SRS WOW AUDIO PROCESSOR

■GENERAL DESCRIPTION

The **NJM2195** is a SRS WOW audio processor, based on the technology of SRS Labs, Inc.

It includes SRS 3D Stereo regenerating 3D surround sound with stereo input, TruBass providing rich bass sound and FOCUS improving sound orientation.

The **NJM2195** is suitable for audio application such as TV, CD radio-cassette, Car Audio, speaker system for PC and others.

■PACKAGE OUTLINE

NJM2195V

■FEATURES

- ●Operating Voltage 4.7 to 13V
- ●WOW Function
- ●Punch Control for TruBass effect
- ●LF Elevation Control for FOCUS effect
- ●Width Control for SRS 3D Stereo effect
- ●Bypass Function (Through)
- ●Internal Mode Switch
- ●Bipolar Technology
- ●Package Outline SSOP44

For further information, please contact:
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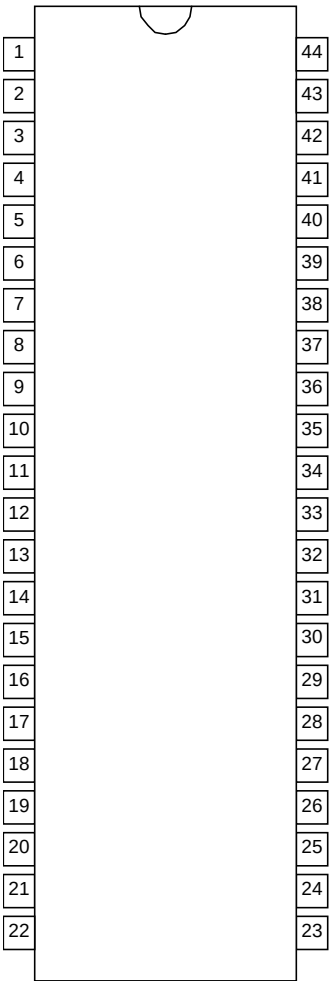
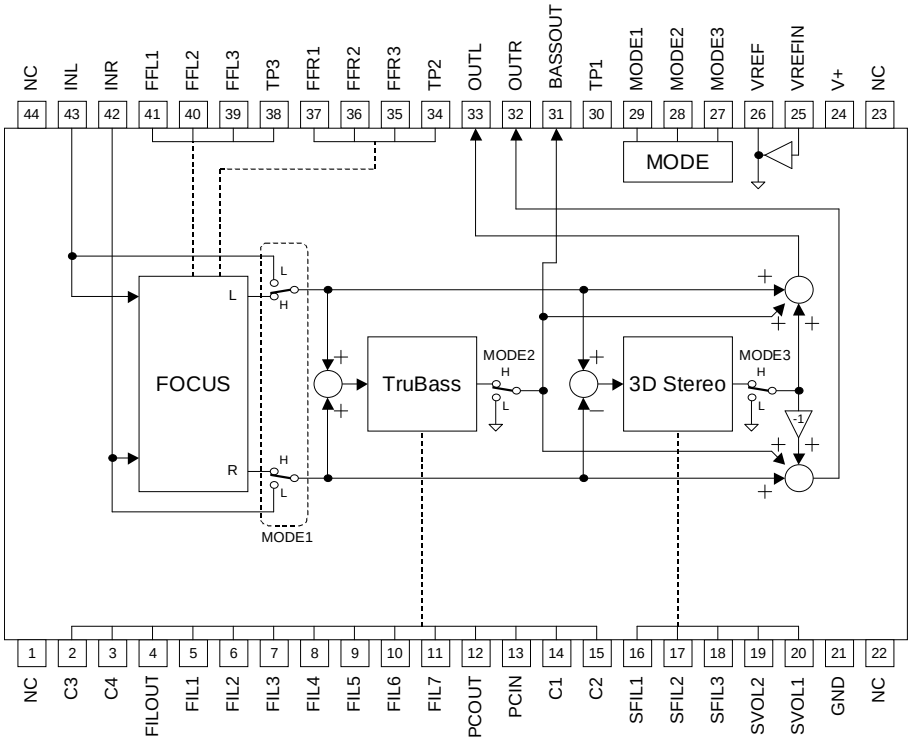
2909 Daimler Street. Santa Ana, CA 92705 USA
Tel: 949-442-1070 Fax: 949-852-1099 http: //www.srslabs.com

