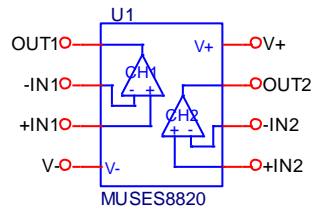# Device Modeling Report

COMPONENTS: OPERATIONAL AMPLIFIER
PART NUMBER: MUSES8820
MANUFACTURER: New Japan Radio
REMARK TYPE: (OPAMP)
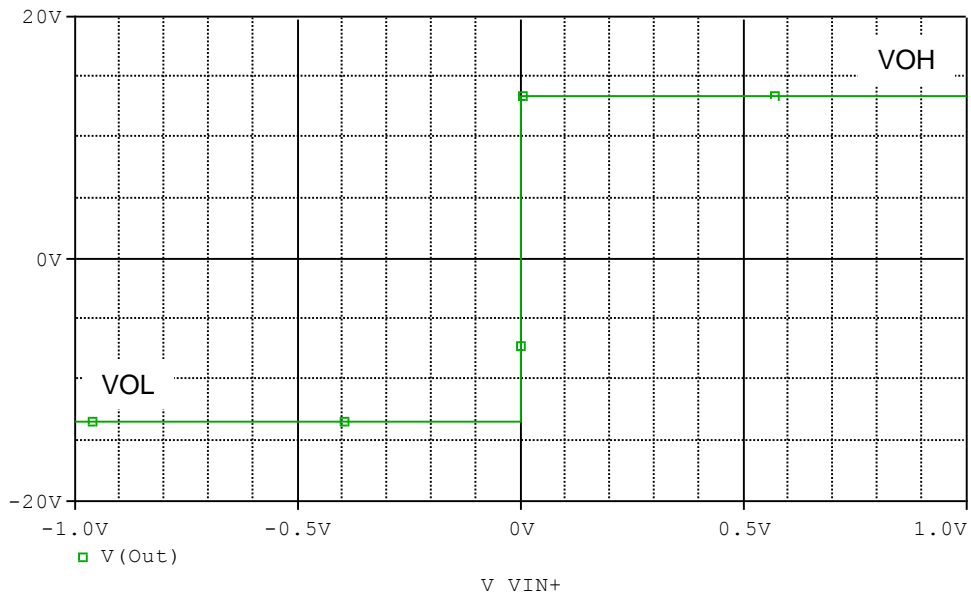
Bee Technologies Inc.

SPICE MODEL
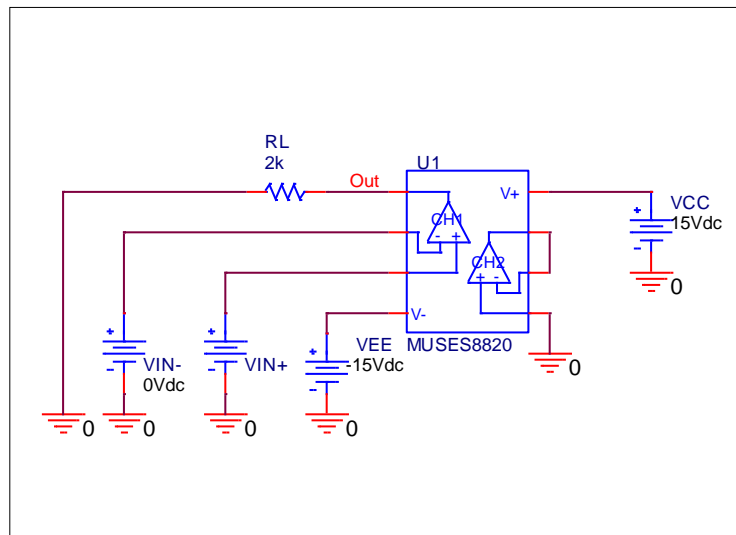
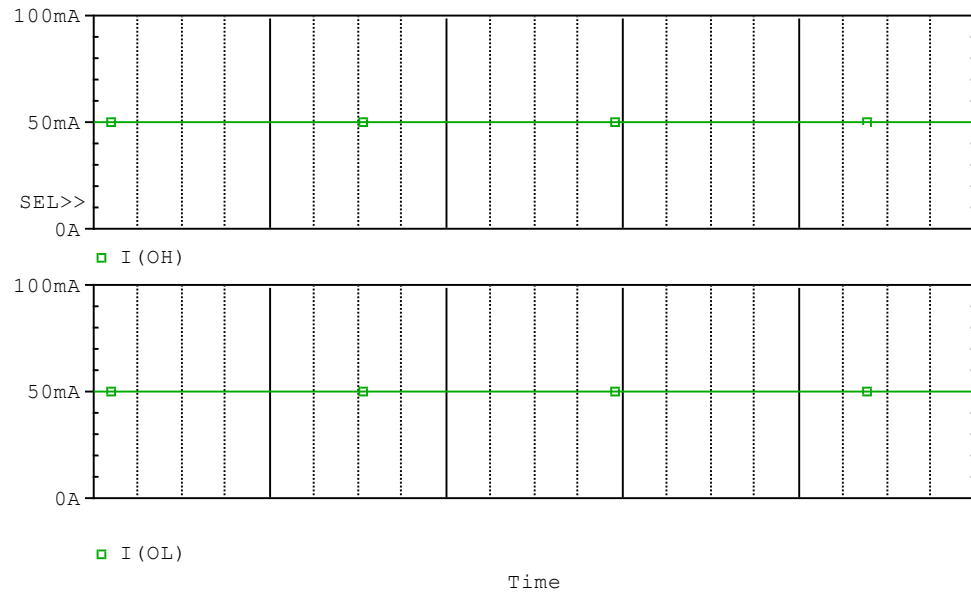# Output Voltage Swing

