HIGH SPEED SINGLE SUPPLY OPERATIONAL AMPLIFIER

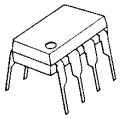
■ GENERAL DESCRIPTION

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

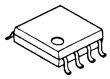
It has wide supply voltage range, +3 to +32 volt and high slew rate.

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

■ PACKAGR OUTLINE



NJM2742D



NJM2742M

NJM2742V

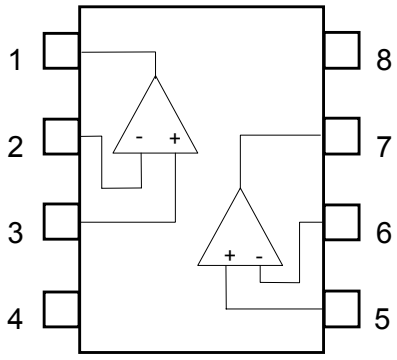
NJM2742RB1

■ FEATURES

- Single Supply
- Operating Voltage (3 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 DIP8,DMP8,SSOP8,TVSP8

■ PIN CONFIGURATION

(Top View)



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^-=±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	Av	R_L>2kΩ	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>10kΩ	+13.7 /-13.7	+14 /-14.8	-	V
Maximum Output Voltage 2	V_{OM2}	R_L>2kΩ	+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}		-	1.0	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	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=2kΩ	3.7	4.0	-	V
	V_{OL}	R_L=2kΩ	-	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)

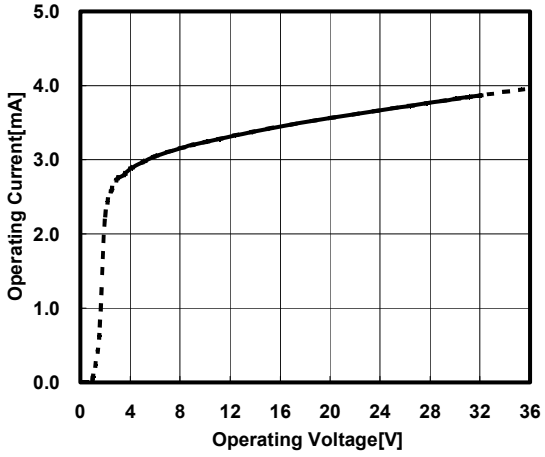
PARAMETER	SYMBOL	TEST CONDITION	MIN	TYP	MAX	UNIT
Slew Rate	SR		-	7	-	V/μs

