

# Device Modeling Report

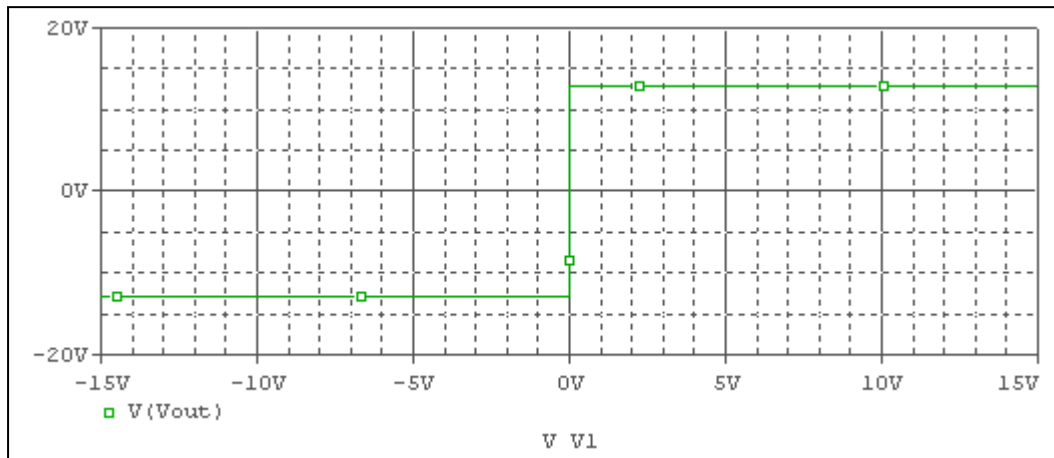
COMPONENTS:MOSFET: OPERATIONAL AMPLIFIER  
PART NUMBER:NJMOP-07M  
MANUFACTURER: NEW JAPAN RADIO CO.,LTD



Bee Technologies Inc.

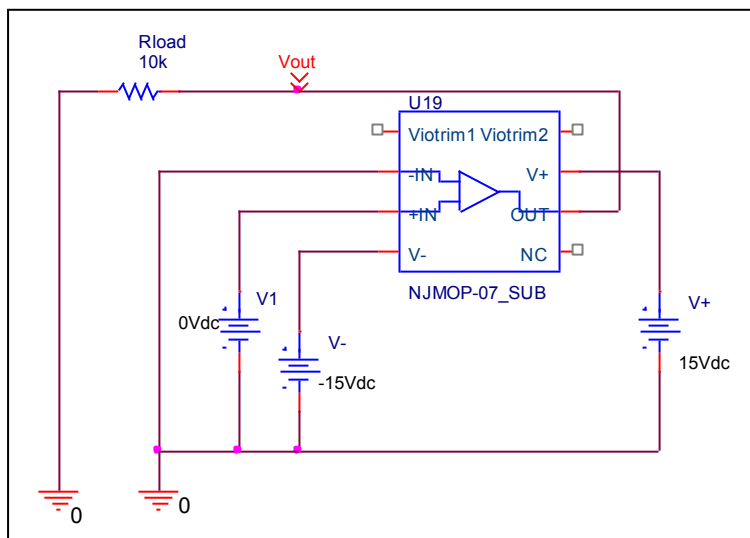
## Output Voltage Swing, +Vout and -Vout

