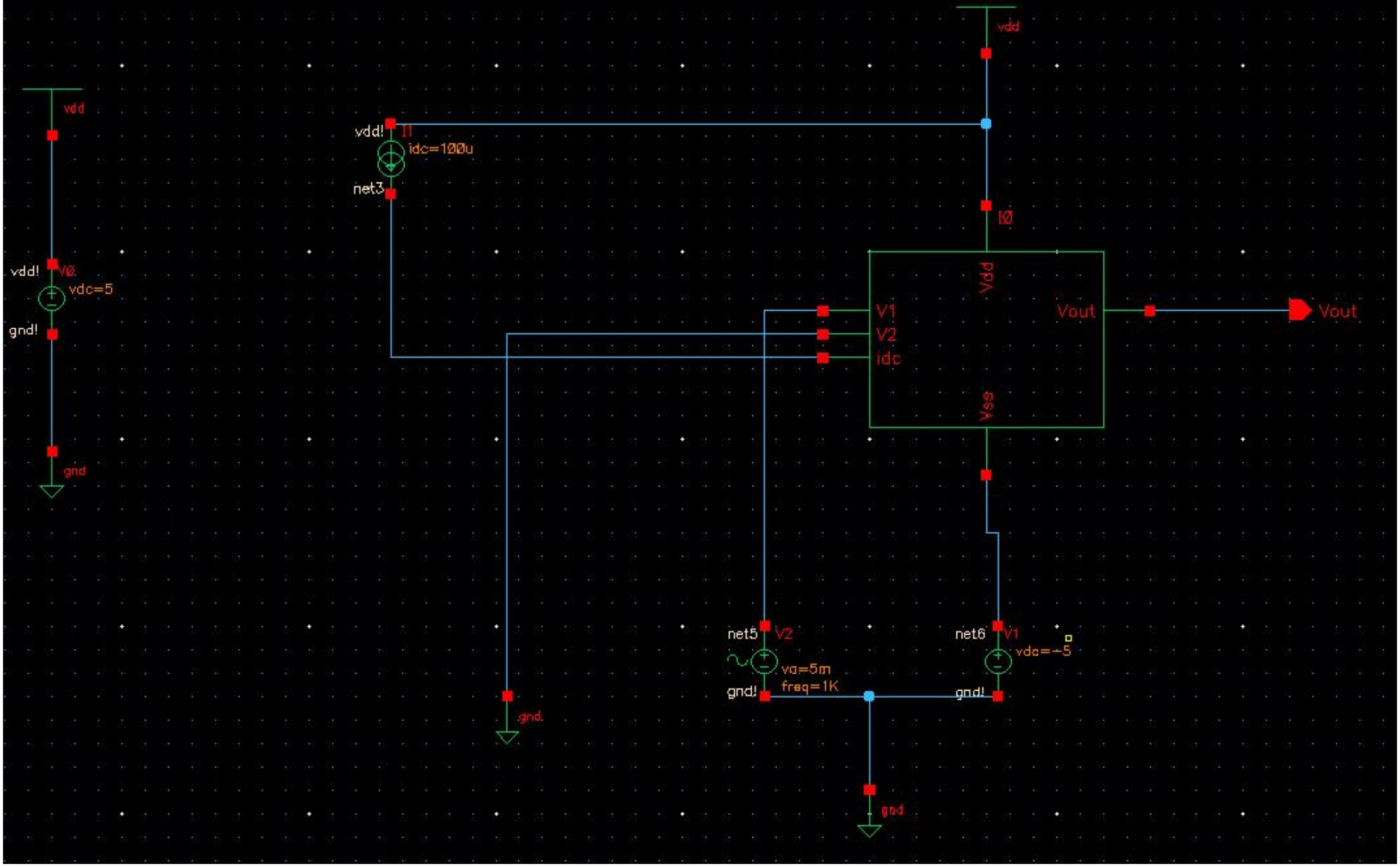


Create Testbench

1.Create an Output Pins: Vout
2. Create vdc where DC voltage = 5V
3. Create Vsin and idc
4. Connect V1 to the Vsin
5. Connect V2 to the gnd

