



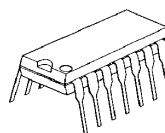
3D SURROUND AUDIO PROCESSOR

■ GENERAL DESCRIPTION

The **NJM2701** is a 3D surround audio processor regenerating the 3D surround sound with only two speakers.

The **NJM2701** is suitable for audio applications, which are speaker system for mini components, CD radio cassette, multimedia speaker systems, TV and others.

■ PACKAGE OUTLINE



NJM2701D

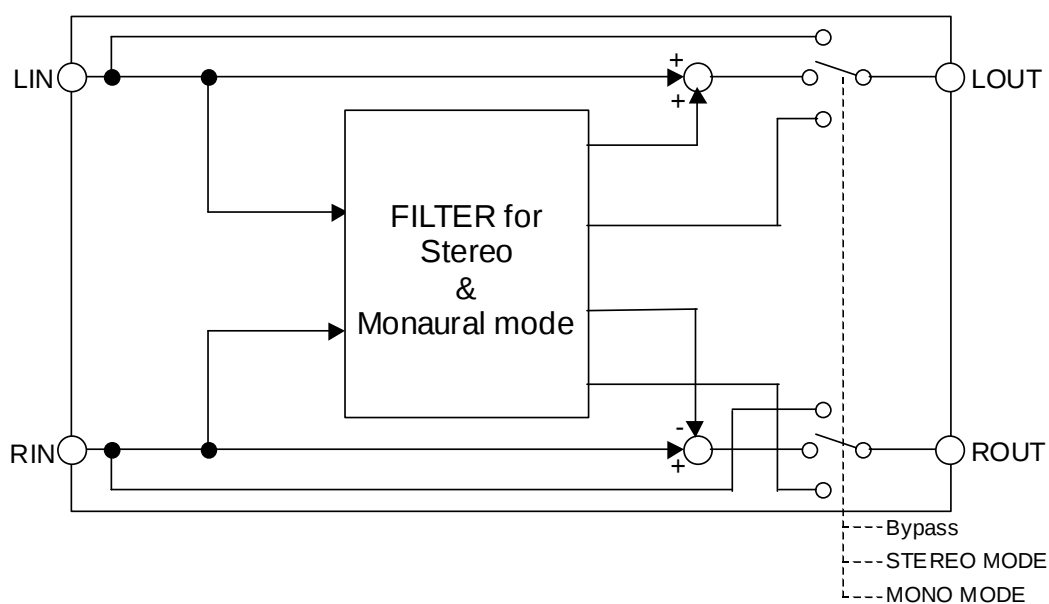


NJM2701M

■ FEATURES

- Operating Voltage 4.7 to 13V
- Stereo mode
 - Stable center image and Natural sound field
 - High quality Surround
 - Free speaker interval
- Monaural mode (Mono-to-Stereo Synthesis)
- Surround control (Stereo mode only)
- Internal Mode Control Switch
- Bipolar Technology
- Package Outline DIP14, DMP14

■ BLOCK DIAGRAM



NJM2701

■ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V ⁺	14	V
Power Dissipation	P _D	(DIP14) 500 (DMP14) 350	mW
Operating Temperature Range	T _{opr}	-40 to +85	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

■ OPERATING VOLTAGE

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V ⁺	-	4.7	12.0	13.0	V

■ELECTRICAL CHARACTERISTICS (V⁺=12V, Ta=25°C unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION						MIN.	TYP.	MAX.	UNIT
		INPUT		OUTPUT	MODE	VR					
		L	R								
Operating Current	I _{cc}	No Signal	0	0	-	BYPASS	-	2.9	5.7	8.6	mA
			0	0	-	Stereo	MAX	2.9	5.8	8.7	
			0	0	-	Mono	-	3.0	5.9	8.9	

●AC CHARACTERISTICS

(V⁺=12V, Ta=25°C, V_{IN}=-10dBV(316mVrms), f=1kHz, RL=4.7kΩ, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITION						MIN.	TYP.	MAX.	UNIT
		INPUT		OUTPUT	MODE	VR					
		L	R								
Maximum Input Voltage	V _{IM}	f=1kHz T.H.D.=3%	V _{IN} 0	0 V _{IN}	L R	BYPASS	-	9.9 (31)	11.9 (39)	-	dBV (V _{rms})
		f=100Hz T.H.D.=3%	V _{IN} 0	0 V _{IN}	L R	Stereo	MAX	-3.8 (0.6)	-1.8 (0.8)	-	
		f=1kHz T.H.D.=3%	V _{IN} V _{IN}	0 0	L R	Mono	-	6.9 (2.2)	8.9 (2.8)	-	
Output Noise	V _{NO}	R _G =0Ω A-Weighted	0	0	L R	BYPASS	-	-	-112 (2.5)	-106 (5.0)	dBV (μV _{rms})
		R _G =0Ω A-Weighted	0	0	L R	Stereo	MAX	-	-100 (10)	-94 (20)	
		R _G =0Ω A-Weighted	0	0	L R	Mono	-	-	-103 (7.1)	-97 (14.1)	

