PRELIMINARY

SRS™ FOCUS™

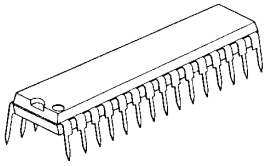
FOCUS & SRS AUDIO PROCESSOR

■ GENERAL DESCRIPTION

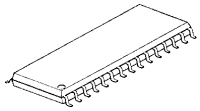
The **NJM2193** is a FOCUS & SRS audio processor, based on SRS FOCUS and 3D Stereo technology. It is capable of raising sound and regenerating 3D sound field.

The **NJM2193** is suitable for car audio, projection TV, home stereo applications, and others.

■ PACKAGE OUTLINE



NJM2193L



NJM2193M

■ FEATURES

- Operating Voltage 4.7 to 13V
- Low Operating Current 6mA typ.
- Low Output Noise 25µVrms typ. at FOCUS&3D Sound mode
- Adjusted by Width,FOCUS,LF Elevation and Bass Compensation Volume
- Independent Audio Input for Bypass MODE
- Bipolar Technology
- Package Outline SDIP30, SDMP30

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SRS Labs requires that all users of the NJM2193 must enter into a license agreement directly with SRS Labs if the royalty is not included in the purchase price. SRS Labs also requires any users to comply with all rules and regulations as outlined in the SRS Trademark Usage Manual.

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■ **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}	-50 to +150	°C

■ **ELECTRICAL CHARACTERISTICS**(V^+=8V,Ta=25°C,V_{IN}=-20dBV(0.1Vrms))

PARAMETER	SYMBOL	TEST CONDITION	IN L	IN R	OUT	MODE	MIN.	TYP.	MAX.	UNIT
Operating Voltage	V^+						4.7	8.0		V
Supply Current	I_{CC}	No Signal					-	6.0	12.0	mA
Reference Voltage	V_{REF}	V^+/2					3.8	4.0	4.2	V
Maximum Input Voltage	V_{INMAX}	F=1kHz THD=3%	V_{IN} 0	0 V_{IN}	L R	BYPASS	-	7.5 (24)	-	dBV (Vrms)
		f=150Hz THD=3%	V_{IN} $-V_{IN}$	$-V_{IN}$ V_{IN}	L R	3D Sound		-9.0 (0.35)	-	
		f=1kHz THD=3%	V_{IN} $-V_{IN}$	$-V_{IN}$ V_{IN}	L R	3D Sound		-3.0 (0.71)	-	
		f=15kHz THD=3%	V_{IN} 0	0 V_{IN}	L R	FOCUS		-6.5 (0.47)	-	
		f=1kHz THD=3%	V_{IN} 0	0 V_{IN}	L R	FOCUS		-5.0 (0.56)	-	
		f=15kHz THD=3%	V_{IN} 0	0 V_{IN}	L R	3D Sound +FOCUS	-17.5 (0.13)	-15.5 (0.17)	-	
		f=1kHz THD=3%	V_{IN} 0	0 V_{IN}	L R	3D Sound +FOCUS	-14.5 (0.19)	-12.5 (0.24)	-	
		f=15kHz THD=3%	V_{IN} $-V_{IN}$	$-V_{IN}$ V_{IN}	L R	3D Sound +FOCUS		-19.5 (0.11)	-	
		f=1kHz THD=3%	V_{IN} $-V_{IN}$	$-V_{IN}$ V_{IN}	L R	3D Sound +FOCUS		-16.0 (0.16)	-	
Output Noise	V_{NOISE}	Rg=0Ω A-Weighted	0	0	L R	BYPASS	-	-113 (2.2)	-94 (20.0)	dBV (µVrms)
		Rg=0Ω A-Weighted	0	0	L R	3D Sound	-	-108 (4.0)	-	
		Rg=0Ω f=20~20kHz	0	0	L R	3D Sound	-	-104 (6.0)	-	
		Rg=0Ω A-Weighted	0	0	L R	FOCUS	-	-94 (20.0)	-	
		Rg=0Ω f=20~20kHz	0	0	L R	FOCUS	-	-92 (25.0)	-	
		Rg=0Ω A-Weighted	0	0	L R	3D Sound +FOCUS	-	-92 (25.0)	-86 (50.0)	
		Rg=0Ω f=20~20kHz	0	0	L R	3D Sound +FOCUS	-	-90 (35.0)	-	

