

# Device Modeling Report

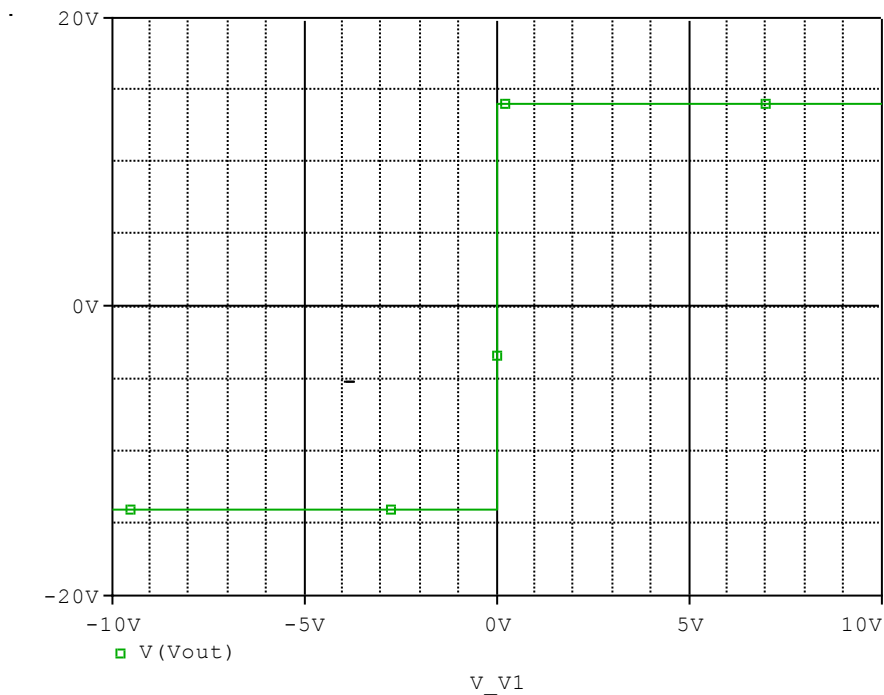
COMPONENTS: OPERATIONAL AMPLIFIER  
PART NUMBER: NJM2058  
MANUFACTURER: NEW JAPAN RADIO CO., LTD



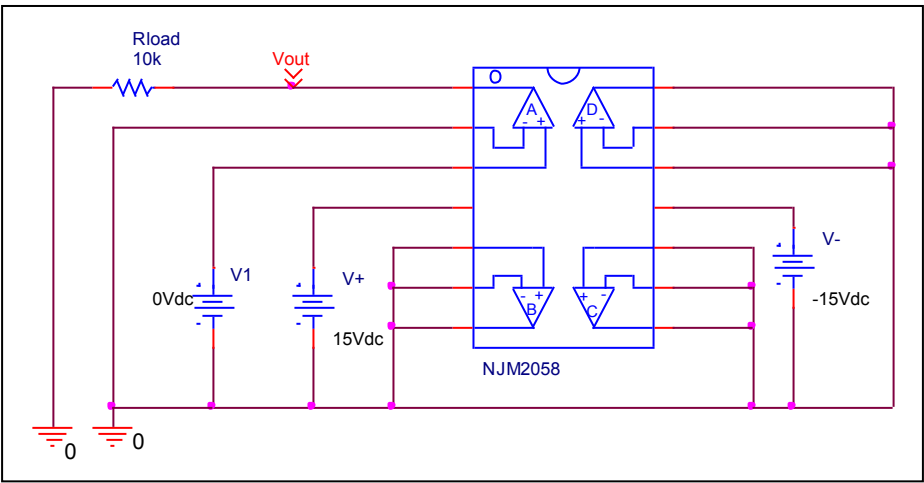
Bee Technologies Inc.