Simulation result

Evaluation circuit

Comparison table

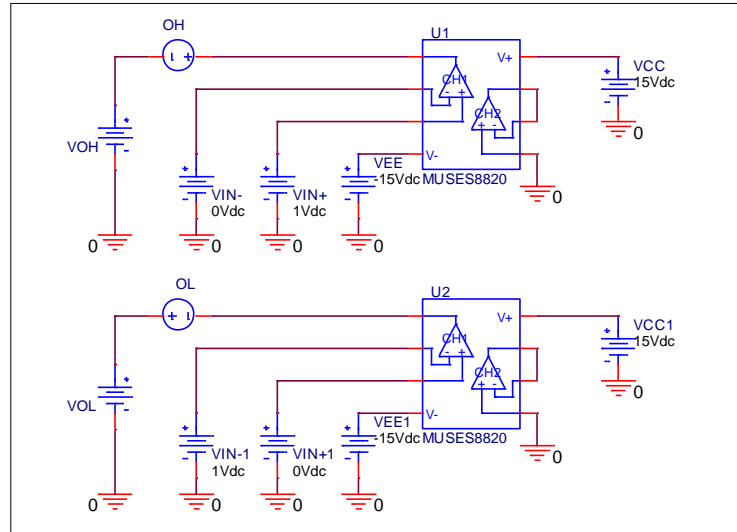| Parameter	Measurement	Simulation	%Error
VOH (V)	13.500	13.497	-0.02
VOL (V)	-13.500	-13.497	-0.02

Output Short Circuit Current
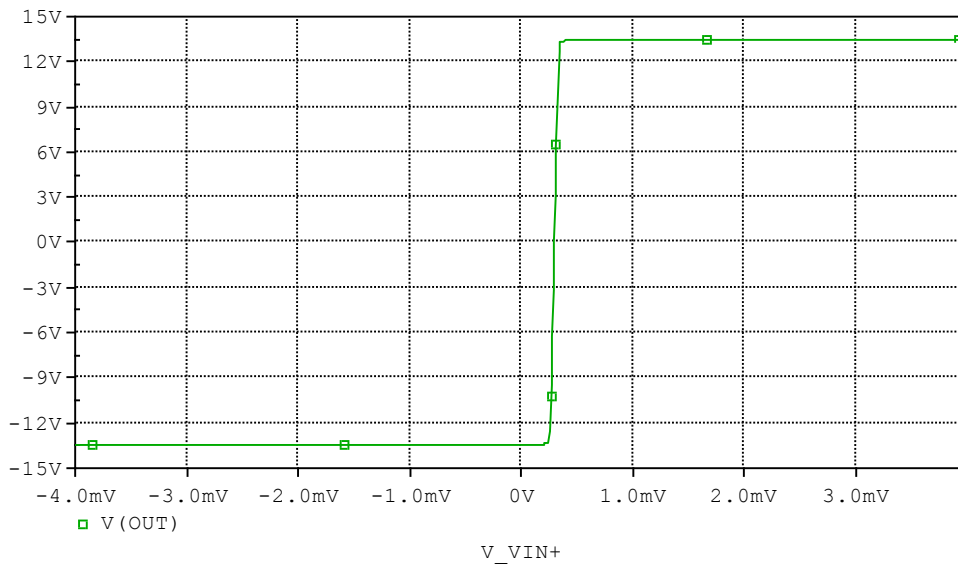
Simulation result
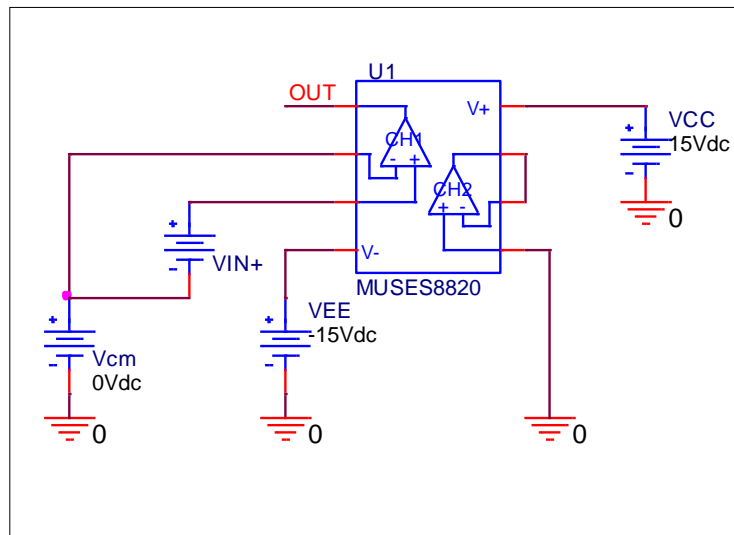

