

Device Modeling Report

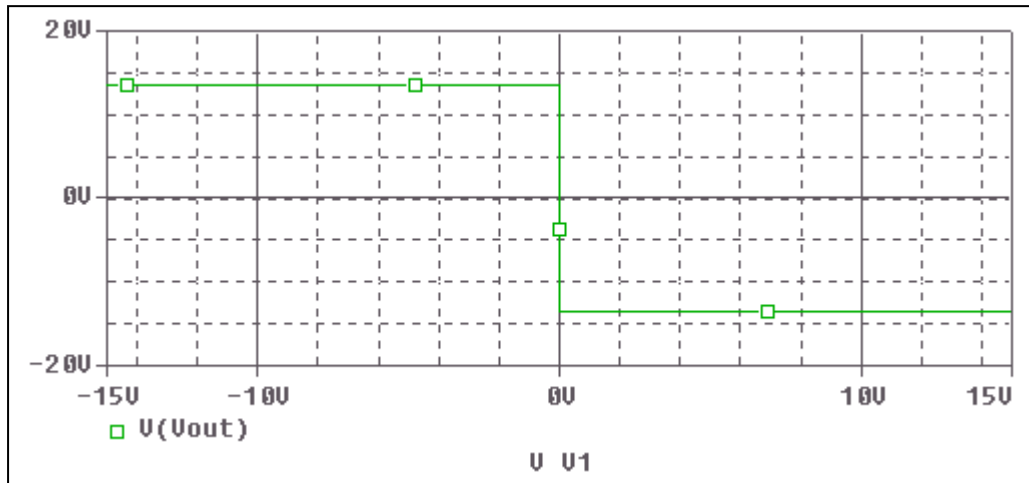
COMPONENTS:MOSFET: OPERATIONAL AMPLIFIER
PART NUMBER:NJM4580
MANUFACTURER: NEW JAPAN RADIO CO.,LTD



Bee Technologies Inc.

