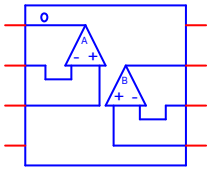
Device Modeling Report

COMPONENTS: OPERATIONAL AMPLIFIER
PART NUMBER:NJM2122
MANUFACTURER: NEW JAPAN RADIO CO.,LTD

Bee Technologies Inc.

Spice Model




```
*$
* PART NUMBER: NJM2122
* MANUFACTURER: NEW JAPAN RADIO
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.Subckt NJM2122 OUT1 -IN1 +IN1 VEE +IN2 -IN2 OUT2 VCC
X_U1     +IN1 -IN1 VCC VEE OUT1 NJM2122_ME
X_U2     +IN2 -IN2 VCC VEE OUT2 NJM2122_ME
.ends  NJM2122
.subckt NJM2122_ME 1 2 3 4 5
  c1   11 12 1.5796E-12
  c2    6  7 17.400E-12
  dc    5 53 dy
  de   54  5 dy
  dlp  90 91 dx
  dln  92 90 dx
  dp    4  3 dx
  egnd 99  0 poly(2) (3,0) (4,0) 0 .5 .5
  fb    7 99 poly(5) vb vc ve vlp vln 0 3.0315E6 -1E3 1E3 3E6 -3E6
  ga    6  0 11 12 1.3195E-3
  gcm   0  6 10 99 263.27E-9
  iee  10  4 dc 79.200E-6
  hlim 90  0 vlim 1K
  q1   11  2 13 qx1
  q2   12  1 14 qx2
  r2    6  9 100.00E3
  rc1   3 11 757.88
  rc2   3 12 757.88
  re1  13 10 35.877
  re2  14 10 35.877
  ree  10 99 2.5253E6
  ro1   8  5 50
  ro2   7 99 25
  rp    3  4 50.038
  vb    9  0 dc 0
  vc    3 53 dc 1.0979
  ve   54  4 dc 1.0979
  vlim  7  8 dc 0
  vlp  91  0 dc 200
  vln   0 92 dc 200
.model dx D(Is=800.00E-18)
.model dy D(Is=800.00E-18 Rs=1m Cjo=10p)
.model qx1 NPN(Is=800.00E-18 Bf=9.1139)
.model qx2 NPN(Is=826.9800E-18 Bf=10.652)
.ends
*$
```
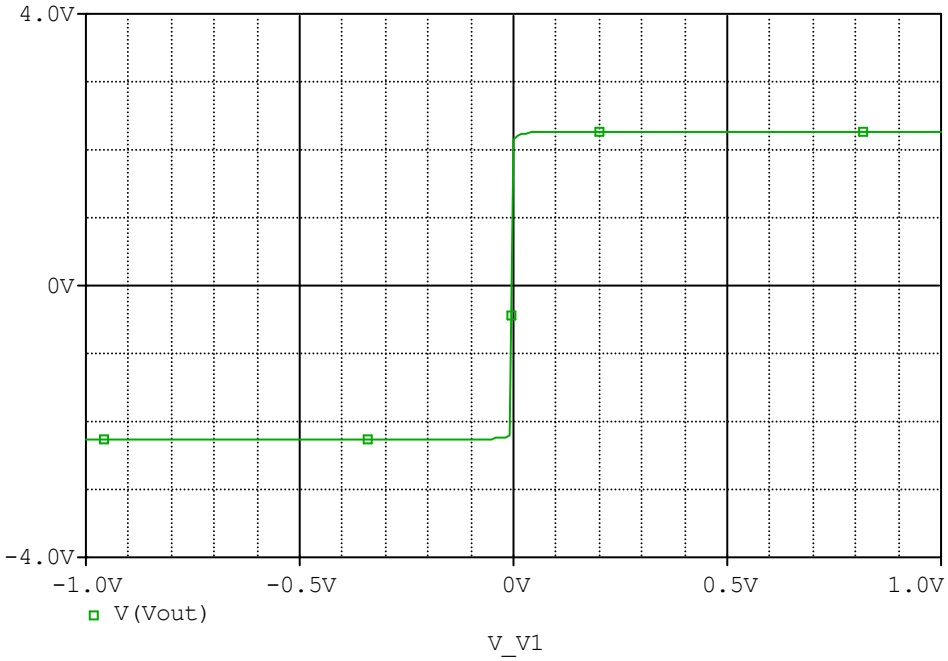
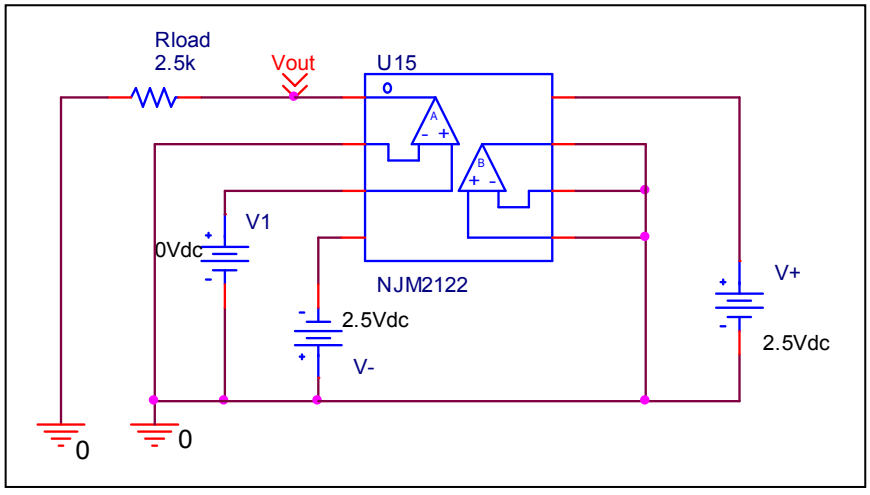

