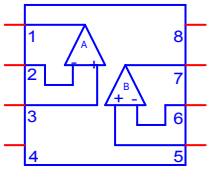
Device Modeling Report

COMPONENTS: OPERATIONAL AMPLIFIER
PART NUMBER:NJM2082
MANUFACTURER: NEW JAPAN RADIO CO.,LTD

Bee Technologies Inc.

SPice Model




```
*$
* PART NUMBER: NJM2082
* MANUFACTURER: NEW JAPAN RADIO
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.Subckt NJM2082 OUT1 -IN1 +IN1 V- +IN2 -IN2 OUT2 V+
X_U1     +IN1 -IN1 V+ V- OUT1 NJM2082_ME
X_U2     +IN2 -IN2 V+ V- OUT2 NJM2082_ME
.ends  NJM2082
*$
.subckt NJM2082_ME  1 2 3 4 5
  c1   11 12 8.6603E-12
  c2    6  7 30.000E-12
  css  10 99 1.0000E-30
  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 15.978E6 -1E3 1E3 16E6 -16E6
  ga    6  0 11 12 791.68E-6
  gcm   0  6 10 99 25.035E-9
  iss   3 10 dc 600.00E-6
  hlim 90  0 vlim 1K
  j1   11  2 10 jx1
  j2   12  1 10 jx2
  r2    6  9 100.00E3
  rd1   4 11 1.2631E3
  rd2   4 12 1.2631E3
  ro1   8  5 50
  ro2   7 99 25
  rp    3  4 1.8000E3
  rss  10 99 333.33E3
  vb    9  0 dc 0
  vc    3 53 dc 2.2979
  ve   54  4 dc 2.7979
  vlim  7  8 dc 0
  vlp  91  0 dc 20
  vln   0 92 dc 20
.model dx D(Is=800.00E-18)
.model dy D(Is=800.00E-18 Rs=1m Cjo=10p)
.model jx1 PJF(Is=8.7500E-12 Beta=1.0446E-3 Vto=-.999)
.model jx2 PJF(Is=6.2500E-12 Beta=1.0446E-3 Vto=-1.001000)
.ends
*$
```
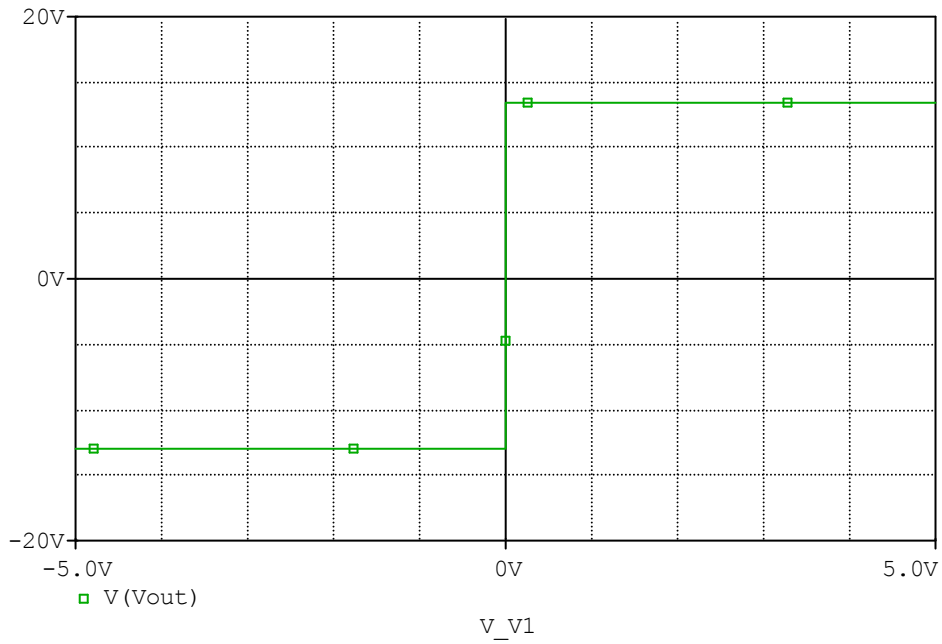
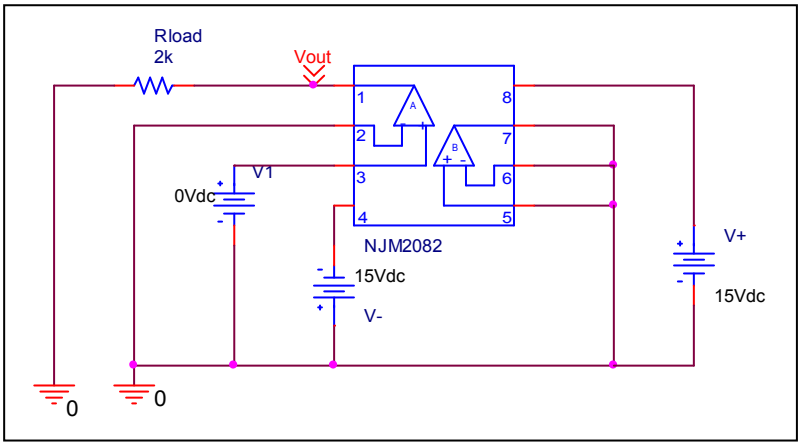