### Simulation result



These simulation results are compared with  $\pm V_{out}$

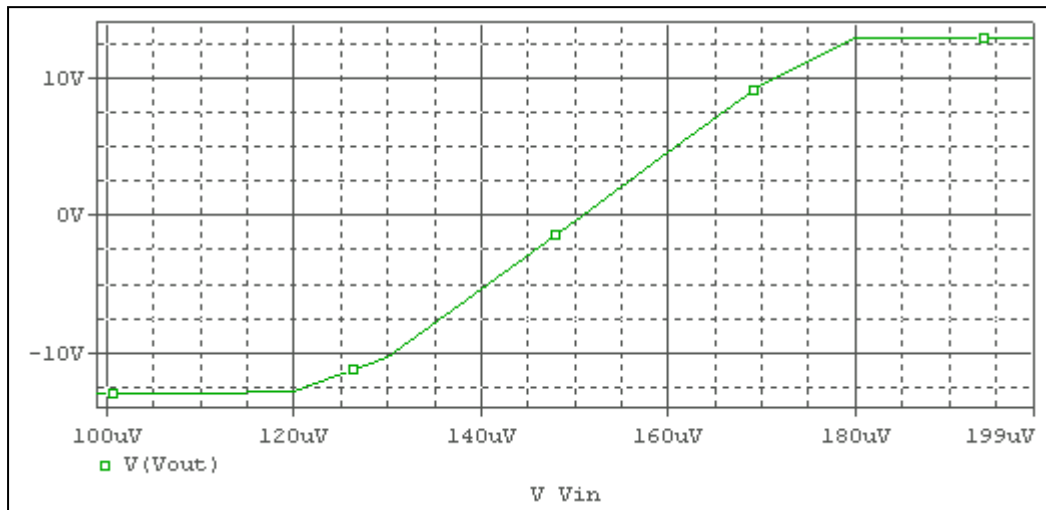
### Evaluation circuit



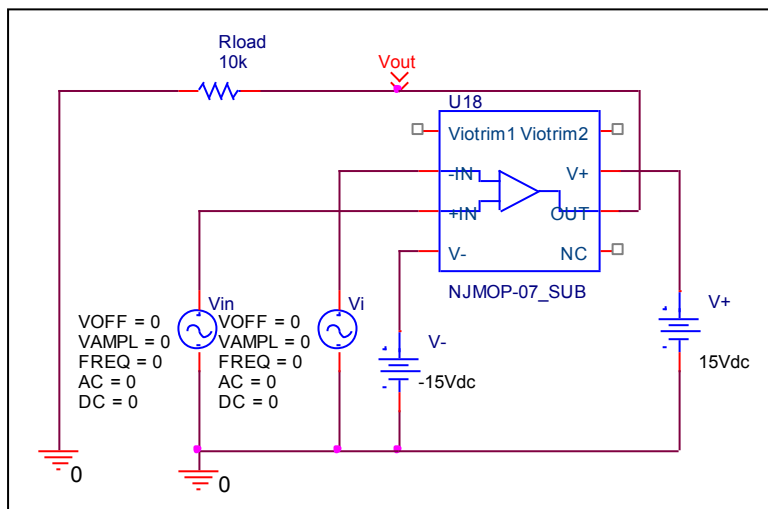
Output Voltage Swing	Data sheet	Simulation	%Error
+Vout(V)	+13	+12.932	0.523
-Vout(V)	-13	-12.932	0.523

