

# Device Modeling Report

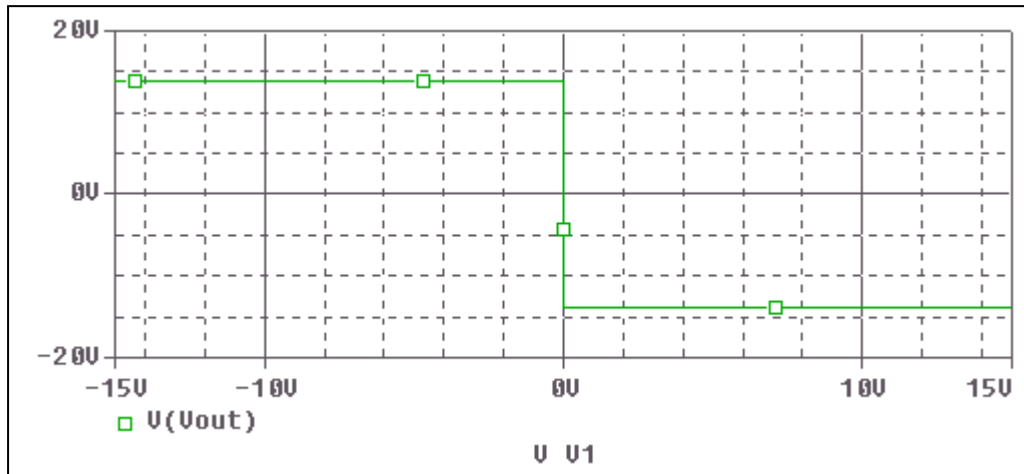
COMPONENTS:MOSFET: OPERATIONAL AMPLIFIER  
PART NUMBER:NJM2147M  
MANUFACTURER: NEW JAPAN RADIO CO.,LTD



Bee Technologies Inc.

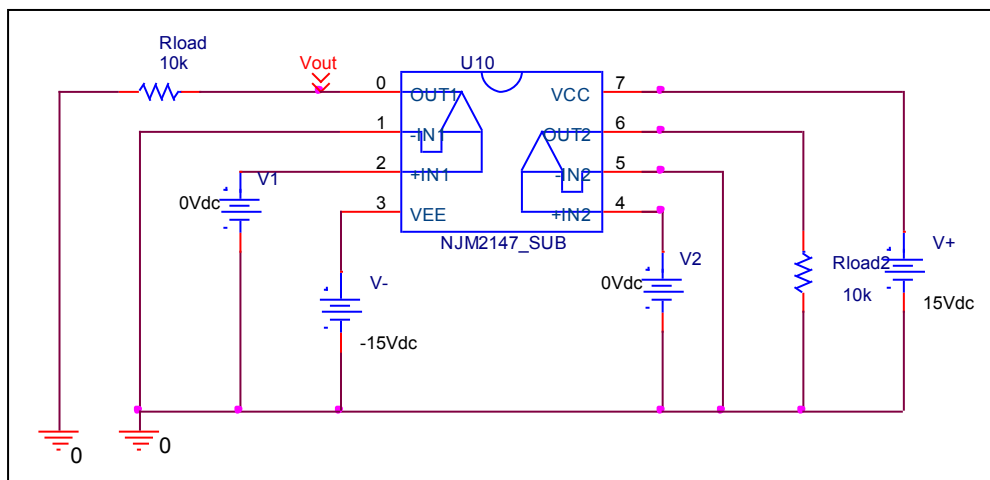
## Output Voltage Swing, +Vout and -Vout