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

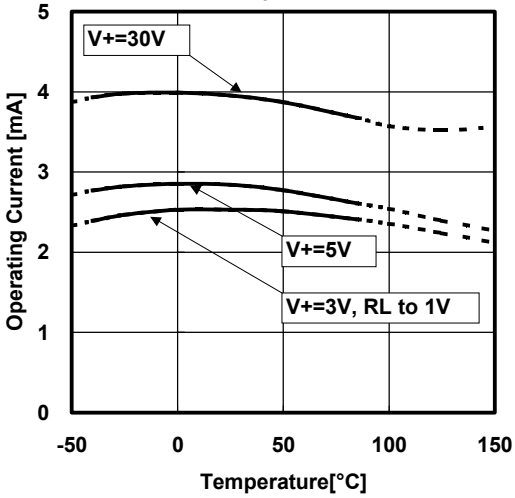
Operating Current vs. Operating Voltage

V_{in}=0V,Ta=25°C



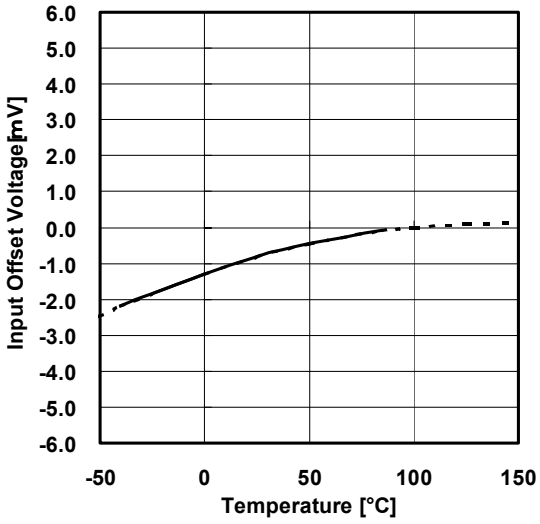
Operating Current vs. Temperature

Vin=0V



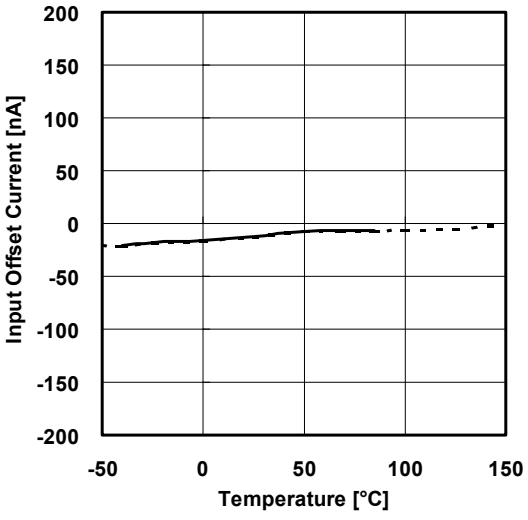
Input Offset Voltage vs. Temperature

V+=5V



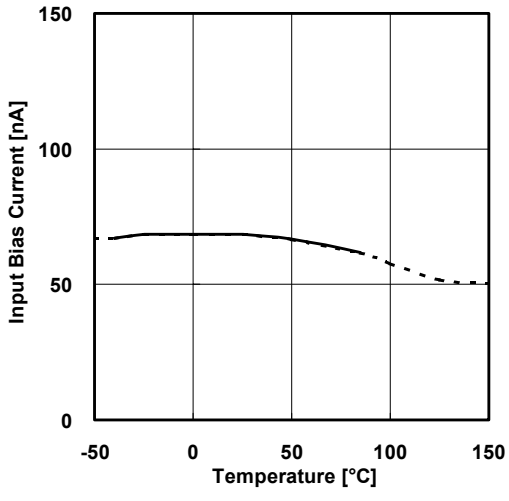
Input Offset Current vs. Temperature

V+=5V



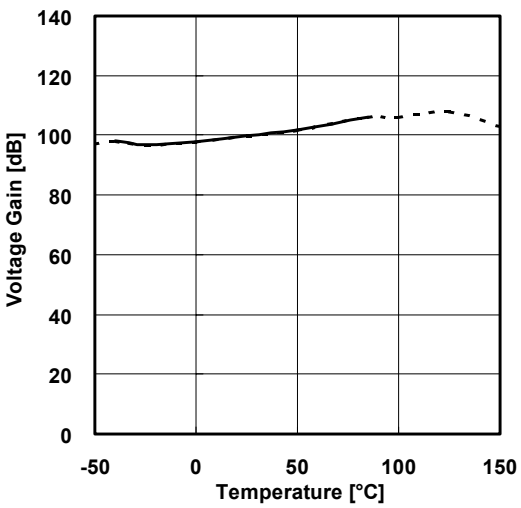
Input Bias Current vs. Temperature

V+=5V



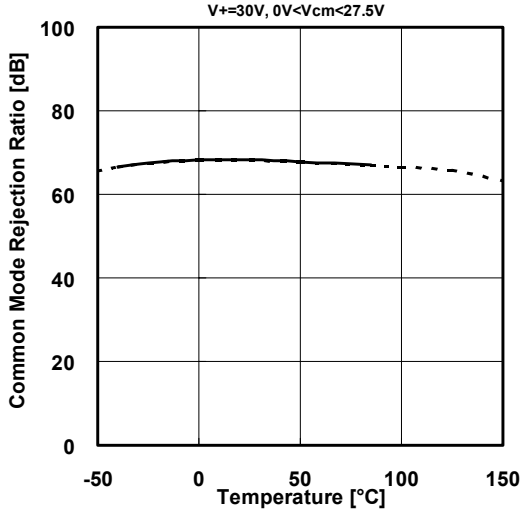
Voltage Gain vs. Temperature

V+=5V



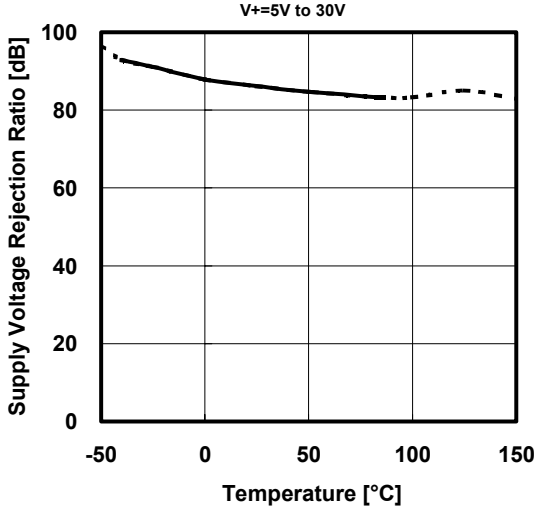
Common Mode Rejection Ratio vs. Temperature

