

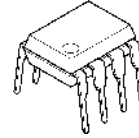
HIGH SPEED SINGLE SUPPLY OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

The **NJM2742** is a single supply dual operational amplifier with a wide operation voltage range from 3V to 32V and high slew rate of 10V/μs. Further it has a low side output swing close to ground ($V_{OL} = 0.2V$ typ. at $R_L = 2k\Omega$, $V^+ = 5V$). The combination of these characteristics makes it well-suited for power supply units, motor driving units and others.

The **NJM2742** is available in a wide variety of packages 8-lead DIP, and 8-lead surface-mount packages of SOP (DMP), SSOP and MSOP (TVSP).

■ PACKAGR OUTLINE



NJM2742D
(DIP8)



NJM2742M
(DMP8)



NJM2742V
(SSOP8)

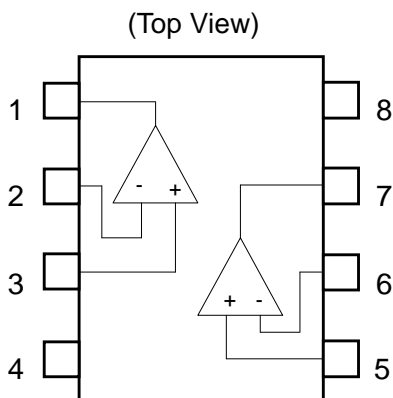


NJM2742RB1
(MSOP8 (TVSP8))

■ FEATURES

- Single Supply
- Operating Voltage 3V to 32V
- Low Saturation Output Voltage $V_{OL} = 0.2V$ typ. (at $R_L = 2k\Omega$, $V^+ = 5V$)
- High Slew Rate 10V/μs typ.
- Bipolar Technology
- Package Outline NJM2742D: DIP8,
NJM2742M: DMP8,
NJM2742V: SSOP8,
NJM2742RB1: MSOP8 (TVSP8) MEET JEDEC MO-187-DA / THIN TYPE

■ PIN CONFIGURATION



NJM2742D, NJM2742M
NJM2742V, NJM2742RB1

PIN FUNCTION

- 1.A OUTPUT
- 2.A -INPUT
- 3.A +INPUT
- 4.GND(V)
- 5.B +INPUT
- 6.B -INPUT
- 7.B OUTPUT
- 8.V⁺

NJM2742

■ ABSOLUTE MAXIMUM RATINGS

(Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	+36	V
Differential Input Voltage	V _{ID}	±36	V
Common Mode Input Voltage	V _{IC}	-0.3 to +36	V
Power Dissipation	P _D	500 (DIP8) 300 (DMP8) 250 (SSOP8) 320 (MSOP8 (TVSP8))	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 ⁺		3.0	-	32	V

■ DC CHARACTERISTICS

(V⁺/V⁻=±15V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Operating Current	I _{CC}	No Signal	-	4.3	5.5	mA
Input Offset Voltage	V _{IO}		-	1	12	mV
Input Bias Current	I _B		-	80	400	nA
Input Offset Current	I _{IO}		-	5	75	nA
Open Loop Voltage Gain	A _v	R _L ≥ 2kΩ to 0V	80	110	-	dB
Common Mode Rejection	CMR	-15V ≤ V _{ICM} ≤ 12.5V	55	75	-	dB
Supply Voltage Rejection	SVR	3V ≤ V ⁺ ≤ 32V	70	90	-	dB
Maximum Output Voltage 1	V _{OM1}	R _L ≥ 10kΩ to 0V	+13.7 /-13.7	+14 /-14.8	-	V
Maximum Output Voltage 2	V _{OM2}	R _L ≥ 2kΩ to 0V	+13.5 /-13.5	-	-	V
Source Output Current	I _{SOURCE}	V _{IN+} = 1V, V _{IN-} = 0V, V _O = 0V	10	30	-	mA
Sink Output Current	I _{SINK}	V _{IN+} = 0V, V _{IN-} = 1V, V _O = 0V	10	30	-	mA
Input Common Mode Voltage Range	V _{ICM}	CMR ≥ 55dB	-15	-	12.5	V

■ AC CHARACTERISTICS

(V⁺/V⁻=±15V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Gain Bandwidth product	GB	f=10kHz	-	2	-	MHz
Equivalent Input Noise Voltage	V _{NI}	f=1kHz	-	40	-	nV/ √Hz
Capacitive Load Tolerance	CL		-	1000	-	pF

■ TRANSIENT CHARACTERISTICS

(V⁺/V⁻=±15V, Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	10	-	V/μs

■ DC CHARACTERISTICS

($V^+=+5V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Operating Current	I_{CC}	No Signal	-	3.3	4.5	mA
Input Offset Voltage	V_{IO}		-	1	12	mV
Input Bias Current	I_B		-	80	400	nA
Input Offset Current	I_{IO}		-	5	75	nA
Open Loop Voltage Gain	A_v	$R_L=2k\Omega$ to 0V	80	110	-	dB
Common Mode Rejection	CMR	$0V \leq V_{ICM} \leq 2.8V$	50	60	-	dB
Supply Voltage Rejection	SVR	$3V \leq V^+ \leq 32V$	70	90	-	dB
Maximum Output Voltage	V_{OH}	$R_L=2k\Omega$ to 0V	3.7	4.0	-	V
	V_{OL}	$R_L=2k\Omega$ to 0V	-	0.1	0.2	
Source Output Current	I_{SOURCE}	$V_{IN+}=1V, V_{IN-}=0V, V_O=2.5V$	10	30	-	mA
Sink Output Current	I_{SINK}	$V_{IN+}=0V, V_{IN-}=1V, V_O=2.5V$	10	30	-	mA
Input Common Mode Voltage Range	V_{ICM}	CMR $\geq 50dB$	0	-	2.8	V

