Device Modeling Report

COMPONENTS: OPERATIONAL AMPLIFIER
PART NUMBER:NJM064
MANUFACTURER: NEW JAPAN RADIO CO.,LTD

Bee Technologies Inc.

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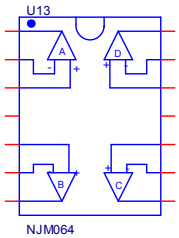
Spice Model

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*$
* PART NUMBER: NJM064
* MANUFACTURER: NEW JAPAN RADIO
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.Subckt NJM064 OUT1 -IN1 +IN1 V+ +IN2 -IN2 OUT2 OUT3 -IN3 +IN3 V-
+ +IN4 -IN4 OUT4
X_U1     +IN1 -IN1 V+ V- OUT1 NJM064_ME
X_U2     +IN2 -IN2 V+ V- OUT2 NJM064_ME
X_U3     +IN3 -IN3 V+ V- OUT3 NJM064_ME
X_U4     +IN4 -IN4 V+ V- OUT4 NJM064_ME
.ends  NJM064
.subckt NJM064_ME   1 2 3 4 5
  c1   11 12 2.5981E-12
  c2    6  7 9.0000E-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 6.3660E6 -1E3 1E3 6E6 -6E6
  ga    6  0 11 12 51.832E-6
  gcm   0  6 10 99 1.7339E-9
  iss   3 10 dc 38.000E-6
  hlim 90  0 vlim 1K
  j1   11  2 10 jx1
  j2   12  1 10 jx2
  r2    6  9 100.00E3
  rd1   4 11 15.915E3
  rd2   4 12 15.915E3
  ro1   8  5 50
  ro2   7 99 25
  rp    3  4 1.8000E3
