

# 4-channel BTL driver for CD players

## BA6798S

The BA6798S is a 4-channel H-bridge BTL driver for CD players and actuators. The 5V regulator and internal standard operational amplifier make this IC suited to a broad range of applications.

### ●Applications

CD players and CD-ROM drives

### ●Features

- 1) 4-channel BTL driver.
- 2) SDIP M 24-pin package for high package power.
- 3) Internal thermal shutdown circuit.
- 4) Driver gain is adjustable with a single attached resistor.
- 5) Internal 5V regulator. (requires attached PNP transistor)

### ●Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage	V <sub>cc</sub>	18	V
Power dissipation	P <sub>d</sub>	3.1*	W
Operating temperature	T <sub>opr</sub>	−35~+85	°C
Storage temperature	T <sub>stg</sub>	−55~+150	°C

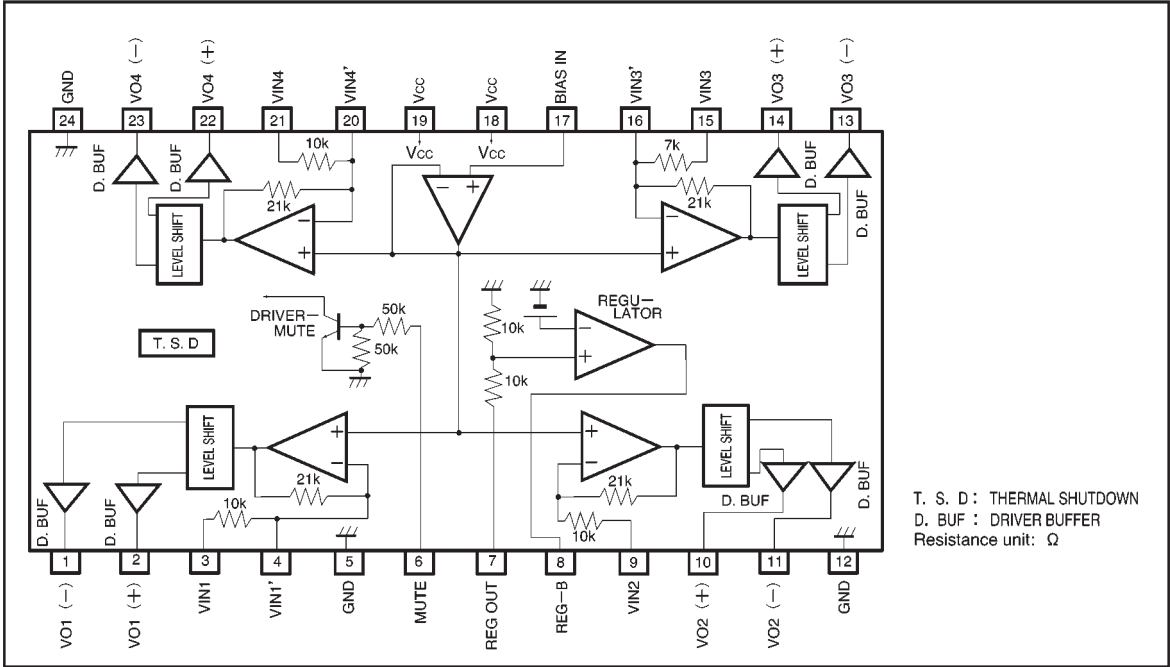
\* Unmounted.

Reduced by 24.8 mW for each increase in Ta of 1°C over 25°C.

Operating voltage range: 6 to 14 V (driver: as low as 5.5 V)



