Aimtron
圓創科技股份有限公司

Features

- 4 channel BTL motor driver.
- Wide dynamic range.(4V(typ.) at PreVcc=8V, PowVcc=5V, RL=8Ω)
- Separating Vcc into Pre and power (Power divides into CH1/2/4 and CH3), can make better power efficiency, by low supply voltage drive.
- Mute operated indivisually CH4 and CH1/2/3.
- All channels mute is stand by mode.
- Suitable for low operation voltage DSP by wide D-range pre opamp.

- Thermal shutdown circuit on chip.
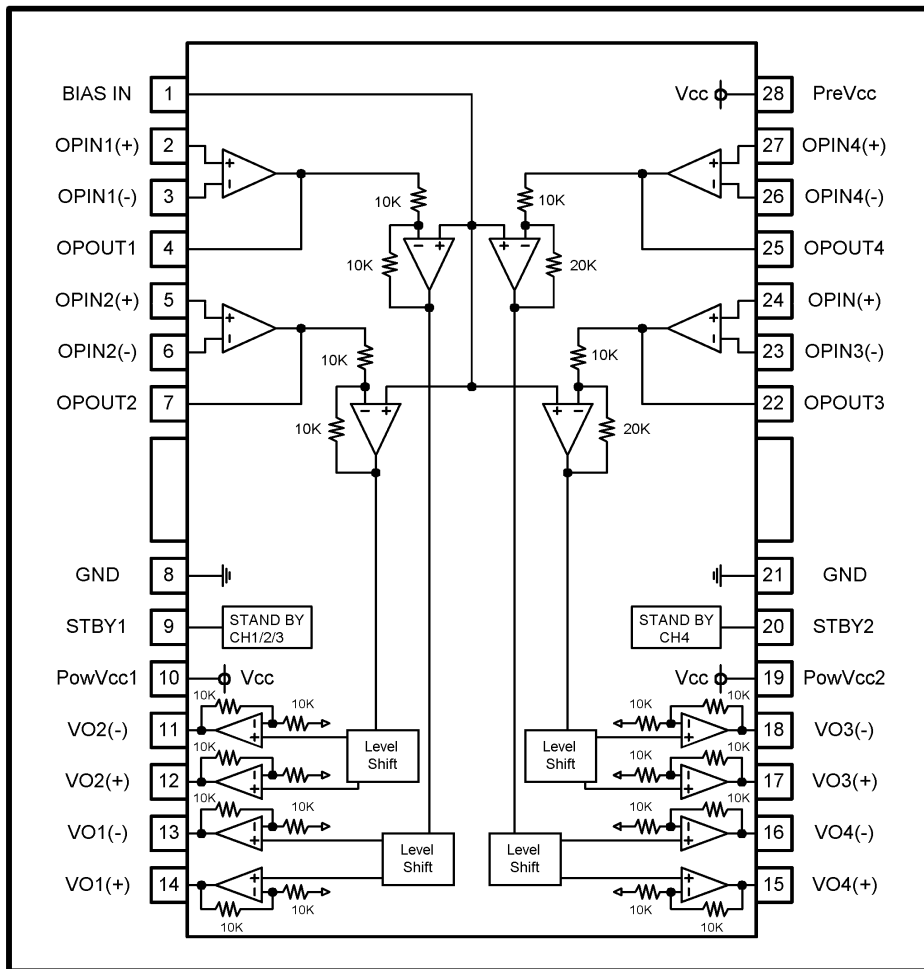- Compatible with BA5983

Description

The AT5683 is a 4-channel BTL driver IC for driving the motors in products such as CD/CD-ROM drives. Suitable for low operation voltage DSP by wide D-range pre opamp. Small surface mounting power package (HSOP28).