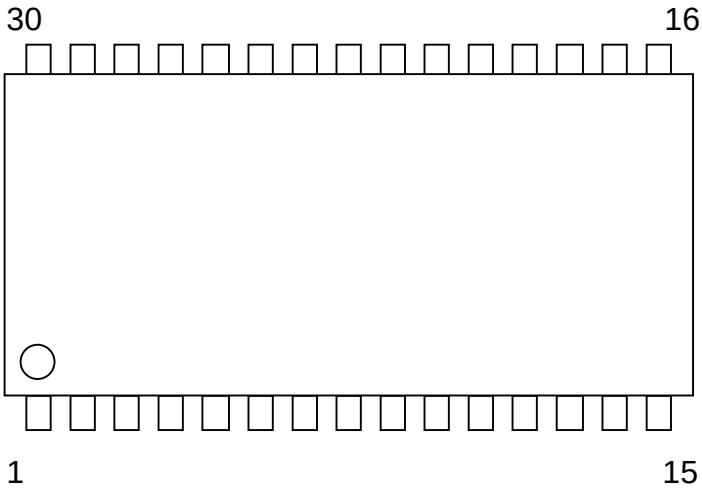
■ ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	CONDITION	IN L	IN R	OUT	MODE	MIN.	TYP.	MAX	UNIT
Total Harmonic Distortion	THD	f=1kHz	V_{IN}	0	L	BYPASS	-	0.005	0.02	%
			0	V_{IN}	R					
			V_{IN}	0	L	3D Sound	-	0.005	-	
			0	V_{IN}	R					
			V_{IN}	0	L	FOCUS	-	0.04	-	
			0	V_{IN}	R					
			V_{IN}	0	L	3D Sound +FOCUS	-	0.1	0.5	
			0	V_{IN}	R					
BYPASS Gain	G_{VBYP}	f=1kHz	V_{IN}	0	L	BYPASS	-1.0	0.0	1.0	dB
			0	V_{IN}	R					
3D Sound(L-R) Gain	G_{VS1}	f=150Hz	V_{IN}	$-V_{IN}$	L	3D Sound	15.0	17.0	19.0	dB
			$-V_{IN}$	V_{IN}	R					
3D Sound(L+R) Gain	G_{VS2}	f=150Hz	V_{IN}	V_{IN}	L	3D Sound	-2.0	0.0	2.0	dB
			V_{IN}	V_{IN}	R					
FOCUS Gain1	G_{VF1}	f=70Hz	V_{IN}	0	L	FOCUS	8.5	10.5	12.5	dB
			0	V_{IN}	R					
FOCUS Gain2	G_{VF2}	f=15kHz	V_{IN}	0	L	FOCUS	12.0	14.0	16.0	dB
			0	V_{IN}	R					
PROCESS Gain	G_{VP}	f=15kHz	V_{IN}	$-V_{IN}$	L	3D Sound +FOCUS	-	27.0	-	dB
			$-V_{IN}$	V_{IN}	R					
MODE Select Control Voltage	V_{IH}	High Level	-	-	-	-	2.0	-	V^+	V
	V_{IL}	Low Level	-	-	-	-	0.0	-	0.7	

