

ULTRA HIGH SPEED SINGLE OPERATIONAL AMPLIFIER

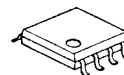
■ GENERAL DESCRIPTION

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

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

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



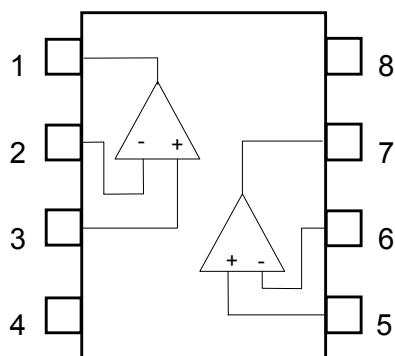
NJU2712RB1

■ FEATURES

- Operating Voltage (± 2.0 to ± 4.5 V)
- Operating Current (3.8mA typ. at $V^+/V^- = \pm 2.5$ V)
- High Slew Rate (260V/ μ s typ.)
- Gain Bandwidth Product (1GHz typ.)
- Bandwidth (10MHz typ. at 40dB)
- Unity Gain Bandwidth (180MHz typ.)
- Input Offset Voltage (7mV max.)
- Maximum Output Voltage (± 1.5 V 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^+

■ 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

($V^+/V^- = \pm 2.5V$, 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	$R_L = 2k\Omega$	65	75	-	dB
Input Common Mode Voltage Range	V_{ICM}		± 1.3	± 1.5	-	V
Common Mode Rejection	CMR	$-1V \leq V_{CM} \leq +1V$	50	60	-	dB
Supply Voltage Rejection	+SVR	$2.5V \leq V^+ \leq 5V$, $R_L = 2k\Omega$	50	60	-	dB
	-SVR	$-5V \leq V^- \leq -2.5V$, $R_L = 2k\Omega$	50	60	-	dB
Maximum Output Voltage	V_{OM}	$R_L = 1k\Omega$	± 1.2	± 1.5	-	V

■ AC CHARACTERISTICS

($V^+/V^- = \pm 2.5V$, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Bandwidth	BW	$A_v = 40dB$, $R_f = 1.98k\Omega$, $R_L = \infty$, $C_L = 10pF$	-	10	-	MHz
Unity Gain Bandwidth	f_T	$A_v = 40dB$, $R_g = 20\Omega$, $R_f = 1.98k\Omega$, $R_L = \infty$, $C_L = 10pF$	-	180	-	MHz
Phase Margin	ϕ_M	$A_v = 40dB$, $R_g = 20\Omega$, $R_f = 1.98k\Omega$, $R_L = \infty$, $C_L = 10pF$	-	38	-	deg
Equivalent Input Noise Voltage	V_{NI}		-	6.8	-	nV/ $\sqrt{Hz}$

■ TRANSIENT CHARACTERISTICS

($V^+/V^- = \pm 2.5V$, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	+SR	$A_v = 6dB$, $R_f = 1k\Omega$, $R_g = 1k\Omega$	-	260	-	V/ μs
	-SR	$R_L = \infty$, $C_L = 10pF$	-	260	-	V/ μs

■ Note:

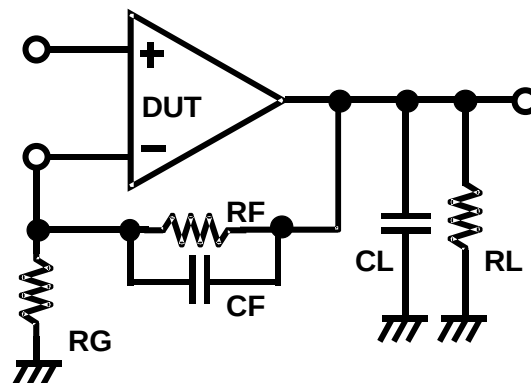
non-inverting amplifier

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 (C_F : about 5pF), parallel with the feedback resistor R_F 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 C_L reduces the frequency response and causes oscillation or ringing.