Output Voltage Swing

Simulation result



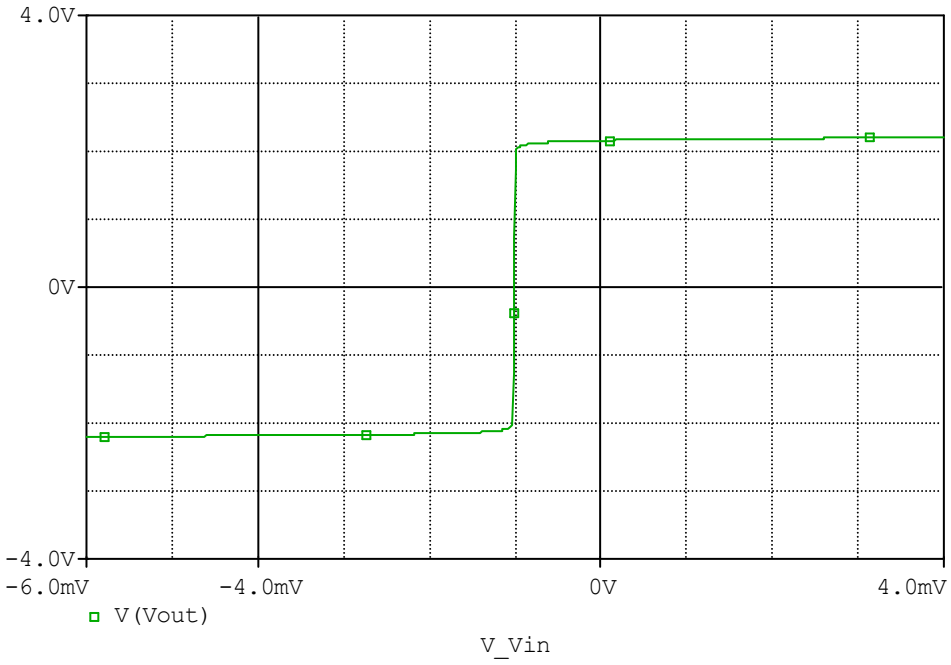
Evaluation circuit



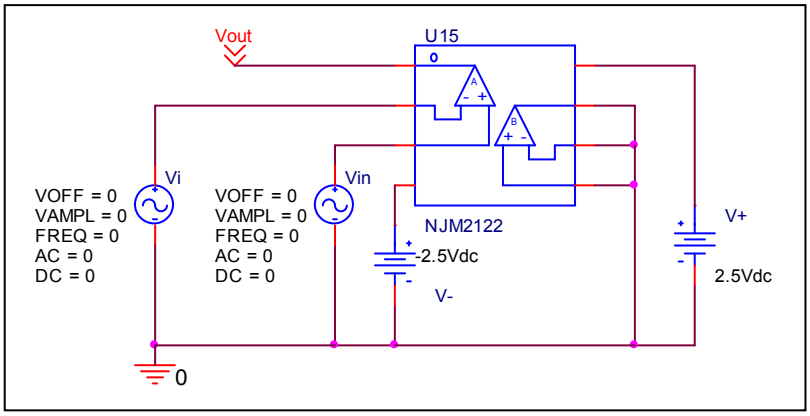
Output Voltage Swing	Measurement	Simulation	%Error
+Vout(V)	2.200	2.25	2.275
-Vout(V)	2.200	2.25	2.275