Output Voltage Swing

Simulation result



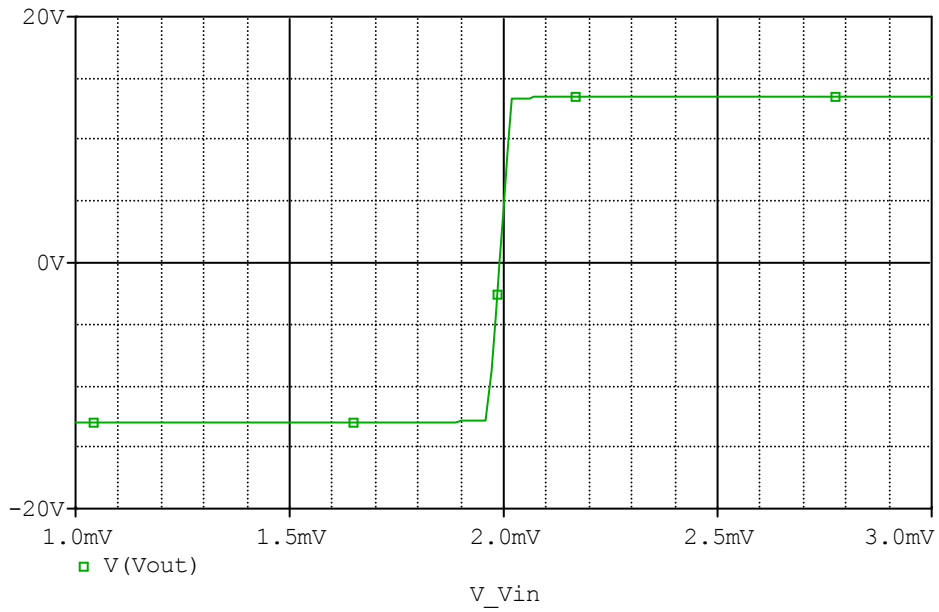
Evaluation circuit



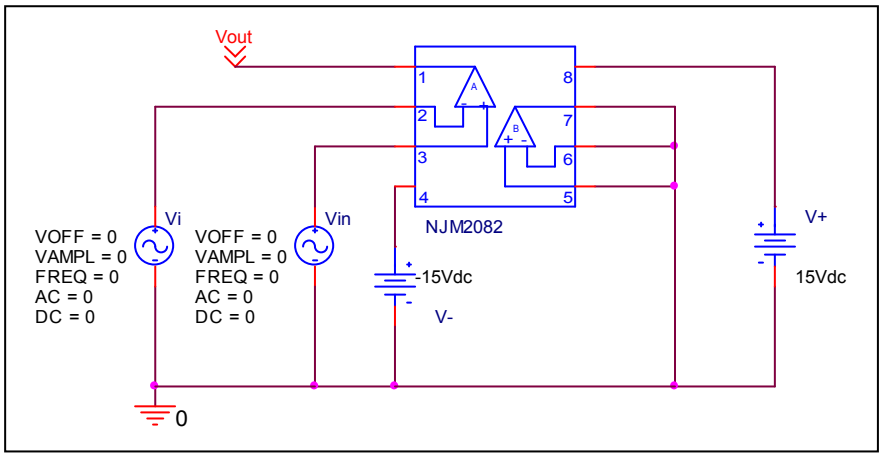
Output Voltage Swing	Measurement	Simulation	%Error
+Vout(V)	+13.500	+13.491	-0.067
-Vout(V)	-13.000	-12.991	-0.069

