3-channel BTL driver for CDs, CD-ROMs, DVDs and DVD-ROMs

BA5932FP

The BA5932FP is a 3-channel BTL driver designed for CD and DVD player actuators and loading drives. The actuator drive can be set to the desired gain and f characteristic with attached components, making this IC adaptable for a wide array of applications.

●Applications

CD and DVD players, CD-ROM drives, DVD-ROM drives, and other optical disc devices

●Features

1) 28-pin HSOP package for application miniaturization.
2) Gain is adjustable with an attached resistor.
3) Positive and negative input pins, for a wide range of input types, including reverse phase input.

●Absolute maximum ratings (Ta = 25°C)

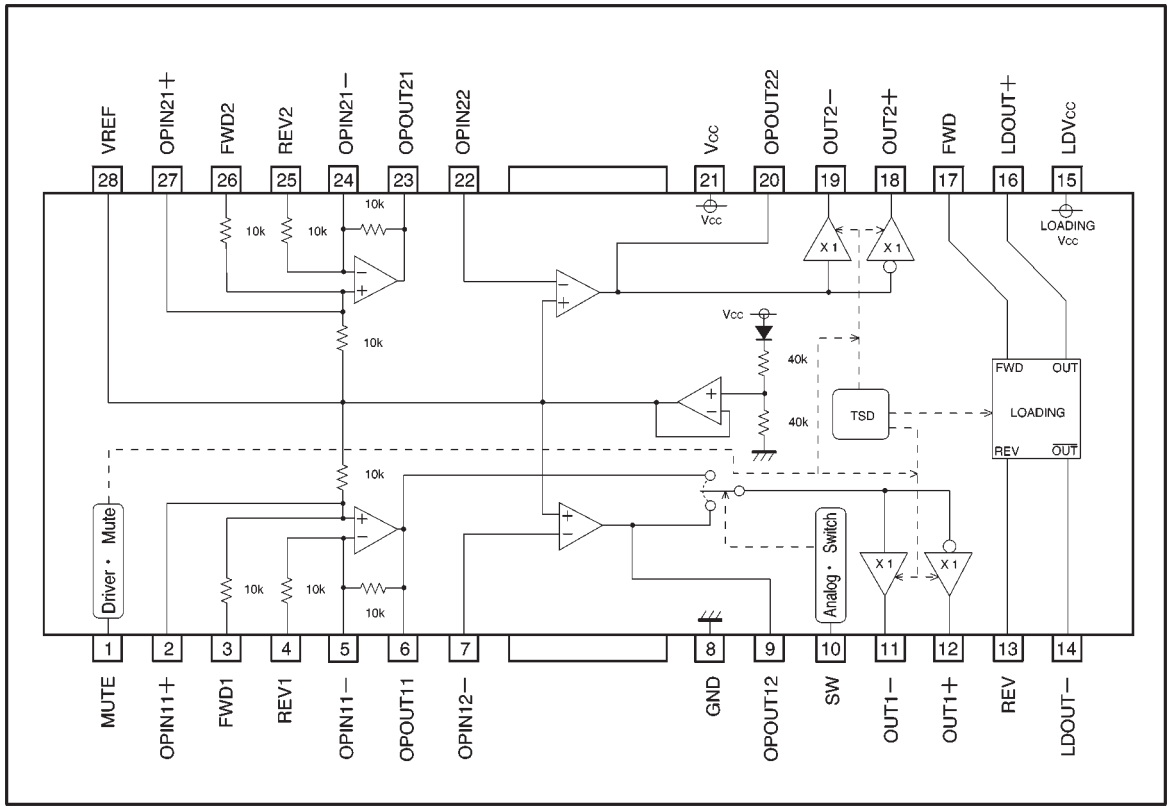
Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	18	V
Power dissipation	Pd	1.8*1 2.9*2	W
Rated current	IoMax.	1.4*3	A
Operating temperature range	Topr	−35～+85	℃
Storage temperature range	Tstg	−55～+150	℃

*1 When mounted on a 70 mm × 70 mm × 1.6 mm glass epoxy board with less than 3% copper foil
*2 When mounted on a 70 mm × 70 mm × 1.6 mm glass epoxy board with less than 60% copper foil
*3 Within the range of power dissipation and safe operational area (ASO)

●Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V_{CC}	4.5～13.5	V
Loading supply voltage	LDV_{CC}	1.5～V_{CC}	V