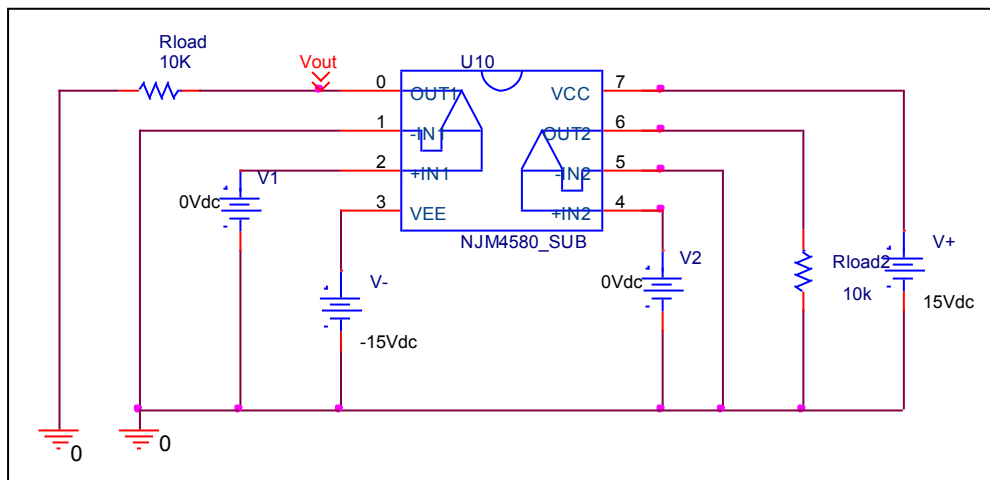
Output Voltage Swing, +Vout and -Vout

Simulation result



These simulation results are compared with $\pm V_{out}$

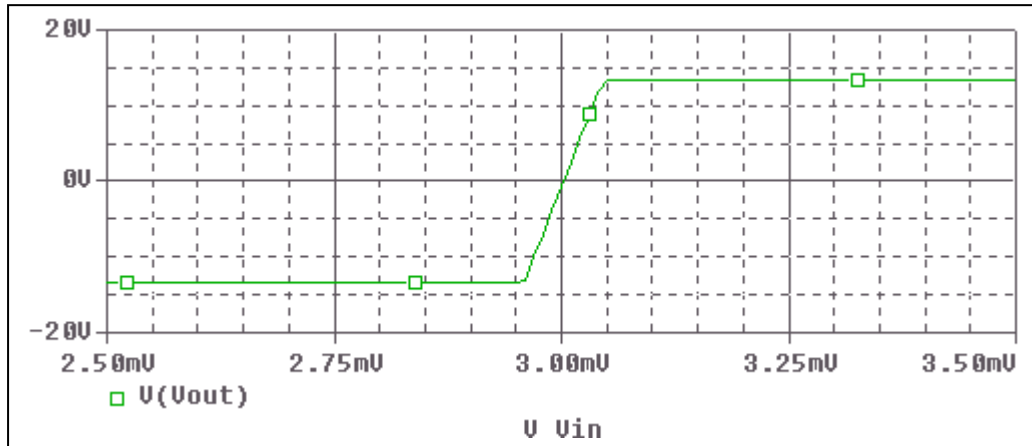
Evaluation circuit



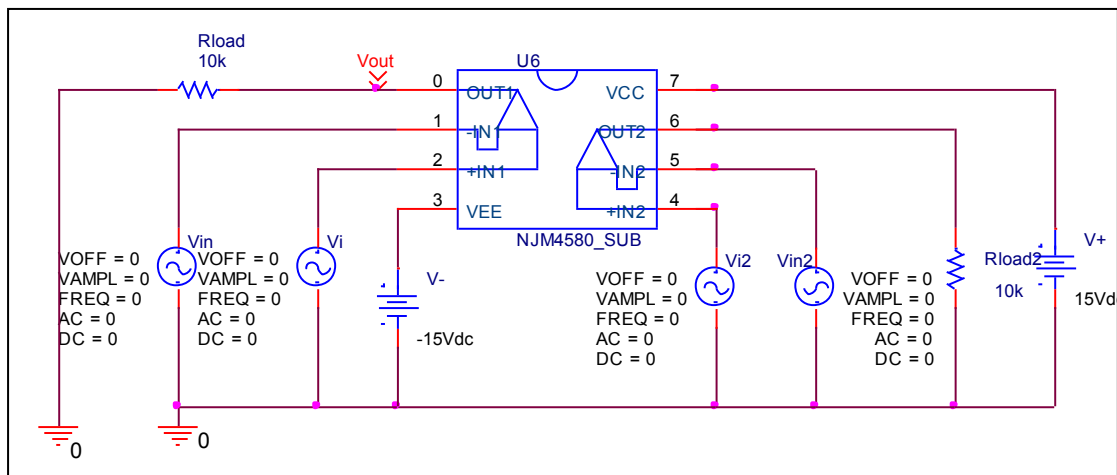
| Output Voltage Swing | Data sheet | Simulation | %Error |
|----------------------|------------|------------|--------|
| +Vout(V) | +13.5 | +13.466 | 0.251 |
| -Vout(V) | -13.5 | -13.466 | 0.251 |