# Input Offset Voltage

## Simulation result



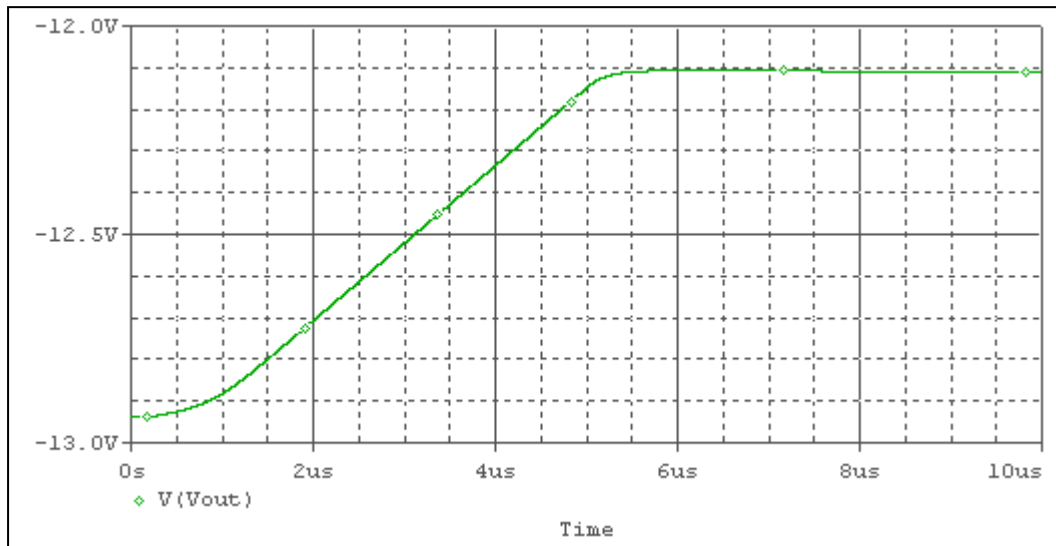
## Evaluation circuit



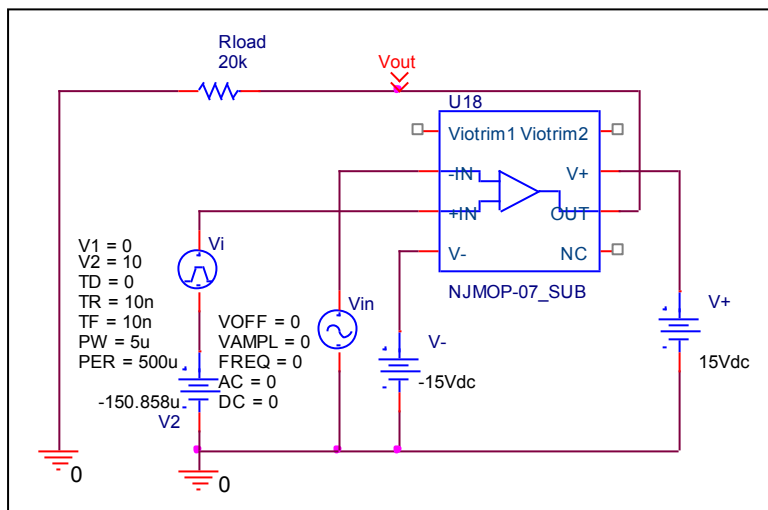
Vos	Measurement		Simulation		Error	
	150	uV	150.858	uV	0.572	%