Applications

CD drives, CD-ROM drives,

Block Diagram

Pin Descriptions

Pin No.	Pin name	Function
1	BIAS IN	Input for Bias-amplifier
2	OPIN1(+)	Op-amp positive input for CH1
3	OPIN1(-)	Op-amp negative input for CH1
4	OUTPUT1	Op-amp output for CH1
5	OPIN2(+)	Op-amp positive input for CH2
6	OPIN2(-)	Op-amp negative input for CH2
7	OUTPUT2	Op-amp output for CH2
8	GND	Substrate ground
9	STBY1	Input for CH1/2/3 STBY control
10	PowVcc1	Vcc for CH1/2/4 power block
11	VO2(-)	Negative output of CH2
12	VO2(+)	Positive output of CH2
13	VO1(-)	Negative output of CH1
14	VO1(+)	Positive output of CH1
15	VO4(+)	Positive output of CH4
16	VO4(-)	Negative output of CH4
17	VO3(+)	Positive output of CH3
18	VO3(-)	Negative output of CH3
19	PowVcc2	Vcc for CH3 power block
20	STBY2	Input for CH4 STBY control
21	GND	Substrate ground
22	OUTPUT3	Op-amp output for CH3
23	OPIN3(-)	Op-amp positive input for CH3
24	OPIN3(+)	Op-amp negative input for CH3
25	OUTPUT4	Op-amp output for CH4
26	OPIN4(-)	Op-amp positive input for CH4
27	OPIN4(+)	Op-amp negative input for CH4
28	PreVcc	Vcc for pre block

Notes: Symbol of ＋ and － (output of drivers) means polarity to input pin.
(For example if voltage of pin4 high, pin14 is high.)

PinOut

Absolute maximum ratings (Ta = 25°C)

Parameter	Symbol	Limits	unit
Power supply voltage	V_{CC}	13.5	V
Power dissipation	P_d	1.7^{*1}	W
Max output current	I_{OM}	1^{*2}	A
Operating temperature	T_{opr}	-35~+85	°C
Storage temperature	T_{stg}	-35~+150	°C

∗ 1 On less than 3﹪ (percentage occupied by copper foil), when mounted on a
  70mm ×70mm ×1.6 mm glass epoxy board.
  Reduce power by 13.6 mW for each increase in T_a of 1°C over 25°C.
∗ 2 The output current must not exceed the maximum Pd and ASO.

Recommended operating conditions (Ta = 25°C)

| Parameter	Symbol	Limits	unit
Vcc for pre block	PreVcc	4.5~13.2	V
Vcc for power block	PVcc	4.5~Pre	V

Electrical characteristics

(**unless otherwise noted, Ta = 25°C, PreV$_{CC}$ = PowV$_{CC}$2 =8V, PV$_{CC}$1 =5V, V$_{BIAS}$=1.65V, RL=8 Ω**)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current	I_Q	−	20	32	mA	RL=∞
CH1/2/3 Stand-by current	I_{OST1}	−	6.2	13	mA	RL=∞
CH4 Stand-by current	I_{OST2}	−	16	26	MA	RL=∞
All channel Stand-by current	I_{OST3}	−	−	10	mA	RL=∞
<Driver block>						
Output offset voltage 1	V_{OOF}	−70	—	70	mA	
Maximum output voltage 1	V_{OM1}	3.6	4.0	−	V	CH1,2 V_{IN} =V_{BIAS}±2.0V
Maximum output voltage 2	V_{OM2}	7.5	9.0	−	V	CH3,4 V_{IN} = V_{BIAS}±2.0V
Close loop voltage gain 1	G_{VC1}	10	12	14	dB	CH1,2 V_{IN} = V_{BIAS}±0.5V
Close loop voltage gain 2	G_{VC2}	16	18	20	dB	CH3,4 V_{IN} = V_{BIAS}±0.5V
Slew Rate	SR_{DRV}	−	1	−	V	
Standby ON voltage	V_{STON}	−	−	0.5	V	
Standby OFF voltage	V_{STOFF}	2.0	−	−	V	
Bias drop mute ON voltage	V_{BMON}	−	−	0.7	V	
Bias drop mute OFF voltage	V_{BMOFF}	1.3	−	−	V	
<Loading motor driver>						
Common mode input range	V_{ICM}	0	−	10	V	
Input offset voltage	V_{OFOP}	−6	0	6	mV	
Input bias current	V_{BOP}	−	−	300	nA	
High level output voltage	V_{OHOP}	11	−	−	V	
Low level output voltage	V_{OLOP}	−	−	0.3	V	
Output sink current	I_{SI}	1	−	−	mA	
Output source current	I_{SO}	400	800	−	μA	
Slew rate	SR_{OP}	−	2	−	V/μS	