Input Offset Voltage

Simulation result



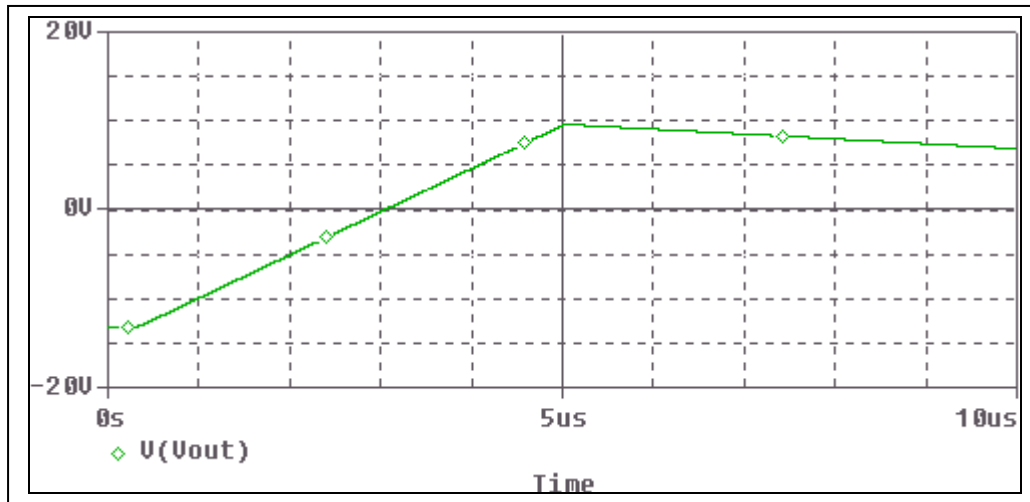
Evaluation circuit



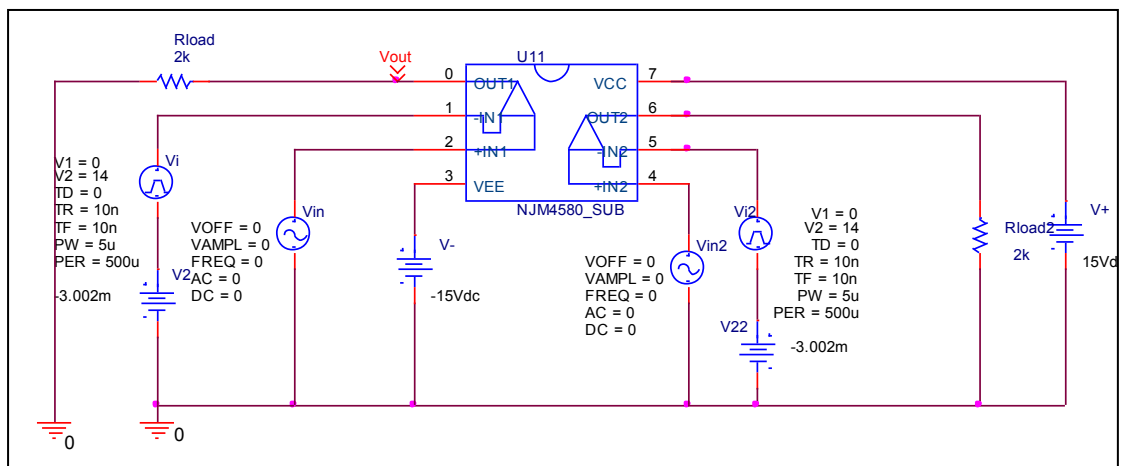
| Vos | Measurement | | Simulation | | Error | |
|-----|-------------|----|------------|----|-------|---|
| | 3 | mV | 3.002 | mV | 0.066 | % |

