

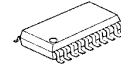
5Vrms Ground Referenced 6-Channel Line Amplifier

■ GENERAL DESCRIPTION

The **NJW1240** is a 6-channel audio line amplifier for High Voltage Pre-out of Car AV system. It can swing 5Vrms(14.1V peak-to-peak) signal at 8V operating voltage because of including the charge pump circuit.

Ground-referenced outputs eliminate output coupling capacitor. The pop noise suppression circuit reduces a pop noise at the power-on and power-off.

■ PACKAGE OUTLINE

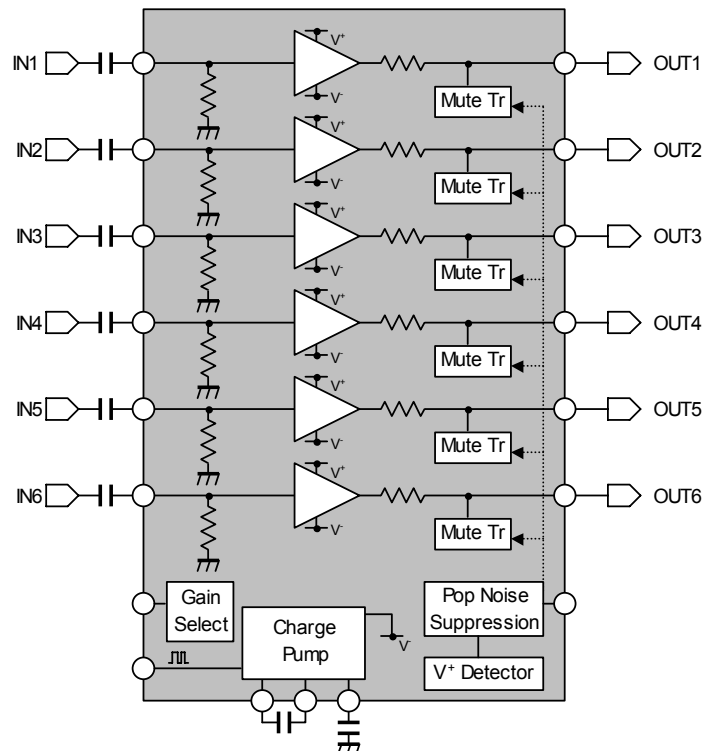


NJW1240V

■ FEATURES

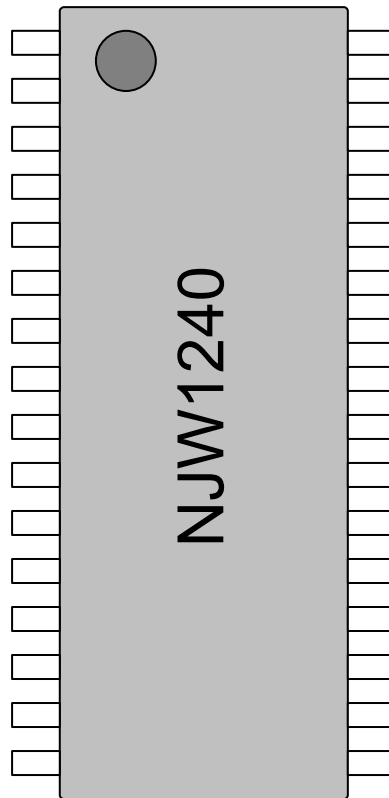
- Operating Voltage +6 to +10V
- Operating Current $I_{DD}=15\text{mA typ.}$
at $V^+=8\text{V}$, $R_L=47\text{k}\Omega$, No Signal
- Maximum Output Voltage 5.0Vrms min.
- Low Distortion 0.0008% typ
- Low Output Noise -102dB typ.
- Output Coupling Capacitor-less
- External Synchronizing Divide-by-2
- Pop Noise Suppression Circuit
- External Mute
- Gain Select +6dB/+8.3dB
- RF Immunity OpAmp tolerant to FR noise. (ex. mobile phone)
- Bi-CMOS Technology
- Package Outline SSOP32

■ BLOCK DIAGRAM



NJW1240

■ PIN CONFIGURATION



No.	Symbol	Function	No.	Symbol	Function
1	IN1	Input 1	17	NC	No Connect
2	IN2	Input 2	18	FB	V- Power Supply External Setting
3	IN3	Input 3	19	CP	Flying Capacitor Positive Terminal
4	IN4	Input 4	20	NC	No Connect
5	IN5	Input 5	21	NC	No Connect
6	IN6	Input 6	22	GND	Ground
7	MUTE	MUTE / Pop Noise Suppression	23	CN	Flying Capacitor Negative Terminal
8	GAIN	Gain Select	24	MUTE_TC	Pop Noise Suppression Capacitor
9	V ⁻ IN	V- Power Input	25	V ⁺ A	V+ Power Supply for Analog
10	V ⁻ OUT	V- Power Output	26	GND	Ground
11	RegCNT	V- Power Control	27	OUT6	Output 6
12	NC	No Connect	28	OUT5	Output 5
13	NC	No Connect	29	OUT4	Output 4
14	CLK	External Clock Input	30	OUT3	Output 3
15	V ⁺ Reg	V+ Power Supply for Regulator	31	OUT2	Output 2
16	NC	No Connect	32	OUT1	Output 1

■ ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V ⁺	10.5	V
CLK Terminal Voltage	V _{CLK}	-0.3~+6	V
V ⁻ Power Supply Control Voltage	V _{RegCNT}	-0.3~+6	V
FB Terminal Voltager	V _{FB}	(V _{OUT})+6	V
Maximum Input Voltage	V _{IN}	V ⁺ +0.3	V
Power Dissipation	P _D	905 ^(Note1)	mW
Operating Temperature Range	Topr	-40 ~ +85	°C
Storage Temperature Range	Tstg	-40 ~ +125	°C

(Note1) EIA/JEDEC STANDARD Test board (76.2x114.3x1.6mm, 2layer, FR-4) mounting

■ RECOMMENDED OPERATING CONDITIONS

(Ta=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V ⁺		6	8	10	V
External Clock Input Range ^(Note2)	f _{CLK}		150	-	1250	kHz
External Clock Duty Input Range	DUTY		45	-	80	%

(Note2) The regulator for V⁻ power supply operates by the half of f_{CLK}.

■ ELECTRICAL CHARACTERISTICS

(Ta=25°C, V⁺=8V, f=1kHz, Vin=0dBV, R_L=47kΩ, GAIN=Low, MUTE=High, RegCNT=High unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Current	I _{DD}	No signal	-	12	20	mA
Voltage Gain1	G _{V1}		5.5	6.0	6.5	dB
Voltage Gain2	G _{V2}	GAIN=High	7.8	8.3	8.8	dB
Maximum Output Voltage	V _{OMAX}	THD=1%	5	-	-	V _{rms}
Mute Level	V _{MUTE}	MUTE=Low	-	-100	-80	dB
Output Noise Voltage	V _{NO}	Rg=0Ω, A=Weighted	-	-102 (7.94)	-	dBV (μV)
Total Harmonic Distortion	THD	BW:400Hz-22kHz	-	0.0008	-	%
Channel Separation	CS	Rg=600Ω	80	-	-	dB
Internal Oscillating Frequency	f _{OSC}	f _{CLK} =No signal	-	300	-	kHz
Output Offset Voltage	V _{OS}	Rg=0Ω	-	-	8	mV

■ CONTROL CHARACTERISTICS

(Ta=25°C, V⁺=8V, f=1kHz, Vin=0dBV, R_L=47kΩ unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Mute Terminal High	Mute _H	MUTE OFF	2.3	-	V ⁺	V
Mute Terminal Low	Mute _L	MUTE ON	0	-	0.7	V
Gain Terminal High	Gain _H	Gv=8.3dB	2.3	-	V ⁺	V
Gain Terminal Low	Gain _L	Gv=6dB	0	-	0.7	V
CLK Terminal High	CLK _H		2.3	-	5.5	V
CLK Terminal Low	CLK _L		0	-	0.7	V

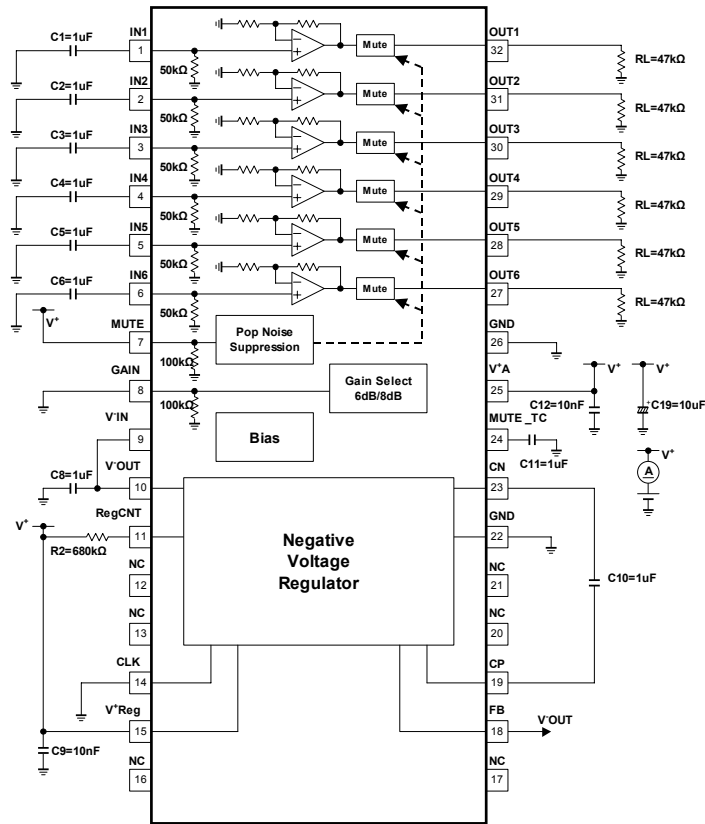
■ TERMINAL DESCRIPTION

Terminal	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
1 2 3 4 5 6	IN1 IN2 IN3 IN4 IN5 IN6	INPUT1 INPUT2 INPUT3 INPUT4 INPUT5 INPUT6		0V
7 8	MUTE GAIN	MUTE/Pop Noise Suppression Gain Select		0V
11	RegCNT	V- Power Control		0V
14	CLK	External Clock Input		0V
18	FB	V- Power Supply External Setting		-

