

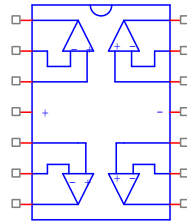
Device Modeling Report

COMPONENTS: OPERATIONAL AMPLIFIER
PART NUMBER: NJM074
MANUFACTURER: NEW JAPAN RADIO CO., LTD



Bee Technologies Inc.

Spice Model



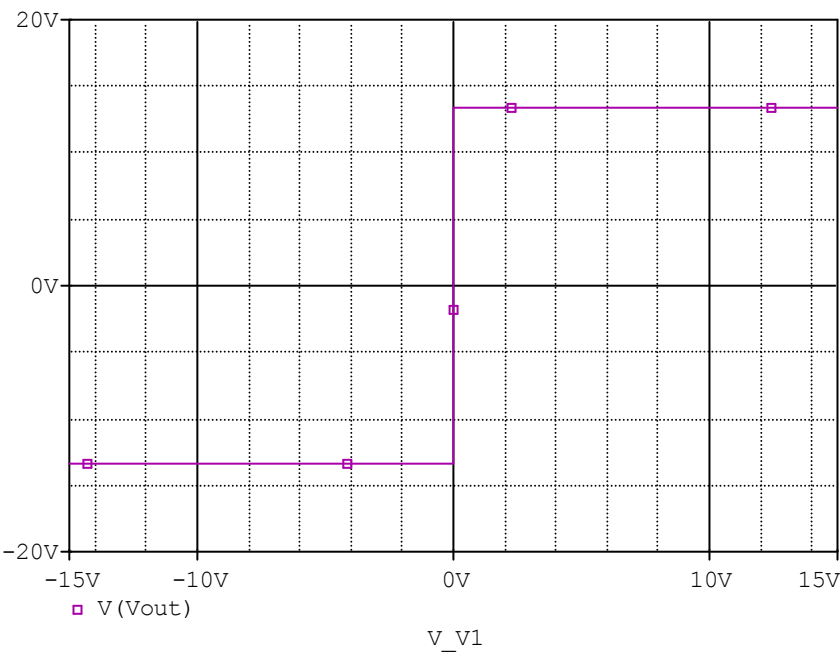
```

*$
* PART NUMBER:NJM074
* MANUFACTURER: NEW JAPAN RADIO
* All Rights Reserved Copyright (c) Bee Technologies Inc. 2005
.Subckt NJM074 OUT1 -IN1 +IN1 V+ +IN2 -IN2 OUT2 OUT3 -IN3 +IN3 V-
+ +IN4 -IN4 OUT4
X_U1  +IN1 -IN1 V+ V- OUT1 NJM074_S
X_U2  +IN2 -IN2 V+ V- OUT2 NJM074_S
X_U3  +IN3 -IN3 V+ V- OUT3 NJM074_S
X_U4  +IN4 -IN4 V+ V- OUT4 NJM074_S
.ends NJM074
.subckt NJM074_S 1 2 3 4 5
c1 11 12 2.8868E-12
c2 6 7 10.000E-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 50.810E6 -1E3 1E3 51E6 -51E6
ga 6 0 11 12 157.08E-6
gcm 0 6 10 99 41.320E-9
iss 3 10 dc 130.00E-6
hlim 90 0 vlim 1K
j1 11 2 10 jx1
j2 12 1 10 jx2
r2 6 9 100.00E3
rd1 4 11 6.3662E3
rd2 4 12 6.3662E3
ro1 8 5 50
ro2 7 99 25
rp 3 4 1.8000E3
rss 10 99 1.5385E6
vb 9 0 dc 0
vc 3 53 dc 2.2147
ve 54 4 dc 2.2147
vlim 7 8 dc 0
vlp 91 0 dc .8
vln 0 92 dc .8
.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=189.80E-6 Vto=-.9985)
.model jx2 PJF(Is=6.2500E-12 Beta=189.80E-6 Vto=-1.001500)
.ends
*$

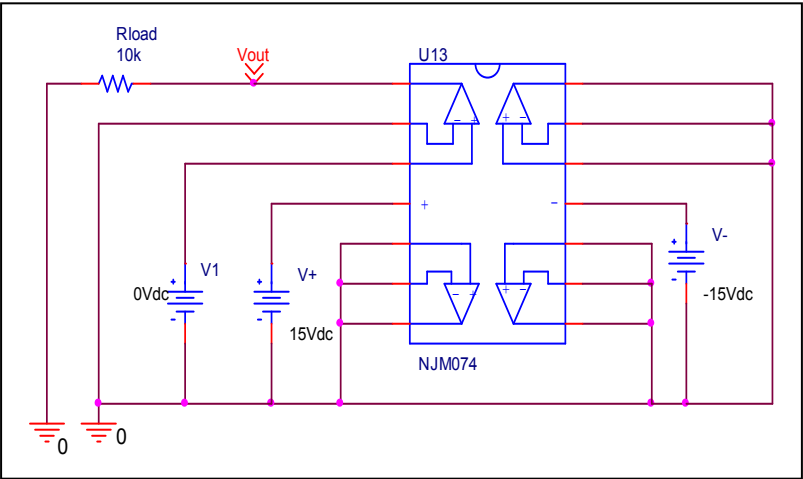
```

