

HIGH SPEED SINGLE SUPPLY OPERATIONAL AMPLIFIER

■ GENERAL DESCRIPTION

The **NJM2742** is a high speed single supply operational amplifier. The low V_{OL} enables to treat small output signal on a single supply.

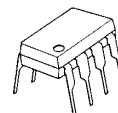
It has wide supply voltage range, +3 to +32 volt and high slew rate.

The **NJM2742** is suitable for power supply and motor driver units.

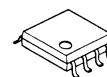
■ FEATURES

- Single Supply
- Operating Voltage (3 to 32V)
- Low Saturation Output Voltage ($V_{OL} = 0.2V$ typ. at $R_L = 2k\Omega, V^+ = 5V$)
- High Slew Rate ($10V/\mu s$ typ.)
- Bipolar Technology
- Package Outline DIP8, DMP8, SSOP8, TVSP8

■ PACKAGR OUTLINE



NJM2742D



NJM2742M

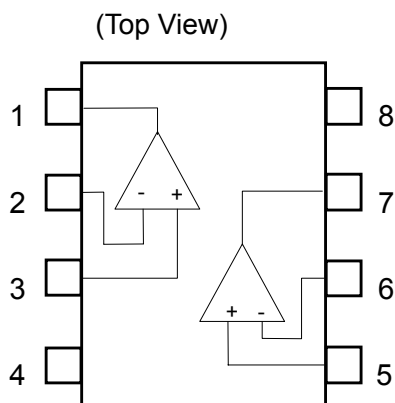


NJM2742V



NJM2742RB1

■ PIN CONFIGURATION



PIN FUNCTION

- 1.A OUTPUT
- 2.A -INPUT1
- 3.A +INPUT1
- 4.V⁻
- 5.B +INPUT2
- 6.B -INPUT2
- 7.B OUTPUT2
- 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 (TVSP8)	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-40 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

($V^+/V^- = \pm 15V$, 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}		-	1.0	12	mV
Input Bias Current	I_B		-	80	400	nA
Input Offset Current	I_{IO}		-	5	75	nA
Open Loop Voltage Gain	A_v	$R_L > 2k\Omega$	80	110	-	dB
Common Mode Rejection	CMR	$-15V < V_{IC} < 12.5V$	55	75	-	dB
Supply Voltage Rejection	SVR	$3V < V^+ < 32V$	70	90	-	dB
Maximum Output Voltage 1	V_{OM1}	$R_L > 10k\Omega$	+13.7 /-13.7	+14 /-14.8	-	V
Maximum Output Voltage 2	V_{OM2}	$R_L > 2k\Omega$	+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

($V^+/V^- = \pm 15V$, 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/ $\sqrt{Hz}$
Capacitive Load Tolerance	CL		-	1000	-	pF

■ TRANSIENT CHARACTERISTICS

($V^+/V^- = \pm 15V$, 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}		-	1.0	12	mV
Input Bias Current	I_B		-	80	400	nA
Input Offset Current	I_{IO}		-	5	75	nA
Open Loop Voltage Gain	A_v	$R_L > 2k\Omega$	80	110	-	dB
Common Mode Rejection	CMR	$0V < V_{IC} < 2.8V$	50	60	-	dB
Supply Voltage Rejection	SVR	$3V < V^+ < 32V$	70	90	-	dB
Maximum Output Voltage	V_{OH}	$R_L = 2k\Omega$	3.7	4.0	-	V
	V_{OL}	$R_L = 2k\Omega$	-	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

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

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

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

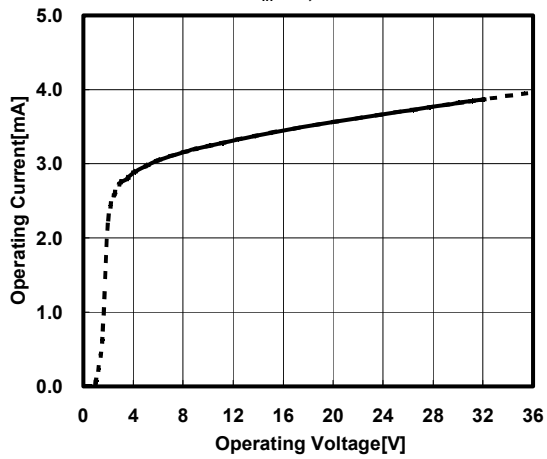
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	7	-	V/ μs