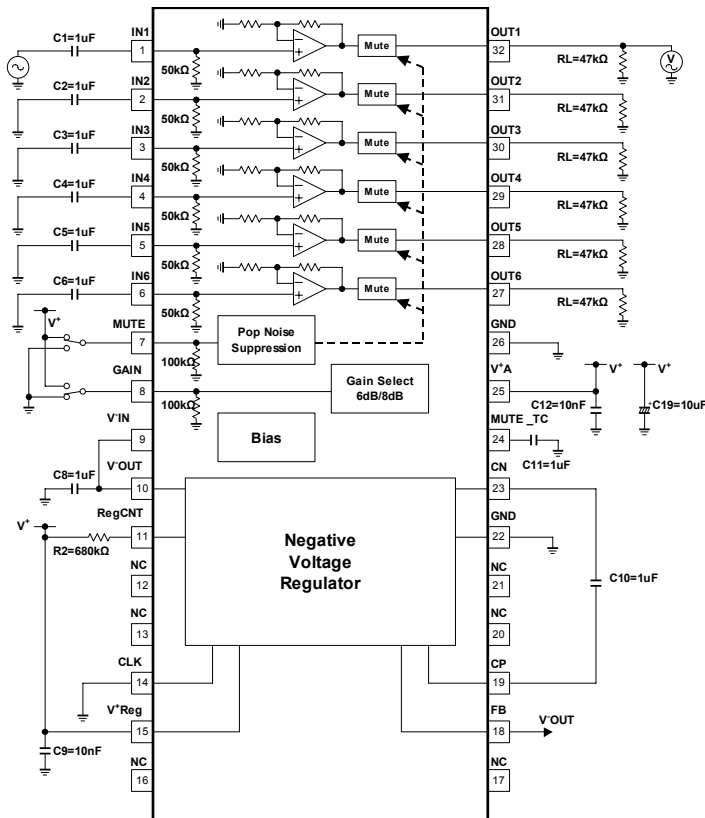
■ TERMINAL DESCRIPTION

Terminal	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
19	CP	Flying Capacitor Positive Terminal		-
23	CN	Flying Capacitor Negative Terminal		-
24	MUTE_TC	Pop Noise Suppression Capacitor		0V
27 28 29 30 31 32	OUT6 OUT5 OUT4 OUT3 OUT2 OUT1	Output6 Output5 Output4 Output3 Output2 Output1		0V

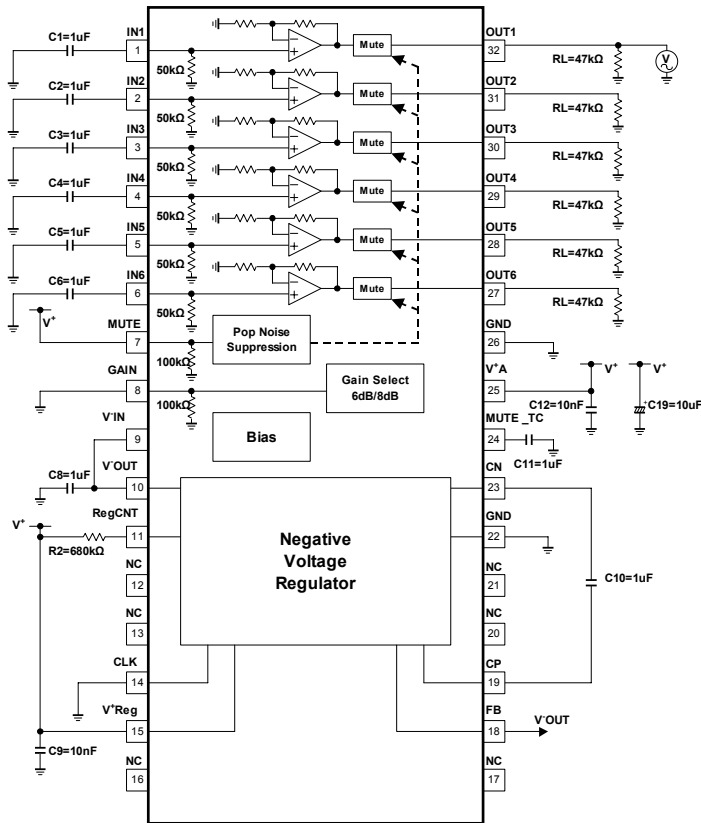
TEST CIRCUIT (I_{DD})



