4-channel BTL driver for CD players BA6793FP

The BA6793FP is a 4-channel BTL driver for CD player actuators and motors. This IC has an internal 5V regulator and a standard operational amplifier, making it suitable for a wide spectrum of applications.

Applications

CD players, CD-ROM drives

Features

- 28-pin HSOP power package allows for application miniaturization.
- 2) Minimum attached components.
- Driver gain is adjustable with a single attached resistor.
- Internal 5V regulator. (requires attached PNP transistor)
- 5) Internal standard operational amplifier.
- 6) Internal thermal shutdown circuit.
- 7) Three separate power supplies.

● Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	Vcc	18	V
Power dissipation	Pd	1.7*1	w
Operating temperature	Topr	−35~+85	°
Storage temperature	Tstg	−55~ +150	င

^{*1} Reduced by 13.6 mW for each increase in Ta of 1°C over 25°C.

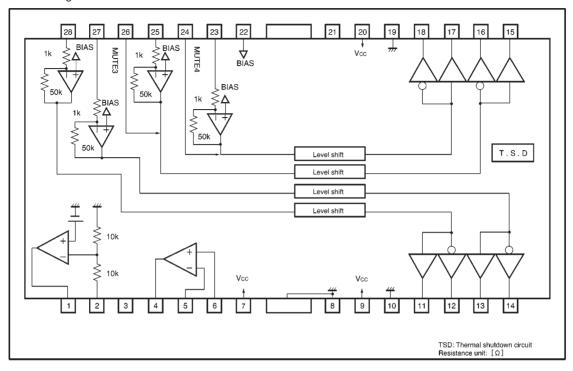
When mounted on a 50 \times 50 \times 1 mm paper phenol board.

• Recommended operating conditions (Ta = 25°C)

Parameter	Parameter Symbol		Unit
Power supply voltage	Vcc	6~14* ²	V

^{*2} The driver can operate as low as 4.5 V.

Block diagram



Pin descriptions

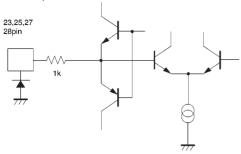
Pin No.	Pin name	Function		
1	REG - B	Connect to the base of the attached transistor		
2	REG OUT	Constant voltage output (connect to the collector of the attached transistor)		
3	_	N.C.		
4	OP OUT	Operational amplifier output		
5	OP IN(-)	Operational amplifier negative input		
6	OP IN(+)	Operational amplifier positive input		
7	Vcc	Vcc (operational amplifier, reg., etc.)		
8	GND	Substrate ground		
9	Vcc D1	Driver Vcc (channels 1 and 2)		
10	GND D1	Driver ground (channels 1 and 2)		
11	VO1-	Channel 1 negative output		
12	VO1+	Channel 1 positive output		
13	VO2-	Channel 2 negative output		
14	VO2+	Channel 2 positive output		

Pin No.	Pin name	Function		
15	VO3-	Channel 3 negative output		
16	VO3+	Channel 3 positive output		
17	VO4-	Channel 4 negative output		
18	VO4+	Channel 4 positive output		
19	GND D2	Driver ground (channels 3 and 4)		
20	Vcc D2	Driver Vcc (channels 3 and 4)		
21	_	N.C.		
22	BIAS IN	Bias input		
23	VIN4	Channel 4 input		
24	MUTE4	Channel 4 mute		
25	VIN3	Channel 3 input		
26	MUTE3	Channel 3 mute		
27	VIN2	Channel 2 input		
28	VIN1	Channel 1 input		

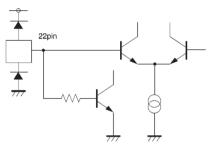
Note:positive and negative output of the driver is relative to the polarity of the input pins. When the input pin is at the high level, the negative output pin is at the low level and the positive output pin is at the high level.

Pin equivalent circuit diagrams

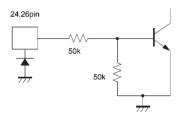
Driver input



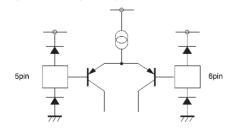
Bias

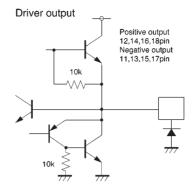


Mute

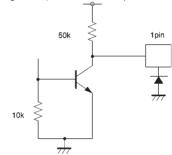


Operational amplifier input

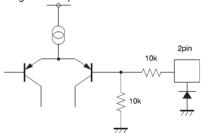




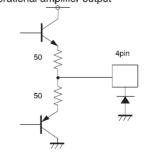
Regulator (base connection)