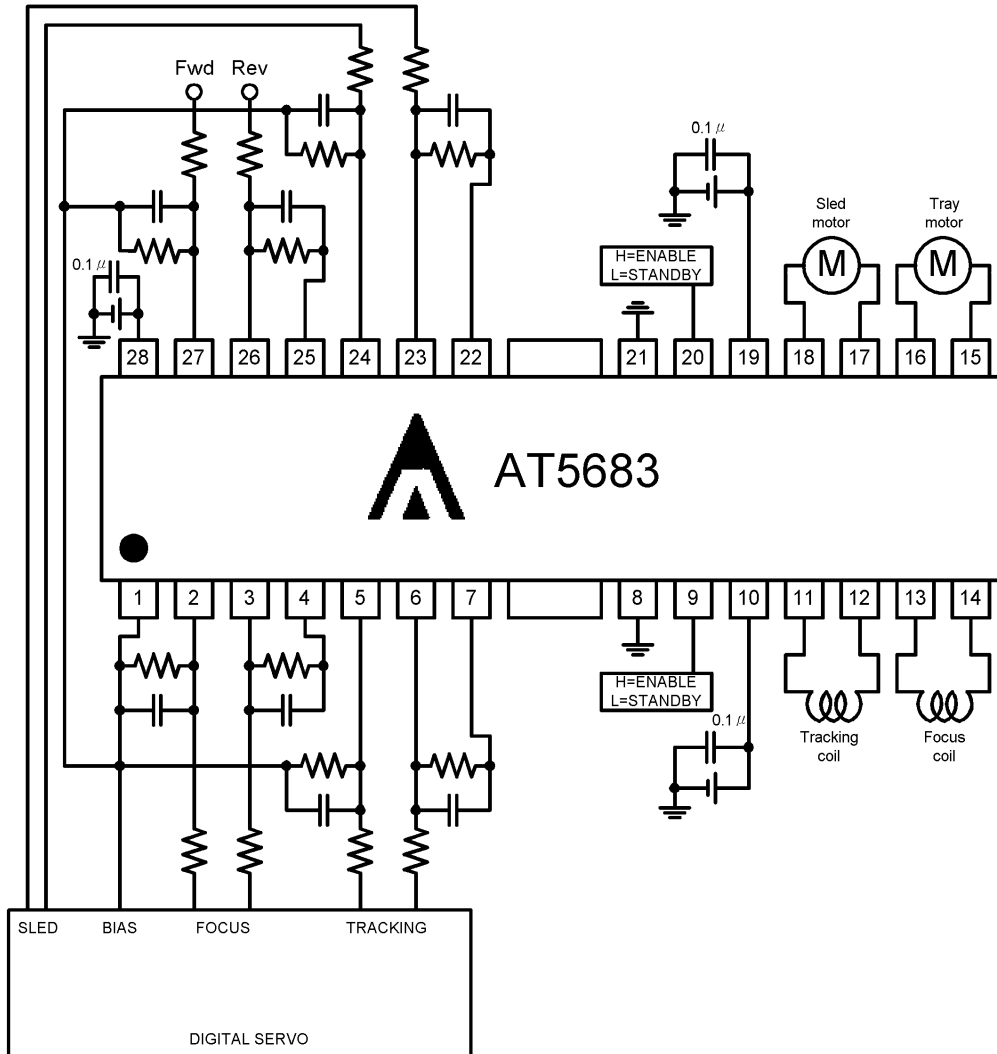*This product is not designed for protection against radioactive rays.