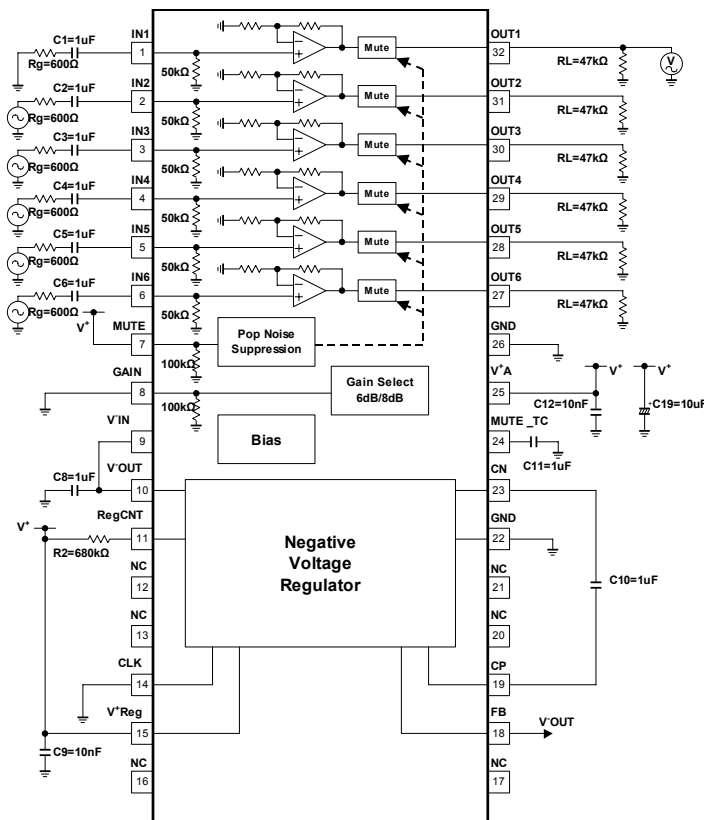
TEST CIRCUIT (G_v , V_{OMAX} , THD, V_{MUTE})



TEST CIRCUIT (V_{NO})

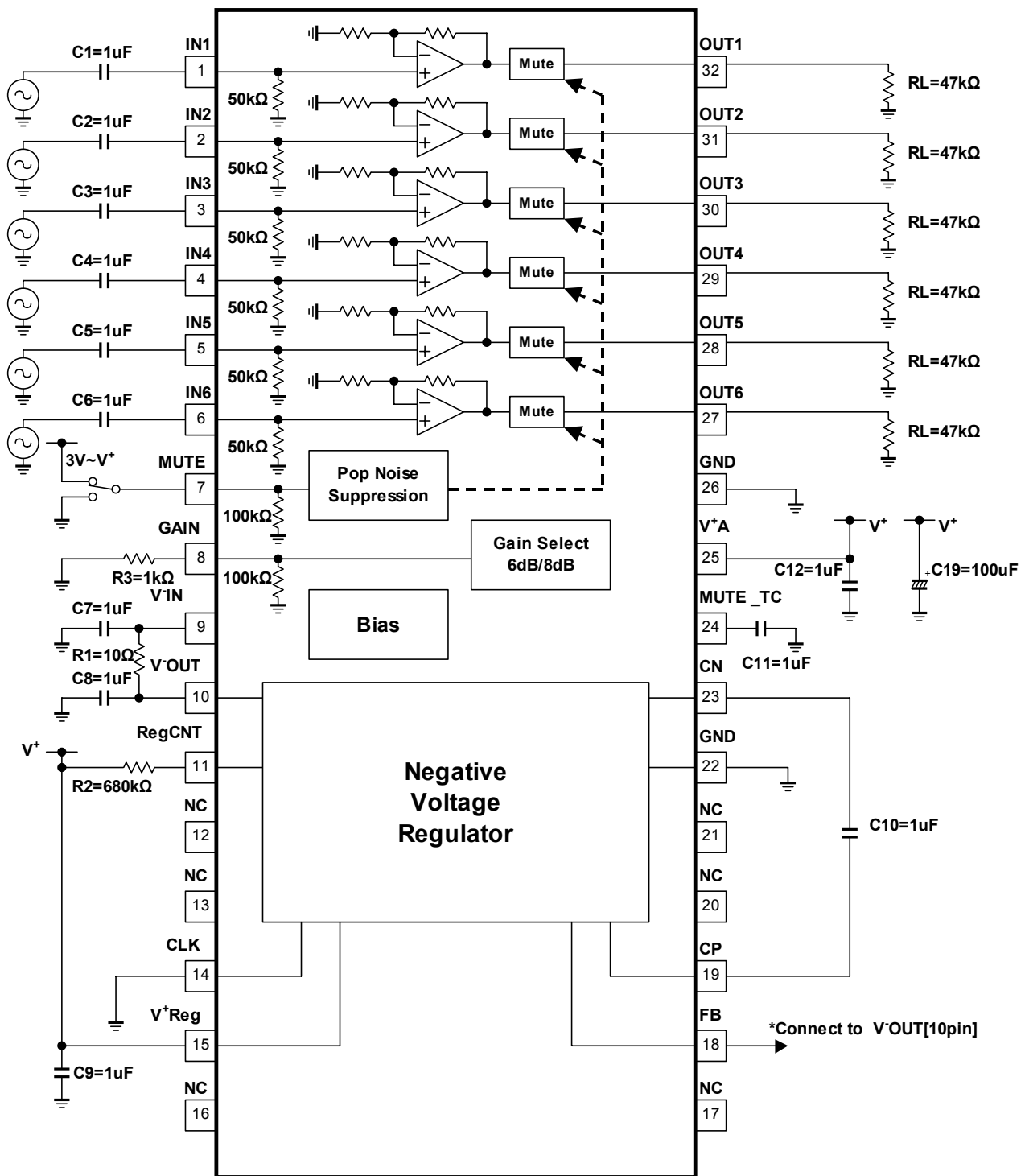


TEST CIRCUIT (CS)