Input Offset Voltage

Simulation result



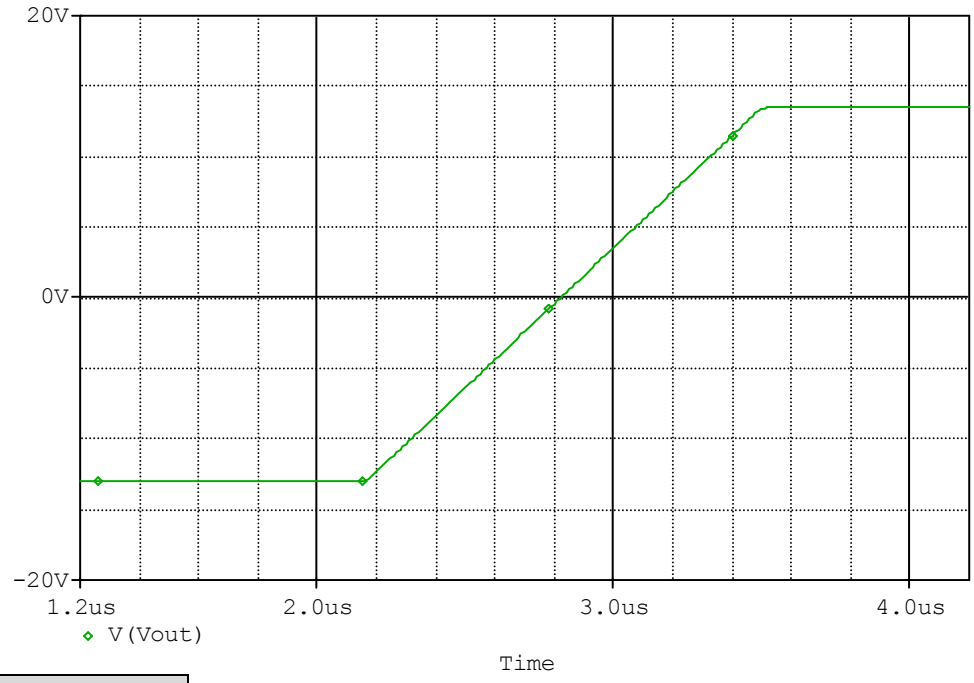
Evaluation circuit



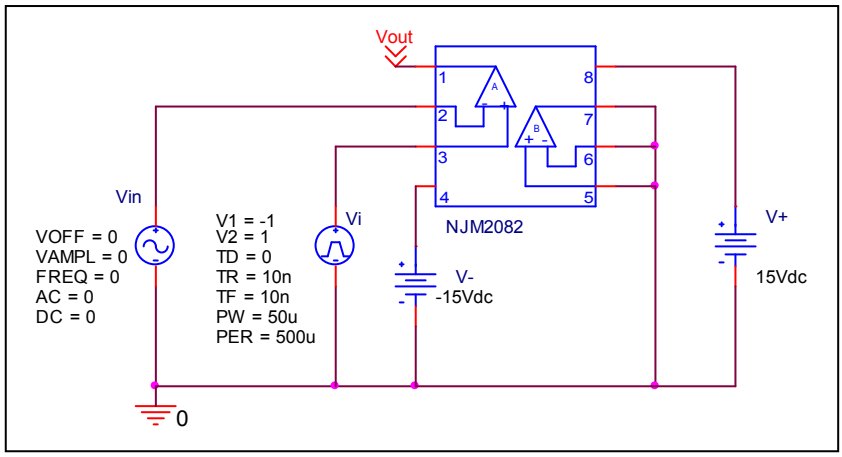
Vos	Measurement		Simulation		Error	
	2.000	mV	1.988	mV	-0.600	%