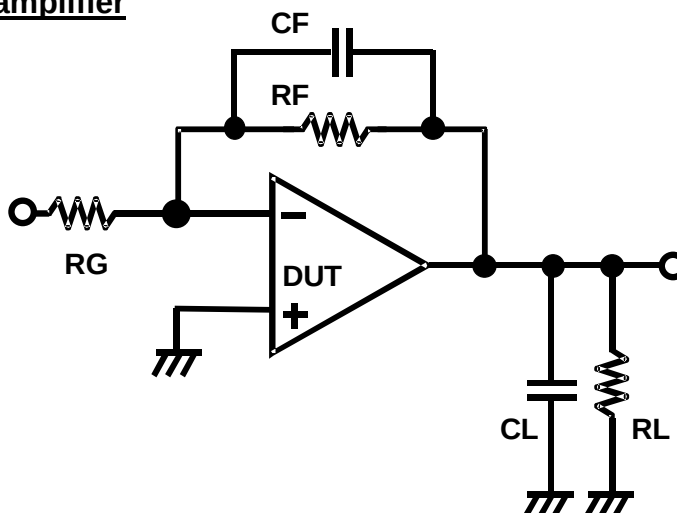
inverting amplifier

1. When the closed gain is lower than 20dB, use a compensation capacitor (C_F ; recommended from 1pF to 5pF), parallel with the feedback resistor R_F 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 C_F can counteract oscillation even with a large feedback resistor R_F .
3. Total load capacitance should be not more than 100pF.
The oscillation margin may be affected by the total load capacitance.

