

Single Supply, Rail-to-Rail Output Single Operational Amplifier

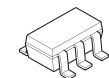
■ GENERAL DESCRIPTION

NJM2741 is a low noise Rail-to-Rail Output single operational amplifier.

Rail-to-Rail Output function provides wide dynamic range, is from ground to power supply level. And Input range rails from ground level.

It is suitable for audio section of portable sets, PCs and any General-purpose applications.

■ PACKAGE OUTLINE



NJM2741F

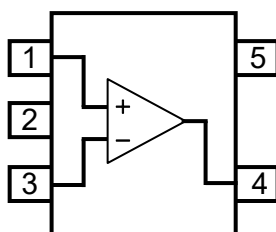


NJM2741F3

■ FEATURES

- Operating Voltage 2.5V to 14V
- Rail-to-Rail Output $V_{OH} \geq 4.9V$ Typ. (at $V^+=5V$, $R_L=5k\Omega$)
 $V_{OL} \leq 0.1V$ Typ. (at $V^+=5V$, $R_L=5k\Omega$)
- Offset Voltage 1mV Typ.
- Slew Rate 3.5V/ μ s Typ.
- Low Distortion 0.001% Typ. (at $V^+=5V$, $f=1kHz$)
- Low Input Voltage Noise 10nV/ $\sqrt{Hz}$ Typ. (at $f=1kHz$)
- Bipolar Technology
- Package Outline SOT-23-5, SC88A

■ PIN CONFIGURATION



NJM2741F
NJM2741F3
(Top View)

PIN FUNCTION

1. +INPUT
2. GND
3. -INPUT
4. OUTPUT
5. V^+

■ ABSOLUTE MAXIMUM RATINGS

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	15	V
Differential Input Voltage Range	V_{ID}	± 15 (Note1)	V
Common Mode Input Voltage Range	V_{ICM}	0 to 15 (Note1)	V
Power Dissipation	P_D	390[SOT-23-5] (Note2) 280[SC88A] (Note2)	mW
Operating Temperature Range	T_{opr}	-40 to +85	°C
Storage Temperature Range	T_{stg}	-50 to +125	°C

(Note1) For supply voltage less than 15V, the absolute maximum input voltage is equal to the supply voltage.

(Note2) On the PCB "EIA/JEDEC (76.2×114.3×1.6mm, two layers, FR-4)"

■ OPERATING VOLTAGE ($T_a=25^\circ\text{C}$)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V^+	2.5 to 14	V

■ ELECTRICAL CHARACTERISTICS

● DC CHARACTERISTICS ($V^+=5\text{V}, T_a=25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I_{CC}	$R_L=\infty, V_{IN}=2.5\text{V}$, No Signal Apply	-	2.2	3.3	mA
Input Offset Voltage	V_{IO}	$R_S \leq 10\text{k}\Omega$	-	1	6	mV
Input Bias Current	I_B		-	100	350	nA
Input Offset Current	I_{IO}		-	5	100	nA
Large Signal Voltage Gain	A_V	$R_L \geq 10\text{k}\Omega$ to 2.5V, $V_O=0.5\text{V}$ to 4.5V	65	85	-	dB
Common Mode Rejection Ratio	CMR	$0\text{V} \leq V_{CM} \leq 4\text{V}$	60	75	-	dB
Supply Voltage Rejection Ratio	SVR	$V^+=2.5\text{V}$ to 14V, $V_{CM}=V^+/2$	60	80	-	dB
Output Voltage	V_{OH}	$R_L=5\text{k}\Omega$ to 2.5V	4.75	4.9	-	V
	V_{OL}	$R_L=5\text{k}\Omega$ to 2.5V	-	0.1	0.25	V
Input Common Mode Voltage Range	V_{ICM}	CMR $\geq 60\text{dB}$	0	-	4	V

● AC CHARACTERISTICS ($V^+=5\text{V}, T_a=25^\circ\text{C}$)