Slew Rate

Simulation result



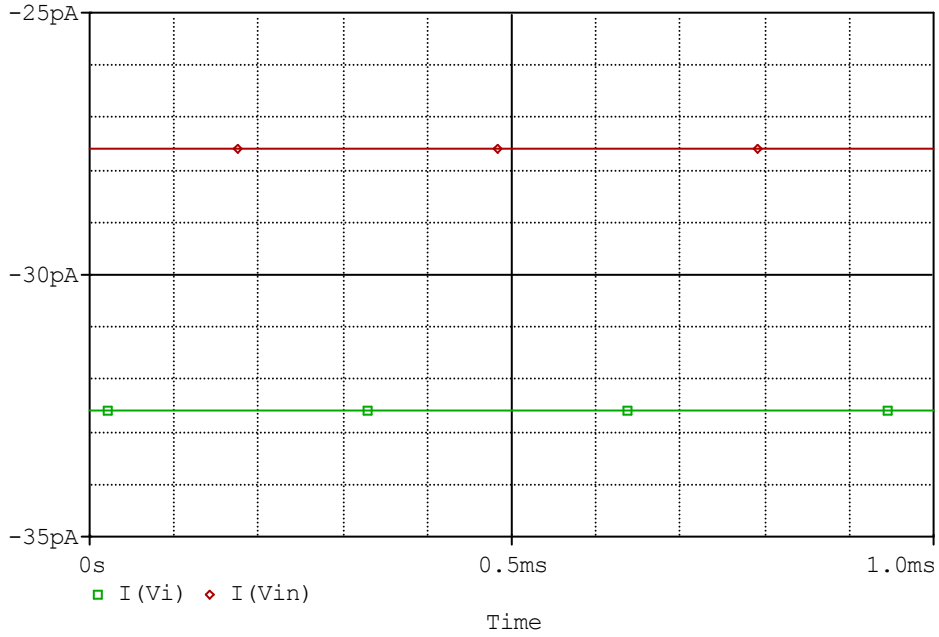
Evaluation circuit



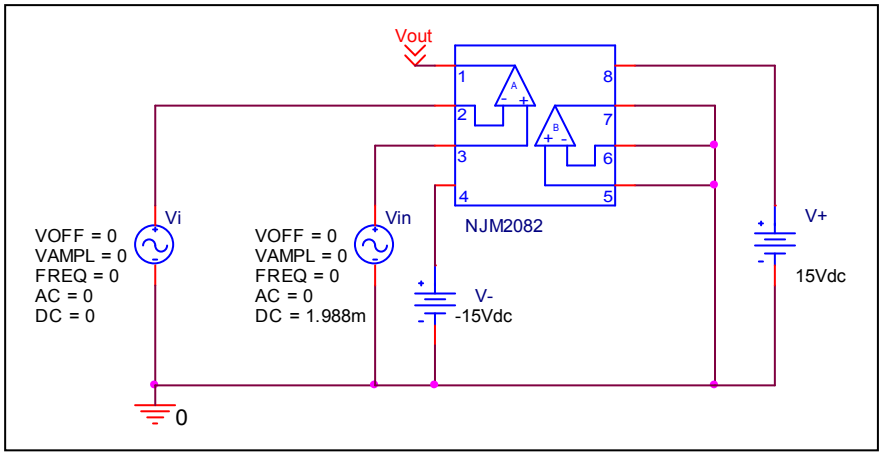
Slew Rate(v/us)	Measurement	Simulation	%Error
	20.000	19.916	-0.420

