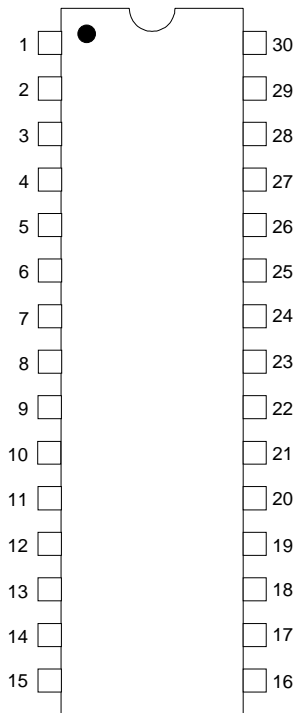


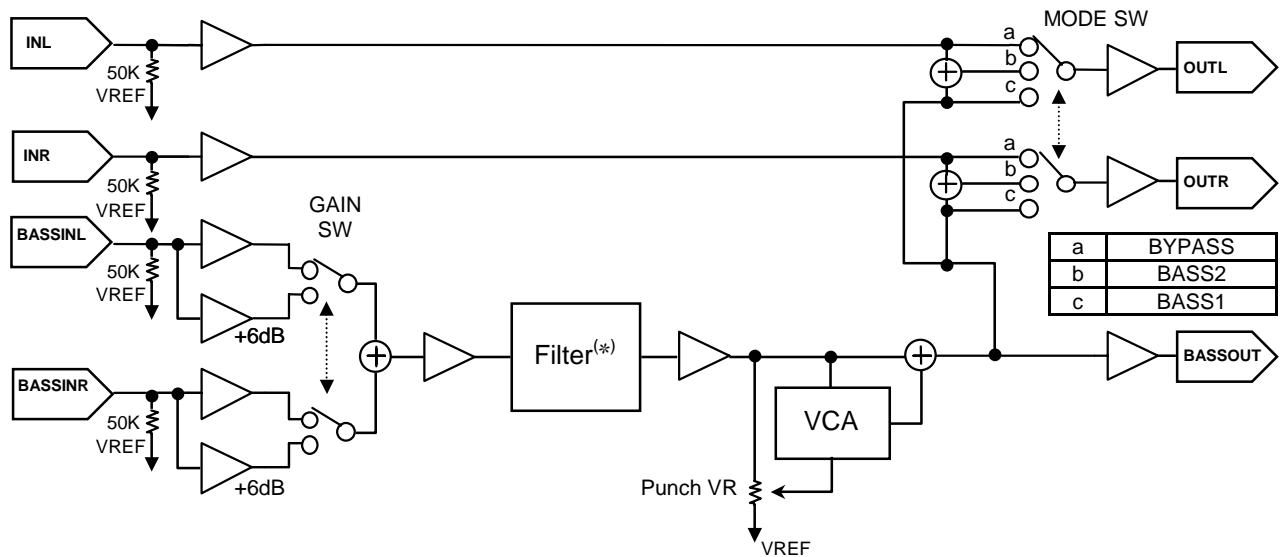
NJM2192A

■PIN CONFIGURATION



- | | |
|------------|-------------|
| 1. FILEOUT | 16. V+ |
| 2. FIL1 | 17. VREFOUT |
| 3. FIL2 | 18. VREFIN |
| 4. FIL3 | 19. GAINSW |
| 5. FIL4 | 20. MODE2 |
| 6. FIL5 | 21. MODE1 |
| 7. FIL6 | 22. BASSOUT |
| 8. FIL7 | 23. OTR |
| 9. PCOUT | 24. OUTL |
| 10. PCIN | 25. BASSINR |
| 11. FIL8 | 26. INR |
| 12. FIL9 | 27. BASSINL |
| 13. C1 | 28. INL |
| 14. C2 | 29. C3 |
| 15. GND | 30. C4 |

■TruBass BLOCK DIAGRAM



(*) Set the speaker size.

■SPEAKER SIZE SETTING

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

- Large Mode : $f_o \leq 80\text{Hz}$
- Medium Mode : $80\text{Hz} < f_o \leq 150\text{Hz}$
- Small Mode : $150\text{Hz} < f_o \leq 250\text{Hz}$

Set the speaker size by TruBass effect of your application.

■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V ⁺	15	V
Power Dissipation	P _D	700	mW
Operating Temperature Range	T _{opr}	-40 to +85	°C
Storage Temperature Range	T _{stg}	-40 to +125	°C

■ELECTRICAL CHARACTERISTICS (V⁺=12V, Ta=25°C, V_{IN}=-20dBV(100mVrms), Speaker Size : Medium)

