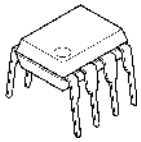
HIGH SPEED SINGLE SUPPLY OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

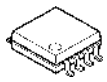
The NJM2742 is a single supply dual operational amplifier with a wide operation voltage range from 3V to 32V and high slew rate of 10v/μs. Further it has a low side output swing close to ground (VOL= 0.2V typ. at RL=2kΩ, V+=5V). The combination of these characteristics makes it well-suited for power 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)

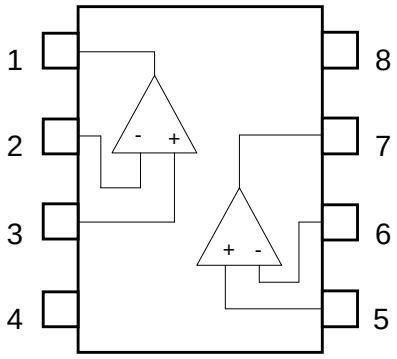
NJM2742RB1
(MSOP8 (TVSP8))

■ FEATURES

- Single Supply
- Operating Voltage — 3V to 32V
- Low Saturation Output Voltage — V_{OL}= 0.2V typ. (at R_L=2kΩ, 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

(Top View)



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^+

■ 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	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-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	Av	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, Ta=25°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	Av	R_L=2kΩ to 0V	80	110	-	dB
Common Mode Rejection	CMR	0V ≤ V_{ICM} ≤ 2.8V	50	60	-	dB
Supply Voltage Rejection	SVR	3V ≤ V^+ ≤ 32V	70	90	-	dB
Maximum Output Voltage	V_{OH}	R_L=2kΩ to 0V	3.7	4.0	-	V
	V_{OL}	R_L=2kΩ 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 ≥ 50dB	0	-	2.8	V

■ AC CHARACTERISTICS

(V^+=+5V, 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^+=+5V, Ta=25°C)

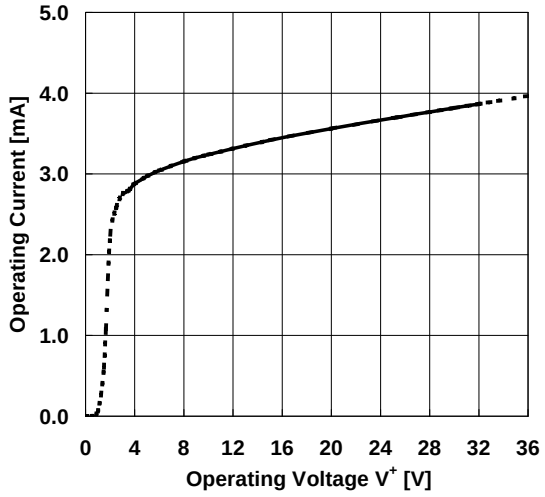
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	7	-	V/μs

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

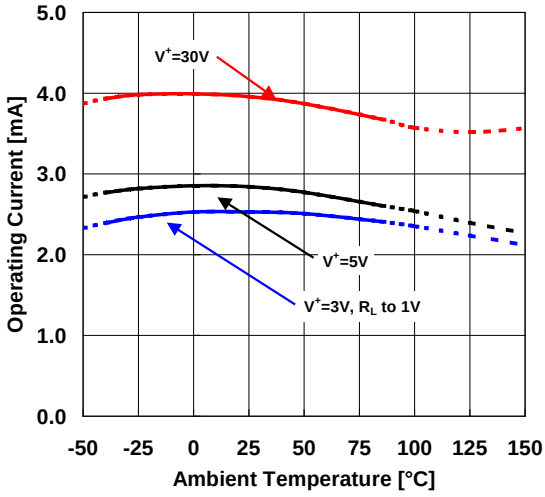
Operating Current vs. Operating Voltage

V_{IN}=0V, Ta=25°C



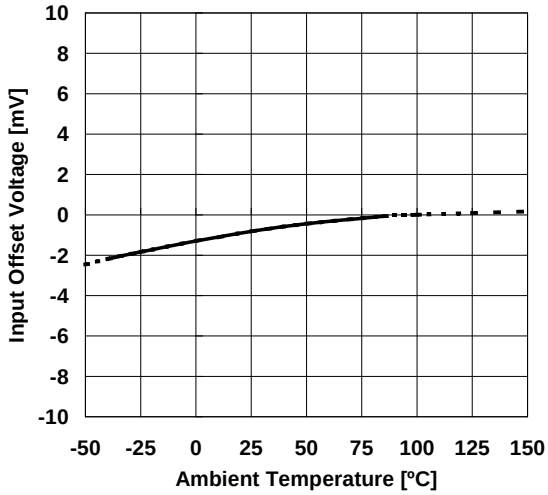
Operating Current vs. Ambient Temperature

