



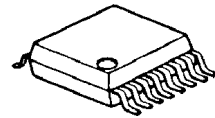
## Sound Enhancement Processor For Telephone

### GENERAL DESCRIPTION

The **NJU7087** is a Sound Enhancement Processor for telephone, using a low power C-MOS technology. Sound enhancement and LPF circuit improve quality of conversation without increasing noise.

The **NJU7087** is suitable for limited band-width application, such as telephone, and answer phone.

### PACKAGE OUTLINE

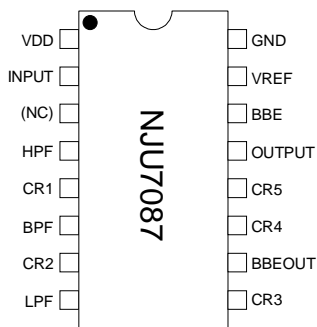


NJU7087

### FEATURES

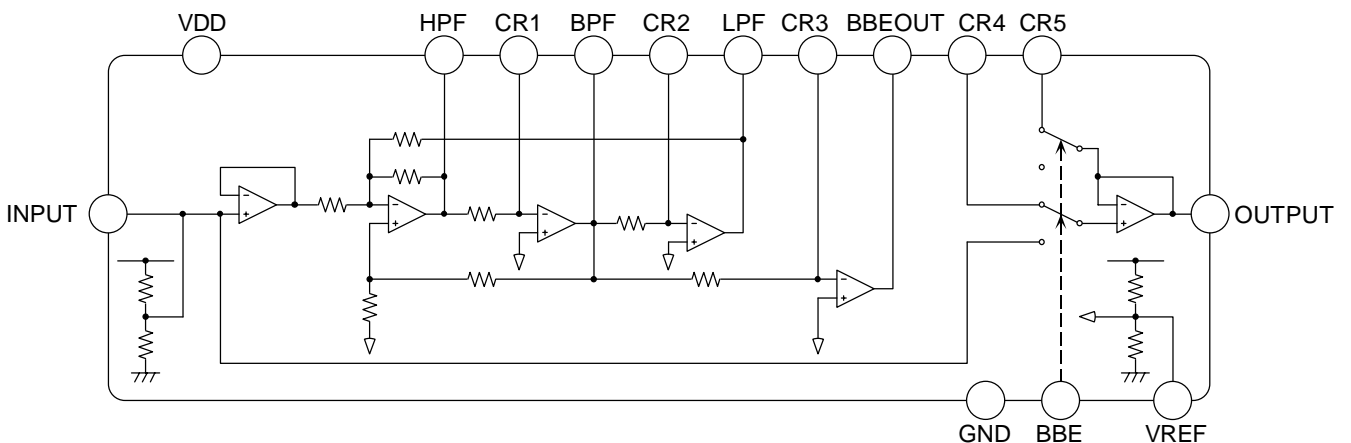
- Operating Voltage  $(V_{DD}=2.4 \text{ to } 5.5\text{V})$
- Low Operating Current  $(2\text{mA typ. at } V_{DD}=3\text{V})$
- Low Output Noise  $(31.6\mu\text{Vrms typ. at BBE ON})$
- Bypass Gain  $(0\text{dB typ.})$
- Adjustable Boost Level(High)
- Package Outline (SSOP16)

### PIN CONFIGURATION



| No. | SYMBOL | FUNCTION       | No. | SYMBOL | FUNCTION          |
|-----|--------|----------------|-----|--------|-------------------|
| 1   | VDD    | Power Supply   | 9   | CR3    | Filter            |
| 2   | INPUT  | Signal Input   | 10  | BBEOUT | BBE Output        |
| 3   | (NC)   | (No Connected) | 11  | CR4    | Filter            |
| 4   | HPF    | HPF Output     | 12  | CR5    | Filter            |
| 5   | CR1    | Filter         | 13  | OUTPUT | Signal Output     |
| 6   | BPF    | BPF Output     | 14  | BBE    | BBE ON/OFF        |
| 7   | CR2    | Filter         | 15  | VREF   | Reference Voltage |
| 8   | LPF    | LPF Output     | 16  | GND    | GND               |

### BLOCK DIAGRAM



## ■ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

| PARAMETER                   | SYMBOL           | RATING             | UNIT |
|-----------------------------|------------------|--------------------|------|
| Supply Voltage              | V <sub>DD</sub>  | 7.0                | V    |
| Input Voltage               | V <sub>I</sub>   | GND-0.5 to VDD+0.5 | V    |
| Power Dissipation           | PD               | 300                | mW   |
| Operating Temperature Range | T <sub>opr</sub> | -40 to +85         | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -55 to +125        | °C   |