PARAMETER	SYMBOL	TEST CONDITION						MIN.	TYP.	MAX.	UNIT
		IN		OUT	MODE	PUNCH VR					
		L	R								
Operating Voltage	V ⁺							4.7	12.0	13.0	V
Supply Current	I _{CC}	No Signal	0	0	-	BYPASS	-	6.6	11.6	16.6	mA
			0	0	-	BASS1	MAX	6.6	11.6	16.6	
			0	0	-	BASS2	MAX	6.6	11.6	16.6	
Reference Voltage	V _{REF}	V ⁺ /2	0	0	-	-	-	5.8	6.0	6.2	V
Maximum Input Voltage	V _M	f=1kHz THD=3%	V _{IN}	-	L	BYPASS	-	10.7 (3.1)	11.7 (3.8)	-	dBV (Vrms)
			-	V _{IN}	R						
		f=100Hz THD=3% Gain "L"	V _{IN}	V _{IN}	L	BASS1	MAX	-6.3 (0.5)	-4.3 (0.6)	-	
			V _{IN}	V _{IN}	R						
		f=100Hz THD=3% Gain "L"	V _{IN}	V _{IN}	L	BASS2	MAX	-4.7 (0.6)	-2.7 (0.7)	-	
			V _{IN}	V _{IN}	R						
Output Noise	V _{NO}	Rg=0Ω A-Weighted	0	0	L	BYPASS	-	-	-105 (5.6)	-98 (12.6)	dBV (μVrms)
			0	0	R						
		Rg=0Ω A-Weighted Gain "L"	0	0	L	BASS2	MAX	-	-94 (20.0)	-88 (40.0)	
			0	0	R						
Total Harmonic Distortion	THD	f=1kHz V _{IN} =-10dBV	V _{IN}	-	L	BYPASS	-	-	0.005	0.01	%
			-	V _{IN}	R						
		f=100Hz Gain "L"	V _{IN}	V _{IN}	L	BASS1	MAX	-	0.1	1.0	
			V _{IN}	V _{IN}	R						
		f=100Hz Gain "L"	V _{IN}	V _{IN}	L	BASS2	MAX	-	0.1	1.0	
			V _{IN}	V _{IN}	R						
BYPASS Gain	G _{V_{BYP}}	f=1kHz	V _{IN}	-	L	BYPASS	-	-1.0	0.0	1.0	dB
			-	V _{IN}	R						

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■ELECTRICAL CHARACTERISTICS ($V^+=12V, T_a=25^\circ C, V_{IN}=-20dBV(100mV_{rms})$, Speaker Size : Medium)

PARAMETER	SYMBOL		TEST CONDITION				MIN.	TYP.	MAX.	UNIT			
			IN		OUT	MODE					PUNCH VR		
BASS Gain	$G_{V_{BASS}}$	f=100Hz Gain "L"	V_{IN}	V_{IN}	L	BASS1	MAX	11.2	13.2	15.2	dB		
			V_{IN}	V_{IN}	R								
		f=100Hz Gain "L"	V_{IN}	V_{IN}	L	BASS1	MIN	-18.4	-14.4	-10.4			
			V_{IN}	V_{IN}	R								
		f=100Hz Gain "H"	V_{IN}	V_{IN}	L	BASS1	MAX	15.7	17.7	19.7			
			V_{IN}	V_{IN}	R								
		f=100Hz Gain "L"	V_{IN}	V_{IN}	L	BASS2	MAX	12.8	14.8	16.8			
			V_{IN}	V_{IN}	R								
		f=100Hz Gain "H"	V_{IN}	V_{IN}	L	BASS2	MAX	16.6	18.6	20.6			
			V_{IN}	V_{IN}	R								
		Switch Control Voltage	V_{IH}	19,20,21pin	-	-	-	-	2.0	-		V^+	V
			V_{IL}	19,20,21pin	-	-	-	-	0.0	-		0.7	

■MODE SWITCH FUNCTION

	MODE1	MODE2	NOTES
BYPASS (a)	L	-	Input Through
BASS1 (c)	H	L	Low Frequency Content of TruBass ⁽¹⁾
BASS2 (b)	H	H	TruBass Mode ⁽²⁾

(1) BASS1: The output signal is low frequency content of TruBass derived from the stereo audio signal.

(2) BASS2: TruBass Mode.

■BASS INPUT AMP GAIN SWITCH FUNCTION

To Increase the TruBass effect with the GAIN Switch.

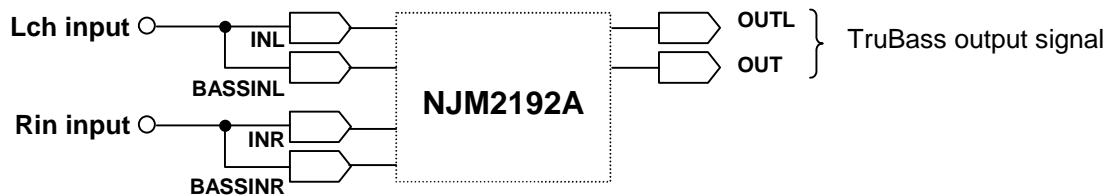
	GAIN	NOTES
Gain Low	L	Normal Position
Gain High	H	Gain +6dB

INPUT TERMINAL OPERATING INSTRUCTION

NJM2192As input equip 4 terminals INL(28pin), INR(26pin), BASSINL(27pin) and BASSINR(25pin).

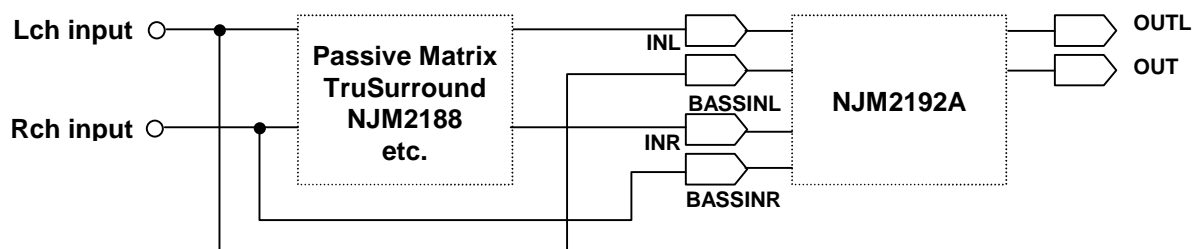
“Normal Setting”

Short INL and BASSINL, INR and BASSINR at the normal TruBass mode.