V_{IN}=0V



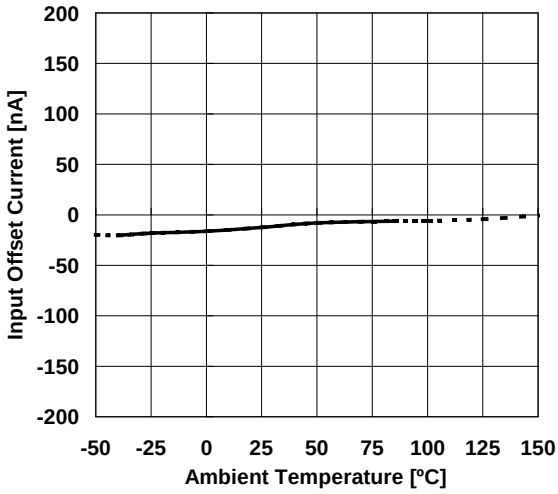
Input Offset Voltage vs. Ambient Temperature

V^+=5V



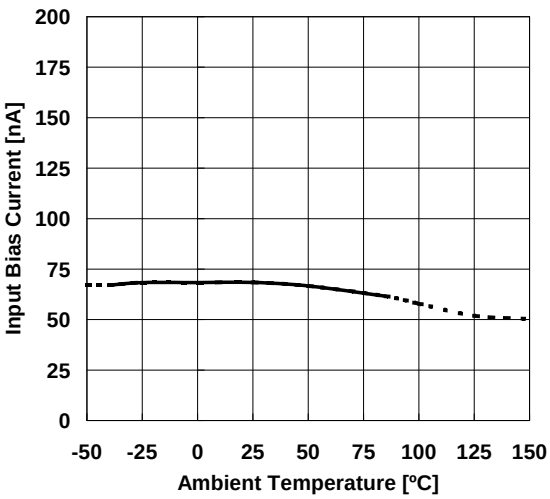
Input Offset Current vs. Ambient Temperature

V^+=5V



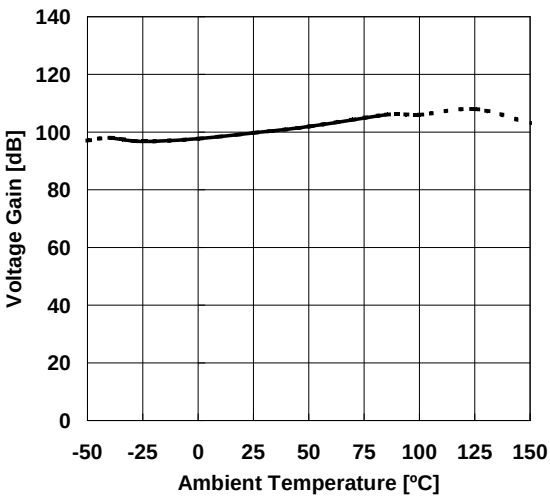
Input Bias Current vs. Ambient Temperature

V^+=5V



Voltage Gain vs. Ambient Temperature

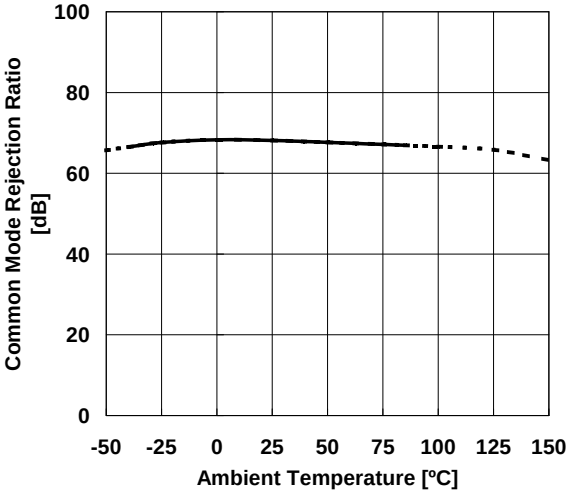
V^+=5V, R_L=2kΩ



■ TYPICAL CHARACTERISTICS

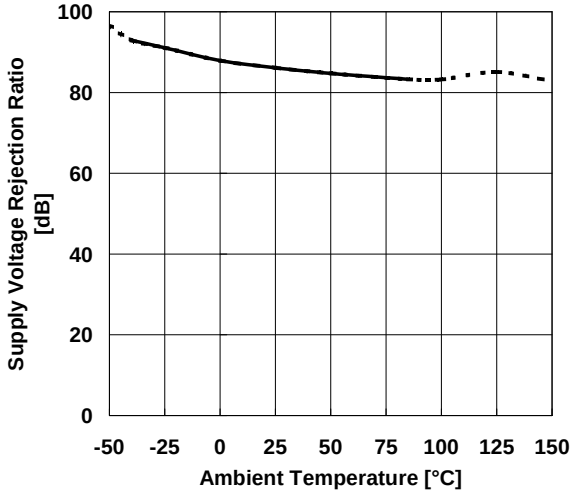
Common Mode Rejection Ratio vs. Ambient Temperature

