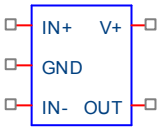
Device Modeling Report

COMPONENTS: OPERATIONAL AMPLIFIER
PART NUMBER:NJM2730
MANUFACTURER: NEW JAPAN RADIO CO.,LTD

Bee Technologies Inc.

Spice Model

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*$
*PART NUMBER: NJM2730
*MANUFACTURER: NEW JAPAN RADIO
*OPAMP
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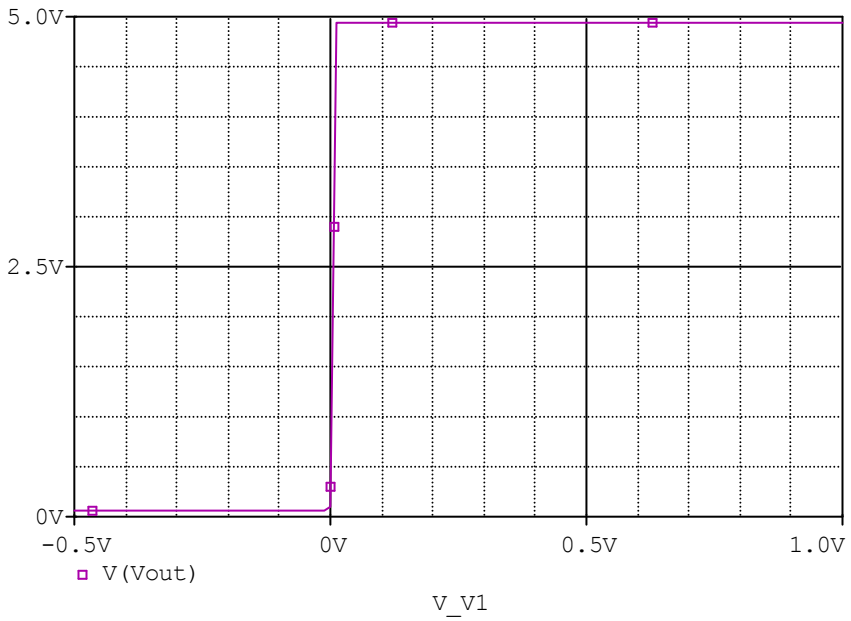
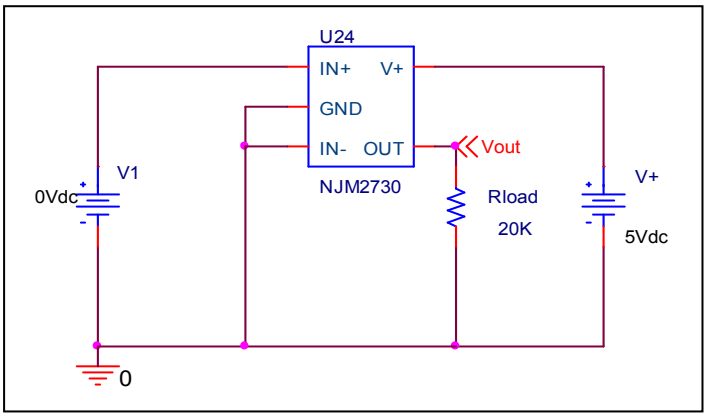
.subckt njm2730 IN+ GND IN- OUT V+
X_U1 IN+ IN- V+ GND OUT njm2730_s
.ends njm2730
.subckt njm2730_S  1 2 3 4 5