●AC CHARACTERISTICS

($V_+ = 12V$, $T_a = 25^\circ C$, $V_{IN} = -10dBV$ (316mVrms), $f = 1kHz$, $R_L = 4.7k\Omega$, unless otherwise specified)

V _T =12V, I _A =25 mA, V _{IN} =-10dBV(510mVrms), f=1kHz, RL=4.7kΩ, unless otherwise specified											
PARAMETER	SYMBOL		TEST CONDITION					MIN.	TYP.	MAX.	UNIT
			INPUT		OUTPUT	MODE	VR				
			L	R							
Total Harmonic Distortion	T.H.D	f=1kHz	V _{IN} 0	0 V _{IN}	L R	BYPASS	-	-	0.005	0.01	%
		f=1kHz Vin=-20dBV	V _{IN} 0	0 V _{IN}	L R	Stereo	MAX	-	0.1	0.5	
		f=1kHz	V _{IN} V _{IN}	0 0	L R	Mono	-	-	0.1	0.5	
Bypass Gain	G _{VBYP}	f=1kHz	V _{IN} 0	0 V _{IN}	L R	BYPASS	-	-1.0	0.0	1.0	dB
Surround Gain	G _{VSUR}	f=100Hz Vin=-20dBV	V _{IN} 0	0 V _{IN}	L R	Stereo	MAX	10.7	12.7	14.7	dB
		f=100Hz Vin=-20dBV	0 V _{IN}	V _{IN} 0	L R	Stereo	MAX	8.4	10.4	12.4	
		f=100Hz Vin=-20dBV	V _{IN} 0	0 V _{IN}	L R	Stereo	MIN	3.6	5.6	7.6	
		f=1kHz	V _{IN} V _{IN}	0 0	L R	Mono	-	1.0	3.0	5.0	

● CONTROL CHARACTERISTICS ($V_+ = 12V$, $T_a = 25^\circ C$ unless otherwise specified)

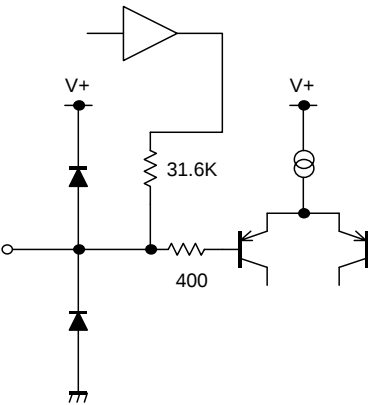
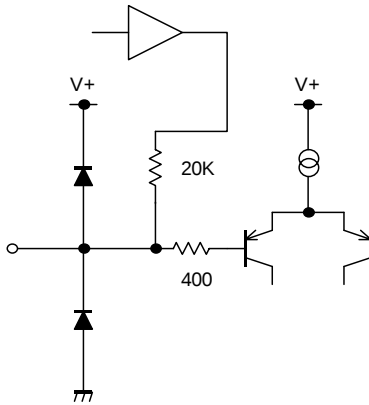
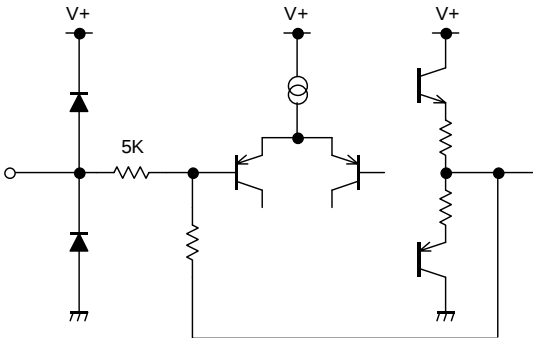
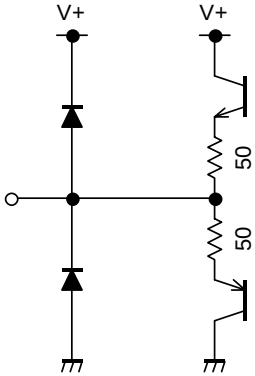
CONTROL CHARACTERISTICS (V ₊ = 12V, I _A = 25 mA unless otherwise specified)											
PARAMETER	SYMBOL		TEST CONDITION					MIN.	TYP.	MAX.	UNIT
			INPUT		OUTPUT	MODE	VR				
			L	R							
Mode Select Control Voltage	V _{MODE}	V _{IN} = High Level	-	-	-	-	-	2.0	-	V+	V
		V _{IN} = Low Level	-	-	-	-	-	0.0	-	0.7	