Input Offset Voltage

Simulation result



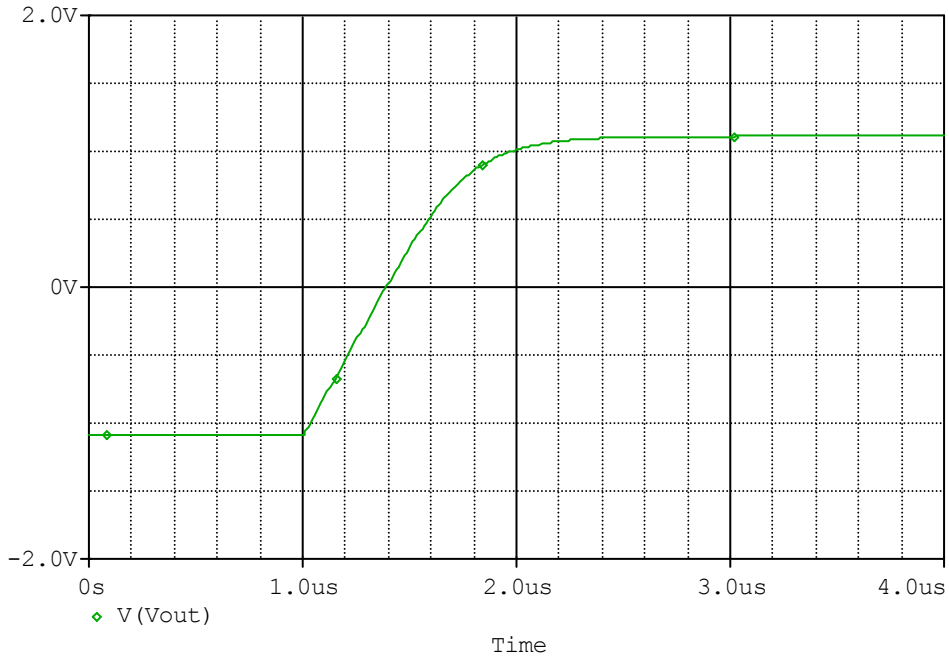
Evaluation circuit



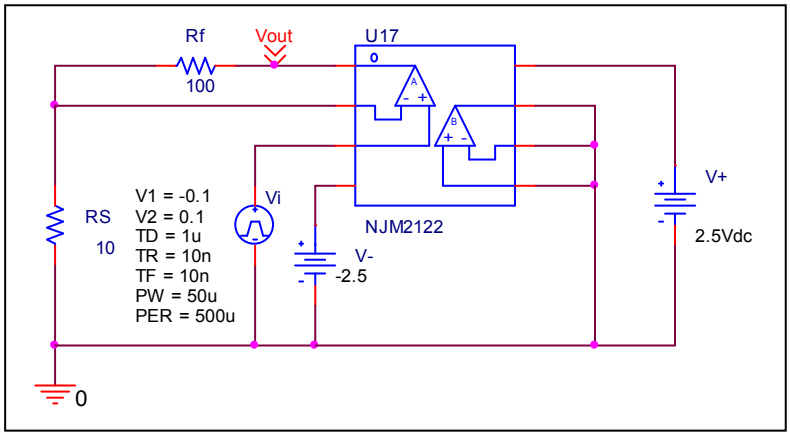
Vos	Measurement		Simulation		Error	
	1.000	mV	1.010	mV	1.000	%