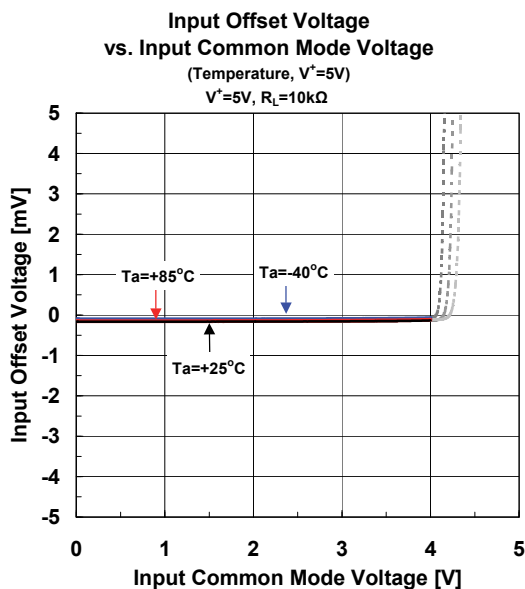
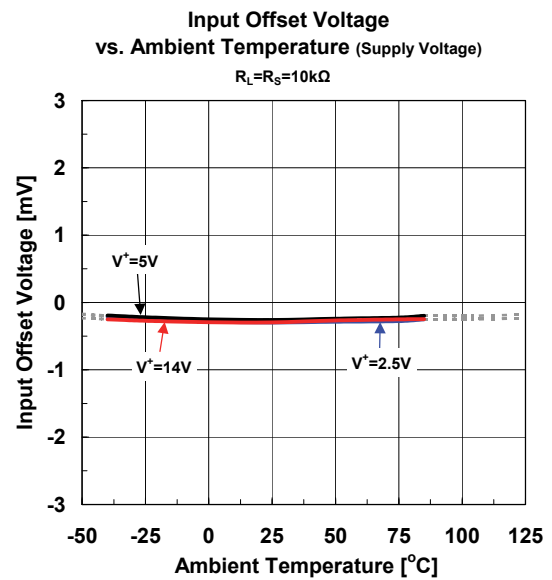
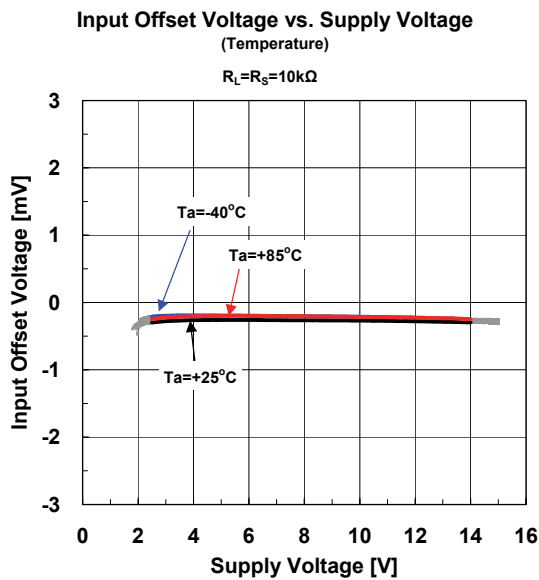
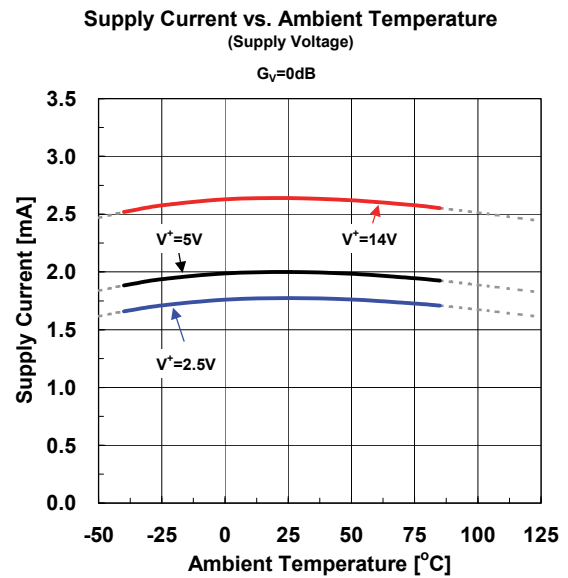
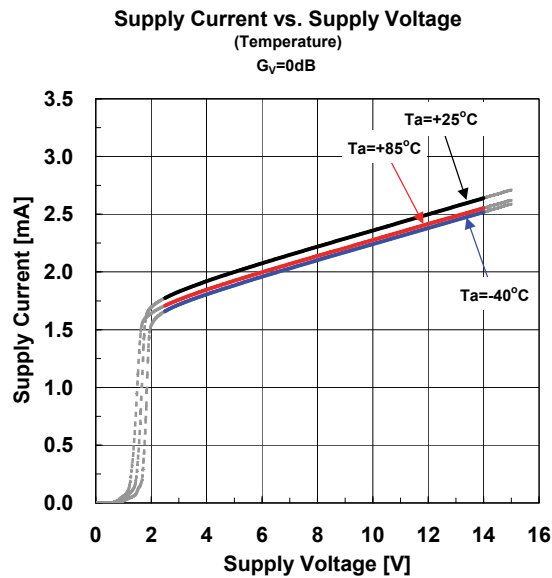
PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Unity Gain Bandwidth	GB	$f=10\text{kHz}, R_L=10\text{k}\Omega$ to 2.5V	-	10	-	MHz
Phase Margin	Φ_M	$R_L=10\text{k}\Omega$ to 2.5V, $C_L=10\text{pF}$	-	75	-	Deg
Equivalent Input Noise Voltage	V_{NI}	$f=1\text{kHz}, V_{CM}=2.5\text{V}$	-	10	-	nV/ $\sqrt{\text{Hz}}$
Total Harmonic Distortion	THD	$f=1\text{kHz}, A_V=+2$ $R_L=10\text{k}\Omega$ to 2.5V, $V_O=1.5\text{V}_{rms}$	-	0.001	-	%