V^+=30V, 0V<V_{ICM}<27.5V



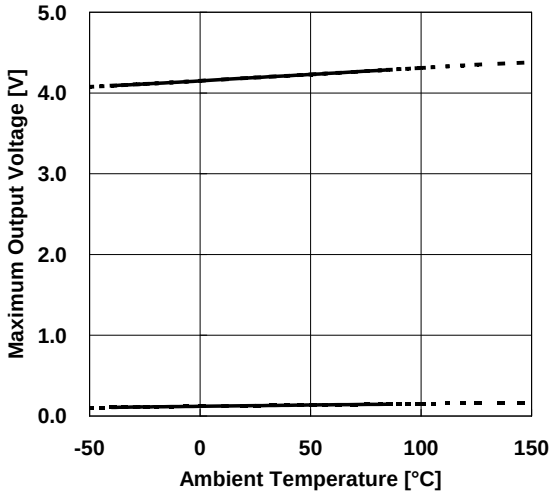
Supply Voltage Rejection Ratio vs. Ambient Temperature

V^+=5V to 30V



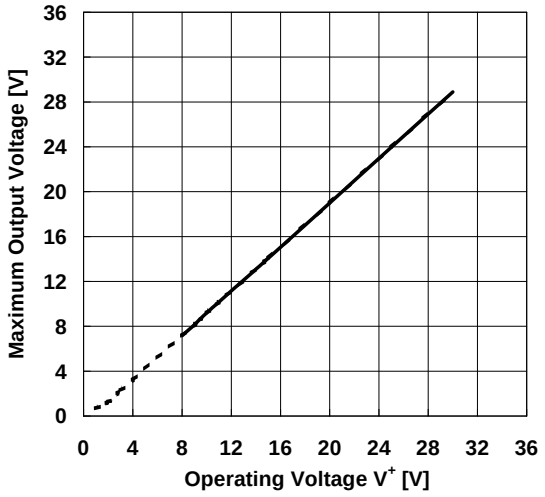
Maximum Output Voltage vs. Ambient Temperature