Slew Rate

Simulation result



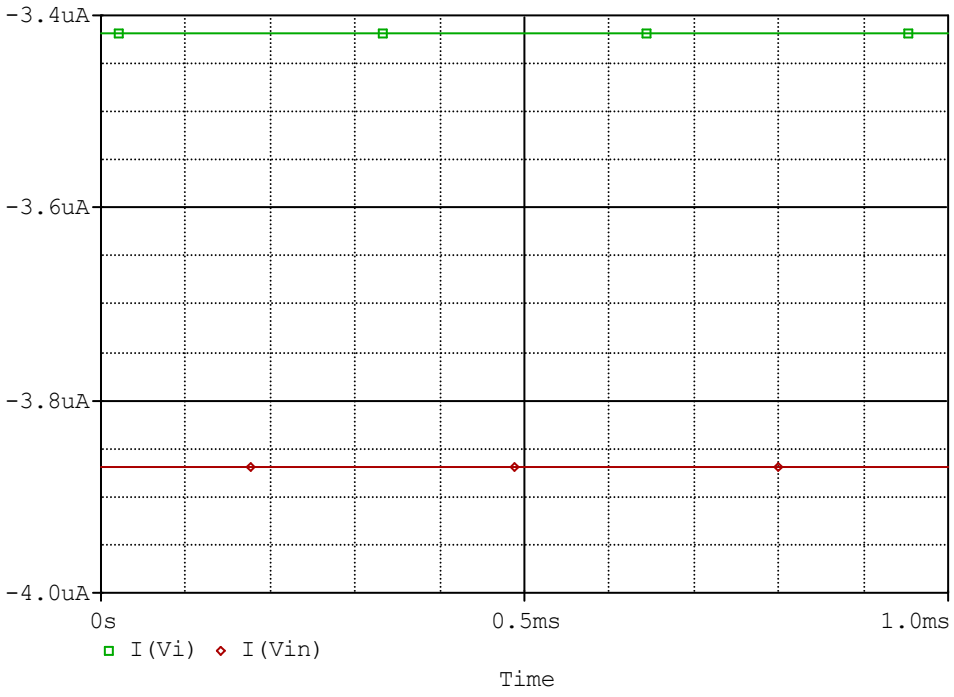
Evaluation circuit



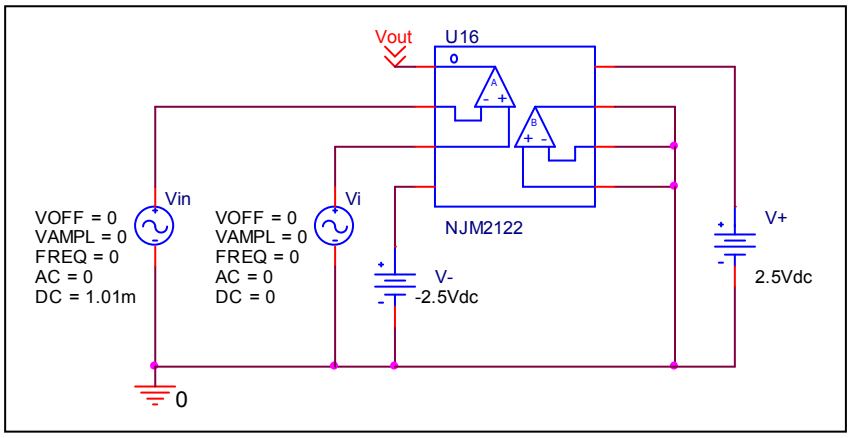
Slew Rate(v/us)	Measurement	Simulation	%Error
	2.400	2.339	-2.542