## ● Block diagram



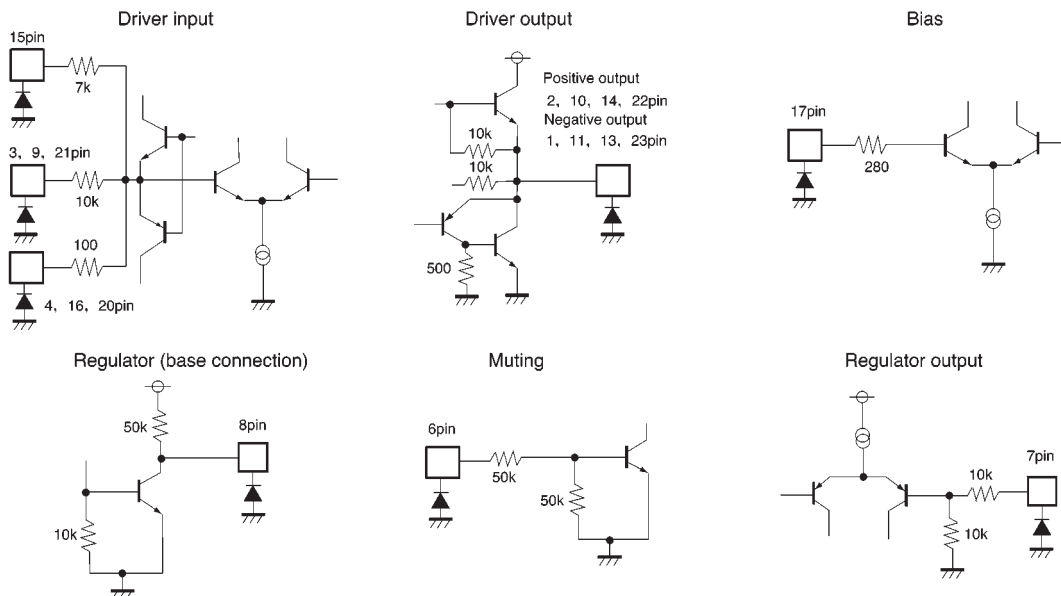
## ● Pin descriptions

Pin No.	Pin name	Function
1	VO1 (—)	Driver channel 1 negative output
2	VO1 (+)	Driver channel 1 positive output
3	VIN1	Driver channel 1 input
4	VIN1'	Driver channel 1 gain adjustment input
5	GND	GND
6	MUTE	Mute control
7	REG OUT	Constant voltage output (connect to attached transistor collector)
8	REG-B	Connect to attached transistor base
9	VIN2	Driver channel 2 input
10	VO2 (+)	Driver channel 2 positive output
11	VO2 (—)	Driver channel 2 negative output
12	GND	Substrate ground

Pin No.	Pin name	Function
13	VO3 (—)	Driver channel 3 negative output
14	VO3 (+)	Driver channel 3 positive output
15	VIN3	Driver channel 3 input
16	VIN3'	Driver channel 3 gain adjustment input
17	BIAS IN	Bias amplifier input
18	Vcc	Vcc
19	Vcc	Vcc
20	VIN4'	Driver channel 4 gain adjustment input
21	VIN4	Driver channel 4 input
22	VO4 (+)	Driver channel 4 positive output
23	VO4 (—)	Driver channel 4 negative output
24	GND	Substrate ground

Note: Positive and negative output is relative to the polarity of the input pins.  
The output pin is HIGH when the input pin is HIGH.

## ● Pin equivalent circuit diagrams

● Electrical characteristics (unless otherwise noted,  $T_a = 25^\circ\text{C}$ ,  $V_{CC} = 8\text{V}$ ,  $f = 1\text{kHz}$ ,  $R_L = 8\Omega$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current dissipation	$I_{CC}$	5.5	9.5	13.5	mA	No load
Output voltage, offset 1	$V_{OO1}$	-50	—	50	mV	Channels 1, 2 and 4
Output voltage, offset 2	$V_{OO2}$	-65	—	65	mV	Channel 3
Maximum output amplitude	$V_{DD}$	3.8	4.3	—	V	
Closed loop voltage gain	$G_{VC1}$	10.5	12.0	13.5	dB	$V_{IN}=0.1V_{rms}, 1\text{kHz}$ (Channels 1, 2 and 4)
Closed loop voltage gain	$G_{VC2}$	13.5	15.0	16.5	dB	$V_{IN}=0.1V_{rms}, 1\text{kHz}$ (Channel 3)
Ripple rejection	RR	—	60	—	dB	$V_{IN}=0.1V_{rms}, 100\text{Hz}$
Slew rate	SR	—	2.0	—	$V/\mu s$	100 kHz square wave, 3 $V_{P-P}$ output
Mute Off voltage	$V_{MOFF}$	2.0	—	—	V	
Mute On voltage	$V_{MON}$	—	—	0.5	V	
< 5 V regulator >						
Output voltage	$V_{reg}$	4.75	5.00	5.25	V	$I_L=100\text{mA}$
Output load differential	$\Delta V_{RL}$	-50	0	10	mV	$I_L=0\sim 200\text{mA}$
Power supply voltage differential	$\Delta V_{VCC}$	-30	0	75	mV	$(V_{CC}=6\sim 14V)$ $I_L=100\text{mA}$

