

Dual operational amplifier with switch, for audio use (2 inputs / 1 output × 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.

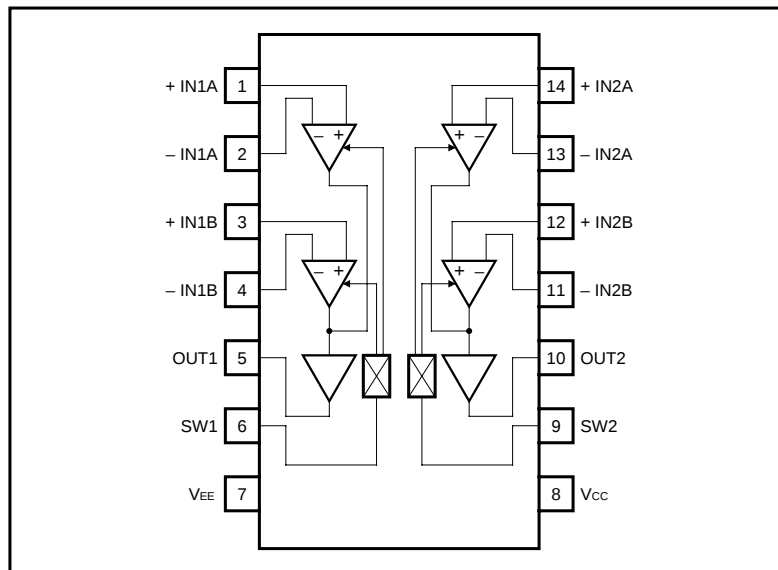
●Applications

Audio amplifiers and other electronic circuits

●Features

- 1) Can drive both dual or single power supplies.
- 2) High gain and low distortion.
($G_v = 110\text{dB}$, $\text{THD} = 0.0015\%$)
- 3) Low noise. ($V_n = 2\mu\text{V}_{\text{rms}}$ 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 _{CC}	± 18	V
Power dissipation	BA3129	Pd	1100*1	mW
	BA3129F		450*2	
Operating temperature		Topr	− 20 ~ + 75	°C
Storage temperature		Tstg	− 55 ~ + 125	°C
Differential input voltage		V _{id}	± V _{CC}	V
Common-mode input voltage		V _i	− V _{CC} ~ V _{CC}	V
Load current		I _O Max.	± 50	mA

*1 Reduced by 11mW for each increase in Ta of 1°C over 25°C.

*2 Reduced by 4.5mW for each increase in Ta of 1°C over 25°C.

● Recommended operating conditions (Ta = 25°C)

Parameter		Symbol	Limits	Unit
Operating power supply voltage	Single power supply	V _{CC}	5 ~ 32	V
	Dual power supplies	V _{CC} , V _{EE}	± 2.5 ~ ± 16	V
Load conditions		R _L	2 k Min.	Ω

● Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = 15V, V_{EE} = − 15V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent circuit current	I _Q	—	4.6	8.0	mA	V _{IN} = 0, R _L = ∞ SW pin open
Input offset voltage	V _{io}	—	0.5	5.0	mV	R _S ≤ 10kΩ
Input offset current	I _{io}	—	5	200	nA	—
Input bias current	I _b	—	50	500	nA	*1
High-amplitude voltage gain	A _{vol}	86	110	—	dB	R _L ≤ 2kΩ, V _o = ± 10V
Common-mode input voltage	V _{icm}	± 12	± 14	—	V	—
Common-mode rejection ratio	CMRR	70	90	—	dB	R _S ≤ 10kΩ
Power supply voltage rejection ratio	PSRR	76	90	—	dB	R _S ≤ 10kΩ
Maximum output voltage	V _{OH} / V _{OL}	± 12	± 14	—	V	R _L ≥ 10kΩ
		± 10	± 13	—	V	R _L ≥ 2kΩ
Slew rate	SR	—	2.4	—	V / μs	GV = 0dB, R _L ≤ 2kΩ
Gain band width product	GBW	—	6.5	—	MHz	f = 10kHz
Input conversion noise voltage	V _n	—	2.0	—	μVrms	R _L = 2kΩ, B. P. F = 20 ~ 30kHz
Crosstalk between A-B	CT _{A-B}	—	85	—	dB	f = 1kHz
Total harmonic distortion	THD	—	0.0015	—	%	f = 1kHz, V _o = 5Vrms
Channel separation	CS	—	120	—	dB	f = 1kHz, input conversion

*1 Because the first stage is configured with a PNP transistor, input bias current is from the IC.