Output Voltage Swing

Simulation result



Evaluation circuit

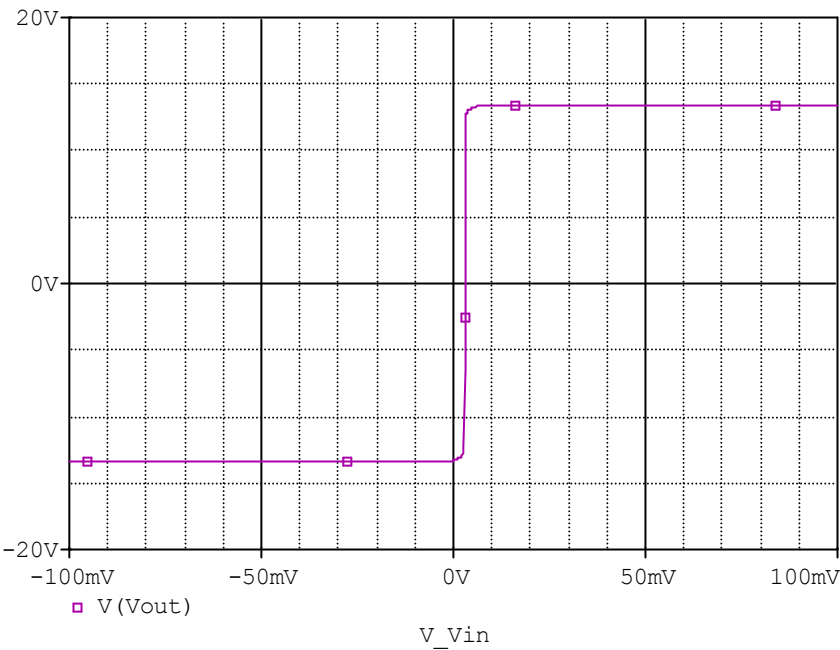


Comparison table

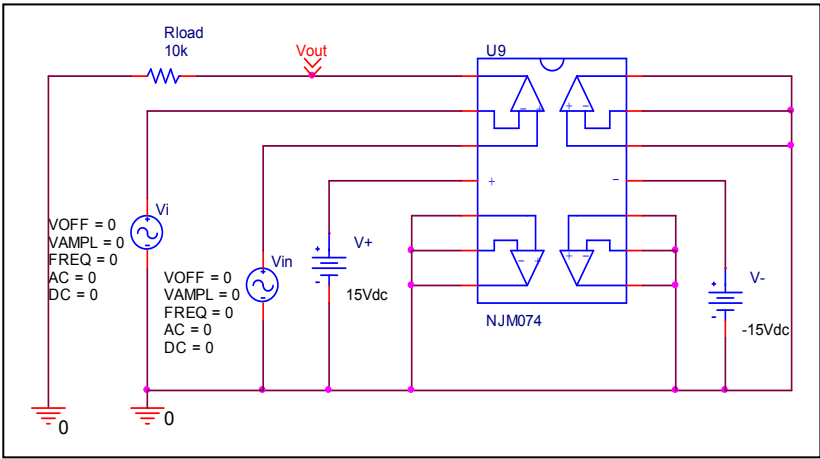
Output Voltage Swing	Data sheet	Simulation	%Error
Vopp	27	26.894	-0.392