Input current

Simulation result



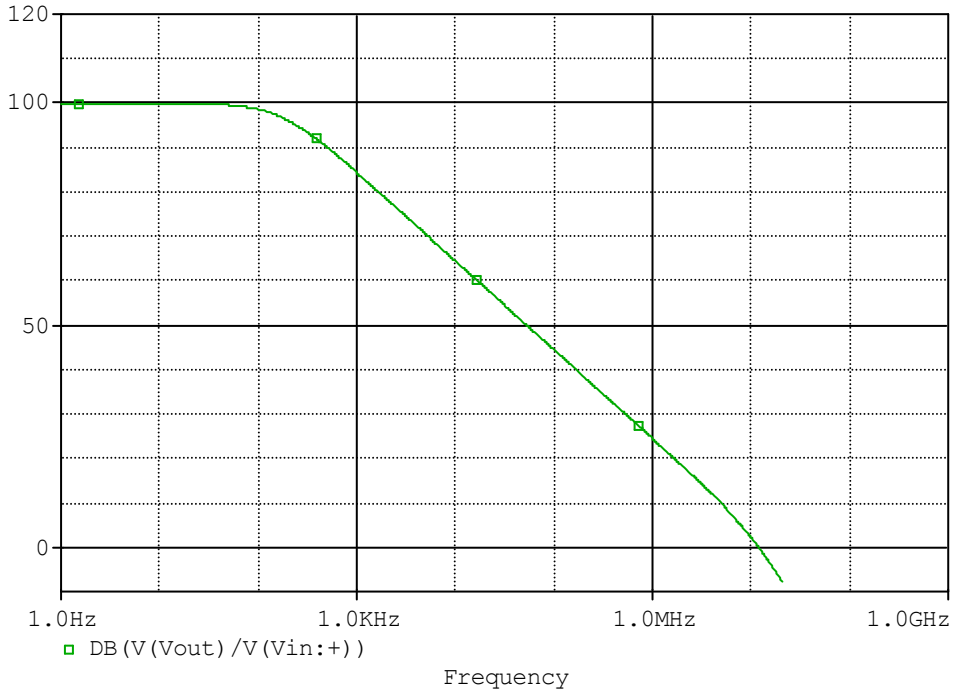
Evaluation circuit



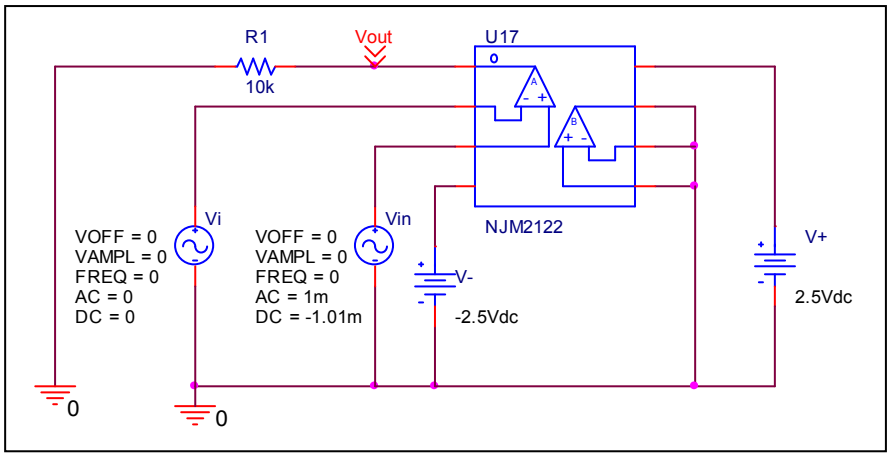
	Measurement	Simulation	%Error
Ib(uA)	3.600	3.642	1.167
Ibos(uA)	0.450	0.450	0