■MODE SWICH

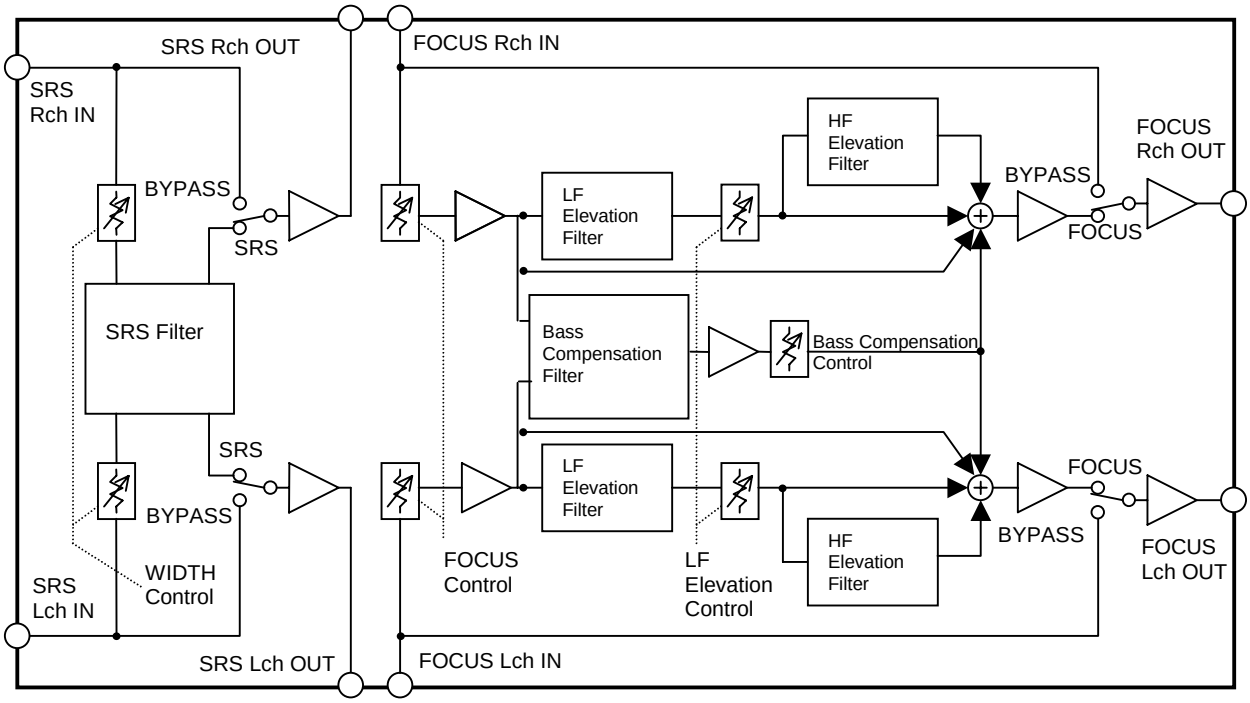
	MODE1	MODE2
BYPASS	L	L
3D Sound	H	L
FOCUS	L	H
3D Sound+ FOCUS	H	H

■ PIN FUNCTION

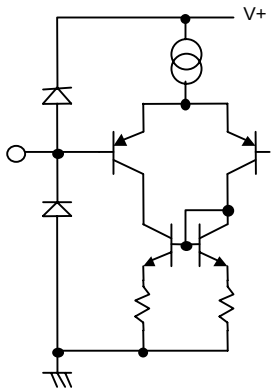
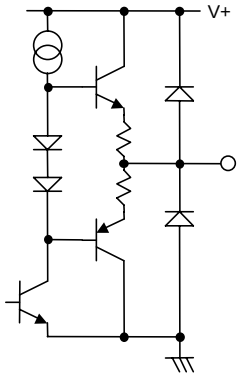
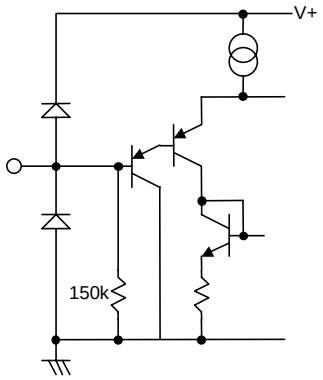
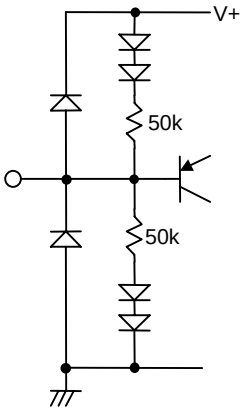


1.SRSINR	16.V+
2.WIDTHR	17.MODE2
3.SRSFILTERR	18.MODE1
4.SRSOUTR	19.FOCUSOUTL
5.FOCUSINR1	20.LPFIN
6.FOCUSINR2	21.LPFOUT
7.LFOUTR	22.HFINL
8.LFINR	23.LFINL
9.HFINR	24.LFOUTL
10.BCOUT	25.FOCUSINL2
11.BCIN	26.FOCUSINL1
12.FOCUSOUTR	27.SRSOUTL
13.REFIN	28.SRSFILTERL
14.VREF	29.WIDTHL
15.GROUND	30.SRSINL