Evaluation circuit

Comparison table

Parameter	Measurement	Simulation	%Error
IOH (mA)	50.000	50.075	0.15
IOL (mA)	50.000	50.075	0.15

Input Offset Voltage

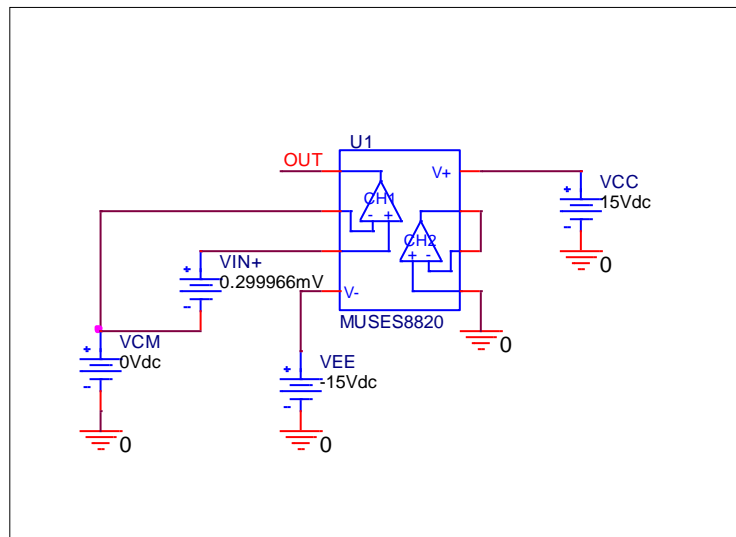## Simulation result

Evaluation circuit

Comparison table

Parameter	Measurement	Simulation	%Error
Vio (mV)	0.300	0.300	-0.01

Input Current Ib, Ibos

- □ ABS(I(U1:2)+I(U1:3))/2   ◇ ABS(I(U1:2)-I(U1:3))

Time
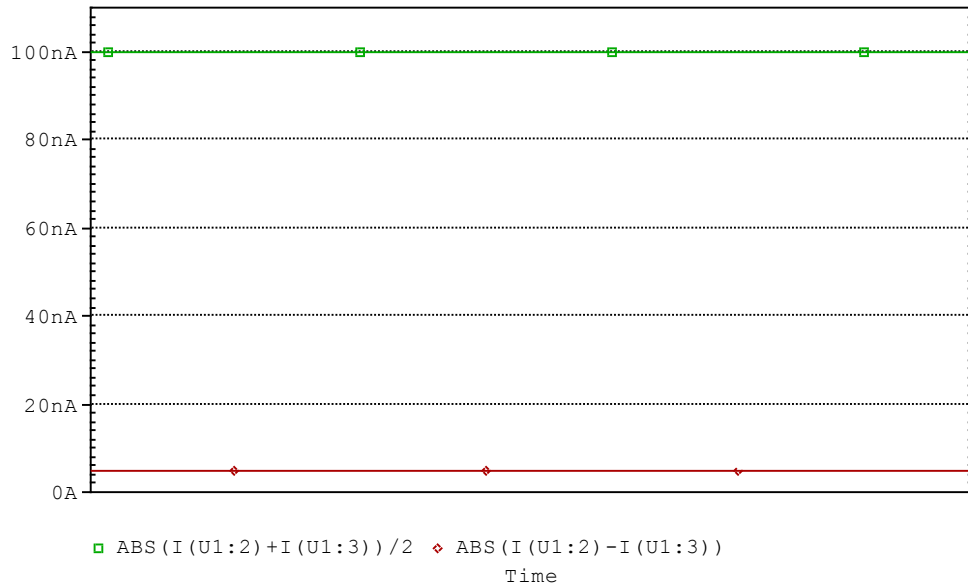
Evaluation circuit

Comparison table

Parameter	Measurement	Simulation	%Error
Iio (nA)	5.000	5.003	0.05
Ib (nA)	100.000	100.012	0.01