■PIN FUNCTION



1.	NC	16.	SFIL1	31.	BASSOUT
2.	C3	17.	SFIL2	32.	OUTR
3.	C4	18.	SFIL3	33.	OUTL
4.	FILOUT	19.	SVOL2	34.	TP2
5.	FIL1	20.	SVOL1	35.	FFR3
6.	FIL2	21.	GND	36.	FFR2
7.	FIL3	22.	NC	37.	FFR1
8.	FIL4	23.	NC	38.	TP3
9.	FIL5	24.	V+	39.	FFL3
10.	FIL6	25.	VREFIN	40.	FFL2
11.	FIL7	26.	VREF	41.	FFL1
12.	PCOUT	27.	MODE3	42.	INR
13.	PCIN	28.	MODE2	43.	INL
14.	C1	29.	MODE1	44.	NC
15.	C2	30.	TP1		

■BLOCK DIAGRAM



■ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V^+	15	V
Power Dissipation	P_D	800 (Note)	mW
Operating Temperature Range	T_{opr}	-40 to+85	°C
Storage Temperature Range	T_{stg}	-40 to +125	°C

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

■ELECTRICAL CHARACTERISTICS (V^+=12V, Ta=25°C, V_{IN}=-20dBV (=0.1Vrms), Speaker Size :Medium)

PARAMETER	SYMBOL	TEST CONDITION	INPUT L	INPUT R	OUTPUT	MODE	PUNCH VR	WIDTH VR	LF VR	MIN	TYP	MAX	UNIT
Operating Voltage	V^+		-	-	-	-	-	-	-	4.7	12.0	13.0	V
Operating Current	I_{CC}	No Signal	-	-	-	BYPASS	-	-	-	8.7	17.4	26.1	mA
			-	-	-	WOW	-	-	-	8.7	17.4	26.1	
Reference Voltage	V_{REF}	V^+/2	-	-	-	-	-	-	-	5.8	6.0	6.2	V
Maximum Input Voltage	V_{IM}	f=1kHz THD=3%	V_{IN}	-	L R	BYPASS	-	-	-	10.0 (3.2)	12.0 (4.0)	-	dBV (Vrms)
		f=100Hz THD=3%	V_{IN}	V_{IN}	L R	TruBass	MAX	-	-	-	-2.7 (0.73)	-	
		f=125Hz THD=3%	V_{IN}	-	L R	3D-STEREO	-	MAX	-	-	0.5 (1.1)	-	
		f=125Hz THD=3%	V_{IN}	$-V_{IN}$	L R	3D-STEREO	-	MAX	-	-	-5.5 (0.53)	-	
		f=10kHz THD=3%	V_{IN}	-	L R	FOCUS	-	-	MAX	-	-0.8 (0.91)	-	
		f=10kHz THD=3%	V_{IN}	-	L R	WOW	MAX	MAX	MAX	-12.0 (0.25)	-10.0 (0.32)	-	
		f=100Hz THD=3%	V_{IN}	V_{IN}	L R	WOW	MAX	MAX	MAX	-5.0 (0.56)	-3.0 (0.71)	-	
		f=10kHz THD=3%	V_{IN}	$-V_{IN}$	L R	WOW	MAX	MAX	MAX	-17.0 (0.14)	-15.0 (0.18)	-	
Output Noise	V_{NO}	Rg=0Ω A-Weighted	0	0	L R	BYPASS	-	-	-	-	-110 (3)	-100 (10)	dBV (μVrms)
		Rg=0Ω A-Weighted	0	0	L R	TruBass	MAX	-	-	-	-80 (100)	-	
		Rg=0Ω A-Weighted	0	0	L R	3D-STEREO	-	MAX	-	-	-95 (18)	-	
		Rg=0Ω A-Weighted	0	0	L R	FOCUS	-	-	MAX	-	-92 (25)	-	
		Rg=0Ω A-Weighted	0	0	L R	WOW	MAX	MAX	MAX	-	-75 (180)	-69 (350)	

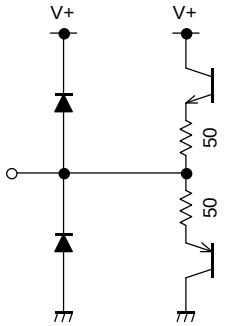
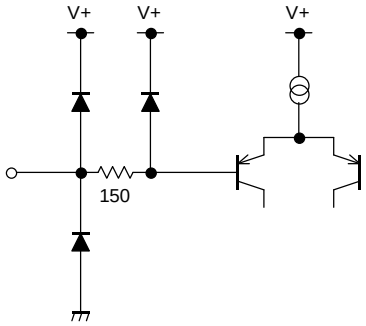
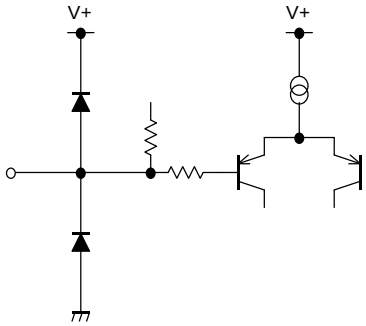
■**ELECTRICAL CHARACTERISTICS** (V^+=12V, Ta=25°C, V_{IN}=-20dBV (=0.1Vrms), Speaker Size :Medium)

