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.

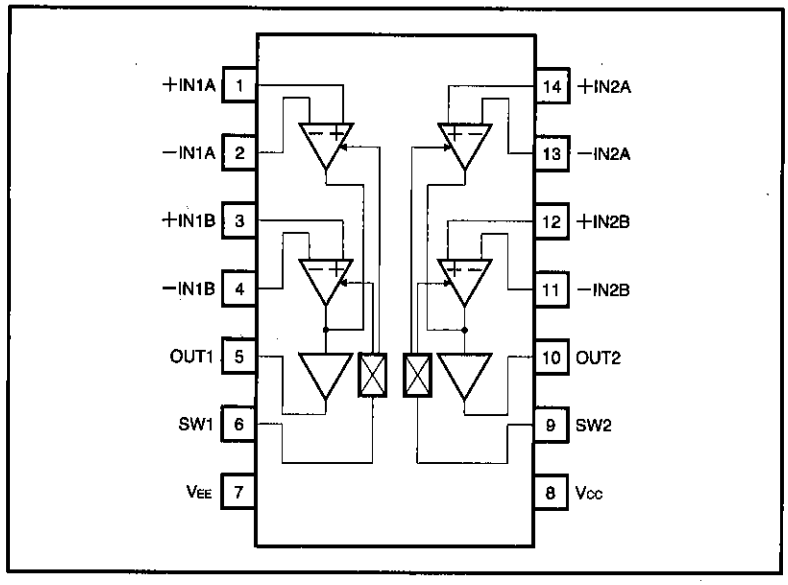
●Applications

Audio amplifiers and other electronic circuits

●Features

1) Can drive both dual or single power supplies.
2) High gain and low distortion (Gv = 110dB, THD = 0.0015%)
3) Low noise. (Vn = 2 μVrms typ. : FLAT)
4) Little switching noise.
5) Internal phase compensation.

●Block diagram



●Absolute maximum ratings (Ta=25℃)

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	℃
Storage temperature		Tstg	−55~125	℃
Differential input voltage		Vid	±V_{CC}	V
In-phase input voltage		Vi	−V_{CC}~V_{CC}	V
Load current		$I_{OMax.}$	±50	mA

*1 If used at temperatures higher than 25°C, reduce power by 11 mW for each 1°C above Ta = 25°C.
*2 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℃)

Parameter		Symbol	Range	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		RL	2 k min.	Ω

●Electrical characteristics (unless otherwise noted, T =25℃, V_{CC}=15V, V_{EE}=-15V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent circuit current	Iq	—	4.6	8.0	mA	Vin = 0, RL = ∞ SW pin open
Input offset voltage	Vio	—	0.5	5.0	mV	RS≦10kΩ
Input offset current	Iio	—	5	200	nA	
Input bias current	Ib	—	50	500	nA	*1
High-amplitude voltage gain	Avol	86	110	—	dB	RL≧2kΩ, Vo=±10V
Common mode input voltage range	Vicm	±12	±14	—	V	
Common mode rejection ratio	CMRR	70	90	—	dB	RS≦10kΩ
Power supply voltage rejection ratio	PSRR	76	90	—	dB	RS≦10kΩ
Maximum output voltage	V_{OH} / V_{OL}	±12	±14	—	V	RL≧10kΩ
		±10	±13	—	V	RL≧2kΩ
Slew rate	SR	—	2.4	—	V / μS	GV=0dB, RL≦2kΩ
Voltage gain band width	GBW	—	6.5	—	MHz	f=10kHz
Input noise voltage	Vn	—	2.0	—	μVrms	RL=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, Vo=5Vrms
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 μA or higher is flowing, the B amplifier is activated.

The pin voltage is $V = V_{CC} - (5\times10^3 + 10\times10^3)\ I - 0.7$. Thus, R1 and R2 are set so that when the switch is off, the switching current is 1 μA or lower, and when the switch is on, the switching current is 20 μA or higher.