# Output Voltage Swing

## Simulation result



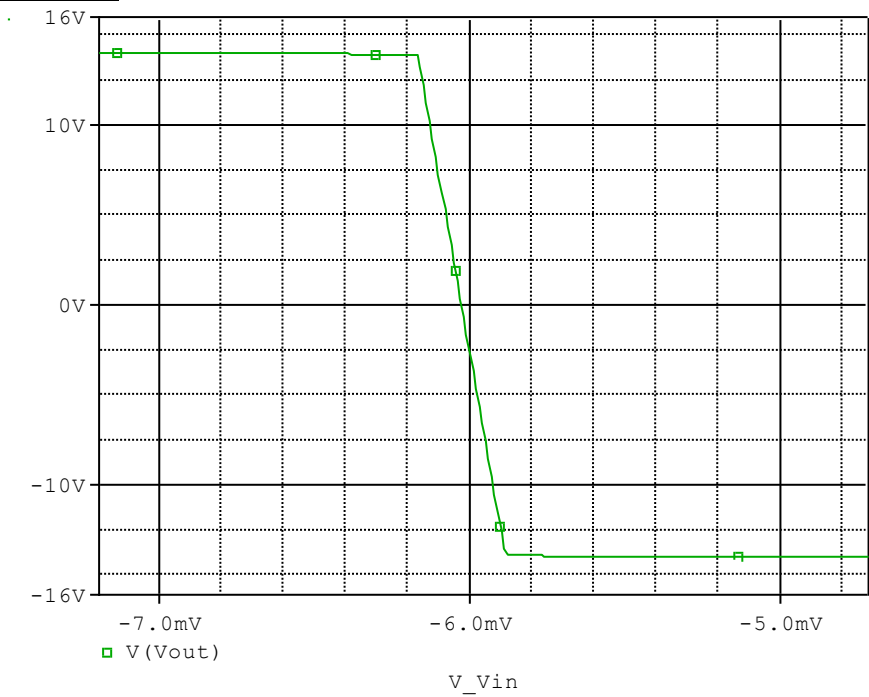
## Evaluation circuit



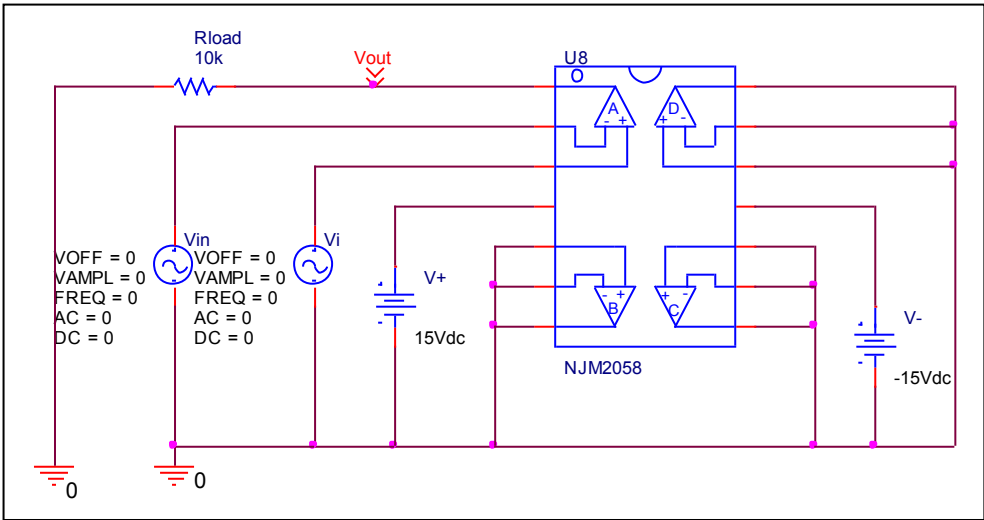
| Output Voltage Swing | Data sheet | Simulation | %Error |
|----------------------|------------|------------|--------|
| + $V_{out}(V)$       | +14.000    | 13.995     | 0.035  |
| - $V_{out}(V)$       | -14.000    | -13.995    | 0.035  |