Slew Rate, +SR, -SR

Simulation result



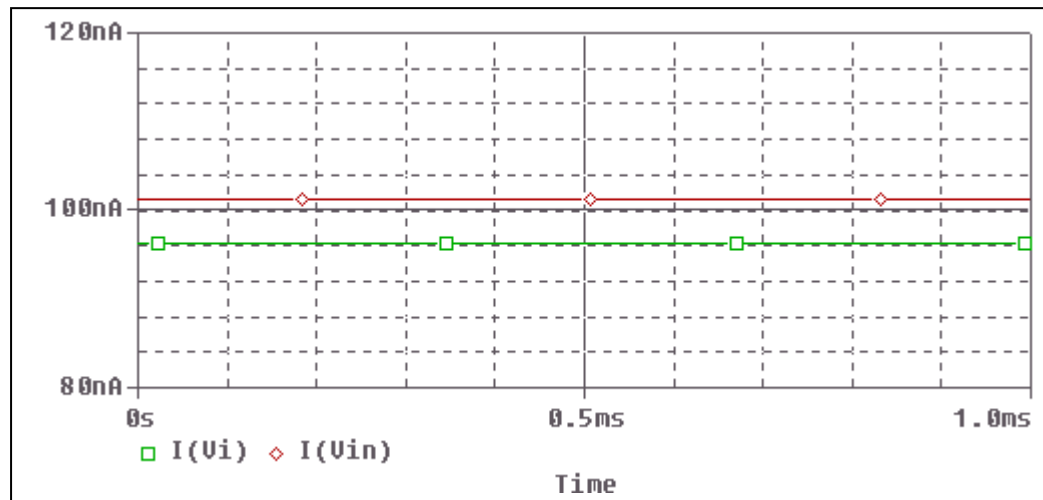
Evaluation circuit



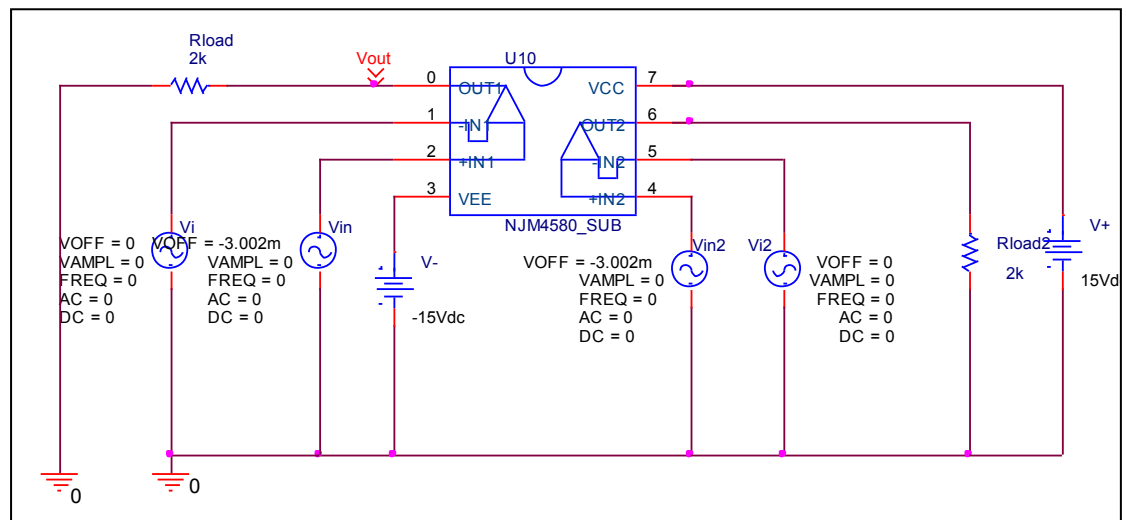
| Slew Rate(v/us) | Data sheet | Simulation | %Error |
|-----------------|------------|------------|----------|
| | | 5V/us | 4.85V/us |

Input current I_b , I_{bos}

Simulation result



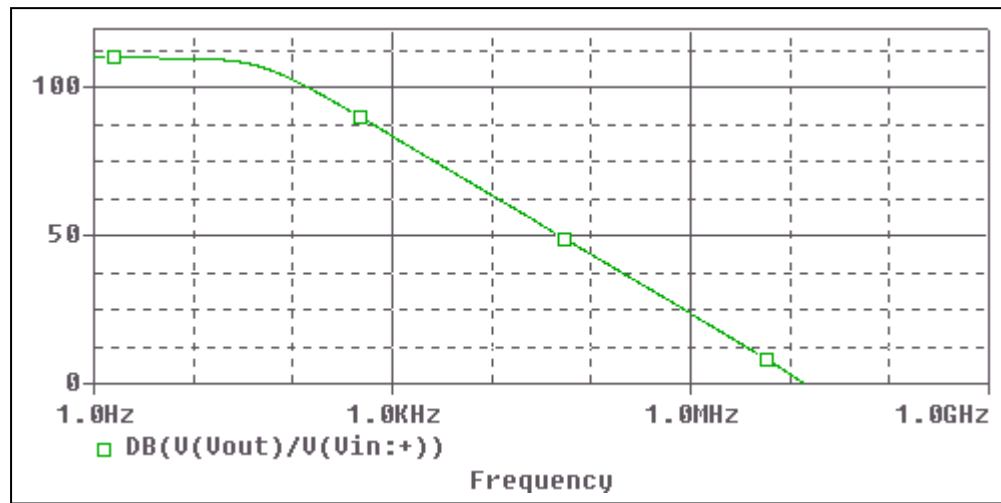
Evaluation circuit



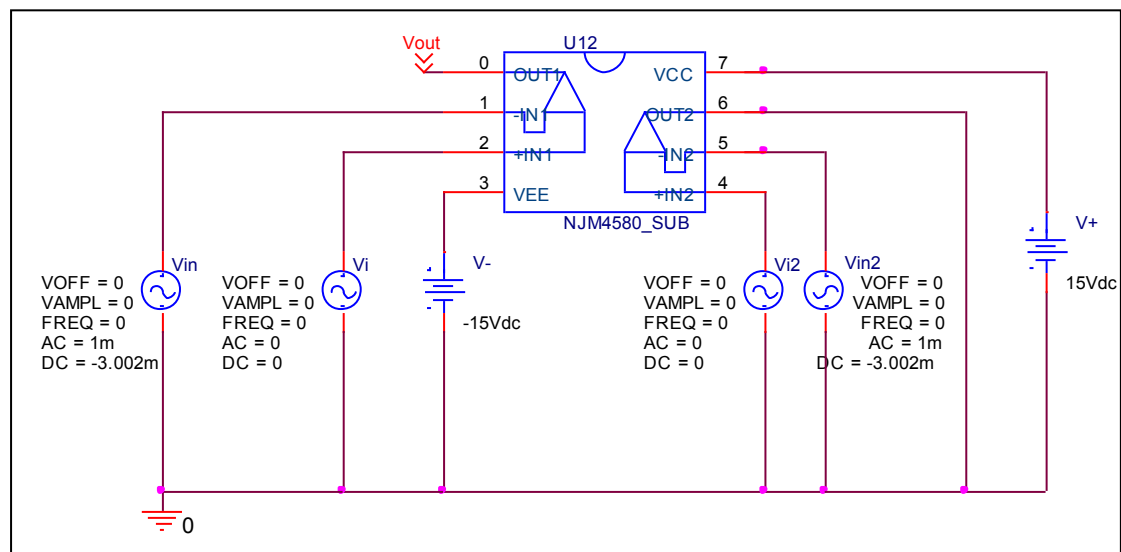
| | Data sheet | Simulation | %Error |
|----------------|------------|------------|--------|
| I_b (nA) | 100 | 98.67 | 1.33 |
| I_{bos} (nA) | 5 | 5.019 | 0.38 |

