

ULTRA HIGH SPEED SINGLE OPERATIONAL AMPLIFIER

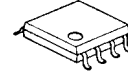
■ GENERAL DESCRIPTION

The **NJM2712** is an ultra high speed dual operational amplifier.

It can swings 260V/μs high slew rate and 1GHz gain band width product(10MHz typ. at 40dB) at ±2.5V.

It is suitable for pickup circuit of CD-R/RW or DVD-R/RW, wideband video system, high resolution scanner or FAX, high speed telecommunications, and any other high speed signal processing system.

■ PACKAGR OUTLINE



NJM2712M



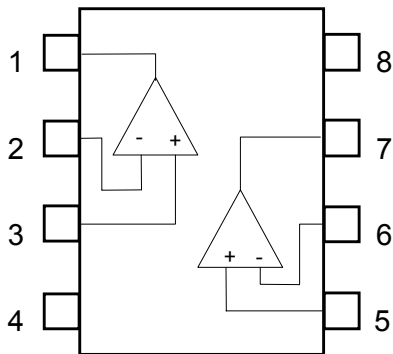
NJU2712RB1

■ FEATURES

- Operating Voltage (±2.0 to ±4.5V)
- Operating Current (3.8mA typ. at $V^+/V^- = \pm 2.5V$)
- High Slew Rate (260V/μs typ.)
- Gain Bandwidth Product (1GHz typ.)
- Bandwidth (10MHz typ. at 40dB)
- Unity Gain Bandwidth (180MHz typ.)
- Input Offset Voltage (7mV max.)
- Maximum Output Voltage (±1.5V typ. at $R_L = 1k\Omega$)
- Open Loop Voltage Gain (75dB typ.)
- Bipolar Technology
- Package Outline DMP8, TVSP8

■ PIN CONFIGURATION

NJM2712M
NJM2712RB1
(Top View)



PIN FUNCTION

- 1. OUTPUT1
- 2. -INPUT1
- 3. +INPUT1
- 4. V^-
- 5. +INPUT2
- 6. -INPUT2
- 7. OUTPUT2
- 8. V^+

NJM2712

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

| PARAMETER | SYMBOL | RATINGS | UNIT |
|-----------------------------|------------------|-------------|------|
| Supply Voltage | V ⁺ | 10 | V |
| Differential Input Voltage | V _{ID} | ±2 | V |
| Power Dissipation | P _D | 200 | mW |
| Operating Temperature Range | T _{opr} | -40 to +85 | °C |
| Storage Temperature Range | T _{stg} | -50 to +150 | °C |

■ RECOMMENDED OPERATING CONDITION

(Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|-------------------------|--------------------------------|----------------|-----|-----|-----|------|
| Operating Voltage Range | V ⁺ /V ⁻ | | 2.0 | 2.5 | 4.5 | V |

■ DC CHARACTERISTICS

(V⁺/V⁻=±2.5V, Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|---------------------------------|------------------|---|------|------|-----|------|
| Operating Current | I _{CC} | No Signal | - | 3.8 | 6.8 | mA |
| Input Offset Voltage | V _{IO} | | - | 2.0 | 7.0 | mV |
| Input Bias Current | I _B | | - | 2 | 7 | μA |
| Input Offset Current | I _{IO} | | - | 350 | 900 | nA |
| Open Loop Voltage Gain | A _v | R _L =2kΩ | 65 | 75 | - | dB |
| Input Common Mode Voltage Range | V _{ICM} | | ±1.3 | ±1.5 | - | V |
| Common Mode Rejection | CMR | -1V ≤ V _{CM} ≤ +1V | 50 | 60 | - | dB |
| Supply Voltage Rejection | +SVR | 2.5V ≤ V ⁺ ≤ 5V, R _L =2kΩ | 50 | 60 | - | dB |
| | -SVR | -5V ≤ V ⁻ ≤ -2.5V, R _L =2kΩ | 50 | 60 | - | dB |
| Maximum Output Voltage | V _{OM} | R _L =1kΩ | ±1.2 | ±1.5 | - | V |

