

# Dual high slew rate, low noise operational amplifier

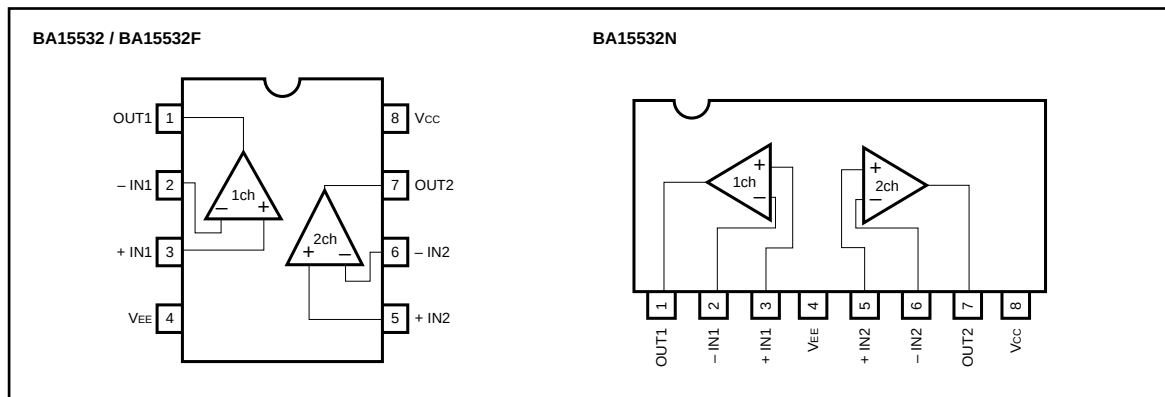
## BA15532 / BA15532F / BA15532N

The BA15532, BA15532F, and BA15532N are low-noise dual operational amplifiers designed especially for applications involving high-grade audio equipment. Since they feature low noise, a wide band width, and high power output, these products can also be used in measuring instruments and control circuits. The following packages are available : 8-pin DIP (BA15532), 8-pin SOP (BA15532F), and 8-pin SIP (BA15532N).

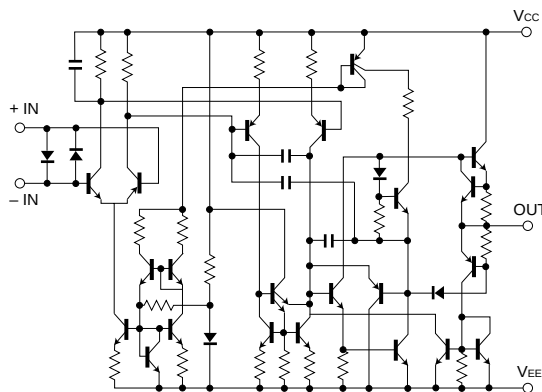
### ●Features

- 1) High output current capacity.
- 2) High slew rate.
- 3) Low noise.

### ●Block diagram



## ● Internal circuit configuration



## ● Absolute maximum ratings (Ta = 25°C)

| Parameter                  | Symbol           | Limits                              |                                     |                                     | Unit |
|----------------------------|------------------|-------------------------------------|-------------------------------------|-------------------------------------|------|
|                            |                  | BA15532                             | BA15532F                            | BA15532N                            |      |
| Power supply voltage       | V <sub>CC</sub>  | ± 21                                | ± 21                                | ± 21                                | V    |
| Power dissipation          | P <sub>d</sub>   | 800*                                | 550*                                | 900*                                | mW   |
| Differential input voltage | V <sub>ID</sub>  | ± 0.5                               | ± 0.5                               | ± 0.5                               | V    |
| Common-mode input voltage  | V <sub>I</sub>   | - V <sub>CC</sub> ~ V <sub>CC</sub> | - V <sub>CC</sub> ~ V <sub>CC</sub> | - V <sub>CC</sub> ~ V <sub>CC</sub> | V    |
| Operating temperature      | T <sub>opr</sub> | - 20 ~ + 75                         | - 20 ~ + 75                         | - 20 ~ + 75                         | °C   |
| Storage temperature        | T <sub>stg</sub> | - 55 ~ + 125                        | - 55 ~ + 125                        | - 55 ~ + 125                        | °C   |

\* Refer to P<sub>d</sub> characteristics diagram.

The values for the BA15532F are those when it is mounted on a glass epoxy board (50mm × 50mm × 1.6mm).

