

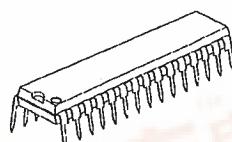
**SRS A/V Focus SPEAKER ELEVATION AUDIO PROCESSOR****■ GENERAL DESCRIPTION**

The NJM2189 is a speaker elevation audio processor with A/V Focus Filter, based on SRS Focus technology. It is capable of raising sound image.

In addition, the NJM2189 includes the A/V Focus Filter to reduce harsh sound when speakers are directly put on hard-surface floor.

The Bypass and Focus Mode inputs are separate to be the same sound volume in both Bypass and Focus mode.

The NJM2189 is suitable for almost all car audio, Projection TV, radio cassette, and then.

■ PACKAGE OUTLINE**NJM2189L****NJM2189M****4****■ FEATURES**

- Operating Voltage (4.7 to 13V)
- Low Operating Current (7.0mA typ.)
- Low Output Noise (15 μ Vrms typ.)
- Adjusted by LF/HF Elevation, and Bass Compensation Volume
- Internal A/V Focus Filter
- Independent Audio Input for Bypass Mode
- Bipolar Technology
- Package Outline SDIP30, SDMP30

The A/V Focus technology incorporated in the NJM2189 is owned by SRS Labs, a US Corporation. The A/V Focus technology is protected under U.S. Patent No.xxxxx, No.xxxxx, No.xxxxx with numerous additional issued and pending foreign patents. The trademarks "SRS", "the SRS symbol" are registered in the U.S. and selected foreign countries.

In order to purchase and implement the NJM2189, all customers must enter into a license agreement directly with SRS Labs for the payment of royalties and to ensure proper trademark usage. Neither the purchase of the NJM2189, nor the corresponding sale of audio enhancement equipment conveys the right to commercialized recordings made with the A/V Focus.

For further information, please contact:
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 Tel 714-442-1070 Fax 714-852-1099 http://www.srs-labs.com.

NJM2189

■ ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	RATING	UNIT
Supply Voltage	V ⁺	15	V
Power Dissipation	P _D	(SDIP30) 700 (SDMP30) 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, Connect Bypass Mode input and Focus Mode input)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V ⁺		4.7	12.0	13.0	V
Supply Current	I _{CC}	No Signal	—	7.0	10.5	mA
Reference Voltage	V _{REF}	V ⁺ /2	5.8	6.0	6.2	V
Maximum Input Voltage	V _{INMAX}	f=1kHz at T.H.D.=3% Controls ∞	Bypass Mode Focus Mode A/V Focus Mode	7.79 (2.45) -4.71 (0.58) -5.21 (0.55)	11.8 (3.88) -1.21 (0.87) -1.71 (0.82)	— — —
		f=70Hz at T.H.D.=3% Controls ∞	Bypass Mode Focus Mode A/V Focus Mode	— — —	11.8 (3.88) 0.77 (1.1) 0.77 (1.1)	— — —
		f=10kHz at T.H.D.=3% Controls ∞	Bypass Mode Focus Mode A/V Focus Mode	— — —	11.8 (3.88) -8.71 (0.37) -8.71 (0.37)	— — —
Output Noise	V _{NOISE}	V _{in} =V _{REF} A-weight Controls ∞	Focus Mode A/V Focus Mode	— —	-94.0 (20.0) -94.0 (20.0)	-88.0 (40.0) -88.0 (40.0)
		V _{in} =V _{REF} A-weight Controls Center	Focus Mode A/V Focus Mode	— —	-96.5 (15.0) -96.5 (15.0)	— —
		V _{in} =V _{REF} A-weight Controls 0	Focus Mode A/V Focus Mode	— —	-96.5 (15.0) -96.5 (15.0)	— —

dBV
(Vrms)

dBV
(μ Vrms)

■ ELECTRICAL CHARACTERISTICS ($V^+ = 12V$, $T_a = 25^\circ C$)

