

# Quad operational amplifier

## BA14741 / BA14741F

The BA14741 and BA14741F are monolithic ICs with four operational amplifiers featuring internal phase compensation mounted on a single silicon chip. Either a dual or single power supply can be driven.

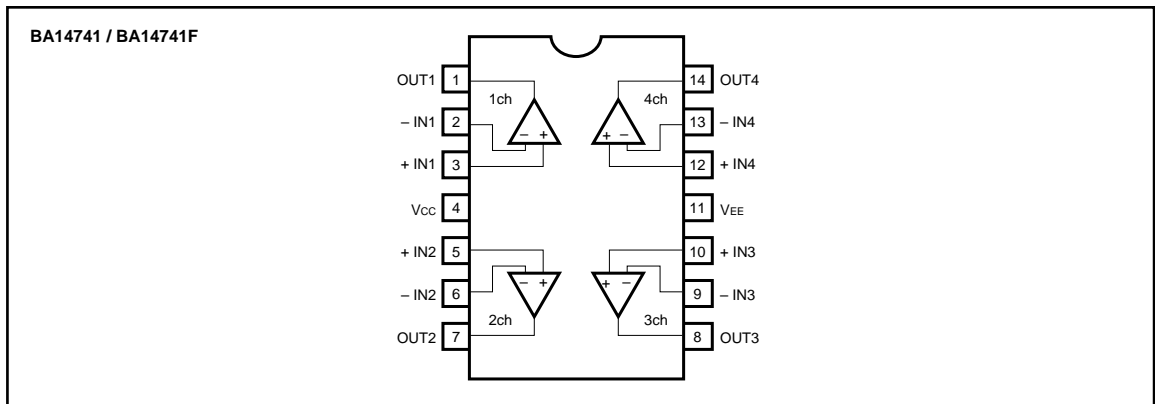
●Applications

- Active filters
- Audio amplifiers
- VCOs
- Other electronic circuits

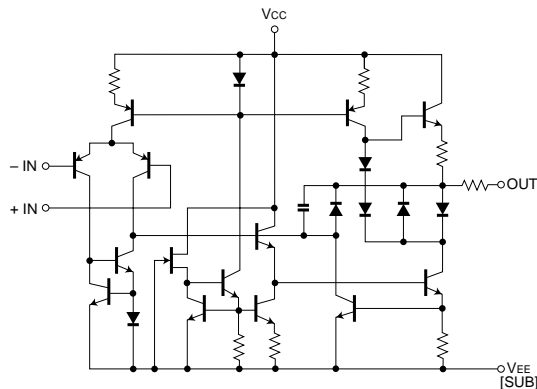
●Features

- 1) Built-in phase compensation circuit.
- 2) Wide range of operating power supply voltages.  
( $\pm 2$  to  $\pm 18V$ )
- 3) Can be connected to other standard quad operational amplifiers.
- 4) High gain and low noise.
- 5) Compatible with model 741 operation amplifiers of other manufacturers.

●Block diagram



● Internal circuit configuration



● Absolute maximum ratings (Ta = 25°C)

| Parameter                  | Symbol           | Limits                              |                                     | Unit |
|----------------------------|------------------|-------------------------------------|-------------------------------------|------|
|                            |                  | BA14741                             | BA14741F                            |      |
| Power supply voltage       | V <sub>CC</sub>  | 36 (± 18)                           | 36 (± 18)                           | V    |
| Power dissipation          | P <sub>d</sub>   | 950*                                | 450*                                | mW   |
| Differential input voltage | V <sub>ID</sub>  | ± V <sub>CC</sub>                   | ± V <sub>CC</sub>                   | 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    |
| Operating temperature      | T <sub>opr</sub> | - 40 ~ + 85                         | - 40 ~ + 85                         | °C   |
| Storage temperature        | T <sub>stg</sub> | - 55 ~ + 125                        | - 55 ~ + 125                        | °C   |

\* Refer to Pd characteristics diagram.

The values for the BA14741F 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>     | —    | 1      | 5    | mV                | R <sub>s</sub> ≤ 10kΩ                        |
| Input offset current                 |        | I <sub>IO</sub>     | —    | 10     | 50   | nA                | —  |
| Input bias current                   |        | I <sub>B</sub>      | —    | 60     | 300  | nA                | —  |
| High-amplitude voltage gain          |        | A <sub>V</sub>      | 86   | 100    | —    | dB                | R <sub>L</sub> = 2kΩ, V <sub>O</sub> = ± 10V |
| Common-mode input voltage            |        | V <sub>ICM</sub>    | ± 12 | ± 13.5 | —    | V                 | —  |
| Maximum output voltage               |        | V <sub>OM</sub>     | ± 10 | ± 12.5 | —    | V                 | R <sub>L</sub> = 2kΩ                         |
| Common-mode rejection ratio          |        | CMRR                | 80   | 100    | —    | dB                | —  |
| Power supply voltage rejection ratio |        | PSRR                | 80   | 100    | —    | dB                | —  |
| Quiescent current                    |        | I <sub>Q</sub>      | —    | 3.0    | 7.0  | mA                | R <sub>L</sub> = ∞, on All Op - Amps         |
| Channel separation                   |        | CS                  | —    | 100    | —    | dB                | f = 1kHz input conversion                    |
| Maximum output current               | source | I <sub>source</sub> | 10   | 20     | —    | mA                | V <sub>O</sub> = 0                           |
|                                      | sink   | I <sub>sink</sub>   | 5    | 10     | —    | mA                | V <sub>O</sub> = 0                           |
| Slew rate                            |        | S. R.               | —    | 1      | —    | V / μs            | A <sub>V</sub> = 1, R <sub>L</sub> = 2kΩ     |
| Maximum frequency                    |        | f <sub>T</sub>      | —    | 2      | —    | MHz               | —  |
| Input conversion noise voltage       |        | V <sub>n</sub>      | —    | 2      | 4.0  | μV <sub>rms</sub> | RIAA, R <sub>s</sub> = 2.2kΩ, 10Hz ~ 30kHz   |