■MODE SWITCH

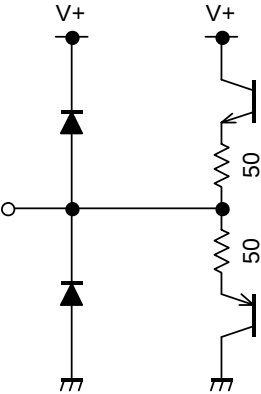
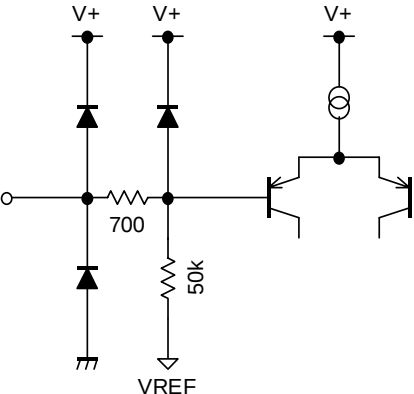
MODE	SW1	SW2	NOTES
BYPASS	L	-	Input Through
Stereo	H	L	Surround Mode (Stereo Input)
Mono	H	H	Surround Mode (Mono Input)

NJM2701

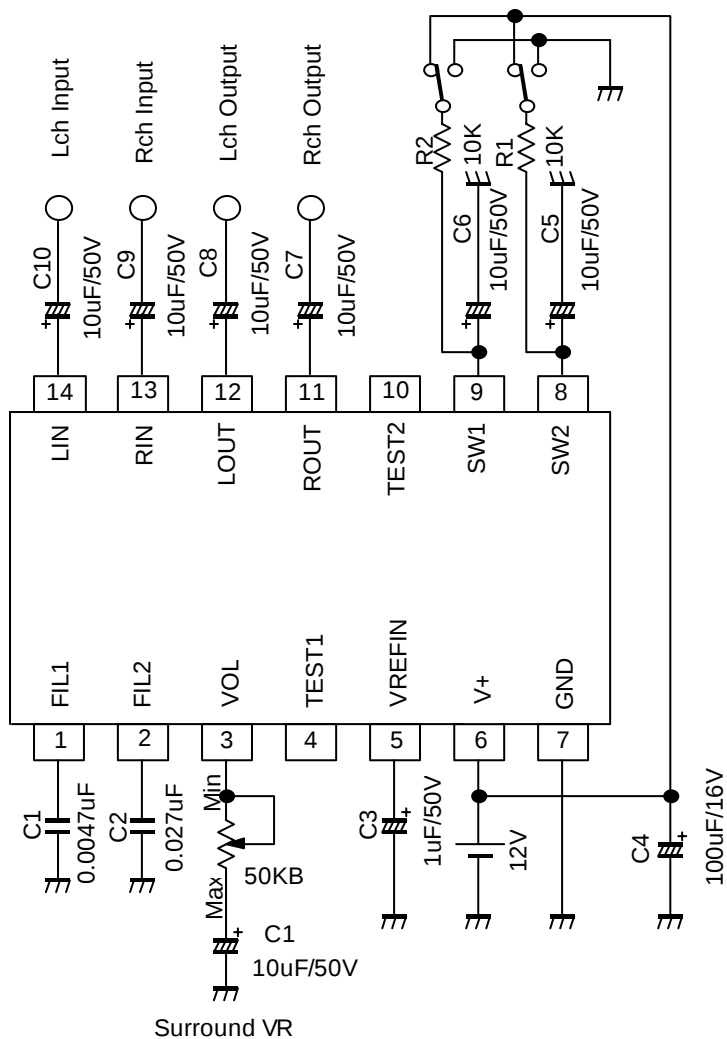
■TERMINAL DESCRIPTION

PIN NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
1	FIL1	Filter Input		V+/2
2	FIL2	Filter Input		V+/2
3	VOL	Surround VR		V+/2
4 10	TEST1 TEST2	Test pin		V+/2

PIN NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
5	VREFIN	Reference Voltage Input		$V+/2$
6	V+	Power Supply		$V+$
7	GND	GND		0V
8 9	SW2 SW1	Mode Control Switch		0V

PIN NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
11 12	ROUT LOUT	Rch Output Lch Output		V+/2
13 14	RIN LIN	Rch Input Lch Input		V+/2