■ AC CHARACTERISTICS

(V⁺/V⁻=±2.5V, Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|--------------------------------|-----------------|--|-----|-----|-----|--------|
| Bandwidth | BW | A _v =40dB, R _f =1.98kΩ, R _L =∞ C _L =10pF | - | 10 | - | MHz |
| Unity Gain Bandwidth | f _T | A _v =40dB, R _g =20Ω, R _f =1.98kΩ R _L =∞, C _L =10pF | - | 180 | - | MHz |
| Phase Margin | φ _M | A _v =40dB, R _g =20Ω, R _f =1.98kΩ R _L =∞, C _L =10pF | - | 38 | - | deg |
| Equivalent Input Noise Voltage | V _{NI} | | - | 6.8 | - | nV/√Hz |

■ TRANSIENT CHARACTERISTICS

(V⁺/V⁻=±2.5V, Ta=25°C)

| PARAMETER | SYMBOL | TEST CONDITION | MIN | TYP | MAX | UNIT |
|-----------|--------|---|-----|-----|-----|------|
| Slew Rate | +SR | A _v =6dB, R _f =1kΩ, R _g =1kΩ | - | 260 | - | V/μs |
| | -SR | R _L =∞, C _L =10pF | - | 260 | - | V/μs |

■ Note:

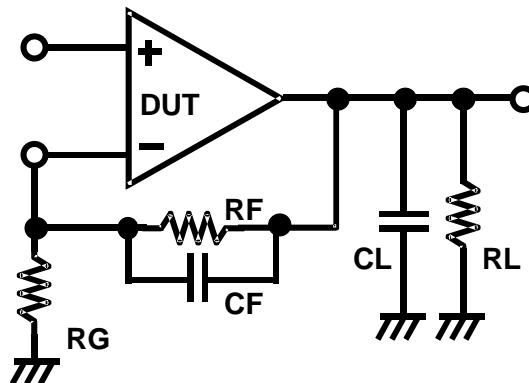
non-inverting amplifier

1. The closed gain should be 6dB or higher to prevent the oscillation.
Unity gain follower application may cause the oscillation.
2. When the closed gain is lower than 20dB, use a compensation capacitor (CF: about 5pF), parallel with the feedback resistor RF to avoid oscillation.
3. Recommended feedback resistor is less than 2k-ohm to keep the flatness of the frequency response.
4. Minimize the load capacitor for the better performance.
A large load capacitor CL reduces the frequency response and causes oscillation or ringing.

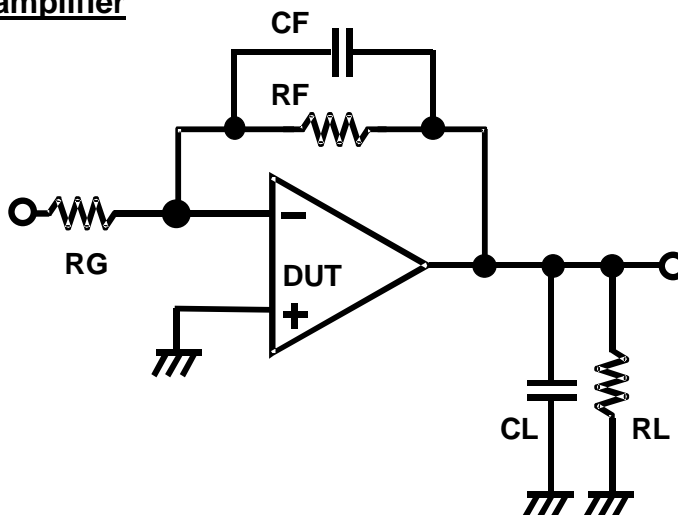
inverting amplifier

1. When the closed gain is lower than 20dB, use a compensation capacitor (CF; recommended from 1pF to 5pF), parallel with the feedback resistor RF to avoid oscillation.
2. Minimize the feedback resistor to keep the frequency response and the slew rate.
(recommended about 1k-ohm)
The proper compensation capacitor CF can counteract oscillation even with a large feedback resistor RF.
3. Total load capacitance should be not more than 100pF.
The oscillation margin may be affected by the total load capacitance.

