

MONAURAL AUDIO POWER AMPLIFIER IC

■GENERAL DESCRIPTION

The NJM2166 are monaural power amplifier suitable for mobile communication equipment. It is possible to operate on low operating voltage such as 2.7V and incorporates mute function, suspend function and AUX input.

■PACKAGE OUTLINE



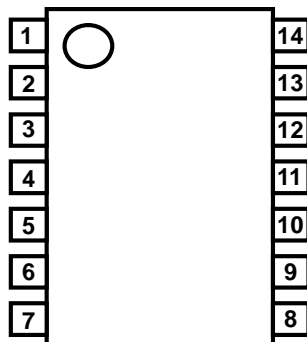
NJM2166R

NJM2166V

■FEATURES

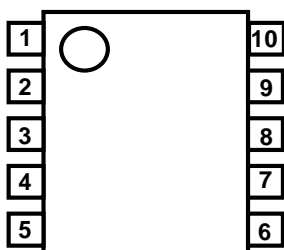
- Operating Voltage (2.7V to 8.5V)
- AUX input
- Suspend Mode Function
- Mute Function
- EVR function
- Bipolar Technology
- Package outline SSOP14, VSP10

■PIN CONFIGURATION



NJM2166V

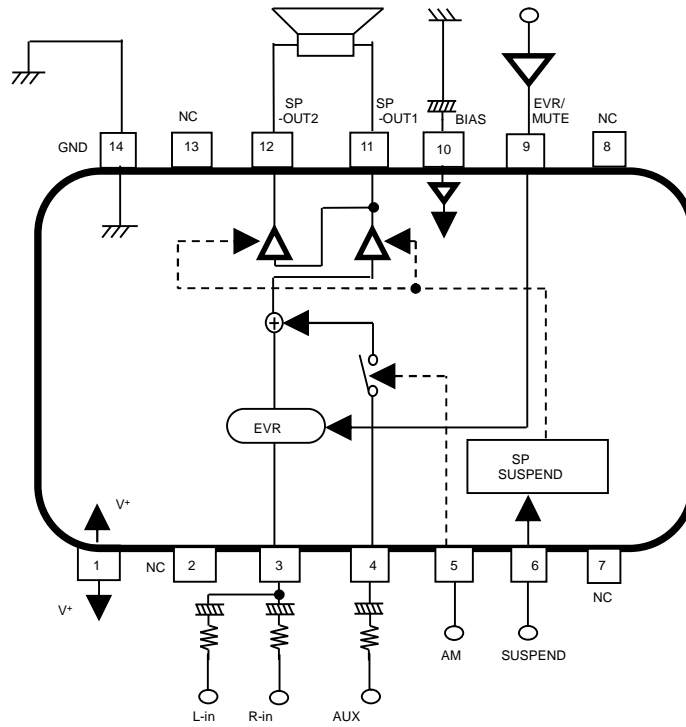
No.	NAME	No.	NAME
1	V+	8	NC
2	NC	9	EVR
3	SP-IN	10	BIAS
4	AUX	11	SP-OUT1
5	AM	12	SP-OUT2
6	SUSPEND	13	NC
7	NC	14	GND