PARAMETER	SYMBOL	TEST CONDITION								MIN	TYP	MAX	UNIT
			INPUT		OUTPUT	MODE	PUNCH VR	WIDTH VR	LF VR				
			L	R									
Total Harmonic Distortion	THD	f=1kHz	V_{IN} -	- V_{IN}	L R	BYPASS	-	-	-	-	0.005	0.01	%
		f=100Hz	V_{IN} V_{IN}	V_{IN} V_{IN}	L R	TruBass	MAX	-	-	-	0.1	-	
		f=1kHz	V_{IIN} -	- V_{IN}	L R	3D-STEREO	-	MAX	-	-	0.1	-	
		f=1kHz	V_{IN} -	- V_{IN}	L R	FOCUS	-	-	MAX	-	0.1	-	
		f=1kHz	V_{IN} -	- V_{IN}	L R	WOW	MAX	MAX	MAX	-	0.1	1.0	
BYPASS Gain	G_{VBYP}	f=1kHz	V_{IN} -	- V_{IN}	L R	BYPASS	-	-	-	-1.0	0.0	1.0	dB
SRS Gain	G_{SRS}	f=100Hz	V_{IN} V_{IN}	V_{IN} V_{IN}	L R	TruBass	MAX	-	-	12.8	14.8	16.8	dB
		f=100Hz	V_{IN} V_{IN}	V_{IN} V_{IN}	L R	TruBass	MIN	-	-	-2.3	1.7	5.7	
		f=125Hz	V_{IN} -	- V_{IN}	L R	3D-STEREO	-	MAX	-	9.4	11.4	13.4	
		f=125Hz	V_{IN} -	- V_{IN}	L R	3D-STEREO	-	MIN	-	-1.5	0.5	2.5	
		f=10kHz	V_{IN} -	- V_{IN}	L R	FOCUS	-	-	MAX	10.7	12.7	14.7	
		f=100Hz	V_{IN} -	- V_{IN}	L R	WOW	MAX	MAX	MAX	13.8	15.8	17.8	
		f=10kHz V_{IN}=-35dBV	V_{IN} -	- V_{IN}	L R	WOW	MAX	MAX	MAX	19.7	21.7	23.7	
MODE Select Control Voltage	V_{MODE}	V_{IN}=High Level								2.0	-	V^+	V
		V_{IN}=Low Level								0.0	-	0.7	

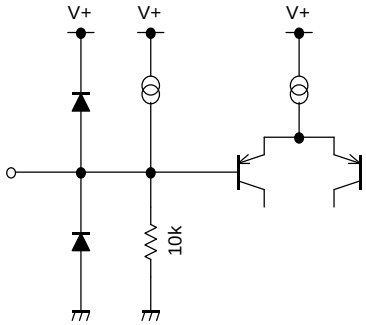
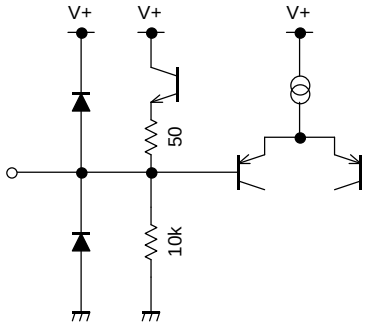
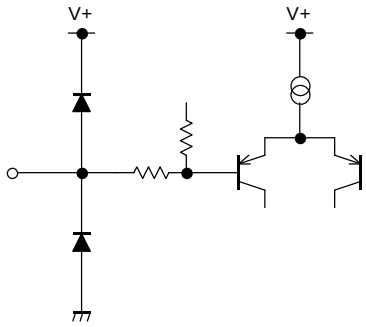
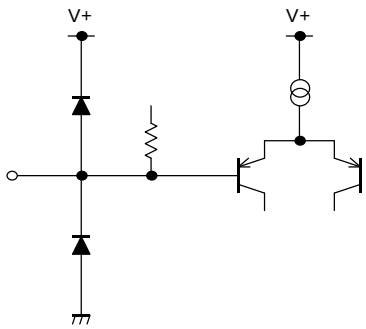
■**MODE SELECT FUNCTION**