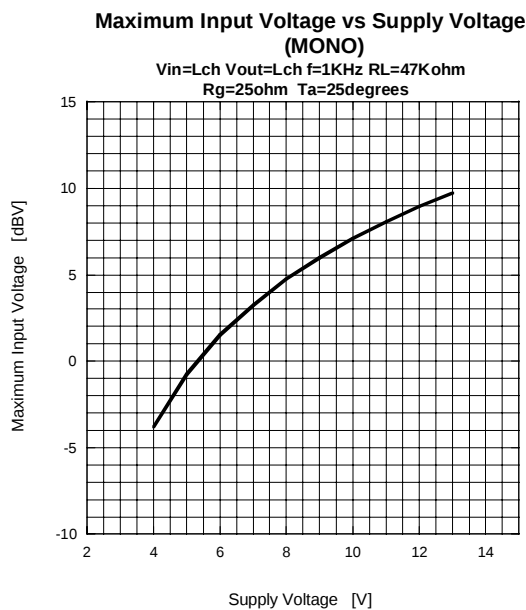
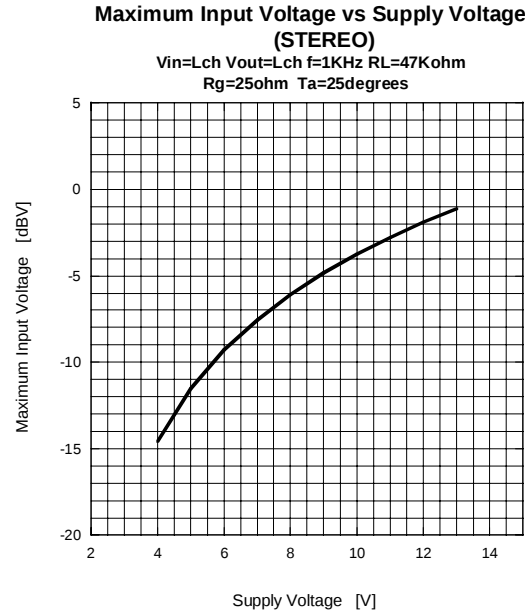
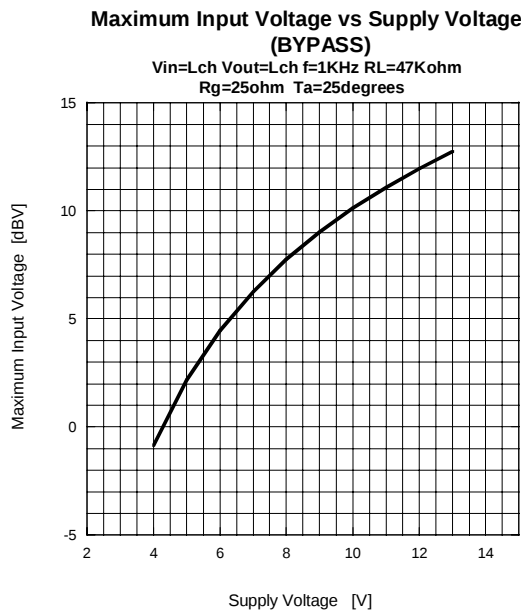
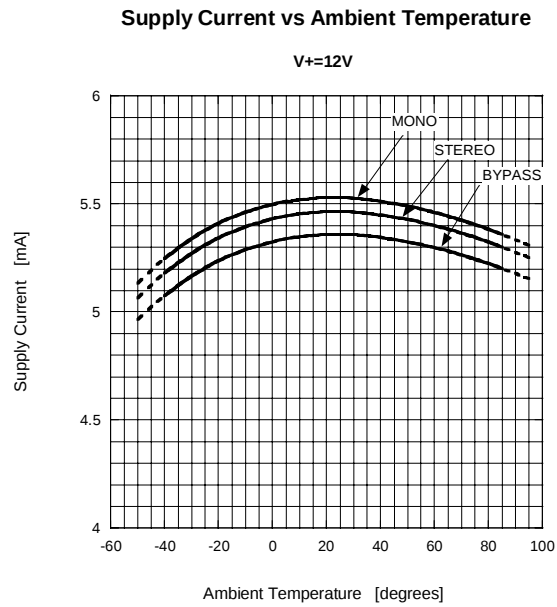
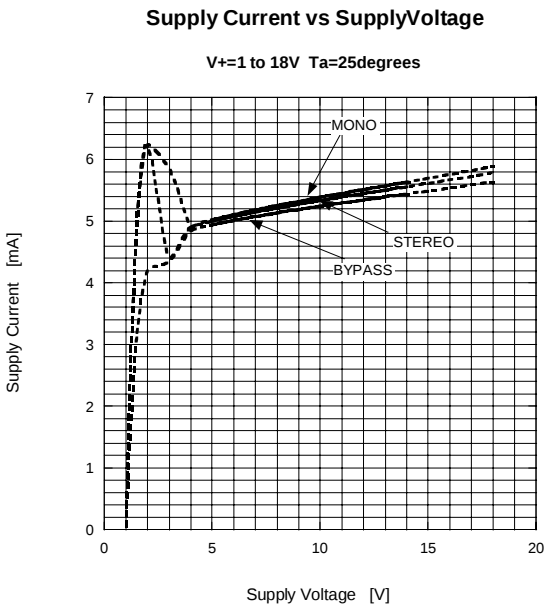
APPLICATION CIRCUIT



Note) In case of monaural mode (mono to stereo synthesis), input monaural signal into left channel input terminal (LIN).