V+=30V, 0V<Vcm<27.5V



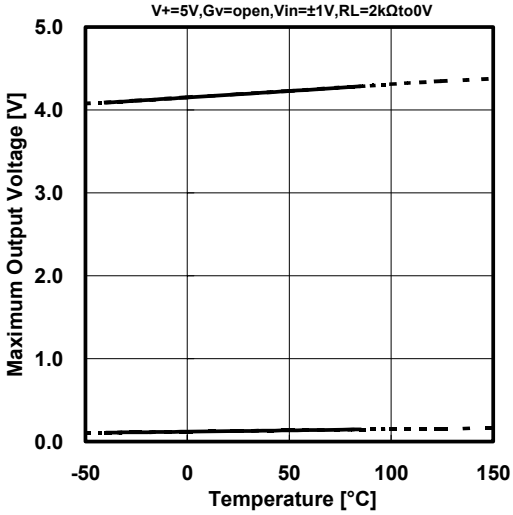
Supply Voltage Rejection vs. Temperature

V+=5V to 30V



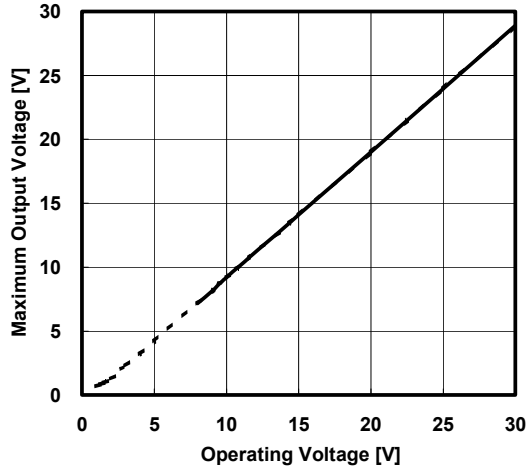
Maximum Output Voltage vs. Temperature

V+=5V,Gv=open,Vin=±1V,RL=2kΩto0V



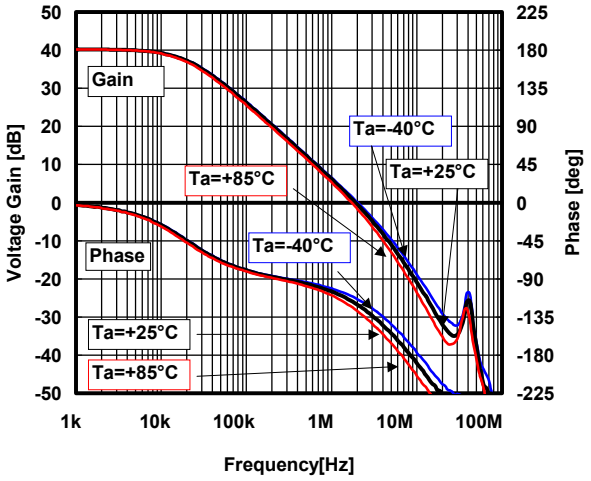
Maximum Output Voltage vs. Operating Voltage