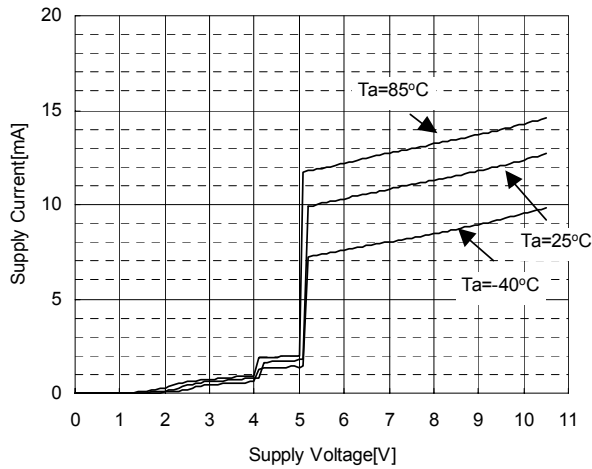
NJW1240

APPLICATION CIRCUIT

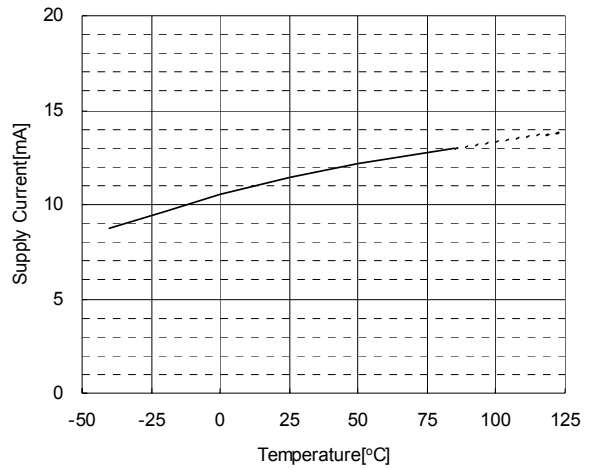


TYPICAL CHARACTERISTICS

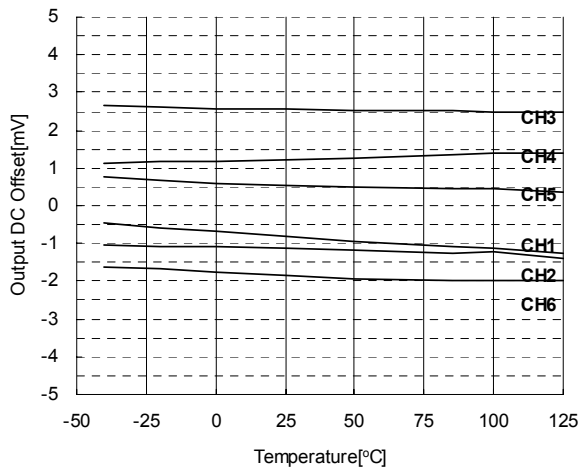
Supply Current vs Supply Voltage
 RL=NoLoad, MUTE=H, GAIN=L



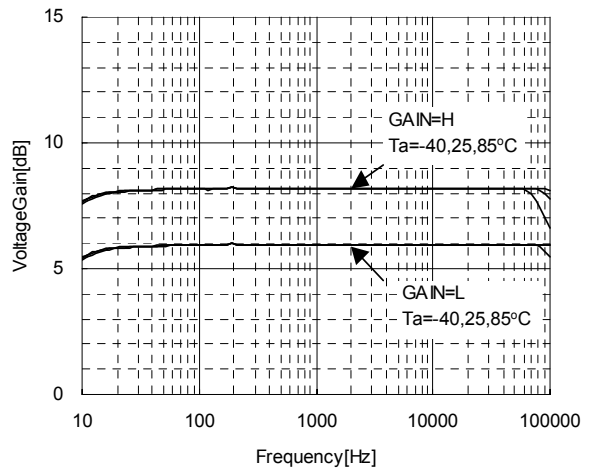
Supply Current vs Temperature
 V+=8V, RL=NoLoad, MUTE=H, GAIN=L