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

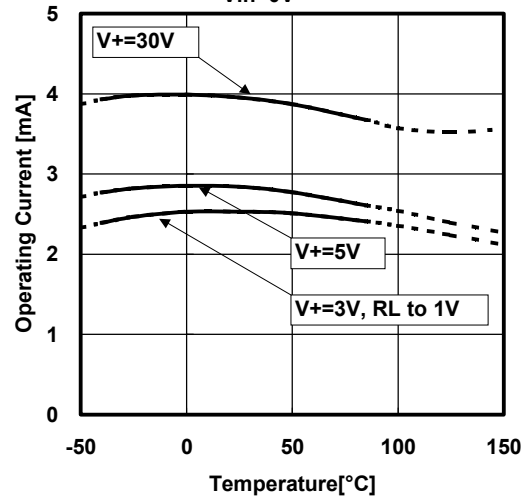
Operating Current vs. Operating Voltage

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



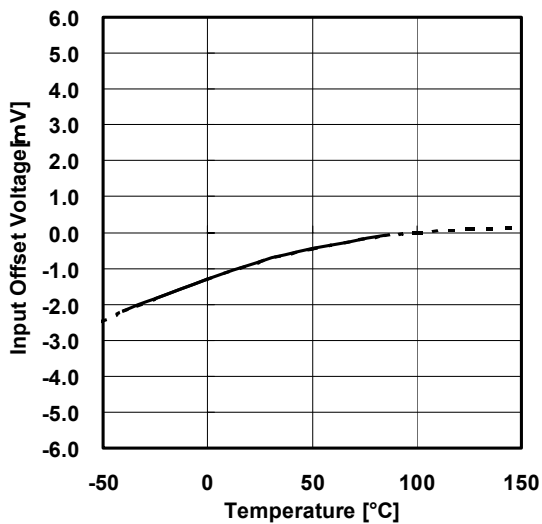
Operating Current vs. Temperature

$V_{in}=0V$



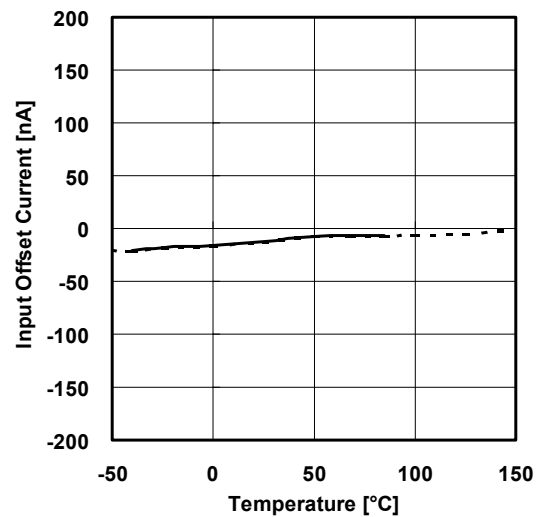
Input Offset Voltage vs. Temperature