RL=2kΩ,Ta=25°C



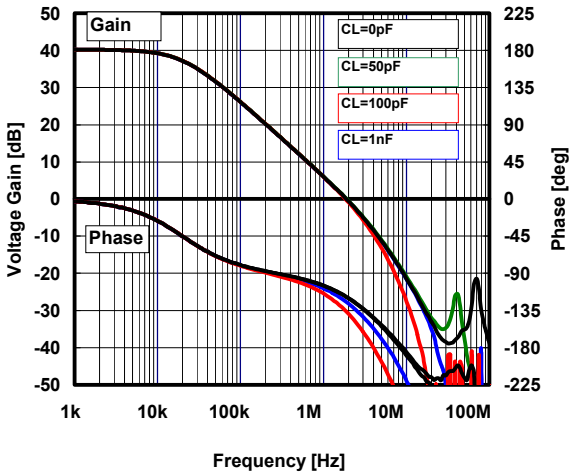
Voltage Gain & Phase vs. Frequency

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



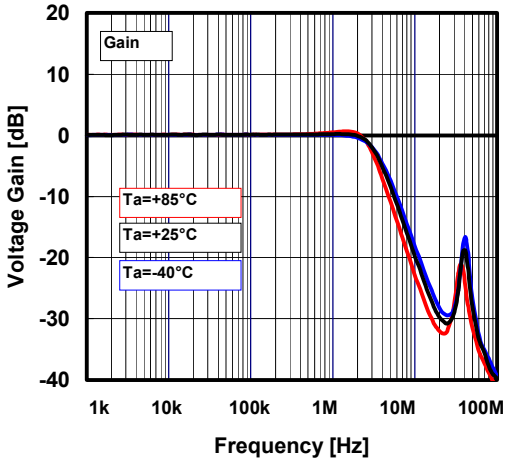
Voltage Gain & Phase vs. Frequency

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



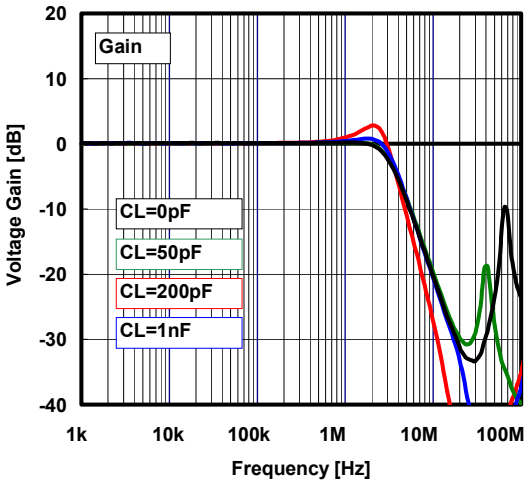
Peak Gain of Voltage Follower

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



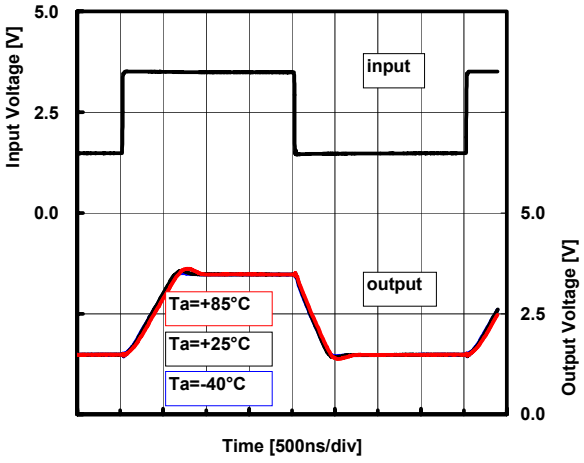
Peak Gain of Voltage Follower