■ AC CHARACTERISTICS

($V^+=+5V$, $T_a=25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Gain Bandwidth product	GB	$f=10kHz$	-	2	-	MHz
Equivalent Input Noise Voltage	V_{NI}	$f=1kHz$	-	40	-	nV/ \sqrt{Hz}
Capacitive Load Tolerance	CL		-	1000	-	pF

■ TRANSIENT CHARACTERISTICS

($V^+=+5V$, $T_a=25^\circ C$)

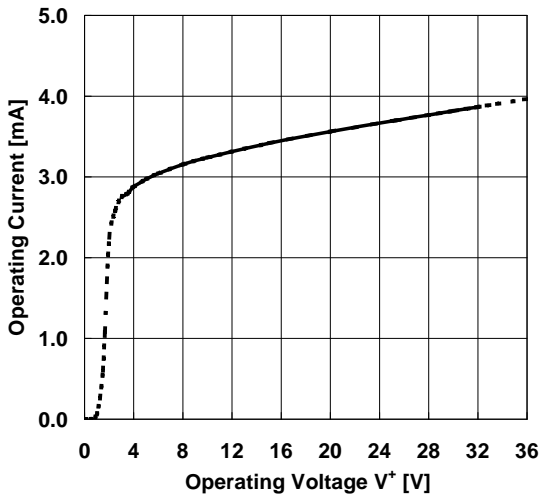
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	7	-	V/ μs

Note: The common mode input voltage range of NJM2742 is shifted toward the V^- for single supply use. At the low operating voltage, the center potential of the V^+ and V^- may be out of the common mode voltage range. In this case, shift the common mode input voltage toward the V^- .

TYPICAL CHARACTERISTICS

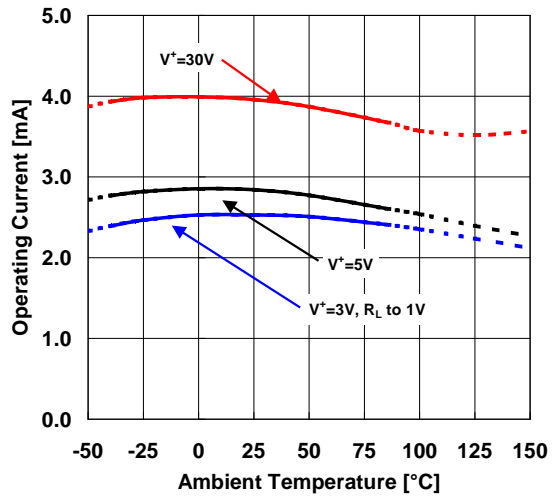
Operating Current vs. Operating Voltage

$V_{IN}=0V, T_a=25^{\circ}C$



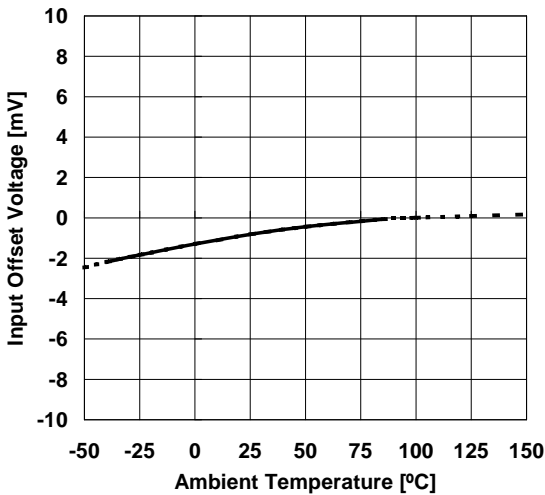
Operating Current vs. Ambient Temperature

$V_{IN}=0V$



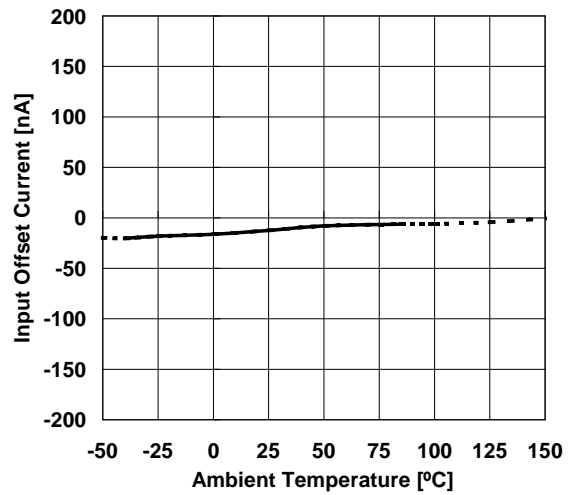
Input Offset Voltage vs. Ambient Temperature

$V^*=5V$



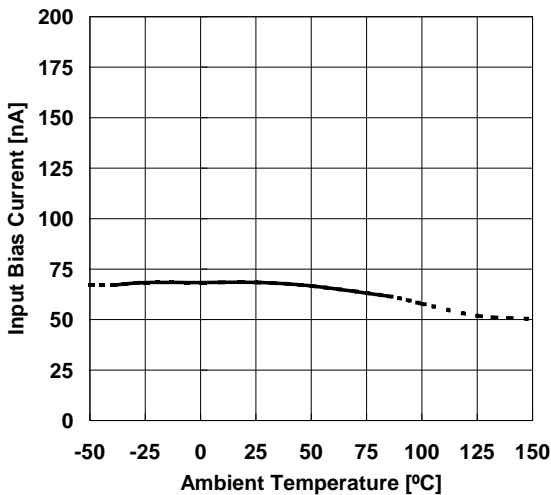
Input Offset Current vs. Ambient Temperature

