



PRELIMINARY

## BBE Mach3Bass Audio Processor

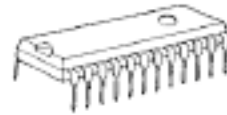
### ■GENERAL DESCRIPTION

**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

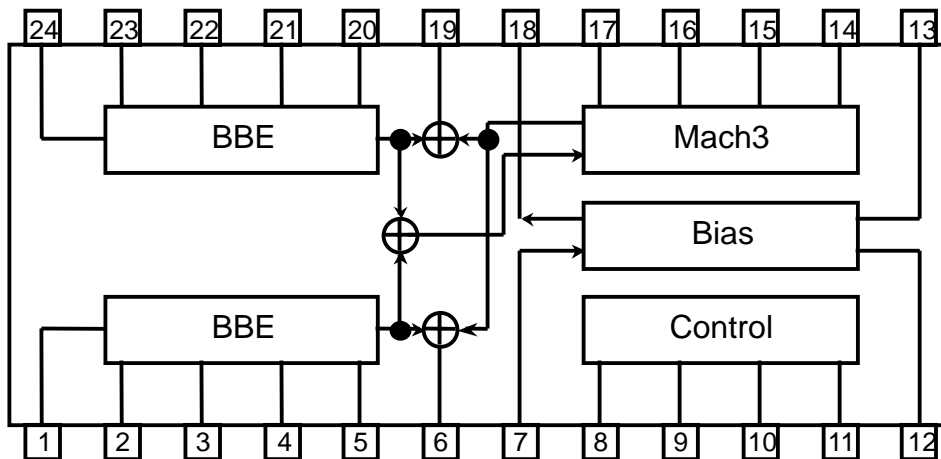


NJM2155M

### ■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. LOOutB
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,<br>LO CONTOUR=L             | ON     | 1.5 | 2.5  | 3.5         | dB             |                |
|                             | Boost2           | f=20Hz,<br>LO CONTOUR=H             | ON     | 4.5 | 5.5  | 6.5         |                |                |
|                             | Boost3           | f=1kHz                              | ON     | 0.0 | 0.6  | 1.2         |                |                |
|                             | Boost4           | f=20kHz,<br>PROCESS=L               | ON     | 5.0 | 6.0  | 7.0         |                |                |
|                             | Boost5           | f=20kHz,<br>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 | -   | 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<br>A-Weighting | ON     | ON  | -    | -94<br>(20) | -84<br>(63)    | dBV<br>(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