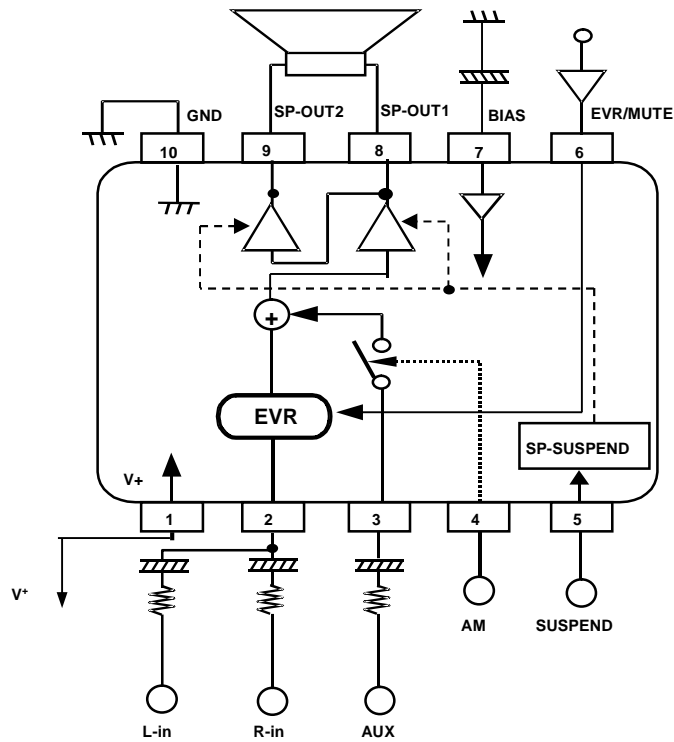
NJM2166R

No.	NAME	No.	NAME
1	V+	6	EVR
2	SP-IN	7	BIAS
3	AUX	8	SP-OUT1
4	AM	9	SP-OUT2
5	SUSPEND	10	GND

■ BLOCK DIAGRAM



NJM2166V Block Diagram



NJM2166V Block Diagram

■ ABSOLUTE MAXIMAM RATINGS (Ta=25°C)

PARAMETER	SYMBOL	RATINGS	UNIT
Supply Voltage	V+	+9.0	V
Power Dissipation	P _D	(VSP10) 490 ⁽¹⁾ (SSOP14) 500 ⁽¹⁾	mW
Operating Temperature Range	Topr	-40 to +85	°C
Storage Temperature Range	Tstg	-50 to +150	°C

(1) 2-Layer: Mounted on glass epoxy board (76.2 mm × 114.3 mm × 1.6 mm: based on EIA/JEDEC standard, 2-layer FR-4).

■ RECOMMENDATION OPERATING LIMITS (Ta=25°C)

Operating Voltage	PARAMETER	SYMBOL	RATINGS	UNIT
	Operating Voltage	V+	+2.7 to +8.5	V

■ ELECTRICAL CHARACTERISTICS (V+=3.0V, Ta=25°C, unless otherwise noted.)

● OPERATING CURRENT

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Operating Current	No signal, V _{evr} =0.3V	I _q	-	2.5	3.5	mA
Operating Current SUSPEND	No signal, V _{SUS} =H	I _{qs}	-	150	200	μA

● SPEAKER AMP1

(Input : SP IN, R_{INSP}=15kΩ)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Output Voltage Level	V _{in} =-16.0dBV, R _L =8Ω	V _o	-6.5	-4.0	-1.5	dBV
Total Harmonic Distortion	V _{in} =-16.0dBV, R _L =8Ω	THD	-	0.9	1.8	%
Maximum Output Level1	R _L =8Ω, THD=3%, A-Weighted	V _{om1}	-2.5	0.0	-	dBV
Maximum Output Level2	V+=5V, R _L =16Ω, THD=3%, A-Weighted	V _{om2}	-4.5	7.0	-	dBV
Output Remain Noise	R _g =1kΩ, A-Weighted	V _{on}	-	-82	-75	dBV
Mute Level	V _{in} =-16.0dBV, V _{evr} =0.3V, A-Weighted	V _{ooffSP}	-	-78	-70	dBV

● SPEAKER AMP2

(Input : AUX IN, R_{INAUX}=30kΩ)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
Output Level	V _{inAUX} =-16.0dBV, R _L =8Ω	V _{OAUX}	-12.5	-10.0	-7.5	dBV
AUX Mix Off Level	V _{inAUX} =-16.0dBV, V _{AM} =L, A-Weighted	V _{ooffAUX}	-	-78	-70	dBV

●CONTROL BLOCK

MUTE JUDGMENT LEVEL (EVR TERMINAL)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
MUTE ON		V _{MON}	-	GND-0.4	-	V
MUTE OFF		V _{MOFF}	-	0.4-V ⁺	-	V