Simulation result



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

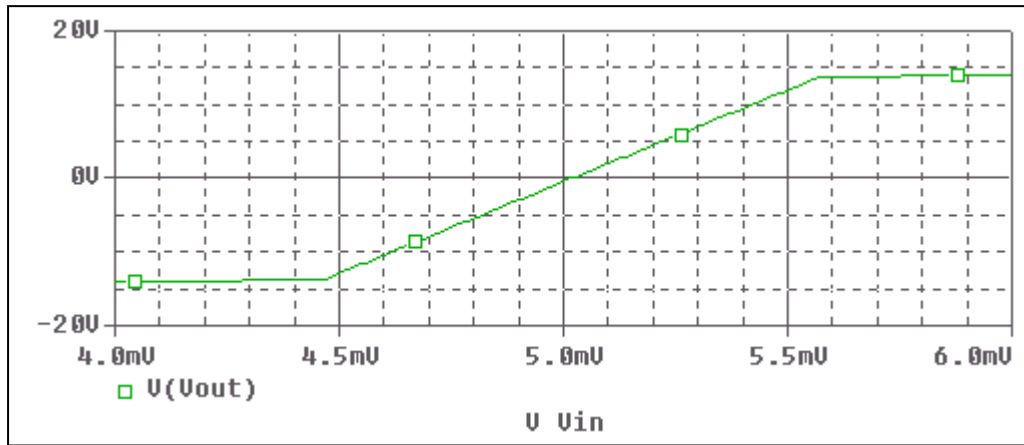
Evaluation circuit



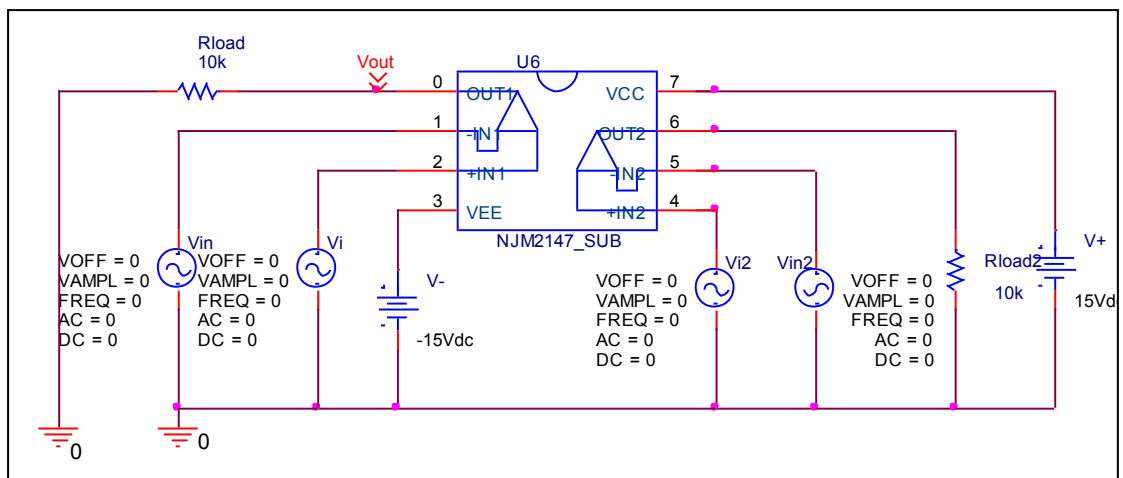
Output Voltage Swing	Data sheet	Simulation	%Error
+Vout(V)	+14	+13.994	0.042
-Vout(V)	-14	-13.994	0.042