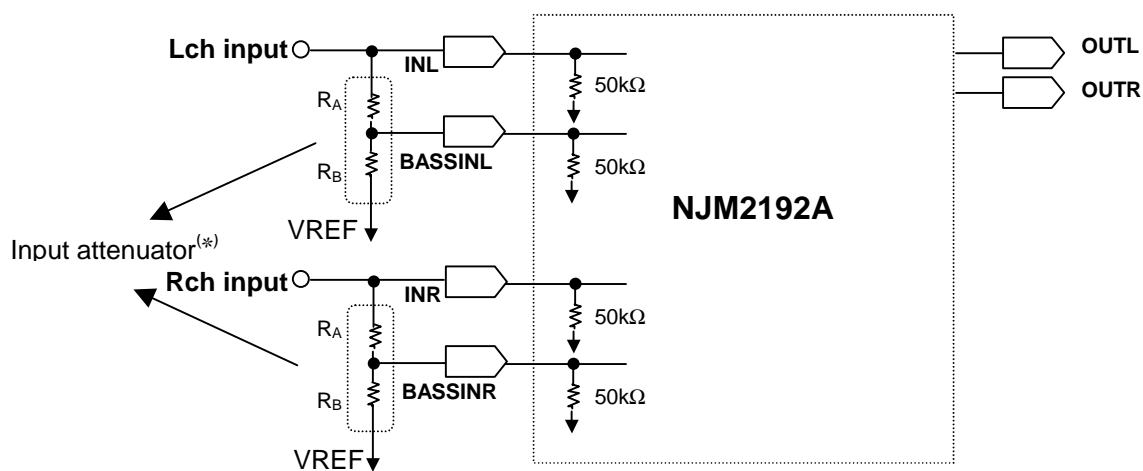
“Connect to the other surround ICs(TruSurround, SRS, etc.)”

If NJM2192A is used with the other surround ICs, the low frequency signal is possible to be amplified by the other surround ICs. Then the audio stereo signal input into the BASSIN L/R, and the other surround signal input into INL/R.



“Adjust TruBass effect”

Insert an attenuator before the BASSIN L/R if necessary.



(*) Set the attenuator : $(R_A+R_B) \geq 50k\Omega$

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■PIN DESCRIPTION

NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
10 29	PCIN C3	PUNCH Control VR Filter Input		V+/2
3 30	FIL2 C4	Filter Input		V+/2
1 17 22 23 24	FILOUT VREFOUT BASSOUT OUTR OUTL	Filter Output Vref Output TruBass Output (Low Frequency Content) Rch Audio Output Lch Audio Output		V+/2
2	FIL1	Filter Input		V+/2

NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
4 5 7	FIL3 FIL4 FIL6	Filter Input		$V+/2$
6 8 11	FIL5 FIL7 FIL8	Filter Input		$V+/2$
9 12	PCOUT FIL9	PUNCH Control VR Filter Output		$V+/2$
13	C1	Filter Input		0V