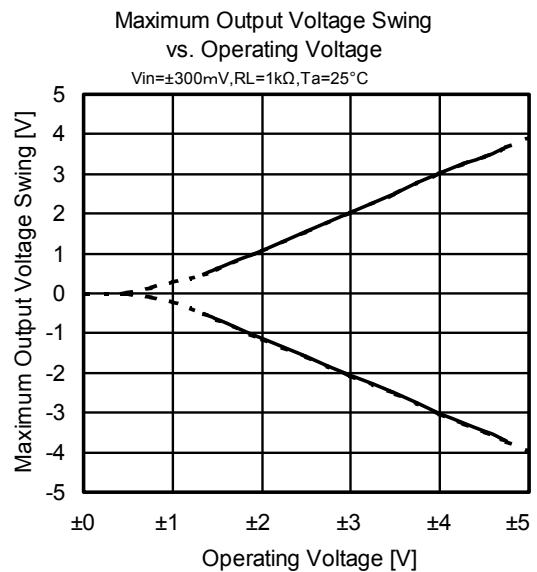
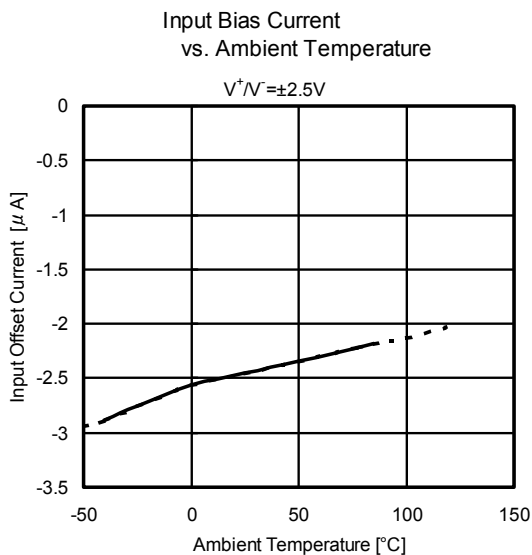
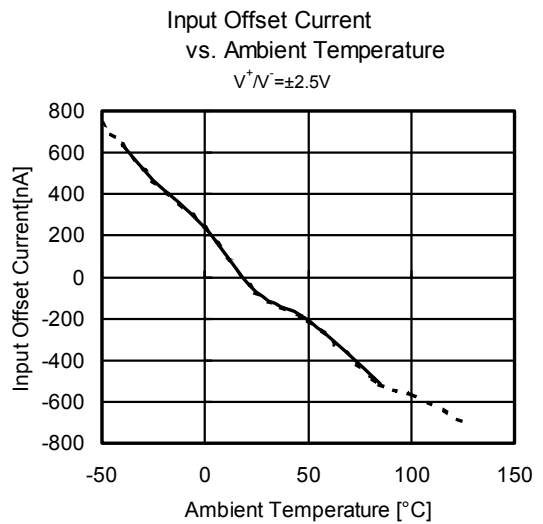