  c1   11 12 8.6603E-12
  c2    6  7 30.000E-12
  dc    5 53 dy
  de   54  5 dy
  dlp  90 91 dx
  dln  92 90 dx
  dp    4  3 dx
  egnd 99  0 poly(2) (3,0) (4,0) 0 .5 .5
  fb    7 99 poly(5) vb vc ve vlp vln 0 3.7737E6 -1E3 1E3 3E6 -3E6
  ga    6  0 11 12 226.19E-6
  gcm   0  6 10 99 71.529E-9
  iee   3 10 dc 12.100E-6
  hlim 90  0 vlim 1K
  q1   11  2 13 qx1
  q2   12  1 14 qx2
  r2    6  9 100.00E3
  rc1   4 11 4.4210E3
  rc2   4 12 4.4210E3
  re1  13 10 109.37
  re2  14 10 109.37
  ree  10 99 16.529E6
  ro1   8  5 50
  ro2   7 99 25
  rp    3  4 125.04
  vb    9  0 dc 0
  vc    3 53 dc .81877
  ve   54  4 dc .8193
  vlim  7  8 dc 0
  vlp  91  0 dc 6
  vln   0 92 dc 6
.model dx D(Is=800.00E-18)
.model dy D(Is=800.00E-18 Rs=1m Cjo=10p)
.model qx1 PNP(Is=800.00E-18 Bf=109.19)
.model qx2 PNP(Is=851.0521E-18 Bf=133.19)
.ends
*$
```

Output Voltage Swing

Simulation result



Evaluation circuit

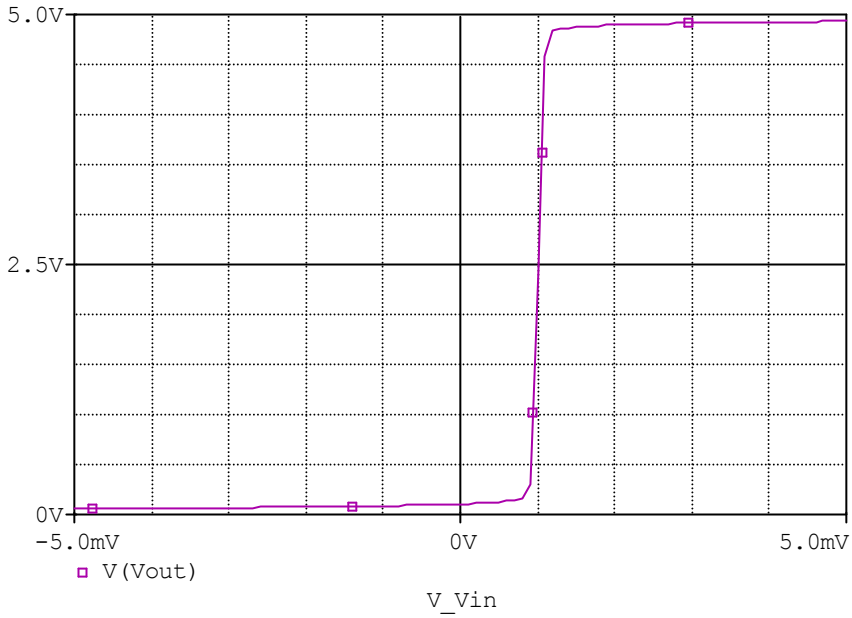


Comparison table

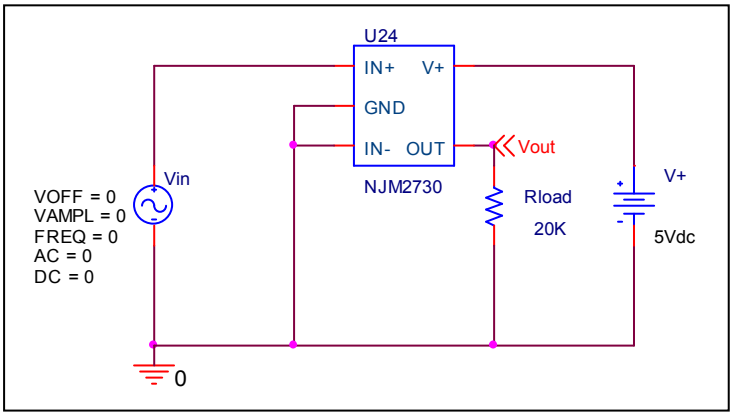
Output Voltage Swing	Data sheet	Simulation	%Error
VOH	4.95	4.949	-0.02
VOL	0.05	0.05	0

Input Offset Voltage