MODE	MODE1	MODE2	MODE3
BYPASS	L	L	L
TruBass	L	H	L
3D-STEREO	L	L	H
FOCUS	H	L	L
WOW	H	H	H

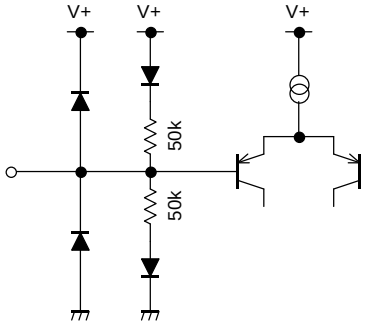
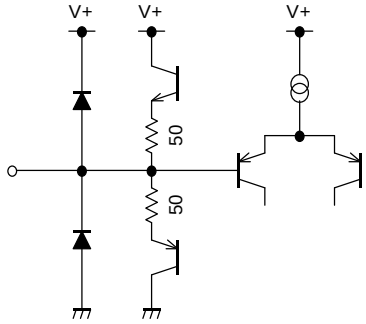
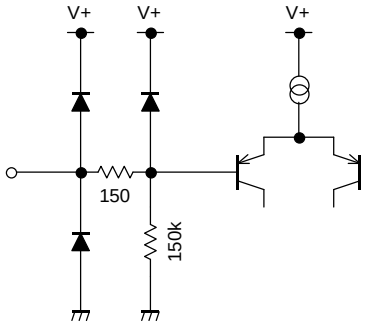
■PIN DESCRIPTION

No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	NOTE
1 22 23 44	NC NC NC NC NC NC NC NC	Non Connect Non Connect Non Connect Non Connect Non Connect Non Connect Non Connect Non Connect	———	-
7 8 10 12 20 35 39	FIL3 FIL4 FIL6 PCOUT SVOL1 FFR3 FFL3	Filter Filter Filter PUNCH Control VR WIDTH Control VR Filter Filter		V+/2
9 11	FIL5 FIL7	Filter Filter		V+/2
13 2	PCIN C3	PUNCH Control VR Filter		V+/2

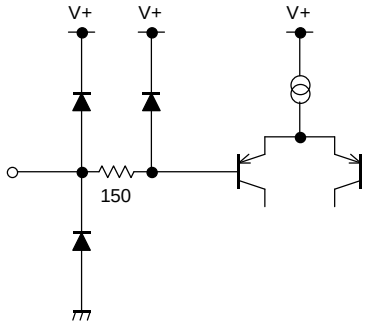
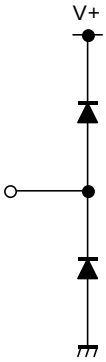
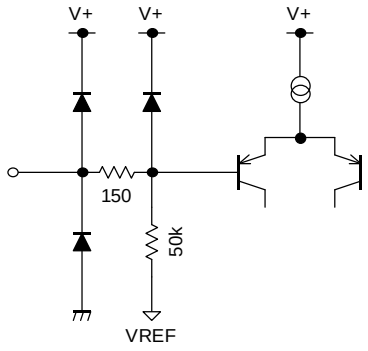
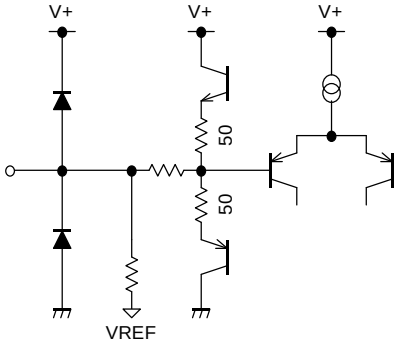
■PIN DESCRIPTION

No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	NOTE
14	C1	Filter		0V
15	C2	Filter		0V
16 17 18	SFIL1 SFIL2 SFIL3	Filter Filter Filter		V+/2
19 3 6	SVOL2 C4 FIL2	WIDTH Control VR Filter Filter		V+/2