PARAMETER	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Output Noise	V_{NOISE}	$V_{in} = V_{REF}$ DIN-AUDIO Controls ∞	Focus Mode	—	-90.1 (30.0)	—
			A/V Focus Mode	—	-90.1 (30.0)	—
		$V_{in} = V_{REF}$ DIN-AUDIO Controls Center	Focus Mode	—	-94.0 (20.0)	—
			A/V Focus Mode	—	-94.0 (20.0)	—
		$V_{in} = V_{REF}$ DIN-AUDIO Controls 0	Focus Mode	—	-94.0 (20.0)	—
			A/V Focus Mode	—	-96.5 (15.0)	—
		$V_{in} = -17.2 \text{dBu}$ f=1kHz Controls ∞	Focus Mode	-1.0	0.0	1.0
			A/V Focus Mode	-1.0	0.0	1.0
Total Harmonic Distortion	THD	$V_{in} = -17.2 \text{dBu}$ Lch f=1kHz Controls ∞	Focus Mode	—	0.05	0.20
			A/V Focus Mode	—	0.09	0.30
BYPASS Gain	G_{BYP}	$V_{in} = -17.2 \text{dBu}$ f=1kHz	Bypass Mode	-1.0	0.0	1.0
FOCUS Gain1	G_{FOC1}	$V_{in} = -17.2 \text{dBu}$ f=70Hz Controls ∞	Focus Mode	8.5	10.5	12.5
FOCUS Gain2	G_{FOC2}	$V_{in} = -17.2 \text{dBu}$ f=20kHz Controls ∞	Focus Mode	19.0	21.0	23.0
AVF Gain	G_{AVF}	$V_{in} = -17.2 \text{dBu}$ f=800Hz Controls 0	A/V Focus Mode	-12.0	-10.0	-8.0
MODE Select Control Voltage	V_{MODE}	$V_{in} = \text{High Level}$		2.0	—	V^+
		$V_{in} = \text{Low Level}$		0.0	—	0.7

■ MODE SWITCH

	MODE1	MODE2
Bypass Mode	L	—
Focus Mode	H	L
A/V Focus Mode	H	H

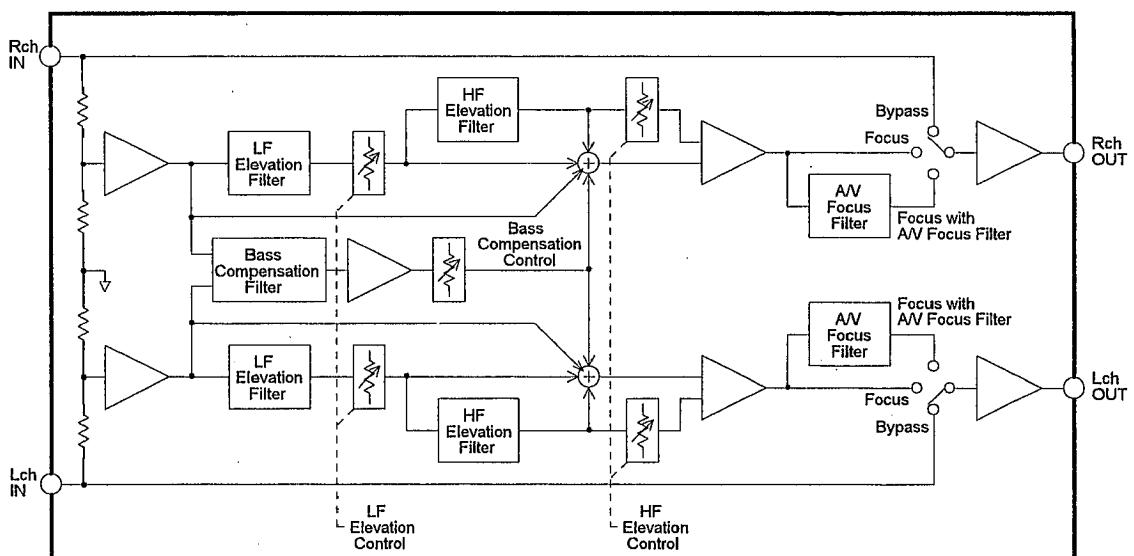
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■ PIN FUNCTION