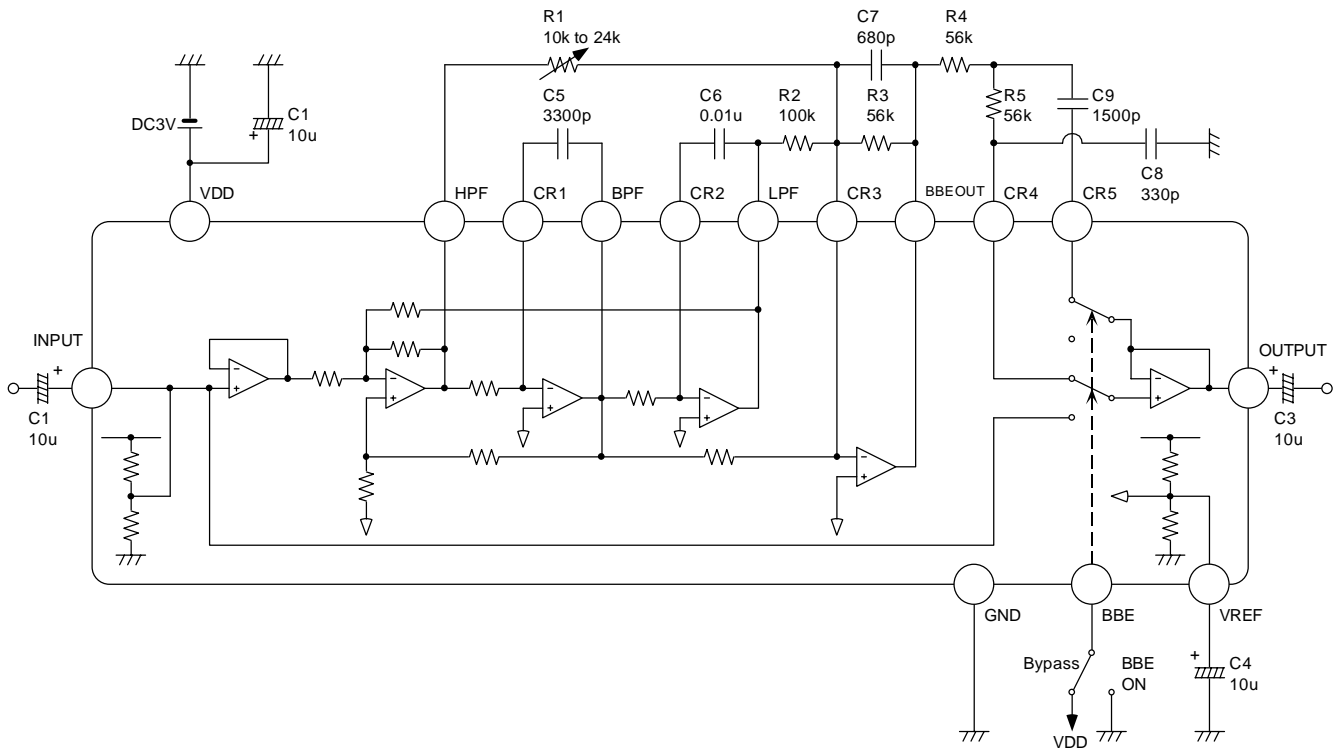
## ■ELECTRICAL CHARACTERISTICS(VDD=3V,Vss=0V,Ta=25°C)

| PARAMETER                  | SYMBOL           | TEST CONDITION                        | BBE    | MIN.                    | TYP.          | MAX.                    | UNIT           |
|----------------------------|------------------|---------------------------------------|--------|-------------------------|---------------|-------------------------|----------------|
|                            |                  |                                       |        |                         |               |                         |                |
| Operating Voltage          | V <sub>DD</sub>  |                                       | -      | 2.4                     | -             | 5.5                     | V              |
| Supply Current             | I <sub>DD</sub>  | No Signal                             | -      | -                       | 2.0           | 4.0                     | mA             |
| Reference Voltage          | VREF             |                                       | -      | -                       | 1.5           | -                       | V              |
| BBE Terminal Input Current | IBBE             | BBE Terminal=3V                       | -      | -                       | -1.0          | -                       | μA             |
| BBE Terminal Input Voltage | VBBEH            |                                       | -      | 0.8V <sub>DD</sub>      | -             | V <sub>DD</sub>         | V              |
|                            | VBBEL            |                                       | -      | GND                     | -             | 0.2V <sub>DD</sub>      | V              |
| Boost Level                | Boost            | R1=24kΩ,R3=56kΩ,f=3kHz                | ON     |                         | 4.0           |                         | dB             |
| Maximum Input Voltage      | VOMH             | RL=50kΩ                               | Bypass | V <sub>DD</sub><br>-0.1 | -             | -                       | V              |
|                            | VOML             | RL=50kΩ                               | Bypass | -                       | -             | V <sub>ss</sub><br>+0.1 | V              |
| Bypass Gain                | G <sub>BYP</sub> | f=1kHz                                | Bypass | -1                      | 0             | 1                       | dB             |
| Total Harmonic Distortion  | THD              | f=1kHz,Vin=0.1Vrms,<br>Boost=4.0dB    | ON     | -                       | 0.1           | -                       | %              |
| Output Noise               | Vno              | Input=GND,Boost=4.0dB,<br>A-Weighting | ON     | -                       | -90<br>(31.6) | -60<br>(100)            | dBV<br>(μVrms) |