$V^*=5V$



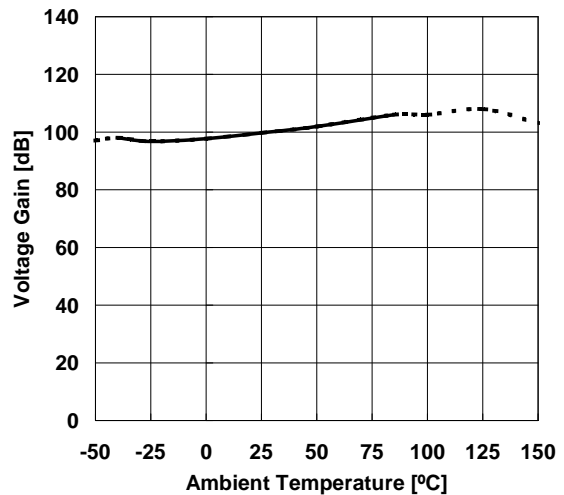
Input Bias Current vs. Ambient Temperature

$V^*=5V$



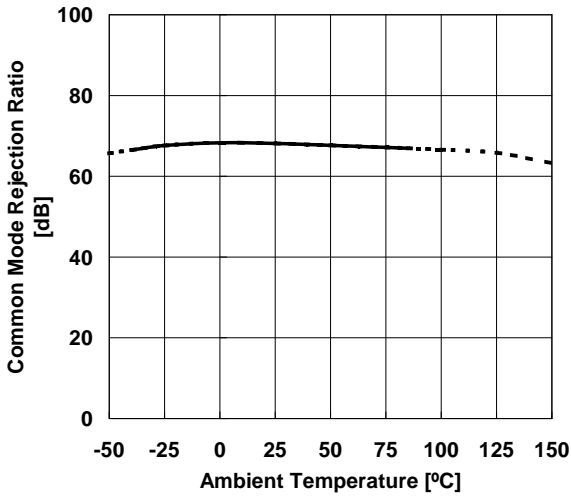
Voltage Gain vs. Ambient Temperature

$V^*=5V, R_L=2k\Omega$

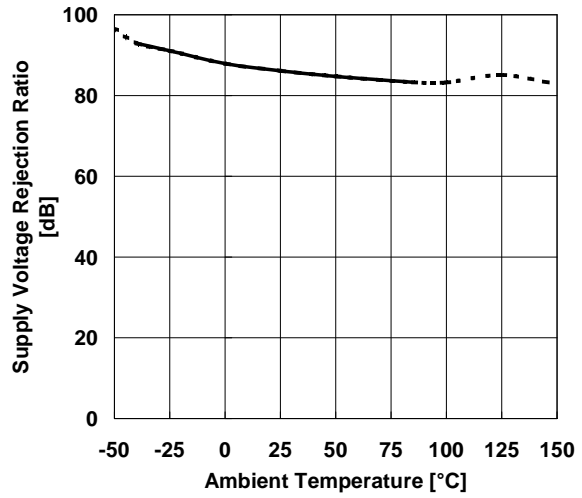


■ TYPICAL CHARACTERISTICS

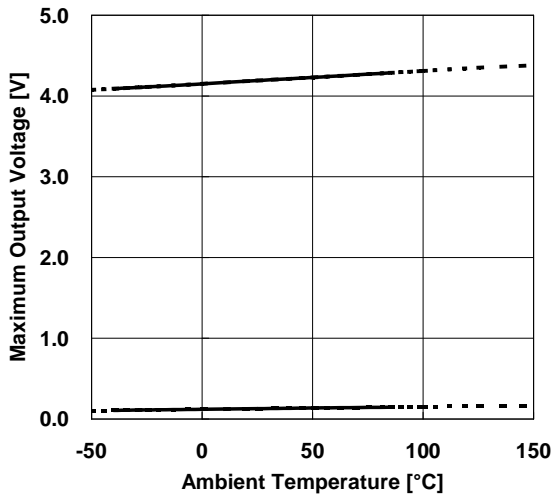
Common Mode Rejection Ratio
vs. Ambient Temperature
 $V^*=30V, 0V < V_{ICM} < 27.5V$



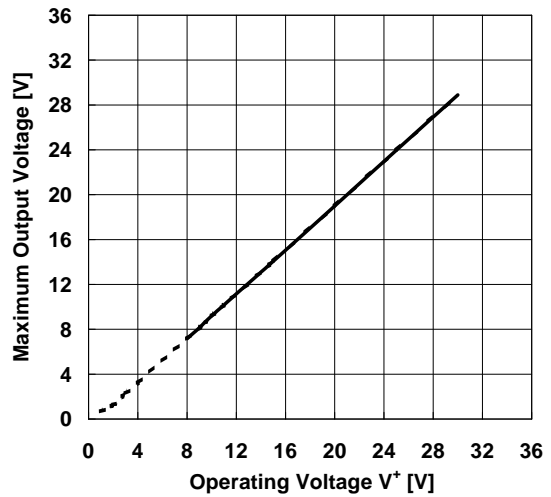
Supply Voltage Rejection Ratio
vs. Ambient Temperature
 $V^*=5V \text{ to } 30V$