● AC CHARACTERISTICS ($V^+=5\text{V}, T_a=25^\circ\text{C}$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Slew Rate	SR	(Note 3), $A_V=1, V_{IN}=2\text{V}_{pp}$ $R_L=10\text{k}\Omega$ to 2.5V, $C_L=10\text{pF}$	-	3.5	-	V/ μs

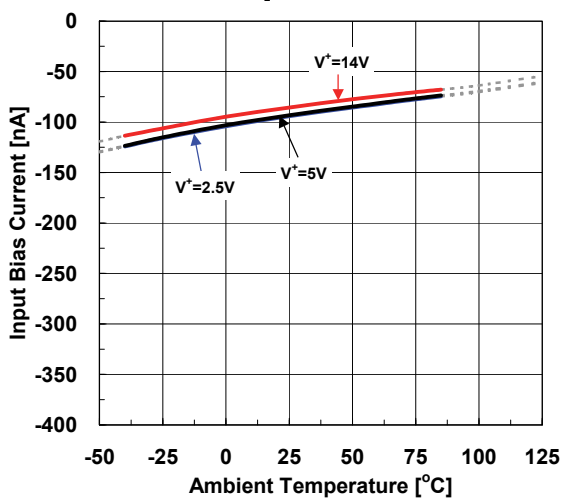
(Note 3) Number specified is the slower of the positive and negative slew rates.