## ■SWITCH FUNCTION

| Switch Terminal | Control Voltage Level | FUNCTION |
|-----------------|-----------------------|----------|
| BBE             | High                  | BYPASS   |
|                 | Low                   | BBE ON   |

## APPLICATION CIRCUIT



| R1   | Boost Level |
|------|-------------|
| 10kΩ | 12dB        |
| 15kΩ | 8dB         |
| 24kΩ | 4dB         |

High Boost Level is adjusted by value of R1.  
 Recommended High Boost Level : 4 to 12dB (R1 : 24k to 10kΩ)

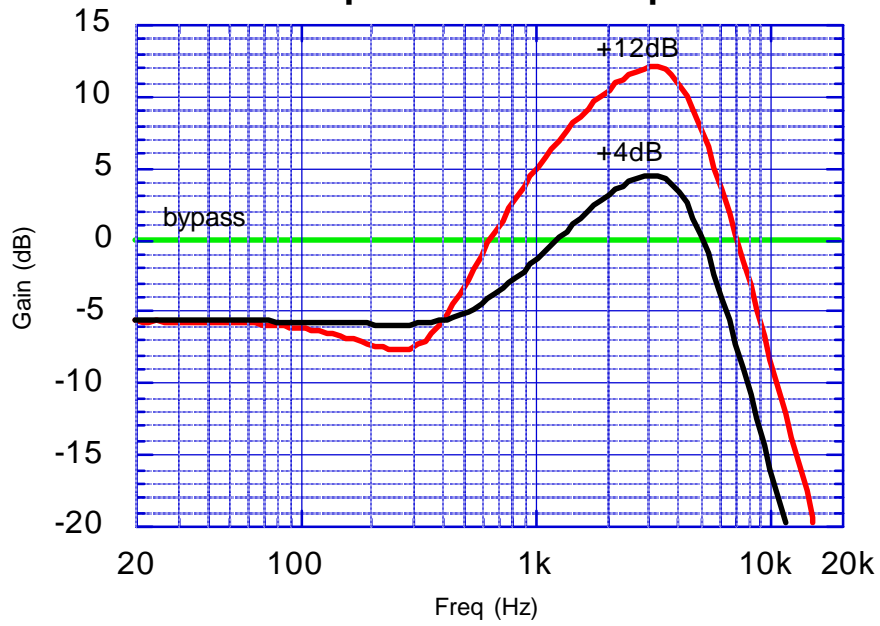
## NOTE

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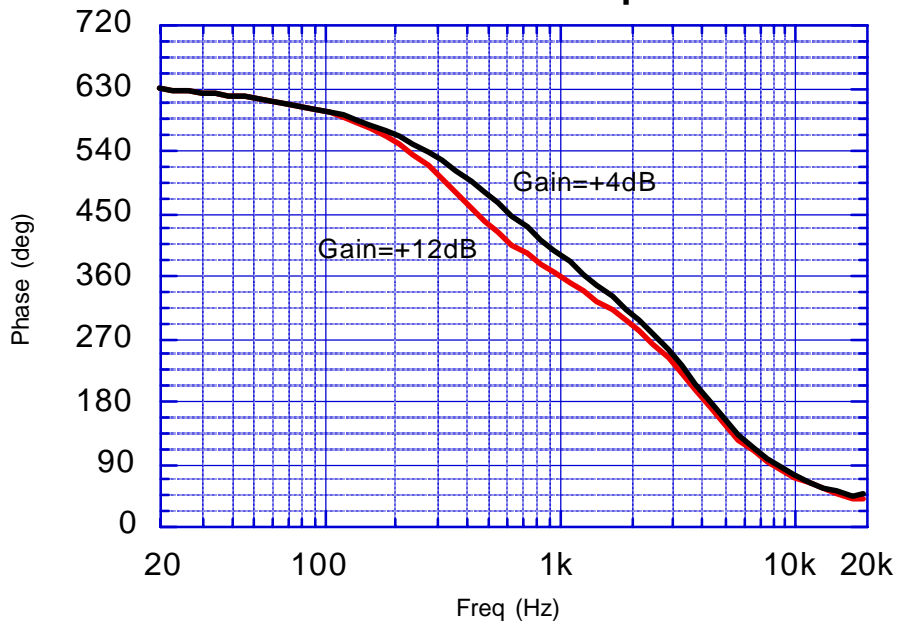
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## ■ TYPICAL CHARACTERISTICS

### Output Gain vs Freq.



### Phase vs Freq.



[CAUTION]  
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