  rss  10 99 5.2632E6
  vb    9  0 dc 0
  vc    3 53 dc 1.4788
  ve   54  4 dc 1.6788
  vlim  7  8 dc 0
  vlp  91  0 dc 7.5000
  vln   0 92 dc 7.5000
.model dx D(Is=800.00E-18)
.model dy D(Is=800.00E-18 Rs=1m Cjo=10p)
.model jx1 PJF(Is=242.50E-12 Beta=79.120E-6 Vto=-.9925)
.model jx2 PJF(Is=142.50E-12 Beta=79.120E-6 Vto=-1.007500)
.ends
*$
```

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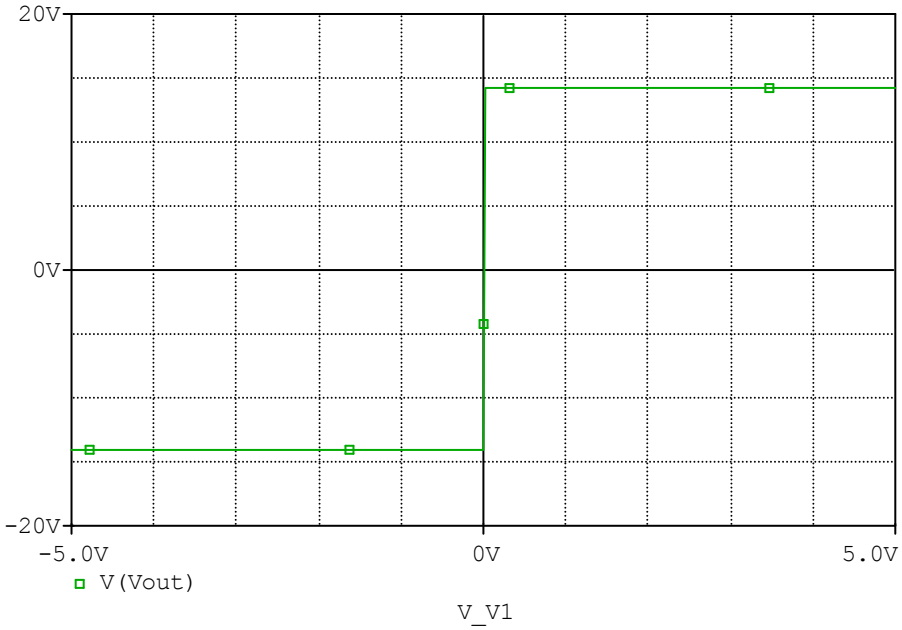
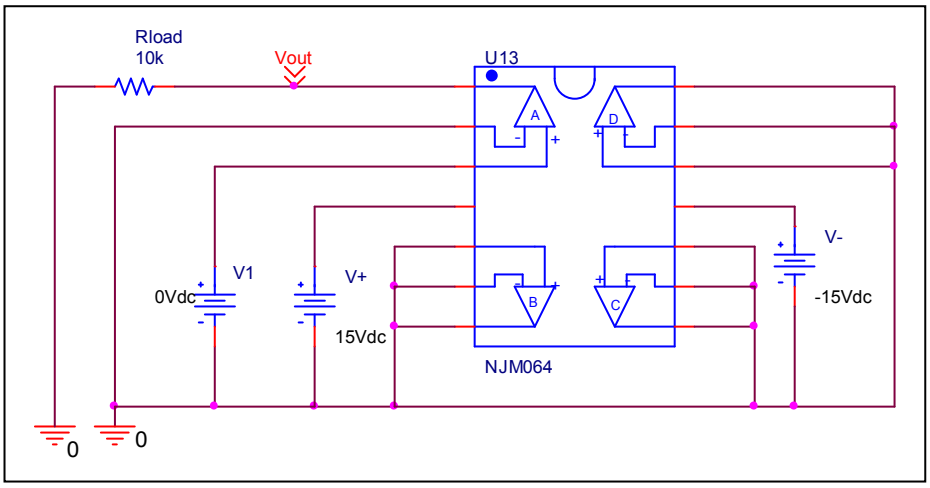
Output Voltage Swing, +Vout and –Vout