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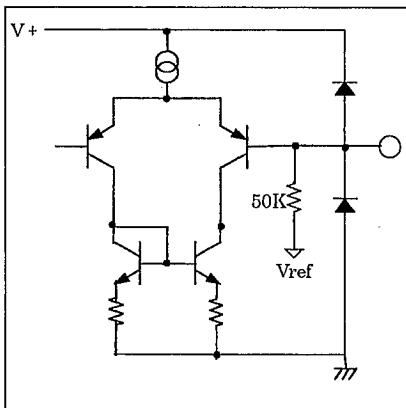
Bypass Mode Lch Input	1 Lin1	Rin1	30 Bypass Mode Rch Input
Focus Mode Lch Input	2 Lin2	Rin2	29 Focus Mode Rch Input
Lch LF Elevation Control Output	3 LFoutL	LFoutR	28 Rch LF Elevation Control Output
Lch LF Elevation Control Input	4 LFinL	LFinR	27 Rch LF Elevation Control Input
Lch HF Elevation Control Input 1	5 HFInL1	HFInR1	26 Rch HF Elevation Control Input 1
Lch HF Elevation Control Input 2	6 HFInL2	HFInR2	25 Rch HF Elevation Control Input 2
Bass Compensation Control Output	7 BCout	LPFout	24 LPF Output
Bass Compensation Control Input	8 BCin	LPFin	23 LPF Input
Lch Focus Output	9 FoutL	FoutR	22 Rch Focus Output
Lch A/V Focus filter Input	10 AVFFinL	AVFFinR	21 Rch A/V Focus filter Input
Lch A/V Focus filter Output	11 AVFFoutL	AVFFoutR	20 Rch A/V Focus filter Output
Lch Output	12 Lout	Rout	19 Rch Output
Vref Input	13 RFin	MODE1	18 Focus/Bypass Mode Select
V+/2	14 Vref	MODE2	17 A/V Focus filter ON/OFF Select
Ground	15 GND	V+	16 4.7 to 13.0V Supply