●Block diagram



●Pin descriptions

Pin No.	Pin name	Function
1	MUTE	Mute pin
2	OPIN11+	Operational amplifier non-inverted input
3	FWD1	Forward input
4	REV1	Reverse input
5	OPIN11−	Operational amplifier inverted input
6	OPOUT11	Operational amplifier output
7	OPIN12−	Operational amplifier inverted input
8	GND	Substrate ground
9	OPOUT12	Operational amplifier output
10	SW	Analog switch input
11	OUT1−	Driver output
12	OUT1+	Driver output
13	REV	Loading reverse input
14	LDOUT−	Loading negative output
15	LDV_{CC}	Vcc (loading / output H bridge)
16	LDOUT+	Loading positive output
17	FWD	Loading forward input
18	OUT2+	Driver output
19	OUT2−	Driver output
20	OPOUT22	Operational amplifier output
21	V_{CC}	Vcc (biaxial driver, loading predrive)
22	OPIN22	Operational amplifier inverted input
23	OPOUT21	Operational amplifier output
24	OPIN21−	Operational amplifier inverted input
25	REV2	Reverse input
26	FWD2	Forward input
27	OPIN21+	Operational amplifier non-inverted input
28	VREF	Reference voltage output

●Electrical characteristics (unless otherwise noted, Ta = 25°C, V_{CC} = 12V, LDV_{CC} = 5V, R_L = 8Ω)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current dissipation 1	I_{Q1}	—	10.5	15.5	mA	No load, loading open mode
Quiescent current dissipation 2	I_{Q2}	—	15.0	30.0	mA	No load, loading forward / reverse mode
Quiescent current dissipation 3	I_{Q3}	—	18.0	28.0	mA	No load, loading brake mode
Loading supply current	I_L	—	—	10	μA	Vcc open
〈Internal reference〉						
Output voltage	V_{ref}	5.40	5.70	6.00	V	
Maximum output (source)	I_{OSO}	10	15	—	mA	
Maximum output (sink)	I_{OSI}	10	40	—	mA	
〈Actuator driver〉						
Output voltage, offset	V_{OO}	−50	0	50	mV	
Maximum output amplitude	V_{OM}	7.5	8.5	—	V	
Closed loop voltage gain	G_{VC}	4.5	6.0	7.5	dB	
Ripple rejection	RR	—	60	—	dB	vosc=0.1V_{rms}, 100Hz
〈Analog switch input〉						
Input high level voltage	V_{IH}	2.0	—	V_{CC}	V	
Input low level voltage	V_{IL}	−0.3	—	0.5	V	
Input high level current	I_{IH}	—	90	135	μA	V_{IN}=5V
Input low level current	I_{IL}	−10	0	10	μA	V_{IN}=0V
〈Loading driver〉						
Output saturation voltage 1	Vsat1	—	0.4	0.7	V	Total for upper and low, I_L = 200 mA
Output saturation voltage 1 (forward / reverse differential)	△Vsat1	—	—	0.1	V	Differential between forward and reverse output saturation voltage 1
Output saturation voltage 2	Vsat2	—	0.9	1.6	V	Output saturation voltage (I_L) = 500 mA
Output saturation voltage 3 (reference)	Vsat3	—	1.0	1.3	V	R_L=7.5Ω
〈Loading logic〉						
Input high level voltage	V_{IHLD}	2.0	—	V_{CC}	V	
Input low level voltage	V_{ILLD}	−0.3	—	0.5	V	
Input high level current	I_{IHLD}	—	180	270	μA	
Input low level current	I_{ILLD}	−10	0	10	μA	

