



## BBE Mach3Bass Audio Processor

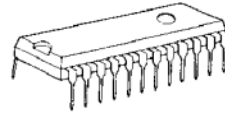
### ■GENERAL DESCRIPTION

**NJM2155** is a BBE Mach3Bass processor, which includes BBE sound enhancement and Mach3Bass system.

The BBE reproduces high definitive and Mach3BASS provides rich and loss less bass sound.

The **NJM2155** is suitable for audio items such as TV, AV receiver, CD radio-cassette, speaker system, and others.

### ■PACKAGE OUTLINE



**NJM2155L**

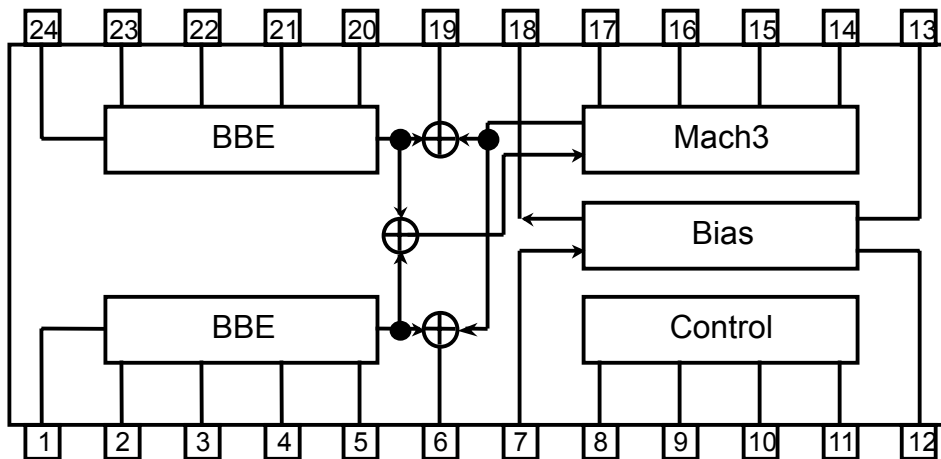


**NJM2155M**

### ■FEATURES

- Operating Voltage           4.7 to 13V
- Low Operating Current     15mA typ.
- Internal Mach3Bass ON/OFF Switch
- Internal High/Low Boost Switch  
(Low Band: 2.5 or 5.5dB, High Band: 6.0 or 9.0dB)
- "Mach3Bass" Boost Switch and Center Frequency Control
- Bipolar Technology
- Package Outline             SDIP24, DMP24

### ■BLOCK DIAGRAM & PIN CONFIGURATION



1. InA
2. HInA
3. HOutA
4. LInA
5. LOutA
6. OutA
7. Filter
8. BBE
9. PROCESS
10. LO CONTOUR
11. Mach3Bass
12. V+
13. GND
14. LPOut
15. LPIIn
16. GOut
17. GIIn
18. Vref
19. OutB
20. LOutB
21. LInB
22. HOutB
23. HInB
24. InB

# NJM2155

## ■ABSOLUTE MAXIMUM RATING (Ta=25°C)

PARAMETER	SYMBOL	TEST CONDITION	UNIT
Supply Voltage	V <sup>+</sup>	15	V
Power Dissipation	P <sub>D</sub>	700	mW
Operating Temperature Range	T <sub>opr</sub>	-40 to +85	°C
Storage Temperature Range	T <sub>stg</sub>	-40 to +125	°C

## ■ELECTRICAL CHARACTERISTICS (Ta=25°C, V<sup>+</sup>=9V, R<sub>g</sub>=600Ω, R<sub>L</sub>=47kΩ, V<sub>in</sub>=100mVrms/1kHz, VR1<sup>\*1)</sup>=500Ω, VR2<sup>\*1)</sup>=36kΩ)