# Input Offset Voltage

## Simulation result



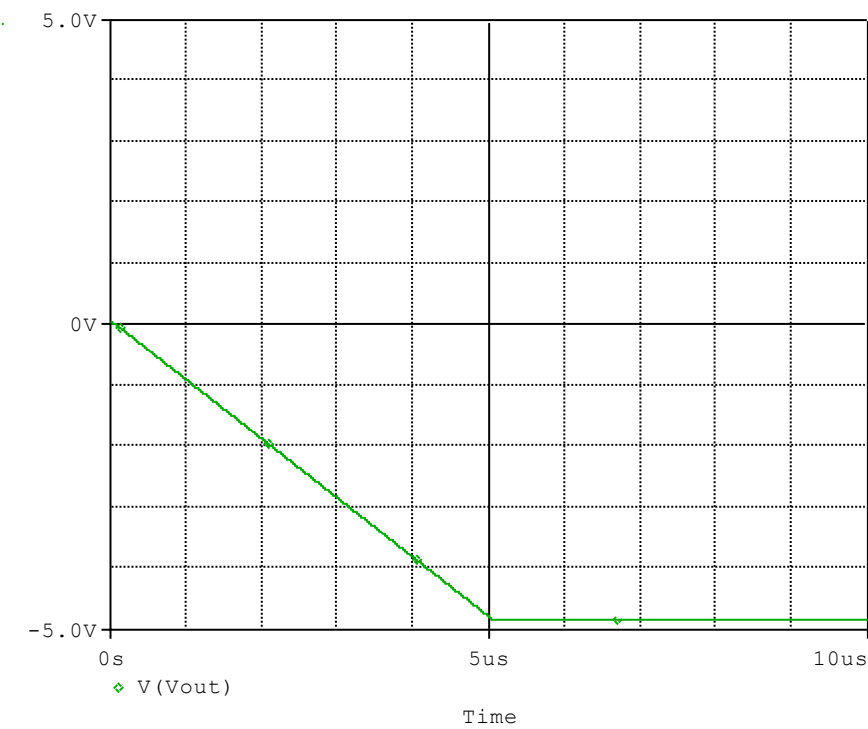
## Evaluation circuit



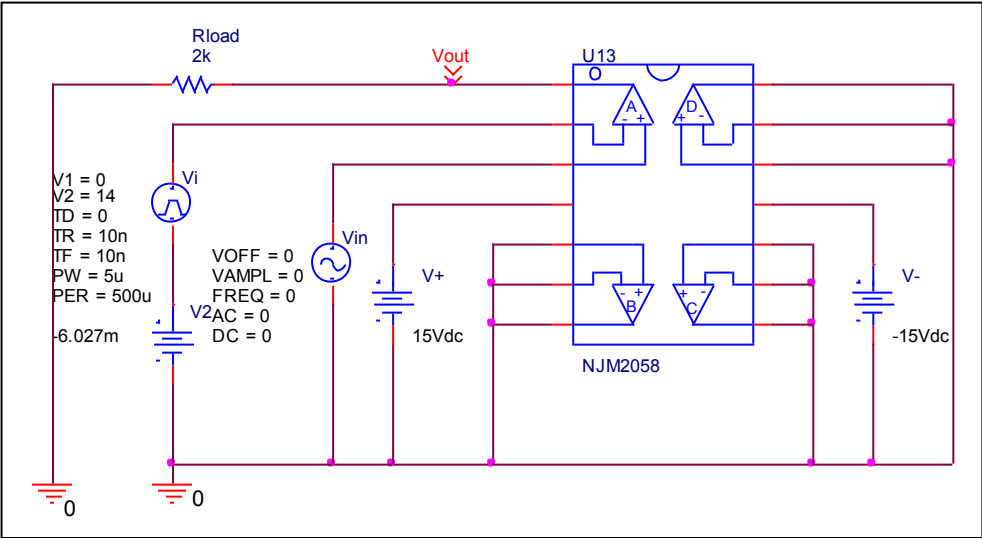
| Vos | Measurement |    | Simulation |    | Error |   |
|-----|-------------|----|------------|----|-------|---|
|     | 6           | mV | 6.027      | mV | 0.45  | % |