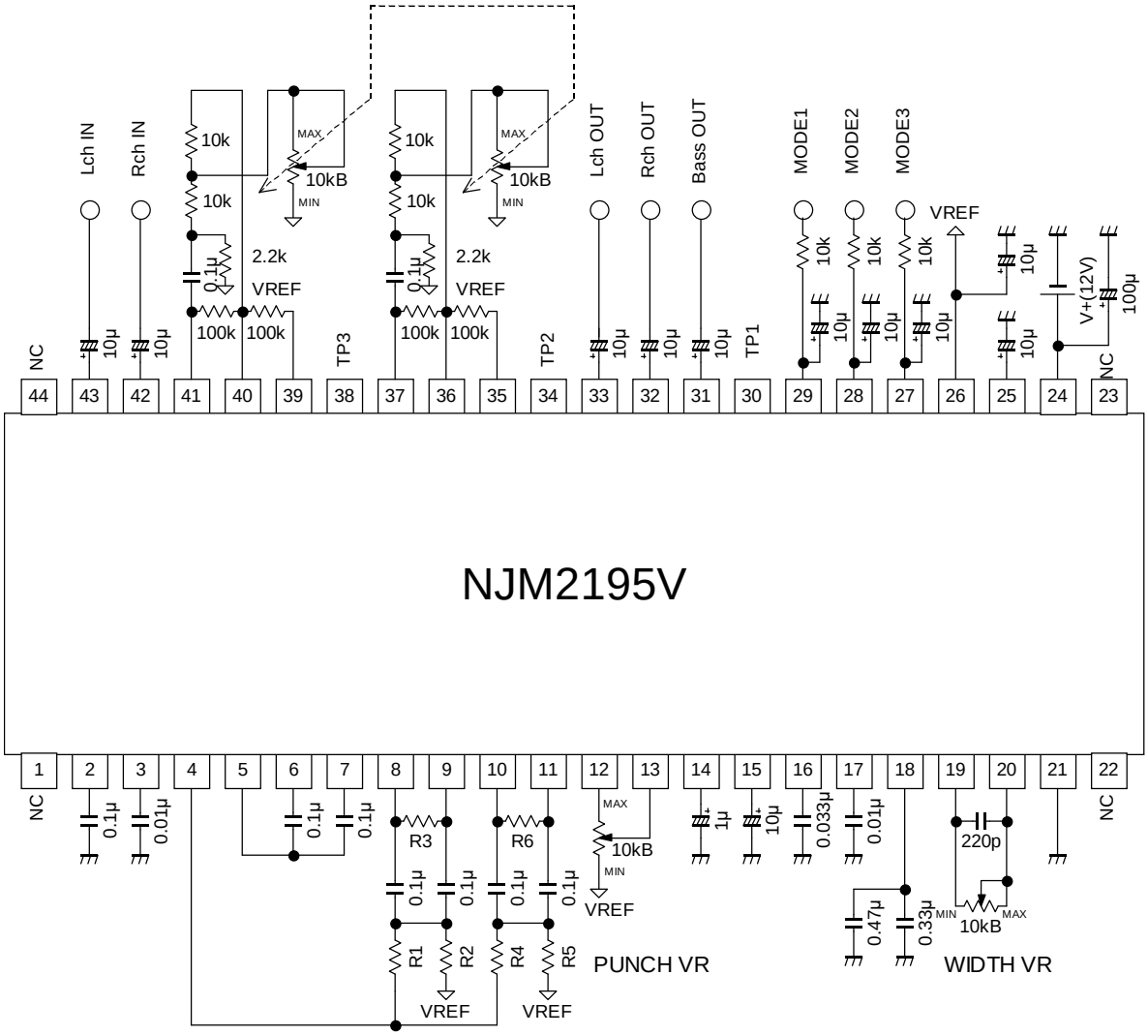
■**PIN DESCRIPTION**

No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	NOTE
21	GND	GND	———	0V
24	V+	Power Supply	———	V+
25	VREFIN	Reference Voltage Input		V+/2
26 31 32 33 37 41 4	VREF BASSOUT OUTR OUTL FFR1 FFL1 FILOUT	Reference Voltage TruBass Output Rch Output Lch Output Filter Filter Filter		V+/2
27 28 29	MODE3 MODE2 MODE1	Mode3 SW Mode2 SW Mode1 SW		0V

■PIN DESCRIPTION

No.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	NOTE
30 36 40	TP1 FFR2 FFL2	Test Pin Filter Filter		V+/2
34 38	TP2 TP3	Test Pin Test Pin		-
42 43	INR INL	Rch Input Lch Input		V+/2
5	FIL1	Filter		V+/2

■APPLICATION CIRCUIT



	SPEAKER SIZE		
	LARGE	MEDIUM	SMALL (TruBass mode only)
R1	56.2k	21k	21k
R2	13k	3.09k	3.09k
R3	158k	42k	42k
R4	37.4k	37.4k	22.1k
R5	8.87k	8.87k	2.32k
R6	107k	107k	32k