■ Typical Characteristics

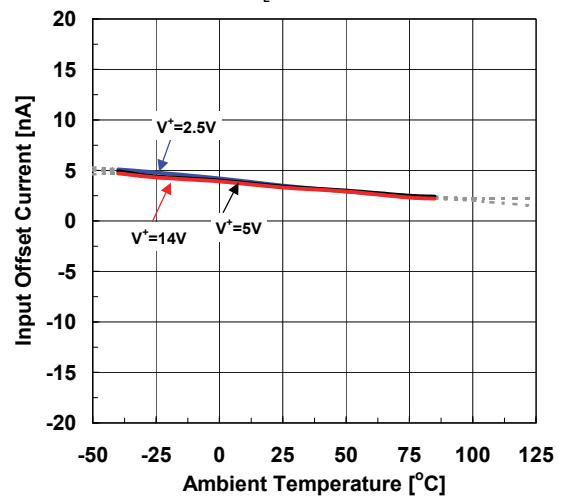


Typical Characteristics

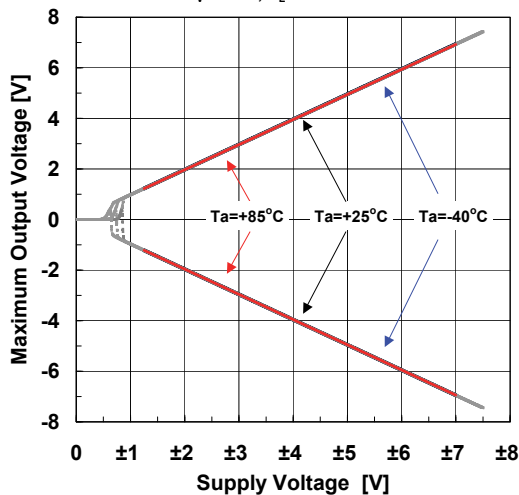
Input Bias Current vs. Ambient Temperature
(Supply Voltage)
 $R_L = 10k\Omega$



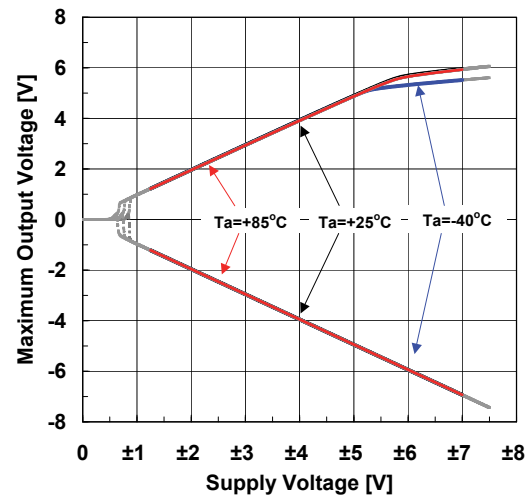
Input Offset Current vs. Ambient Temperature (Supply Voltage)
 $R_L = 10k\Omega$



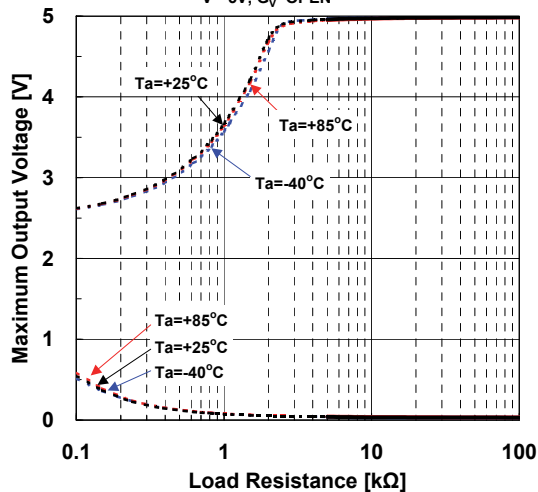
Maximum Output Voltage vs. Supply Voltage
(Temperature, $R_L = 10k\Omega$)
 $G_V = \text{OPEN}$, $R_L = 10k\Omega$



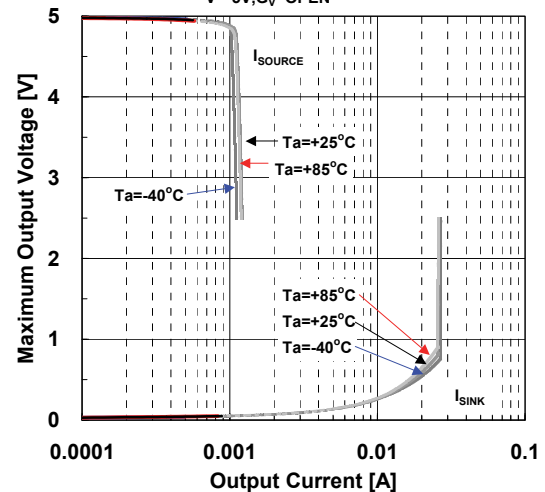
Maximum Output Voltage vs. Supply Voltage
(Temperature, $R_L = 5k\Omega$)
 $G_V = \text{OPEN}$, $R_L = 5k\Omega$