Input current

Simulation result



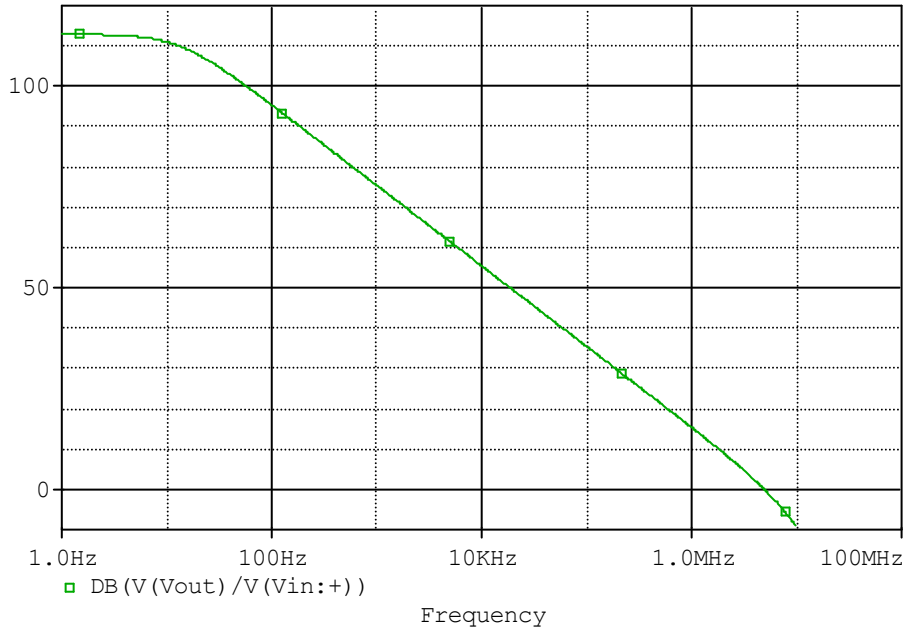
Evaluation circuit



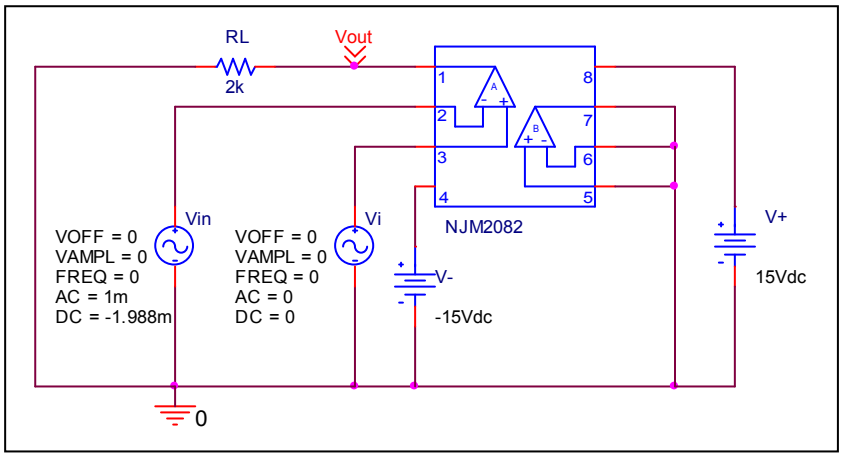
	Measurement	Simulation	%Error
Ib(pA)	30.000	30.000	0.000
Ibos(pA)	5.000	5.000	0.000