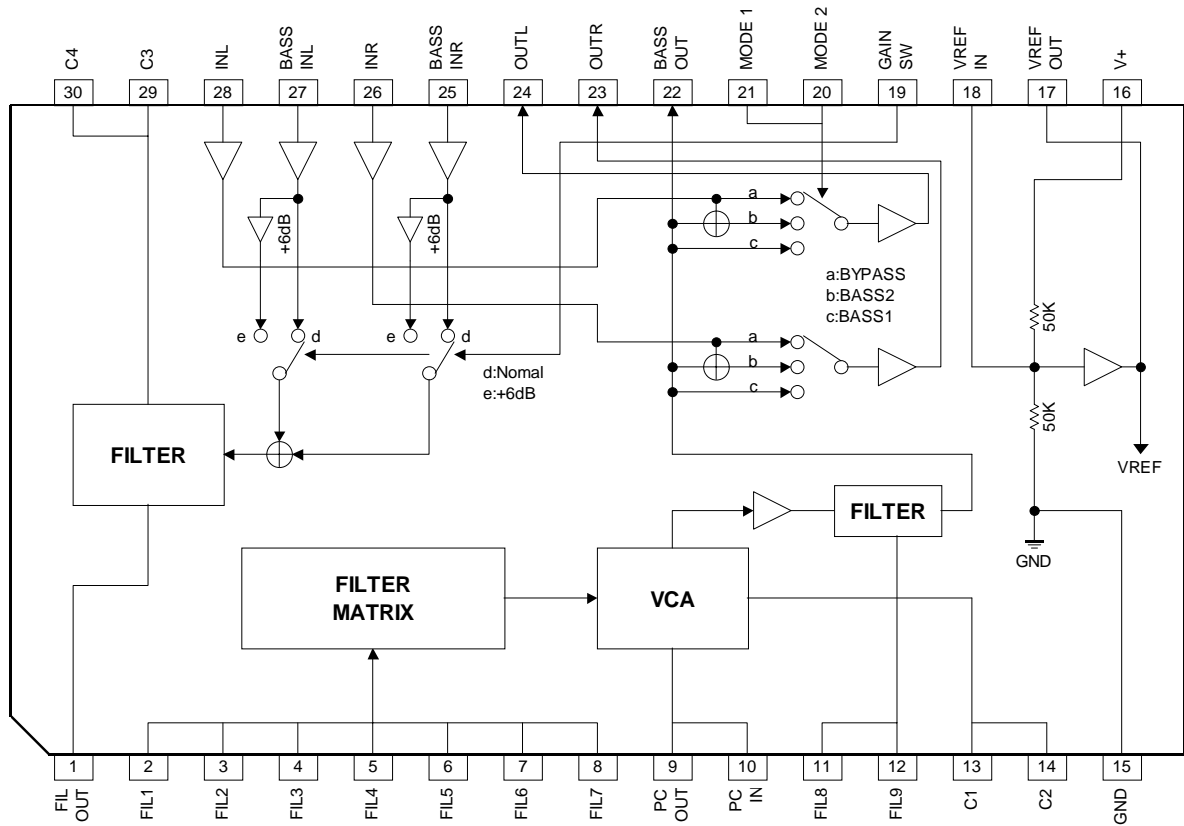
NJM2192A

NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
14	C2	Filter Input		0V
18	VREFIN	Vref Input		V+/2
19 20 21	GAINSW MODE2 MODE1	Gain SW MODE2 SW MODE1 SW		0V
25 26 27 28	BASSINR INR BASSINL INL	Audio Input		V+/2

NO.	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
15	GND	GND		0V
16	V+	V+		V+