Open Loop Voltage Gain vs. Frequency , Av-dc, f-0dB

Simulation result



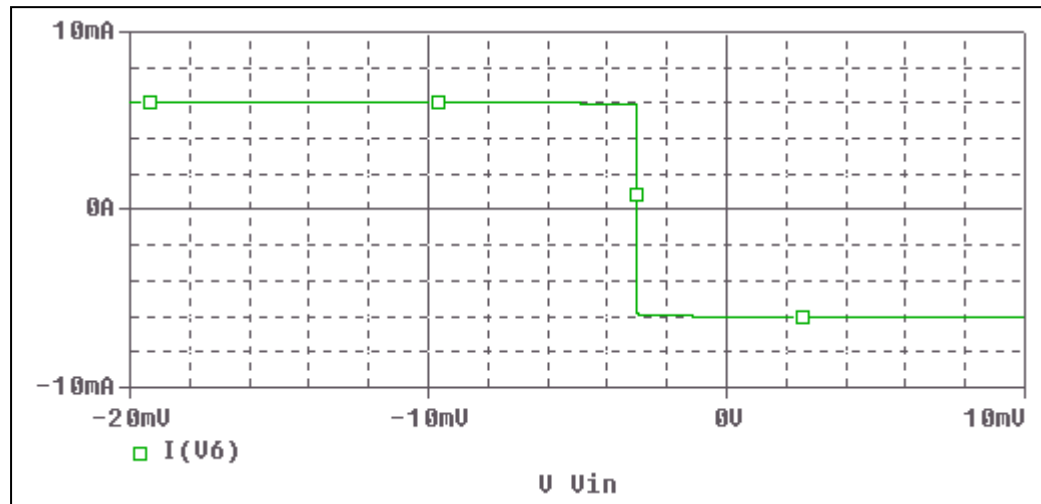
Evaluation circuit



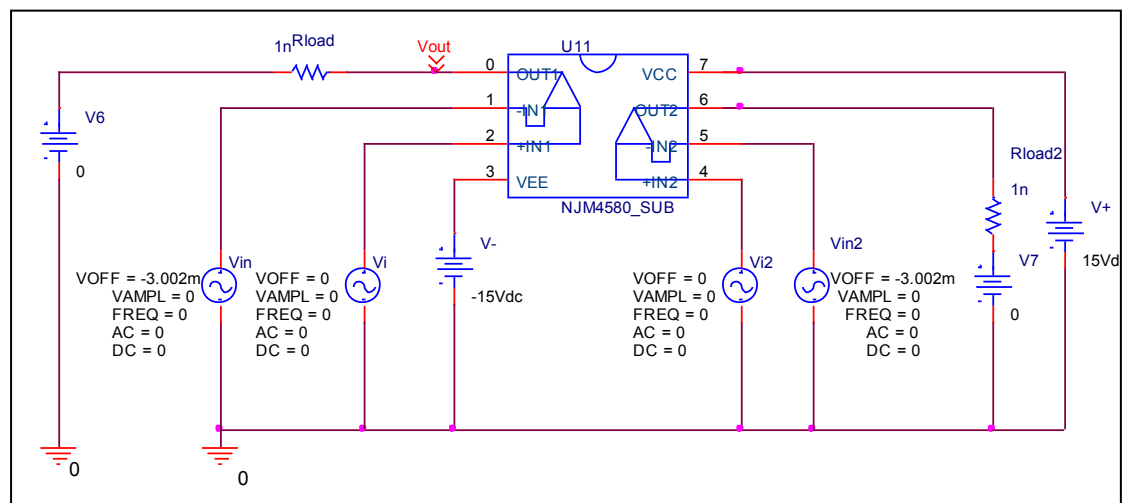
| | Data sheet | Simulation | %Error |
|-------------------|------------|------------|--------|
| f-0dB(MHz) | 15 | 14.3 | 4.666 |
| Av-dc | 110 | 110.2 | 0.181 |