■ BLOCK DIAGRAM

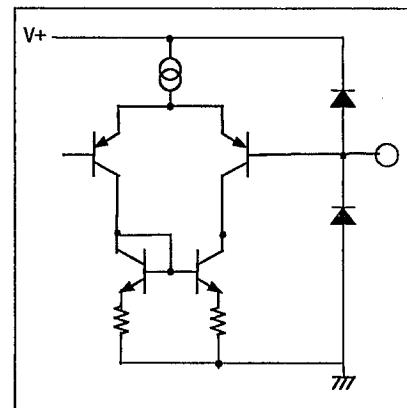


■PIN DESCRIPTION

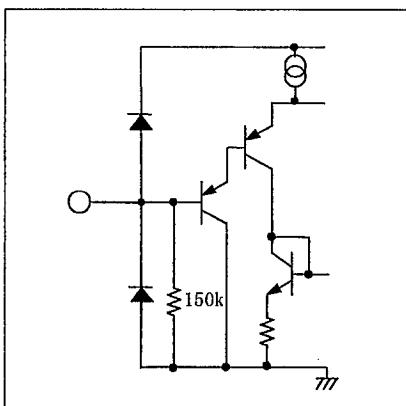
Lin1, Rin1



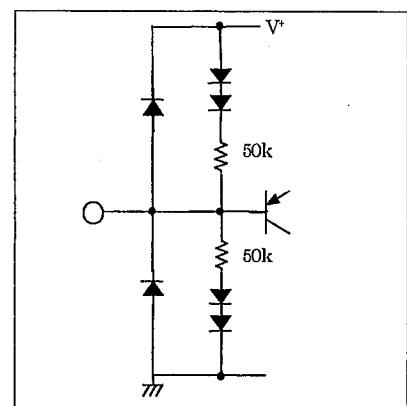
Lin2, Rin2



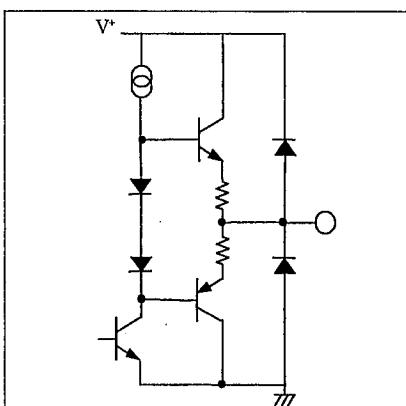
MODE1, MODE2



REFin

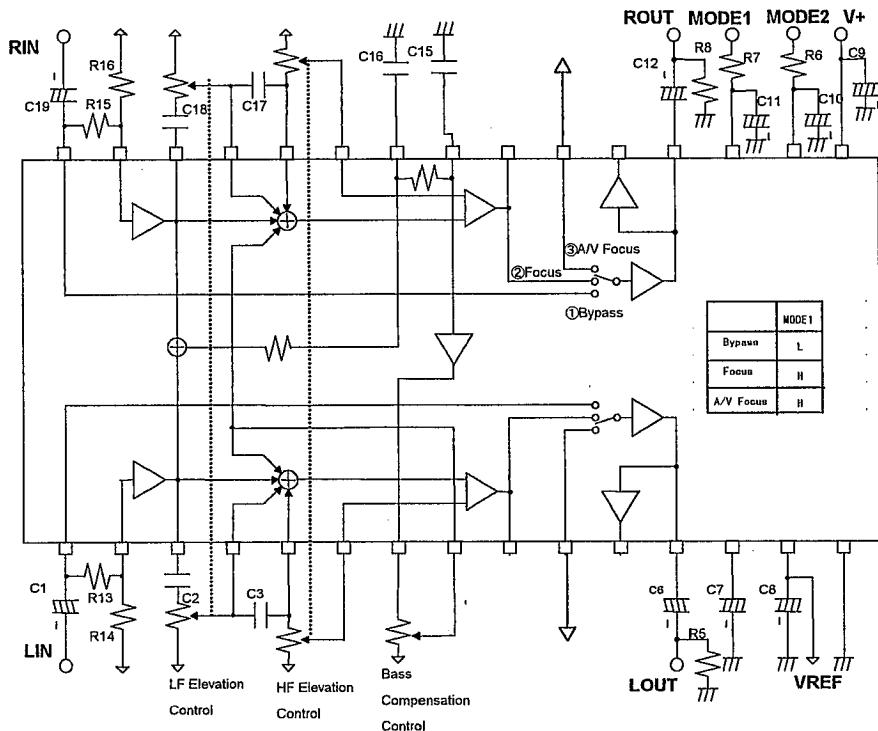


Lout, Rout, Vref



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■ APPLICATION CIRCUIT



PART No.	VALUE	Tolerance	PART No.	VALUE	Tolerance
C1, C6, C7	10 μ F		R5, R6, R8	10k Ω	
C10, C11, C12, C19	10 μ F		R7	22k Ω	$\pm 5\%$
C8	33 μ F				
C9	100 μ F				
C2, C18	0.22 μ F	$\pm 5\%$			
C3, C17	3900pF	$\pm 5\%$			
C15	0.01 μ F	$\pm 5\%$			
C16	0.1 μ F	$\pm 5\%$			

● R13(R15), R14(R16)

The R13(R15) and R14(R16) control sound pressure level when between Bypass and Focus MODE switch.