Input Offset Voltage

Simulation result



Evaluation circuit

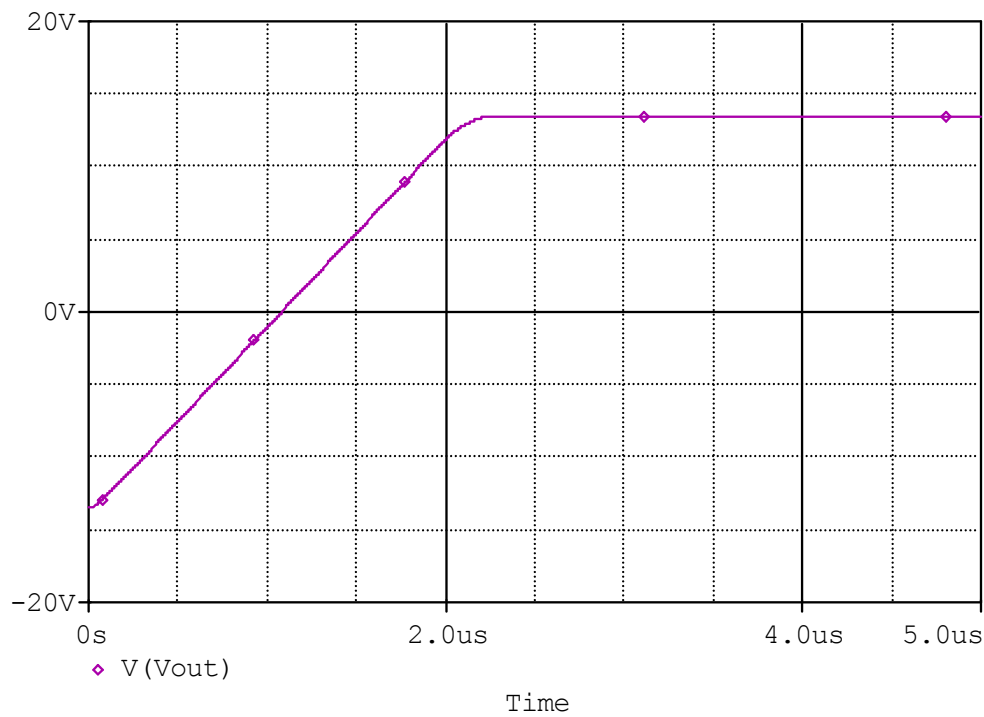


Comparison table

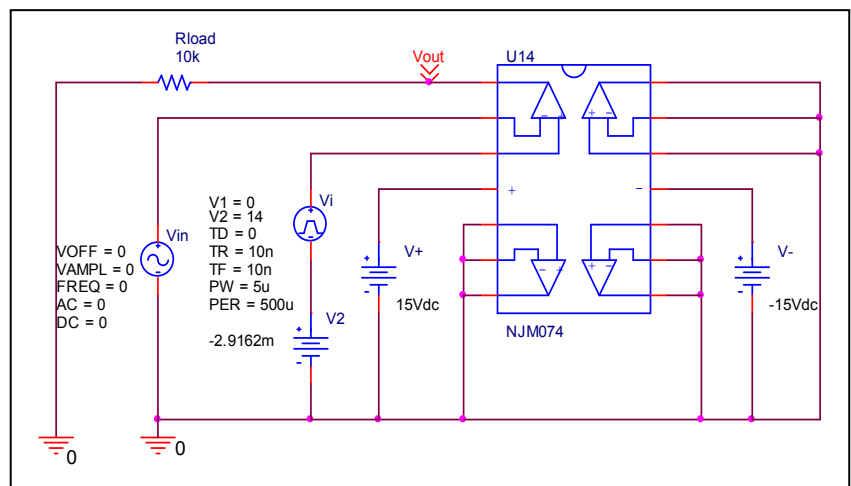
Vos	Measurement		Simulation		Error	
	3	mV	2.916	mV	-2.8	%