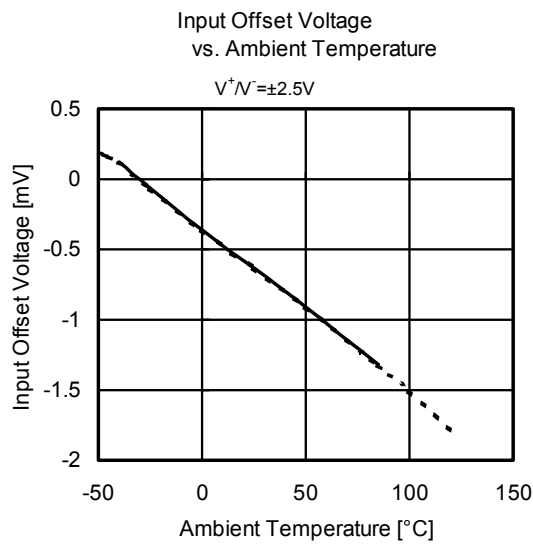
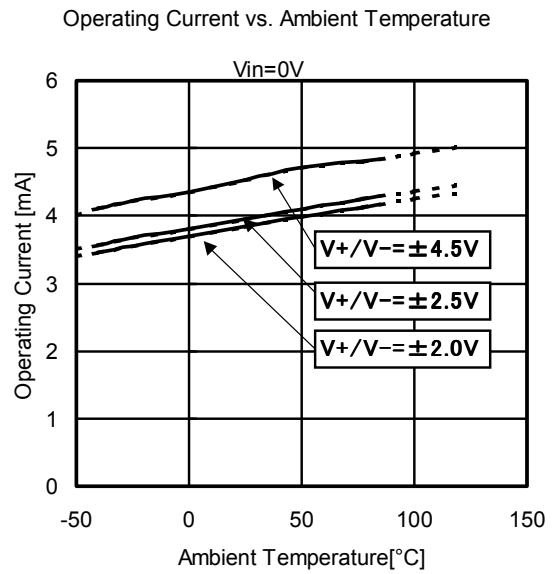
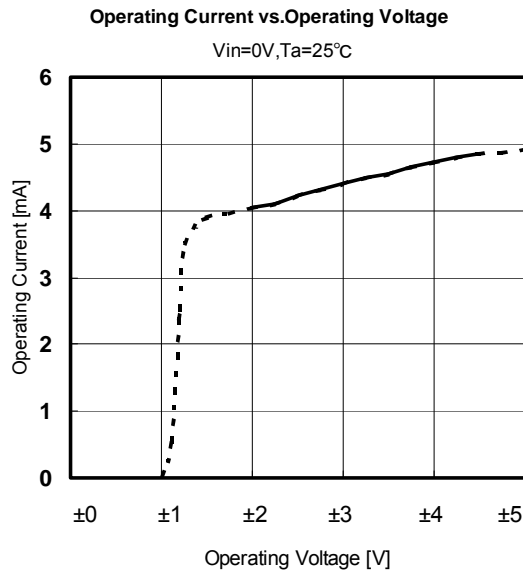
non-inverting amplifier