Simulation result



Evaluation circuit



Output Voltage Swing	Data sheet	Simulation	%Error
+Vout(V)	+14.200	+14.290	0.633
-Vout(V)	-14.000	-14.090	0.642

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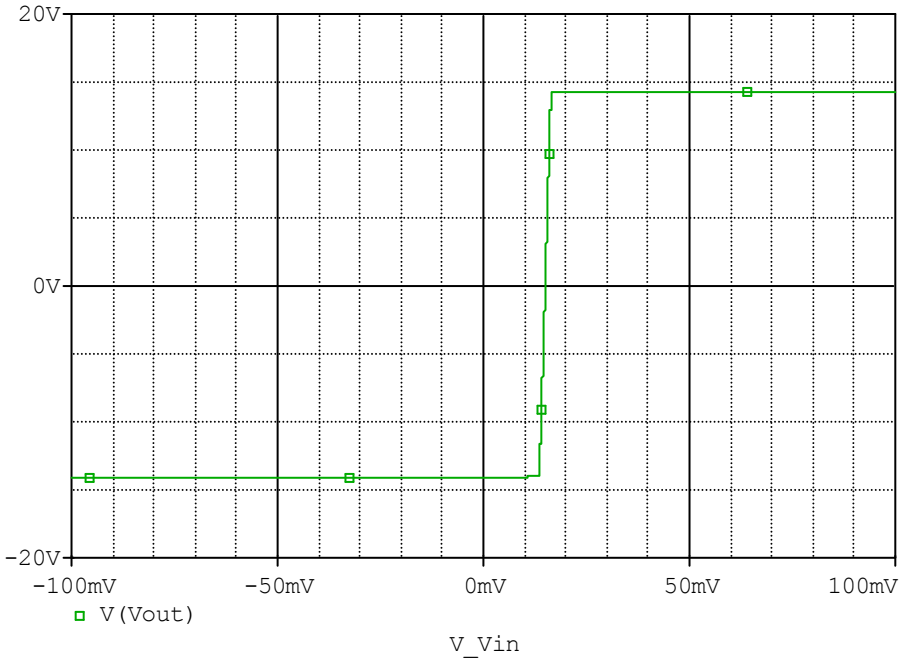
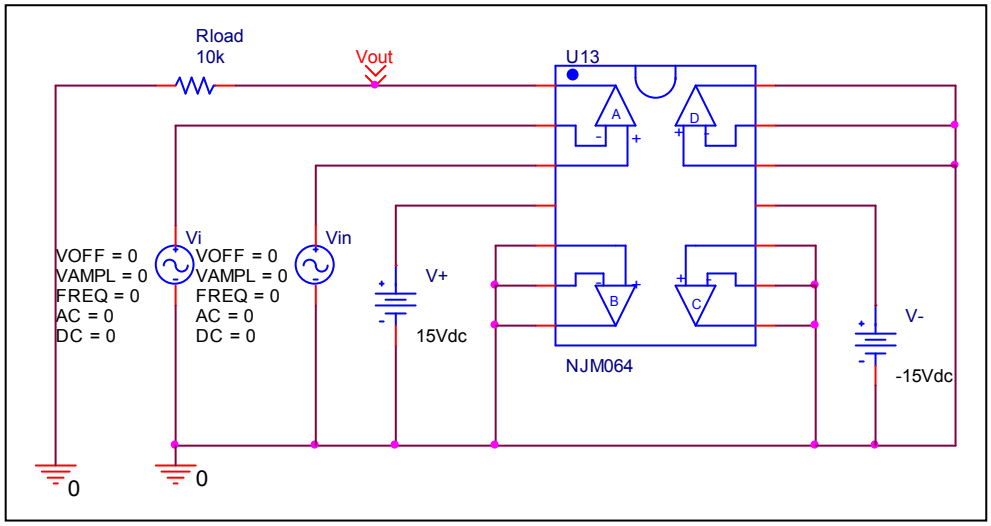
Input Offset Voltage

Simulation result



Evaluation circuit



Vos	Measurement		Simulation		Error	
	15.000	mV	14.985	mV	0.100	%

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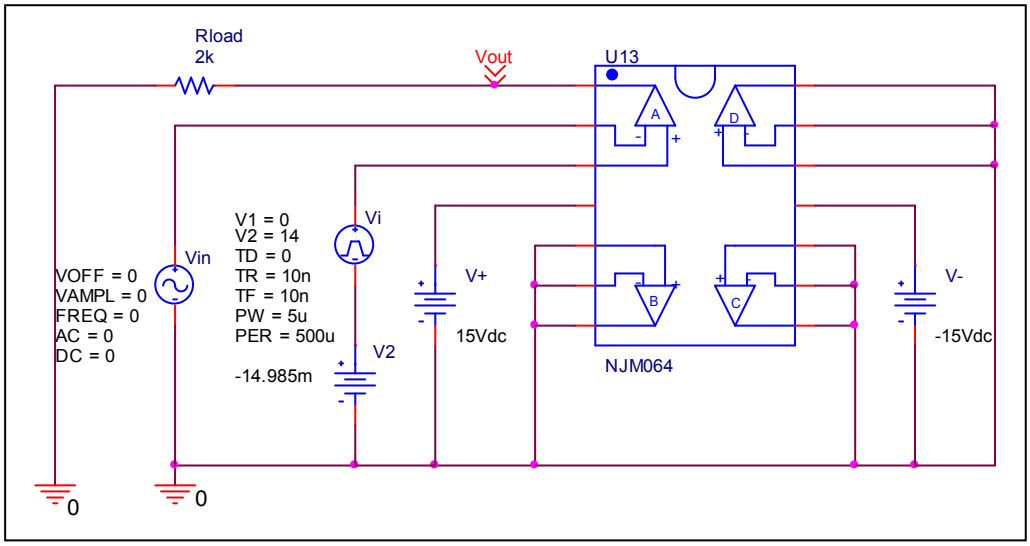
Slew Rate, +SR, -SR

Simulation result