$V+=5V$



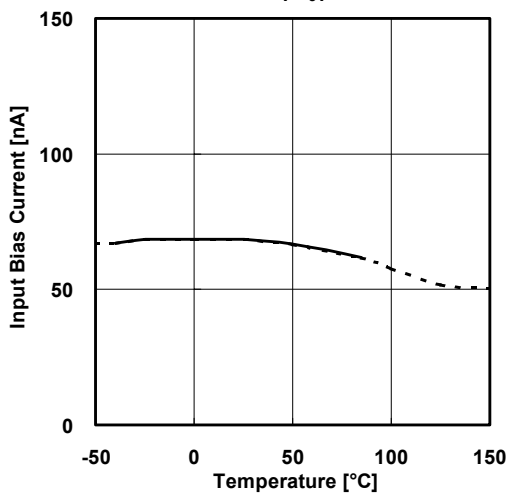
Input Offset Current vs. Temperature

$V+=5V$



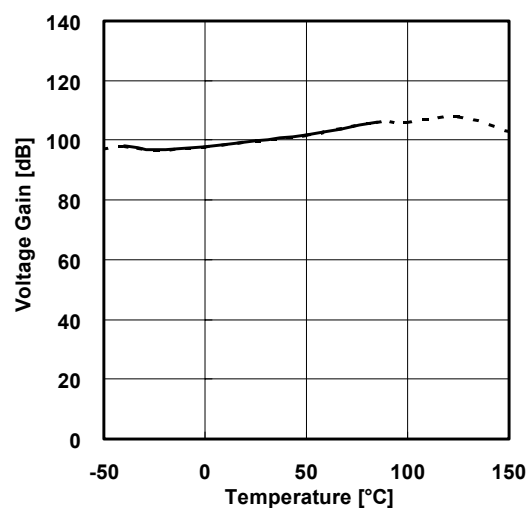
Input Bias Current vs. Temperature

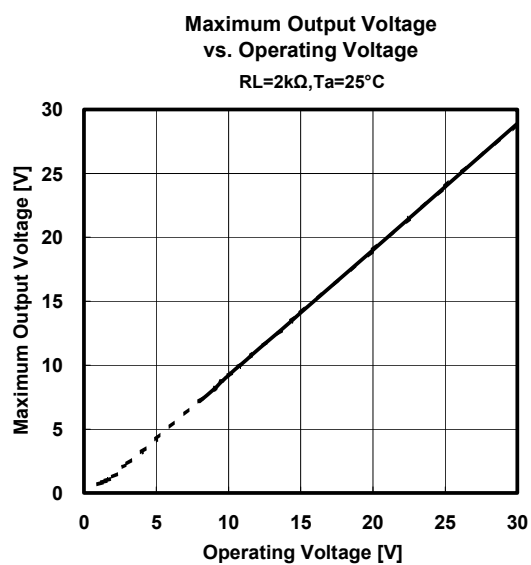
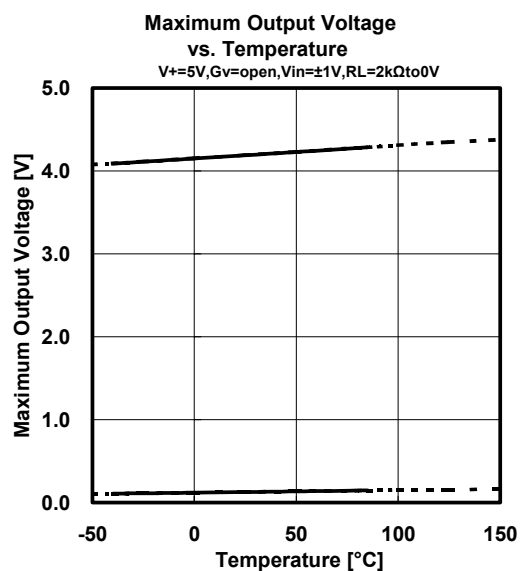
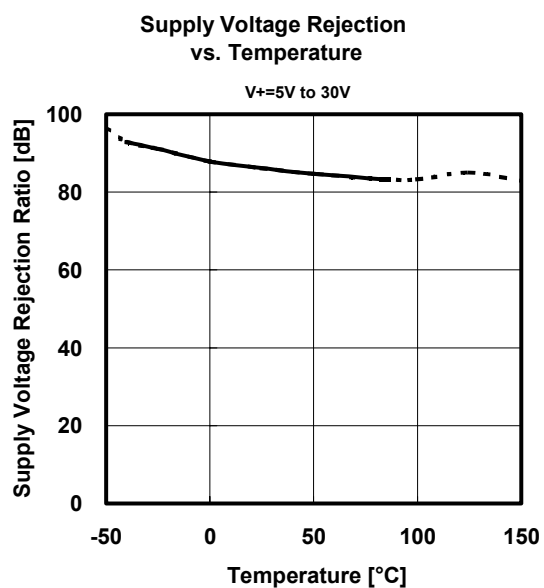
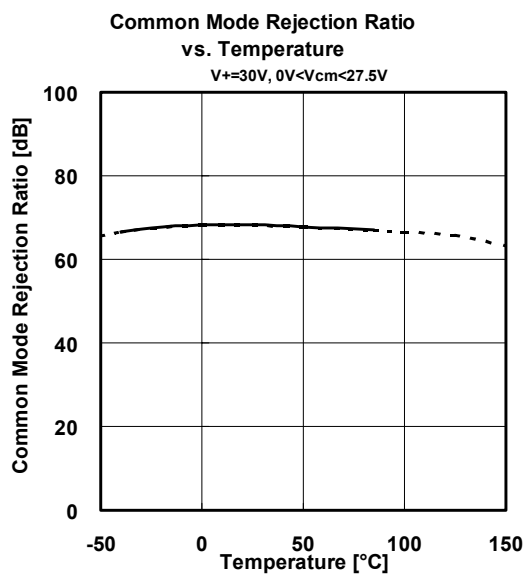
$V+=5V$