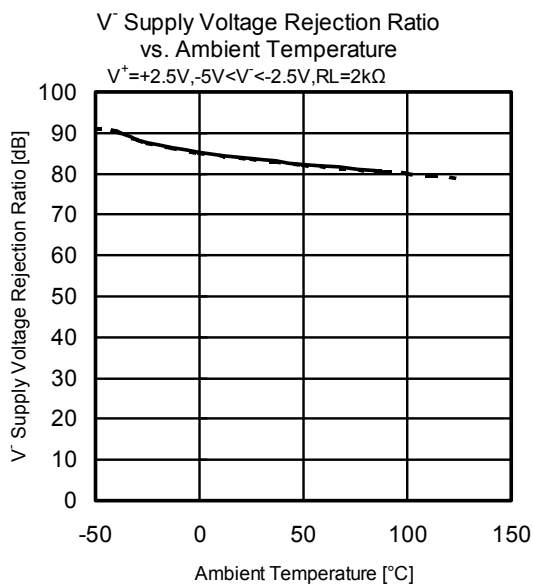
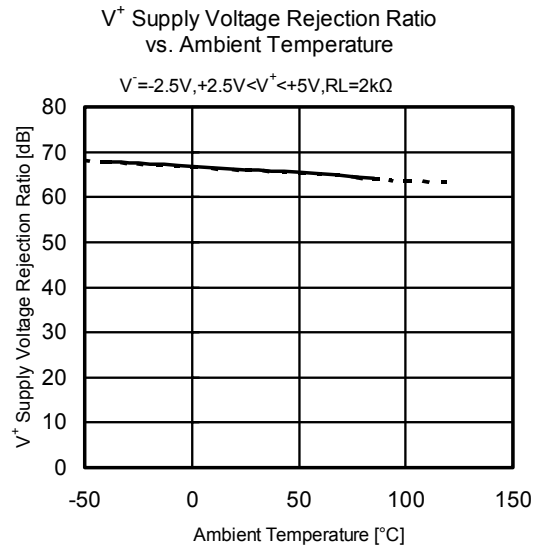
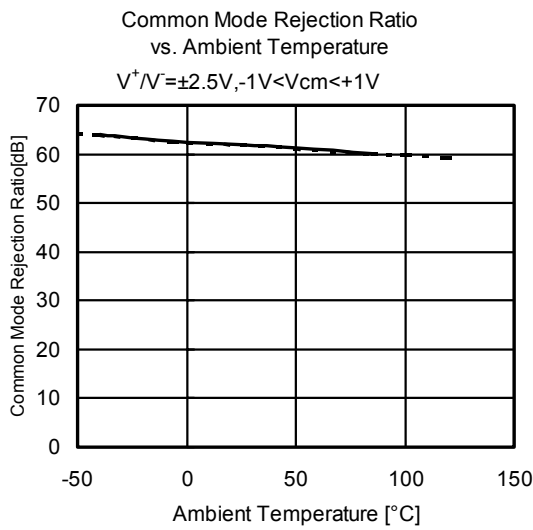
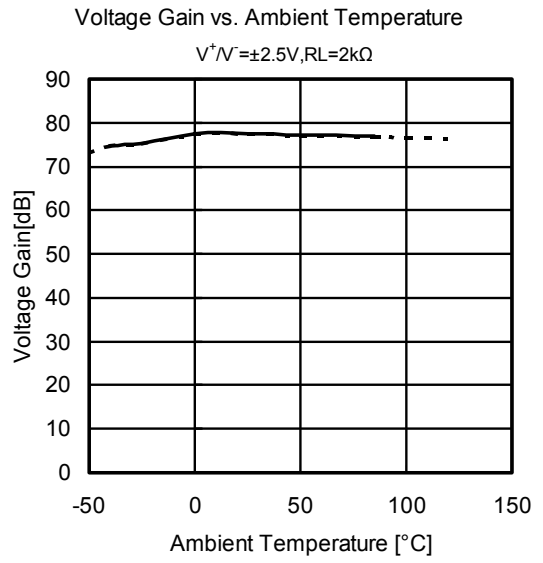
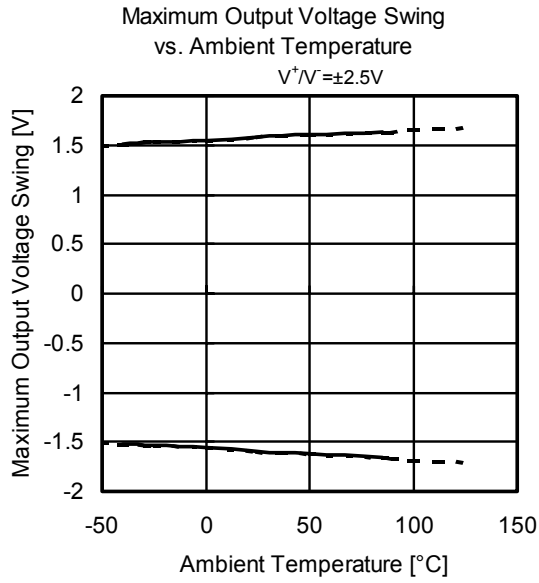