Evaluation circuit



Slew Rate(v/us)	Data sheet	Simulation	%Error
	3.500V/us	3.475V/us	0.714

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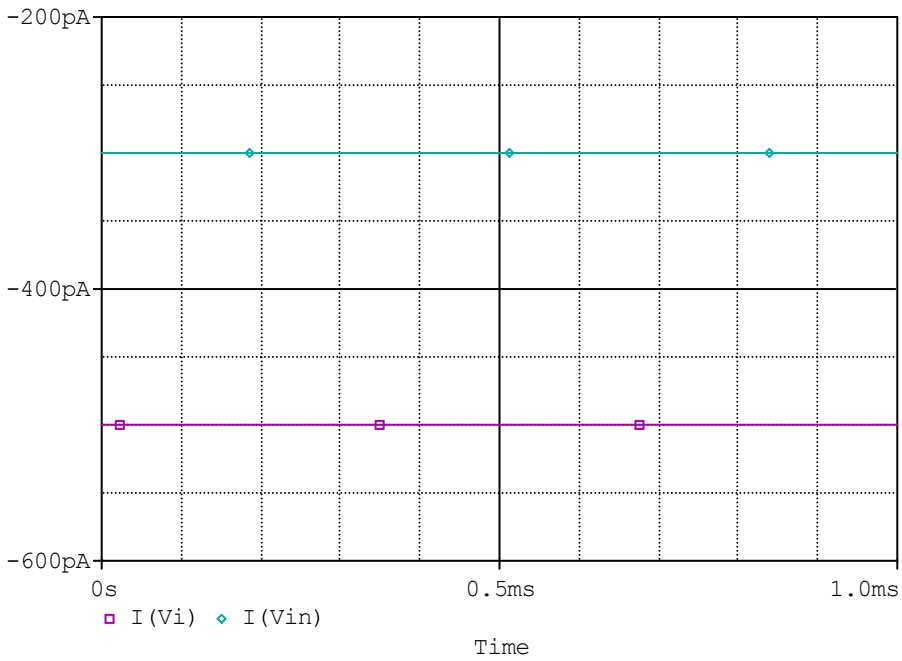
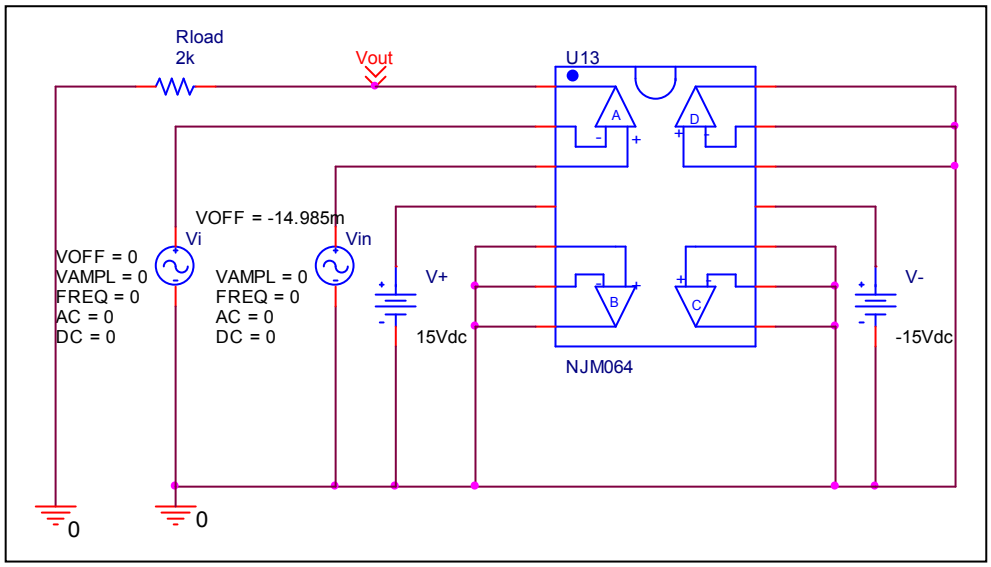
Input current Ib, Ibos

Simulation result



Evaluation circuit



	Data sheet	Simulation	%Error
Ib(pA)	400.000	400.150	0.037
Ibos(pA)	200.000	200.060	0.030

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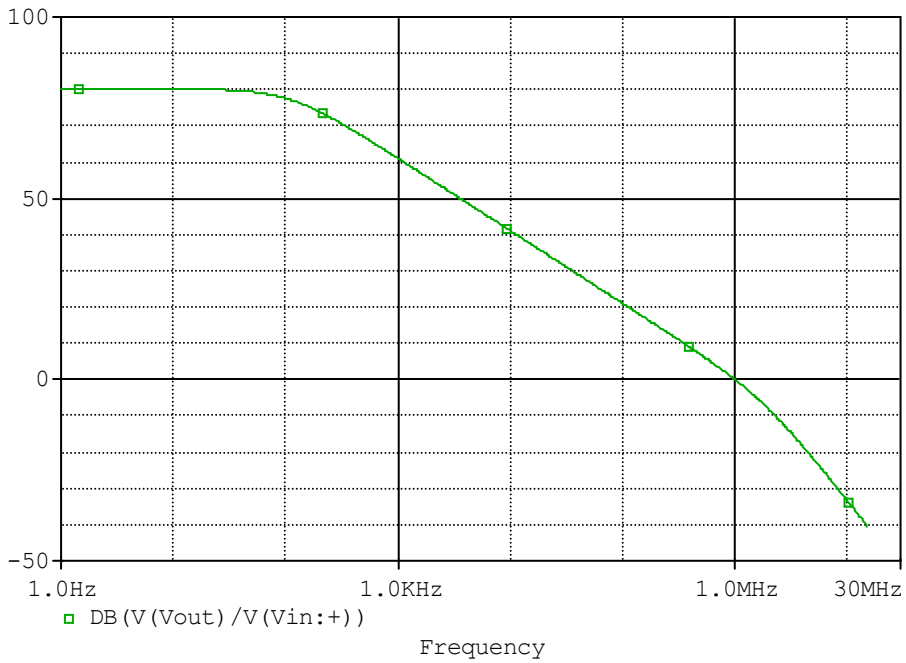
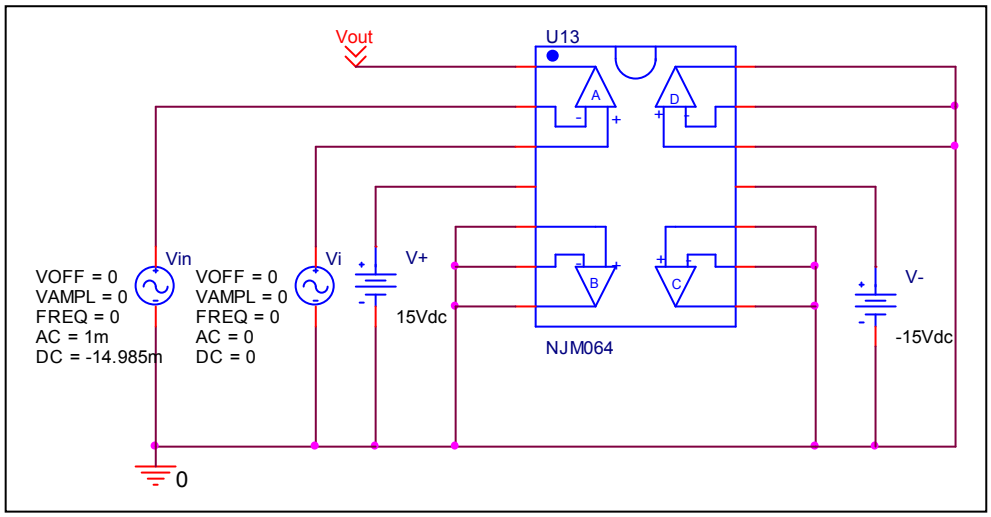