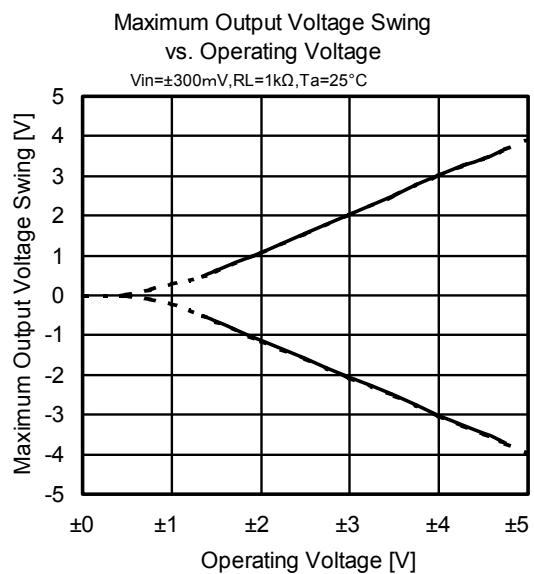
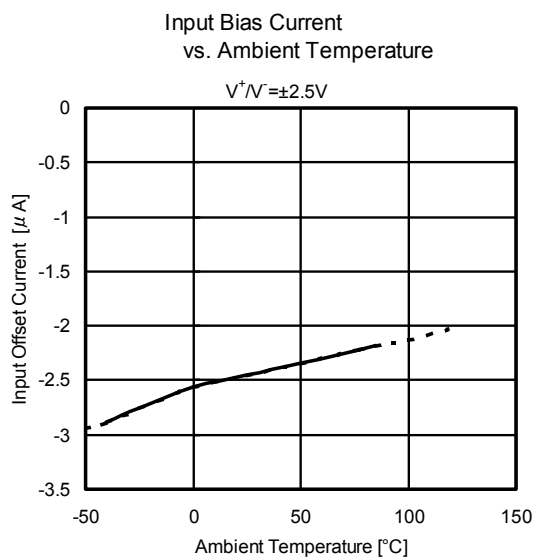
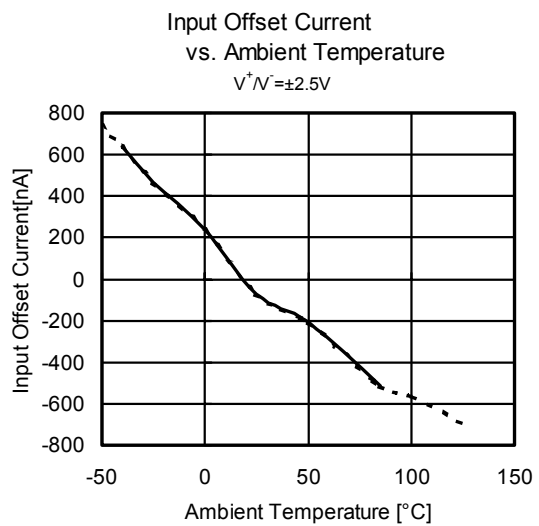
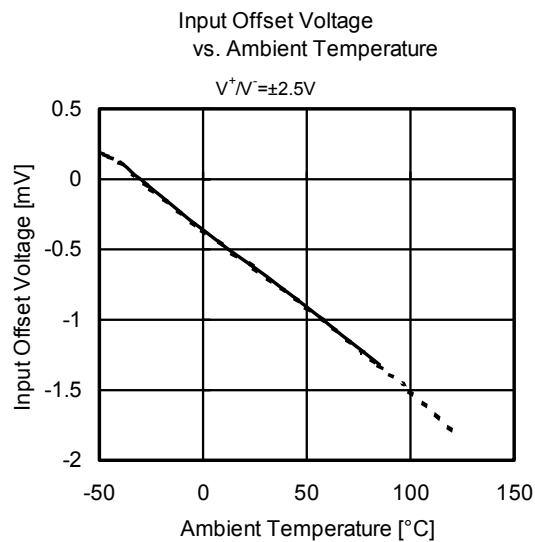
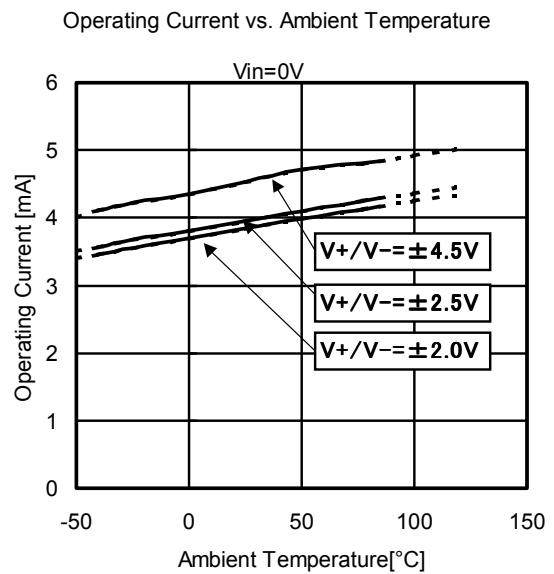
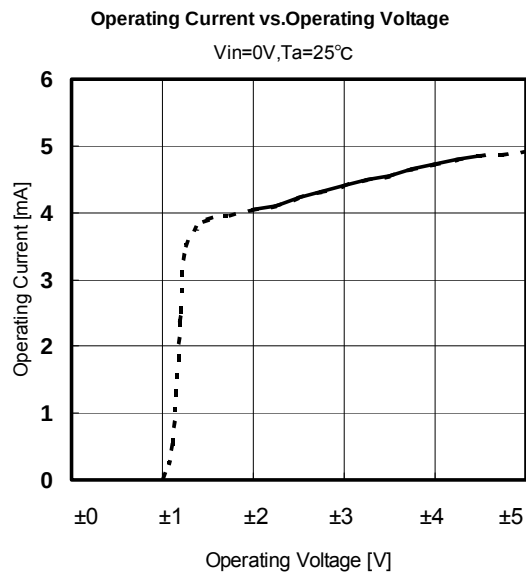
non-inverting amplifier