Slew Rate
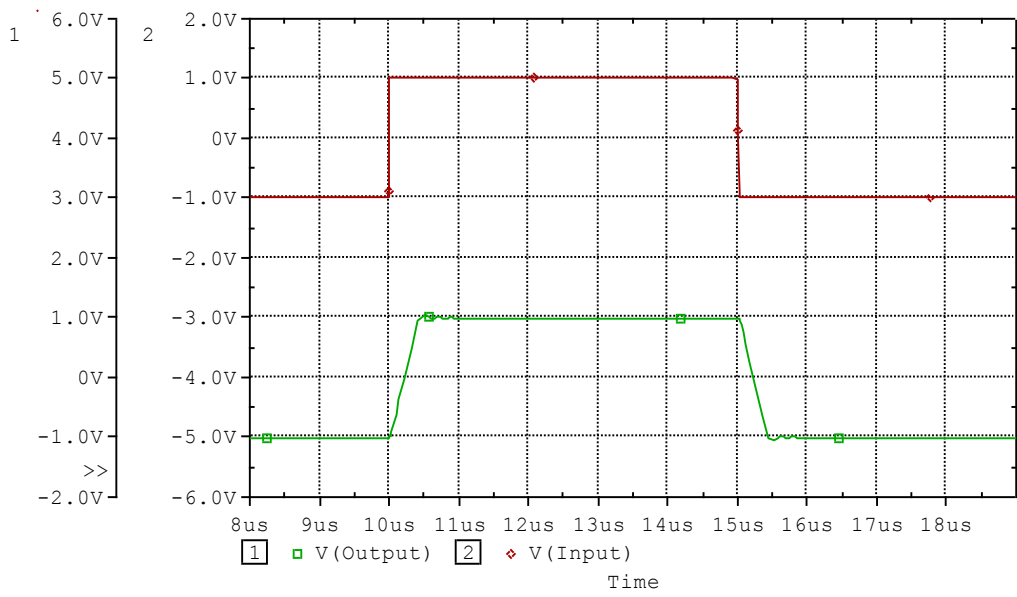
Evaluation circuit
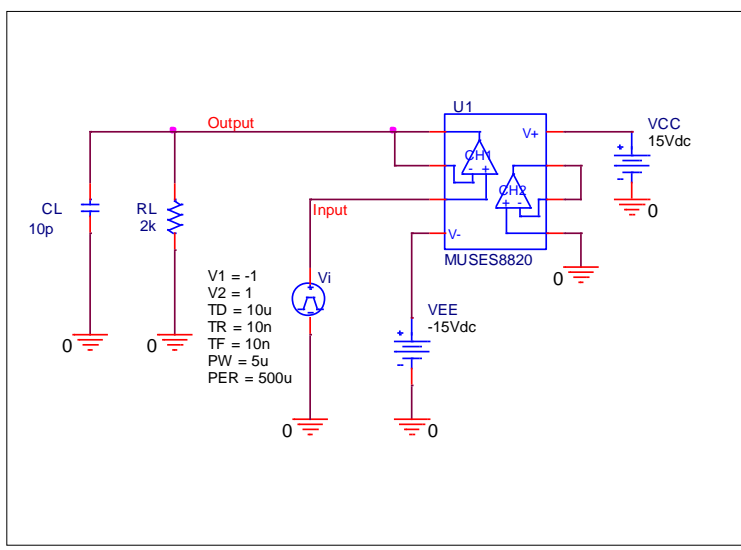
Comparison table

Parameter	Measurement	Simulation	%Error
Slew Rate (V/us)	5.000	4.925	-1.50

Open loop voltage gain

Simulation result

DB(V(Output)/V(Input))