## Slew Rate, +SR, -SR

### Simulation result



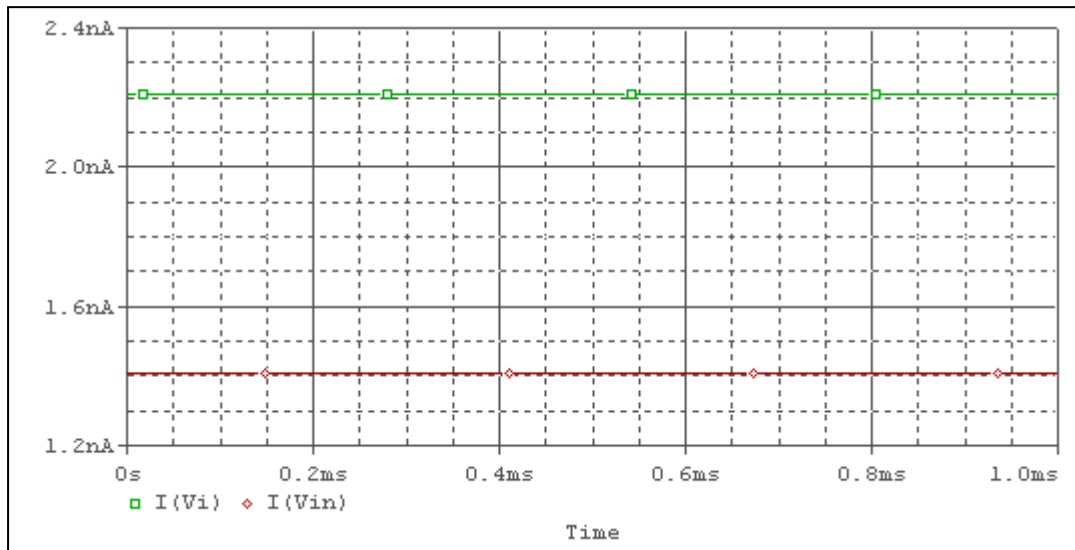
### Evaluation circuit



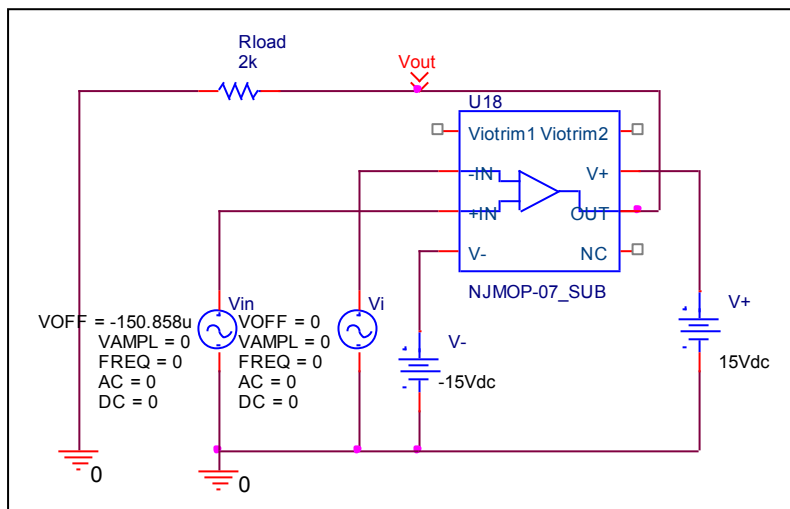
Slew Rate(v/us)	Data sheet	Simulation	%Error
		0.17V/us	0.175V/us

# Input current $I_b$ , $I_{bos}$

## Simulation result



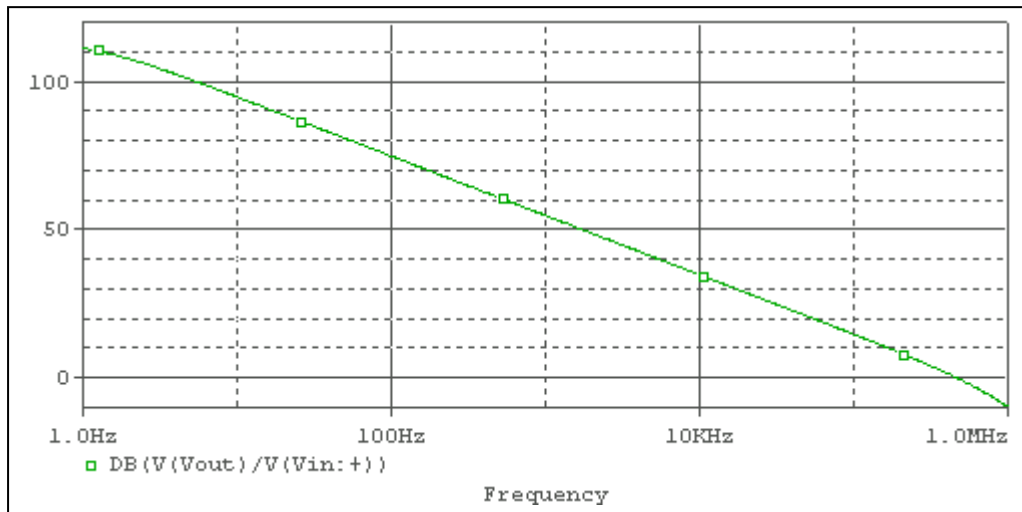
## Evaluation circuit



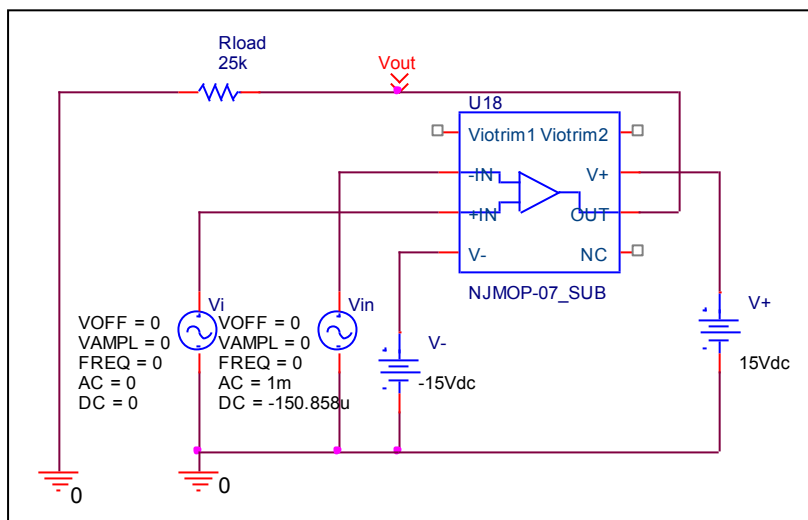
	Data sheet	Simulation	%Error
$I_b$ (pA)	0.8	0.8	0
$I_{bos}$ (nA)	1.8	1.805	0.277