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■BLOCK DIAGRAM

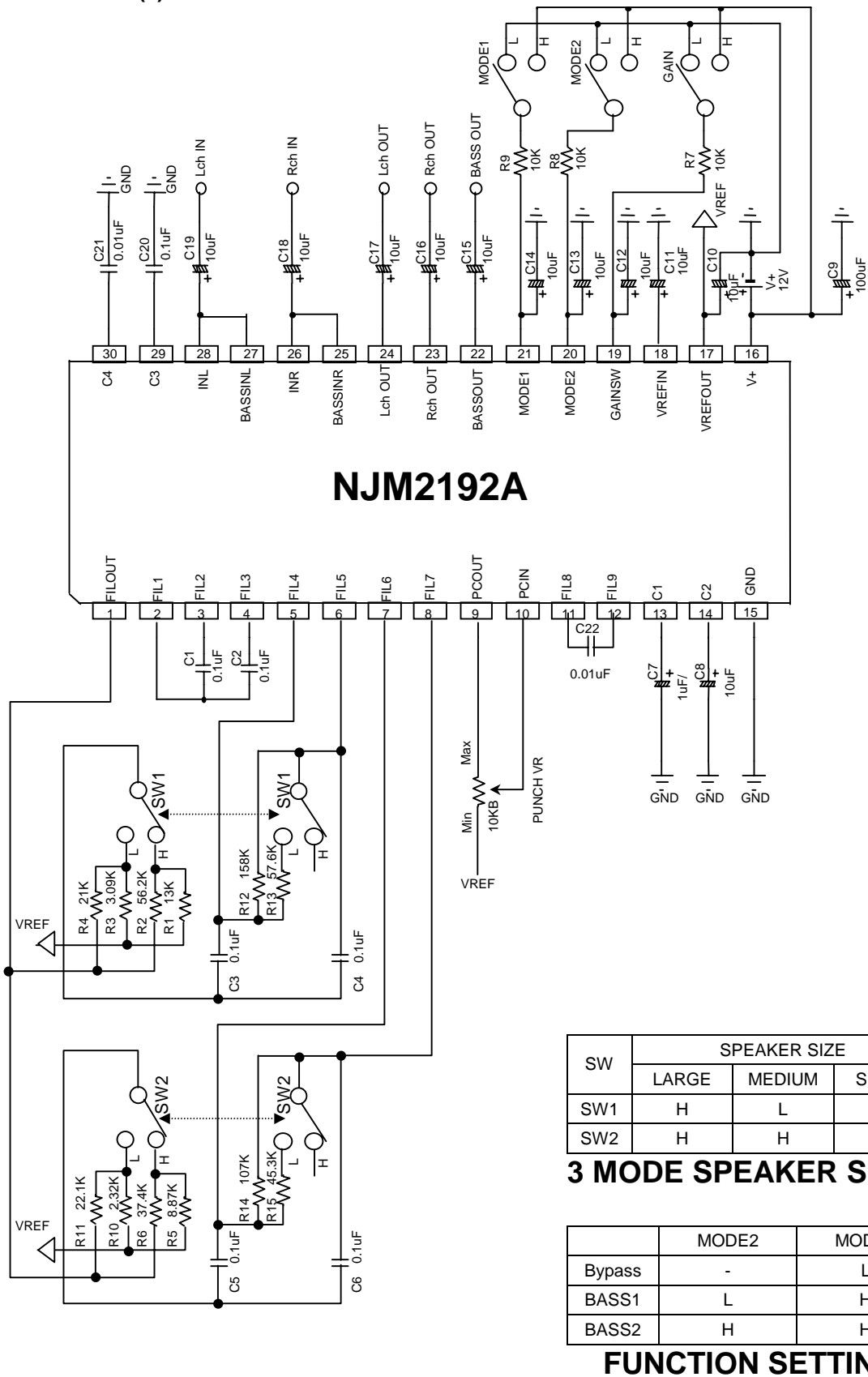


No.	SYMBOL	FUNCTION	No.	SYMBOL	FUNCTION
1	FILOUT	Filter Output	16	V+	Supply Voltage
2	FIL1	Filter Input	17	VREFOUT	V ⁺ /2 Output
3	FIL2	Filter Input	18	VREFIN	V ⁺ /2 Input
4	FIL3	Filter Input	19	GAINSW	Gain Switch
5	FIL4	Filter Input	20	MODE2	MODE2 Switch
6	FIL5	Filter Input	21	MODE1	MODE1 Switch
7	FIL6	Filter Input	22	BASSOUT	TruBass Output (Low Frequency Content) ⁽¹⁾
8	FIL7	Filter Input	23	OUTR	Rch Output
9	PCOUT	Punch Control VR	24	OUTL	Lch Output
10	PCIN	Punch Control VR	25	BASSINR	TruBass Input ⁽²⁾
11	FIL8	Filter Input	26	INR	Rch Input
12	FIL9	Filter Output	27	BASSINL	TruBass Input ⁽³⁾
13	C1	Filter Input	28	INL	Lch Input
14	C2	Filter Input	29	C3	Filter Input
15	GND	GND	30	C4	Filter Input

(1) The BASSOUT is low frequency signal derived from the stereo audio signal.

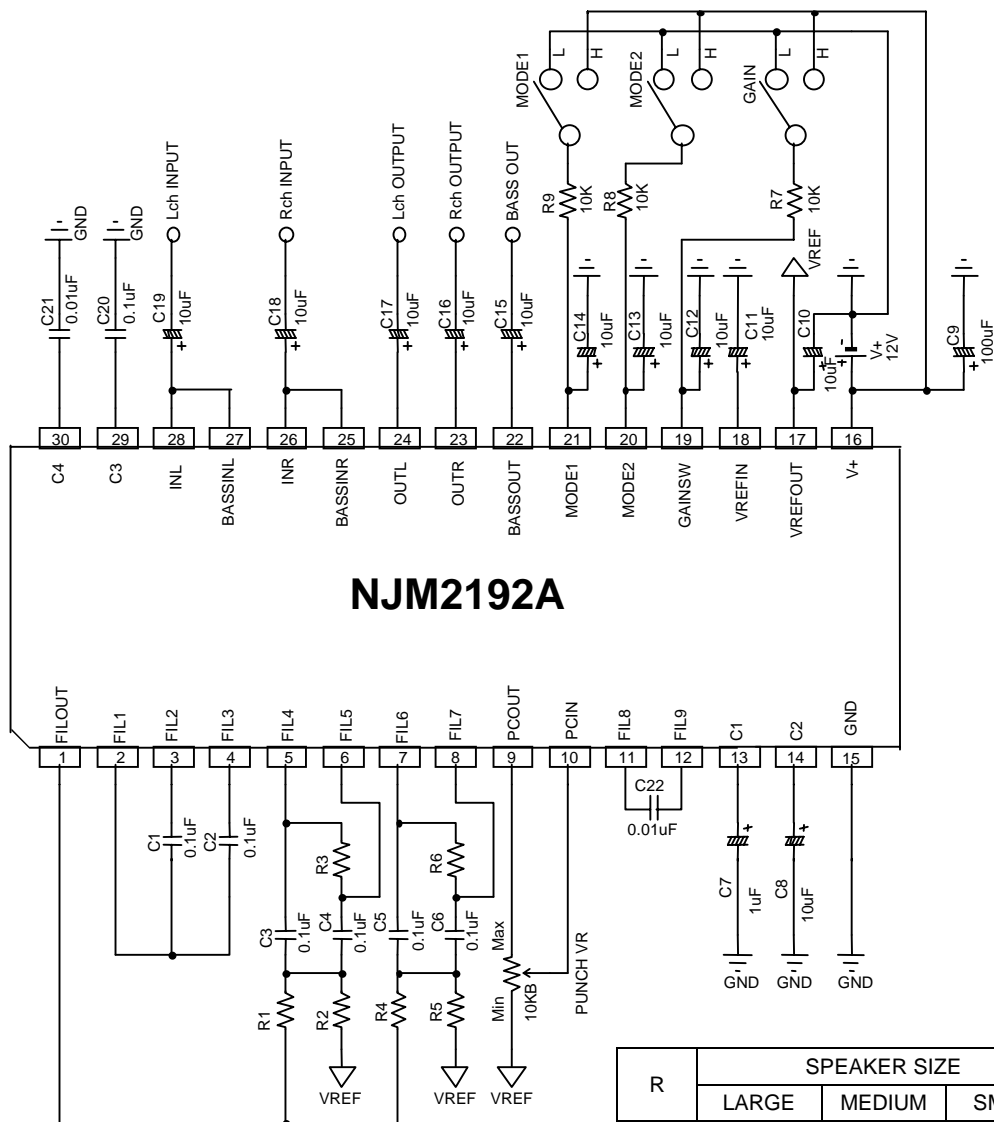
(2),(3) Refer to “■INPUT TERMINAL OPERATING INSTRUCTION”

APPLICATION CIRCUIT(1)