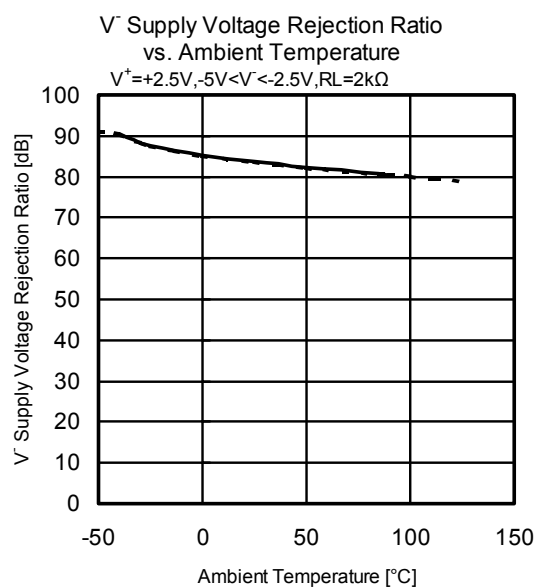
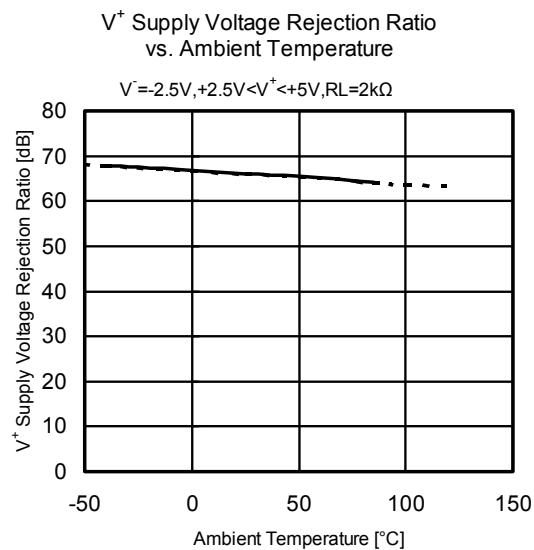
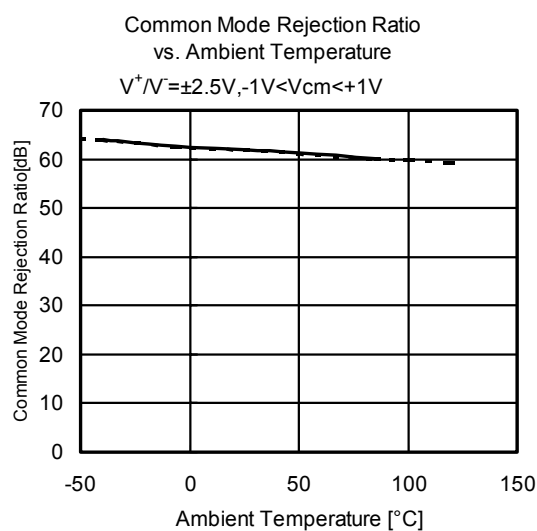
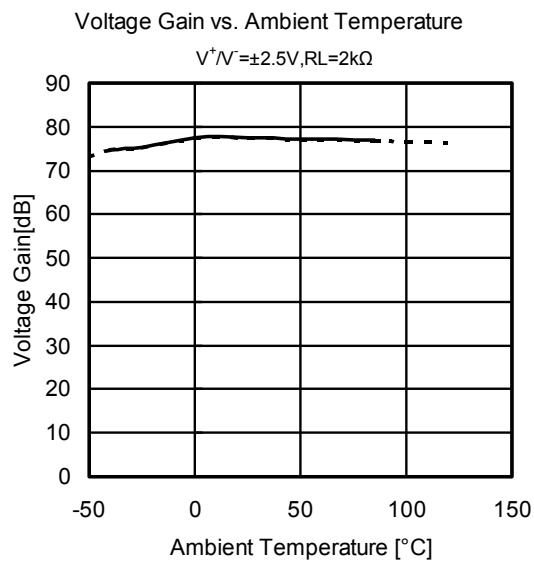
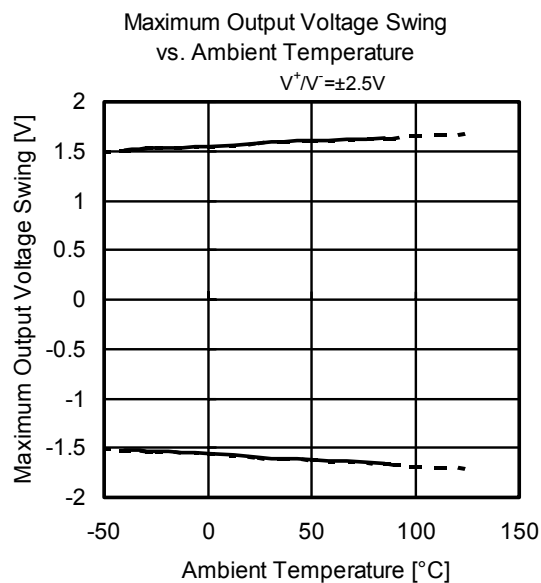