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



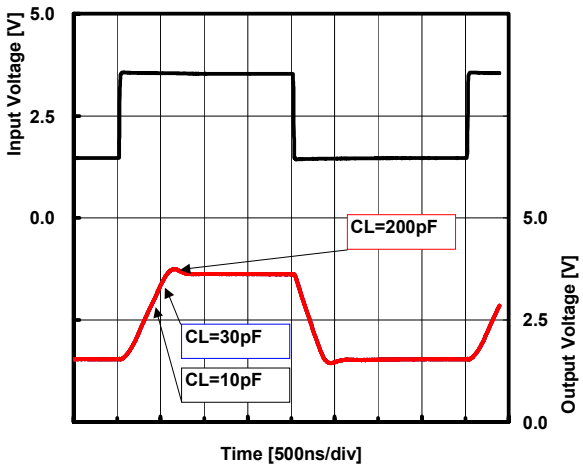
Pulse Response

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



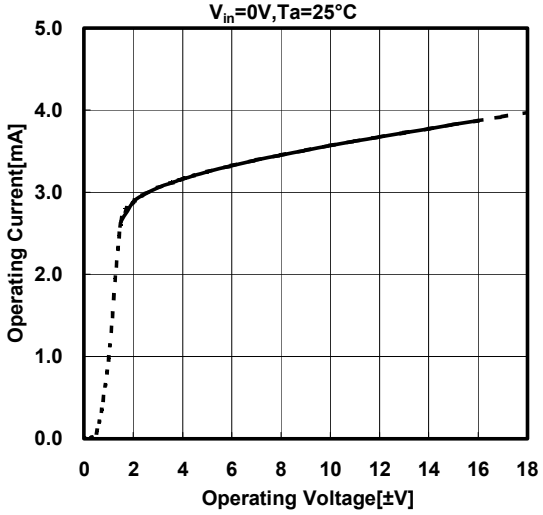
Pulse Response

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



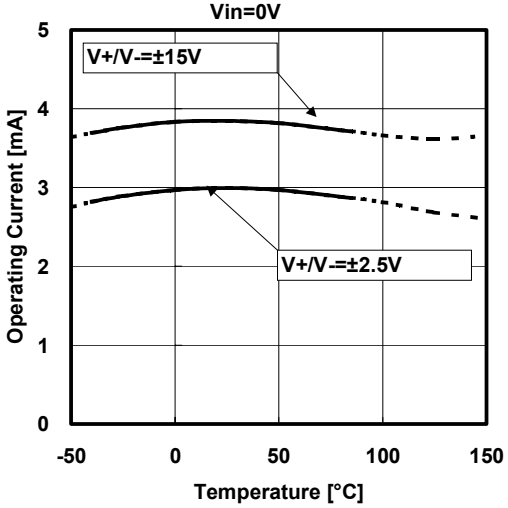
Operating Current vs. Operating Voltage

V_{in}=0V,Ta=25°C



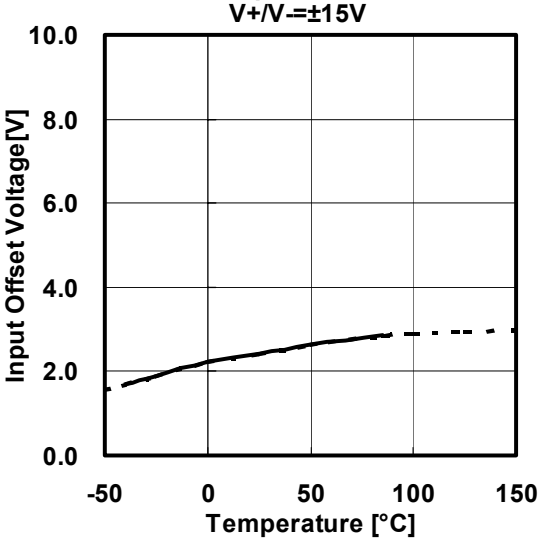
Operating Current vs. Temperatur

Vin=0V



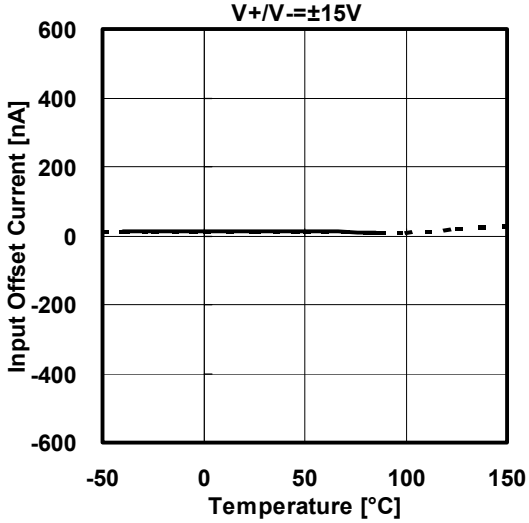