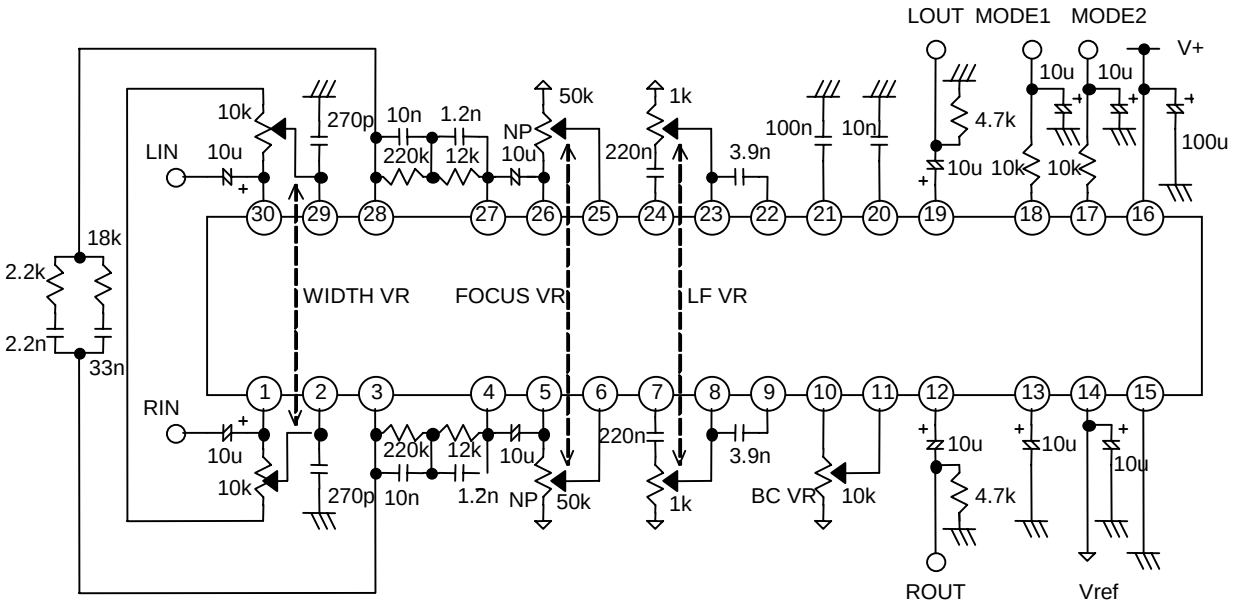
■ BLOCK DIAGRAM



■ **TERMINAL DESCRIPTION**

PIN NO.	SYMBOL	EQUIVALENT CIRCUIT	TERMINAL VOLTAGE
1 2 5 6 25 26 29 30	SRSINR WIDTHR FOCUSINR1 FOCUSINR2 FOCUSINL2 FOCUSINL1 WIDTHL SRSINL		
4 12 14 19 27	SRSOUTR FOCUSOUTR VREF FOCUSOUTL SRSOUTL		VREF(14pin)=1/2V+
17 18	MODE2 MODE1		
13	REFIN		1/2V+