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

### Simulation result



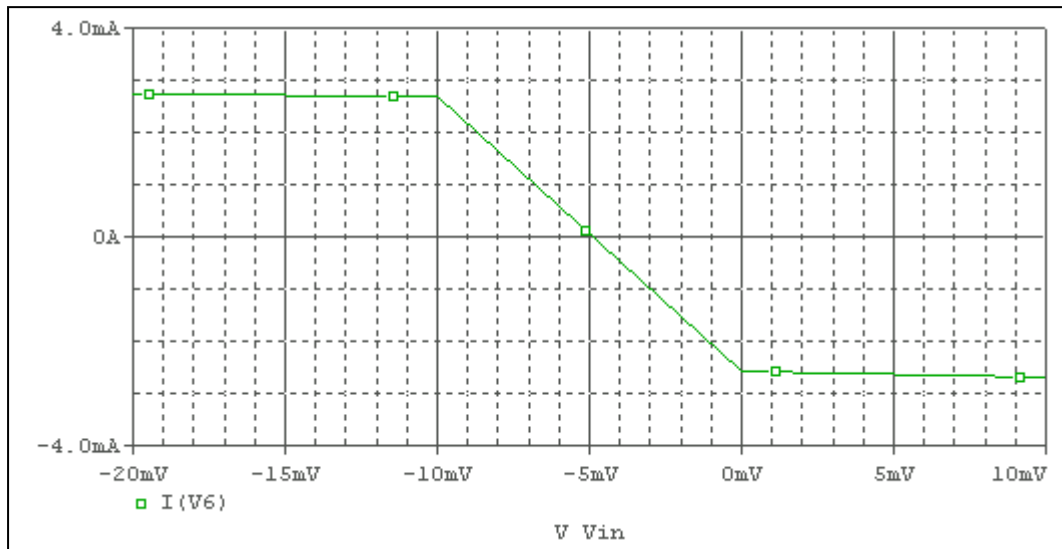
### Evaluation circuit



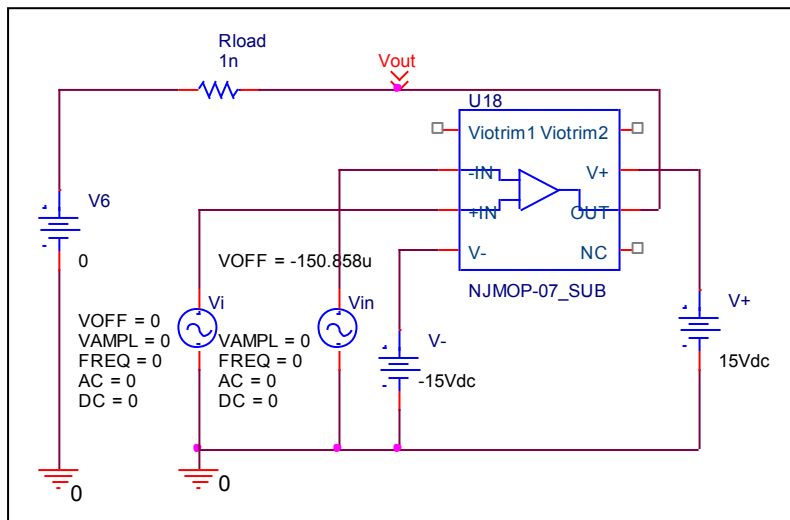
	Data sheet	Simulation	%Error
<b>f-0dB(MHz)</b>	0.5	0.476	4.8
<b>Av-dc(dB)</b>	112	111.3	0.625