Maximum Output Voltage vs. Ambient Temperature
 $V^*=5V, G_v=\text{open}, V_{IN}=\pm 1V, R_L=2k\Omega \text{ to } 0V$



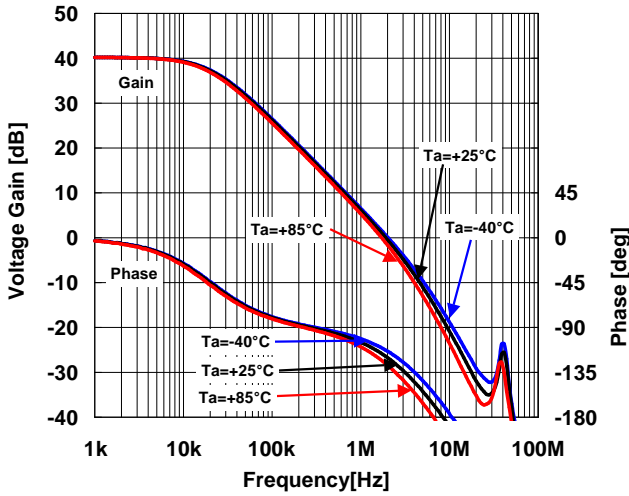
Maximum Output Voltage vs. Operating Voltage
 $R_L=2k\Omega, T_a=25^\circ\text{C}$



TYPICAL CHARACTERISTICS

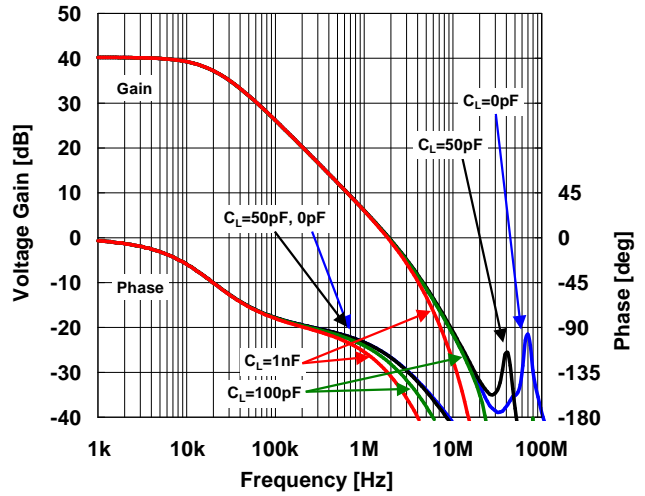
40dB Voltage Gain & Phase vs. Frequency

$V^+=5V, V_{IN}=0.02V_{pp}, G_V=40dB, R_T=50\Omega, R_F=1.98k\Omega,$
 $R_G=20\Omega, C_F=0, R_L=2k\Omega, C_L=50pF$



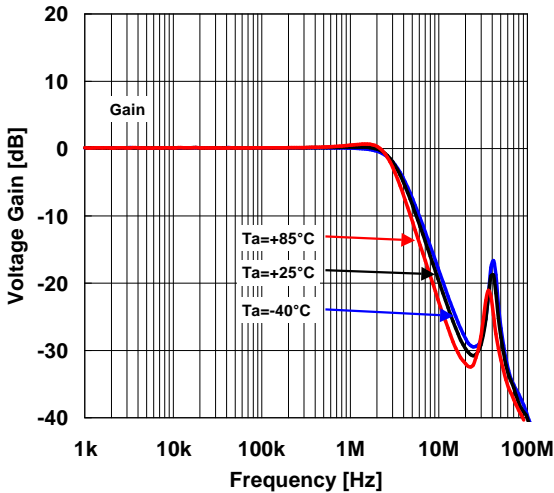
40dB Voltage Gain & Phase vs. Frequency

$V^+=5V, V_{IN}=0.01V_{pp}, G_V=40dB, R_T=50\Omega,$
 $R_F=1.98k\Omega, R_G=20\Omega, R_L=10k\Omega, Ta=+25^\circ C$



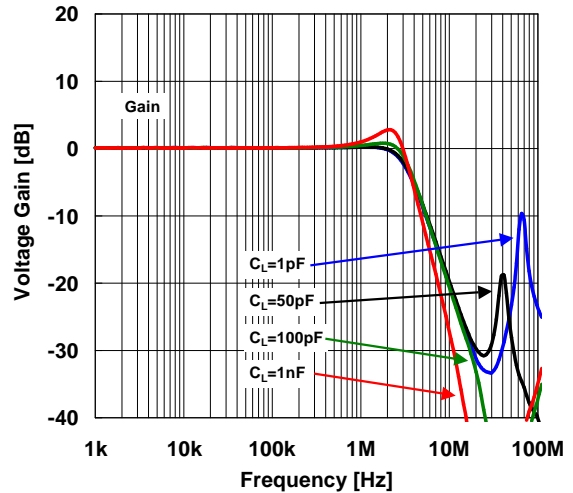
Peak Gain of Voltage Follower

$V^+=5V, V_{IN}=0.02V_{pp}, G_V=0dB, R_T=50\Omega,$
 $R_F=0\Omega, R_G=open, C_L=50pF, R_L=1k\Omega$