PARAMETER	SYMBOL	TEST CONDITION		MIN	TYP	MAX	UNIT	
		BBE	Mach3					
Operating Voltage	V <sup>+</sup>		-	4.5	9.0	13.0	V	
Operating Current	I <sub>cc</sub>	No Signal	BYPASS	-	8.0	-	mA	
Reference Voltage	V <sub>REF</sub>	V <sup>+</sup> /2	-	4.0	4.5	5.0	V	
Maximum Input Voltage	V <sub>IM</sub>	f=1kHz	BYPASS	2.8	-	-	Vrms	
Boost Level	Boost1	f=20Hz, LO CONTOUR=L	ON	1.5	2.5	3.5	dB	
	Boost2	f=20Hz, LO CONTOUR=H	ON	4.5	5.5	6.5		
	Boost3	f=1kHz	ON	0.0	0.6	1.2		
	Boost4	f=20kHz, PROCESS=L	ON	5.0	6.0	7.0		
	Boost5	f=20kHz, PROCESS=H	ON	8.0	9.0	10.0		
Mach3 Boost	Mach3	fc=80Hz	ON	ON	11.0	12.0	13.0	dB
Bypass Gain	G <sub>VBY</sub>	f=1kHz	BYPASS	-	-1.0	0.0	1.0	dB
Total Harmonic Distortion	THD	f=1kHz	ON	ON	-	0.05	0.11	%
Output Noise	V <sub>NO</sub>	V <sub>in</sub> =GND A-Weighting	ON	ON	-	-94 (20)	-84 (63)	dBV (μVrms)
Mode Select Control Voltage	V <sub>IH</sub>	V <sub>in</sub> =High Level			2.0	-	V <sup>+</sup>	V
	V <sub>IL</sub>	V <sub>in</sub> =Low Level			0	-	0.5	

\*1), \*2): Refer to APPLICATION CIRCUIT

## ■SWITCH FUNCTION

Switch Terminal	Control Voltage Level	FUNCTION
BBE	Low	BYPASS
	High	BBE ON
Mach3Bass	Low	Mach3Bass OFF (with BBE switch on)
	High	Mach3Bass ON (with BBE switch on)
LO CONTOUR	Low	Low Frequency: +2.5dB Boost (with BBE switch on)
	High	Low Frequency: +5.5dB Boost (with BBE switch on)
PROCESS	Low	High Frequency: +6.0dB Boost (with BBE switch on)
	High	High Frequency: +9.0dB Boost (with BBE switch on)

## TERMINAL DESCRIPTION

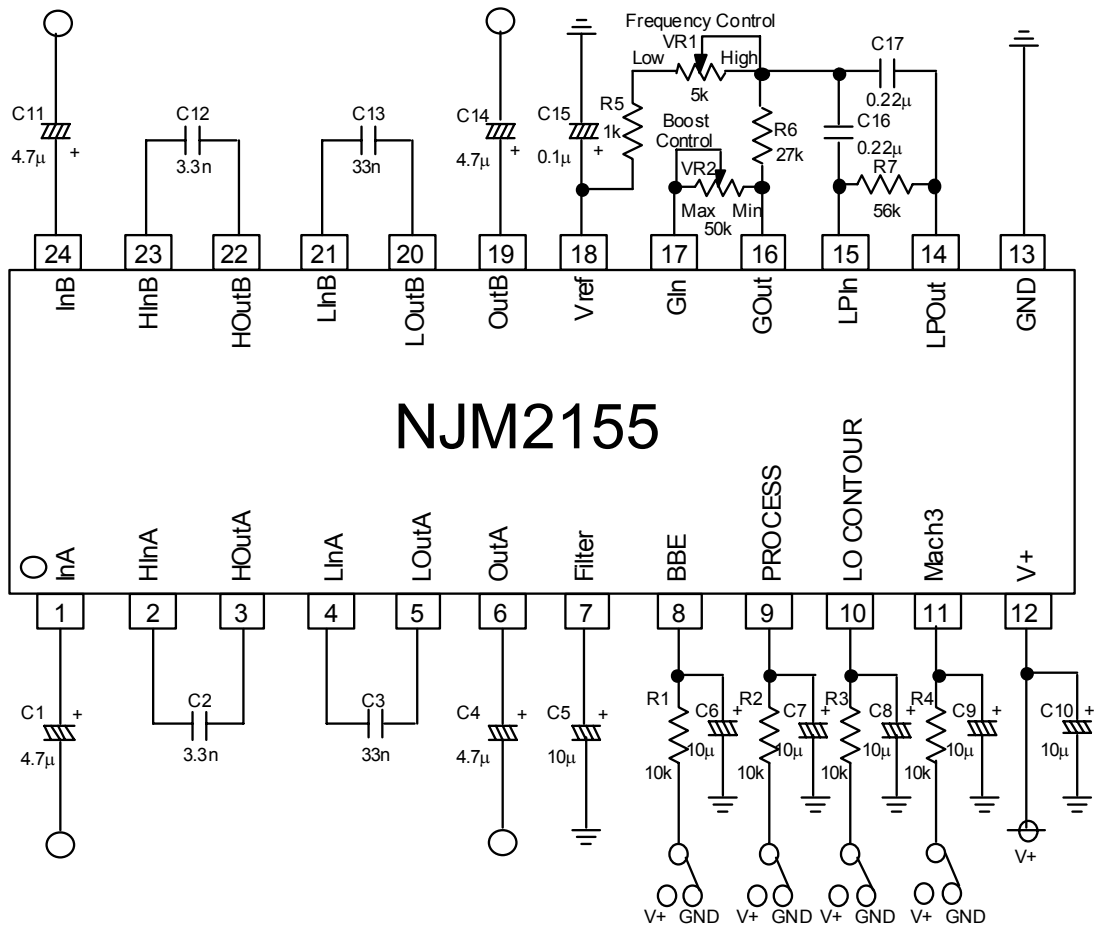
No	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
1 24	InA InB	Audio Signal Input (Ach) Audio Signal Input (Bch)		V+/2
2 4 21 23	HinA LinA LinB HinB	BBE High Pass Filter Input (Ach) BBE Low Pass Filter Input (Ach) BBE Low Pass Filter Input (Bch) BBE High Pass Filter Input (Bch)		V+/2
3 5 6 14 16 18 19 20 22	HOutA LOutA OutA LPOut GOut Vref OutB LOutB HOutB	BBE High Pass Filter Output (Ach) BBE Low Pass Filter Output (Ach) Audio Signal Output (Ach) Mach3Bass Filter Output Output for Mach3Bass Gain Adjustment Reference Voltage Output Audio Signal Output (Bch) BBE Low Pass Filter Output (Bch) BBE High Pass Filter Output (Bch)		V+/2
7	Filter	Reference Voltage Filter		V+/2