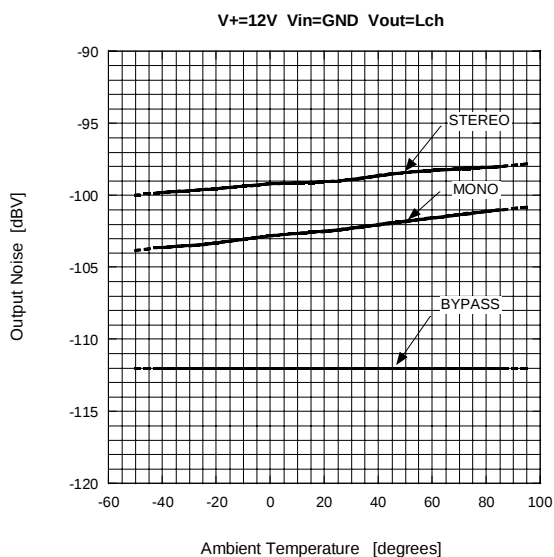
Parts No.	Value	Tolerance	Parts No.	Value	Tolerance
R1,R2	10kΩ	5%	C3	1μF	20%
C1	0.0047μF	5%	C4	100μF	20%
C2	0.027μF	5%	C5,C6,C7,C8,C9,C10,C11	10μF	20%

TYPICAL CHARACTERISTICS

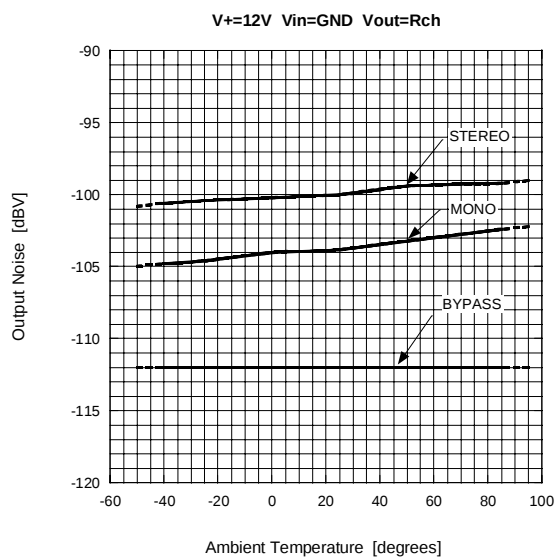


TYPICAL CHARACTERISTICS

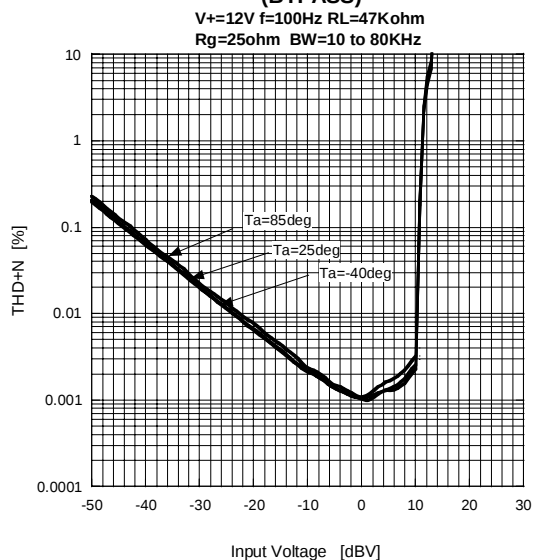
Output Noise vs Ambient Temperature



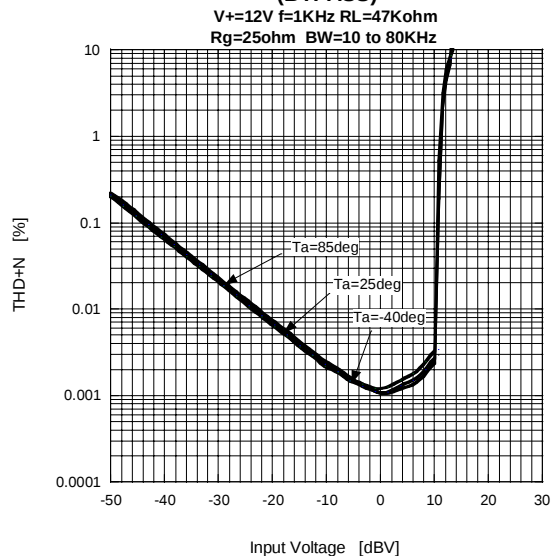
Output Noise vs Ambient Temperature



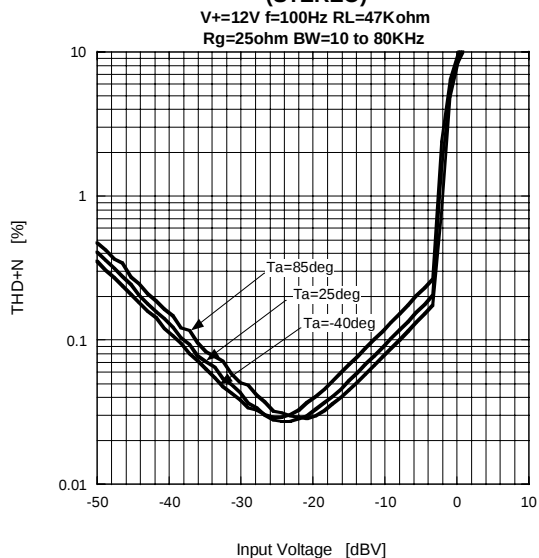
Total Harmonic Distortion vs Input Voltage (BYPASS)