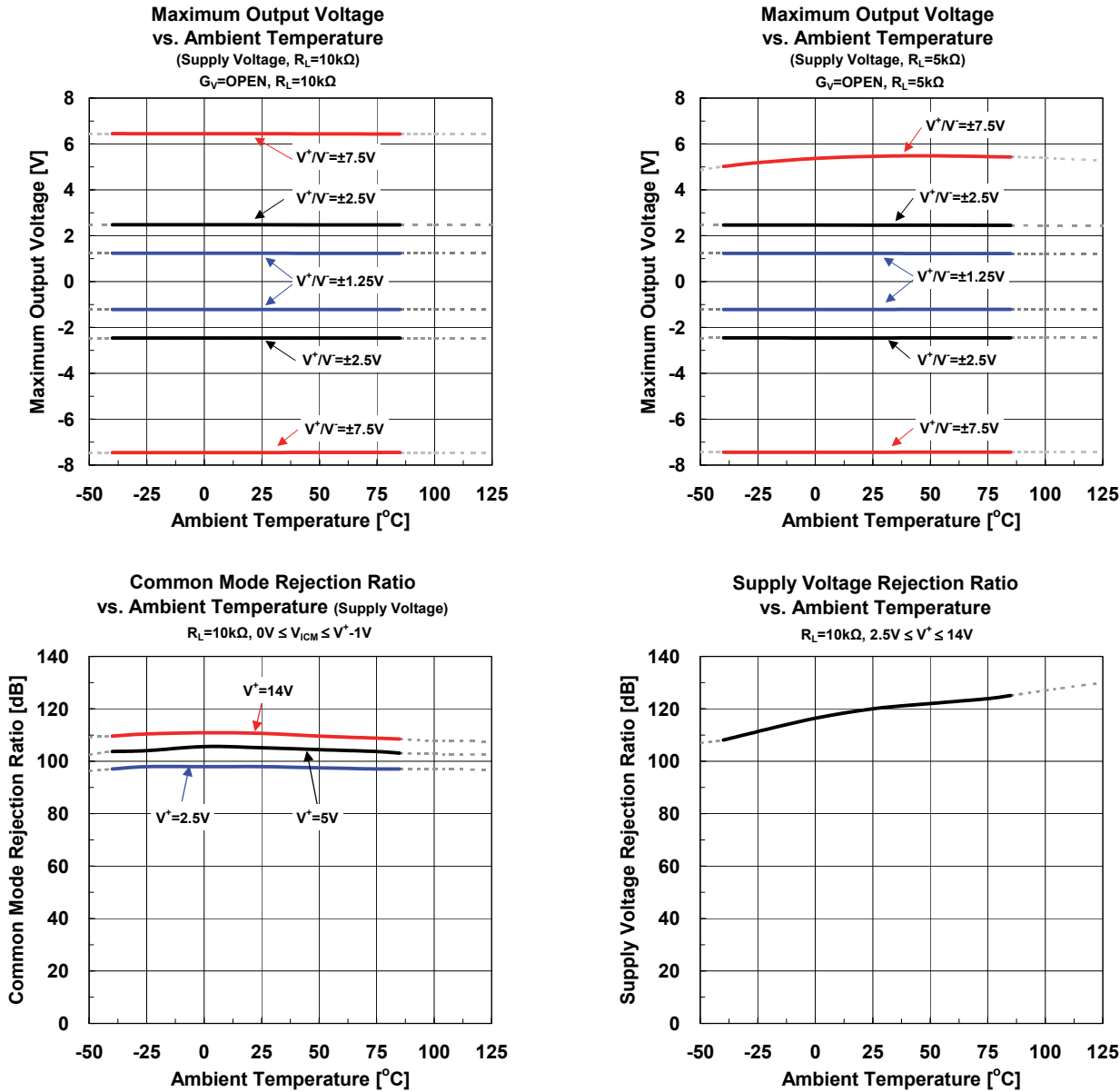
Maximum Output Voltage vs. Load Resistance
(Ambient Temperature, $V^+ = 5V$)
 $V^+ = 5V$, $G_V = \text{OPEN}$