V^+=5V, Gv=open, V_{IN}=±1V, R_L=2kΩ to 0V



Maximum Output Voltage vs. Operating Voltage

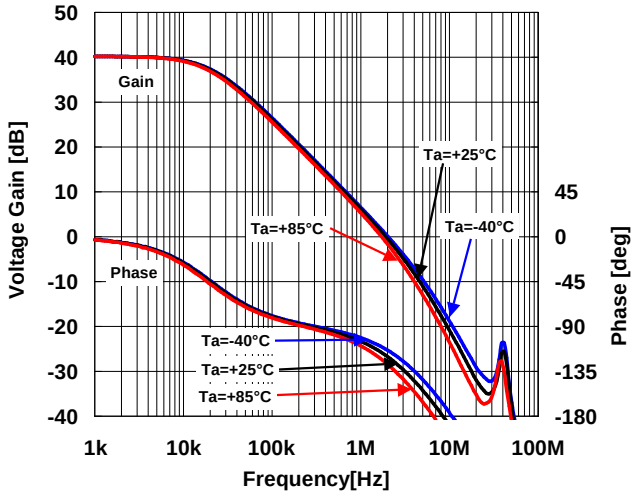
R_L=2kΩ, Ta=25°C



■ TYPICAL CHARACTERISTICS

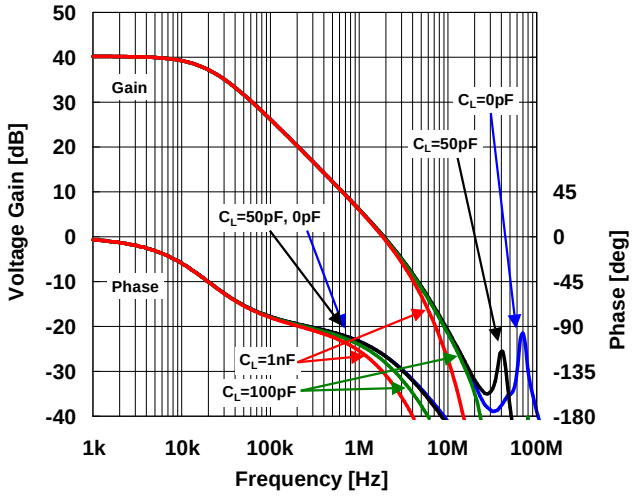
40dB Voltage Gain & Phase vs. Frequency

V^+=5V, V_{IN}=0.02Vpp, G_V=40dB, R_T=50Ω, R_F=1.98kΩ, R_G=20Ω, C_F=0, R_L=2kΩ, C_L=50pF



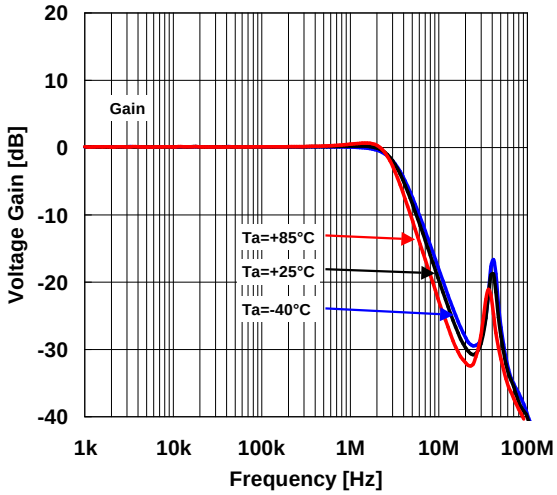
40dB Voltage Gain & Phase vs. Frequency

V^+=5V, V_{IN}=0.01Vpp, G_V=40dB, R_T=50Ω, R_F=1.98kΩ, R_G=20Ω, R_L=10kΩ, Ta=+25°C



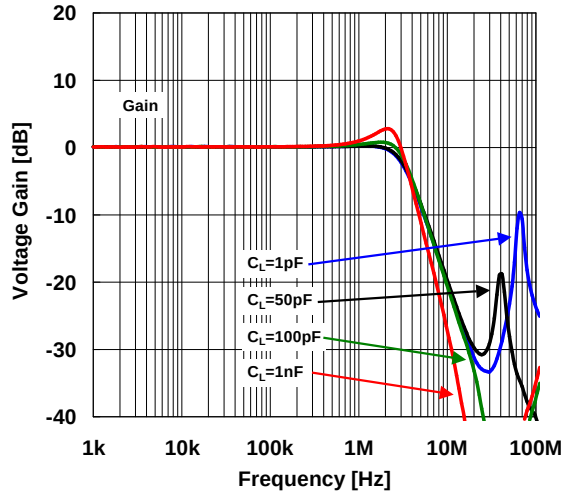
Peak Gain of Voltage Follower

V^+=5V, V_{IN}=0.02Vpp, G_V=0dB, R_T=50Ω, R_F=0Ω, R_G=open, C_L=50pF, R_L=1kΩ



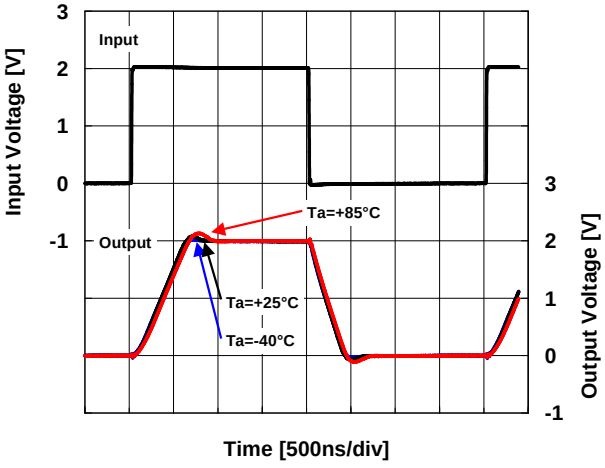
Peak Gain of Voltage Follower

V^+=5V, V_{IN}=0.02Vpp, G_V=0dB, R_T=50Ω, R_F=0Ω, R_G=open, R_L=1kΩ, Ta=+25°C



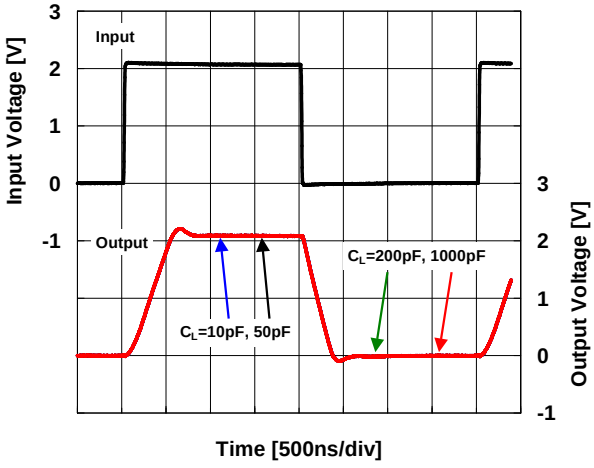
Pulse Response

V^+=5V, f=250kHz, V_O=2V_{PP}, G_V=0dB, R_T=50Ω, R_F=0Ω, C_L=10pF, R_G=open, R_L=10kΩ, Ta=25°C