Regulator output



Operational amplifier output



Resistance unit: $[\Omega]$

•Electrical characteristics (unless otherwise noted, Ta = 25°C, Vcc = 12V, BIAS = 2.5V, f = 1kHz, R_{IN} = 20kΩ, R_{L} =8Ω)

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Quiescent current dissipation	lcc	-	11.0	15.0	mA	No load
Output voltage, offset	Voo	-90	_	90	mV	
Maximum output amplitude	Vом	7.5	8.3	_	V	
Closed loop voltage gain	Gvc	12.0	14.0	16.0	dB	V _{IN} =BIAS+0.15V
Ripple rejection	RR	_	60	_	dB	V _{IN} =0.1V _{rms} , 100Hz
Slew rate	SR	_	2.0	_	V/μs	100 kHz square wave, 3 VP-P output
Mute On voltage	VMON	2.0	_	_	V	
Mute Off voltage	VMOFF	_	_	0.5	V	
⟨5 V regulator⟩						
Output voltage	Vreg	4.75	5.00	5.25	V	IL=100mA
Output load differential	△VRL	-50	0	10	mV	IL=0~200mA
Power supply voltage differential	△VVcc	-15	21	60	mV	(Vcc=6~14V) IL=100mA
〈Operational amplifier〉						
Offset voltage	Vofop	-5	0	5	mV	
Input bias current	VBOP	_	_	300	nA	
Output high level voltage	Vонор	10.5	11.4	_	V	
Output low level voltage	Volop	_	0.74	1.1	V	
Output drive current (sink)	Isink	-200	0	200	mA	IL=10mA
Output drive current (source)	Isource	-200	0	200	mA	IL=-10mA
Open loop voltage gain	Gvo	_	78	_	dB	V _{IN} =-75dBV, 1kHz
Slew rate	SROP	_	1	_	V/μs	100 kHz square wave, 4 Vp-p output
Ripple rejection	RROP	_	65	_	dB	V _{IN} =-20dBV, 100Hz
Common mode rejection ratio	CMRR	_	84	_	dB	V _{IN} =-20dBV, 1kHz

ONot designed for radiation resistance.

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Measurement circuit

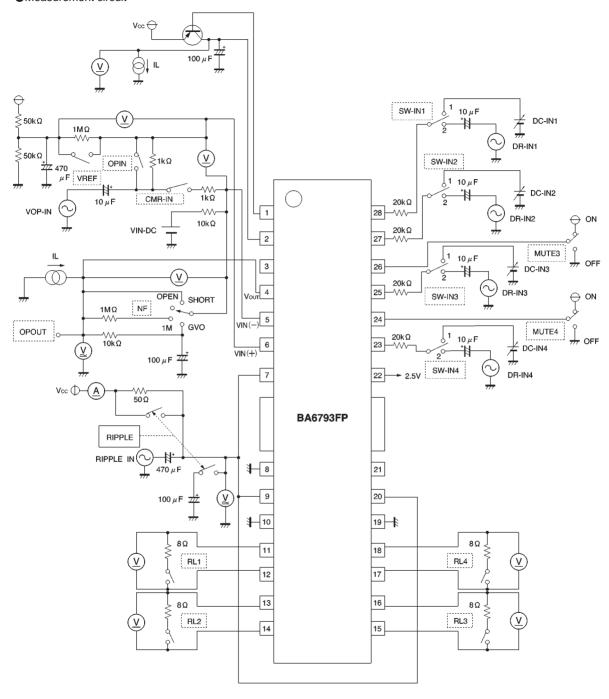


Fig. 1

Circuit operation

(1) Driver

Inputs to the IC are the focus tracking error signal from the servo preamplifier and the control signal from the motor. The input signals, which normally center on 2.5V, are V / I converted by the preamplifier, generating a current corresponding to the input voltage. This current is

passed through a resistor and into the internal reference voltage component, the preamplifier output being a signal centering on the internal reference voltage. Two systems (positive phase and negative phase) are created during V / I conversion, generating BTL output via the driver buffer.

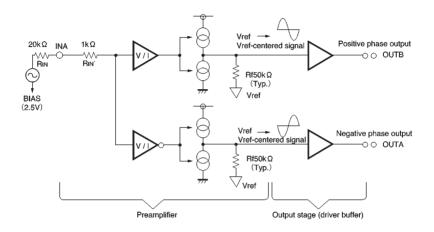


Fig. 2

(2) Regulator

This is a typical series regulator that generates a reference voltage internally. A PNP low saturation transistor must be connected.