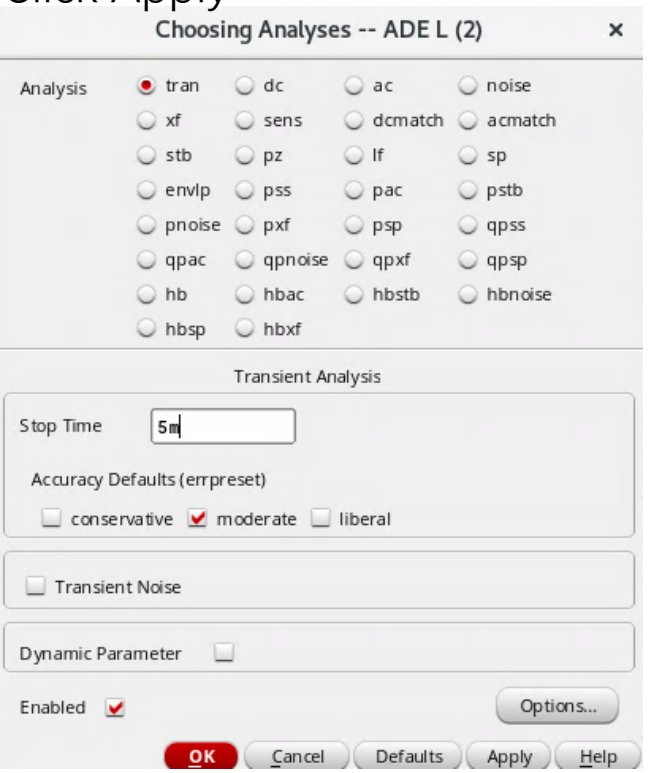
Please see the next page

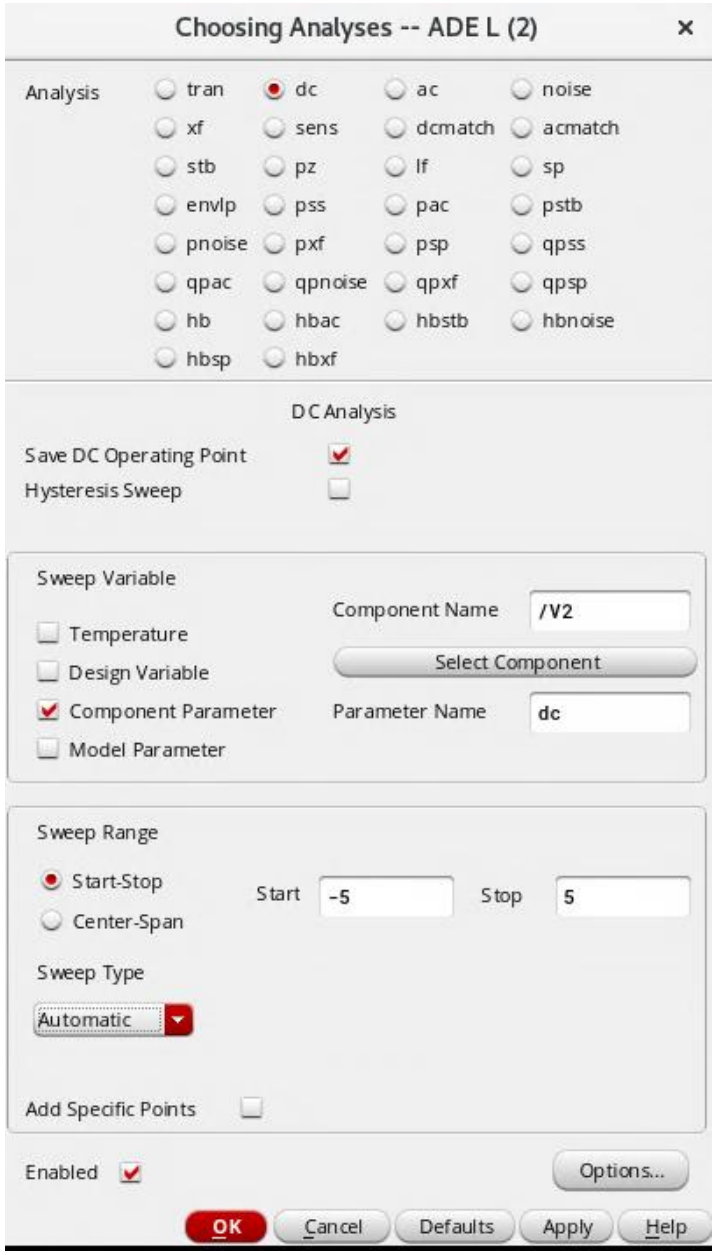



vdd
vdd!
I1
idc=100u
net3
I0
vdd!
V0
vdc=5
gnd!
gnd
Vdd
V1
V2
idc
Vout
Vout
Vss
net5
V2
va=5m
freq=1K
gnd!
net6
V1
vdc=-5
gnd!
gnd
gnd
gnd