Pulse Response

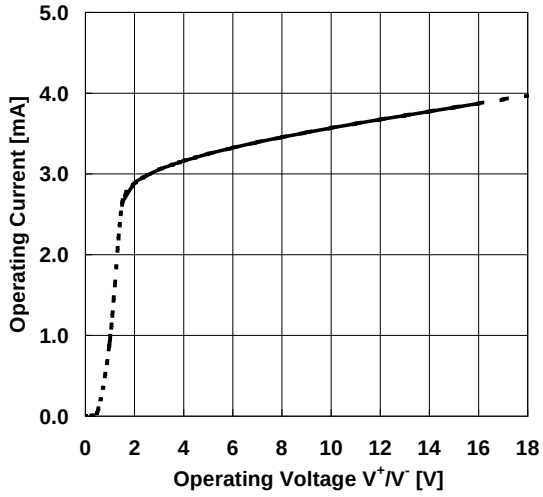
V^+=5V, f=250kHz, V_O=2V_{PP}, G_V=0dB, R_T=50Ω, R_F=0Ω, C_F=0, R_G=open, R_L=2kΩ, Ta=25°C



■ TYPICAL CHARACTERISTICS

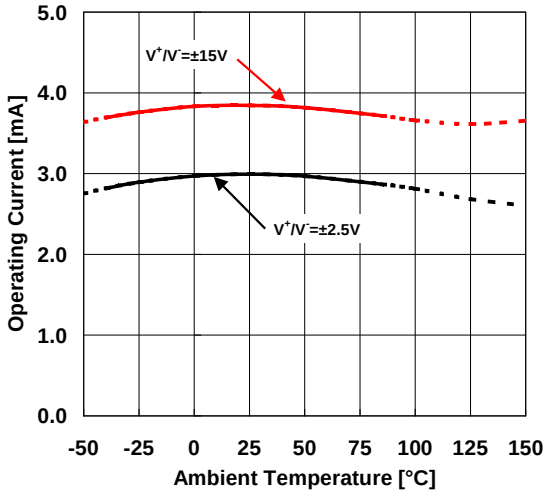
Operating Current vs. Operating Voltage

V_{IN}=0V, Ta=25°C



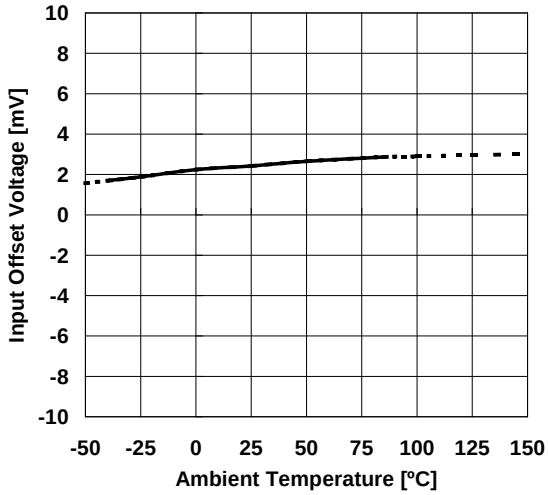
Operating Current vs. Ambient Temperature

V_{IN}=0V



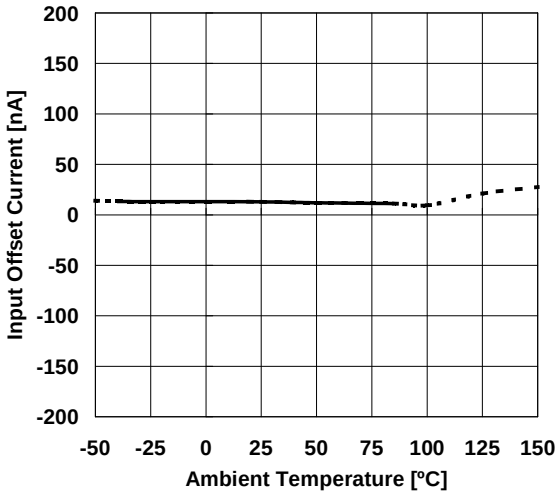
Input Offset Voltage vs. Ambient Temperature

V^+/V^-=±15V



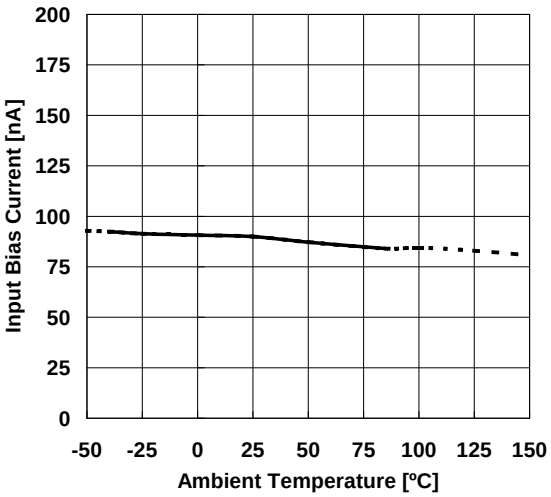
Input Offset Current vs. Ambient Temperature