inverting amplifier

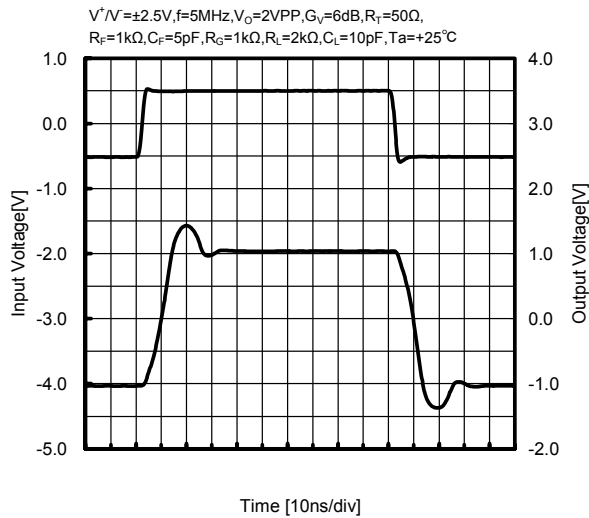


■ TYPICAL CHARACTERISTICS

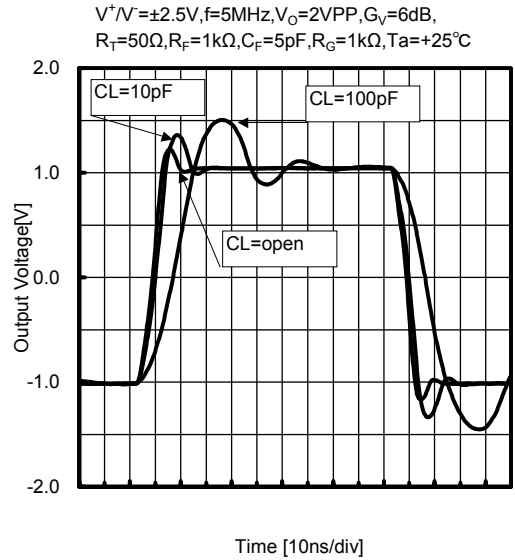




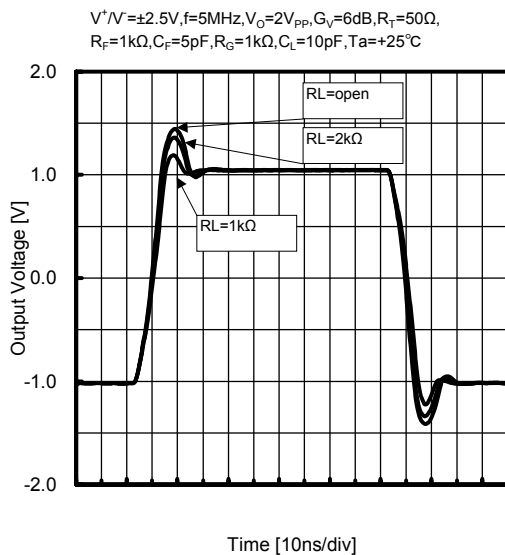
Pulse Response



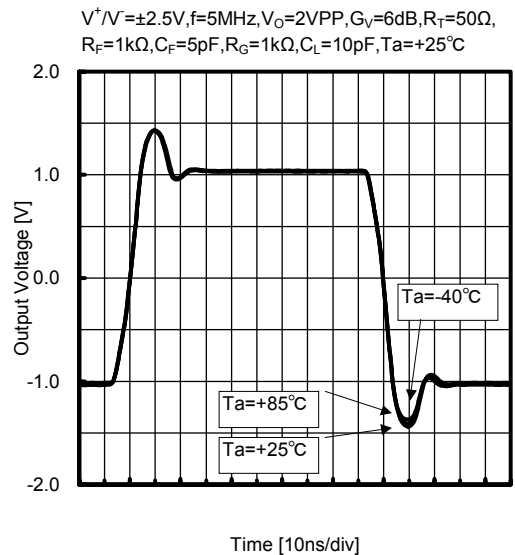
Pulse Response (with capacitive load)