Voltage Gain vs. Temperature

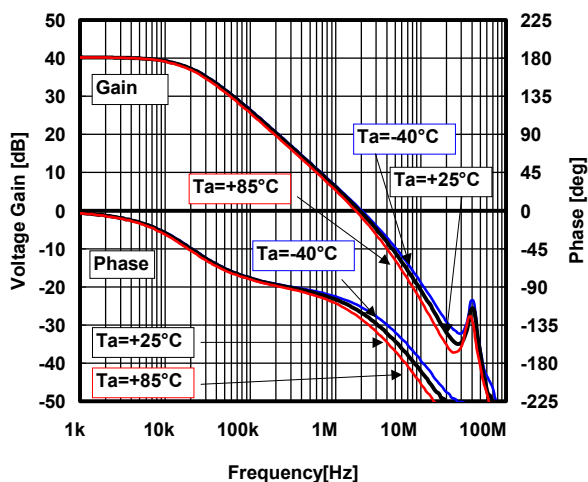
$V+=5V$





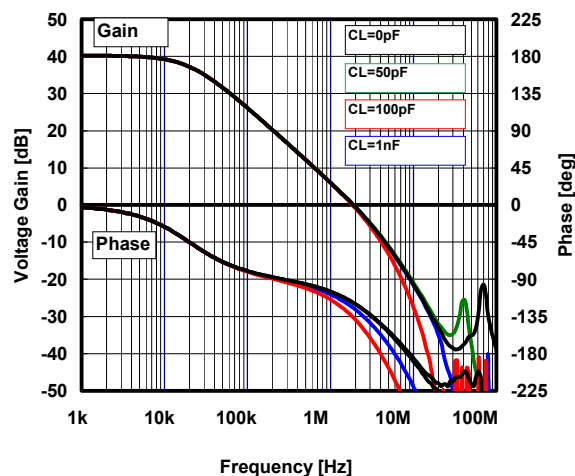
Voltage Gain & Phase vs. Frequency

V+=5V, VIN=0.02Vpp, GV=40dB, RT=50Ω, RF=1.98kΩ, RG=20Ω, CF=0, RL=2kΩ, CL=50pF



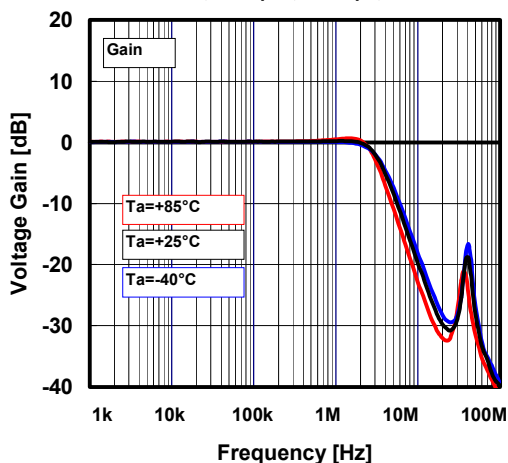
Voltage Gain & Phase vs. Frequency

V+=5V, VIN=0.01Vpp, GV=40dB, RT=50Ω, RF=1.98kΩ, RG=20Ω, RL=10kΩ, Ta=+25°C



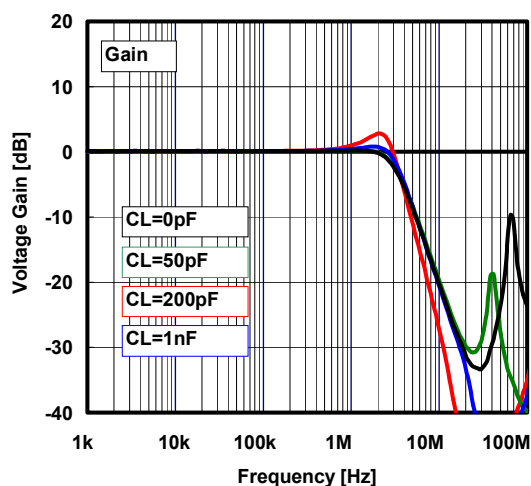
Peak Gain of Voltage Follower

V+=5V, VIN=0.02Vpp, GV=0dB, RT=50Ω, RF=0Ω, RG=open, CL=50pF, RL=1kΩ



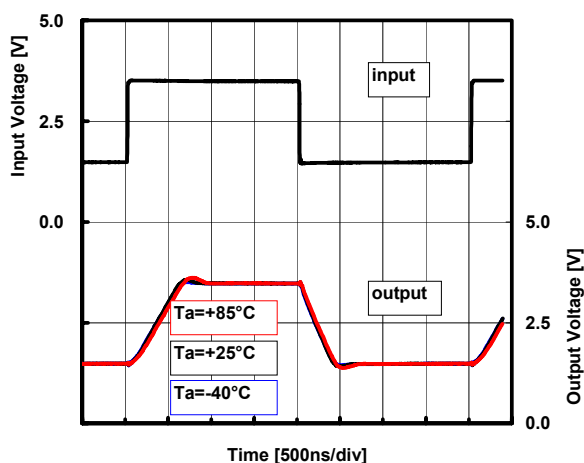
Peak Gain of Voltage Follower

V+=5V, VIN=0.02Vpp, GV=0dB, RT=50Ω, RF=0Ω, RG=open, RL=1kΩ, Ta=+25°C



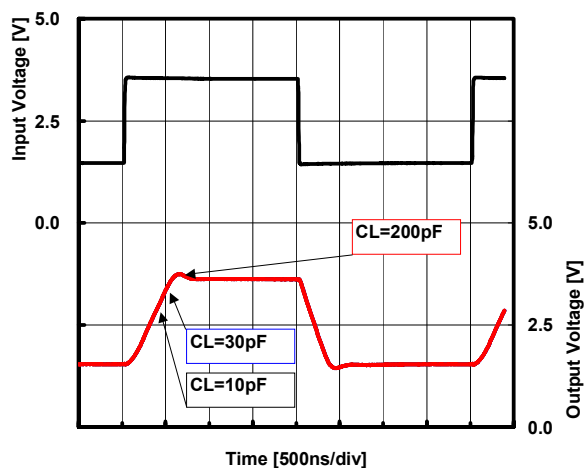
Pulse Response

V+=5V, f=250kHz, VO=4VPP, GV=0dB, RT=50Ω, RF=0Ω, CL=10pF, RG=open, RL=10kΩ, Ta=25°C