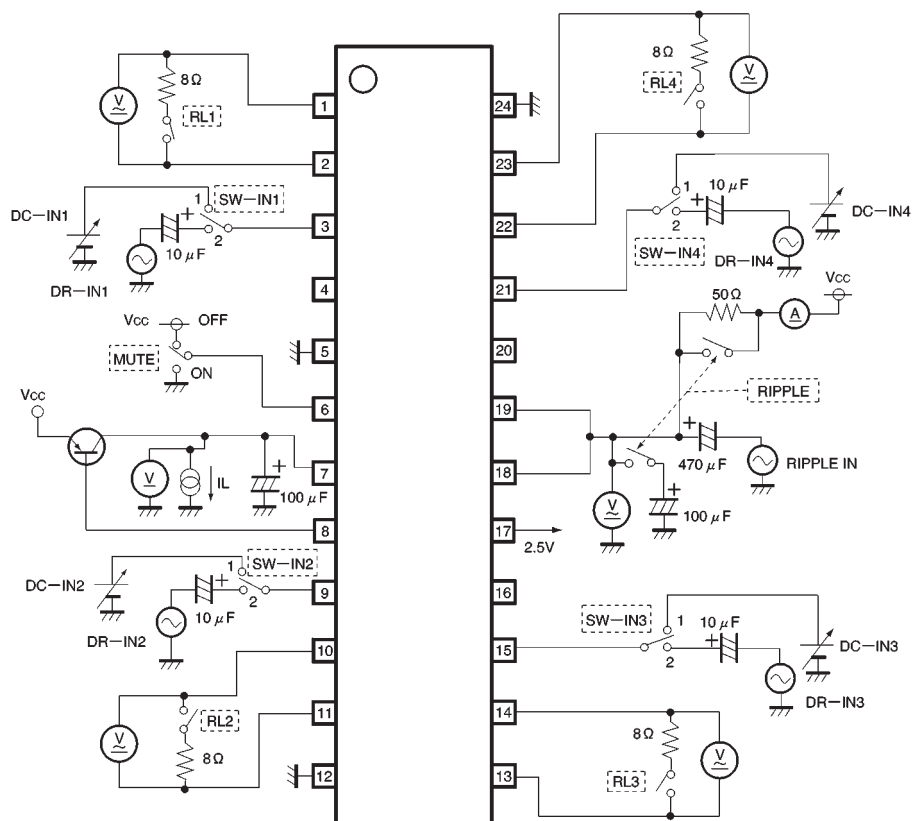


Fig.1

### ● 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. Both positive and negative phases are created during  $V/I$  conversion, generating BTL output via the driver buffer.