$$R13+R14 \geq 20k \Omega$$

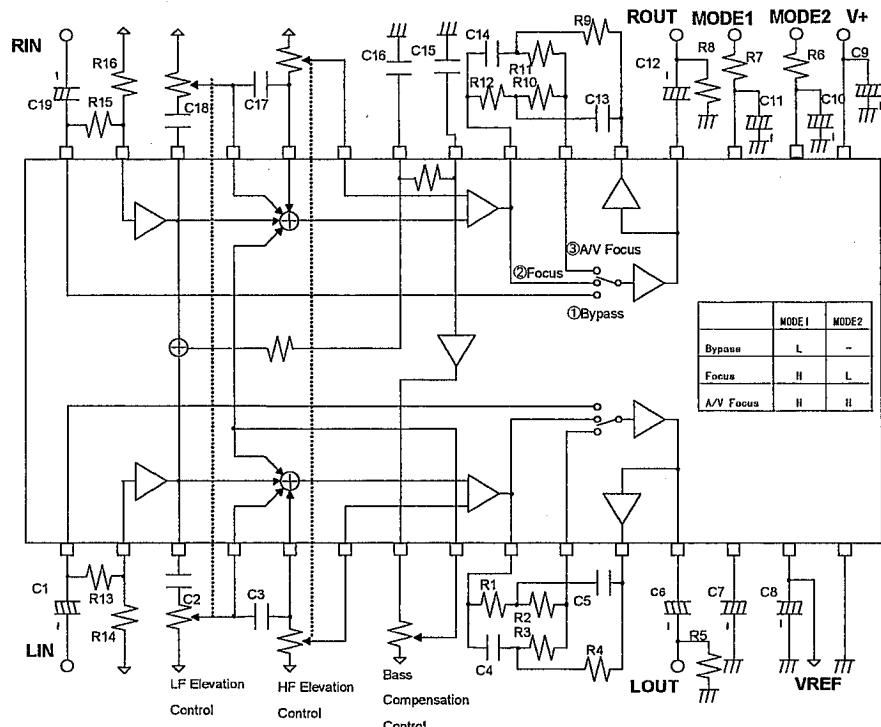
$$R13=R15, R14=R16$$

● LF Elevation Control : 1kB Single-shaft Dual-unit

● HF Elevation Control : 10kB Single-shaft Dual-unit

● Bass Compensation Control : 1kB Single-shaft Single-unit

■ APPLICATION CIRCUIT (Without A/V Focus filter)



PART No.	VALUE	Tolerance	PART No.	VALUE	Tolerance
C1, C6, C7	10 μ F		R5, R6, R8	10k Ω	
C10, C11, C12, C19	10 μ F		R1, R12	1.8k Ω	$\pm 5\%$
C8	33 μ F		R2, R3, R7, R10, R11	22k Ω	$\pm 5\%$
C9	100 μ F		R4, R9	5. 6k Ω	$\pm 5\%$
C2, C18	0. 22 μ F	$\pm 5\%$			
C3, C17	3900pF	$\pm 5\%$			
C4, C14, C15	0. 01 μ F	$\pm 5\%$			
C5, C13	0. 47 μ F	$\pm 5\%$			
C16	0. 1 μ F	$\pm 5\%$			

● R13(R15), R14(R16)

The R13(R15) and R14(R16) control sound pressure level when between Bypass and Focus MODE switch.

$$R13+R14 \geq 20k\Omega$$

$$R13=R15, R14=R16$$

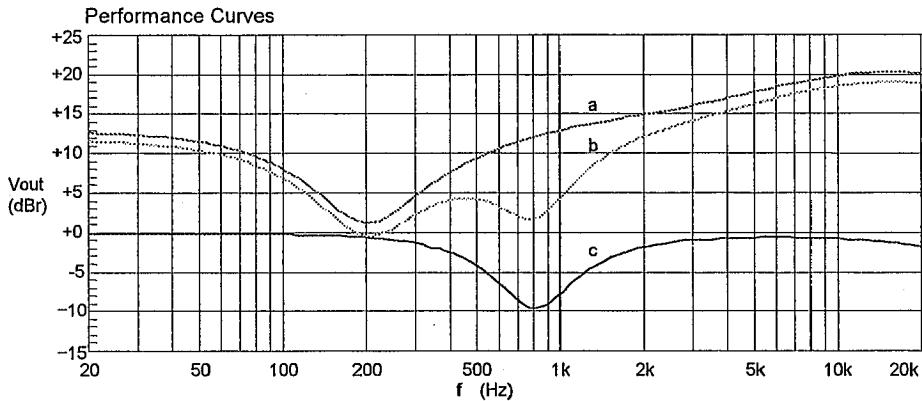
● LF Elevation Control : 1kB Single-shaft Dual-unit