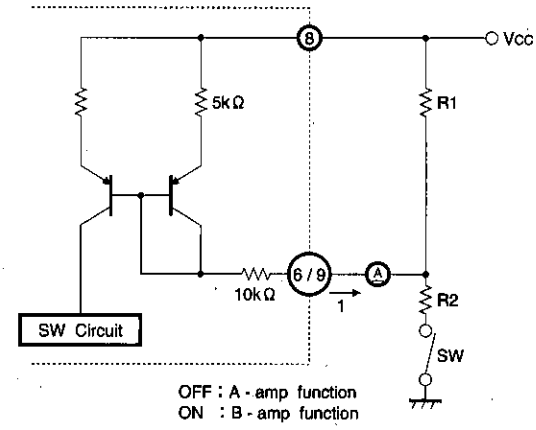
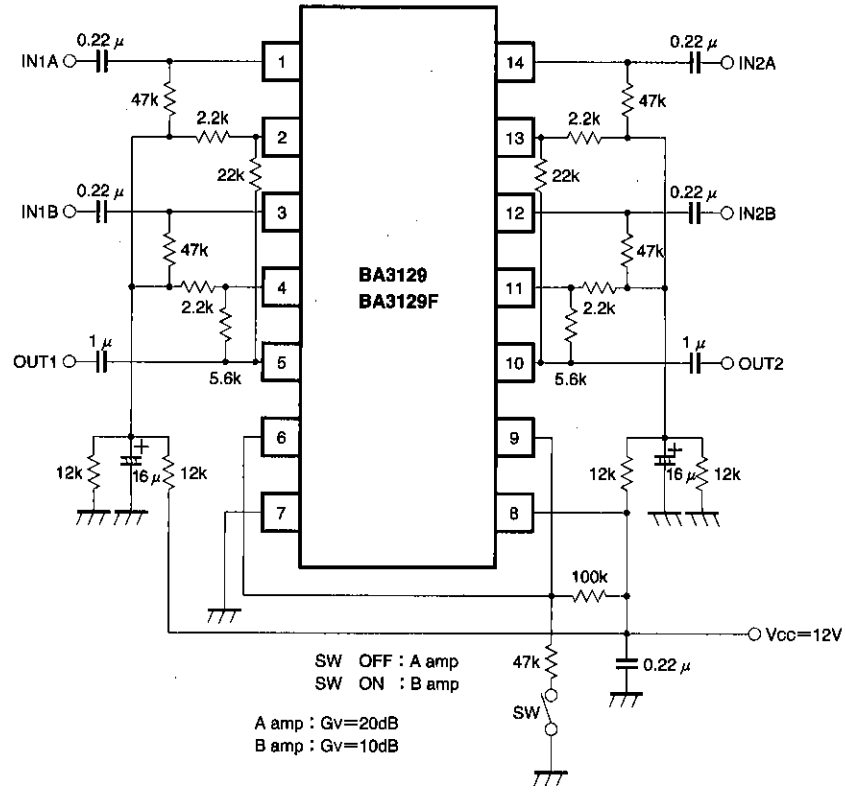


Fig.1

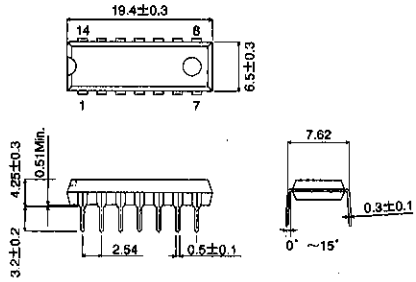
●Application example



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)

BA3129



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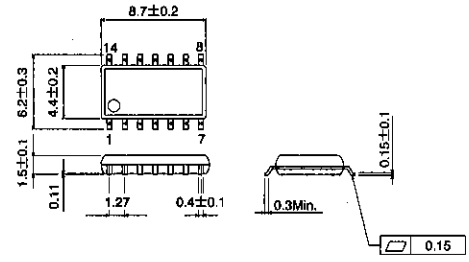
BA3129F



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