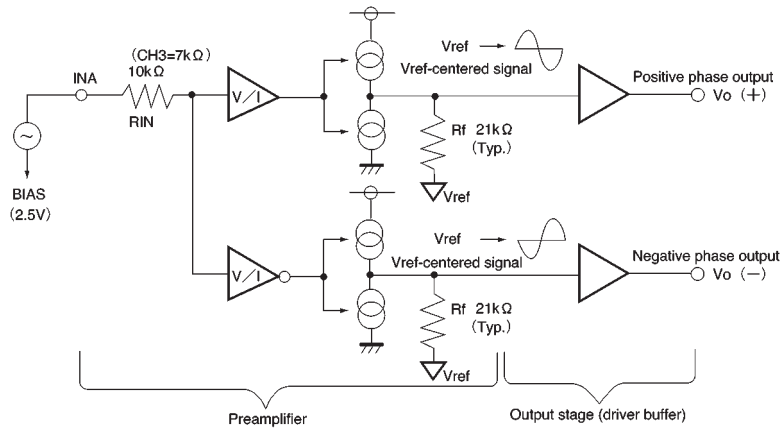


Fig. 2

#### (2) Regulator

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

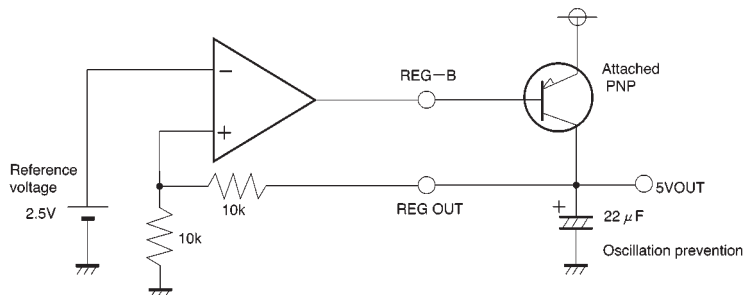


Fig. 3

## ● Application example

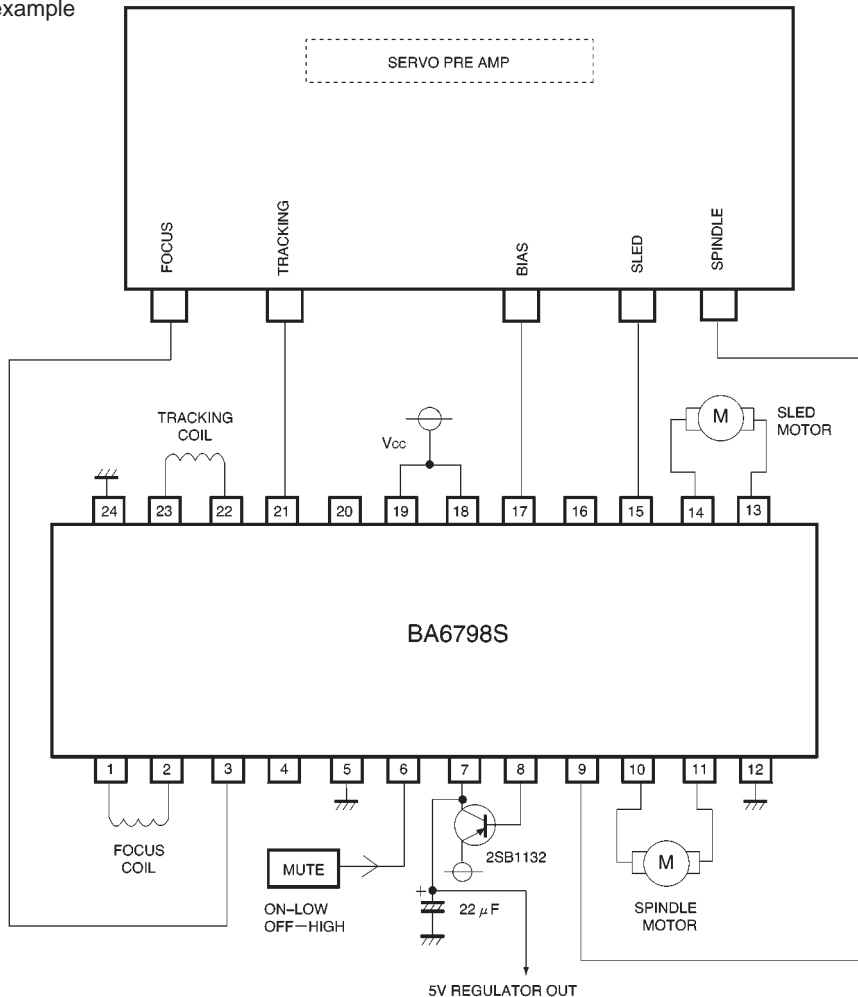


Fig. 4

## ● Operation notes

- (1) The BA6798S has an internal thermal shutdown circuit. Output current is muted when the chip temperature exceeds 175°C (typically).
- (2) If the mute pin (pin 6) voltage is opened or lowered below 0.5V, the output current will be muted. Pin 6 should be pulled up above 2.0V during normal use.
- (3) The bias pin (pin 17) is muted when lowered below 1.4V (typically). Make sure it stays above 1.6V during normal use.

- (4) Muting occurs during thermal shutdown, mute-on operations or a drop in the bias pin voltage or supply voltage. In each case, only the drivers are muted. During muting, the output pins remain at the internal bias voltage, roughly  $(V_{CC} - V_F / 2)$ .
- (5) The driver circuit shuts down when the supply voltage drops below 4.5V (typically), and starts up again when the voltage rises above 4.7V (typically).
- (6) Be sure to connect the IC to a 0.1μF bypass capacitor to the power supply, at the base of the IC.
- (7) The capacitor between regulator output (pin 7) and GND also serves to prevent oscillation of the IC, so select one with good temperature characteristics.