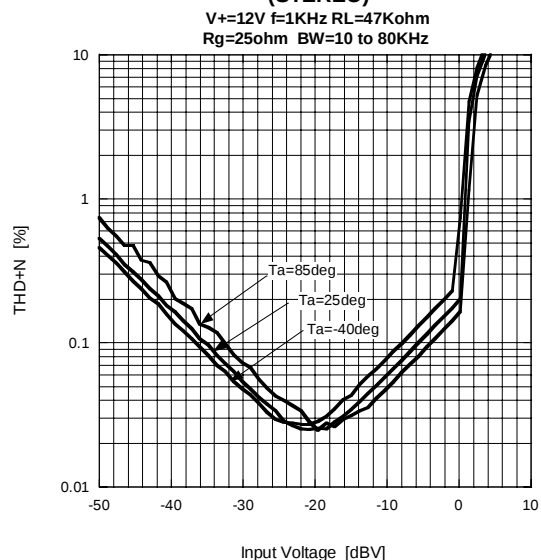
Total Harmonic Distortion vs Input Voltage (BYPASS)



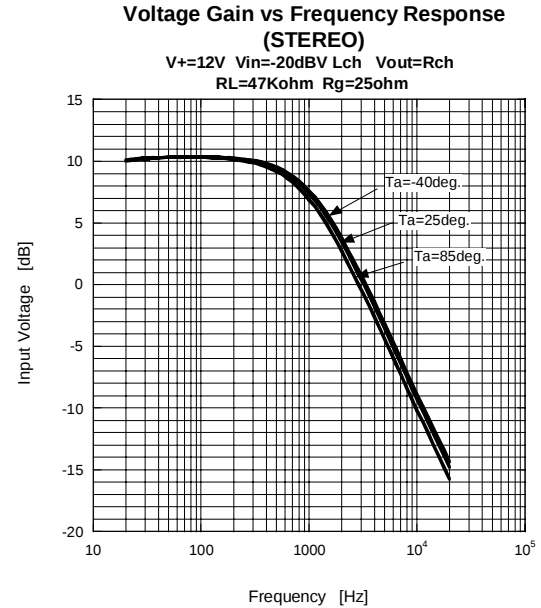
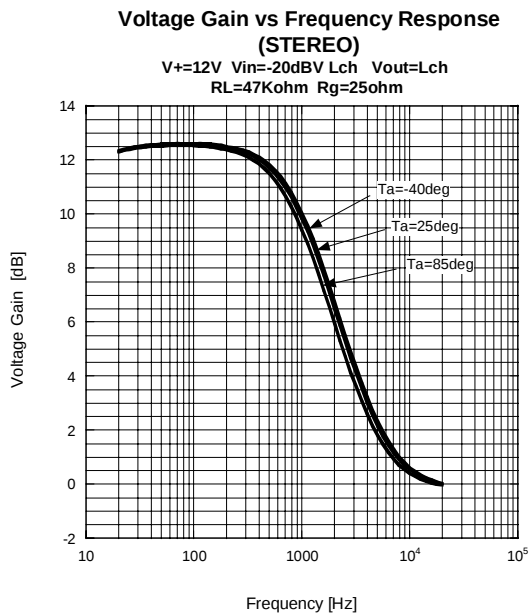