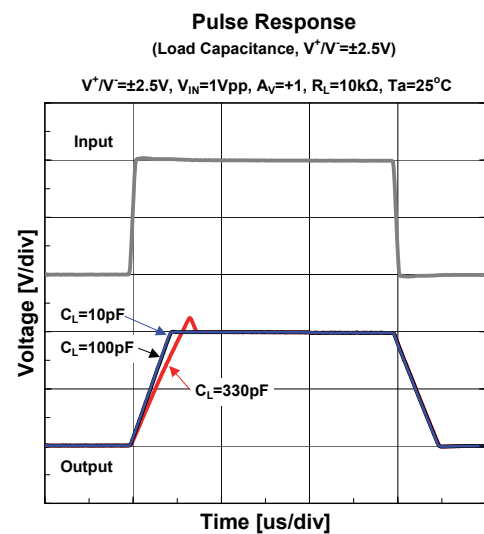
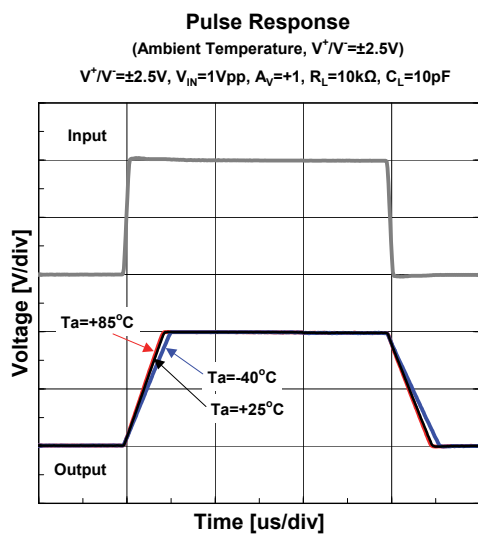
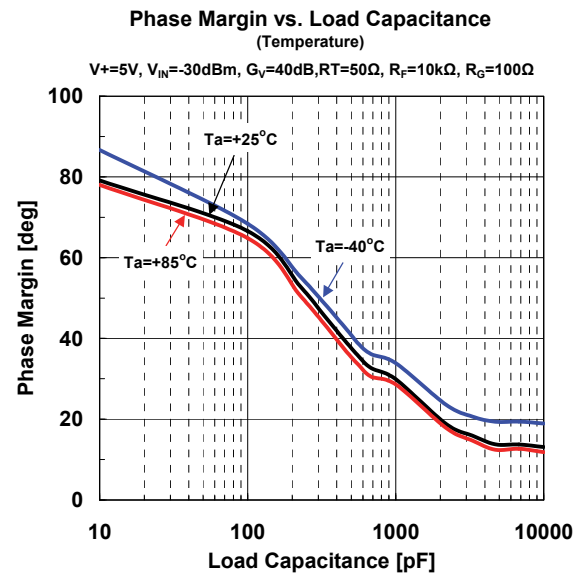
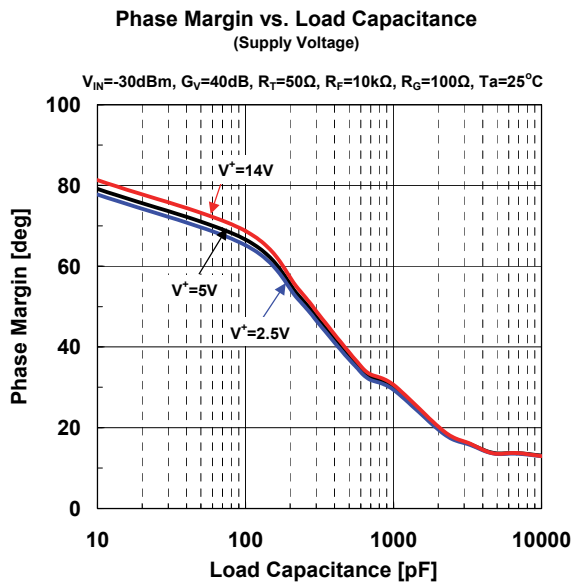