Open Loop Voltage Gain vs. Frequency

Simulation result



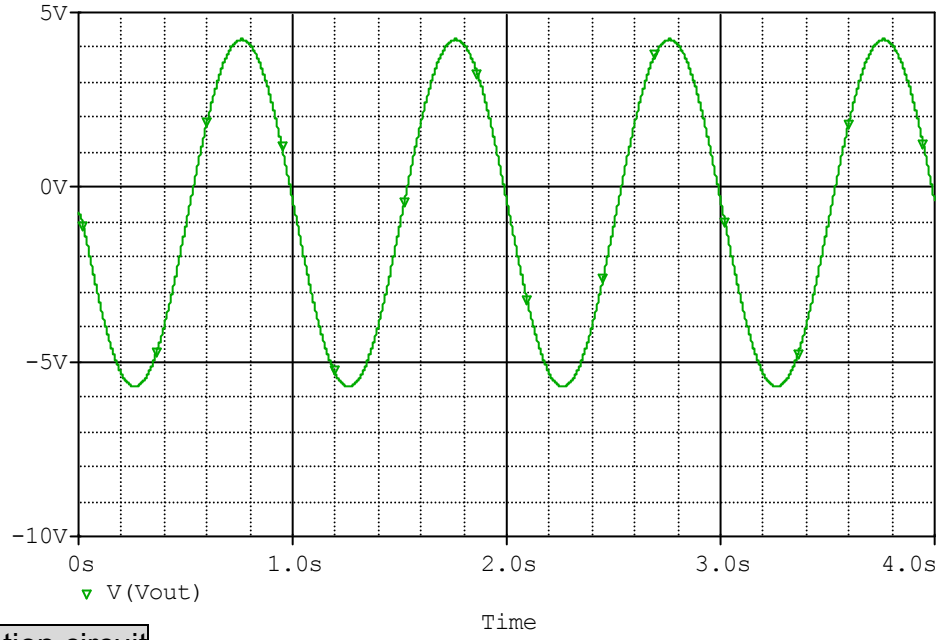
Evaluation circuit



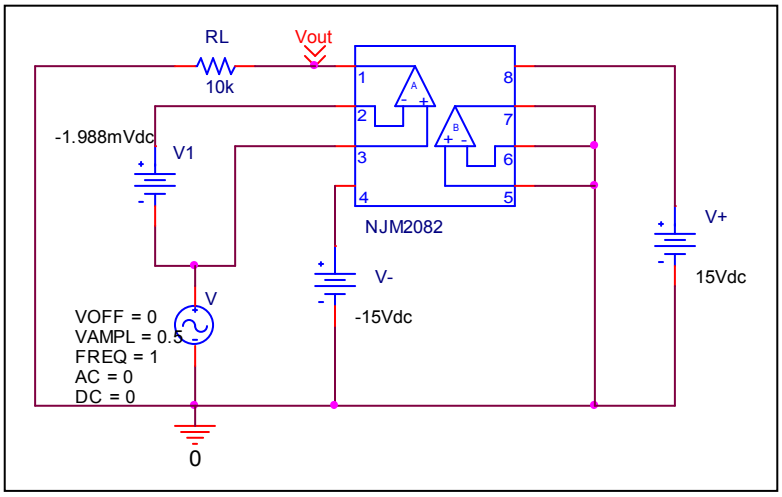
	Measurement	Simulation	%Error
f-0dB(MHz)	5.000	5.067	1.340
Av-dc	110.000	112.931	2.665