○ Not designed for radiation resistance.

●Operation notes

(1) 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.

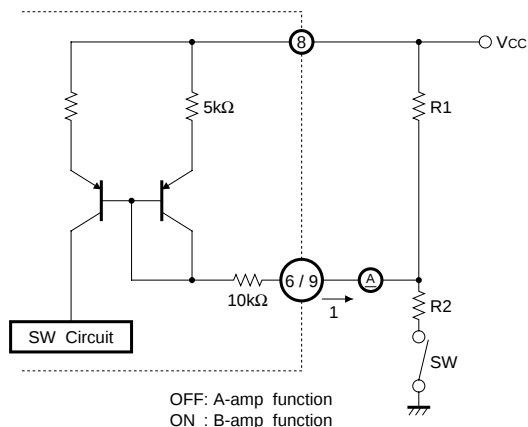


Fig.1

●Application example

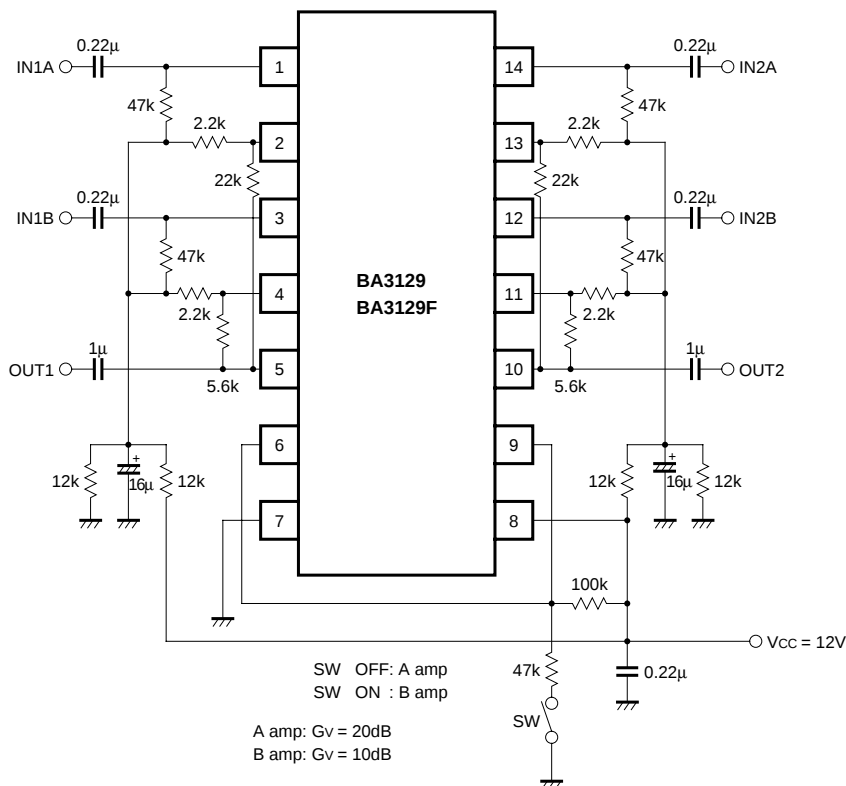
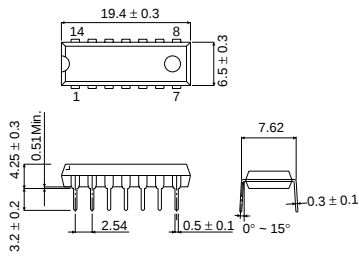


Fig.2

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.

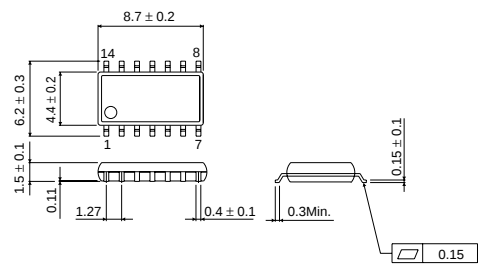
● External dimensions (Units: mm)

BA3129



DIP14

BA3129F



SOP14