

# Dual operational amplifier with switch, for audio use (2 inputs/1 output, $\times 2$ )

## BA3129/BA3129F

The BA3129 and BA3129F contain two circuits with operational amplifiers configured of two differential input circuits, an output circuit, and a switch circuit. The two differential input circuits are separate, enabling independent settings to be entered for the amplifier gain and frequency characteristic.

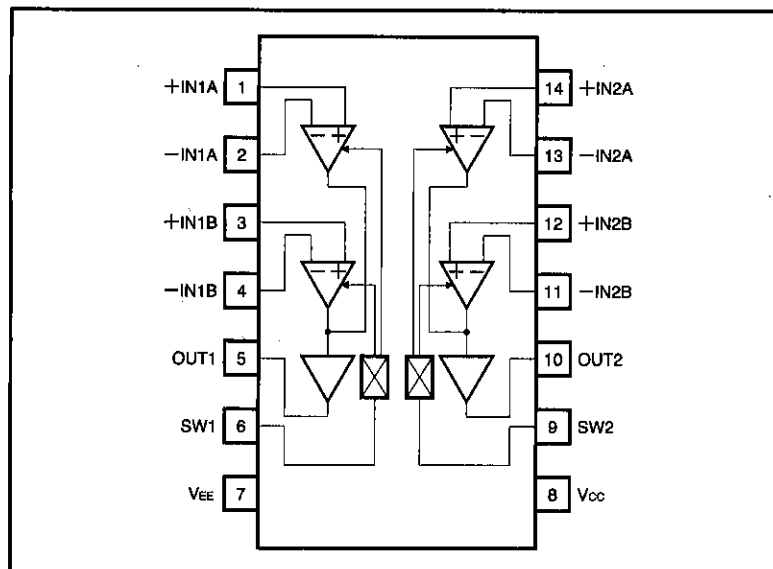
### ●Applications

Audio amplifiers and other electronic circuits

### ●Features

- 1) Can drive both dual or single power supplies.
- 2) High gain and low distortion ( $G_v = 110\text{dB}$ , THD = 0.0015%)
- 3) Low noise. ( $V_n = 2\ \mu\text{Vrms typ. : FLAT}$ )
- 4) Little switching noise.
- 5) Internal phase compensation.

### ●Block diagram



● Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Applied voltage	V <sub>CC</sub>	±18	V
Power dissipation	BA3129	1100* <sup>1</sup>	mW
	BA3129F	450* <sup>2</sup>	
Operating temperature	T <sub>opr</sub>	-20~75	°C
Storage temperature	T <sub>stg</sub>	-55~125	°C
Differential input voltage	V <sub>id</sub>	±V <sub>CC</sub>	V
In-phase input voltage	V <sub>i</sub>	-V <sub>CC</sub> ~V <sub>CC</sub>	V
Load current	I <sub>Omax</sub>	±50	mA

\*<sup>1</sup> If used at temperatures higher than 25°C, reduce power by 11 mW for each 1°C above Ta = 25°C.

\*<sup>2</sup> If used at temperatures higher than 25°C, reduce power by 4.5 mW for each 1°C above Ta = 25°C.

● Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Range	Unit	
Operating power supply voltage	Single power supply	V <sub>CC</sub>	5~32	V
	Dual power supplies	V <sub>CC</sub> , V <sub>EE</sub>	±2.5~±16	V
Load conditions	R <sub>L</sub>	2 k min.	Ω	