Open Loop Voltage Gain vs. Frequency , Av-dc, f-0dB

Simulation result



Evaluation circuit



	Data sheet	Simulation	%Error
f-0dB(MHz)	1.000	1.000	0.000
Av-dc	80.000	80.100	0.125

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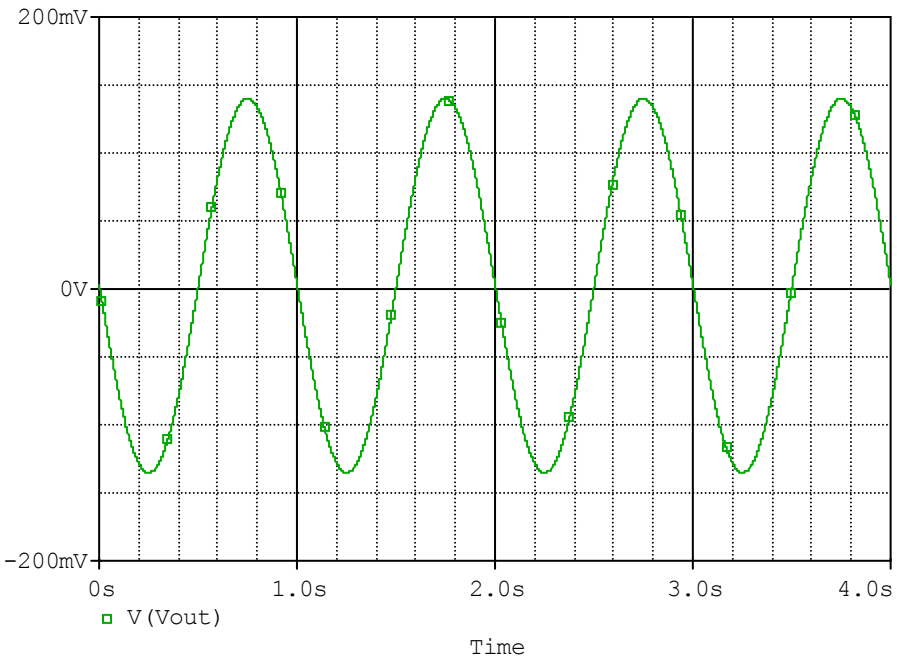
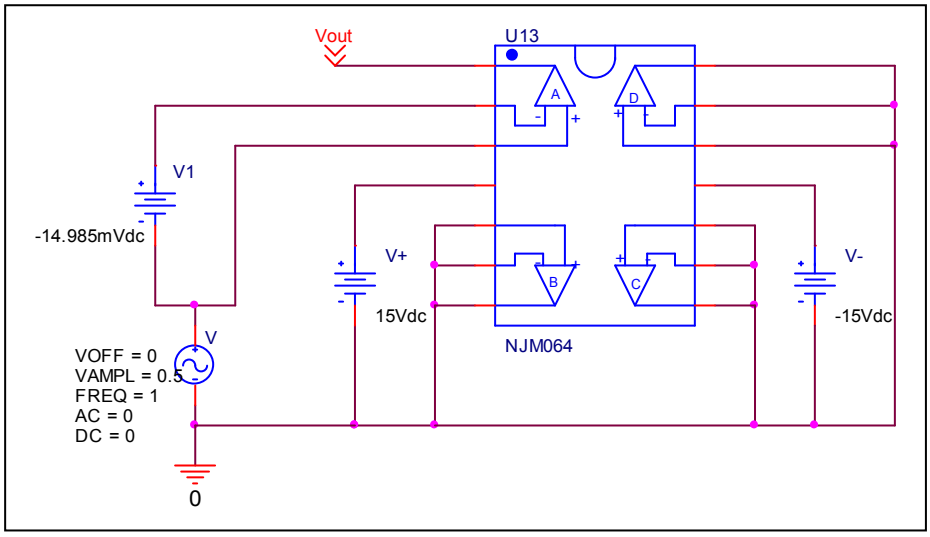
Common-Mode Rejection Voltage gain

Simulation result



Evaluation circuit



Common Mode Reject Ratio=10115/0.275=36781

CMRR	Data sheet	Simulation	%Error
	90.000	91.312	1.458

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