



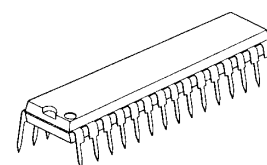
FOCUS & SRS AUDIO PROCESSOR

■ GENERAL DESCRIPTION

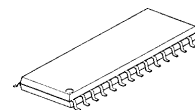
The **NJM2193** is a FOCUS & SRS audio processor, based on SRS FOCUS and 3D Stereo technology. It is capable of raising sound and regenerating 3D sound field.

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 25 μ Vrms typ. at FOCUS&3D Sound mode
- Adjusted by Width, FOCUS, LF Elevation and Bass Compensation Volume
- Bipolar Technology
- Package Outline SDIP30, SDMP30

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NJM2193

■ 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					MIN.	TYP.	MAX.	UNIT			
		IN		OUT	MODE	MIN.					TYP.	MAX.	UNIT
		L	R										
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 _N 0	0 V _N	L R	BYPASS	-	7.5 (24)	-	dBV (Vrms)			
		f=150Hz THD=3%	V _N -V _N	-V _N V _N	L R	3D Sound		-9.0 (0.35)	-				
		f=1kHz THD=3%	V _N -V _N	-V _N V _N	L R	3D Sound		-3.0 (0.71)	-				
		f=15kHz THD=3%	V _N 0	0 V _N	L R	FOCUS		-6.5 (0.47)	-				
		f=1kHz THD=3%	V _N 0	0 V _N	L R	FOCUS		-5.0 (0.56)	-				
		f=15kHz THD=3%	V _N 0	0 V _N	L R	3D Sound +FOCUS	-17.5 (0.13)	-15.5 (0.17)	-				
		f=1kHz THD=3%	V _N 0	0 V _N	L R	3D Sound +FOCUS	-14.5 (0.19)	-12.5 (0.24)	-				
		f=15kHz THD=3%	V _N -V _N	-V _N V _N	L R	3D Sound +FOCUS		-19.5 (0.11)	-				
		f=1kHz THD=3%	V _N -V _N	-V _N V _N	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

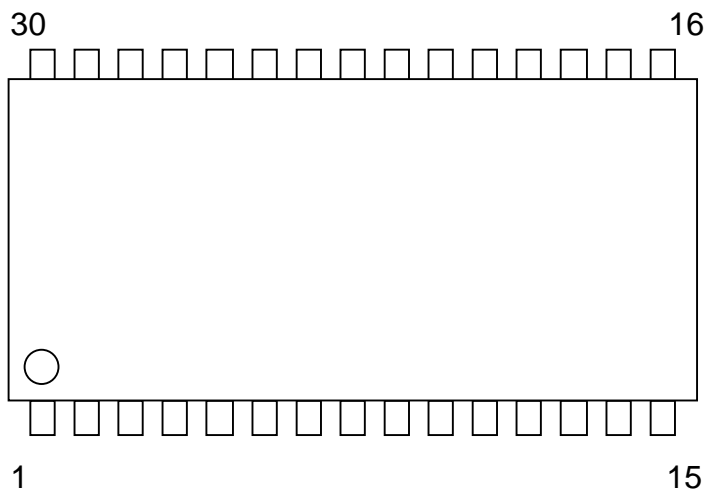
PARAMETER	SYMBOL		CONDITION				MIN.	TYP.	MAX	UNIT
			IN		OUT	MODE				
			L	R						
Total Harmonic Distortion	THD	f=1kHz	V_N	0	L	BYPASS	-	0.005	0.02	%
			0	V_N	R					
			V_N	0	L	3D Sound	-	0.005	-	
			0	V_N	R					
BYPASS Gain	G_{VBYP}	f=1kHz	V_N	0	L	BYPASS	-1.0	0.0	1.0	dB
			0	V_N	R					
			V_N	0	L	3D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