NJM2192A

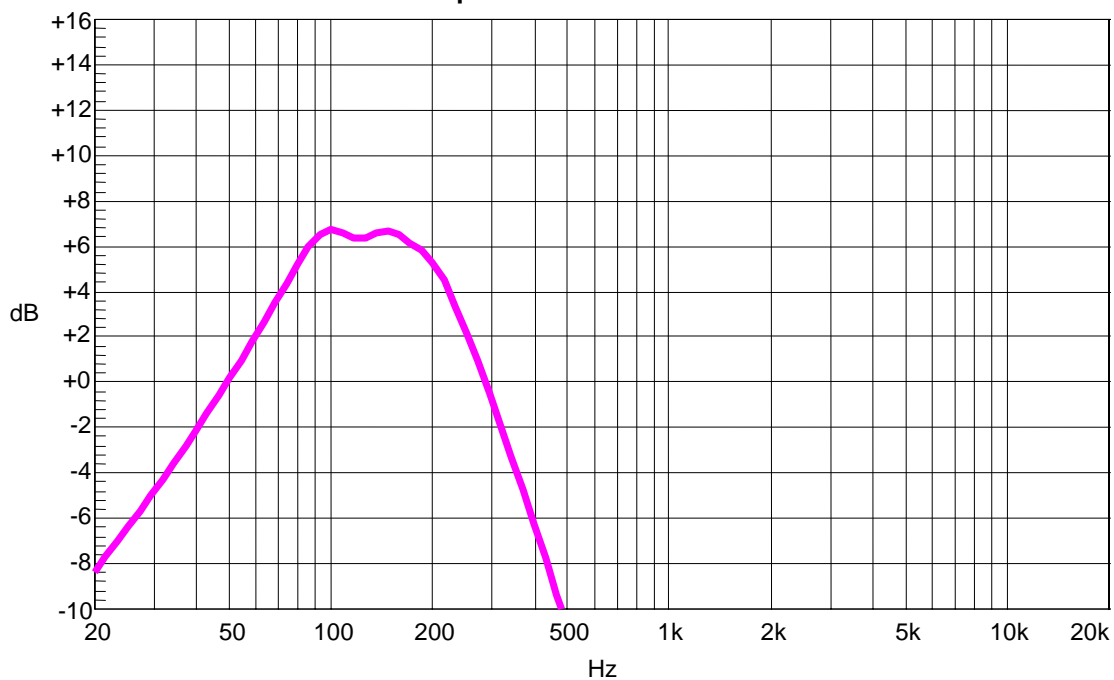
APPLICATION CIRCUIT(2)



R	SPEAKER SIZE		
	LARGE	MEDIUM	SMALL
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

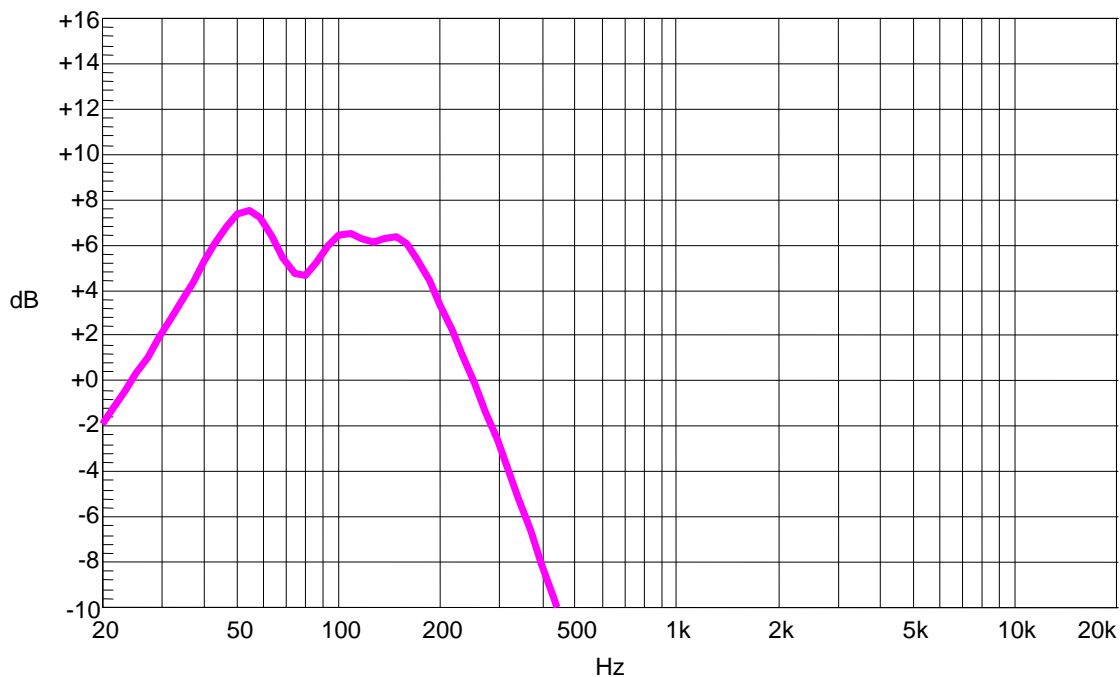
■BASS1 MODE TYPICAL CHARACTERISTICS

NJM2192(TruBass) GAIN STRUCTURE
"Speaker Size : Small"