# Input Offset Voltage

## Simulation result



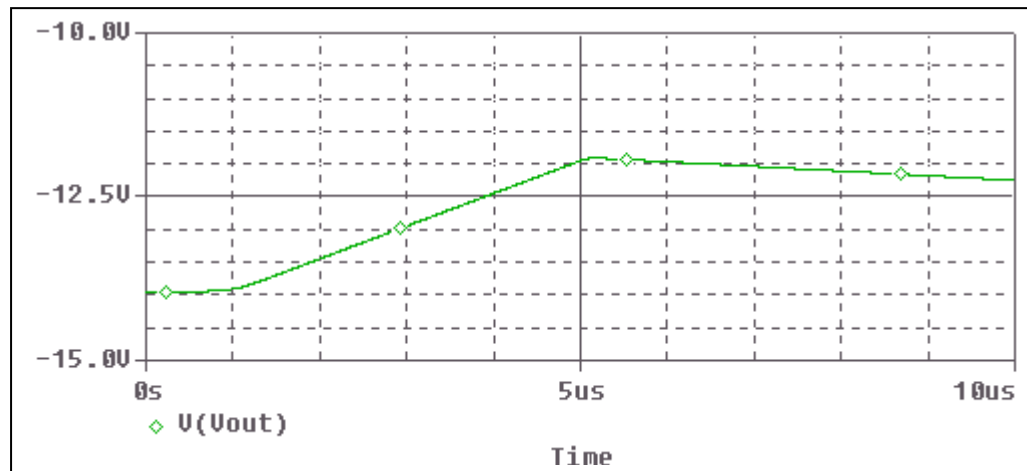
## Evaluation circuit



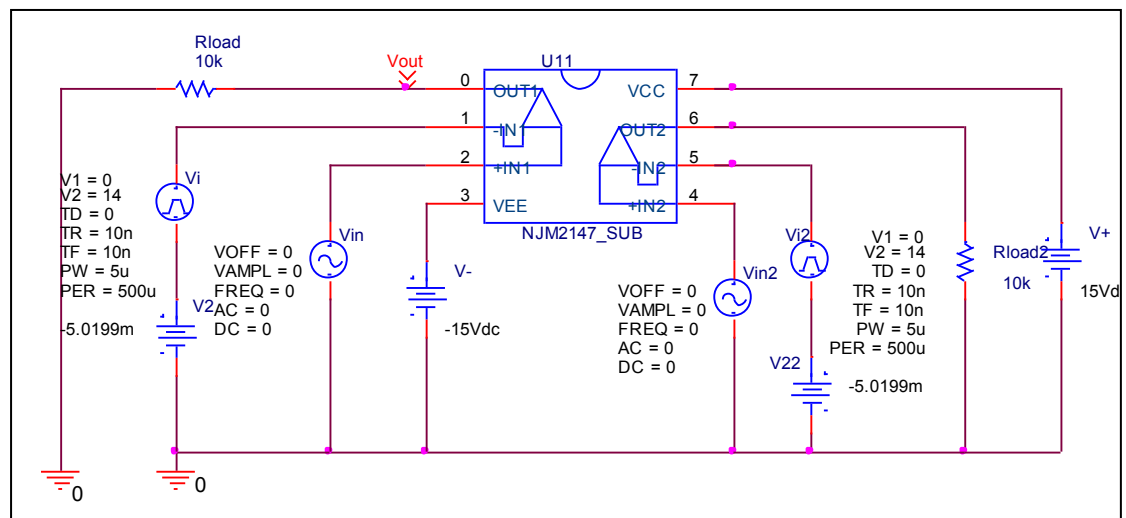
Vos	Measurement		Simulation		Error	
	5	mV	5.0199	mV	0.398	%