## Output Short Circuit Current - Ios

### Simulation result



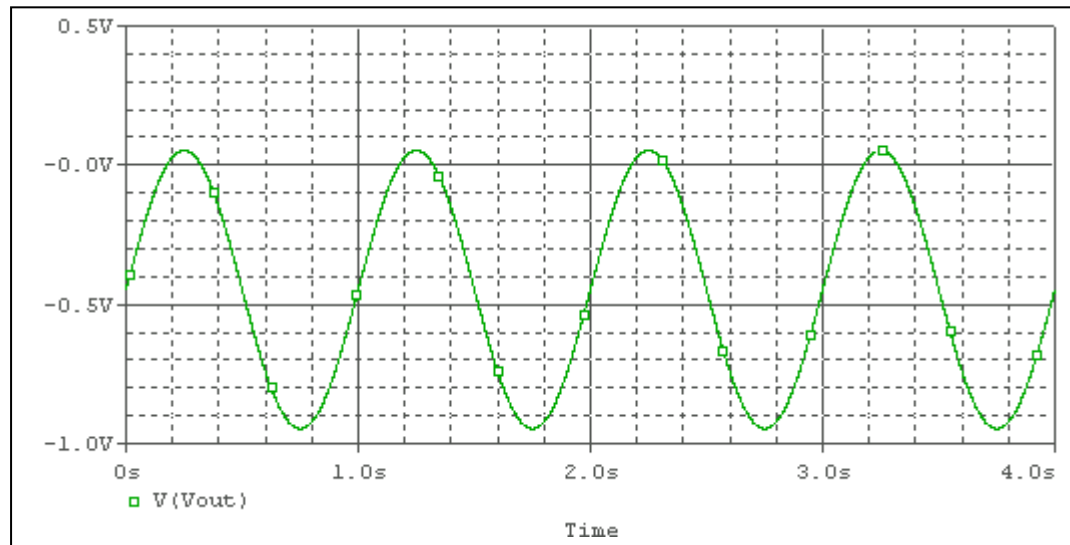
### Evaluation circuit



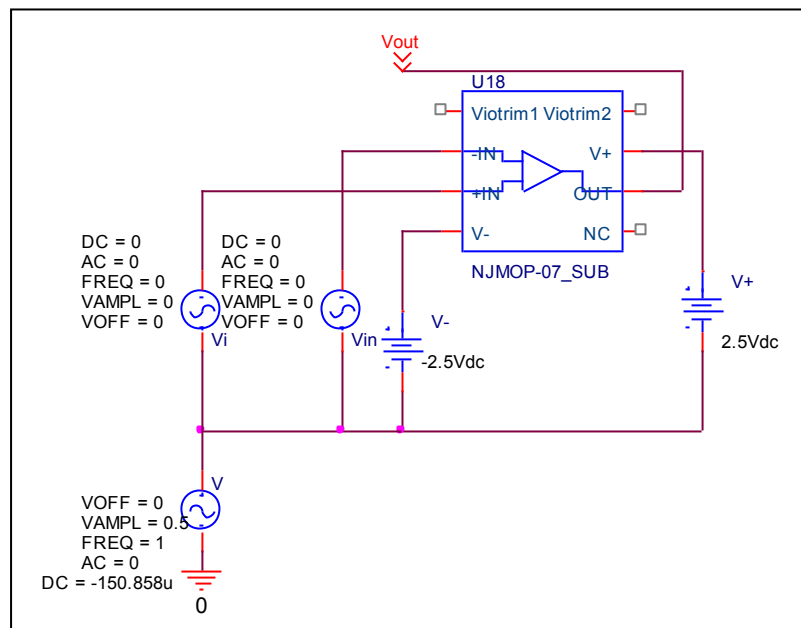
Short Circuit Current	Data sheet	Simulation	%Error
	2.7mA	2.701mA	0.037

## Common-Mode Rejection Voltage gain

### Simulation result



### Evaluation circuit



Common mode gain=0.398107/1

Common Mode Reject Ratio=367282/0.398107=922571

CMRR(dB)	Data sheet	Simulation	%Error
		120	119.29