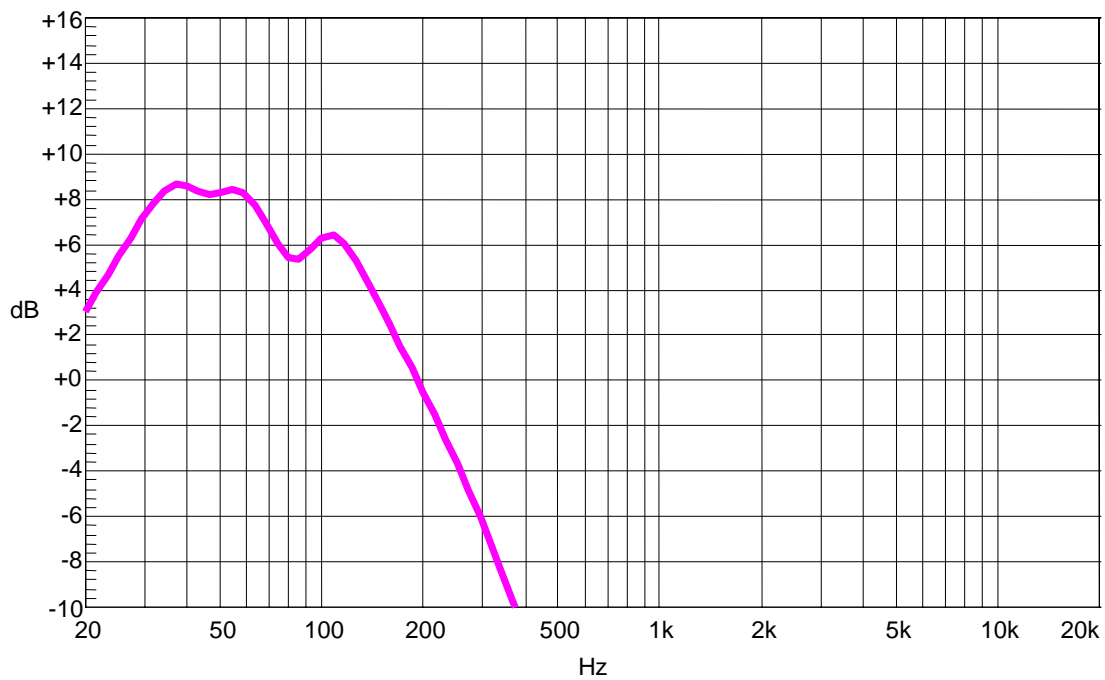
Vin=-12.2dBV(245mVrms), Lch In → Lch Out, Punch VR : MAX
V+ = 12V

NJM2192(TruBass) GAIN STRUCTURE
"Speaker Size : Medium"



Vin=-12.2dBV(245mVrms), Lch In → Lch Out, Punch VR : MAX
V+ = 12V

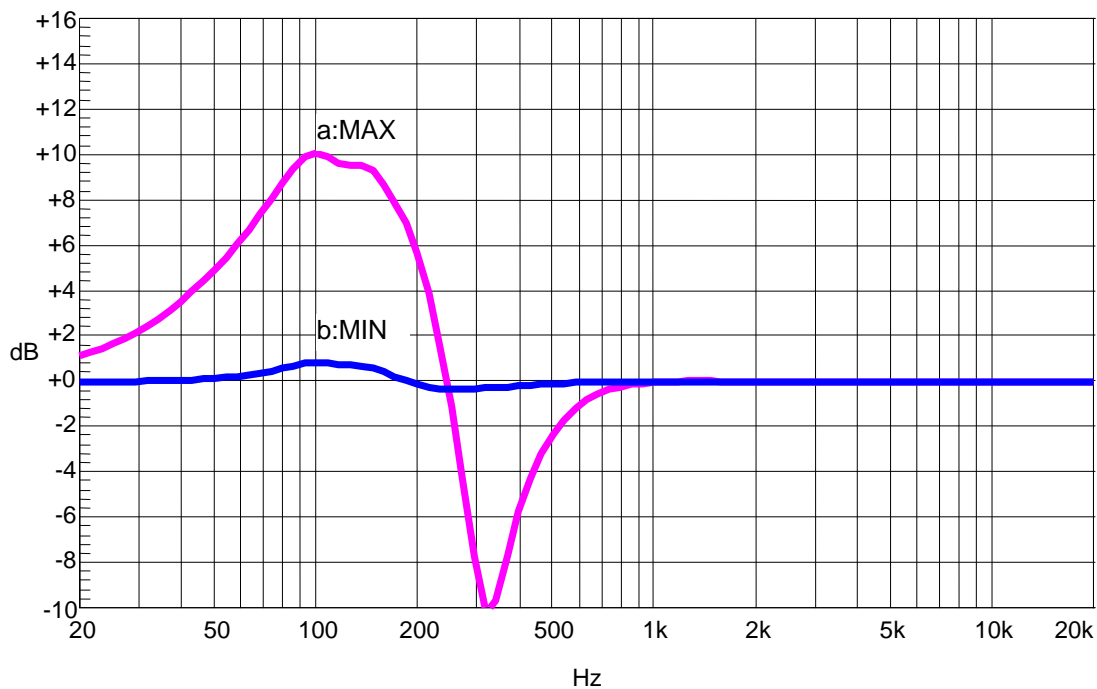
NJM2192(TruBass) GAIN STRUCTURE "Speaker Size : Large"