Open Loop Voltage Gain vs. Frequency

Simulation result



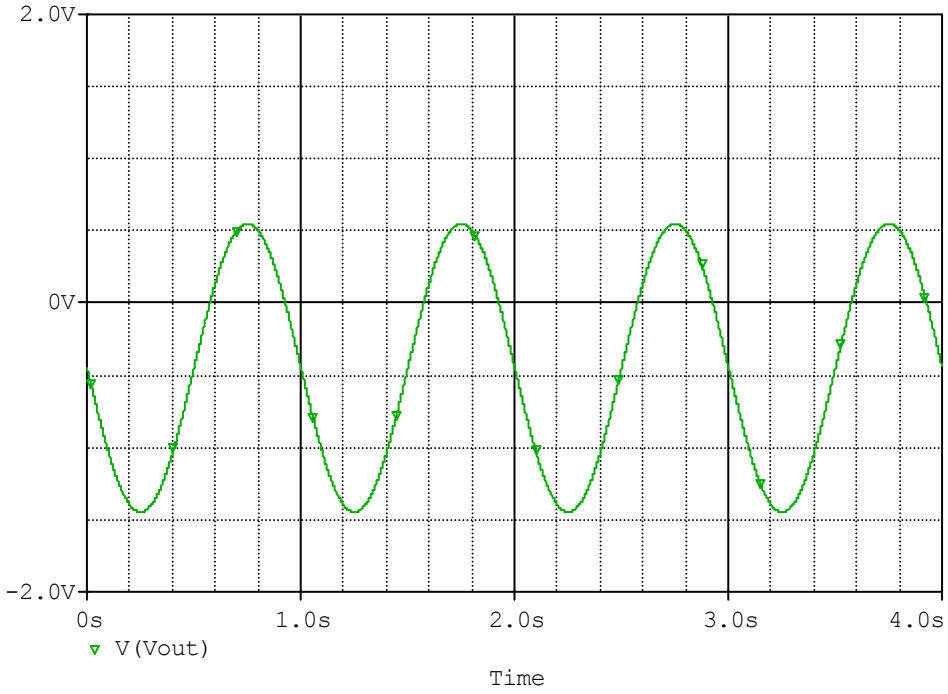
Evaluation circuit



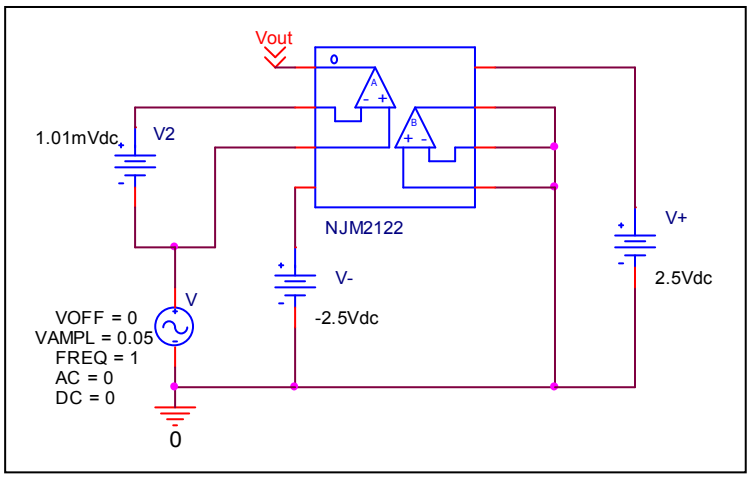
	Measurement	Simulation	%Error
f-0dB(MHz)	12.000	12.016	0.133
Av-dc	100.000	99.907	-0.093

Common-Mode Rejection Voltage gain

Simulation result



Evaluation circuit

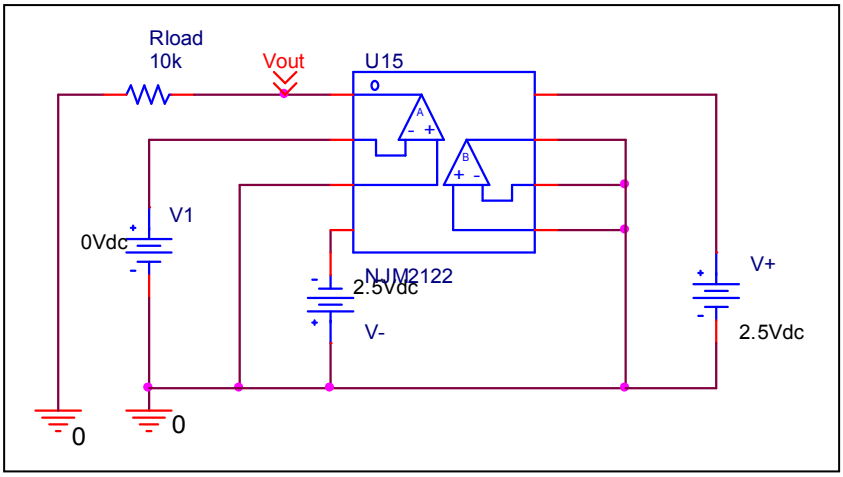


Common Mode Reject Ratio=98935.009/19.99=4949.225

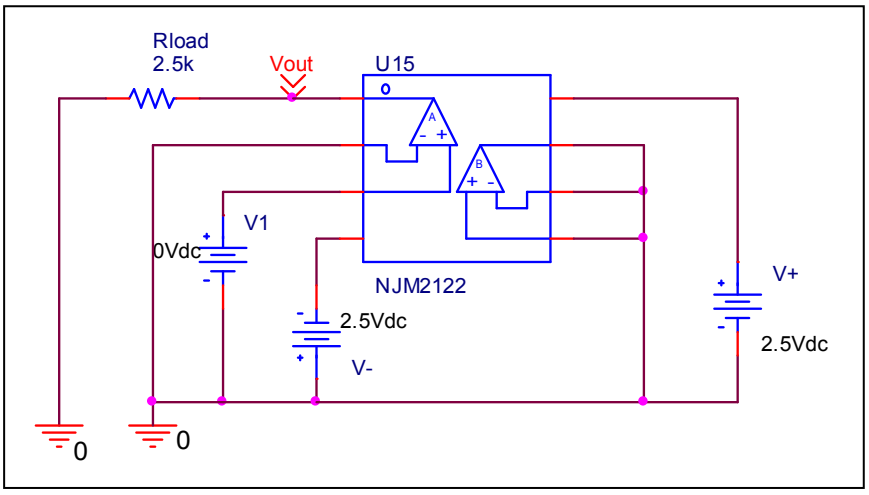
CMRR	Measurement	Simulation	%Error
	74.000	73.890	-0.149