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## TERMINAL DESCRIPTION

No	SYMBOL	FUNCTION	EQUIVALENT CIRCUIT	VOLTAGE
8 9 10 11	BBE PROCESS LO CONTOUR Mach3	BBE ON/OFF Control Boost Level Control for High Band Boost Level Control for Low Band Mach3Bass ON/OFF Control		0V
15	LPIn	Mach3Bass Filter Input		V+/2
17	Gin	Input for Mach3Bass Gain Adjustment		V+/2
12	V+	Power Supply	_____	V+
13	GND	GND	_____	0V

## APPLICATION CIRCUIT



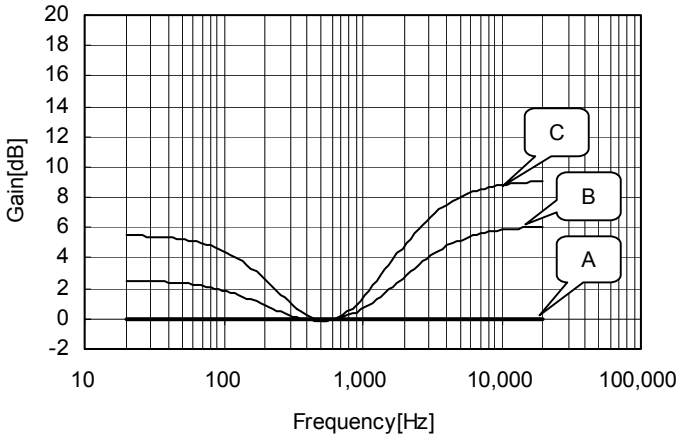
- \*1) C2, C3, C12 and C13 decide the BBE characteristics. Use the specified value.
- \*2) C16, C17, R5, R6 and R7 decide the Mach3Bass characteristics. Use the specified value.
- \*3) VR1 controls Center Frequency for Mach3Bass.
- \*4) VR2 controls Boost Gain for Mach3Bass.