# Slew Rate

## Simulation result



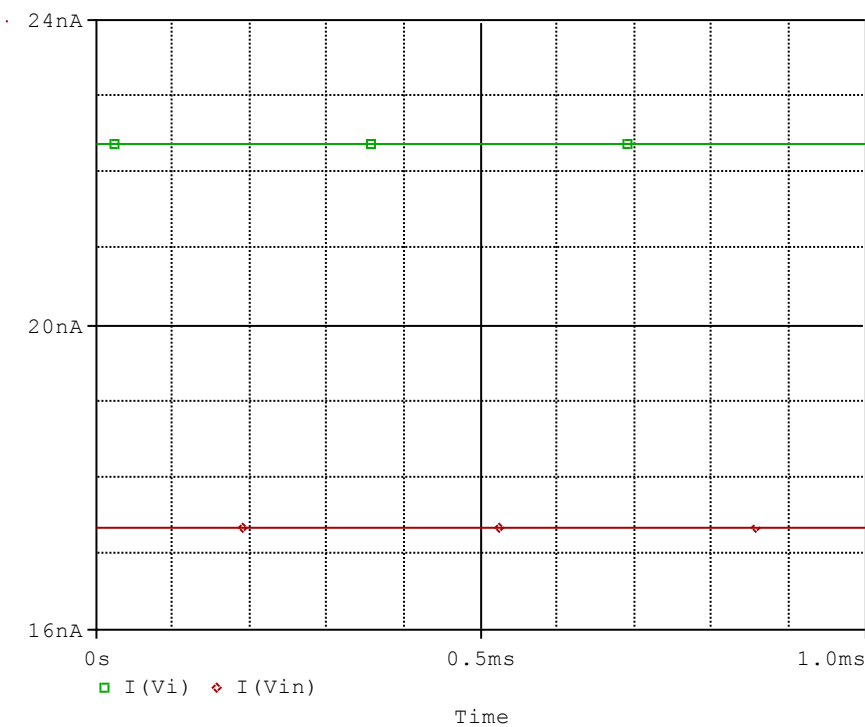
## Evaluation circuit



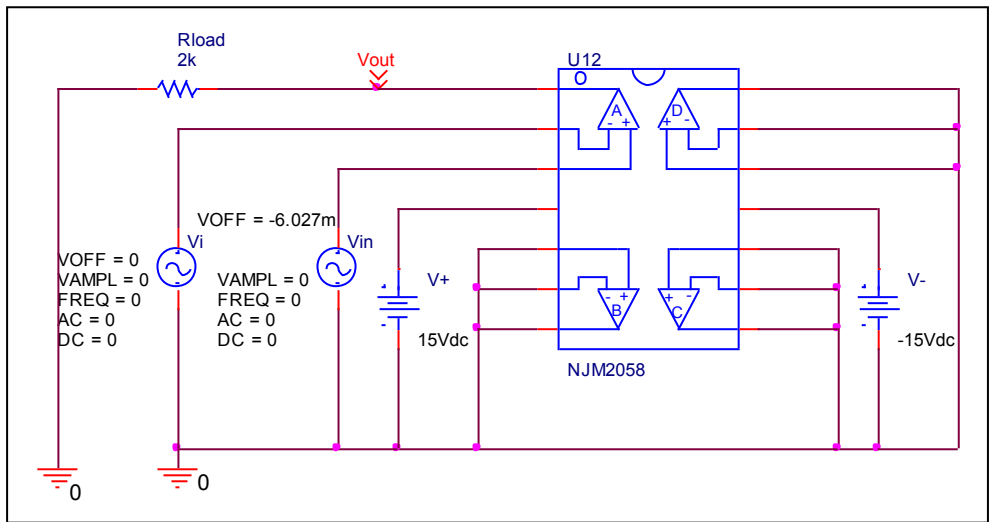
| Slew Rate(v/us) | Data sheet | Simulation | %Error |
|-----------------|------------|------------|--------|
|                 | 1.000      | 0.973      | 2.700  |