Remark Output Voltage Swing

Before

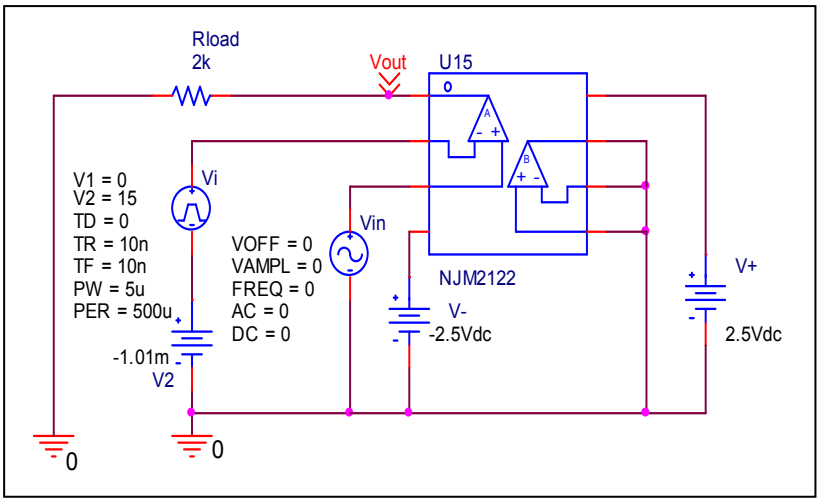


After

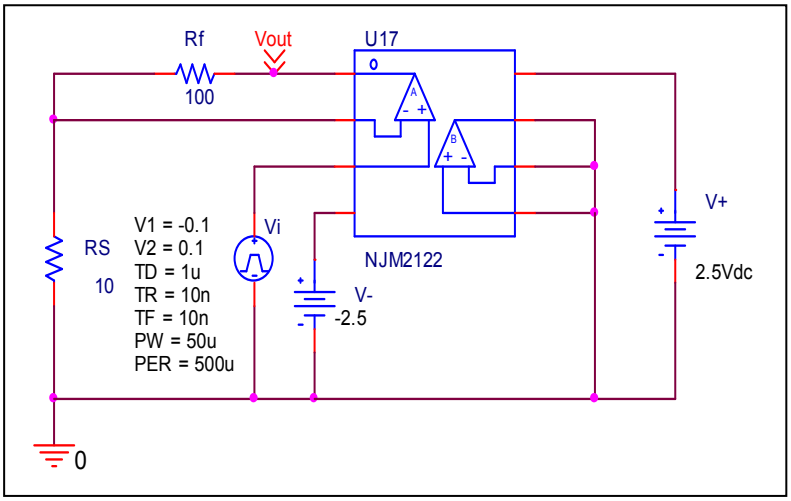


Remark Slew Rate

Before

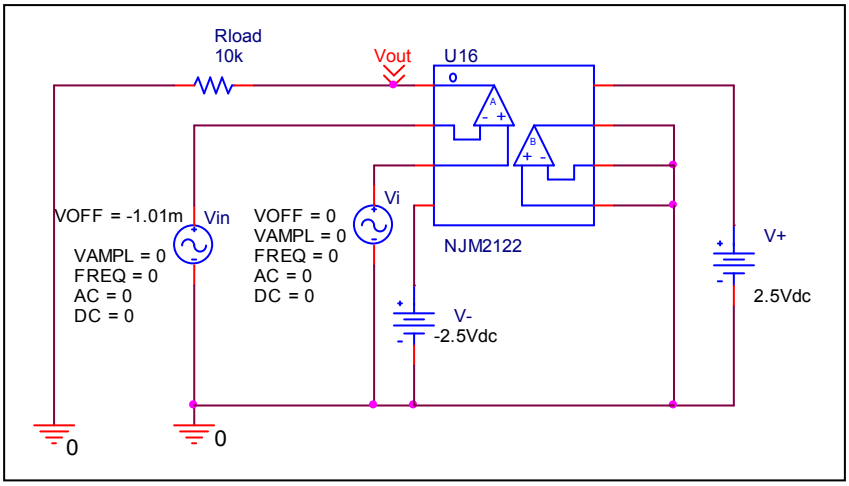


After

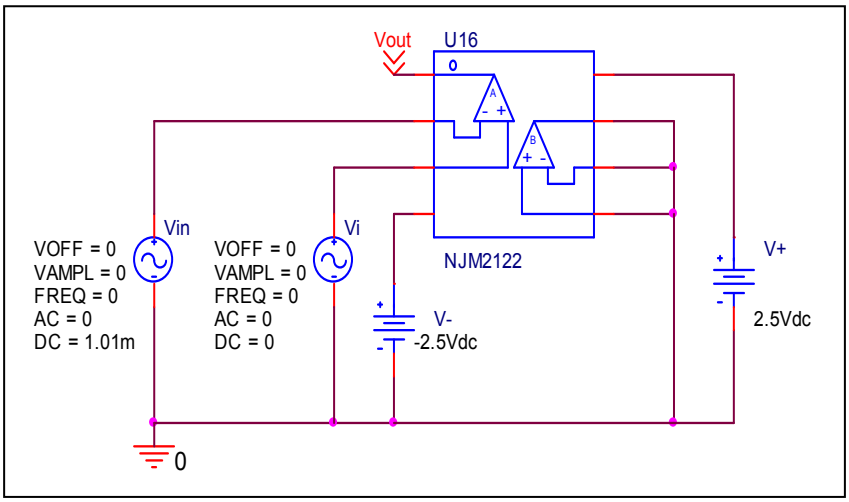


Remark Input current