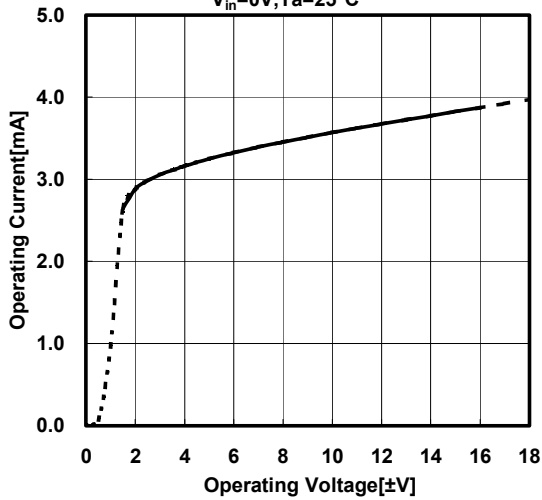


Pulse Response

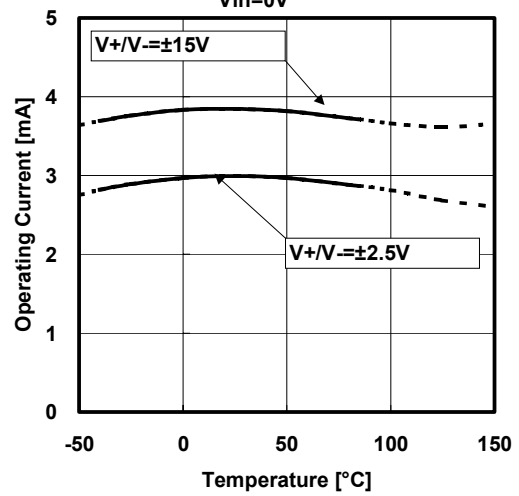
V+=5V, f=250kHz, VO=4VPP, GV=0dB, RT=50Ω, RF=0Ω, CF=0, RG=open, RL=2kΩ, Ta=25°C



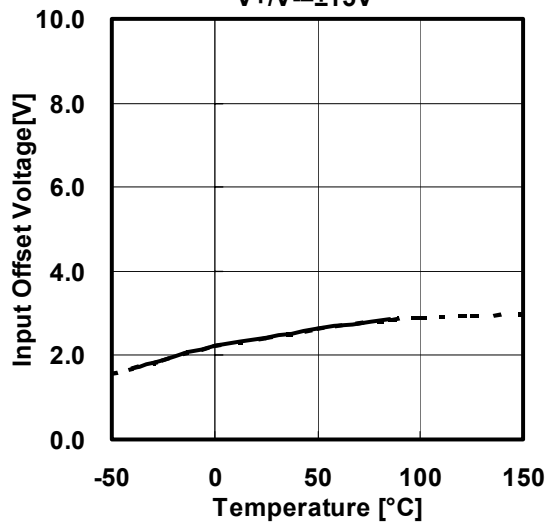
Operating Current vs. Operating Voltage
 $V_{in}=0V, T_a=25^{\circ}C$



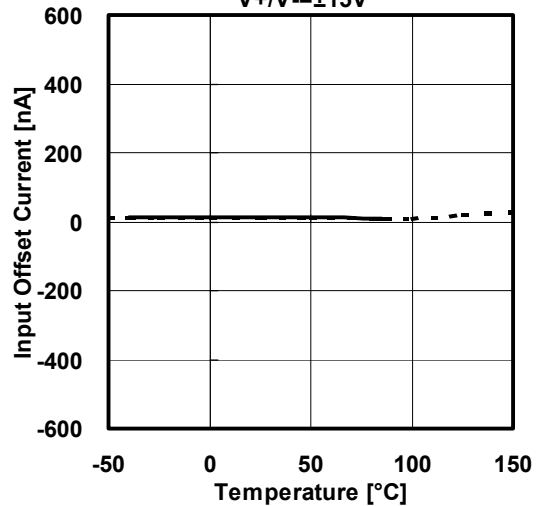
Operating Current vs. Temperature
 $V_{in}=0V$



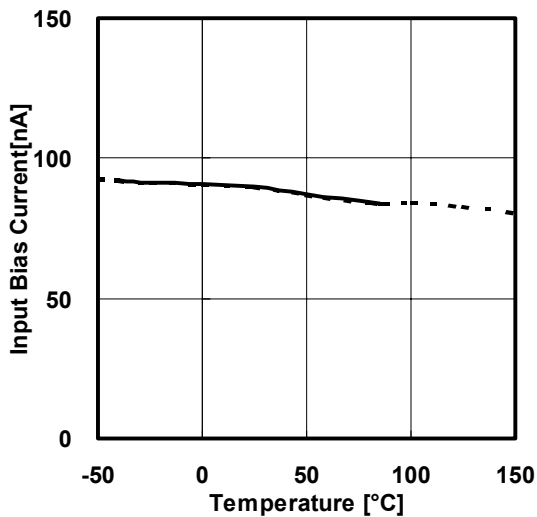
Input Offset Voltage vs. Temperature
 $V+/V-=\pm 15V$