● HF Elevation Control : 10kB Single-shaft Dual-unit

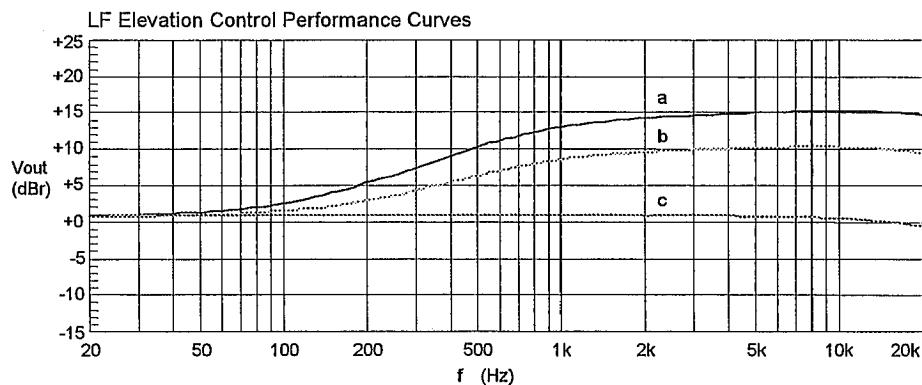
● Bass Compensation Control : 1kB Single-shaft Single-unit

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■ CHARACTERISTICS

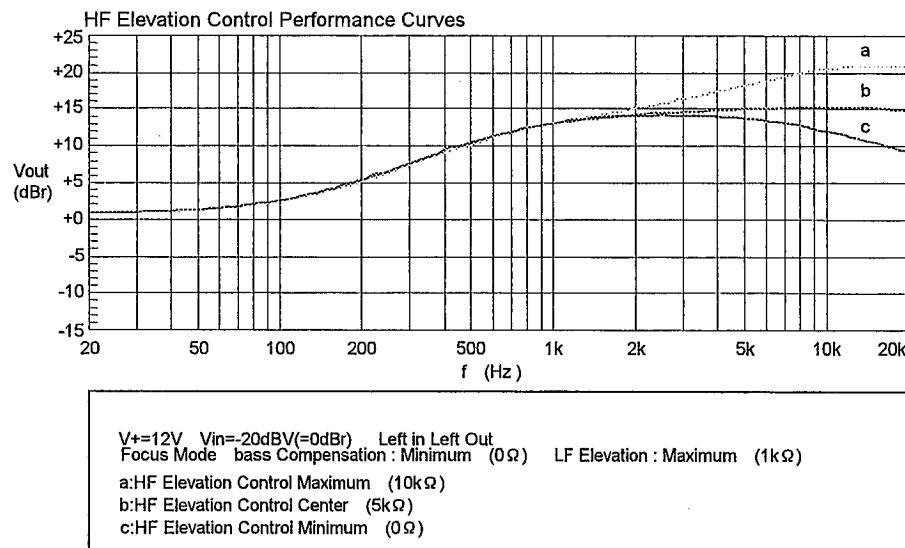


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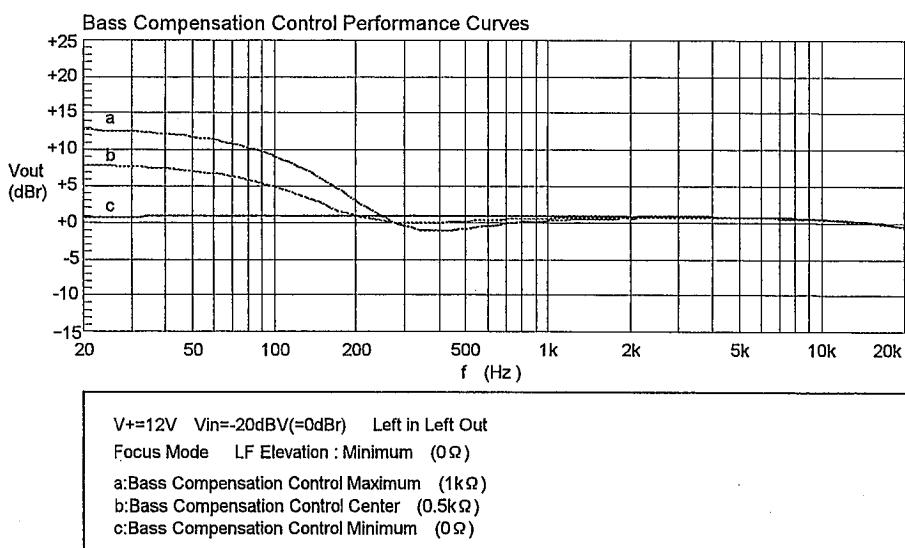