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## TYPICAL CHARACTERISTICS

BBE Frequency Characteristics

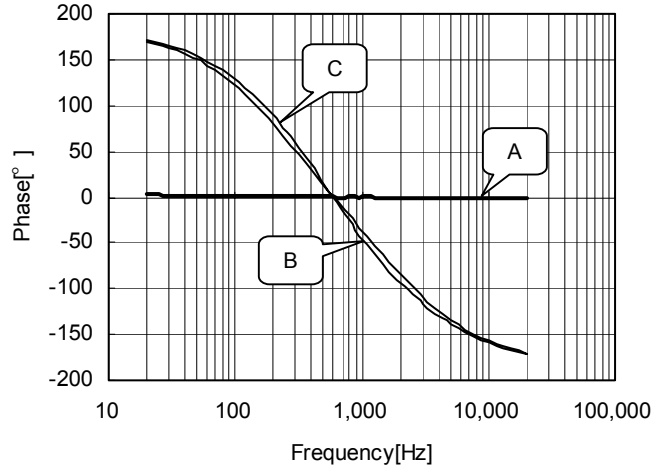
(V+=9V, Ta=25°C)



A: BYPASS  
B: PROCESS=L, LO CONTOUR=L  
C: PROCESS=H, LO CONTOUR=H

BBE Frequency Characteristics

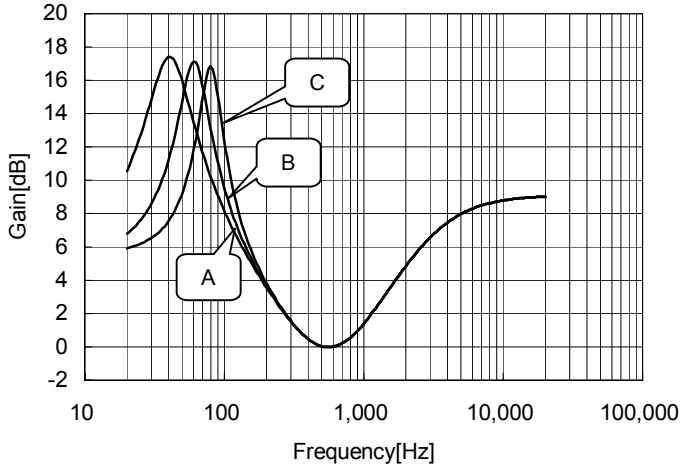
(V+=9V, Ta=25°C)



A: BYPASS  
B: PROCESS=L, LO CONTOUR=L  
C: PROCESS=H, LO CONTOUR=H

BBE Mach3Bass frequency Characteristics

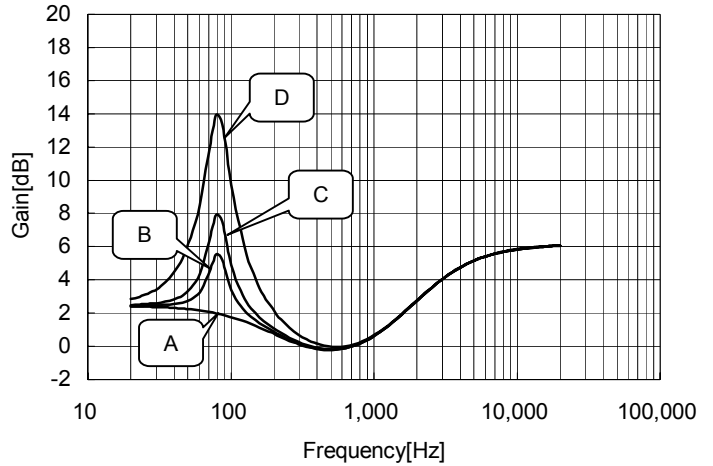
(V+=9V, Ta=25°C, BBE=ON, PROCESS=H, LO CONTOUR=H, Mach3=ON)



A: f=40Hz, VR1=6kΩ      B: f=60Hz, VR1=2kΩ  
C: f=80Hz, VR1=500Ω

BBE Mach3Bass frequency Characteristics

(V+=9V, Ta=25°C, BBE=ON, PROCESS=L, LO CONTOUR=L, Mach3=ON)



A: 3.5dB, VR2=0kΩ      B: 6dB, VR2=6.2kΩ  
C: 12dB, VR2=18kΩ      D: 12dB, VR2=36kΩ

## ■NOTE

BBE is a registered trademark of BBE Sound Inc.  
A license from BBE Sound Inc. is required before the NJM2155 can be purchased from New Japan Radio Co., Ltd.

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[CAUTION]

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