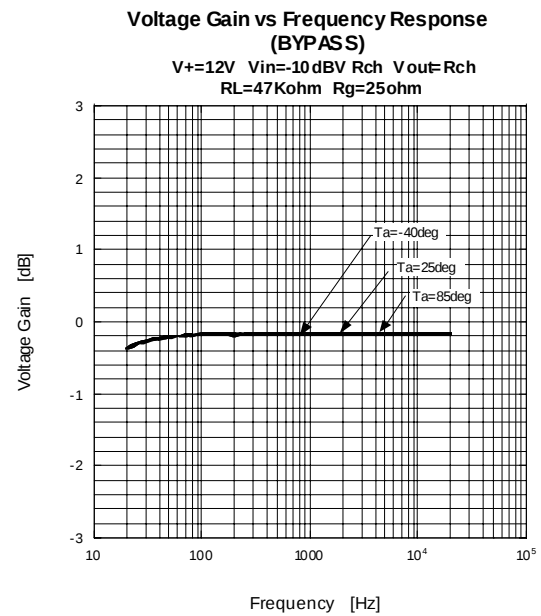
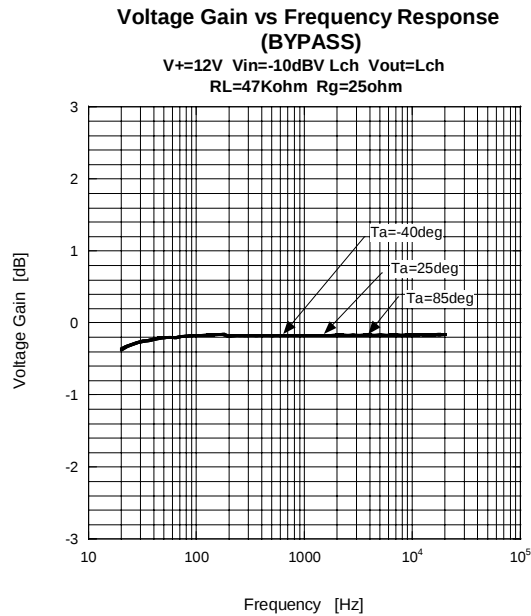
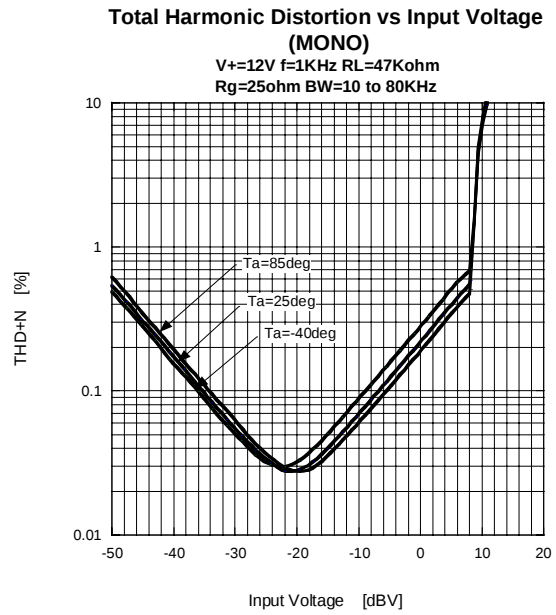
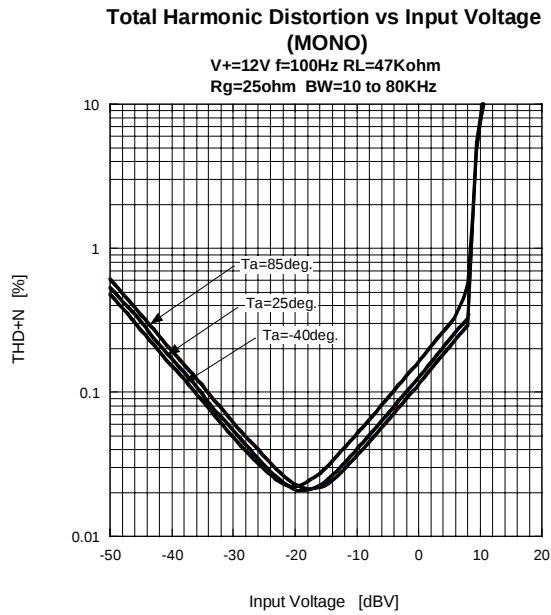
Total Harmonic Distortion vs Input Voltage (STEREO)