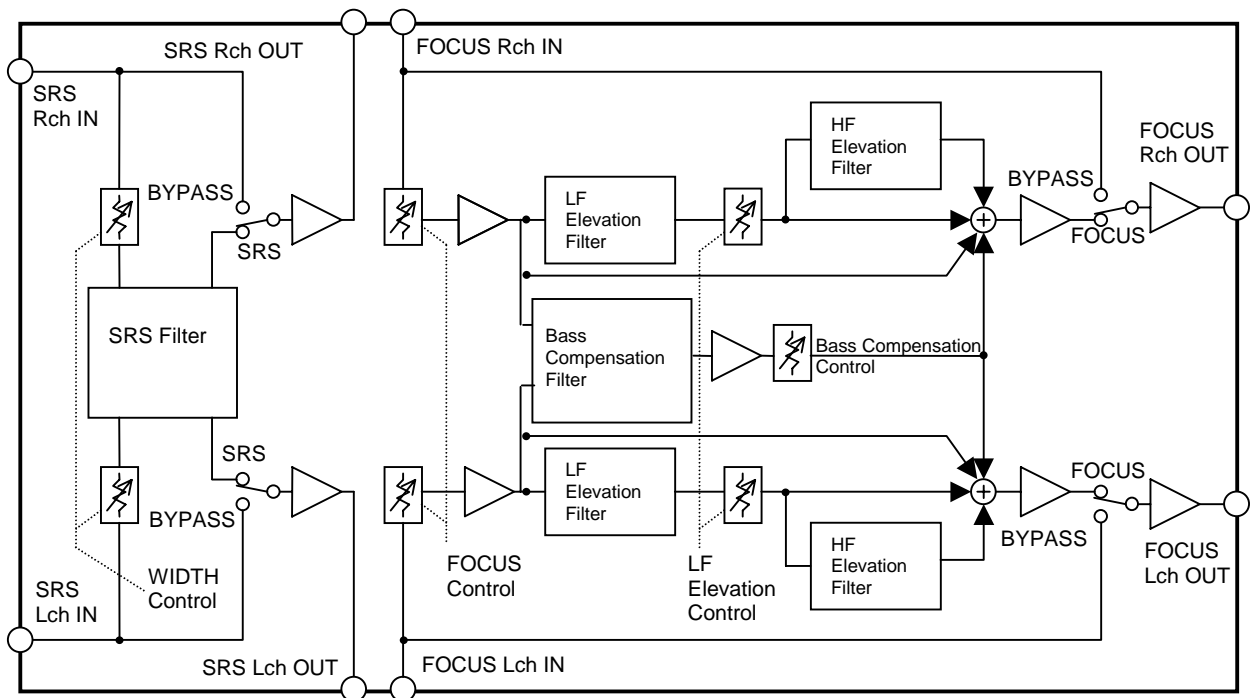
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■ PIN FUNCTION

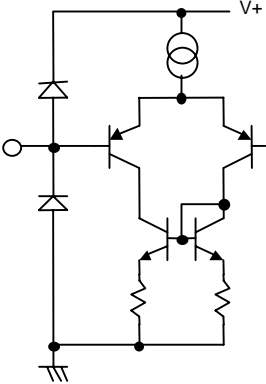
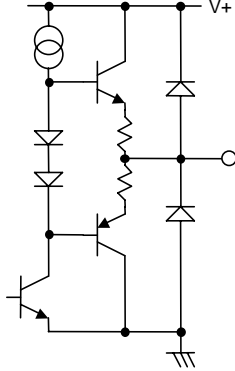
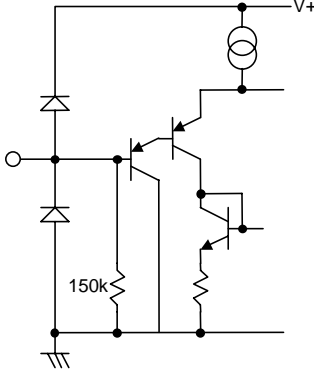
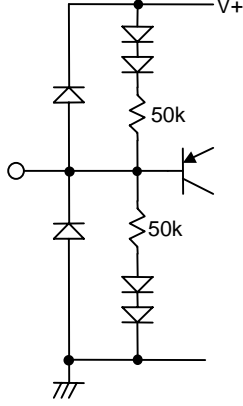