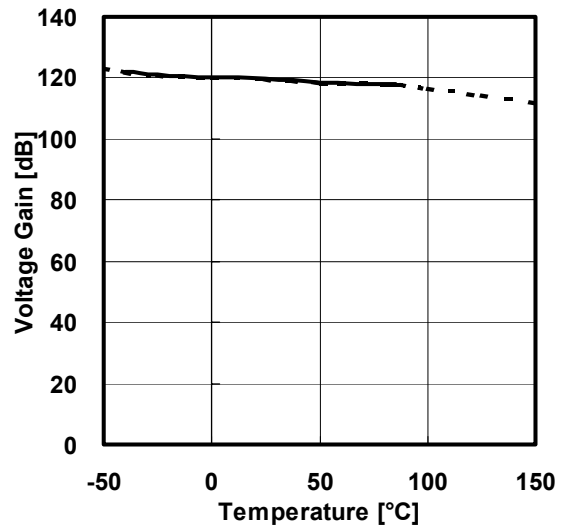
Input Offset Current vs. Temperature
 $V+/V-=\pm 15V$



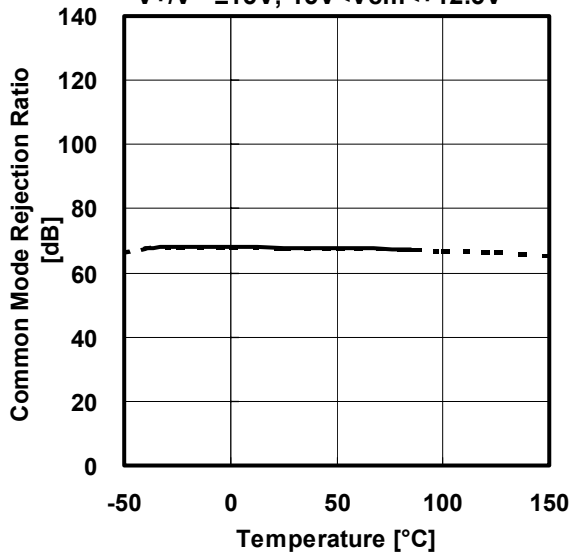
Input Bias Current vs. Temperature
 $V+/V-=\pm 15V$



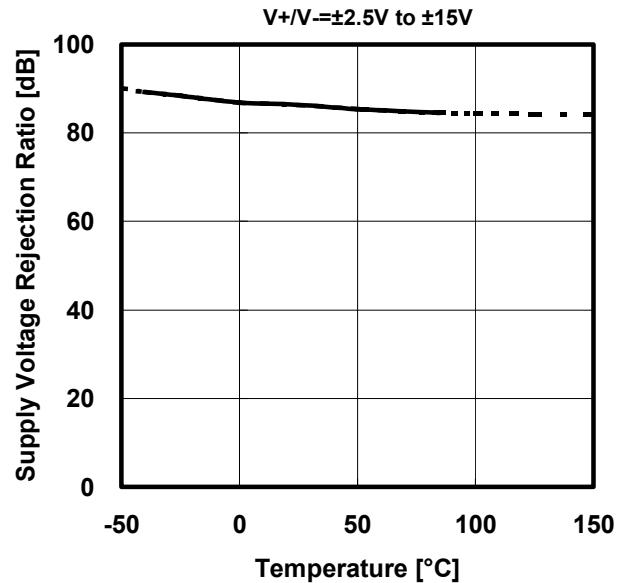
Voltage Gain vs. Temperature
 $V+/V-=\pm 15V, R_L=2k\Omega$



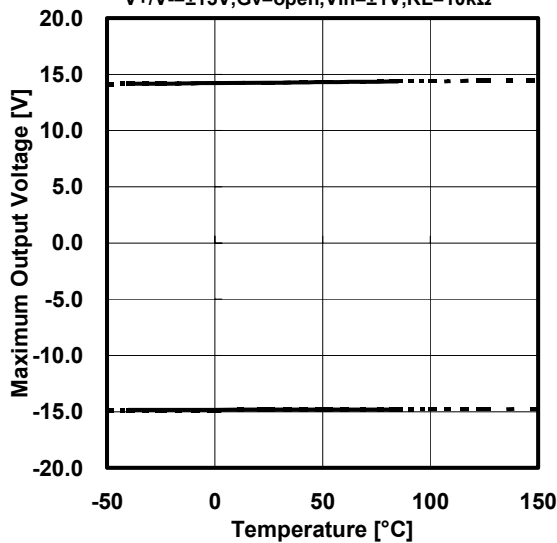
Common Mode Rejection Ratio
vs. Temperature
 $V_+/V_- = \pm 15V, -15V < V_{cm} < +12.5V$