Frequency
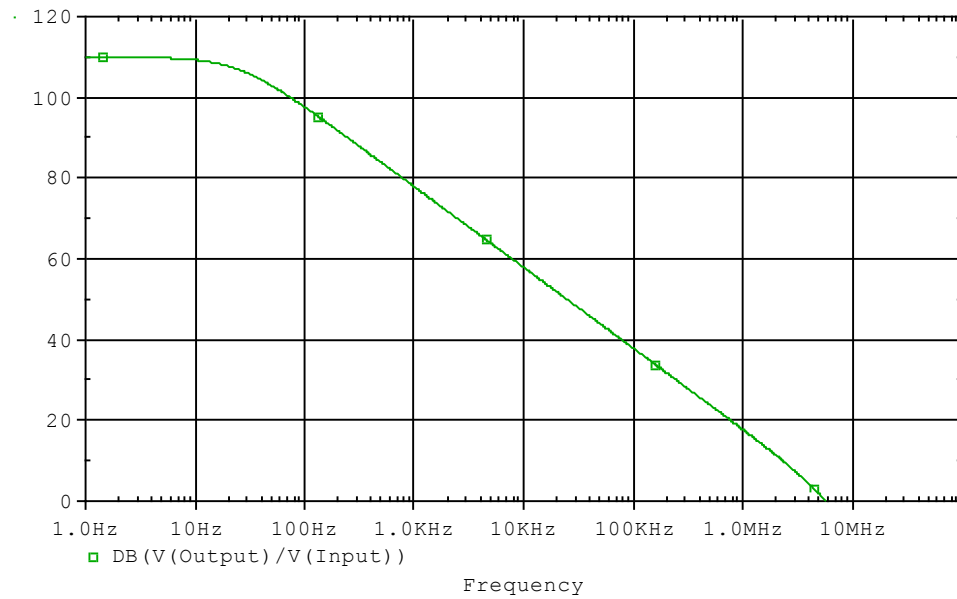
Evaluation circuit
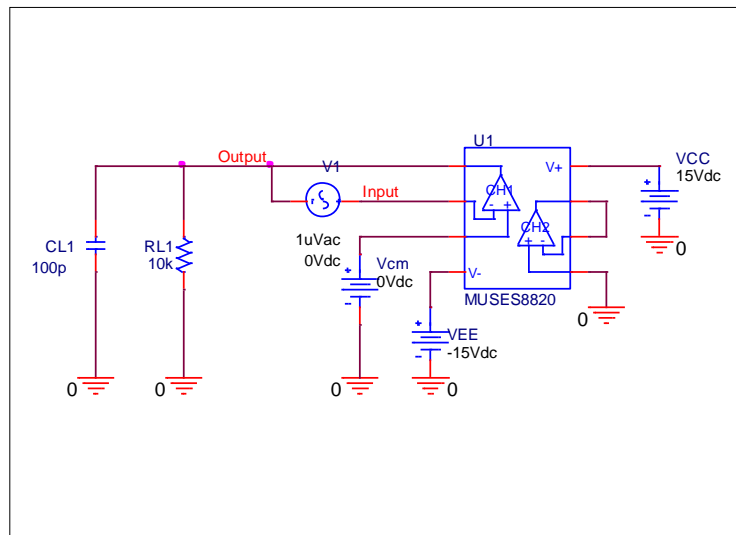
Comparison table

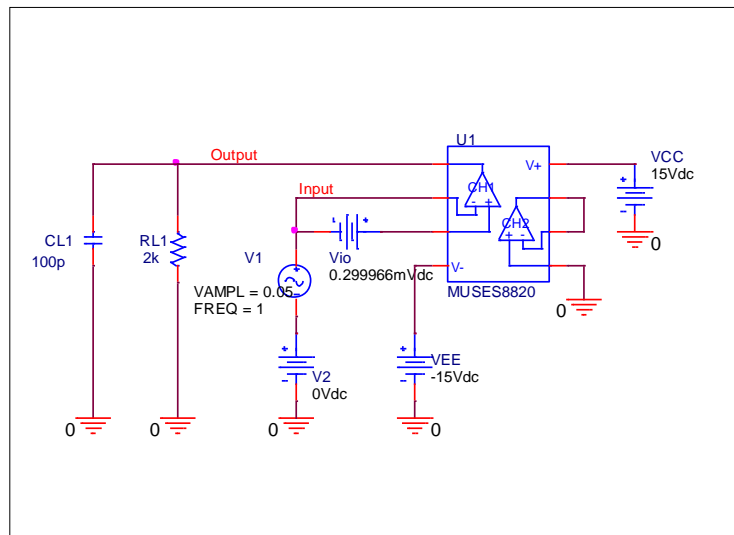| Parameter	Measurement	Simulation	%Error
AV (db)	110.000	109.914	-0.08