●Measurement circuit

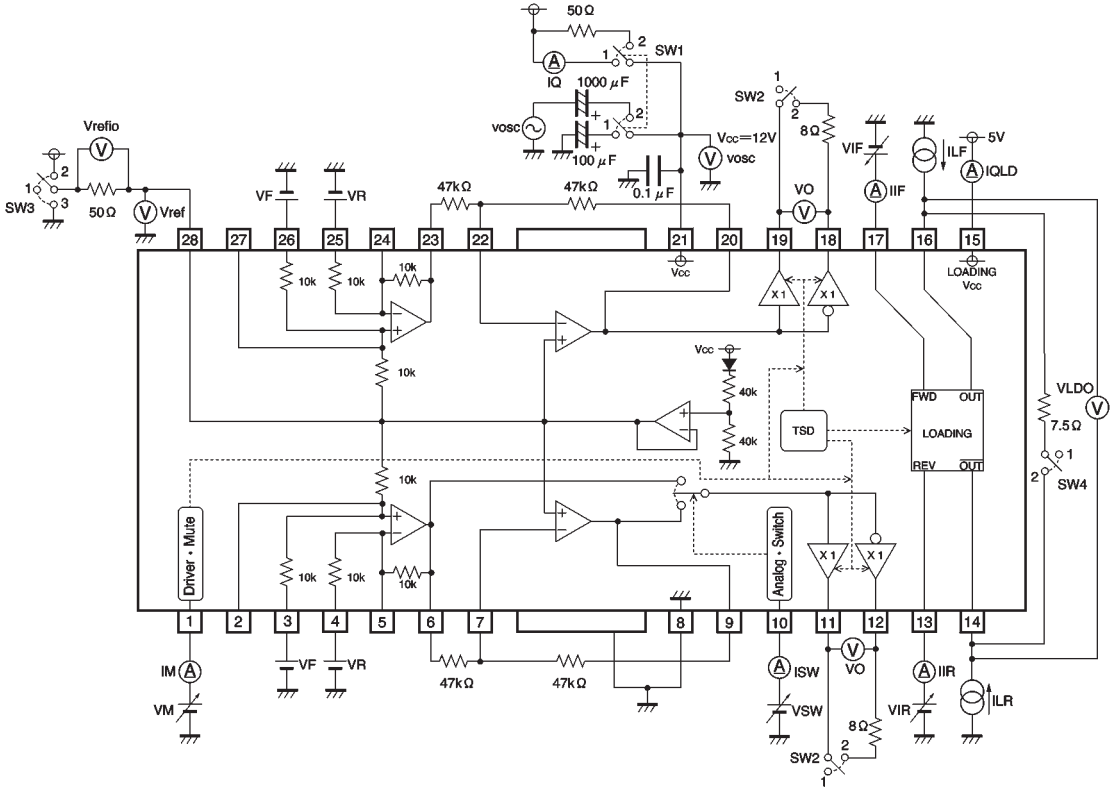


Fig. 1

●Application circuit

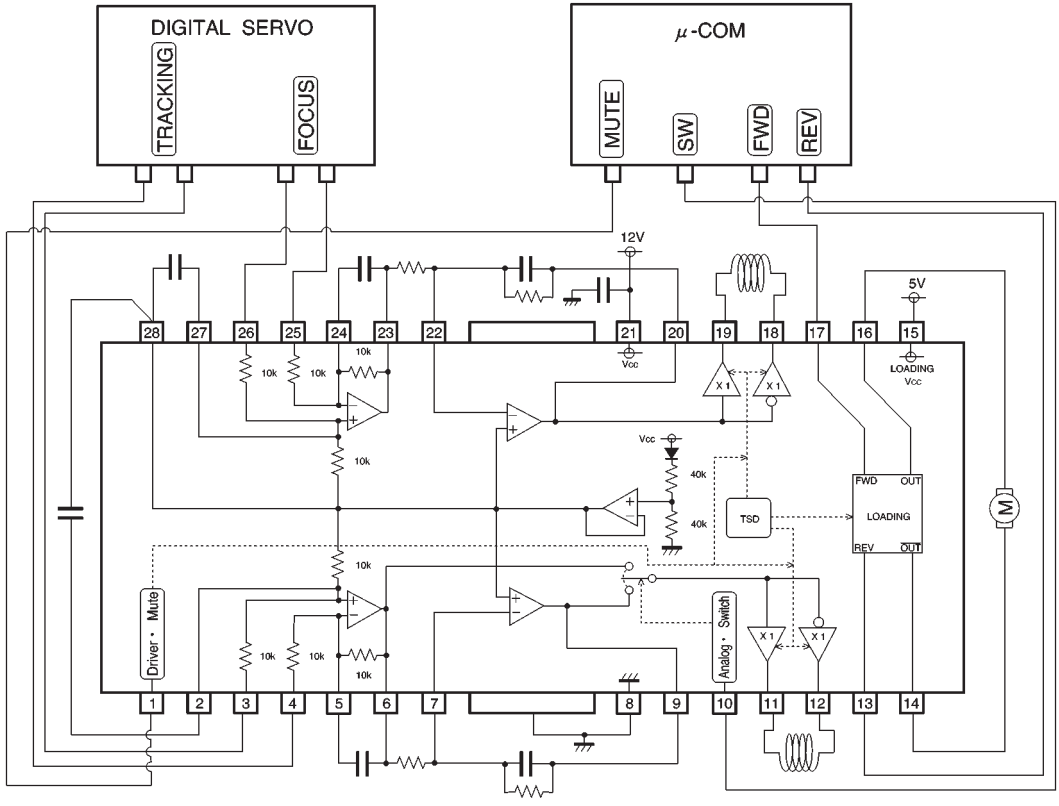


Fig. 2

●Operation notes

(1) Mute input (pin 1) truth table

Input	Function
L	Actuator driver mute ON
H	Actuator driver mute OFF

(2) Analog switch input (pin 10) truth table

Input	Function
L	Driver buffer input: to pin 6
H	Driver buffer input: to pin 9

(3) Loading driver logic input (pins 13, 17) truth table

FWD	REV	Function
L	L	Open mode
L	H	Reverse mode
H	L	Forward mode
H	H	Brake mode

(4) The BA5932FP has an internal thermal shutdown circuit. Output current is muted when the chip temperature exceeds 175°C (typically) and restored when the chip temperature falls to 150°C (typically).