● Electrical characteristics (unless otherwise noted, Ta = 25°C, V<sub>CC</sub> = + 15V, V<sub>EE</sub> = - 15V)

| Parameter                            | Symbol           | Min. | Typ. | Max. | Unit   | Conditions                                                            |
|--------------------------------------|------------------|------|------|------|--------|-----------------------------------------------------------------------|
| Input offset voltage                 | V <sub>IO</sub>  | —    | 0.5  | 4    | mV     | R <sub>S</sub> = 50Ω, R <sub>L</sub> ≥ 10kΩ                           |
| Input offset current                 | I <sub>IO</sub>  | —    | 10   | 150  | nA     | R <sub>L</sub> ≥ 10kΩ                                                 |
| Input bias current                   | I <sub>B</sub>   | —    | 200  | 800  | nA     | R <sub>L</sub> ≥ 10kΩ                                                 |
| High-amplitude voltage gain          | A <sub>v</sub>   | 80   | 94   | —    | dB     | R <sub>L</sub> ≥ 600Ω, V <sub>O</sub> = ± 10V                         |
| Common-mode input voltage            | V <sub>ICM</sub> | ± 12 | ± 13 | —    | V      | R <sub>L</sub> ≥ 10kΩ                                                 |
| Maximum output voltage               | V <sub>OM</sub>  | ± 12 | ± 13 | —    | V      | R <sub>L</sub> ≥ 600Ω                                                 |
| Maximum output voltage               | V <sub>OM</sub>  | ± 15 | ± 16 | —    | V      | R <sub>L</sub> ≥ 600Ω, V <sub>CC</sub> = 18V, V <sub>EE</sub> = - 18V |
| Common-mode rejection ratio          | CMRR             | 70   | 100  | —    | dB     | R <sub>L</sub> ≥ 10kΩ                                                 |
| Power supply voltage rejection ratio | PSRR             | 80   | 100  | —    | dB     | R <sub>S</sub> = 50Ω, R <sub>L</sub> ≥ 10kΩ                           |
| Quiescent current                    | I <sub>Q</sub>   | —    | 8    | 16   | mA     | R <sub>L</sub> = ∞, on All Op - Amps                                  |
| Output short-circuit current         | I <sub>OS</sub>  | —    | 38   | —    | mA     |                                                                       |
| Slew rate                            | S. R.            | —    | 8    | —    | V / μs | A <sub>v</sub> = 1, R <sub>L</sub> = 600Ω, C <sub>L</sub> = 100pF     |
| Voltage gain band width              | GBW              | —    | 20   | —    | MHz    | C <sub>L</sub> = 100pF, R <sub>L</sub> = 600Ω, f = 10kHz              |
| Maximum frequency                    | f <sub>r</sub>   | —    | 7    | —    | MHz    |                                                                       |
| Input conversion noise voltage       | V <sub>n</sub>   | —    | 0.7  | 1.5  | μV     | RIAA, R <sub>S</sub> = 100Ω, BW = 20Hz ~ 30kHz                        |
| Channel separation                   | CS               | —    | 110  | —    | dB     | RIAA, f = 1kHz                                                        |