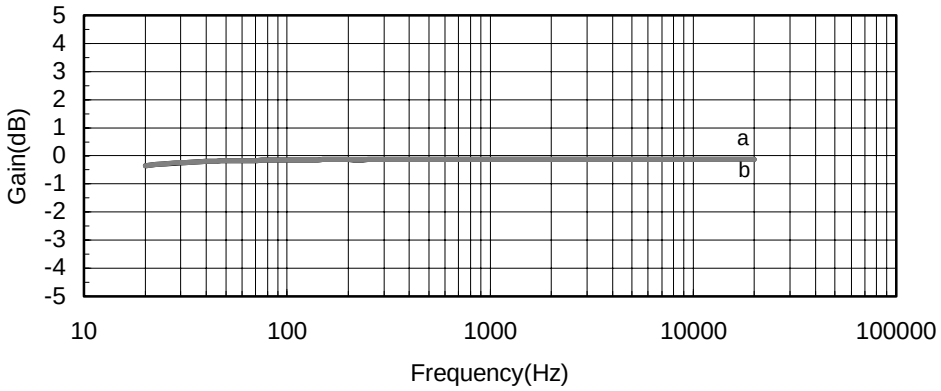
■ APLLICATION CIRCUIT



- Width Control : 10kB, Dual VR
- LF Elevation Control : 1kB, Dual VR
- FOCUS Control : 50kB, Dual VR
- Bass Compensation Control : 10kB, Dual VR

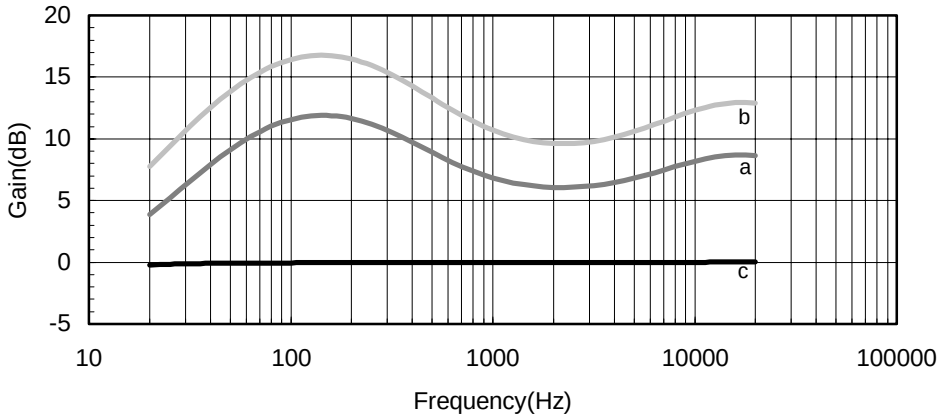
■TYPICAL CHARACTERISTICS

NJM2193 Gain Structure
BYPASS Mode
Conditions:Vin=-20dBV(100mVrms) , V+=8V



a: Lin → Lout b: Rin→ Rout

NJM2193 Gain Structure
3D Stereo Mode
Conditions:Vin=-20dBV(100mVrms) , V+=8V
WIDTH VR:MAX



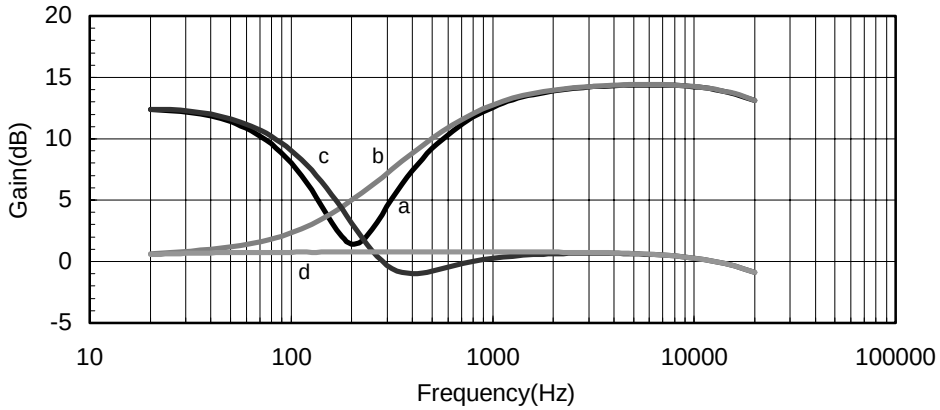
a: Lin → Lout b: L-Rin → Lout c: L+Rin → Lout

■TYPICAL CHARACTERISTICS

NJM2193 Gain Structure

FOCUS Mode

Conditions:Vin=-20dBV(100mVrms)Lch,Vout=Lch,V+=8V



a: LF VR MAX, BC VR MAX b: LF VR MAX, BC VR MIN
c: LF VR MIN, BC VR MAX d: LF VR MIN, BC VR MIN

[CAUTION]
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