Slew Rate

Simulation result



Evaluation circuit

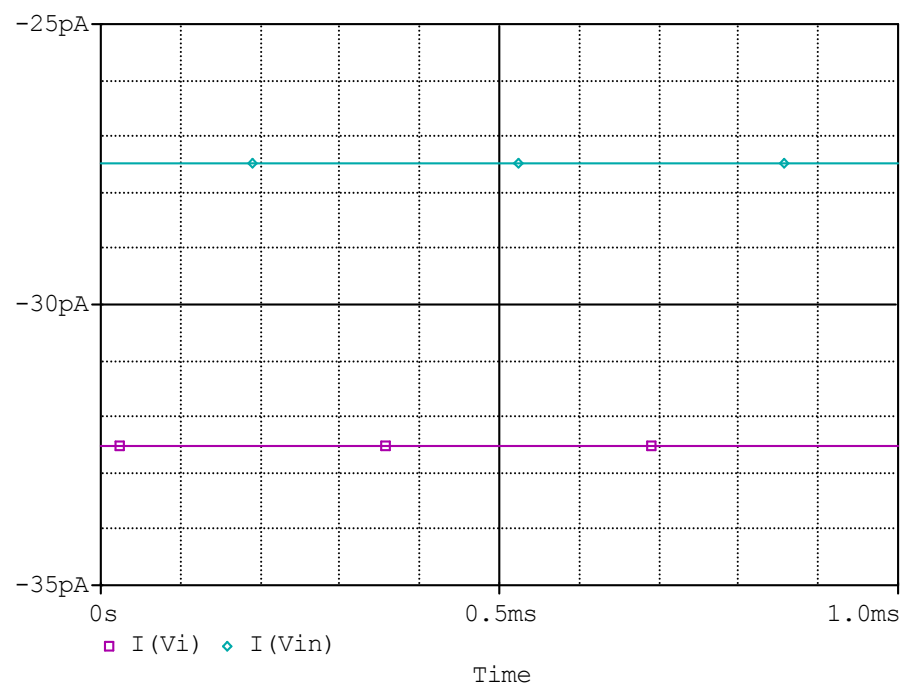


Comparison table

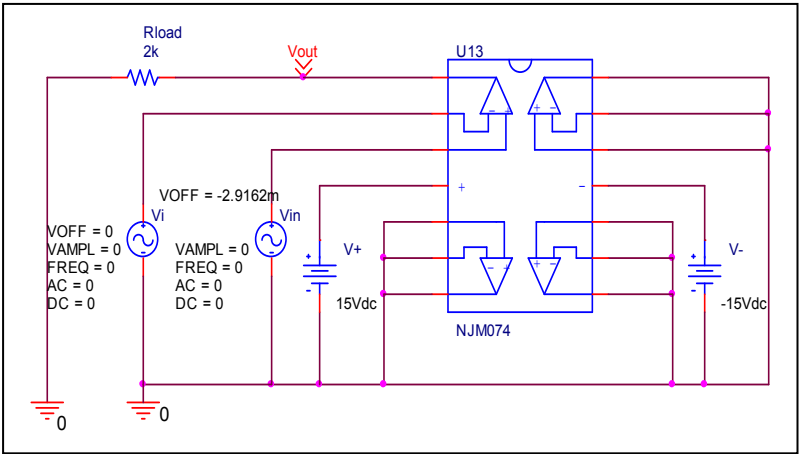
Slew Rate(v/us)	Data sheet	Simulation	%Error
	13	12.925	-0.576