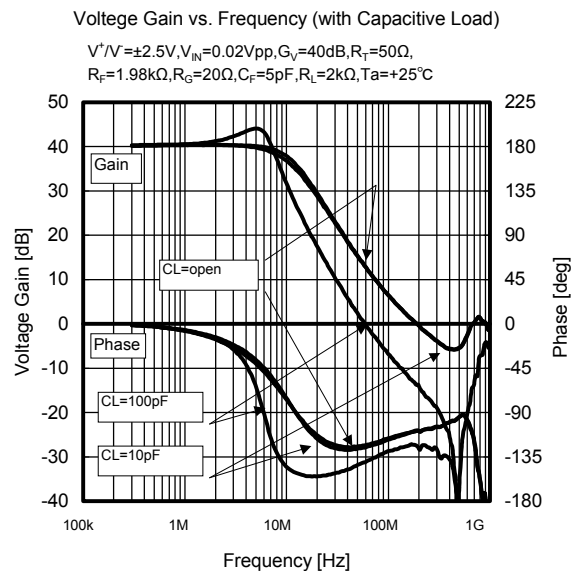
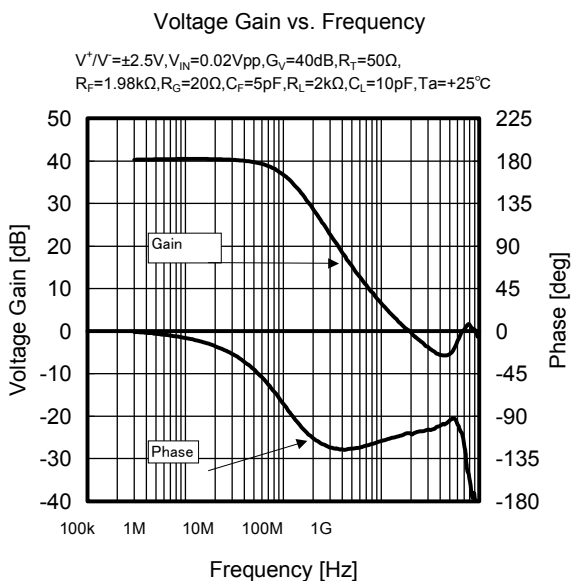
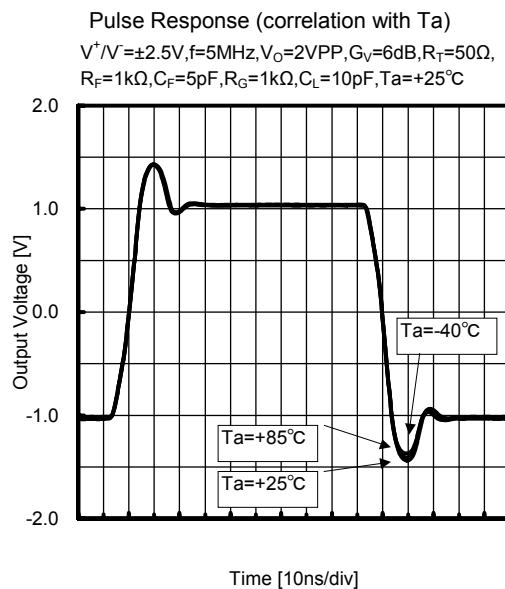