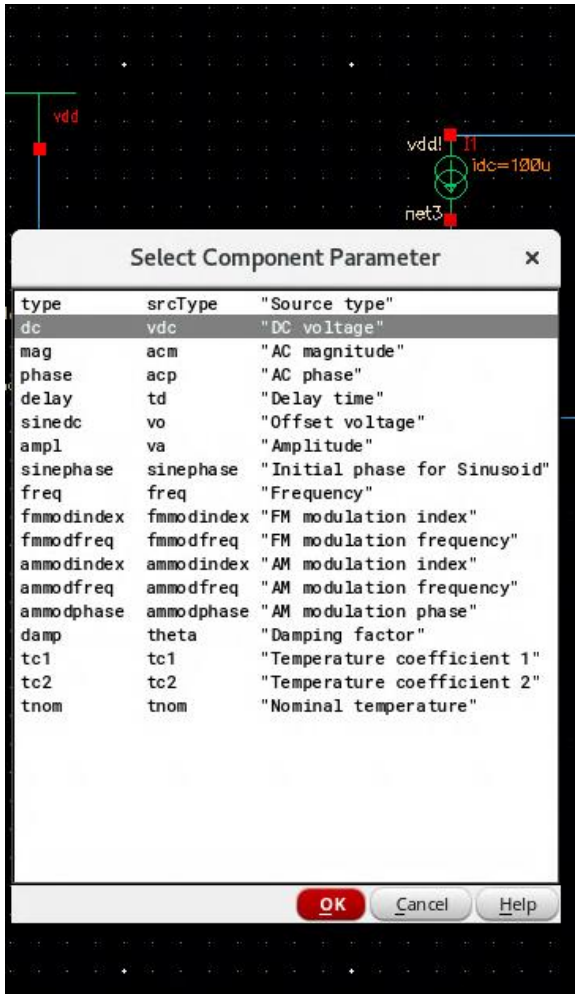
Launch ADE L
Analyses

Tran ->Stop time: 5m -> moderate -> Enabled
Click Apply

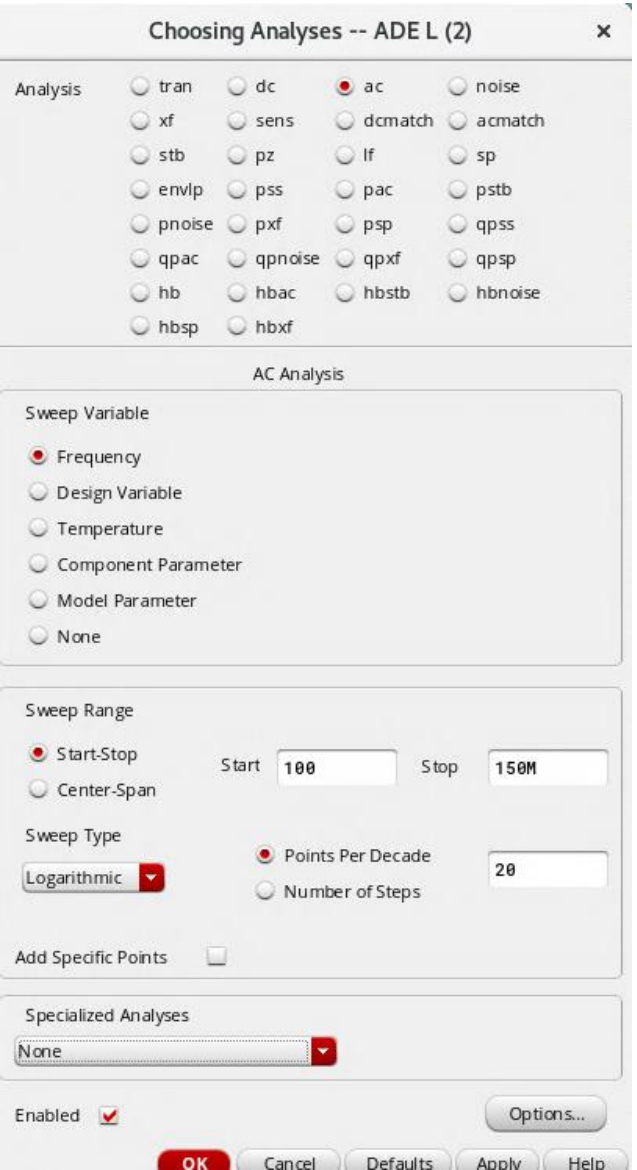




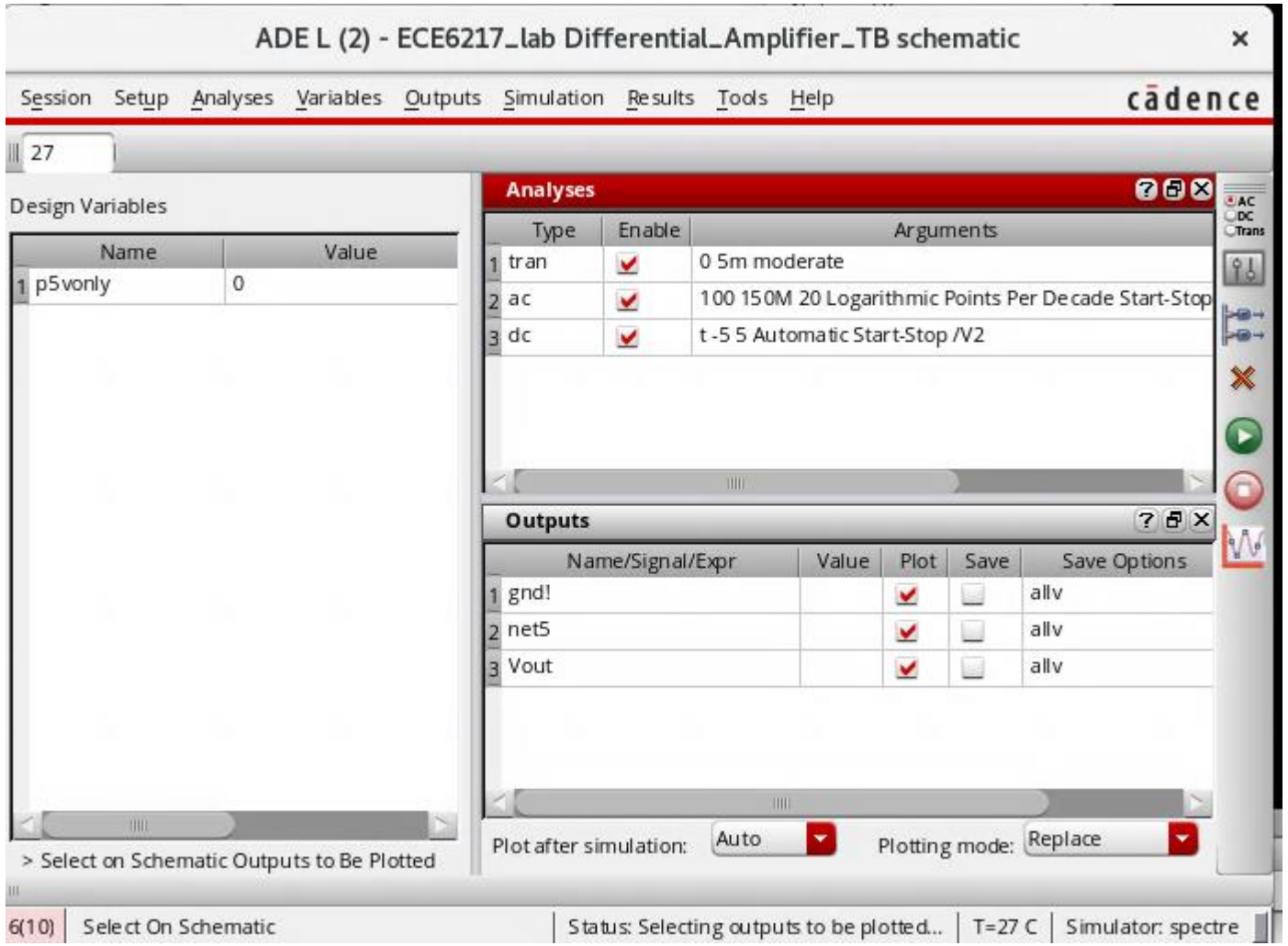
dc -> Save DC operating point ->Component parameter -> select component -> choose Vsin ->choose dc – vdc-DC voltage
-> click ok
Start-Stop : -5 to 5 -> click Apply



ac
Frequency -> Start-Stop ->100, 150M
Sweep Type ->Logarithmic -> 20
Click Apply and ok



Click Outputs
Choose V1, V2 and Vout from schematic
Run simulation



Click Split All stripes
You will see your simulation result