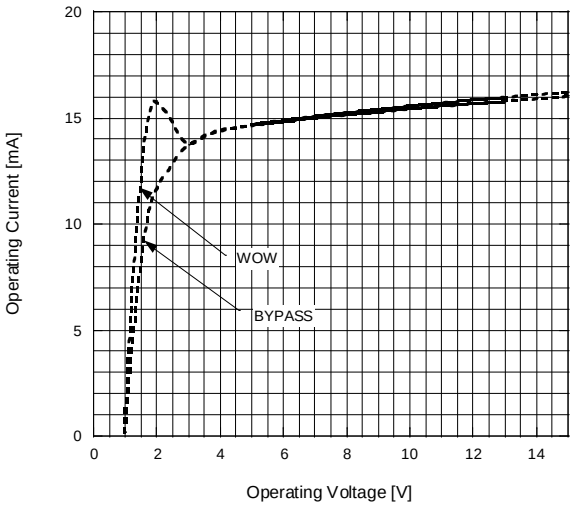
The standard setting of speaker size is as follows.(Reference)

- Large Mode : fo ≤ 80Hz
- Medium Mode : 80Hz < fo ≤ 150Hz
- Small Mode : 150Hz < fo ≤ 250Hz

■TYPICAL CHARACTERISTICS

Operating Current vs. Operating Voltage

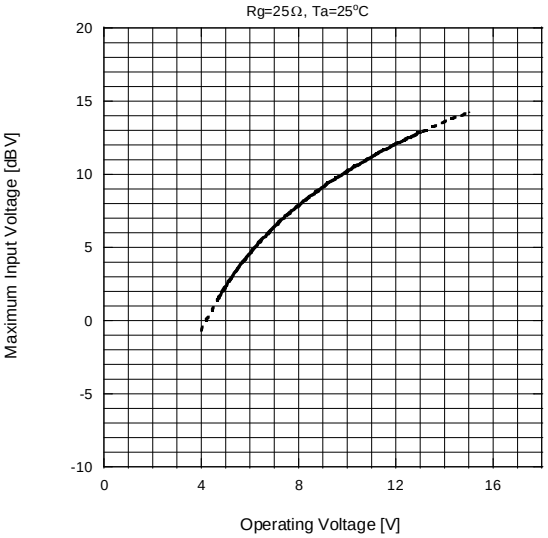
V+=1 to 15V, Ta=25°C



Maximum Input Voltage vs. Operating Voltage (BYPASS)

Vin=Lch, Vout=Lch, f=1kHz, RL=4.7kΩ

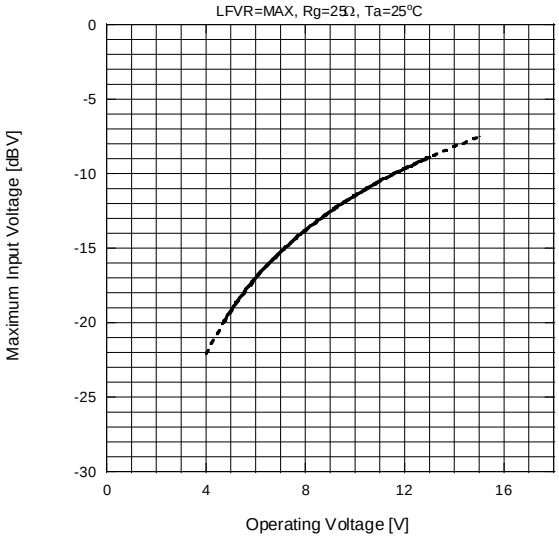
Rg=25Ω, Ta=25°C



Maximum Input Voltage vs. Operating Voltage (WOW)

Vin=Lch, Vout=Lch, f=10kHz, RL=4.7kΩ

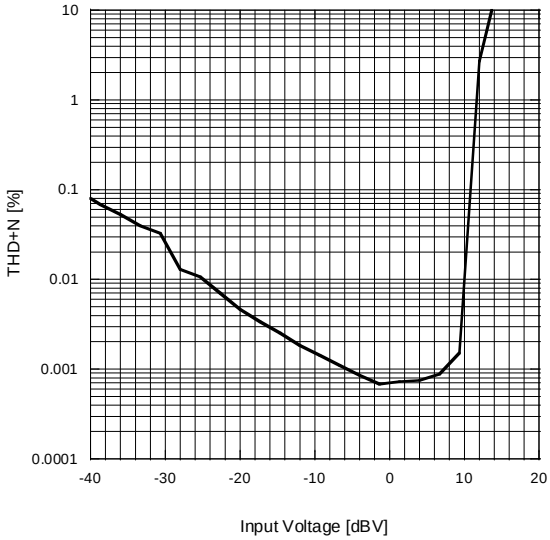
LFVR=MAX, Rg=25Ω, Ta=25°C



Total Harmonic Distortion vs. Input Voltage (BYPASS)