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

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent circuit current	I <sub>q</sub>	—	4.6	8.0	mA	V <sub>in</sub> = 0, R <sub>L</sub> = ∞ SW pin open
Input offset voltage	V <sub>io</sub>	—	0.5	5.0	mV	R <sub>S</sub> ≤ 10kΩ
Input offset current	I <sub>io</sub>	—	5	200	nA	
Input bias current	I <sub>b</sub>	—	50	500	nA	*1
High-amplitude voltage gain	A <sub>vol</sub>	86	110	—	dB	R <sub>L</sub> ≤ 2kΩ, V <sub>o</sub> = ±10V
Common mode input voltage range	V <sub>icm</sub>	±12	±14	—	V	
Common mode rejection ratio	CMRR	70	90	—	dB	R <sub>S</sub> ≤ 10kΩ
Power supply voltage rejection ratio	PSRR	76	90	—	dB	R <sub>S</sub> ≤ 10kΩ
Maximum output voltage	V <sub>OH</sub> / V <sub>OL</sub>	±12	±14	—	V	R <sub>L</sub> ≥ 10kΩ
		±10	±13	—	V	R <sub>L</sub> ≥ 2kΩ
Slew rate	SR	—	2.4	—	V / μS	GV = 0dB, R <sub>L</sub> ≤ 2kΩ
Voltage gain band width	GBW	—	6.5	—	MHz	f = 10kHz
Input noise voltage	V <sub>n</sub>	—	2.0	—	μV <sub>rms</sub>	R <sub>L</sub> = 2kΩ, B. P. F = 20~30kHz
Crosstalk between A - B	CT <sub>A-B</sub>	—	85	—	dB	f = 1kHz
Total harmonic distortion	THD	—	0.0015	—	%	f = 1kHz, V <sub>o</sub> = 5V <sub>rms</sub>
Channel separation	CS	—	120	—	dB	f = 1kHz, input conversion

\*1 Because the initial stage is configured by the PNP transistor, the direction of the input bias current is the direction of the flow from the IC.

○ Not designed for radiation resistance.

●Precautions concerning use

Using SW pins

The Pin 6 and Pin 9 SW pins control switching of the dual-system differential input amplifier. When the current flowing from the SW pins is detected, the differential input amplifier is switched. If no current is flowing from the SW pins, the A amplifier is activated, and if current of  $20\ \mu\text{A}$  or higher is flowing, the B amplifier is activated.

The pin voltage is  $V = V_{CC} - (5 \times 10^3 + 10 \times 10^3) I - 0.7$ . Thus, R1 and R2 are set so that when the switch is off, the switching current is  $1\ \mu\text{A}$  or lower, and when the switch is on, the switching current is  $20\ \mu\text{A}$  or higher.

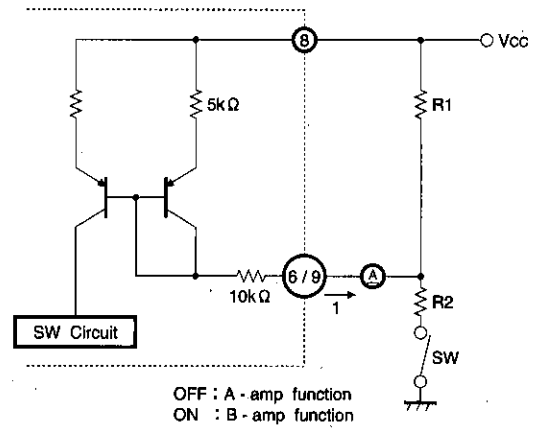
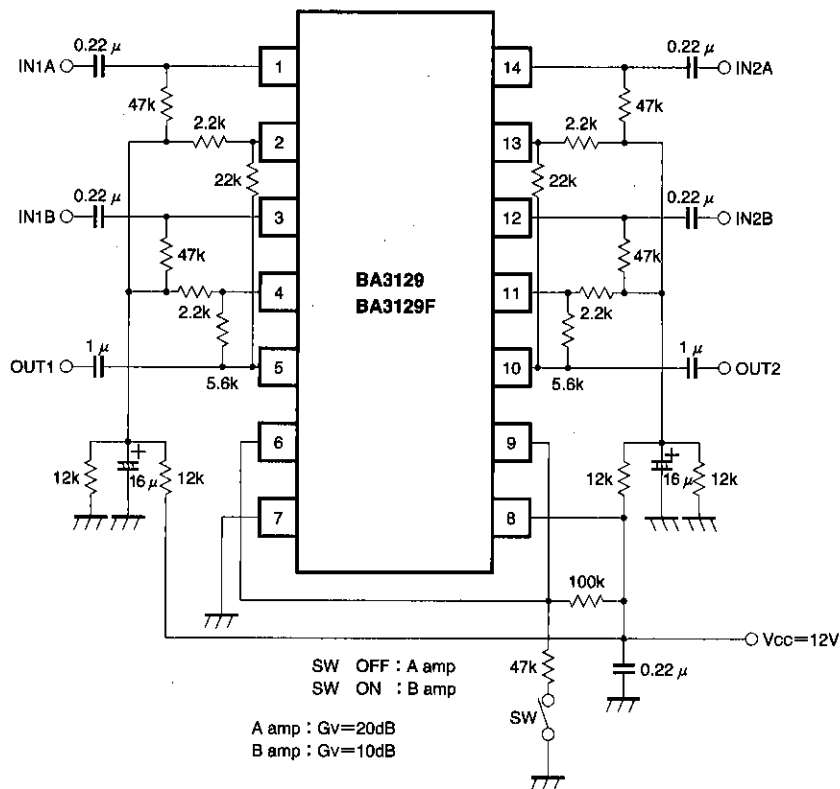