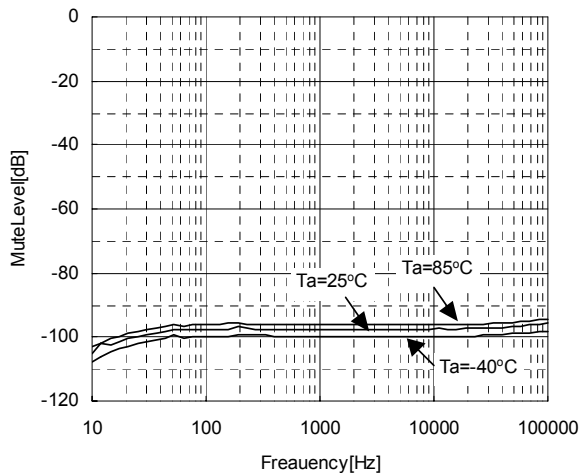
Output DC Offset vs Temperature
 V+=8V, Vin=NoSignal, RL=47kΩ
 MUTE=H, GAIN=L



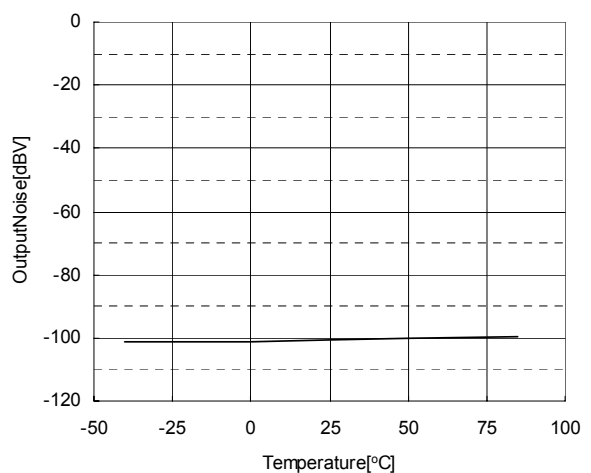
Voltage Gain vs Frequency
 V+=8V, Vin=0dBV, RL=47kΩ, MUTE=H



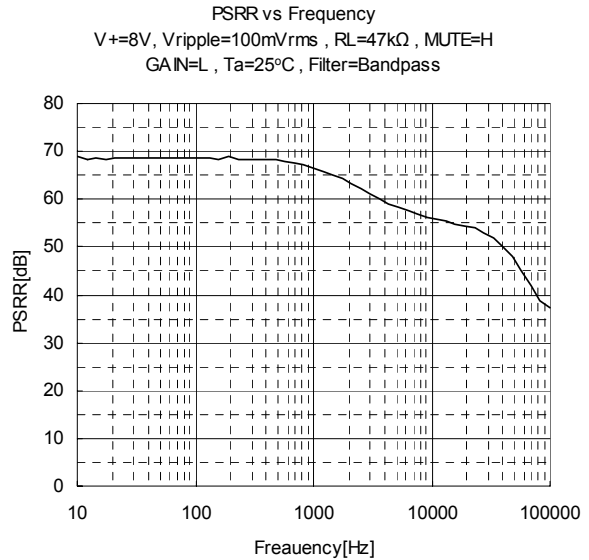