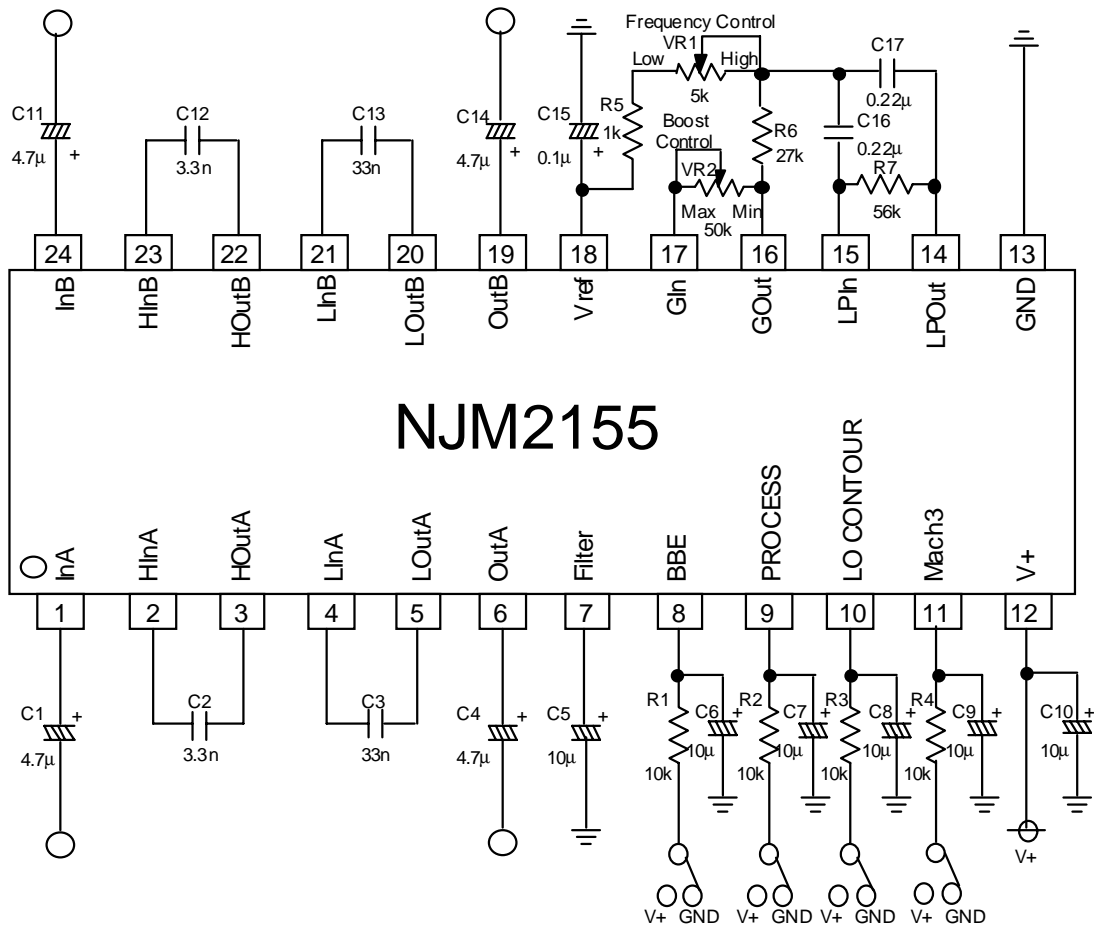
| No  | SYMBOL  | FUNCTION  | EQUIVALENT CIRCUIT | VOLTAGE |
|---|---|---|--------------------|---------|
| 1<br>24   | InA<br>InB  | Audio Signal Input (Ach)<br>Audio Signal Input (Bch)  |                    | V+/2    |
| 2<br>4<br>21<br>23                              | HinA<br>LinA<br>LinB<br>HinB  | BBE High Pass Filter Input (Ach)<br>BBE Low Pass Filter Input (Ach)<br>BBE Low Pass Filter Input (Bch)<br>BBE High Pass Filter Input (Bch)  |                    | V+/2    |
| 3<br>5<br>6<br>14<br>16<br>18<br>19<br>20<br>22 | HOutA<br>LOutA<br>OutA<br>LPOut<br>GOut<br>Vref<br>OutB<br>LOutB<br>HOutB | BBE High Pass Filter Output (Ach)<br>BBE Low Pass Filter Output (Ach)<br>Audio Signal Output (Ach)<br>Mach3Bass Filter Output<br>Output for Mach3Bass Gain Adjustment<br>Reference Voltage Output<br>Audio Signal Output (Bch)<br>BBE Low Pass Filter Output (Bch)<br>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<br>9<br>10<br>11 | BBE<br>PROCESS<br>LO CONTOUR<br>Mach3 | BBE ON/OFF Control<br>Boost Level Control for High Band<br>Boost Level Control for Low Band<br>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



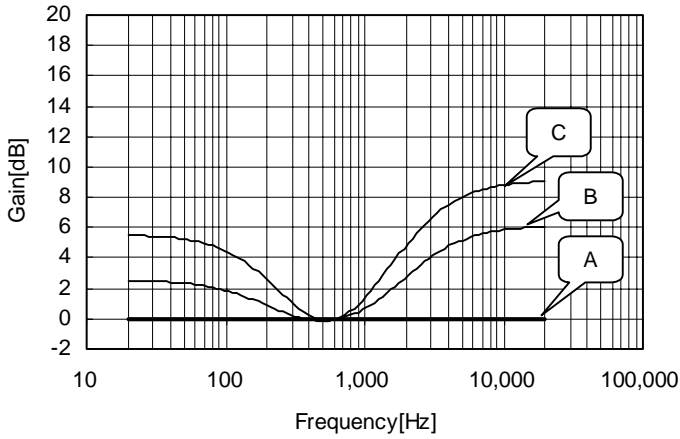
- \*1) C2, C3, C12 and C13 decide the BBE characteristics. Use the specified value.
- \*2) C16, C17, R5, R6 and R7 decide the Mach3Bass characteristics. Use the specified value.
- \*3) VR1 controls Center Frequency for Mach3Bass.
- \*4) VR2 controls Boost Gain for Mach3Bass.