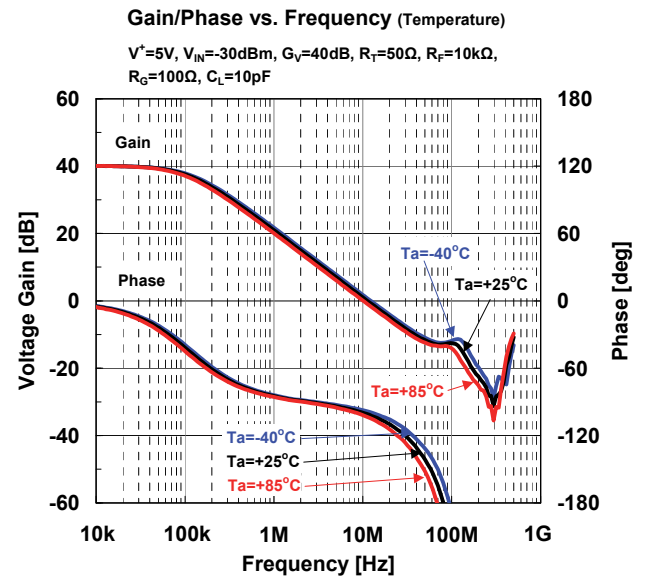
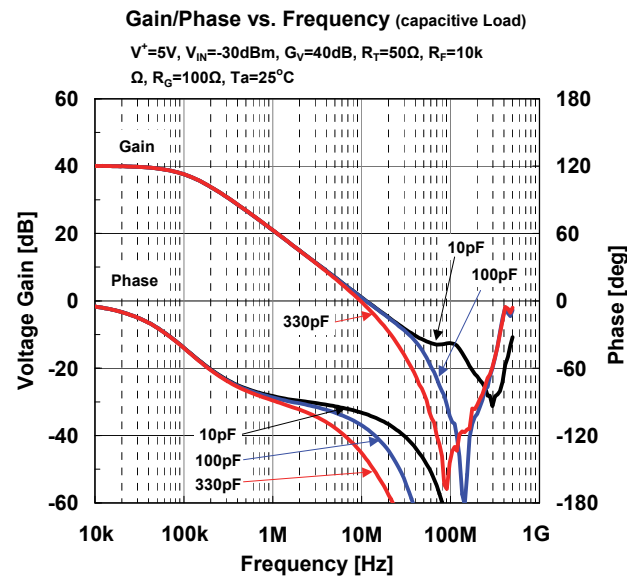
Maximum Output Voltage vs. Output Current
(Temperature, $V^+ = 5V$)
 $V^+ = 5V$, $G_V = \text{OPEN}$