Common-mode rejection voltage gain

Simulation result
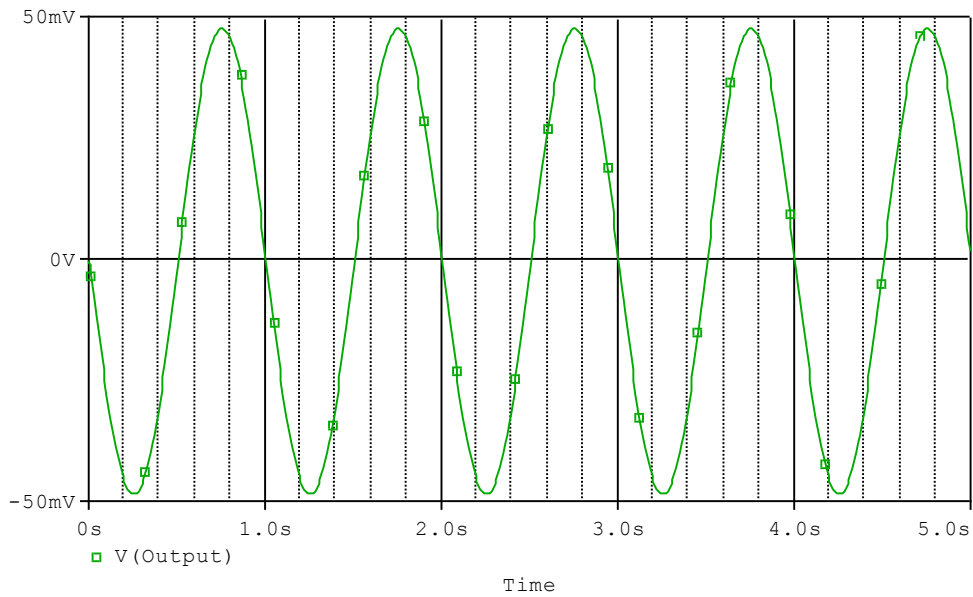
Evaluation circuit

Comparison table

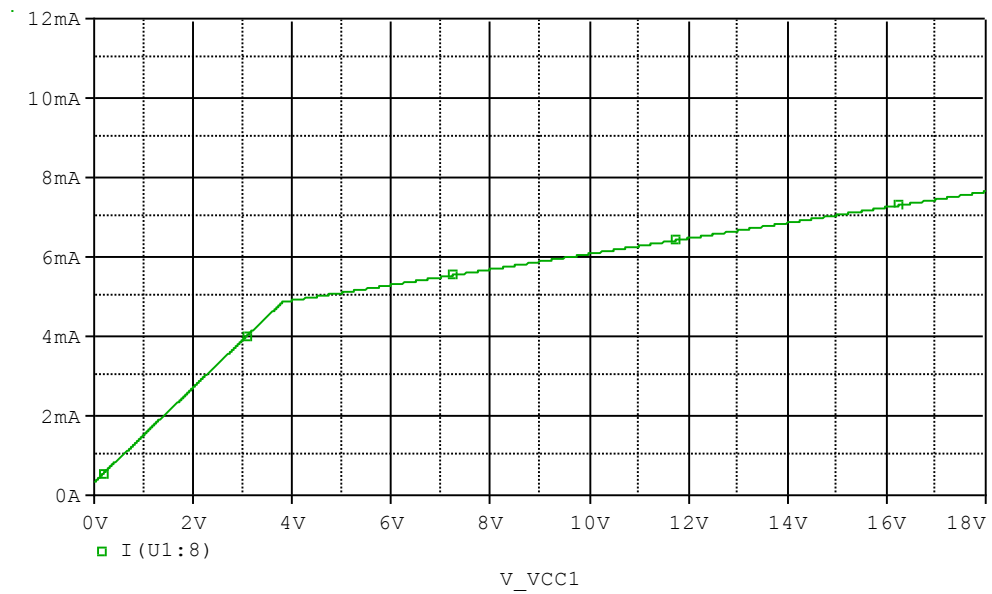Common mode gain = 0.961 V/V

CMRR = $20*\log_{10}(316627/0.961)$ = 110.356

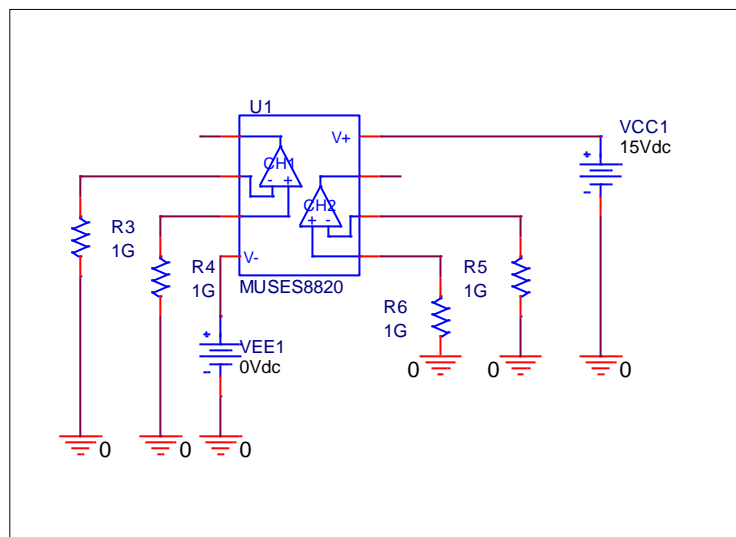| Parameter	Measurement	Simulation	%Error
CMRR(dB)	110.000	110.356	0.32

Supply Current

Evaluation circuit

Comparison table

Parameter	Measurement	Simulation	%Error
ICC (mA)	7.600	7.641	0.54

Power supply rejection ration

db(v(in)/v(out))