- | | |
|--------------|---------------|
| 1.SRSINR | 16.V+ |
| 2.WIDTHR | 17.MODE2 |
| 3.SRSFILTERR | 18.MODE1 |
| 4.SRSOUTR | 19.FOCUSOUTL |
| 5.FOCUSINR1 | 20.LPFIN |
| 6.FOCUSINR2 | 21.LPFOUT |
| 7.LFOUTR | 22.HFINL |
| 8.LFINR | 23.LFINL |
| 9.HFINR | 24.LFOUTL |
| 10.BCOUT | 25.FOCUSINL2 |
| 11.BCIN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

■ BLOCK DIAGRAM

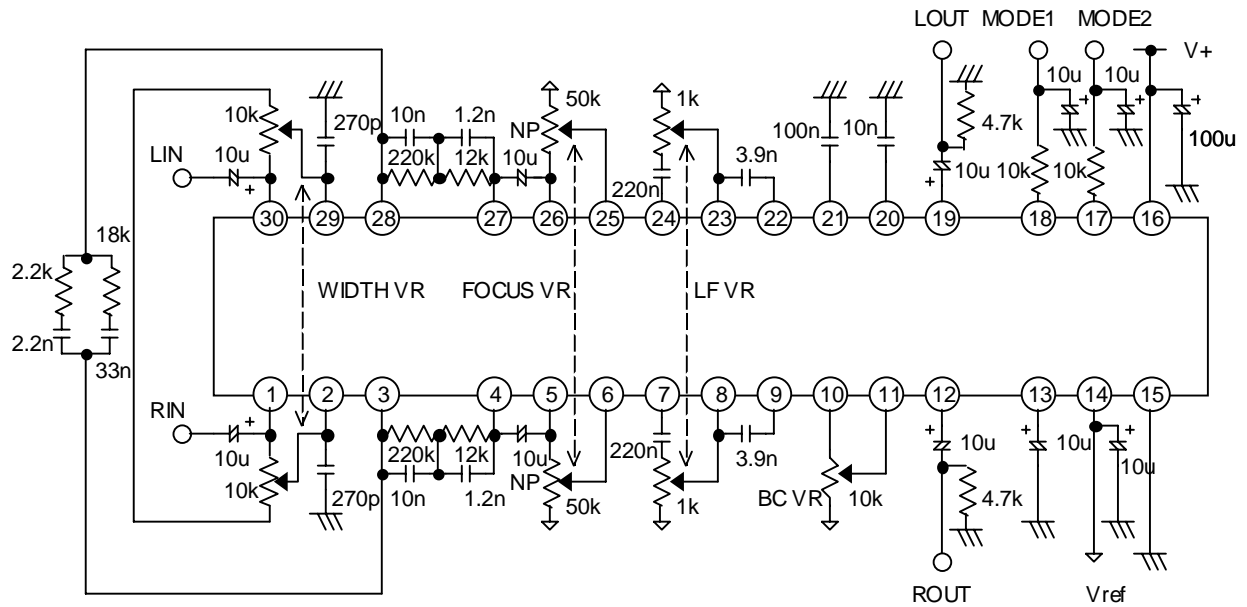


■ TERMINAL DESCRIPTION

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		$V_{REF}(14pin)=1/2V+$
17 18	MODE2 MODE1		
13	REFIN		$1/2V+$

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■ APPLICATION CIRCUIT



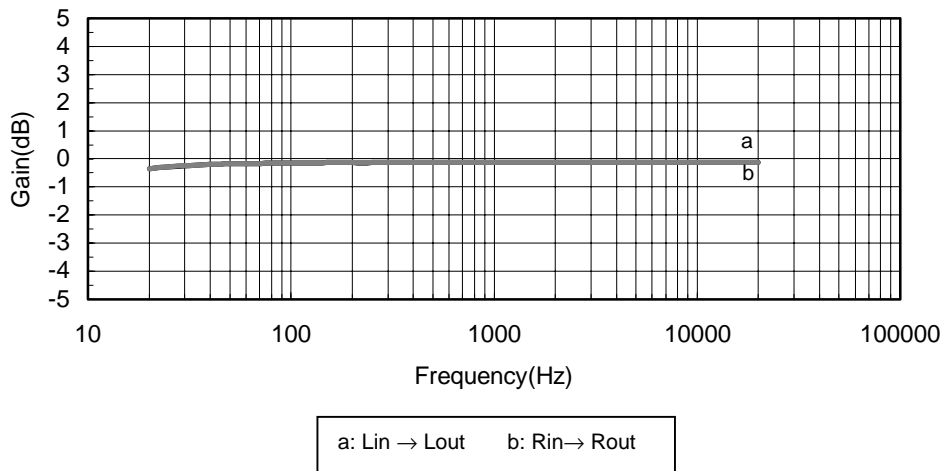
- Width Control : 10kB, Dual VR
- LF Elevation Control : 1kB, Dual VR
- FOCUS Control : 50kB, Dual VR
- Bass Compensation Control : 10kB, Dual VR