## Slew Rate, +SR, -SR

### Simulation result



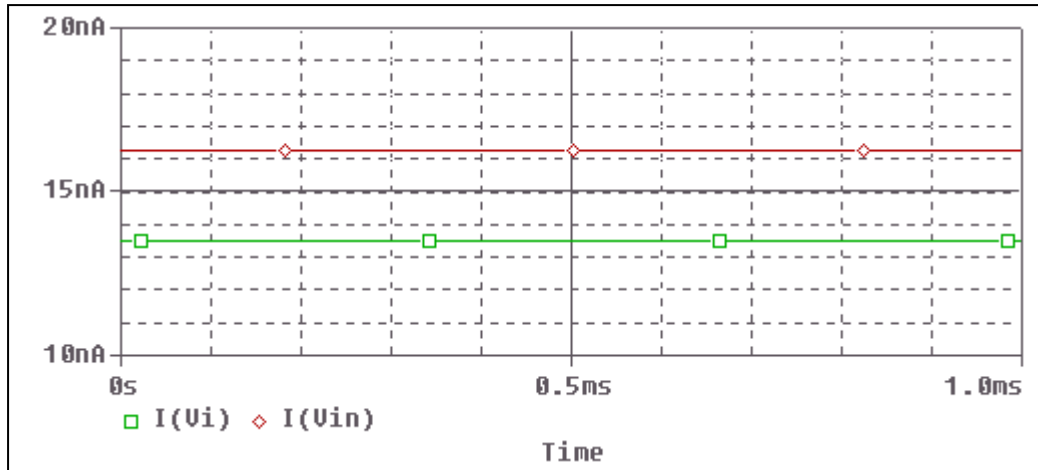
### Evaluation circuit



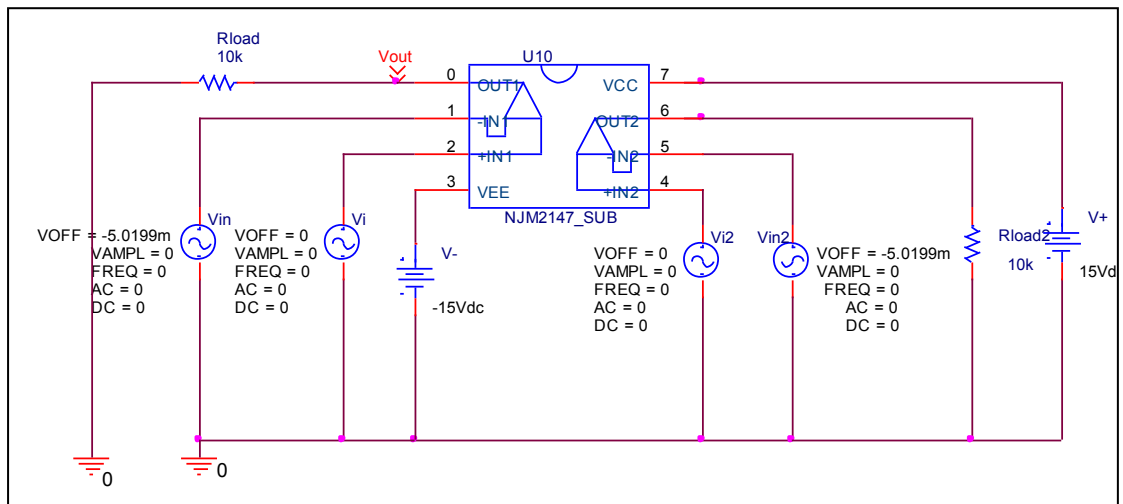
Slew Rate(v/us)	Data sheet	Simulation	%Error
		0.5V/us	0.499V/us

## Input current Ib, Ibos

### Simulation result



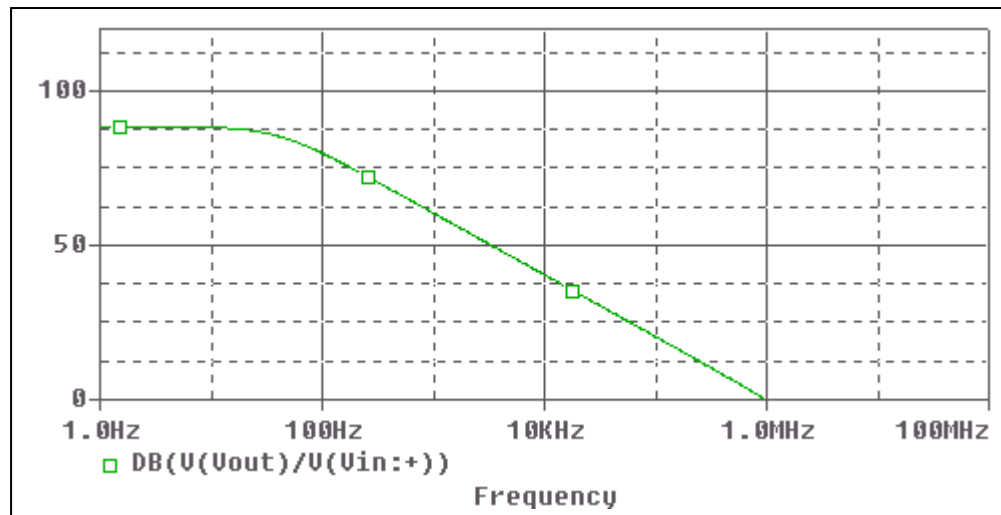
### Evaluation circuit



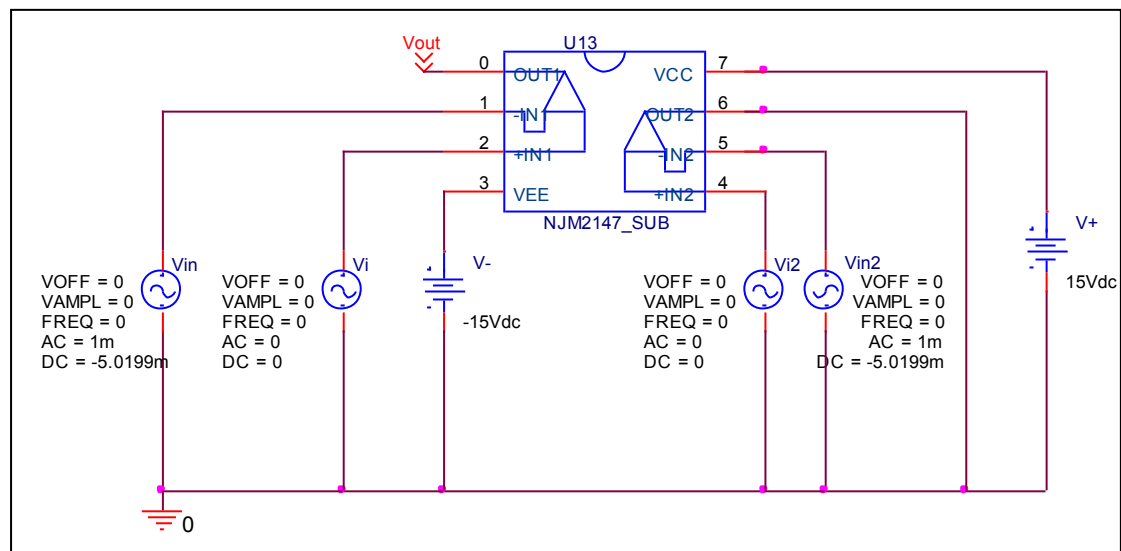
	Data sheet	Simulation	%Error
Ib(nA)	15	14.4	4
Ibos(nA)	80(Max)	2.76	-