Input Offset Voltage vs. Temperature

V+/V-=±15V



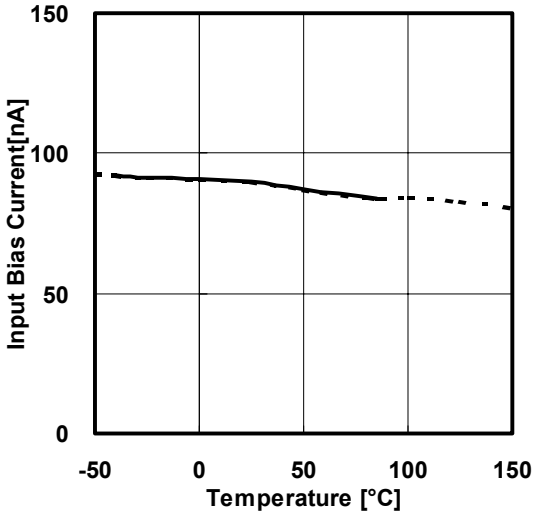
Input Offset Current vs. Temperature

V+/V-=±15V



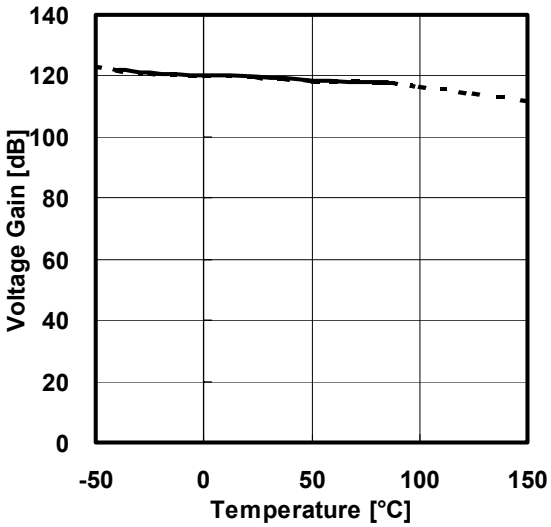
Input Bias Currentvs. Temperature

V+/V-=±15V

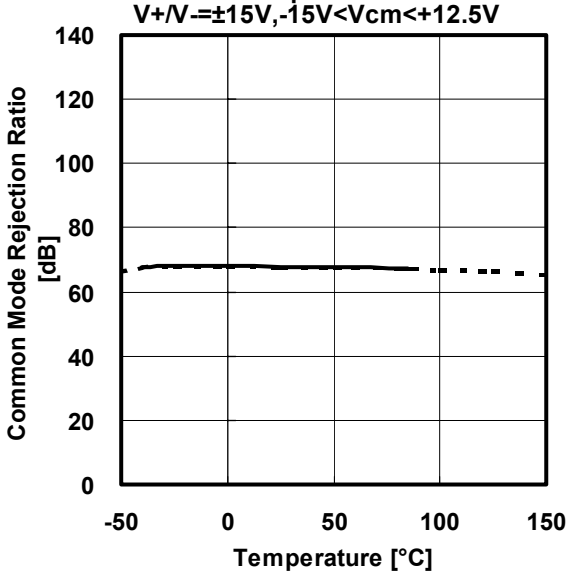


Voltage Gain vs. Temperature

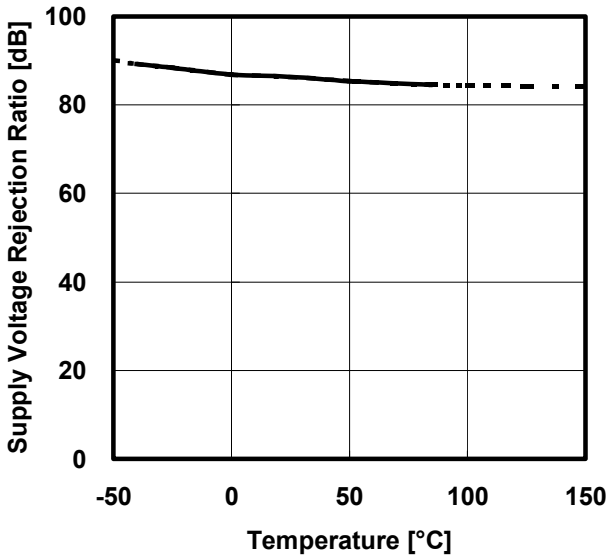
V+/V-=±15V,RL=2kΩ



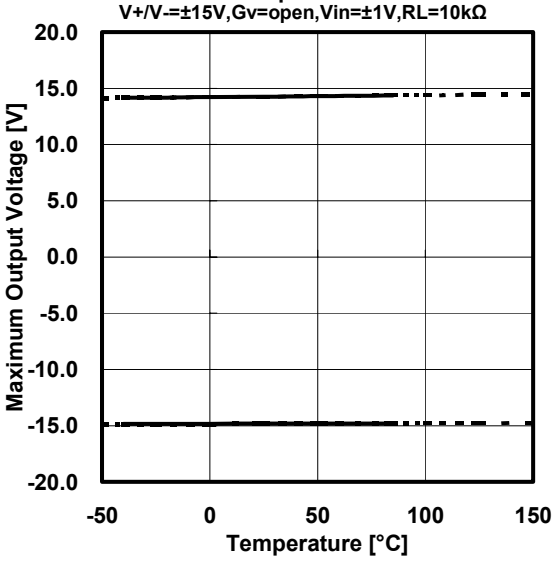
Common Mode Rejection Ratio
vs. Temperature
V+/V-=±15V,-15V<Vcm<+12.5V