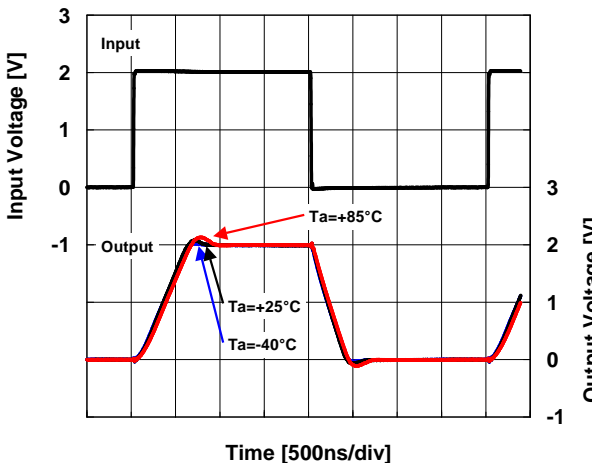
Peak Gain of Voltage Follower

$V^+=5V, V_{IN}=0.02V_{pp}, G_V=0dB, R_T=50\Omega,$
 $R_F=0\Omega, R_G=open, R_L=1k\Omega, Ta=+25^\circ C$



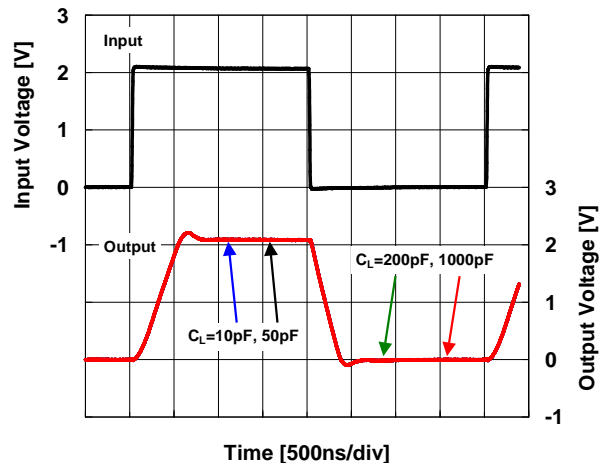
Pulse Response

$V^+=5V, f=250kHz, V_O=2V_{pp}, G_V=0dB, R_T=50\Omega,$
 $R_F=0\Omega, C_L=10pF, R_G=open, R_L=10k\Omega, Ta=25^\circ C$



Pulse Response

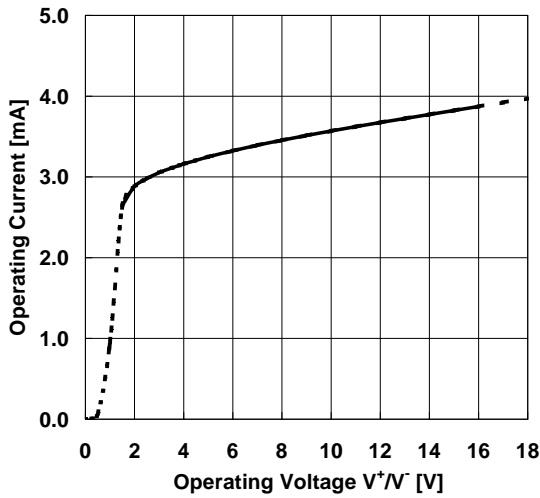
$V^+=5V, f=250kHz, V_O=2V_{pp}, G_V=0dB, R_T=50\Omega,$
 $R_F=0\Omega, C_F=0, R_G=open, R_L=2k\Omega, Ta=25^\circ C$



■ TYPICAL CHARACTERISTICS

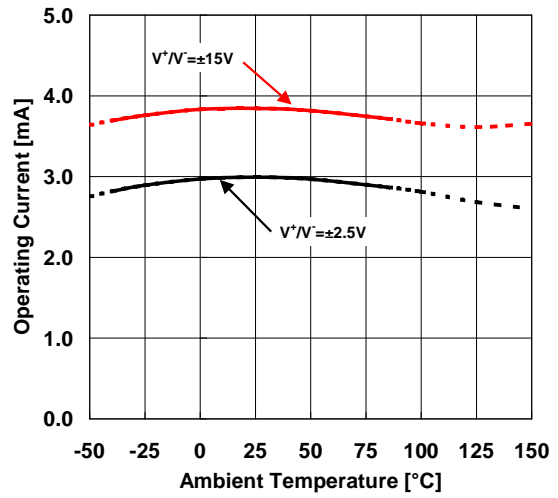
Operating Current vs. Operating Voltage

$V_{IN}=0V, T_a=25^{\circ}C$



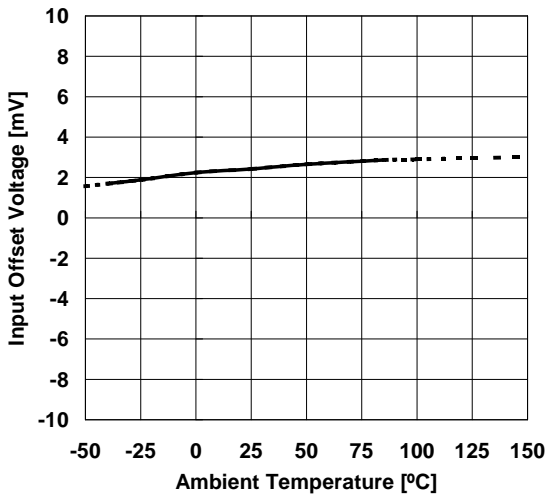
Operating Current vs. Ambient Temperature