V+=12V, Vin=Lch, Vout=Lch, f=1kHz, RL=4.7kΩ

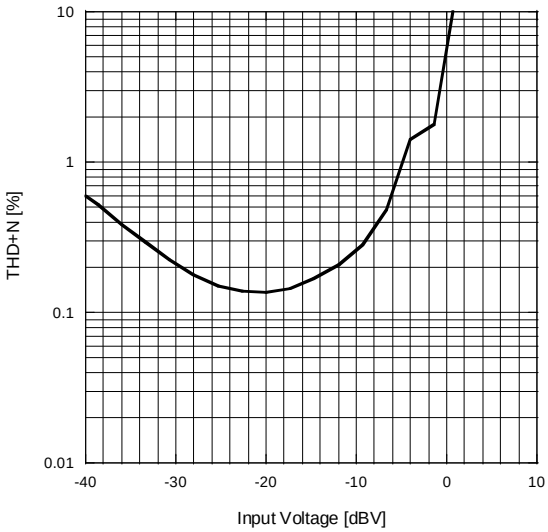
Rg=25Ω, BW=10-80kHz



Total Harmonic Distortion (TruBass)

V+=12V, Vin=L+Rch, Vout=Lch, f=100Hz, RL=4.7kΩ

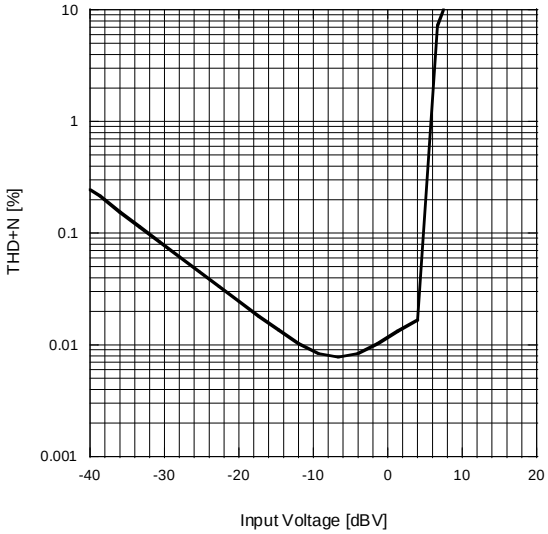
Rg=25Ω, BW=10-80kHz



Total Harmonic Distotion vs. Input Voltage (3D Stereo)

V+=12V, Vin=Lch, Vout=Lch, f=1kHz, RL=4.7kΩ

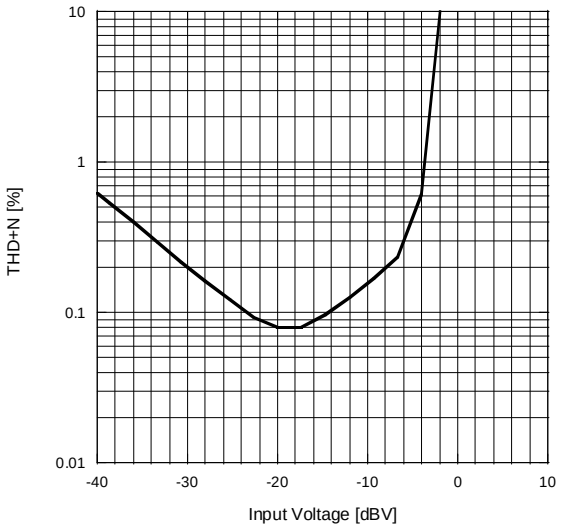
Rg=25Ω, BW=10-80kHz



■TYPICAL CHARACTERISTICS

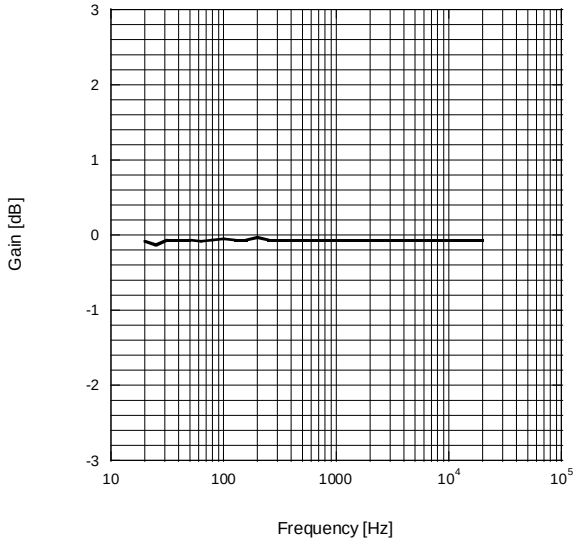
Total Harmonic Distortion vs. Input Voltage (WOW)