# Input current

## Simulation result



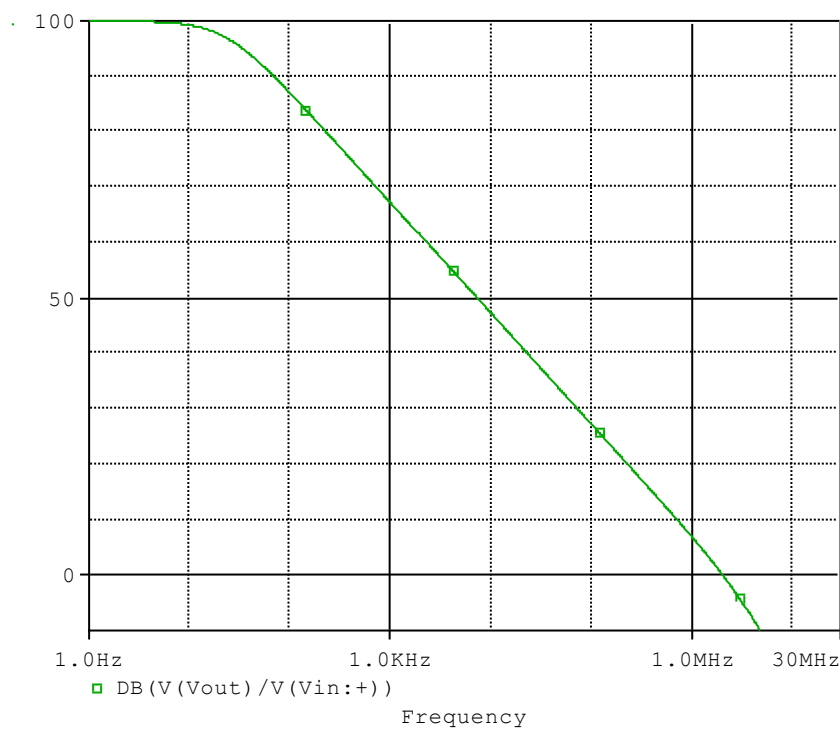
## Evaluation circuit



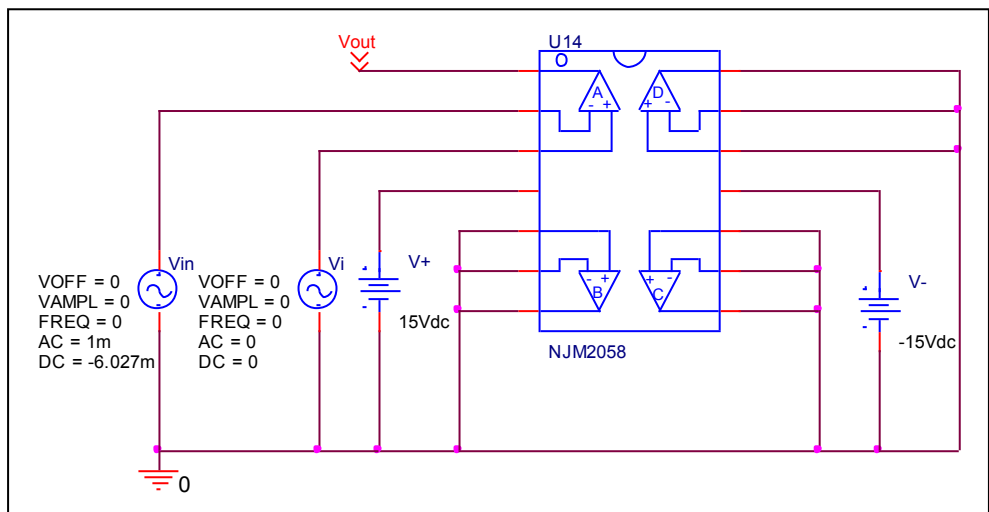
|          | Data sheet | Simulation | %Error |
|----------|------------|------------|--------|
| Ib(nA)   | 20.000     | 19.835     | 0.825  |
| Ibos(nA) | 5.000      | 5.033      | 0.660  |