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

### Simulation result



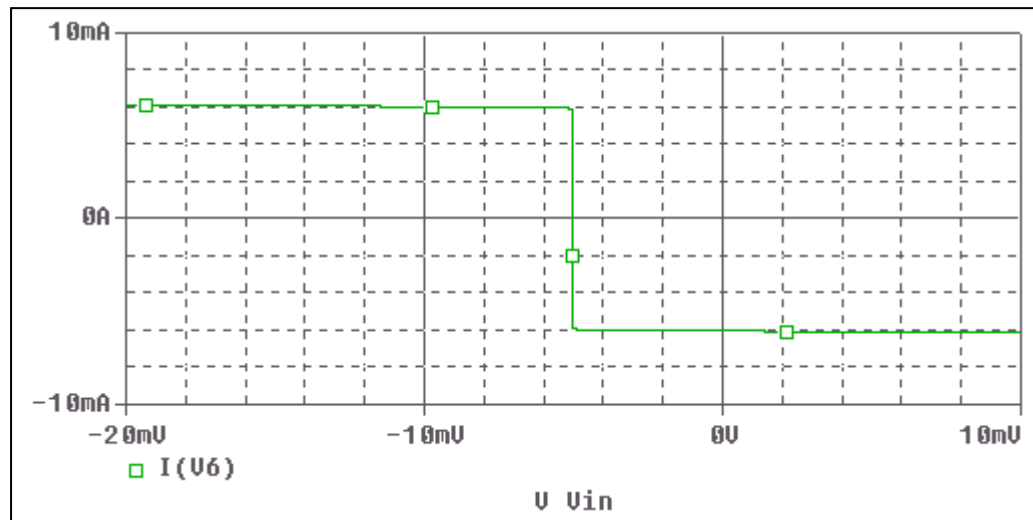
### Evaluation circuit



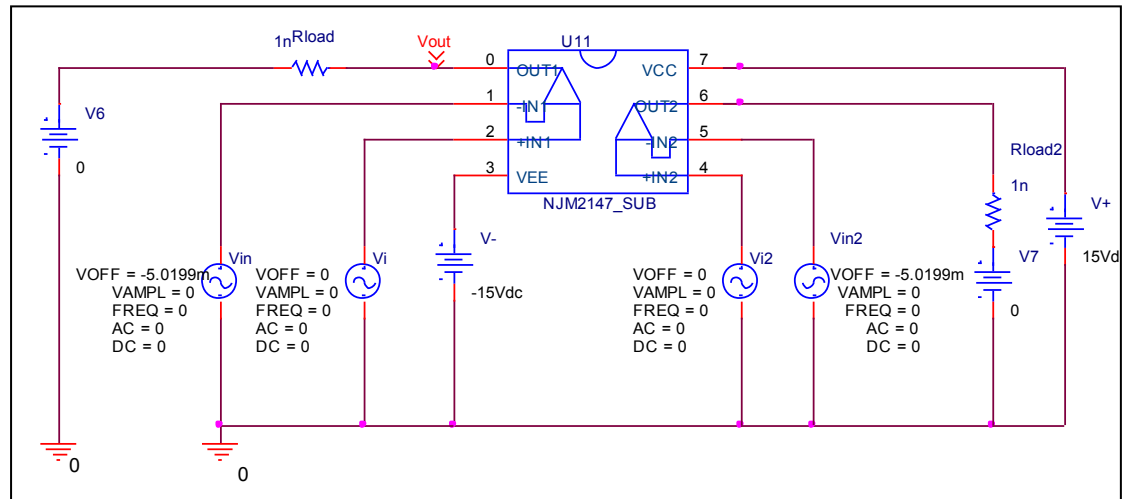
	Data sheet	Simulation	%Error
f-0dB(MHz)	1	0.964	3.6
Av-dc	88	88.3	0.34