$V_{IN}=0V$



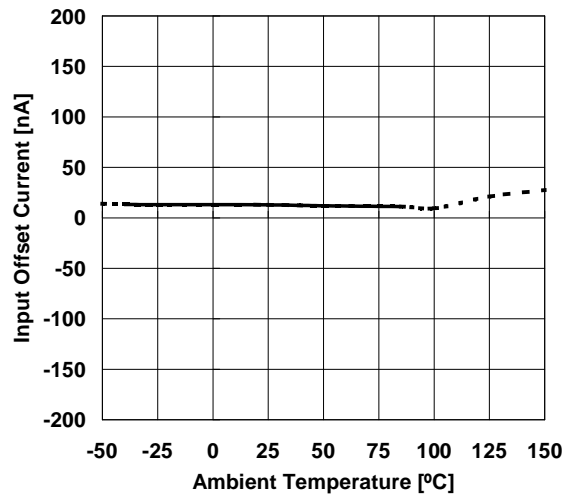
Input Offset Voltage vs. Ambient Temperature

$V^+/V^- = \pm 15V$



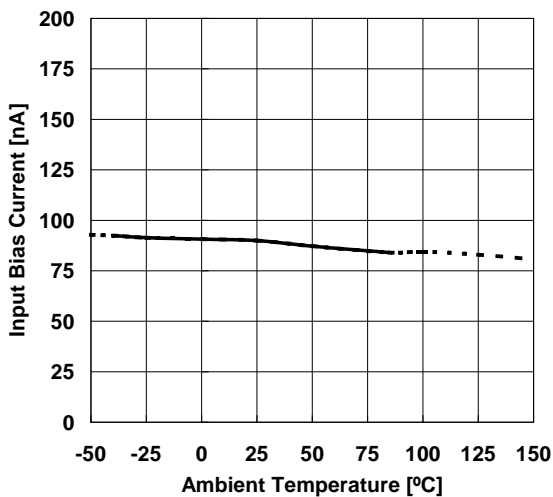
Input Offset Current vs. Ambient Temperature

$V^+/V^- = \pm 15V$



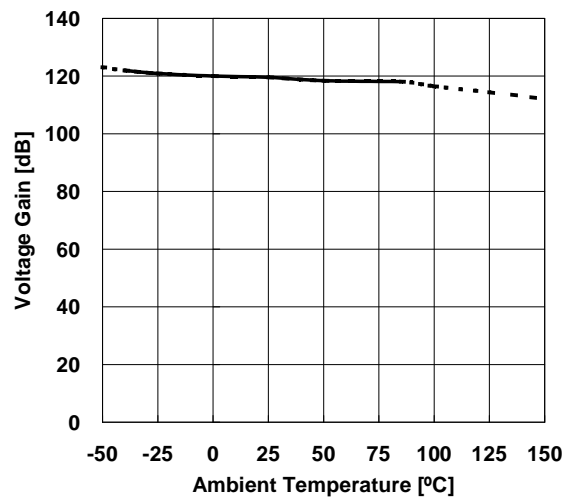
Input Bias Current vs. Ambient Temperature

$V^+/V^- = \pm 15V$



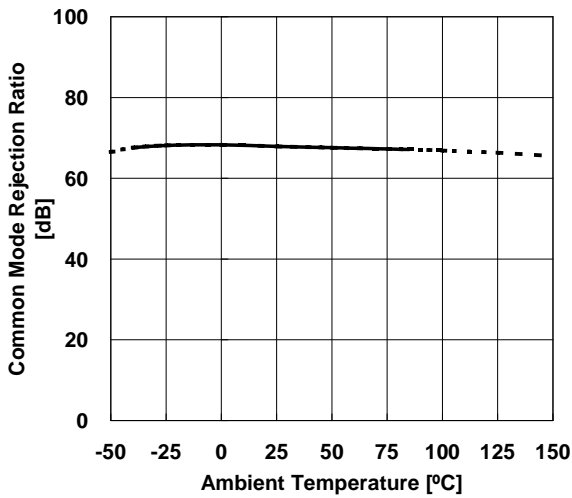
Voltage Gain vs. Ambient Temperature

$V^+/V^- = \pm 15V, R_L = 2k\Omega$

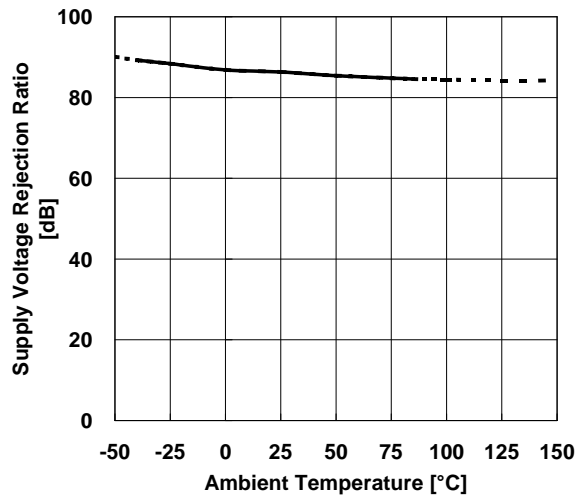


■ TYPICAL CHARACTERISTICS

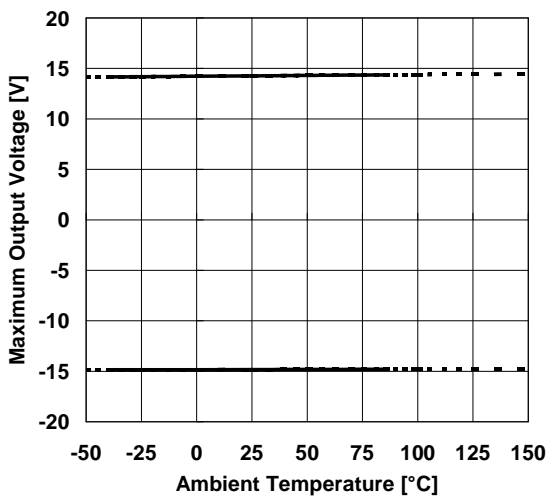
Common Mode Rejection Ratio
vs. Ambient Temperature
 $V^*/V = \pm 15V, -15V < V_{ICM} < +12.5V$