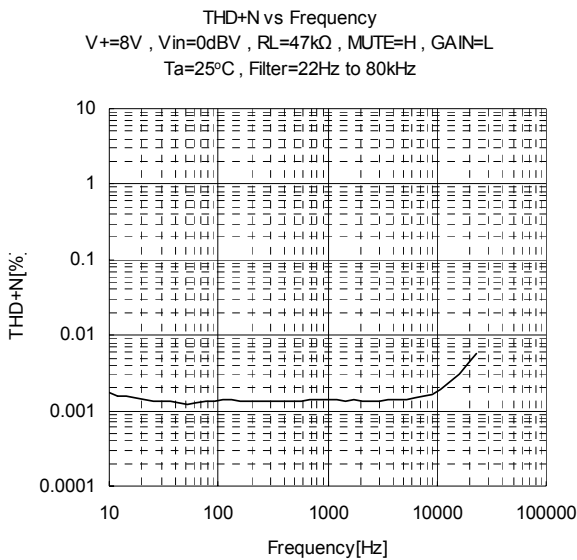
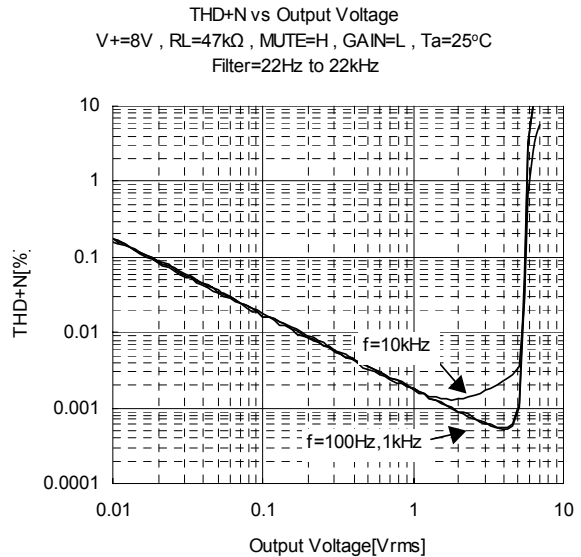
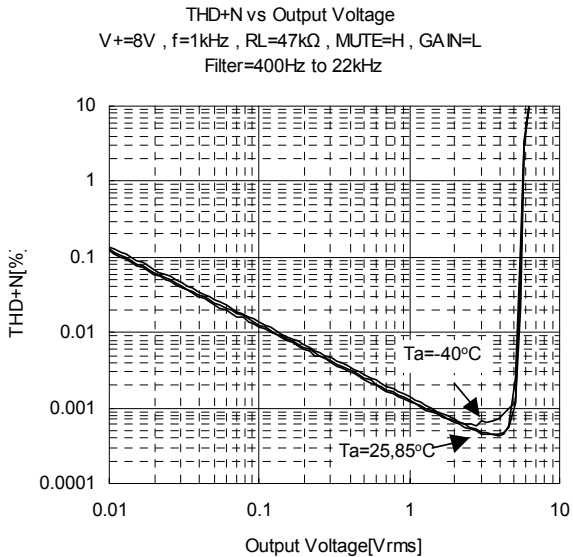
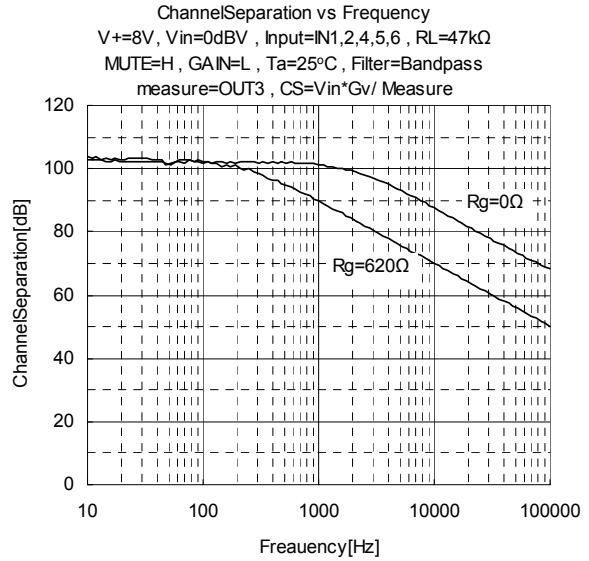
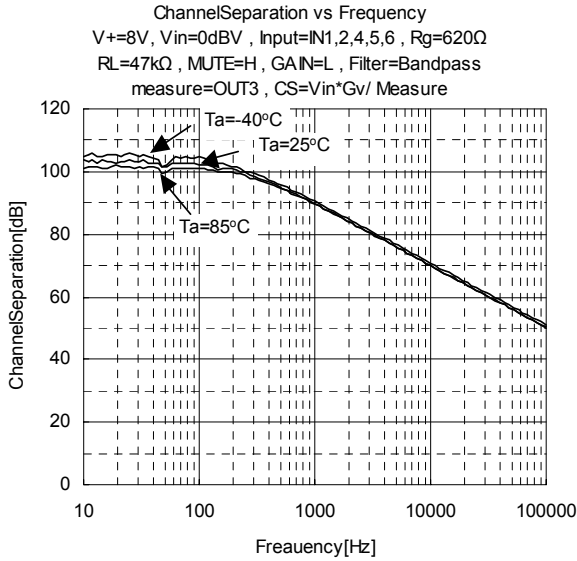
MuteLevel vs Frequency
 V+=8V, RL=47kΩ, MUTE=L, GAIN=L
 Filter=Bandpass