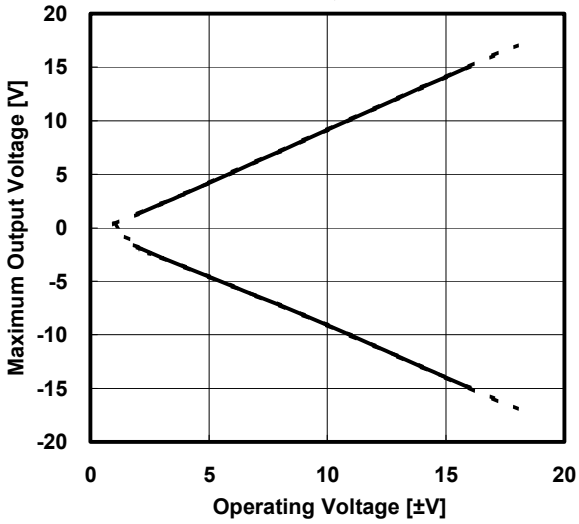
Supply Voltage Rejection Ratio
vs. Temperature
V+/V-=±2.5V to ±15V



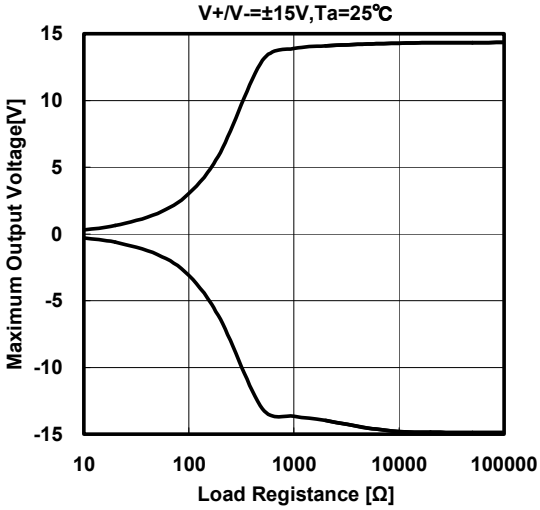
Maximum Output Voltage
vs. Temperature
V+/V-=±15V,Gv=open,Vin=±1V,RL=10kΩ