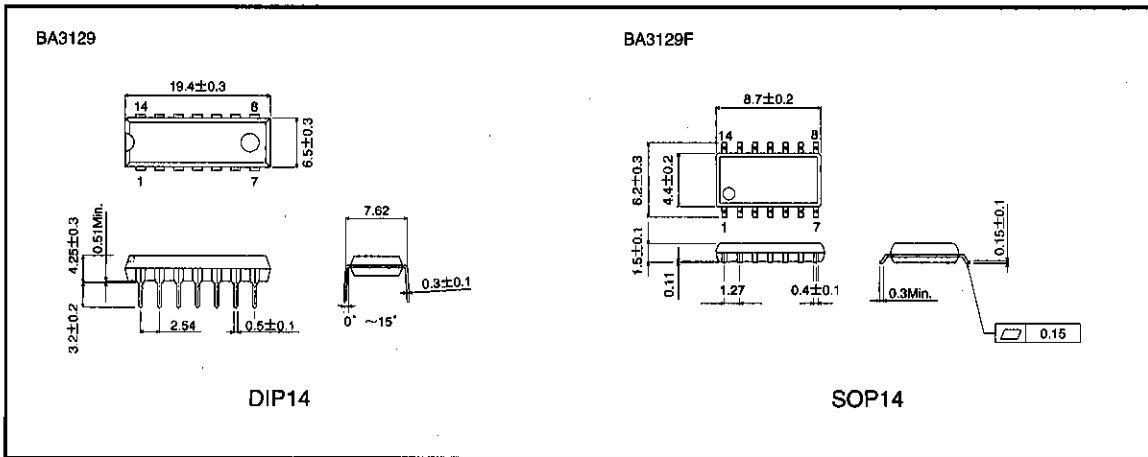
Fig.1

●Application example



When the switch is off, Pins 6 and 9 are open, resulting in high impedance. To guard against induction noise and other adverse effects, we recommend using a pull-up resistance.

● External dimensions (Units: mm)



Operational amplifiers with output switch

Operational amplifiers/Comparators

## Notes

- The contents described in this catalogue are correct as of March 1997.
- No unauthorized transmission or reproduction of this book, either in whole or in part, is permitted.
- The contents of this book are subject to change without notice. Always verify before use that the contents are the latest specifications. If, by any chance, a defect should arise in the equipment as a result of use without verification of the specifications, ROHM CO., LTD., can bear no responsibility whatsoever.
- Application circuit diagrams and circuit constants contained in this data book are shown as examples of standard use and operation. When designing for mass production, please pay careful attention to peripheral conditions.
- Any and all data, including, but not limited to application circuit diagrams, information, and various data, described in this catalogue are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO., LTD., disclaims any warranty that any use of such device shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes absolutely no liability in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices; other than for the buyer's right to use such devices itself, resell or otherwise dispose of the same; no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by ROHM CO., LTD., is granted to any such buyer.
- The products in this manual are manufactured with silicon as the main material.
- The products in this manual are not of radiation resistant design.

The products listed in this catalogue are designed to be used with ordinary electronic equipment or devices (such as audio-visual equipment, office-automation equipment, communications devices, electrical appliances, and electronic toys). Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers, or other safety devices) please be sure to consult with our sales representatives in advance.

- Notes when exporting
  - It is essential to obtain export permission when exporting any of the above products when it falls under the category of strategic material (or labor) as determined by foreign exchange or foreign trade control laws.
  - Please be sure to consult with our sales representatives to ascertain whether any product is classified as a strategic material.