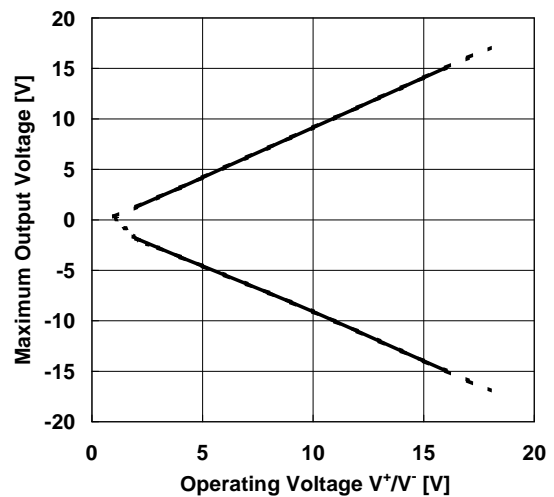
Supply Voltage Rejection Ratio
vs. Ambient Temperature
 $V^*/V = \pm 2.5V$ to $\pm 15V$



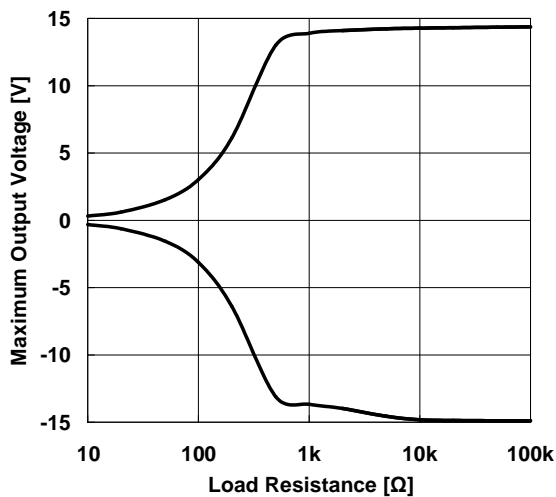
Maximum Output Voltage
vs. Ambient Temperature
 $V^*/V = \pm 15V, G_v = \text{open}, V_{IN} = \pm 1V, R_L = 10k\Omega$



Maximum Output Voltage vs. Operating Voltage
 $R_L = 2k\Omega, T_a = 25^\circ C$



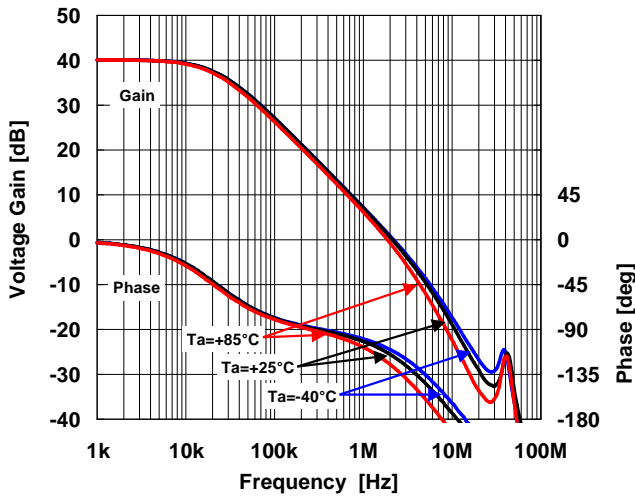
Maximum Output Voltage vs. Load Resistance
 $V^*/V = \pm 15V, T_a = 25^\circ C$



TYPICAL CHARACTERISTICS

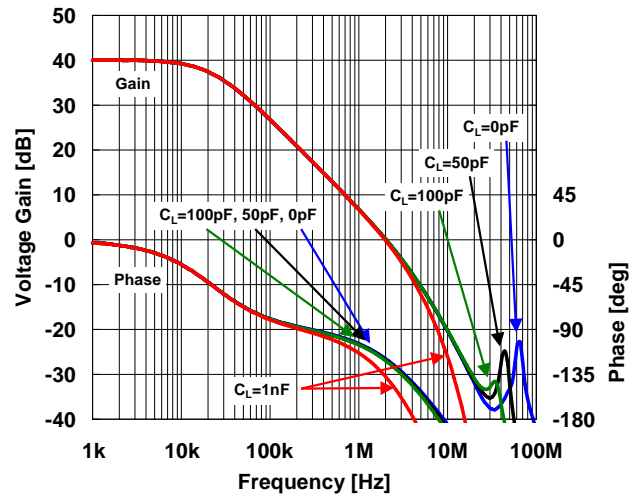
40dB Voltage Gain & Phase vs. Frequency

$V^+/V^- = \pm 15V$, $V_{IN} = 0.02V_{pp}$, $G_V = 40dB$, $R_T = 50\Omega$,
 $R_F = 1.98k\Omega$, $R_G = 20\Omega$, $C_F = 0$, $R_L = 2k\Omega$, $C_L = 50pF$