Maximum Output Voltage vs. Operating Voltage
RL=2kΩ,Ta=25°C

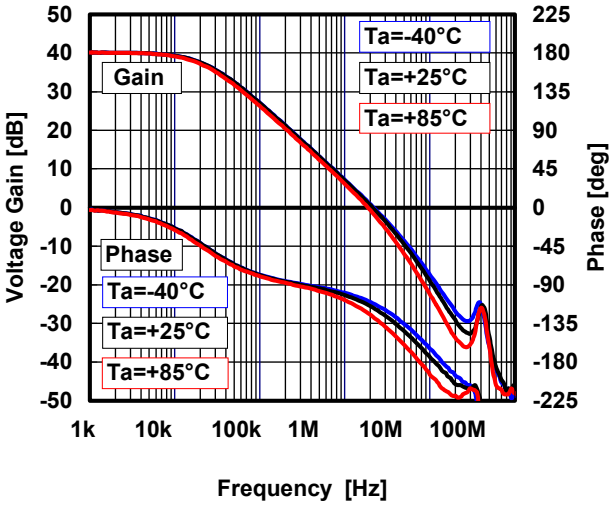


Maximum Output Voltage vs. Operating Current
V+/V-=±15V,Ta=25℃



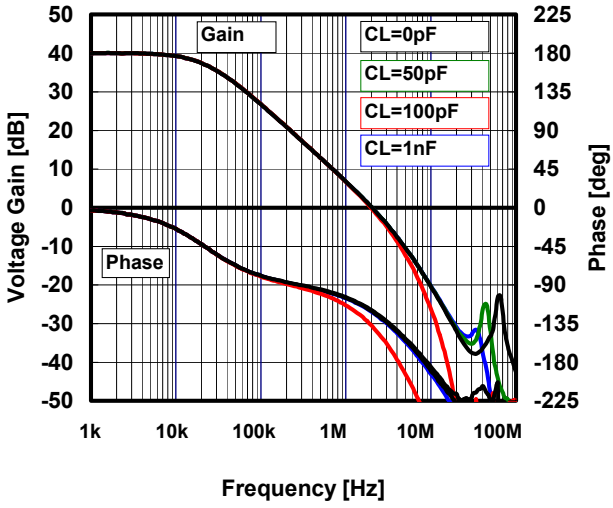
Voltage Gain & Phase vs. Frequency

V+/V-=±15V,VIN=0.02Vpp,GV=40dB,RT=50Ω,
RF=1.98kΩ,RG=20Ω,CF=0,RL=2kΩ,CL=50pF



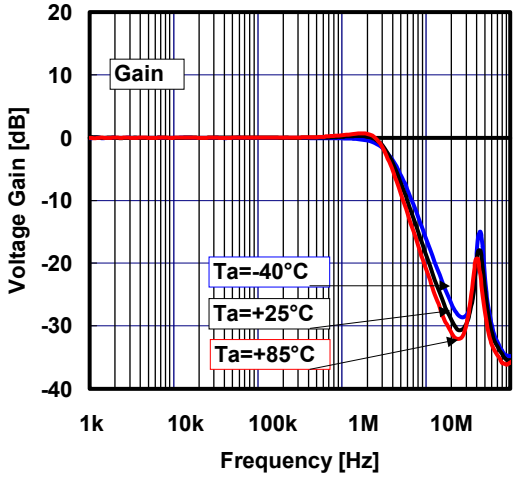
Voltage Gain & Phase vs. Frequency

V+/V-=±15V,VIN=0.01Vpp,GV=40dB,RT=50Ω,
RF=1.98kΩ,RG=20Ω,RL=10kΩ,Ta=+25°C



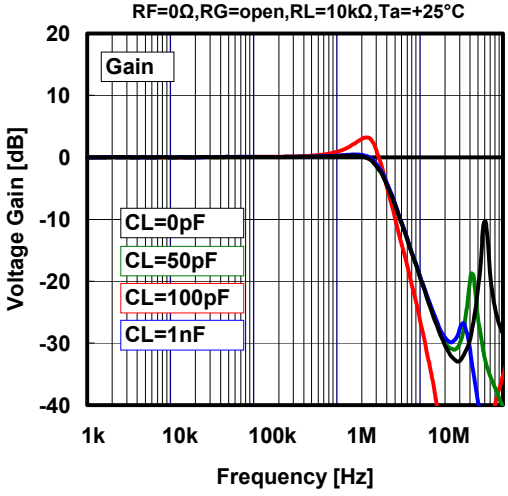
Peak Gain of Voltage Follower

V+/V-=±15V,VIN=0.02Vpp,GV=0dB,RT=50Ω, RF=0
Ω,RG=open,CF=0,RL=2kΩ,CL=50pF



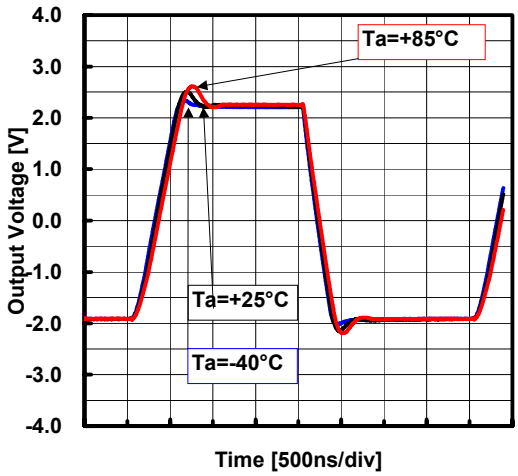
Peak Gain of Voltage Follower

V+/V-=±15V,VIN=0.02Vpp,GV=0dB,RT=50Ω,
RF=0Ω,RG=open,RL=10kΩ,Ta=+25°C



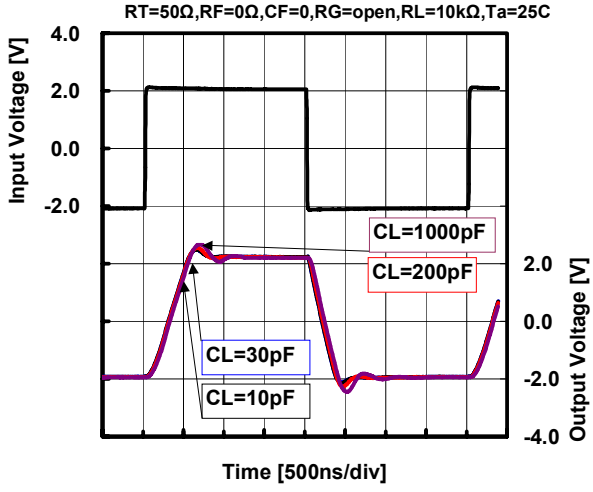
Pulse Response

V+/V-=±15V,f=250kHz,VO=4VPP,GV=0dB,
RT=50Ω,RF=0Ω,CF=0,RG=open,CL=50pF,RL=10kΩ



Pulse Response

V+/V-=±15V,f=250kHz,VO=4VPP,GV=0dB,
RT=50Ω,RF=0Ω,CF=0,RG=open,RL=10kΩ,Ta=25C



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