Common-Mode Rejection Voltage gain

Simulation result



Evaluation circuit

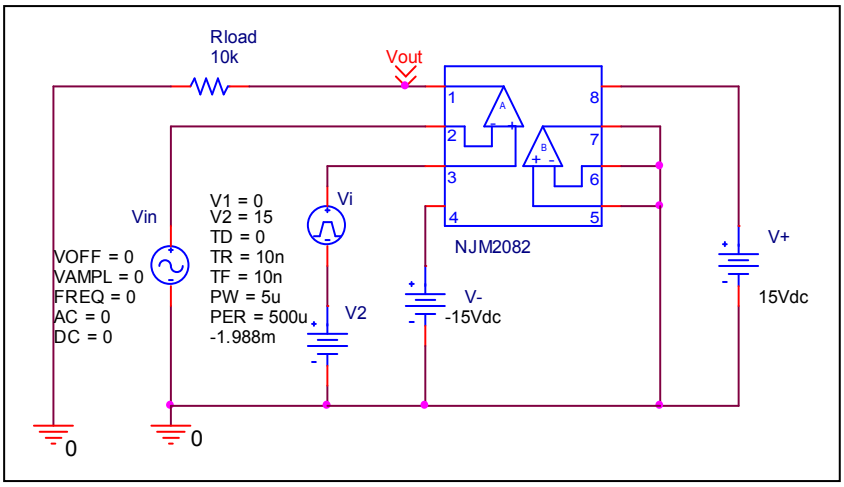


Common Mode Reject Ratio=441570.447/9.945=44401.251

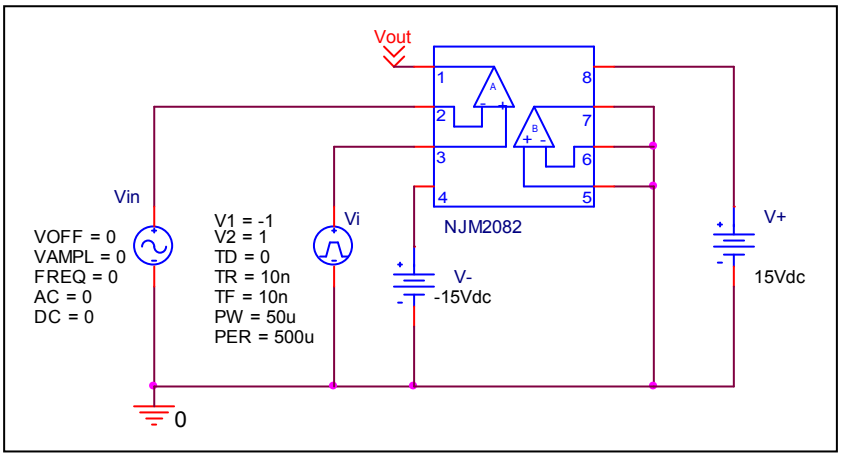
CMRR	Measurement	Simulation	%Error
	90.000	92.947	3.274