● Electrical characteristic curves

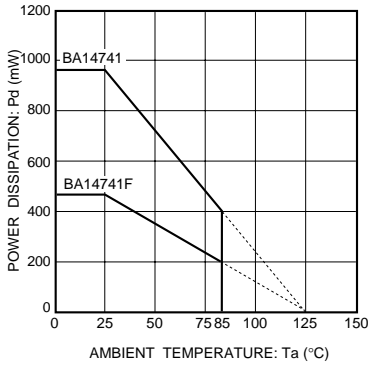


Fig.1 Power dissipation vs. ambient temperature

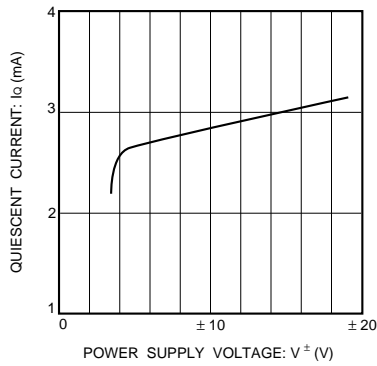


Fig.2 Quiescent current vs. power supply voltage

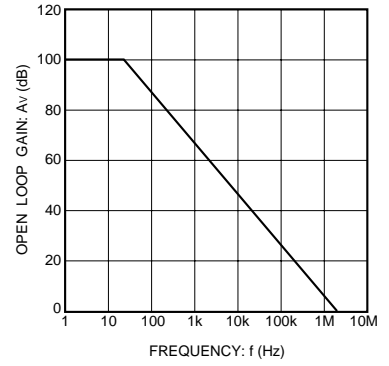


Fig.3 Open loop voltage gain vs. frequency

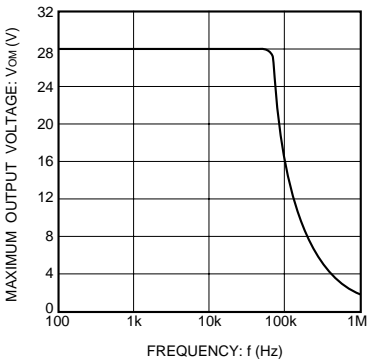


Fig.4 Maximum output voltage vs. frequency

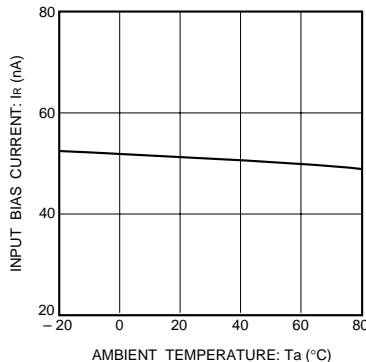


Fig.5 Input bias current vs. ambient temperature

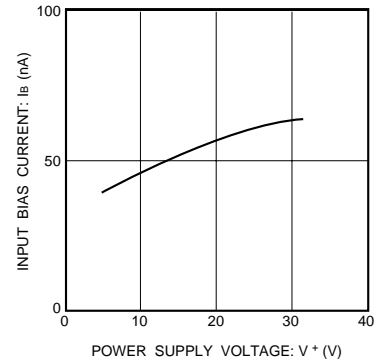


Fig.6 Input bias current vs. power supply voltage

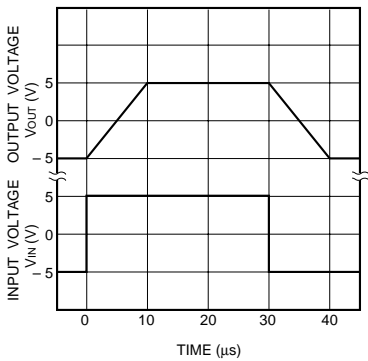


Fig.7 Output response characteristics

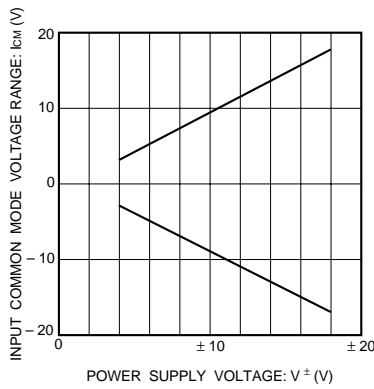


Fig.8 Common mode input voltage vs. power supply voltage

● 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 ( $V_{ICM}$ ).

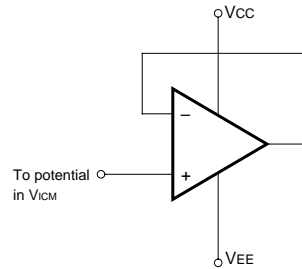


Fig.9 Unused circuit connections

● External dimensions (Units: mm)