■ TYPICAL CHARACTERISTICS

NJM2193 Gain Structure

BYPASS Mode

Conditions: $V_{in} = -20\text{dBV}(100\text{mVrms})$, $V_{+} = 8\text{V}$

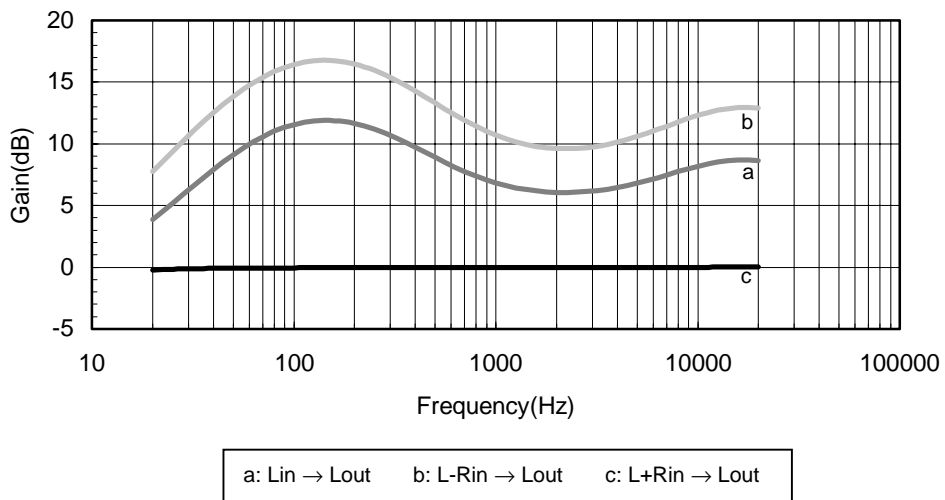


NJM2193 Gain Structure

3D Stereo Mode

Conditions: $V_{in} = -20\text{dBV}(100\text{mVrms})$, $V_{+} = 8\text{V}$

WIDTH VR:MAX

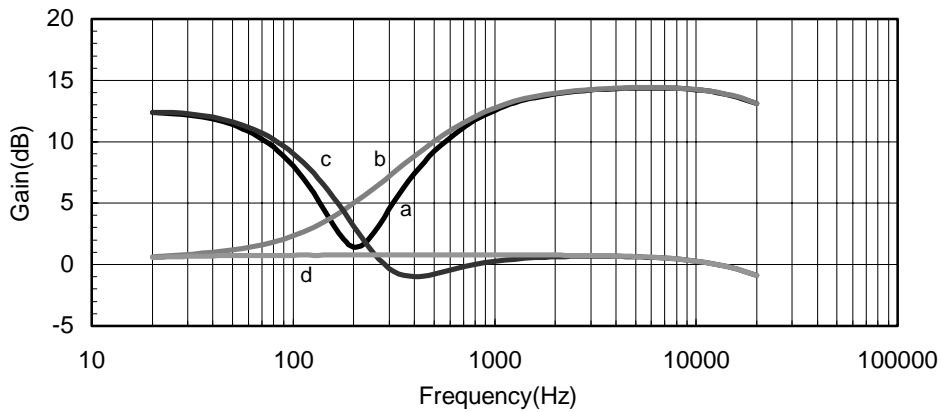


■ TYPICAL CHARACTERISTICS

NJM2193 Gain Structure

FOCUS Mode

Conditions: $V_{in} = -20\text{dBV}$ (100mVrms) Lch, $V_{out} = \text{Lch}$, $V_{+} = 8\text{V}$



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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