Remark Slew Rate

Before

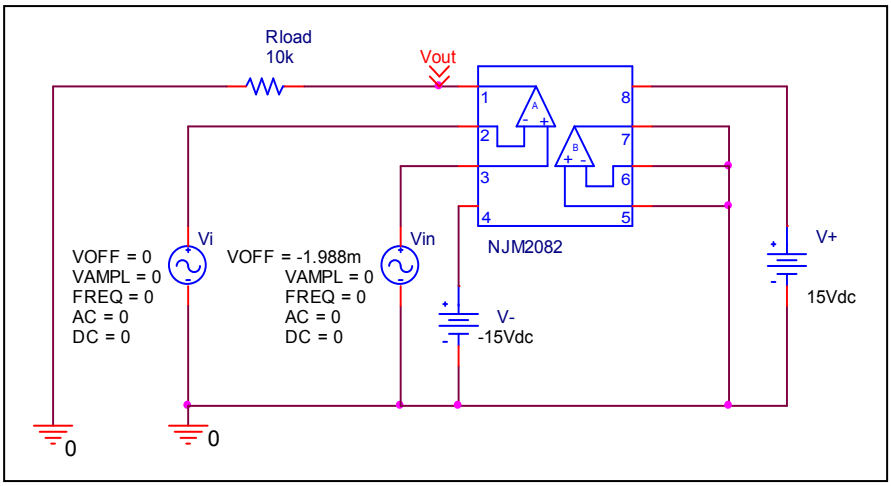


After

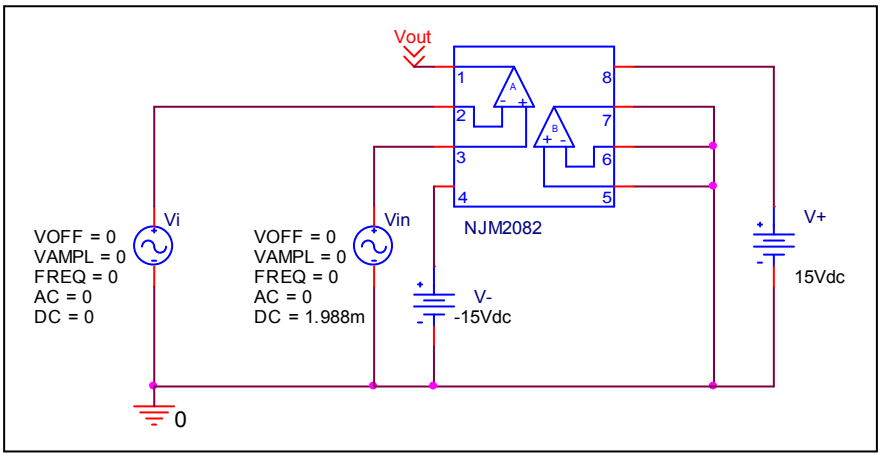


Remark Input current

Before

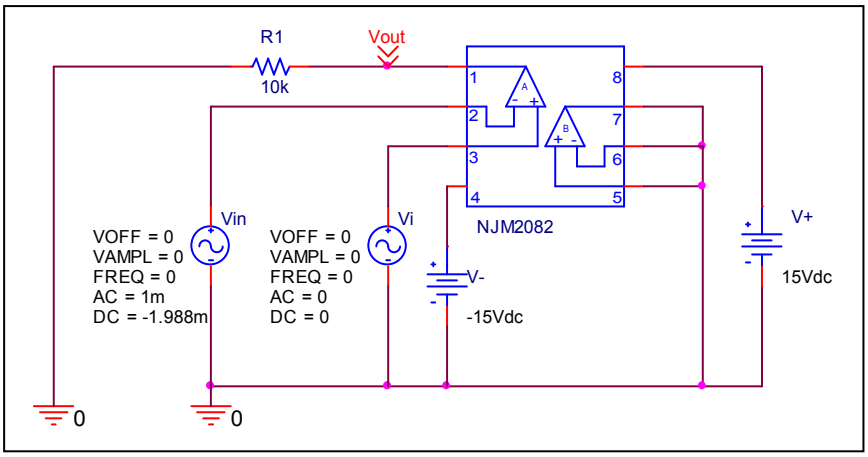


After

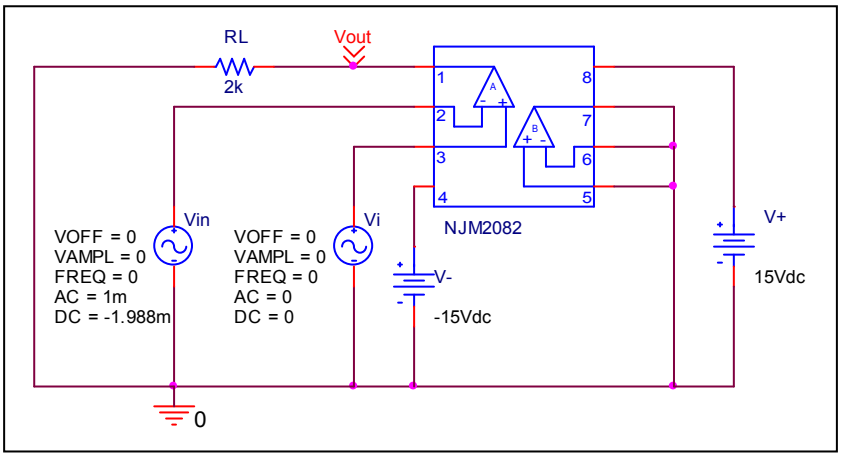


Remark Open Loop Voltage Gain vs. Frequency

Before

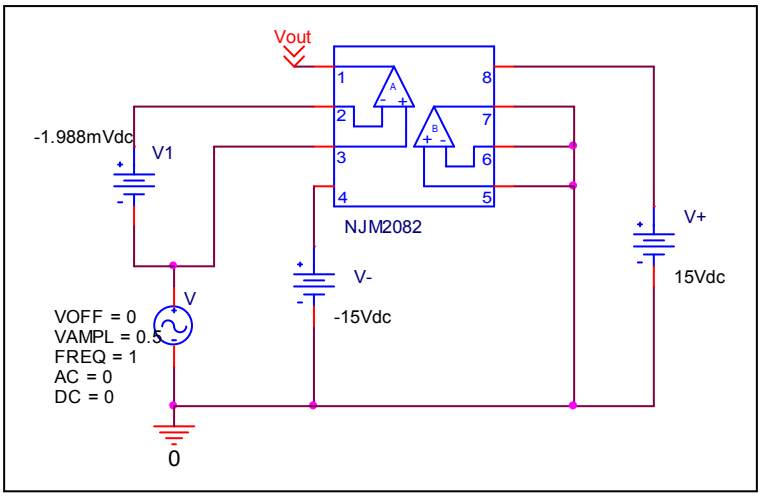


After



Remark Common-Mode Rejection Voltage gain

Before



After