Simulation result



Evaluation circuit

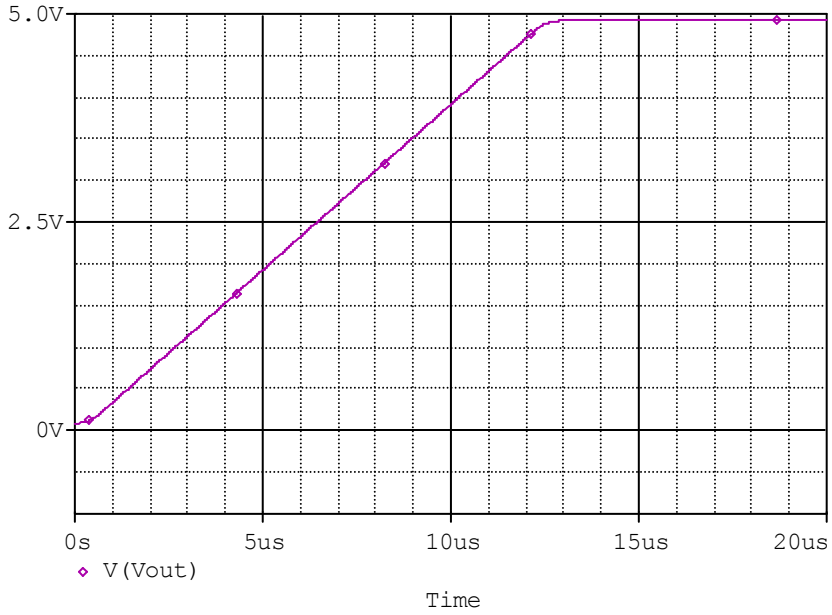


Comparison table

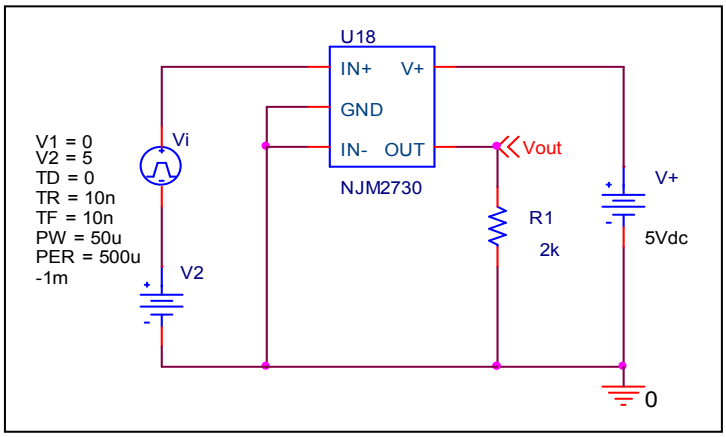
Vio	Measurement		Simulation		Error	
	1	mV	1	mV	0	%

Slew Rate

Simulation result



Evaluation circuit

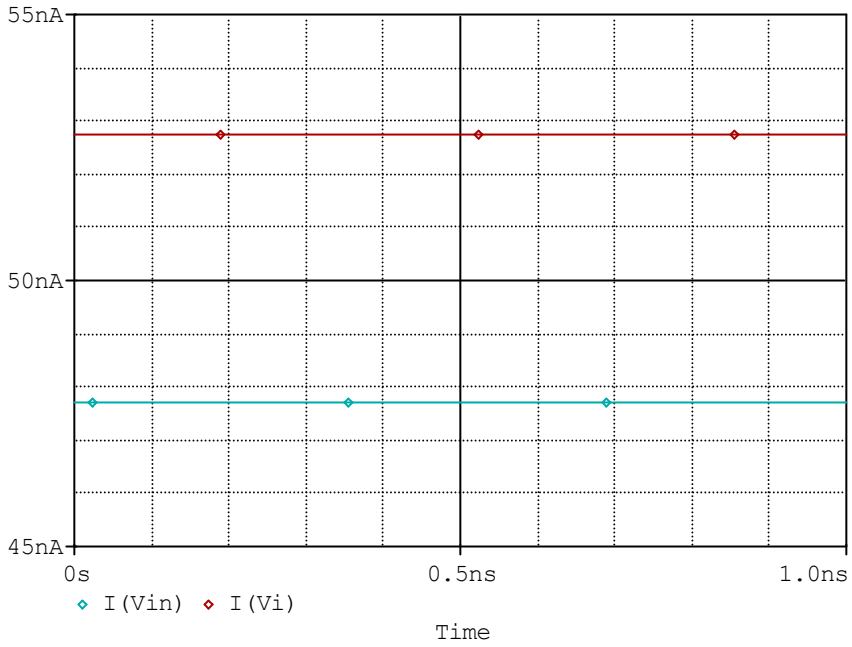


Comparison table

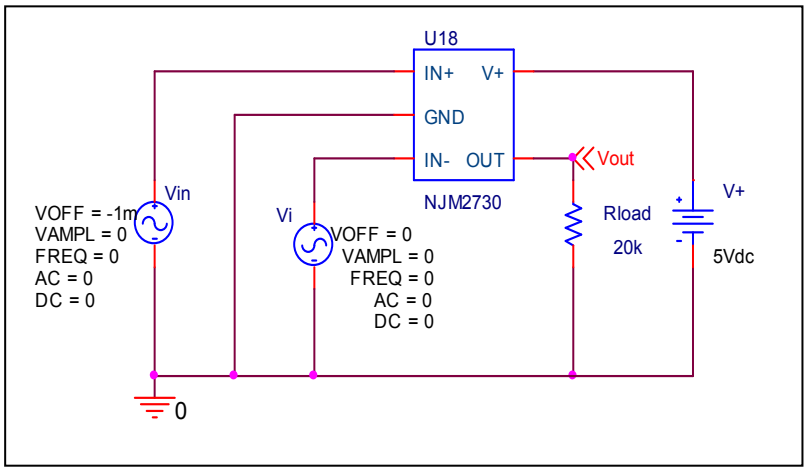
Slew Rate(v/us)	Data sheet	Simulation	%Error
	0.4	0.402	0.5

Input current

Simulation result



Evaluation circuit

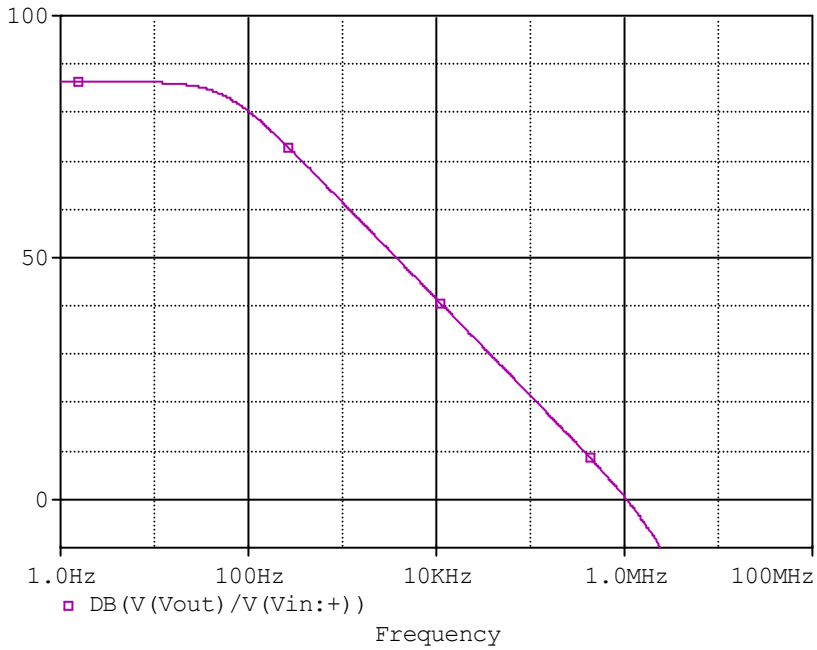


Comparison table

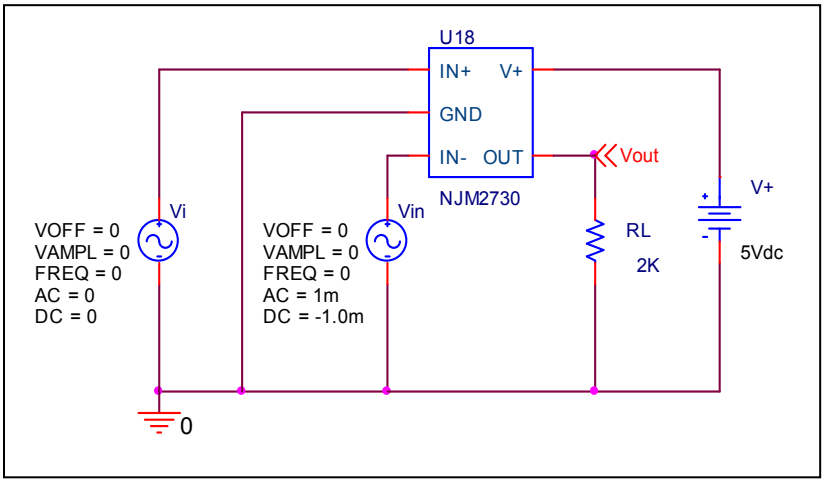