Vin=-12.2dBV(245mVrms), Lch In → Lch Out, Punch VR : MAX
V+ = 12V

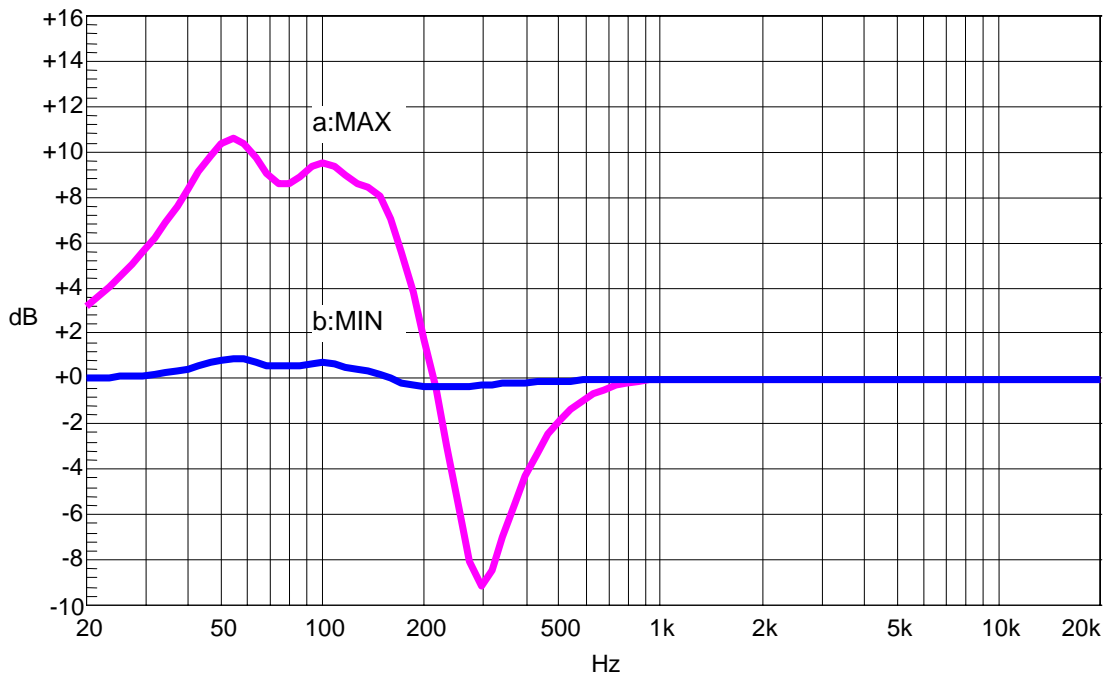
■BASS2 MODE TYPICAL CHARACTERISTICS

NJM2192(TruBass) GAIN STRUCTURE "Speaker Size : Small"



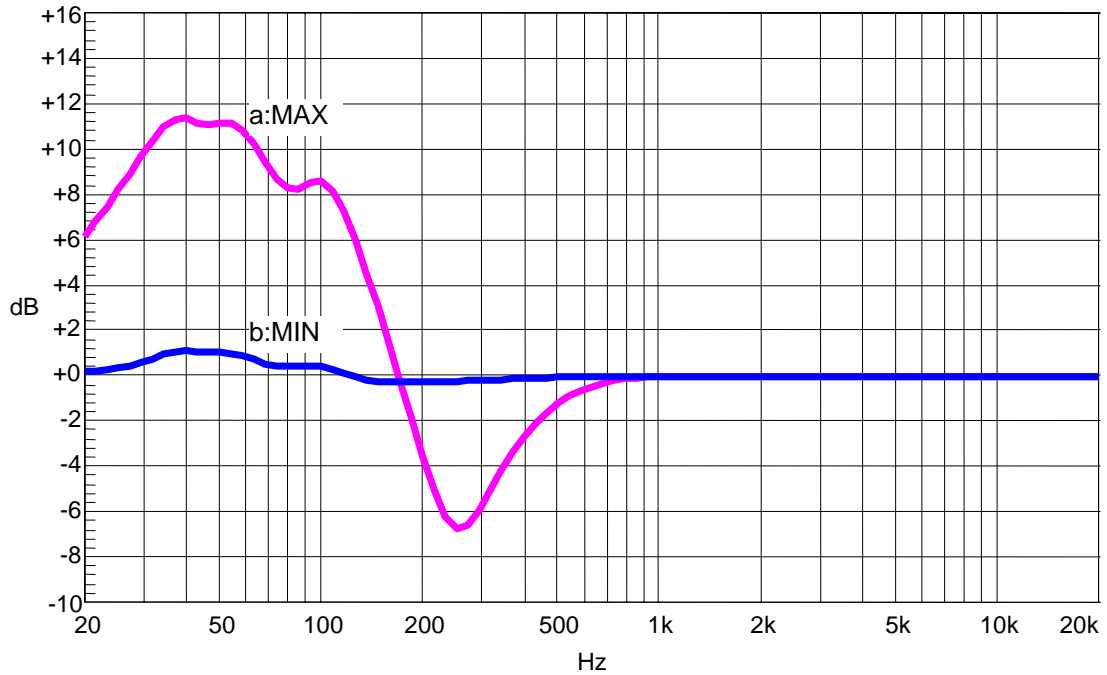
Vin=-12.2dBV(245mVrms), Lch In → Lch Out, Punch VR a:MAX, b:MIN
V+ = 12V

NJM2192(TruBass) GAIN STRUCTURE "Speaker Size : Medium"



Vin=-12.2dBV(245mVrms), Lch In → Lch Out, Punch VR a:MAX, b:MIN
V+ = 12V

NJM2192(TruBass) GAIN STRUCTURE "Speaker Size : Large"



Vin=-12.2dBV(245mVrms) Lch In → Lch Out, Punch VR a:MAX, b:MIN
V+ = 12V

[CAUTION]
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