## ●Electrical characteristic curves

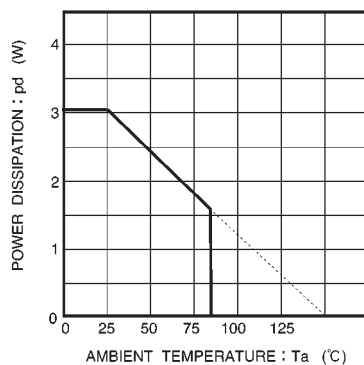


Fig.5 Thermal derating curve (unmounted)

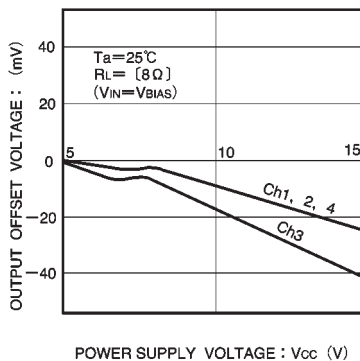


Fig.6 Power supply voltage vs. output offset voltage

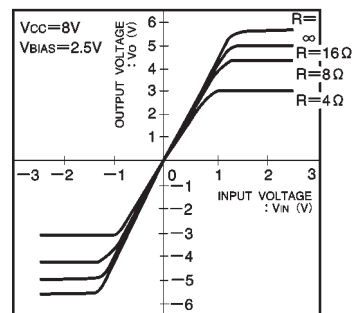


Fig.7 Driver (channels 1, 2 and 4) I/O characteristics (variable load)

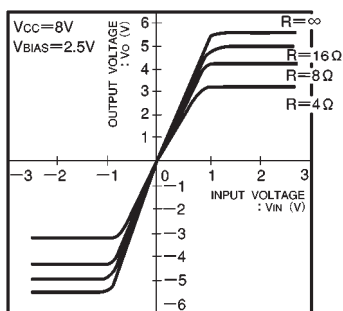


Fig.8 Driver (channel 3) I/O characteristics (variable load)

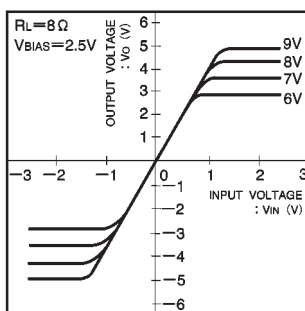
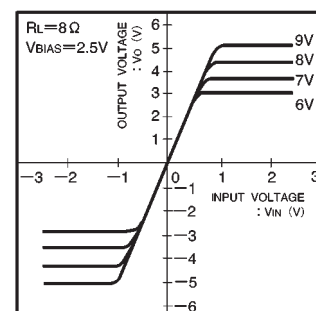
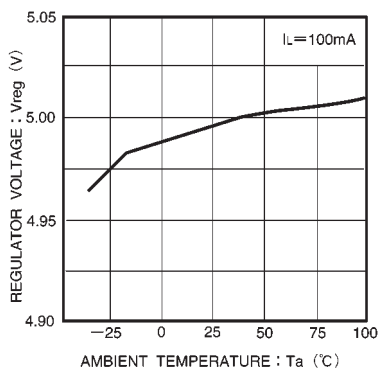
Fig.9 Driver (channels 1, 2 and 4) I/O characteristics (variable  $V_{CC}$ )Fig.10 Driver (channel 3) I/O characteristics (variable  $V_{CC}$ )

Fig.11 Regulator voltage vs. temperature

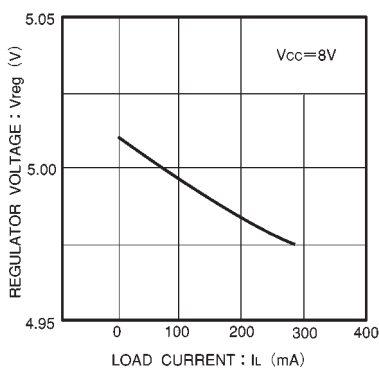
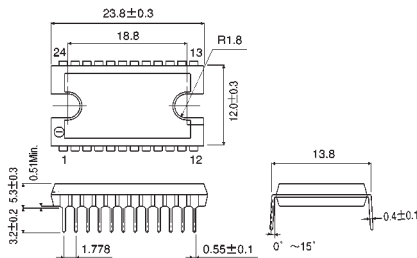


Fig.12 Load current vs. regulator voltage

●External dimensions (Units: mm)



SDIP M24