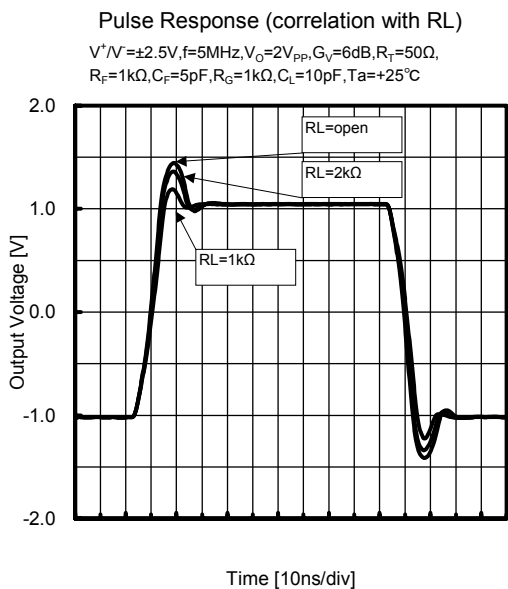
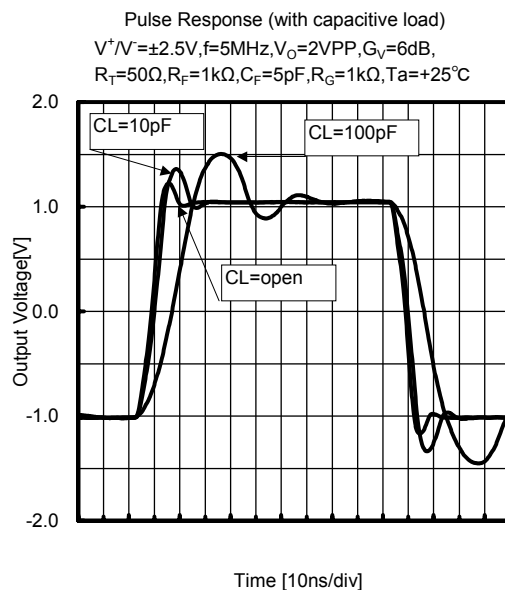
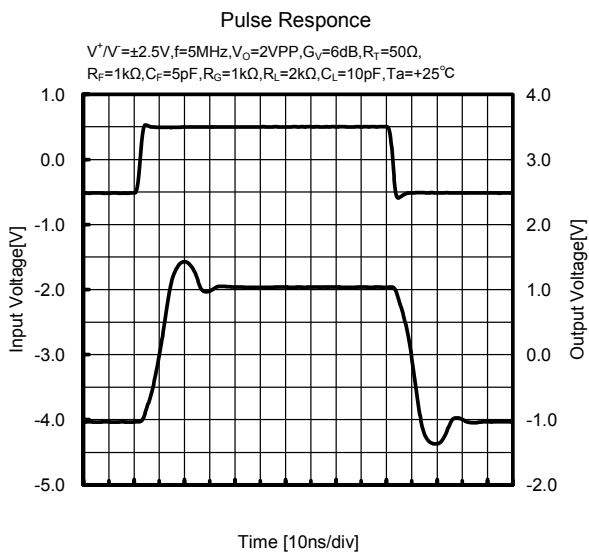
inverting amplifier