■ Typical Characteristics



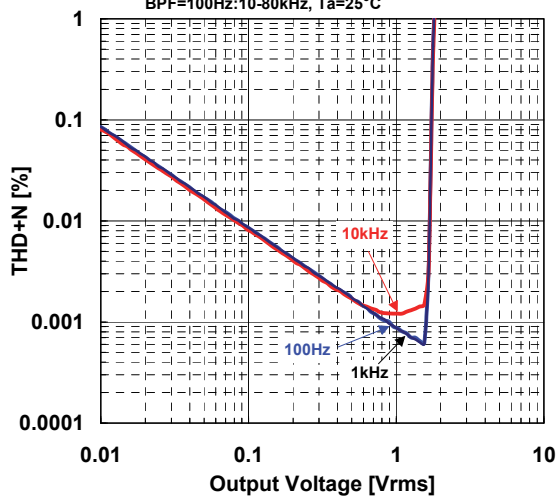
■ Typical Characteristics



Typical Characteristics

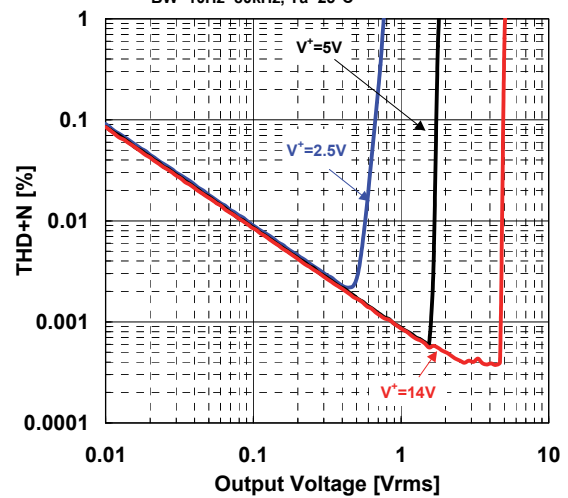
THD+N vs. Output Voltage (Frequency)

$V^*=5V$, $A_v=+2$, $R_S=600k\Omega$, $R_F=5k\Omega$, $R_G=5k\Omega$
BPF=100Hz~100kHz, $T_a=25^\circ C$



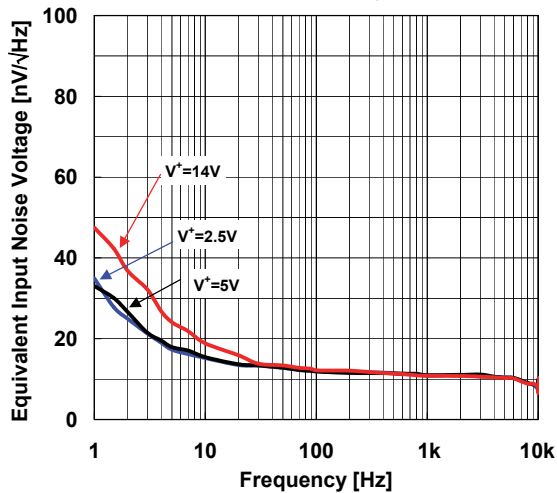
THD+N vs. Output Voltage (Supply Voltage)

$f=1kHz$, $A_v=+2$, $R_S=600k\Omega$, $R_F=5k\Omega$, $R_G=5k\Omega$,
BW=10Hz~80kHz, $T_a=25^\circ C$



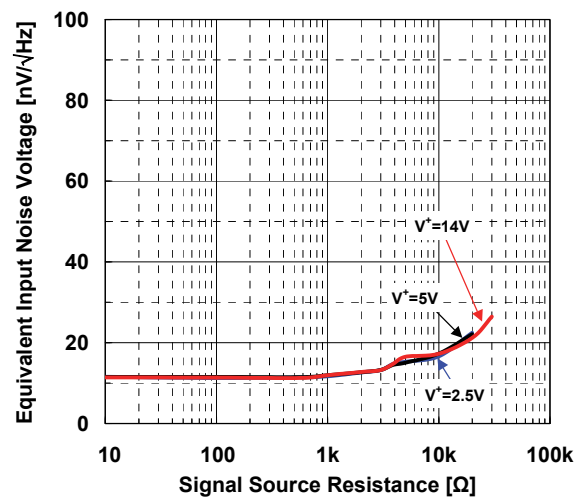
Equivalent Input Noise Voltage
vs. Frequency (Supply Voltage)

$G_v=60dB$, $R_I=600k\Omega$, $R_F=100k\Omega$, $R_G=100k\Omega$, $T_a=25^\circ C$



Equivalent Input Noise Voltage
vs. Signal Source Resistance (Supply Voltage)

$f=1kHz$, $G_v=60dB$, $R_F=100k\Omega$, $R_G=100k\Omega$, $T_a=25^\circ C$



■ MEMO

[CAUTION]

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