V+=12V, Vin=Lch, Vout=Lch, f=1kHz, RL=4.7kΩ
Rg=25Ω, BW=10-80kHz



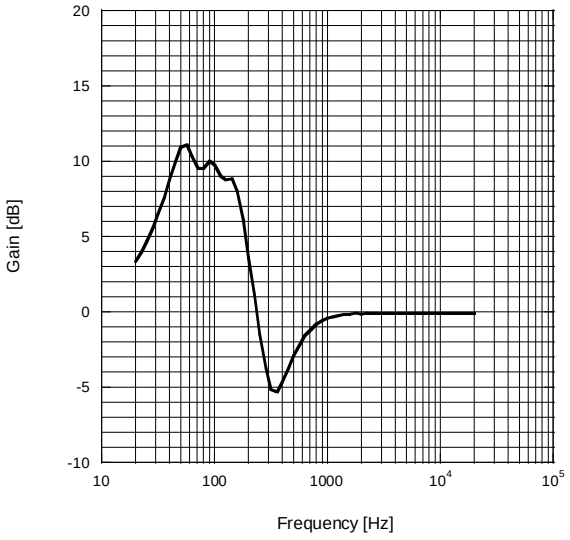
Frequency Responce (BYPASS)

V+=12V, Vin=-10dBV Lch, Vout=Lch, RL=4.7kΩ
Rg=25Ω



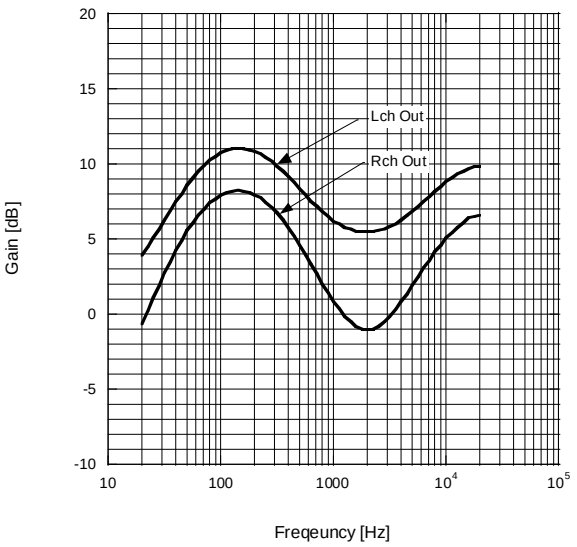
Frequency Responce (TruBass)

V+=12V, Vin=-20dBV L+Rch, Vout=Lch, RL=4.7kΩ
VR=ALLMAX, Medium Mode, Rg=25Ω



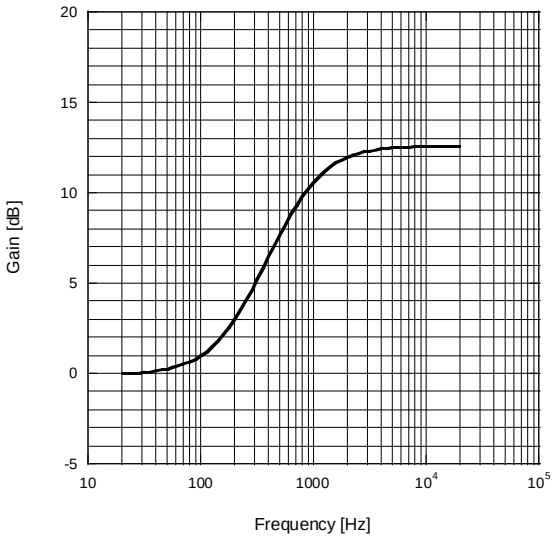
Freqeuncy Responce (3D Stereo)

V+=12V, Vin=-20dBV Lch, Vout=L/Rch, RL=4.7kΩ
VR=ALLMAX, Rg=25Ω



Frequency Responce (FOCUS)

V+=12V, Vin=-20dBV Lch, Vout=Lch, RL=4.7kΩ
Rg=25Ω



Frequency Responce (WOW)

V+=12V, Vin=-20dBV Lch, Vout=L/Rch, RL=4.7kΩ
VR=ALLMAX, Rg=25Ω