SUSPEND CONTROL BLOCK (SUSPEND TERMINAL)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
SUSPEND ON		V _{SH}	1.5	-	V ₊	V
SUSPEND OFF		V _{SL}	GND	-	0.4	V

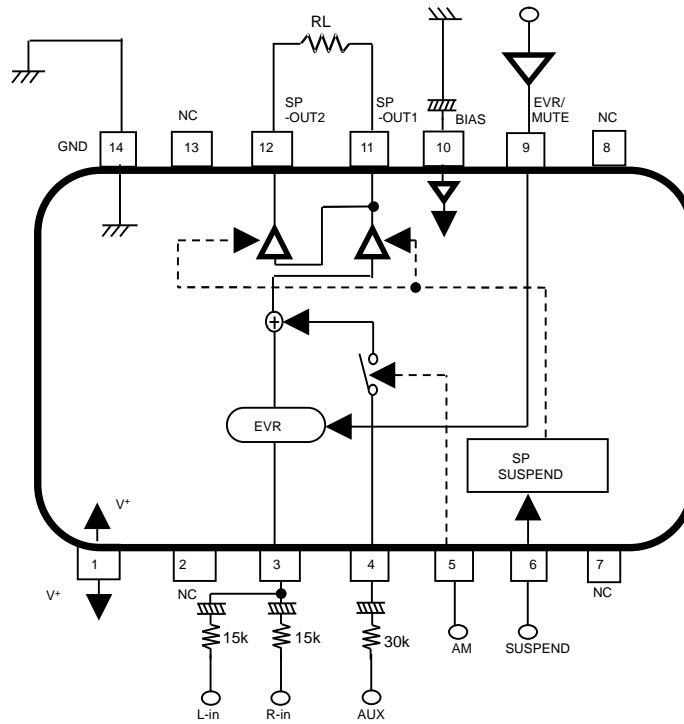
AUX.MIX CONTROL BLOCK (AM TERMINAL)

PARAMETER	TEST CONDITION	SYMBOL	MIN.	TYP.	MAX.	UNIT
AUX MIX ON		V _{AMH}	1.5	-	V ₊	V
AUX MIX OFF		V _{AML}	GND	-	0.4	V

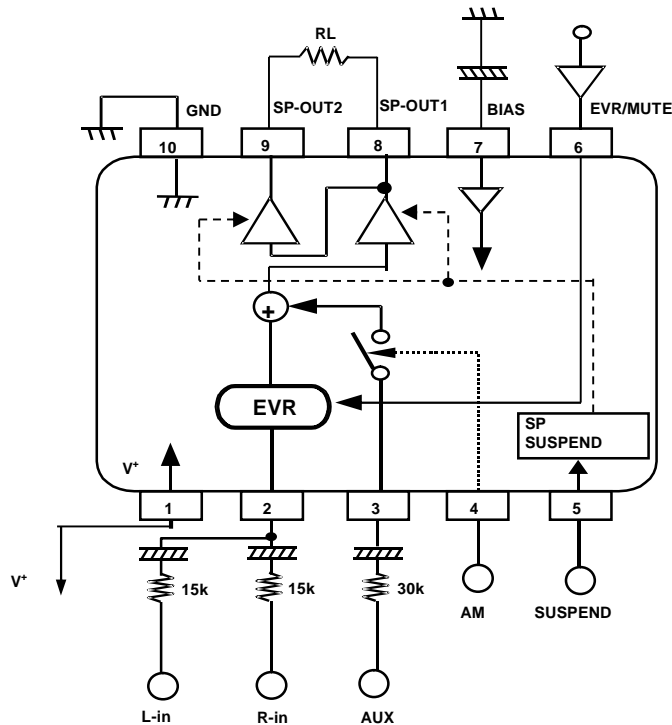
(Note) Unless specified, tested with next mode below.