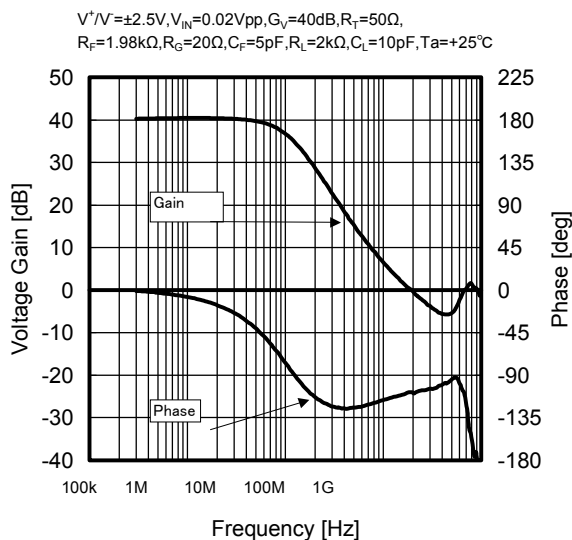
Pulse Response (correlation with R_L)



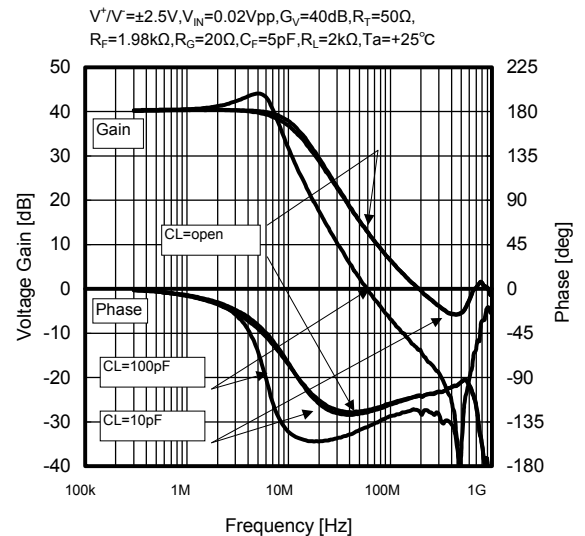
Pulse Response (correlation with T_a)