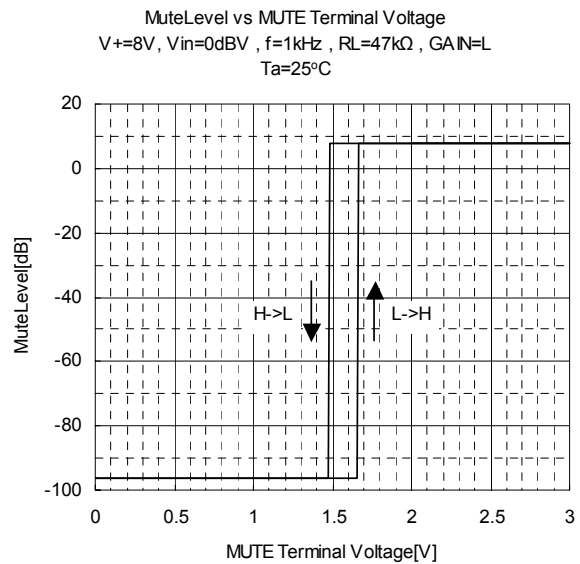
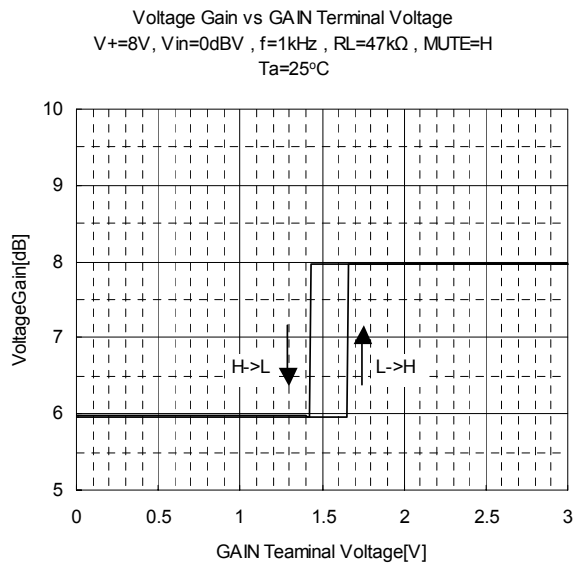
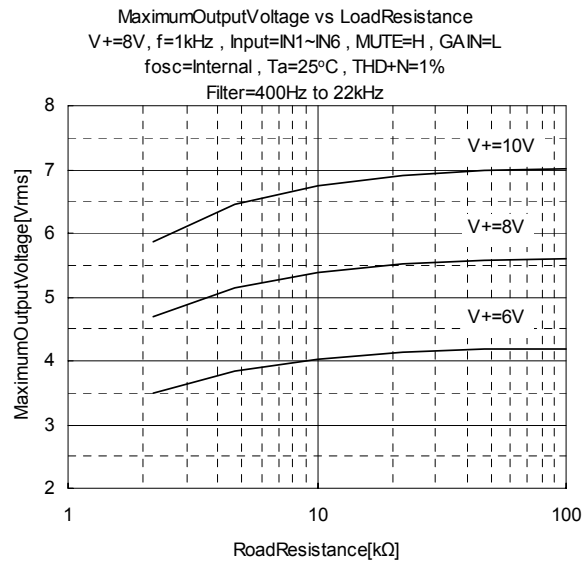
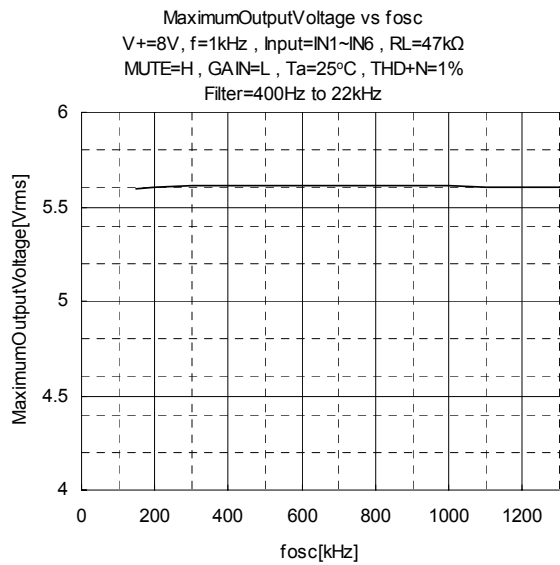
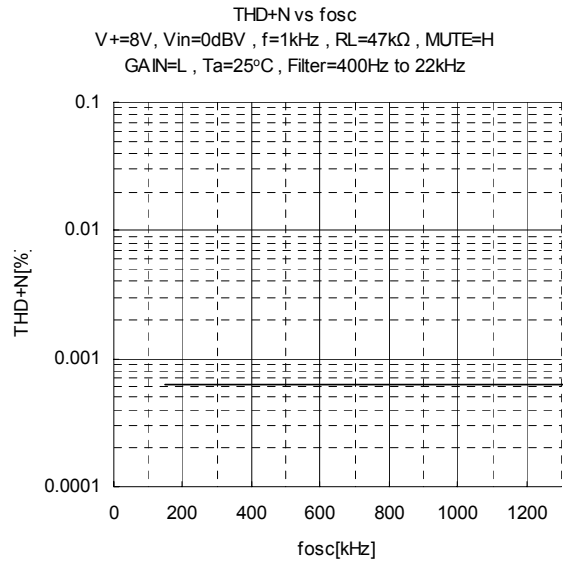
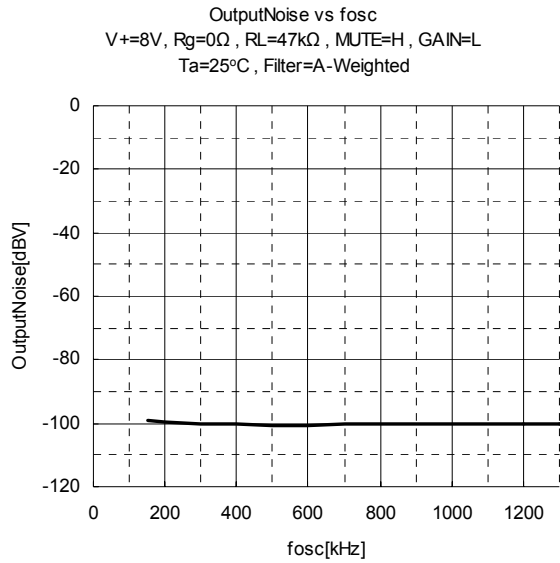
Output Noise vs Temperature
 V+=8V, Rg=0Ω, RL=47kΩ, MUTE=H, GAIN=L
 Filter=A-weighted



TYPICAL CHARACTERISTICS



■ TYPICAL CHARACTERISTICS



[CAUTION]

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