TERMINAL NAME	SYMBOL	TERMINAL NUMBER	CONDITION	STATUS
		NJM2166E/V (NJM2166R)		
EVR CONTROL	EVR	9 pin (6 pin)	V _{evr} = V ⁺	EVR=MAX.
SUSPEND CONTROL	SUSPEND	6 pin (5 pin)	V _{sus} =L	SUSPEND OFF
AUX.MIX CONTROL	AM	5 pin (4 pin)	V _{am} =H	AUX.MIX ON

■ TEST CIRCUIT



NJM2166V TEST CIRCUIT



NJM2166R TEST CIRCUIT

■ **TERMINAL EXPLANATION** (CONDITION: $V^+ = 3.0V$)

TERMINAL NUMBER		TERMINAL NAME	FUNKTION	TERMINAL VOLTAGE(V)	OTHERS
NJM2166V	NJM2166R				
1	1	V+	Supply Terminal	3.0	-
3	2	SP-IN	Speaker Input	1.1	Base(PNP)
4	3	AUX	AUX Input	1.1	Base(PNP)
5	4	AM	Speaker AUX.MIX ON/OFF Control	0.0	100kΩ PULL DOWN
6	5	SUSPEND	Suspend Control	-	Base(PNP)
9	6	EVR/MUTE	EVR & Mute Control	1.0	Base(PNP)-R
10	7	BIAS	Bias	1.1	Base(PNP)
11	8	SP-OUT1	BTL Negative Output	1.1	EMI-F(NPN)
12	9	SP-OUT2	BTL Positive Output	1.1	EMI-F(NPN)
14	10	GND	GND	0.0	-
2,7,8,13	-	NC	-	-	-

■ **CONTROL TERMINAL EXPLANATION**

1: MUTE CTRL (EVR)

PARAMETER	STATUS	NOTE
MUTE ON	GND-0.4V	The amplifier is not given off signal
MUTE OFF	0.4V-V ⁺	The amplifier is given off signal.

2: SUSPEND CTRL (SUSPEND)

PARAMETER	STATUS	NOTE
SUSPEND ON	H	Amplifier is non-active
SUSPEND OFF	L	Amplifier is active

3: AUX.MIX CTRL (AM)

PARAMETER	STATUS	NOTE
AUX MIX ON	H	AUX signal get in amplifier.
AUX MIX OFF	L	AUX signal don't get in amplifier.

■ EVR DESCRIPTION

The EVR terminal possesses that interior power amplifier gain control function. It is in proportion to input DC voltage.

And this terminal can reduction pop noise. In that case establish the voltage “mute bias level”. This function’s is shown in Figure 1.

The MUTE judgment voltage has temperature characteristics.

Therefore, we recommend a setting that is close to the GND level.

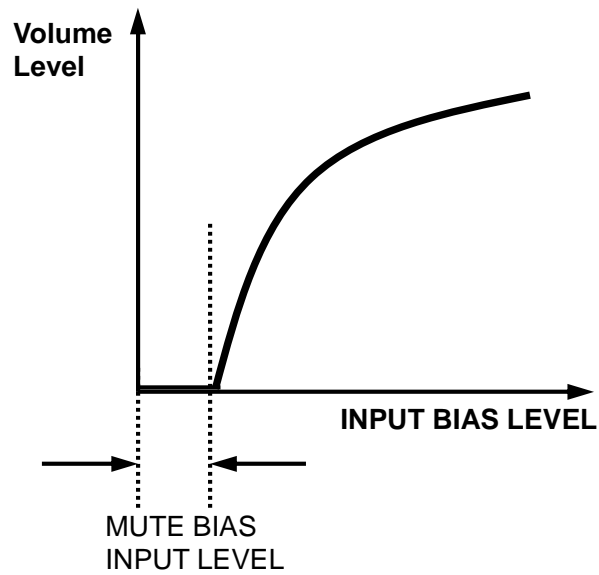


Figure 1

[CAUTION]

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