Input current

Simulation result



Evaluation circuit

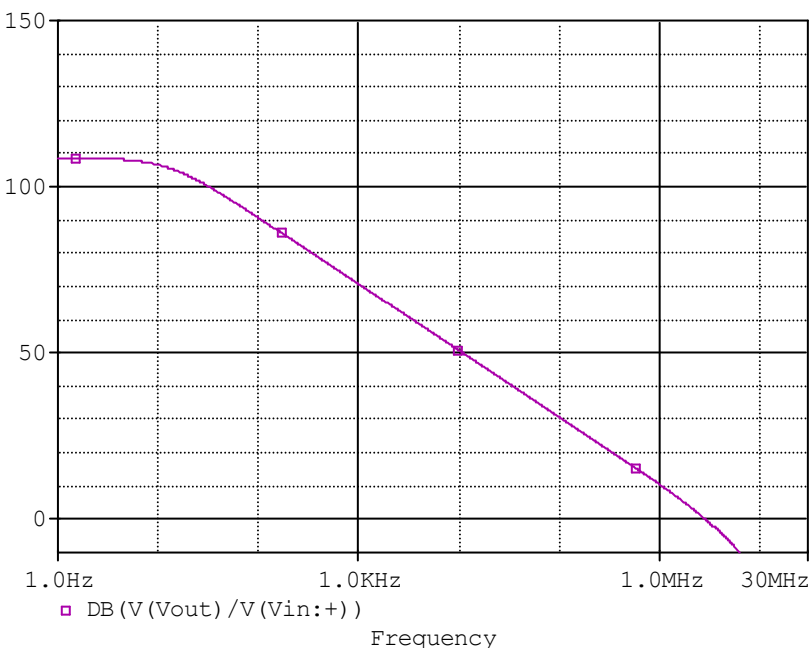


Comparison table

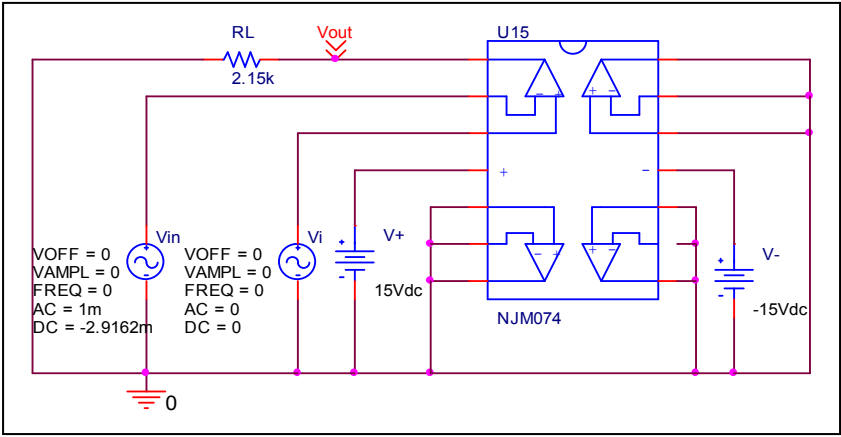
	Data sheet	Simulation	%Error
Ib(nA)	30	29.998	-0.006
Ibos(nA)	5	5.014	0.28