V^+/V^-=±15V



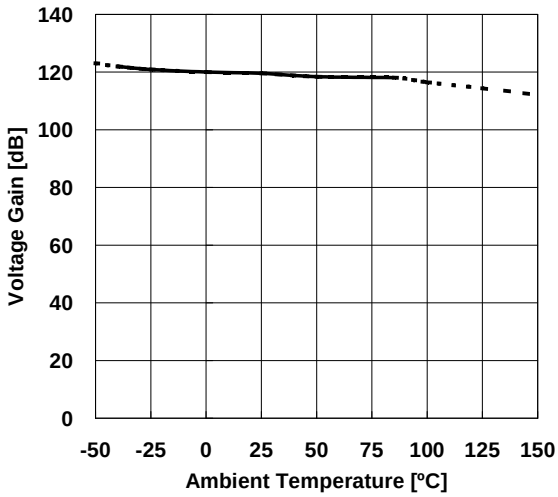
Input Bias Current vs. Ambient Temperature

V^+/V^-=±15V



Voltage Gain vs. Ambient Temperature

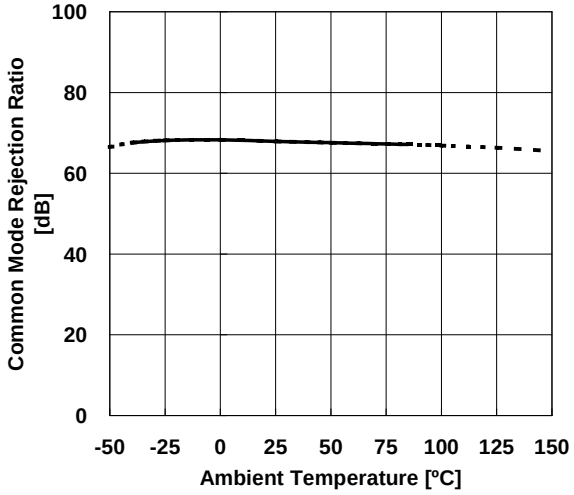
V^+/V^-=±15V, R_L=2kΩ



■ TYPICAL CHARACTERISTICS

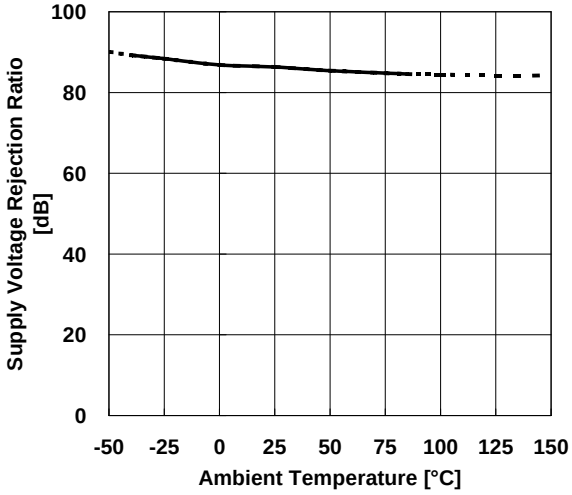
Common Mode Rejection Ratio vs. Ambient Temperature

V^+/V^-=±15V, -15V<V_{ICM}<+12.5V



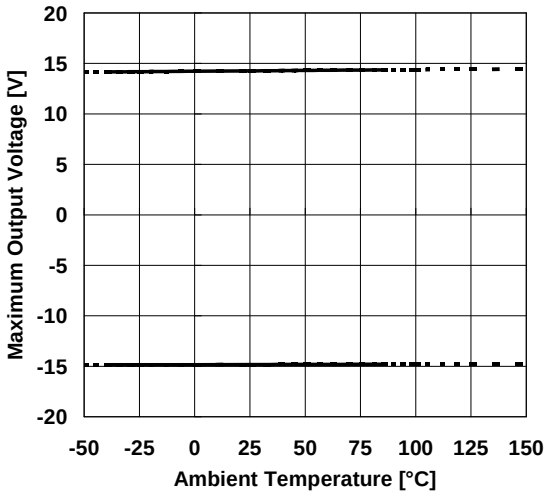
Supply Voltage Rejection Ratio vs. Ambient Temperature