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## TYPICAL CHARACTERISTICS

BBE Frequency Characteristics

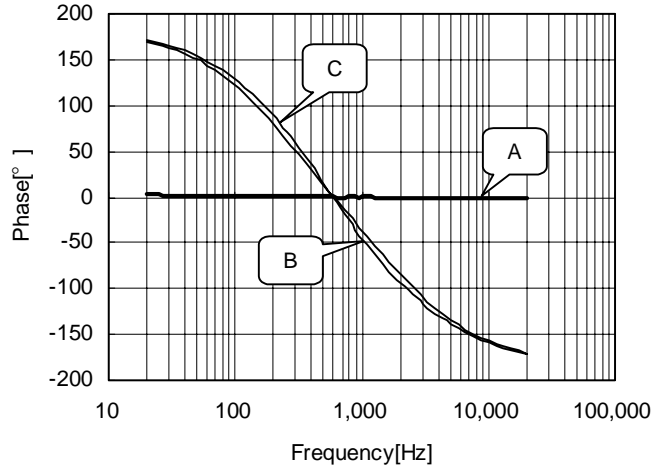
(V+=9V, Ta=25°C)



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

BBE Frequency Characteristics

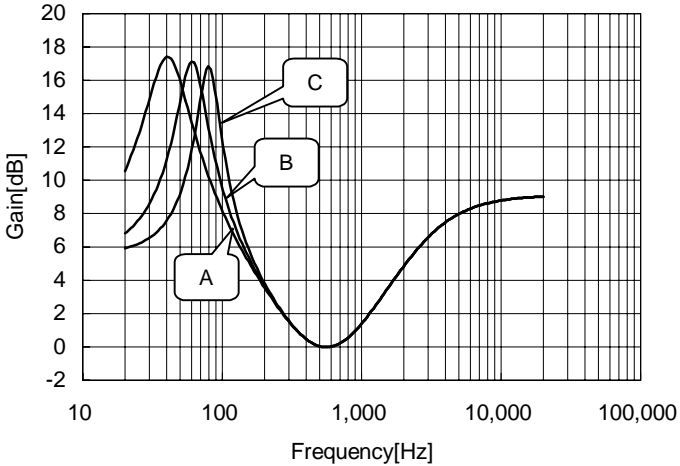
(V+=9V, Ta=25°C)



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

BBE Mach3Bass frequency Characteristics

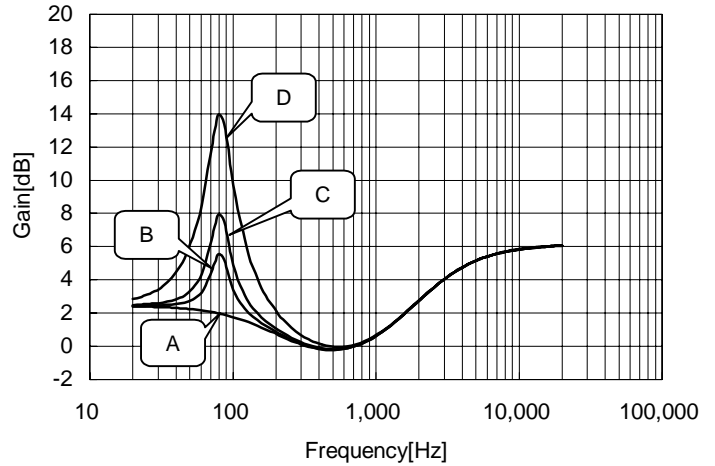
(V+=9V, Ta=25°C, BBE=ON, PROCESS=H, LO CONTOUR=H, Mach3=ON)



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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