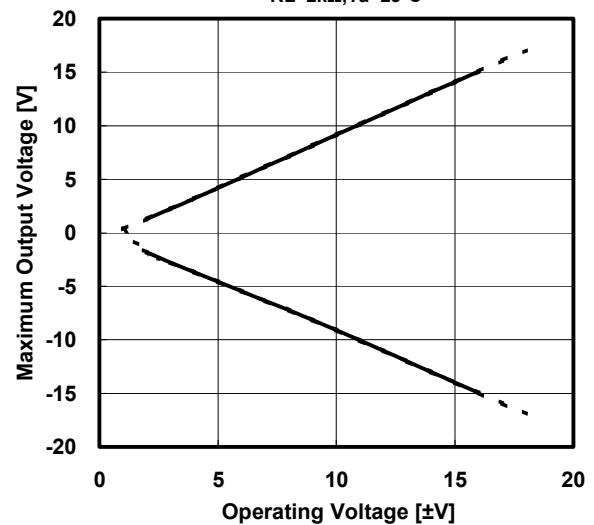
Supply Voltage Rejection Ratio
vs. Temperature
 $V_+/V_- = \pm 2.5V$ to $\pm 15V$



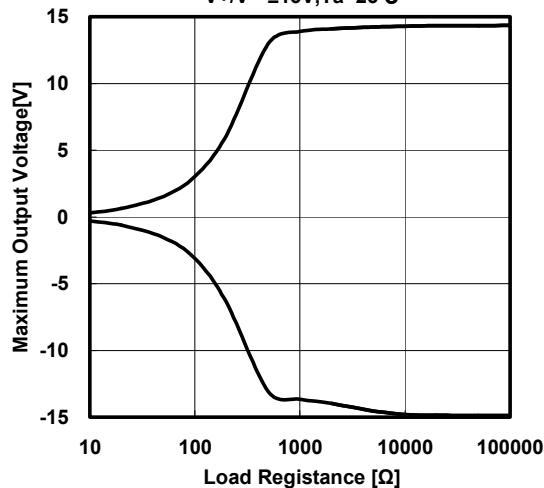
Maximum Output Voltage
vs. Temperature
 $V_+/V_- = \pm 15V, G_v = \text{open}, V_{in} = \pm 1V, R_L = 10k\Omega$



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

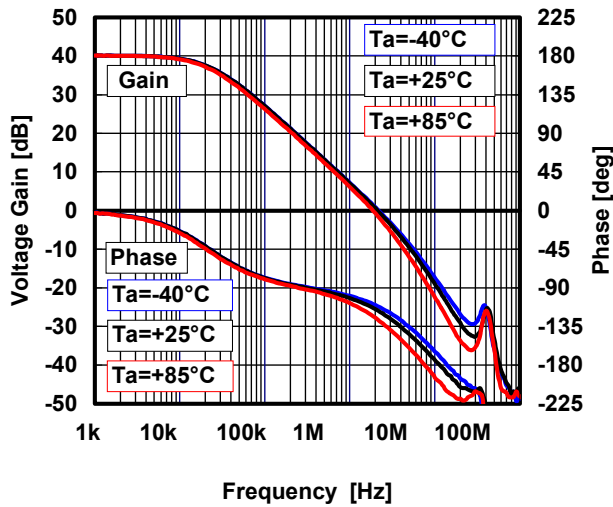


Maximum Output Voltage vs. Operating Current
 $V_+/V_- = \pm 15V, T_a = 25^\circ C$



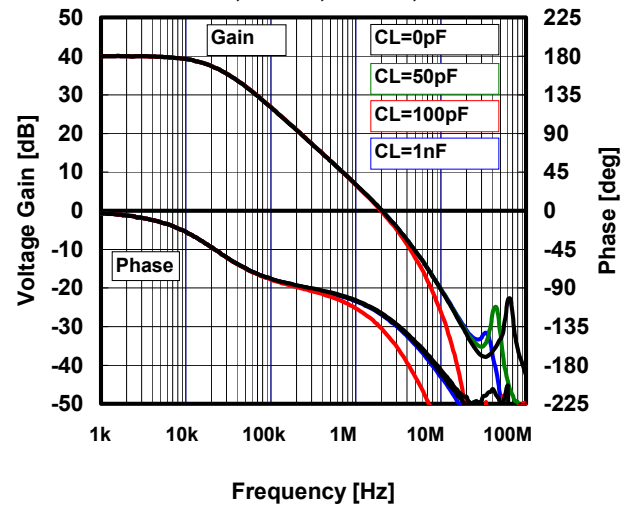
Voltage Gain & Phase vs. Frequency

$V+/V- = \pm 15V$, $V_{IN} = 0.02V_{pp}$, $GV = 40dB$, $RT = 50\Omega$,
 $RF = 1.98k\Omega$, $RG = 20\Omega$, $CF = 0$, $RL = 2k\Omega$, $CL = 50pF$