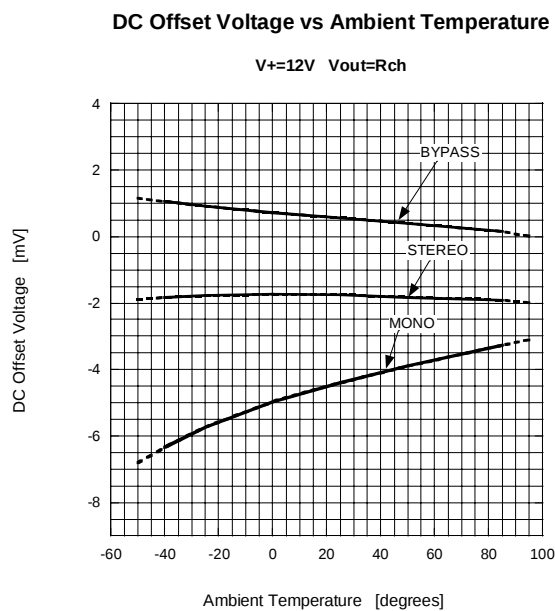
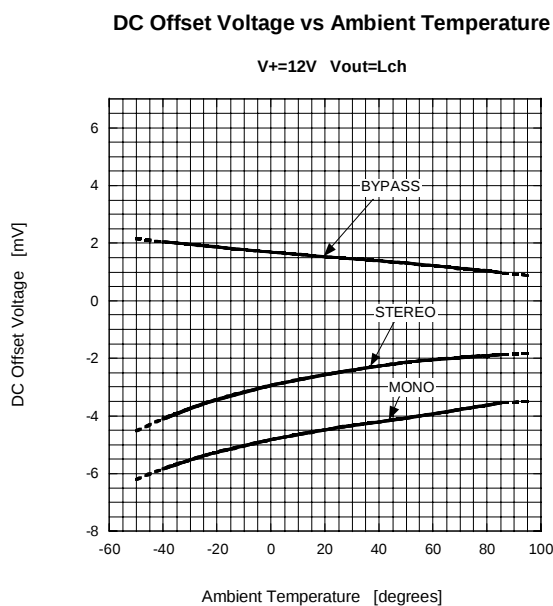
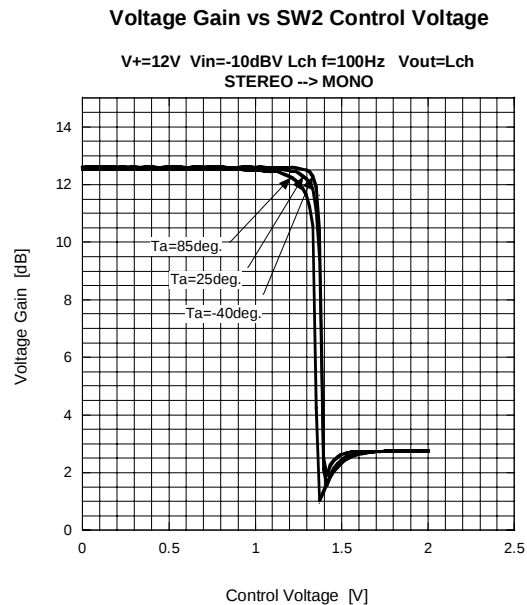
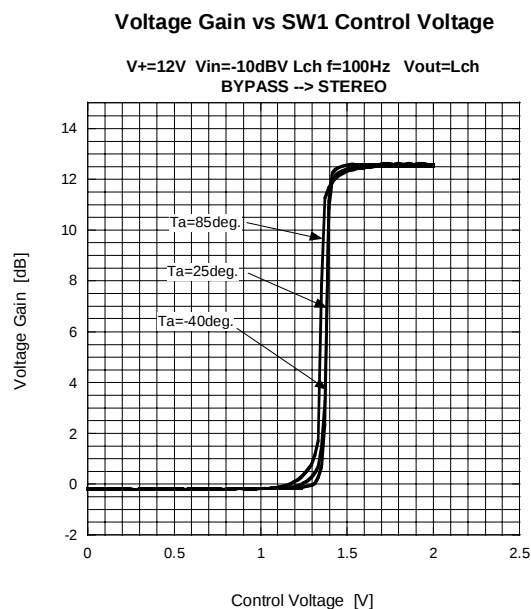
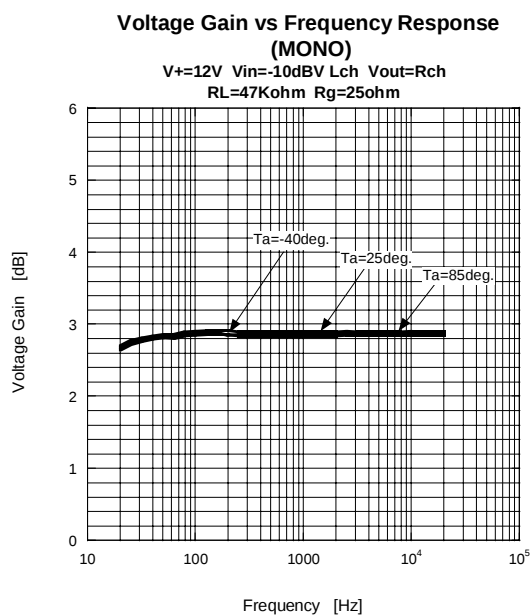
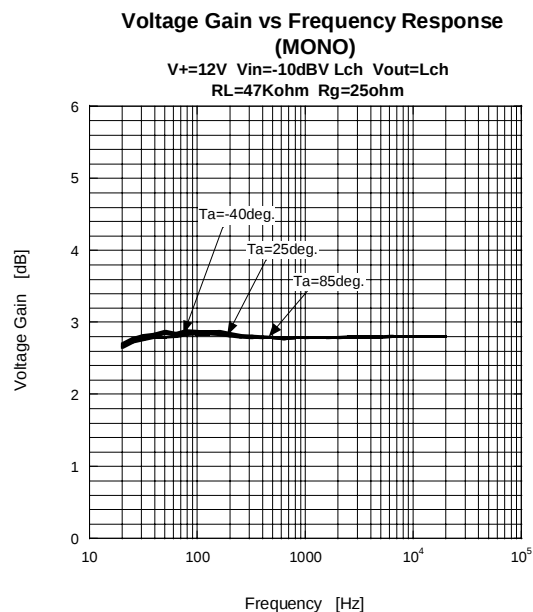
Total Harmonic Distortion vs Input Voltage (STEREO)



■ TYPICAL CHARACTERISTICS



TYPICAL CHARACTERISTICS



[CAUTION]

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