V^+/V^-=±2.5V to ±15V



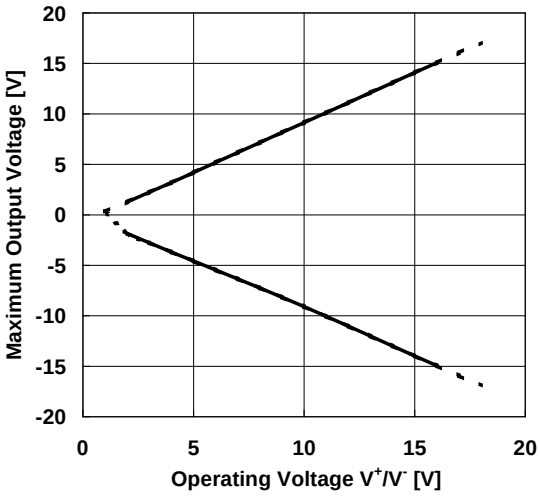
Maximum Output Voltage vs. Ambient Temperature

V^+/V^-=±15V, Gv=open, V_{IN}=±1V, R_L=10kΩ



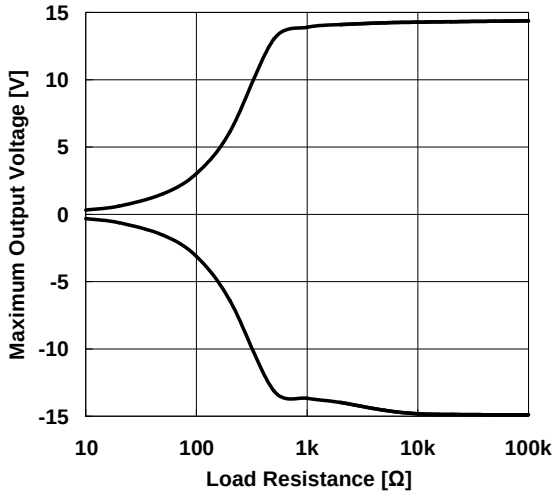
Maximum Output Voltage vs. Operating Voltage