Output Short Circuit Current - Ios

Simulation result



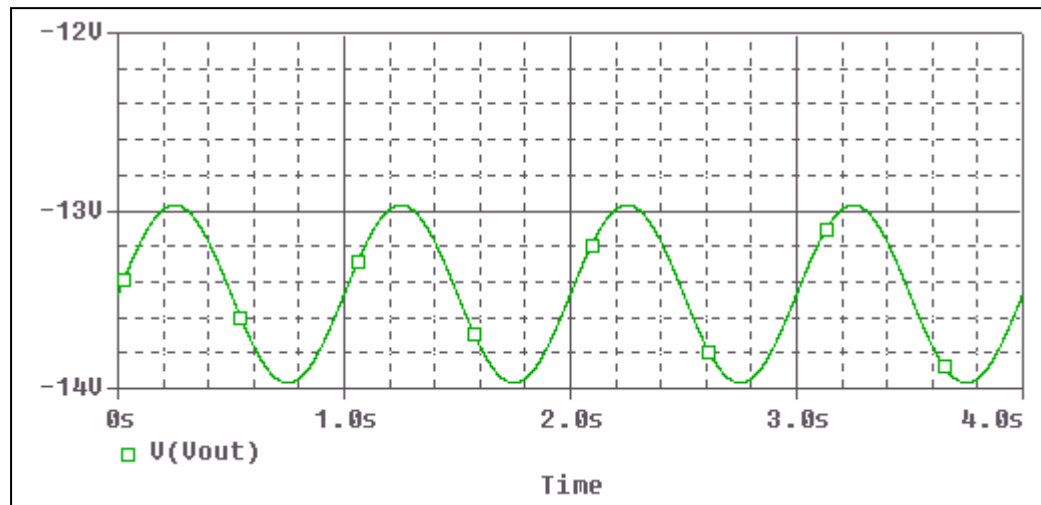
Evaluation circuit



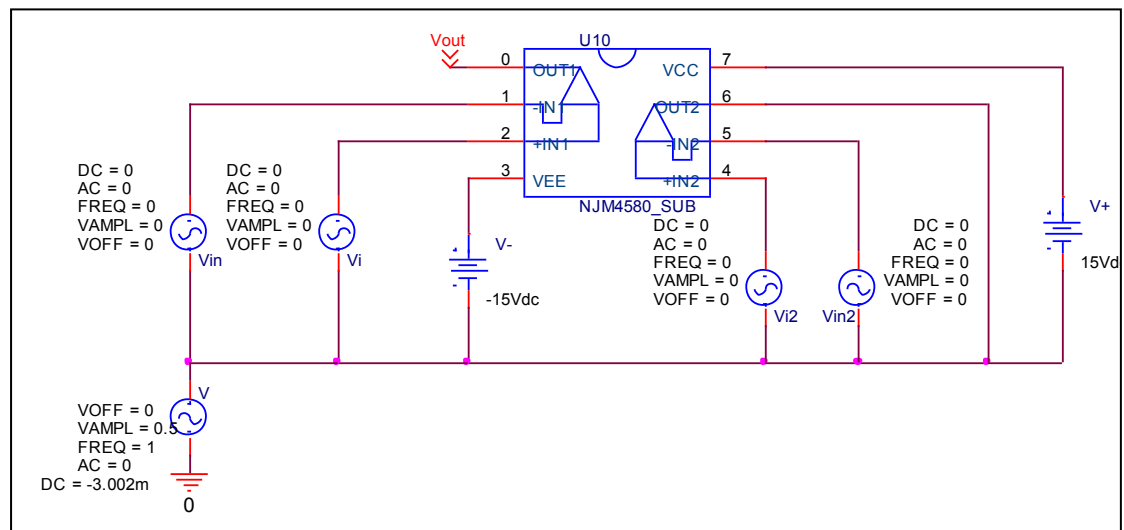
| Short Circuit Current | Data sheet | Simulation | %Error |
|-----------------------|------------|------------|---------|
| | | 6mA | 6.044mA |

Common-Mode Rejection Voltage gain

Simulation result



Evaluation circuit



Common mode gain=1/1

Common Mode Reject Ratio=323593/1=323593

| CMRR | Data sheet | Simulation | %Error |
|------|------------|------------|--------|
| | | 316230 | 323593 |