Frequency
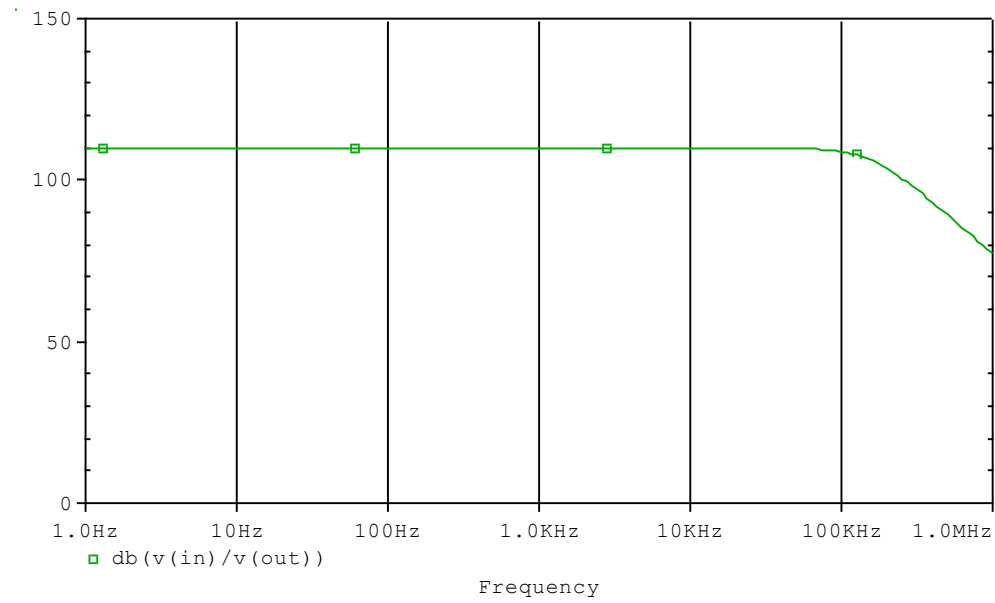
Evaluation circuit
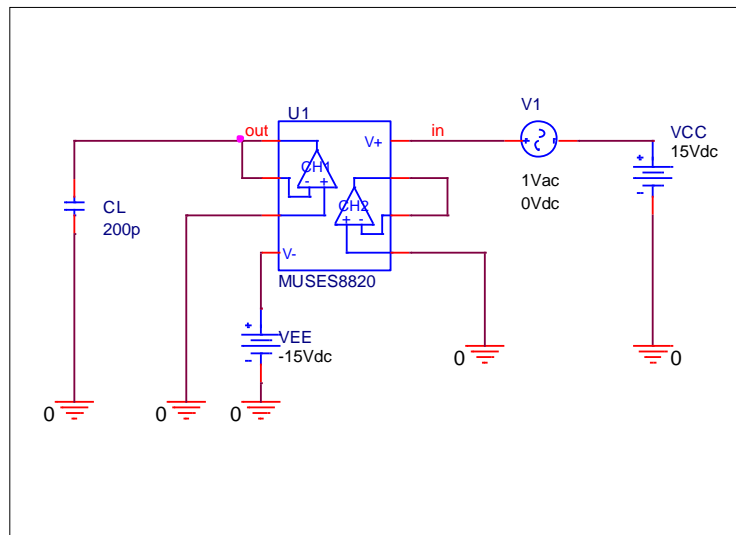
Comparison table

Parameter	Measurement	Simulation	%Error
PSRR (dB)	110.000	109.992	-0.01

Input common-mode voltage range

V(OUT)

V_VIN
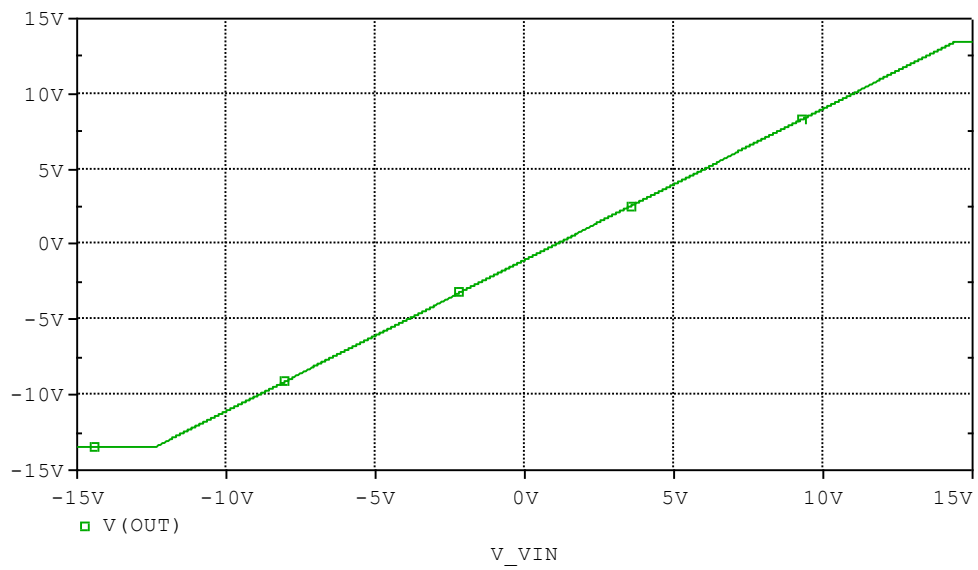
Evaluation circuit
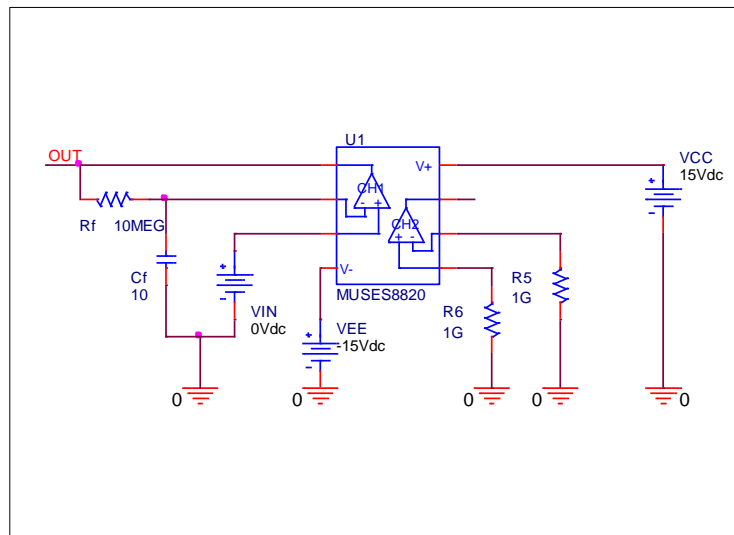
Comparison table