# Open Loop Voltage Gain vs. Frequency

## Simulation result



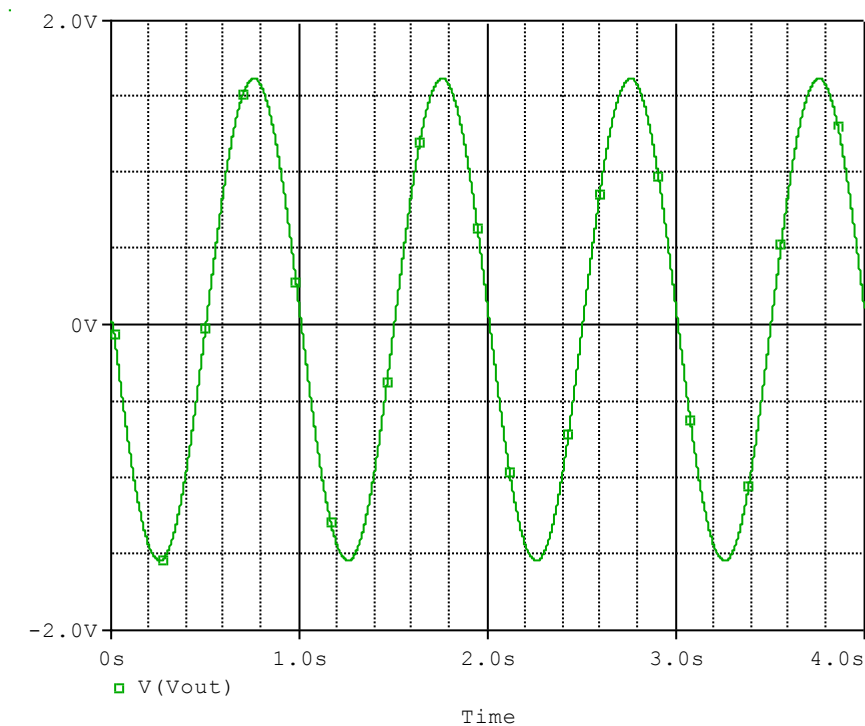
## Evaluation circuit



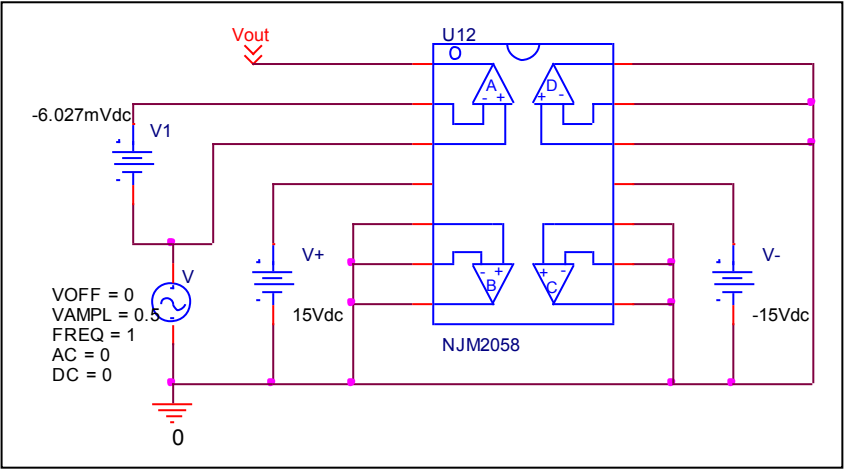
|            | Data sheet | Simulation | %Error |
|------------|------------|------------|--------|
| f-0dB(MHz) | 2.000      | 2.045      | 2.250  |
| Av-dc(dB)  | 100.000    | 99.972     | 0.028  |

# Common-Mode Rejection Voltage gain

## Simulation result



## Evaluation circuit



Common Mode Reject Ratio= $99678/3.162=31523$

| CMRR(dB) | Data sheet | Simulation | %Error |
|----------|------------|------------|--------|
|          | 90.000     | 89.972     | 0.031  |