R_L=2kΩ, Ta=25°C



Maximum Output Voltage vs. Load Resistance

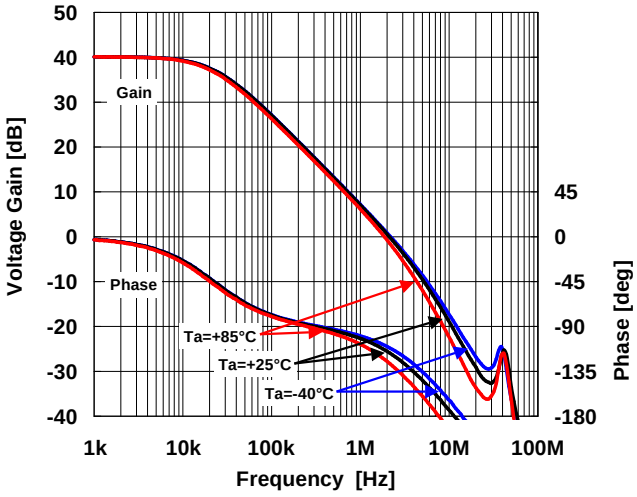
V^+/V^-=±15V, Ta=25ºC



■TYPICAL CHARACTERISTICS

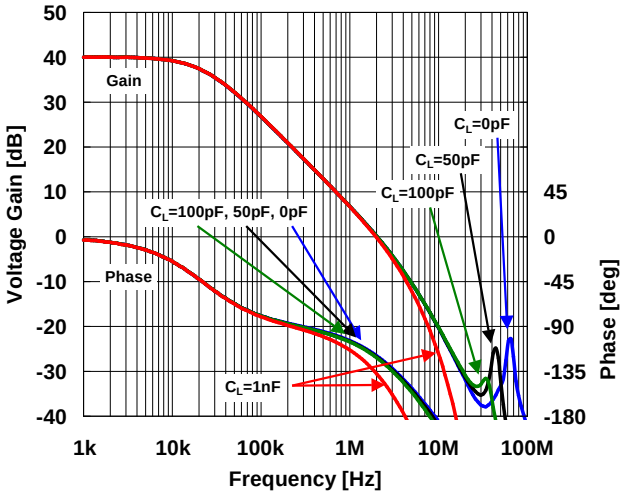
40dB Voltage Gain & Phase vs. Frequency

V^+/V^-=±15V, V_{IN}=0.02Vpp, G_V=40dB, R_T=50Ω,
R_F=1.98kΩ, R_G=20Ω, C_F=0, R_L=2kΩ, C_L=50pF



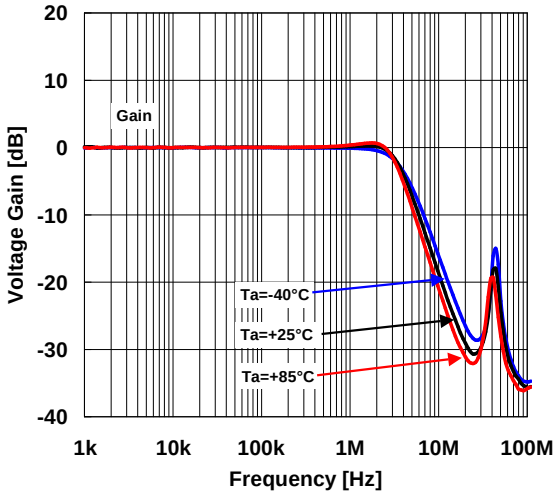
Voltage Gain & Phase vs. Frequency

V^+/V^-=±15V, V_{IN}=0.01Vpp, G_V=40dB, R_T=50Ω,
R_F=1.98kΩ, R_G=20Ω, R_L=10kΩ, Ta=+25°C



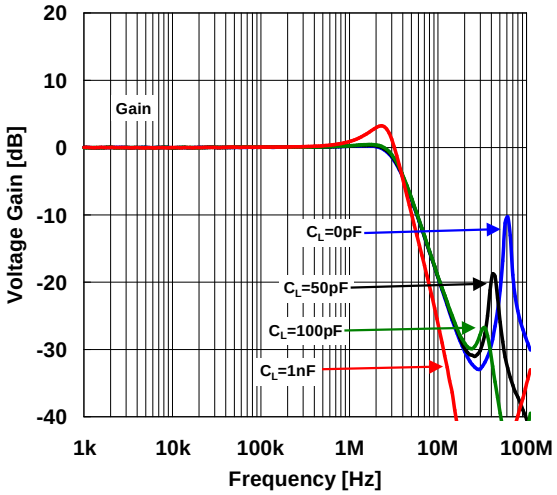
Peak Gain of Voltage Follower

V^+/V^-=±15V, V_{IN}=0.02Vpp, G_V=0dB, R_T=50Ω,
R_F=0Ω, R_G=open, C_F=0, R_L=2kΩ, C_L=50pF



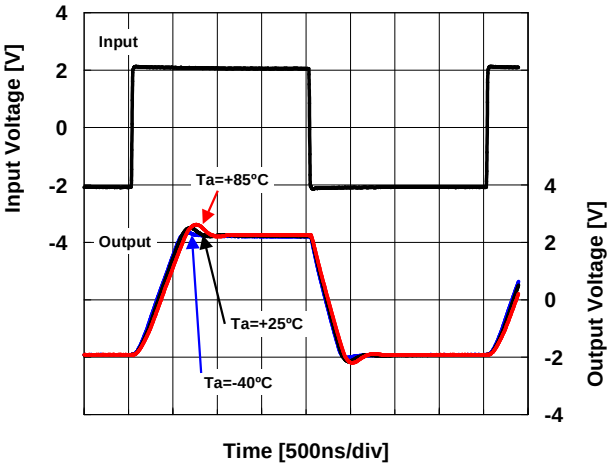
Peak Gain of Voltage Follower

V^+/V^-=±15V, V_{IN}=0.02Vpp, G_V=0dB, R_T=50Ω,
R_F=0Ω, R_G=open, R_L=10kΩ, Ta=+25°C



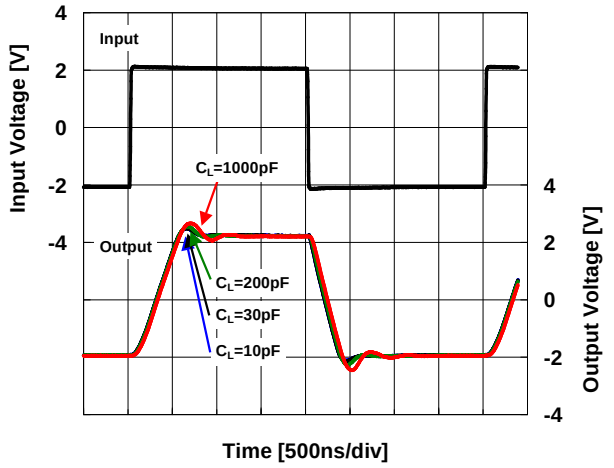
Pulse Response

V^+/V^-=±15V, f=250kHz, V_O=4V_{PP}, G_V=0dB,
R_T=50Ω, R_F=0Ω, C_F=0F, R_G=open, C_L=50pF, R_L=10kΩ



Pulse Response

V^+/V^-=±15V, f=250kHz, V_O=4V_{PP}, G_V=0dB, R_T=50Ω,
R_F=0Ω, C_F=0F, R_G=open, R_L=10kΩ, Ta=25°C



■NOTE

[CAUTION]
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