## ● Electrical characteristic curves

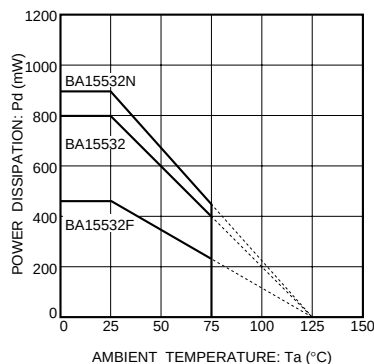


Fig.1 Power dissipation vs. ambient temperature

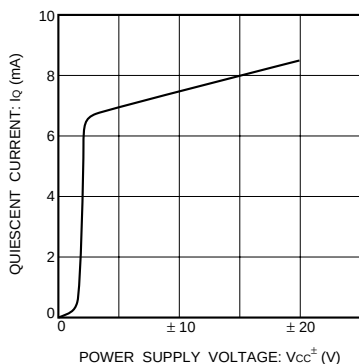


Fig.2 Quiescent current vs. power supply voltage

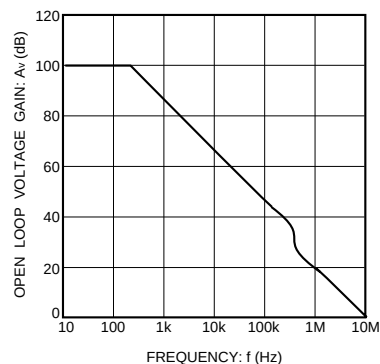


Fig.3 Open loop voltage gain vs. frequency

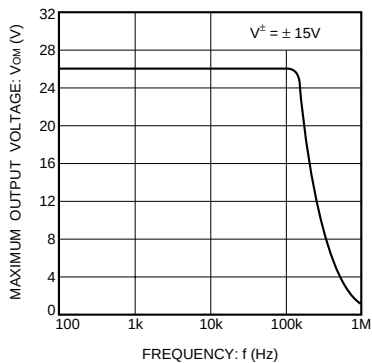


Fig.4 Maximum output voltage vs. frequency

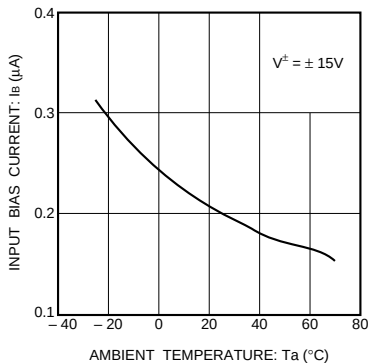


Fig.5 Input bias current vs. ambient temperature

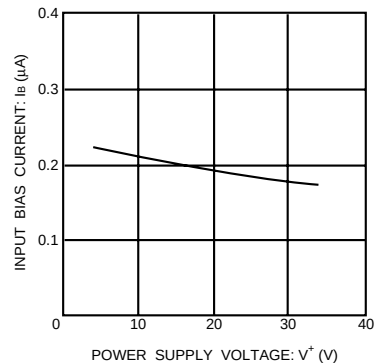


Fig.6 Input bias current vs. power supply voltage

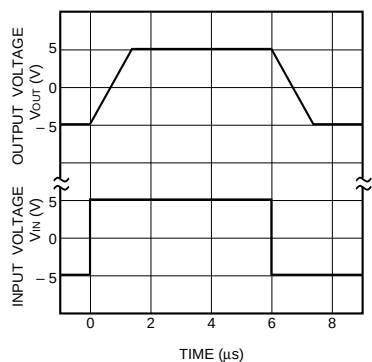


Fig.7 Output response characteristics

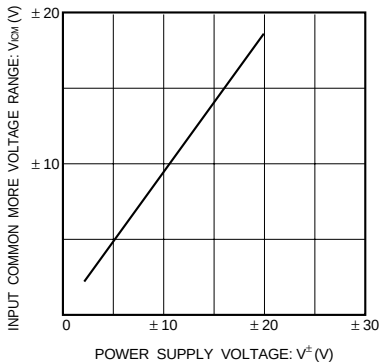


Fig.8 Common mode input voltage vs. power supply voltage

## ● Operation notes

## (1) Handling unused circuits

If there are any circuits which are not being used, we recommend making connections as shown in Figure 9, with the non-inverted input pin connected to the potential within the in-phase input voltage range ( $V_{ICM}$ ).

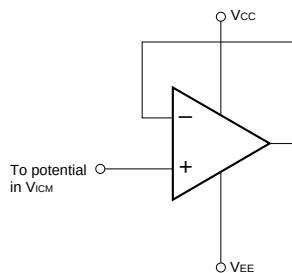
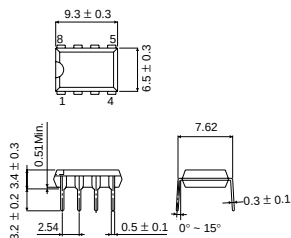


Fig.9 Unused circuit connections

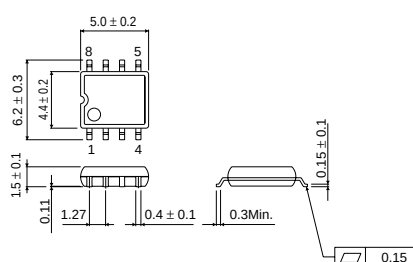
## ● External dimensions (Units: mm)

BA15532



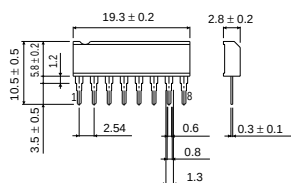
DIP8

BA15532F



SOP8

BA15532N



SIP8