## Output Short Circuit Current - Ios

Simulation result



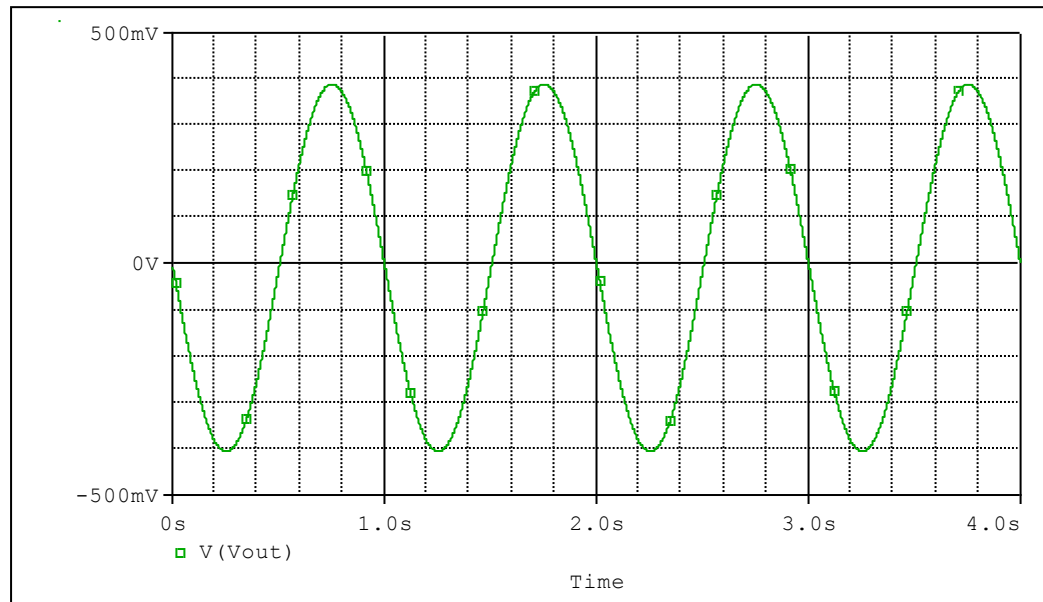
Evaluation circuit



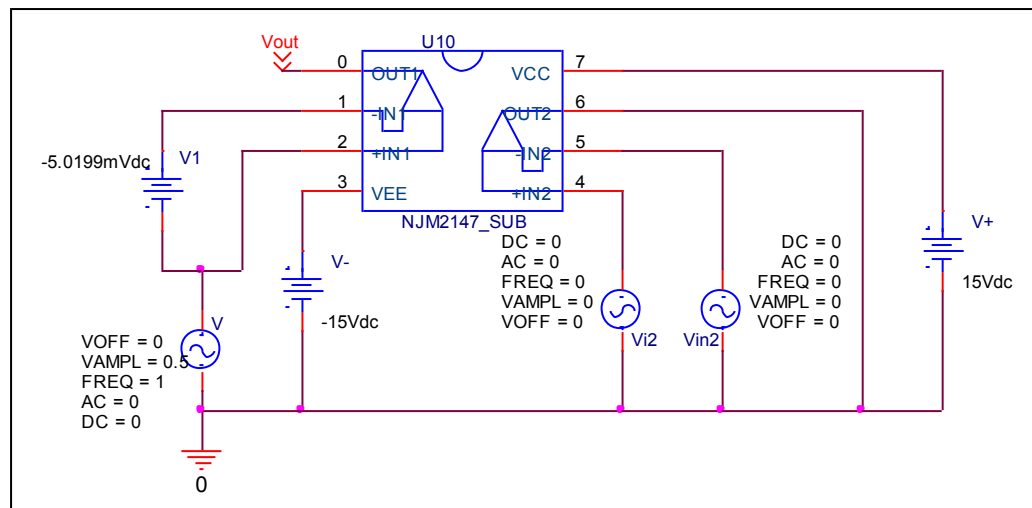
Short Circuit Current	Data sheet	Simulation	%Error
		6mA	6.03mA

## Common-Mode Rejection Voltage gain

### Simulation result



### Evaluation circuit



Common Mode Reject Ratio= $26001.595/0.795=32706.409$

CMRR	Data sheet	Simulation	%Error
		90	90.292