Open Loop Voltage Gain vs. Frequency

Simulation result



Evaluation circuit

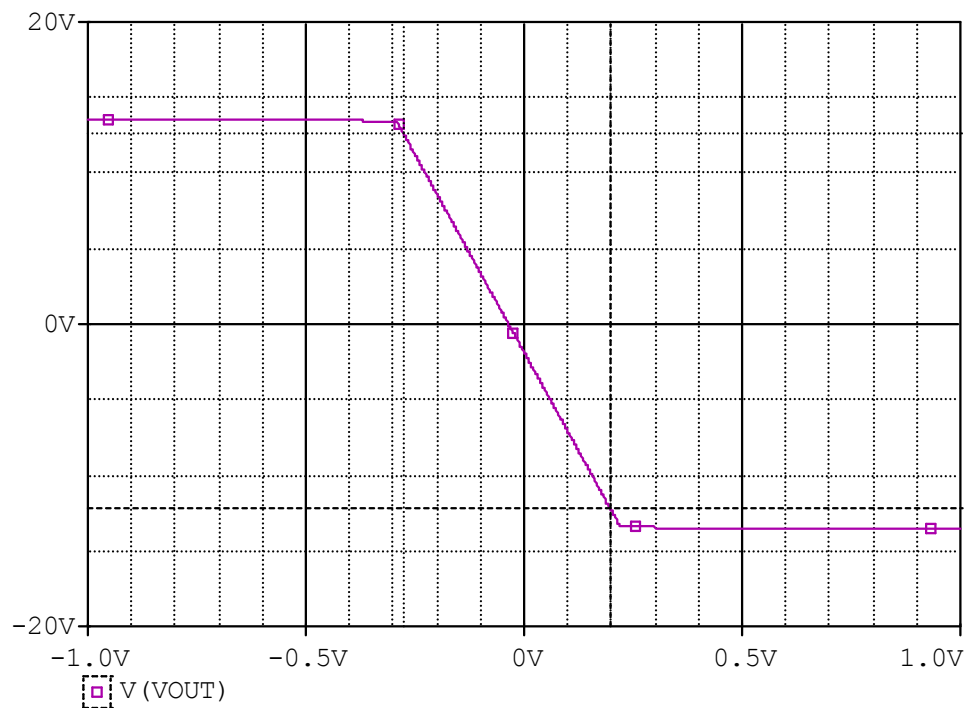


Comparison table

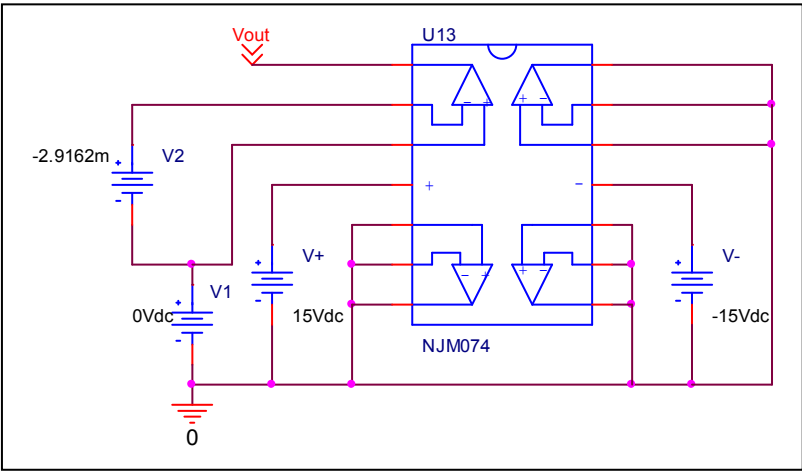
	Data sheet	Simulation	%Error
f-0dB(MHz)	3	2.976	-0.8
Av-dc	106	108.695	2.54

Common-Mode Rejection Voltage gain

Simulation result



Evaluation circuit



Common Mode Reject Ratio= $272113.444/52.35 = 5197.964 = 74.316\text{dB}$

Comparison table

CMRR(dB)	Data sheet	Simulation	%Error
	76	74.316	-2.215