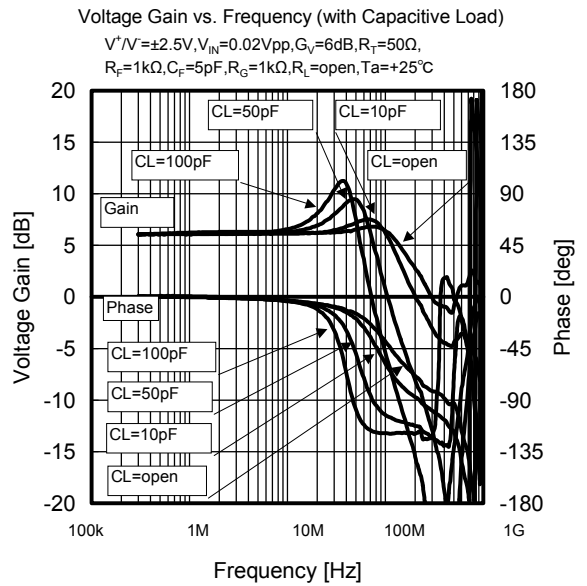
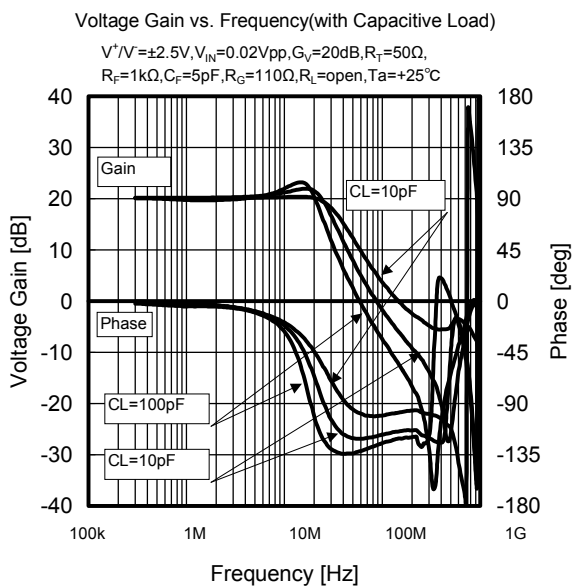
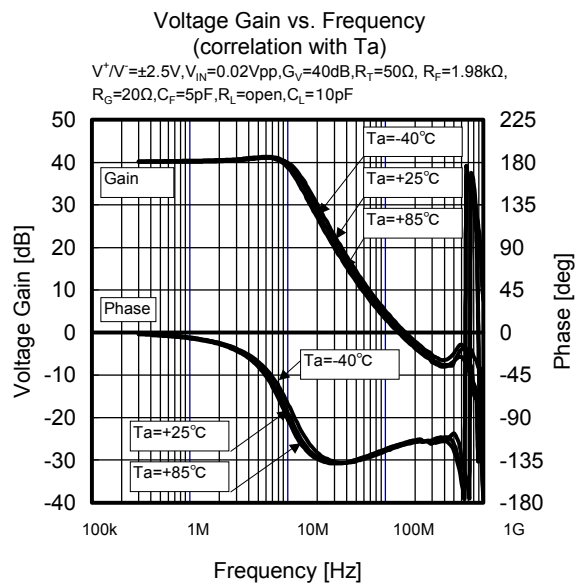
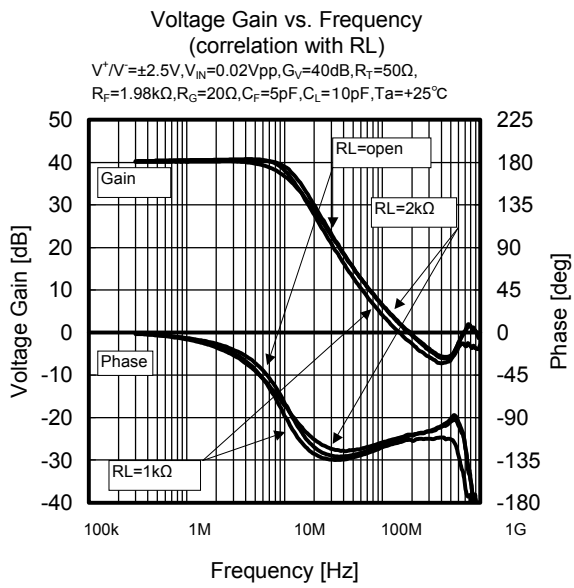


TYPICAL CHARACTERISTICS

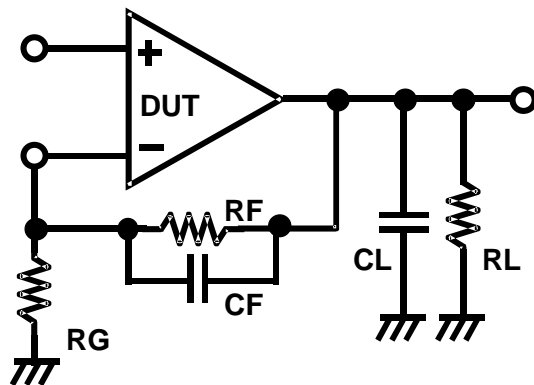








MEASUREMENT CIRCUIT



[CAUTION]
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