(5) Connect the IC to a 0.1μF bypass capacitor to the power supply, at the base of the IC.

(6) Be sure to connect the radiating fin to an external ground.

●Electrical characteristic curves

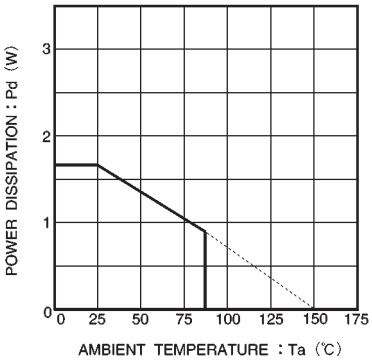


Fig. 3 Thermal derating curve

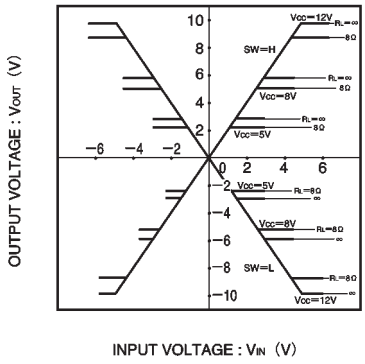


Fig. 4 Driver I / O characteristics (when load changes)

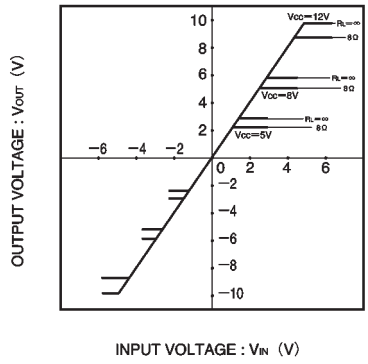


Fig. 5 Driver I / O characteristics (when supply voltage changes)

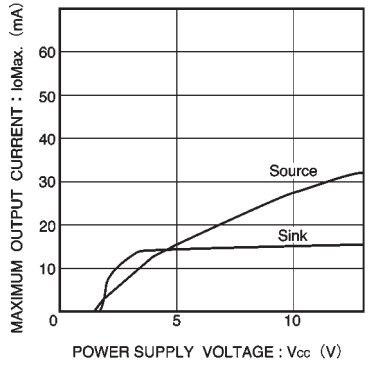


Fig. 6 Power supply voltage vs. Vref amplifier maximum output current

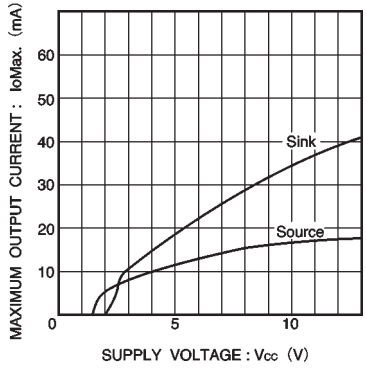


Fig. 7 Supply voltage vs. operational amplifier maximum output current

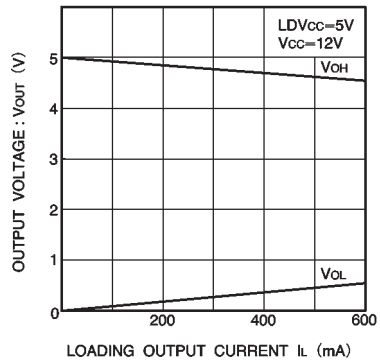


Fig. 8 Loading output current vs. output voltage

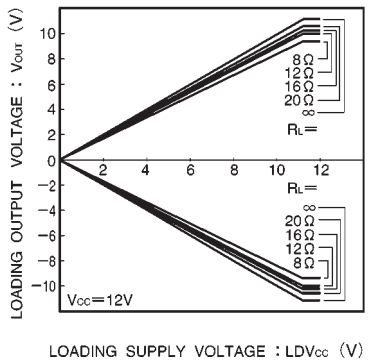


Fig. 9 Loading supply voltage vs. output voltage (variable load)

●External dimensions (Units: mm)