Parameter	Measurement	Simulation	%Error
Vicm (V)	27.000	27.153	0.57

Gain Bandwidth Product

Simulation result
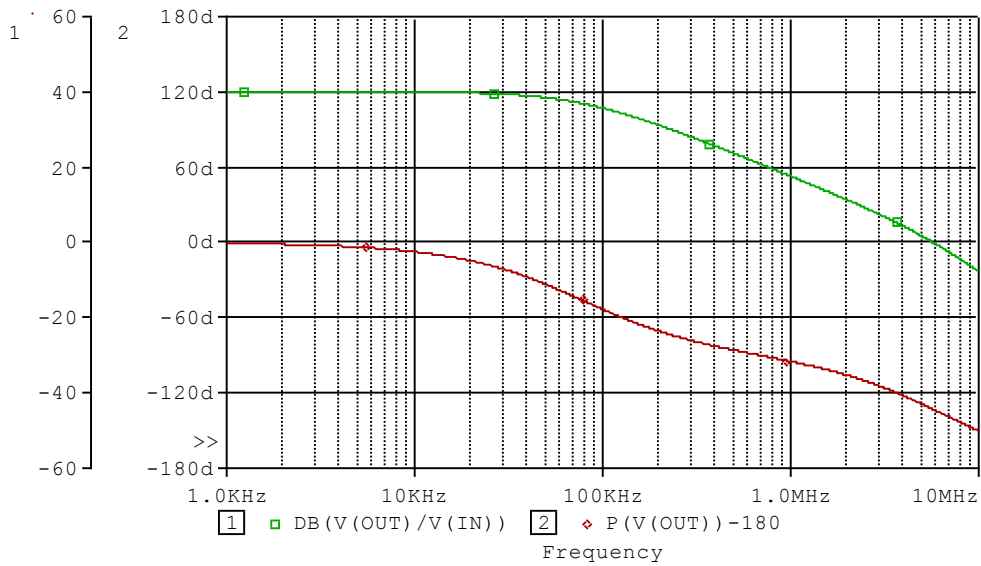
Evaluation circuit
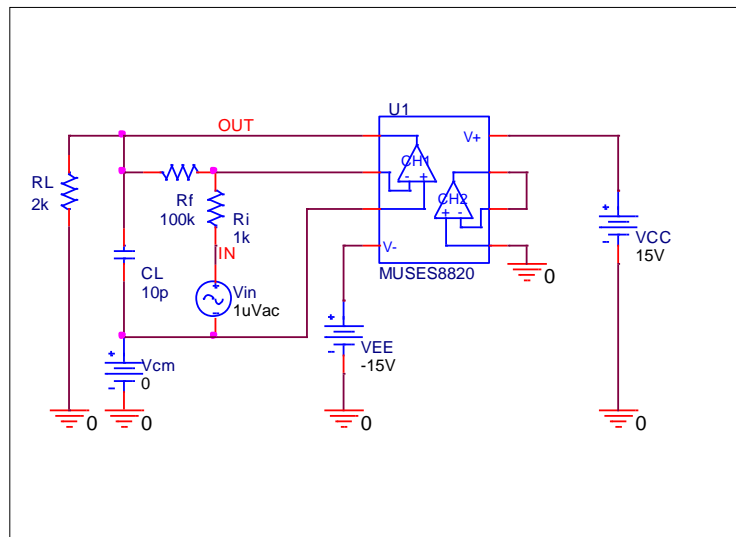
Comparison table

VCC=15[V], VEE=-15[V], Av=40[dB]

Parameter	Measurement	Simulation	%Error
Ft (MHz)	5.800	5.711	-1.54
Phase margin θ (°)	48.000	46.969	-2.15