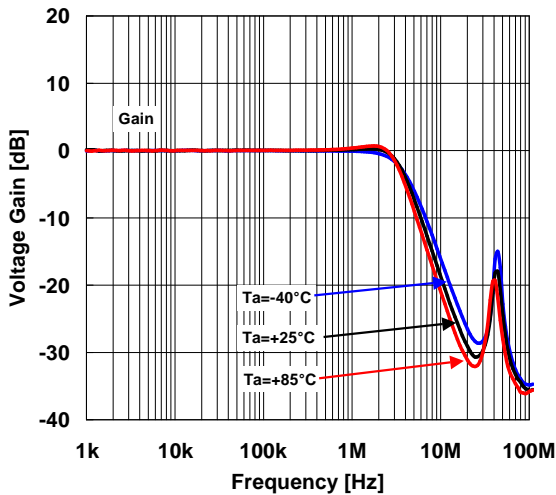
Voltage Gain & Phase vs. Frequency

$V^+/V^- = \pm 15V$, $V_{IN} = 0.01V_{pp}$, $G_V = 40dB$, $R_T = 50\Omega$,
 $R_F = 1.98k\Omega$, $R_G = 20\Omega$, $R_L = 10k\Omega$, $T_a = +25^\circ C$



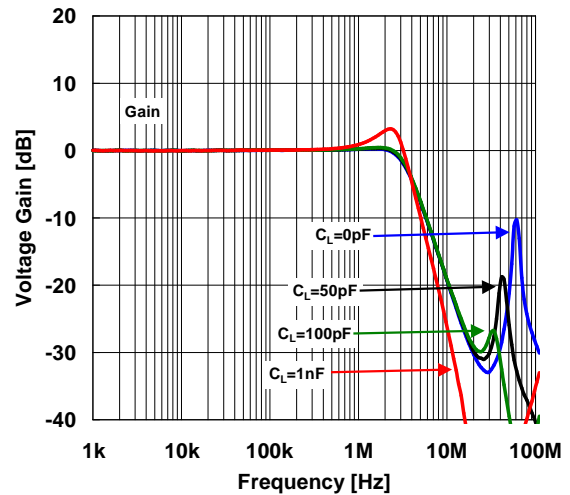
Peak Gain of Voltage Follower

$V^+/V^- = \pm 15V$, $V_{IN} = 0.02V_{pp}$, $G_V = 0dB$, $R_T = 50\Omega$,
 $R_F = 0\Omega$, $R_G = \text{open}$, $C_F = 0$, $R_L = 2k\Omega$, $C_L = 50pF$



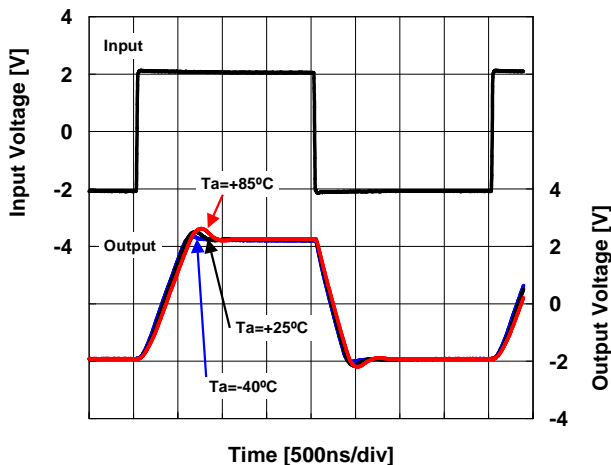
Peak Gain of Voltage Follower

$V^+/V^- = \pm 15V$, $V_{IN} = 0.02V_{pp}$, $G_V = 0dB$, $R_T = 50\Omega$,
 $R_F = 0\Omega$, $R_G = \text{open}$, $R_L = 10k\Omega$, $T_a = +25^\circ C$



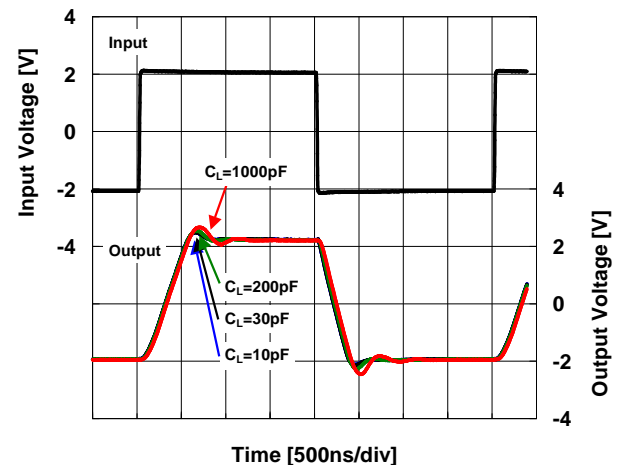
Pulse Response

$V^+/V^- = \pm 15V$, $f = 250kHz$, $V_O = 4V_{pp}$, $G_V = 0dB$,
 $R_T = 50\Omega$, $R_F = 0\Omega$, $C_F = 0F$, $R_G = \text{open}$, $C_L = 50pF$, $R_L = 10k\Omega$



Pulse Response

$V^+/V^- = \pm 15V$, $f = 250kHz$, $V_O = 4V_{pp}$, $G_V = 0dB$, $R_T = 50\Omega$,
 $R_F = 0\Omega$, $C_F = 0F$, $R_G = \text{open}$, $R_L = 10k\Omega$, $T_a = 25^\circ C$



■NOTE

[CAUTION]

The specifications on this databook are only given for information, without any guarantee as regards either mistakes or omissions. The application circuits in this databook are described only to show representative usages of the product and not intended for the guarantee or permission of any right including the industrial rights.