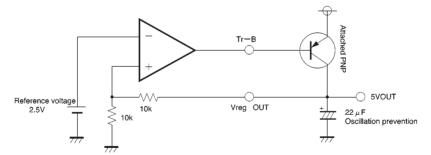


Fig. 3

(3) Operational amplifier A standard 4558 type.

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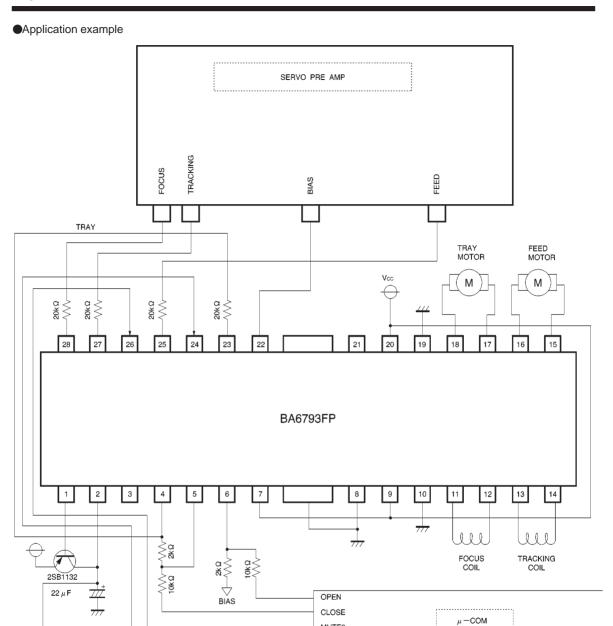


Fig. 4

5V REGULATOR OUT

MUTE3

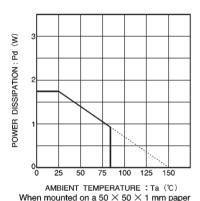
MUTE4

Operation notes

- (1) The BA6793FP has a thermal shutdown circuit. The output current is muted when the chip temperature rises above 175°C (typically). When the chip temperature falls to 150°C (typically), the driver circuit starts up again.
- (2) The output currents (channels 3 and 4) can be muted by pulling up the mute pins (pins 24 and 26) above 2.0V. During ordinary use, pins 24 and 26 should be left open or lowered below 0.5V.
- (3) Muting also occurs when the bias pin (pin 22) drops below 1.4V (typically). Make sure it stays above 2.0V during normal use.

- (4) Muting occurs during thermal shutdown, mute-on operations or a drop in the bias pin voltage. In each case, only the drivers are muted. During muting, the output pins remain at the internal bias voltage, roughly (Vcc VF) / 2.
- (5) Connect the IC to a $1\mu F$ bypass capacitor between power supplies, at the base of the IC.
- (6) The radiating fin is connected to the package's internal GND, but should also be connected to an external ground.
- (7) The capacitor between regulator output (pin 2) and GND also serves to prevent oscillation of the IC, so select one with good temperature characteristics.

Electrical characteristic curves



phenol board.

Fig. 5 Thermal derating curve

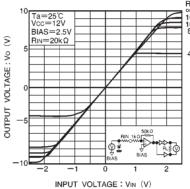


Fig. 6 Driver I / O characteristics (variable load)

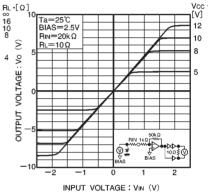


Fig. 7 Driver I / O characteristics (variable Vcc)

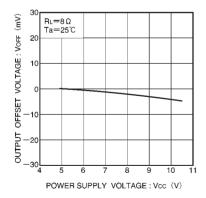


Fig. 8 Power supply voltage vs. output offset voltage

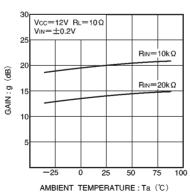


Fig. 9 Driver gain vs. temperature

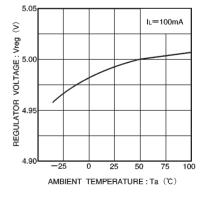
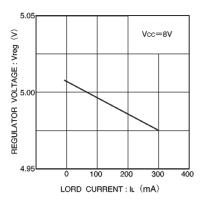


Fig. 10 Regulator voltage vs. temperature

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180° 80 60 EVENT STATE OF THE S

Fig. 11 Load current vs. regulator voltage

Fig. 12 Operational amplifier vs. open loop

External dimensions (Units: mm)