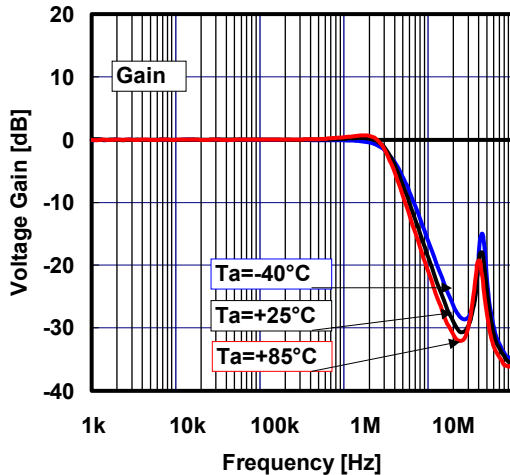
Voltage Gain & Phase vs. Frequency

$V+/V- = \pm 15V$, $V_{IN} = 0.01V_{pp}$, $GV = 40dB$, $RT = 50\Omega$,
 $RF = 1.98k\Omega$, $RG = 20\Omega$, $RL = 10k\Omega$, $Ta = +25^\circ C$



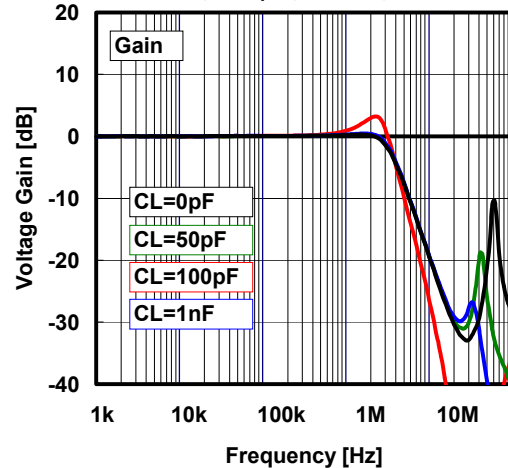
Peak Gain of Voltage Follower

$V+/V- = \pm 15V$, $V_{IN} = 0.02V_{pp}$, $GV = 0dB$, $RT = 50\Omega$, $RF = 0$,
 Ω , $RG = open$, $CF = 0$, $RL = 2k\Omega$, $CL = 50pF$



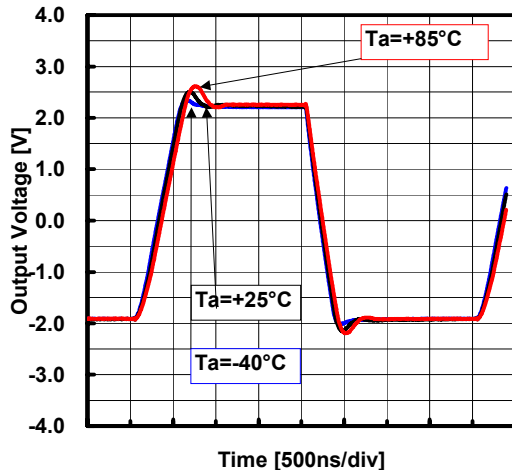
Peak Gain of Voltage Follower

$V+/V- = \pm 15V$, $V_{IN} = 0.02V_{pp}$, $GV = 0dB$, $RT = 50\Omega$,
 $RF = 0\Omega$, $RG = open$, $RL = 10k\Omega$, $Ta = +25^\circ C$



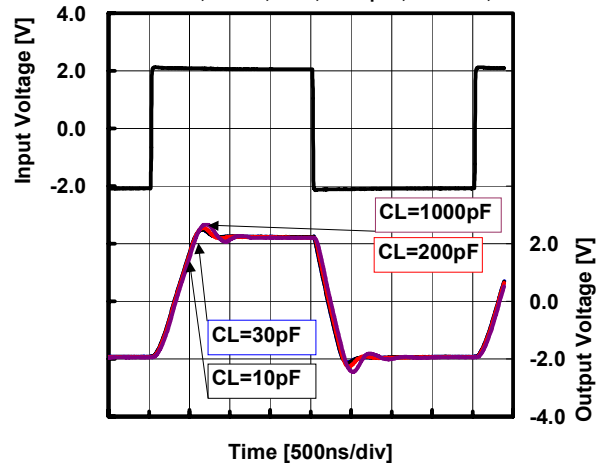
Pulse Response

$V+/V- = \pm 15V$, $f = 250kHz$, $VO = 4V_{PP}$, $GV = 0dB$,
 $RT = 50\Omega$, $RF = 0\Omega$, $CF = 0$, $RG = open$, $CL = 50pF$, $RL = 10k\Omega$



Pulse Response

$V+/V- = \pm 15V$, $f = 250kHz$, $VO = 4V_{PP}$, $GV = 0dB$,
 $RT = 50\Omega$, $RF = 0\Omega$, $CF = 0$, $RG = open$, $RL = 10k\Omega$, $Ta = 25^\circ C$



[CAUTION]
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