	Data sheet	Simulation	%Error
Ib(nA)	50	50.235	0.47
Iio(nA)	5	5.051	1.02

Open Loop Voltage Gain vs. Frequency

Simulation result



Evaluation circuit

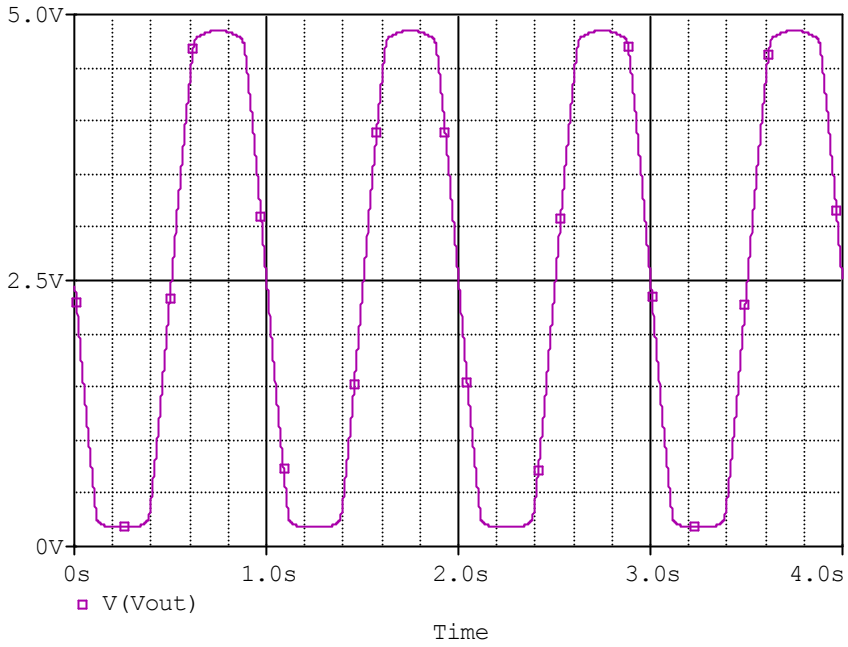


Comparison table

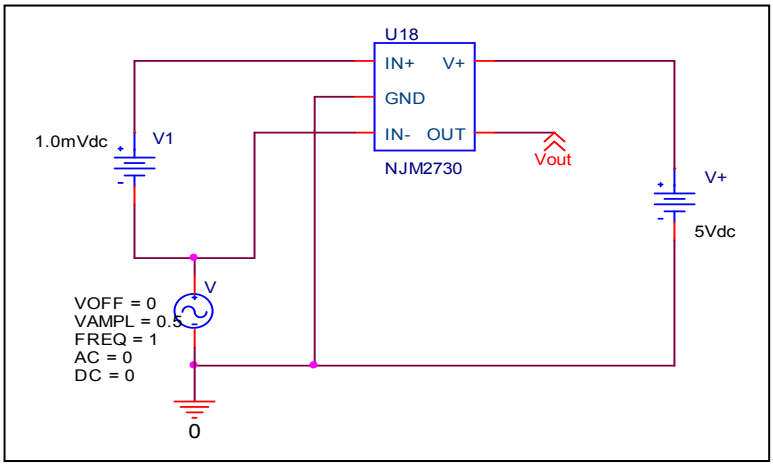
	Data sheet	Simulation	%Error
f-0dB(MHz)	1	1.048	4.8
Av-dc	85	86.344	1.58

Common-Mode Rejection Voltage gain

Simulation result



Evaluation circuit



Common Mode Reject Ratio=20758.692/4.672 = 4443.213= 72.95dB

Comparison table

CMRR(dB)	Data sheet	Simulation	%Error
	70	72..95	4.214