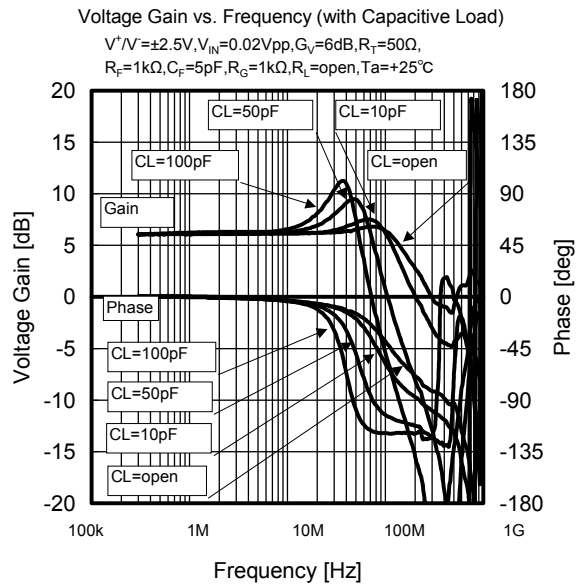
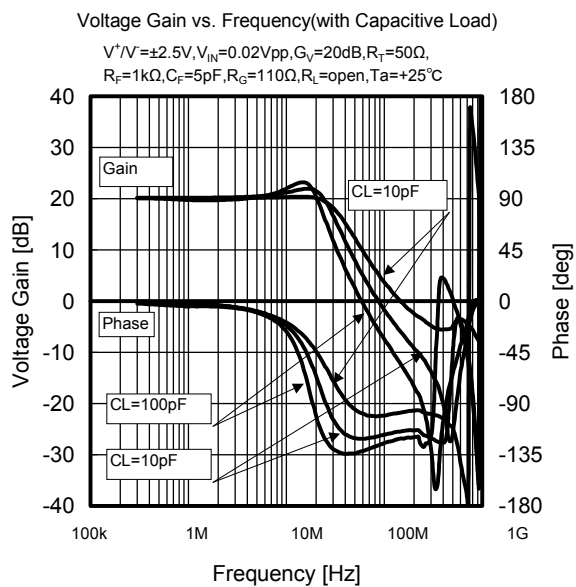
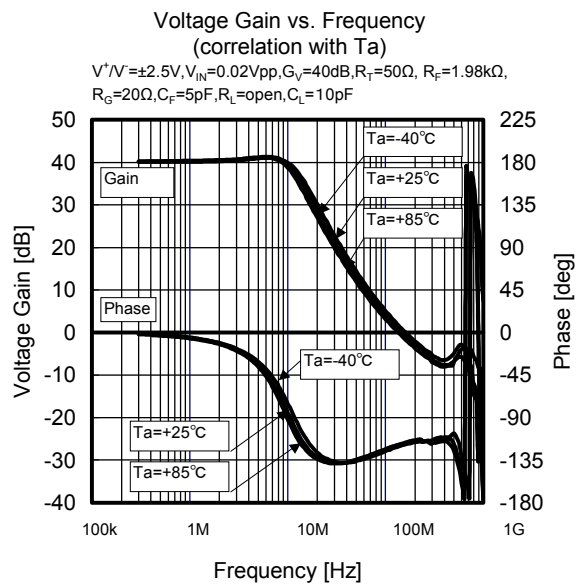
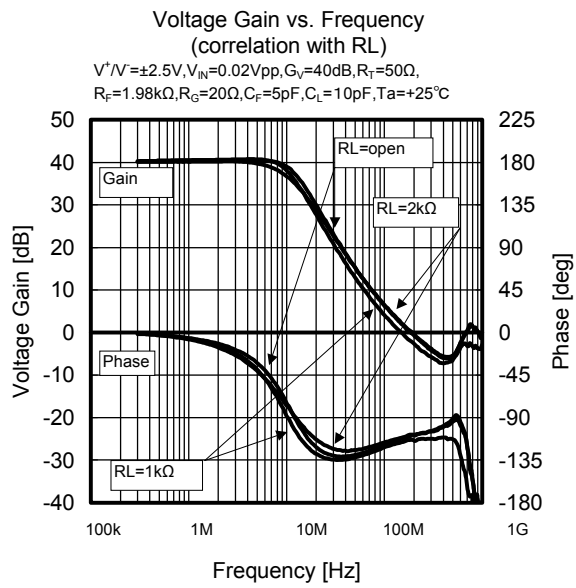


Voltage Gain vs. Frequency

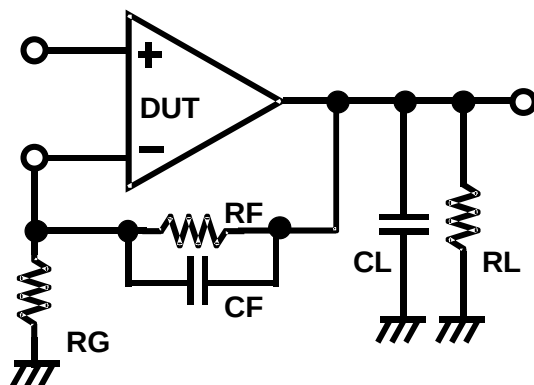


Voltage Gain vs. Frequency (with Capacitive Load)





■ MEASUREMENT CIRCUIT



[CAUTION]

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