Before

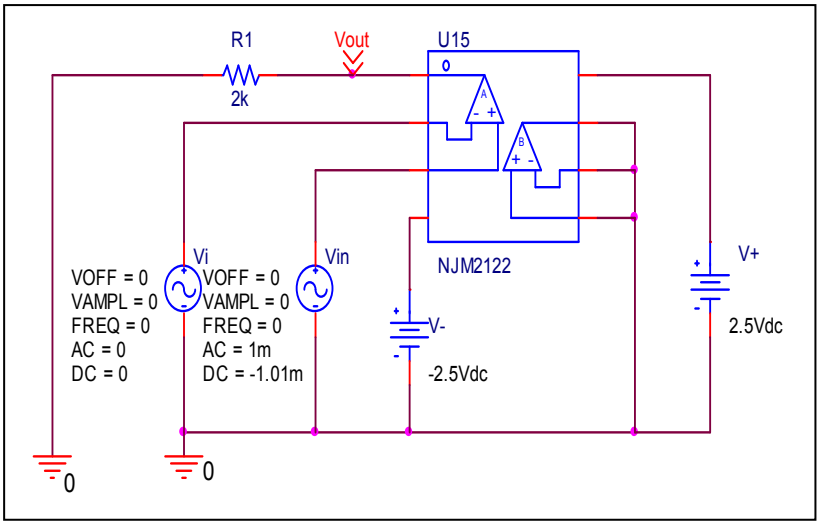


After

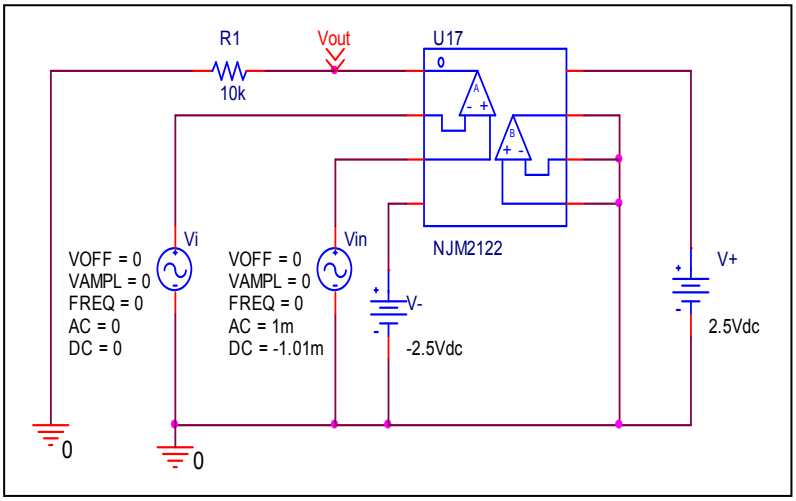


Remark Open Loop Voltage Gain vs. Frequency

Before

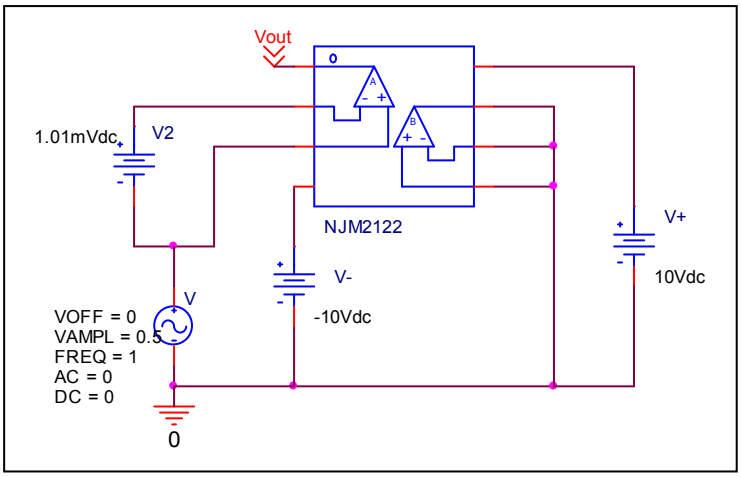


After



Remark Common-Mode Rejection Voltage gain

Before



After