$V_{in} = 12V$ $V_{in} = -20dBV(=0dB)$ Left in Left Out
Focus Mode Bass Compensation : Minimum (0 Ω) HF Elevation : Center (5k Ω)
a:LF Elevation Control Maximum (1k Ω)
b:LF Elevation Control Center (0.5k Ω)
c:LF Elevation Control Minimum (0 Ω)

■ CHARACTERISTICS

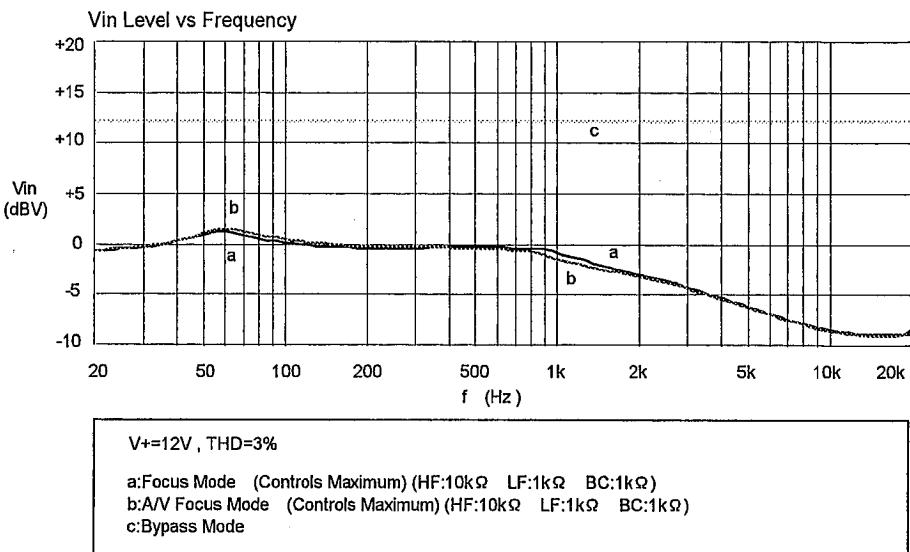


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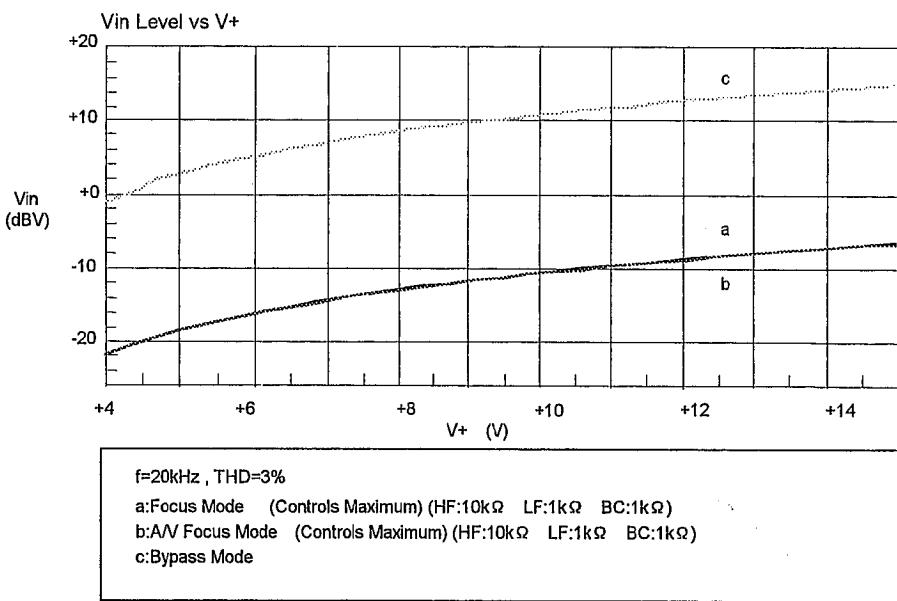


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■ CHARACTERISTIC



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* HF:HF Elevation
LF:LF Elevation
BC:Bass Compensation

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MEMO

[CAUTION]
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