Typical Curve
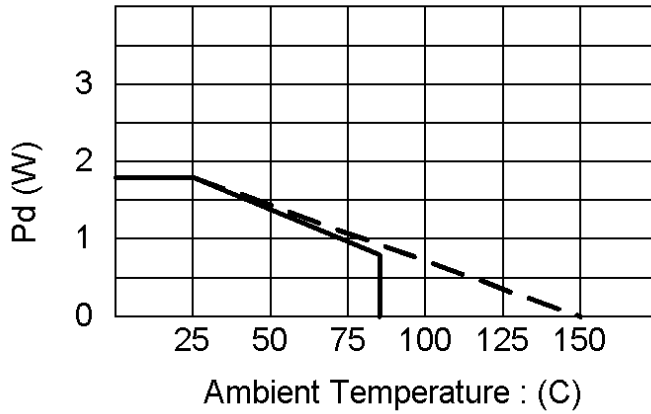
Test Circuit
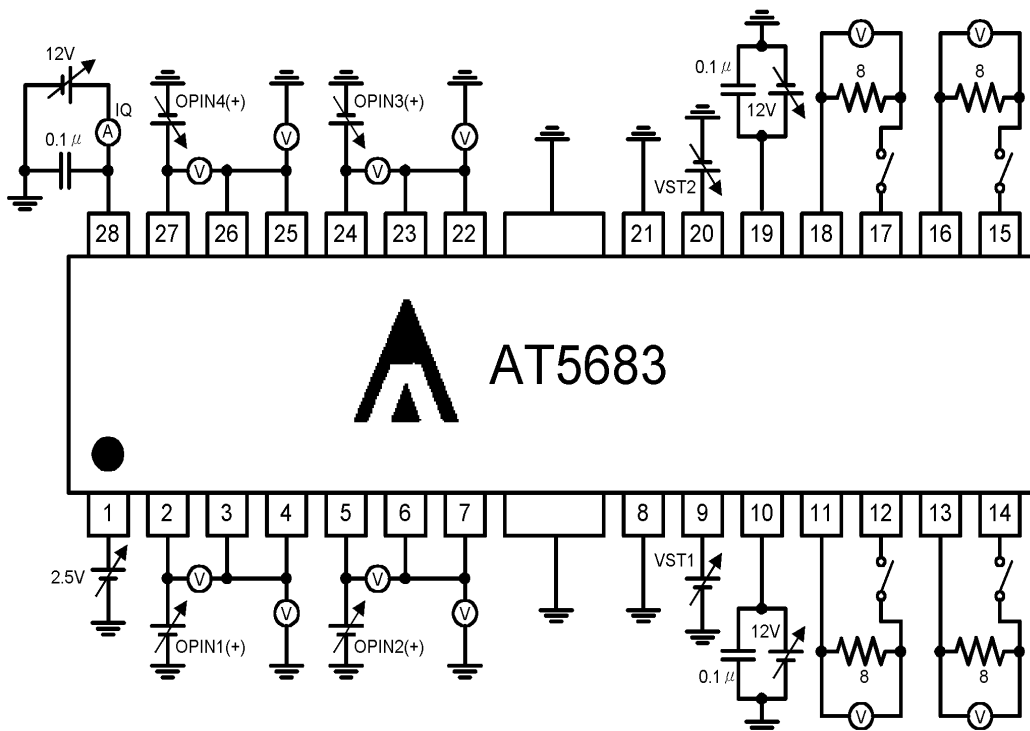
Application example

Operation notes

(1) Thermal-shut-down circuit is built in. In case IC chip temperature rise to $175\,^\circ\text{C}$ (typ.), thermal-shut-down circuit operates and muted the output current. Next time IC chip temperature falls below $150\,^\circ\text{C}$ (typ.), the driver blocks start.

(2) In case supply voltage falls below 3.8V(typ.), output current is muted. Next time supply voltage rises to 4.0V(typ.), the driver block start.

(3) Bias-pin (pin 27) should be pulled up more than 1.3V. In case bias-pin voltage is pulled down under 0.7V (typ.), output current is muted.

(4) Mute operation is caused by Thermal-shut-down, Stand-by, decrease of bias pin voltage or decrease of supply voltage. When mute is done, output voltage becomes internal reference voltage (about PowVcc/2).

(5) One of the standby terminals low or open, muted channel circuit (include opamps) shutdown.

(6) both of the standby terminals low or open, all circuit circuits shutdown(sleep mode) and all output pin become high impedance.

(7) Supply voltage of PreVcc should be equal to or higher than PowVcc.

(8) Take care the external resister value of OPamp. OPamp source current supplies to external resister as well as internal resister (10k).

(9) Keep the GND pin voltage the lowest of all terminals.

(10) Insert the by-pass capacitor between Vcc-pin and GND-pin of IC as possible as near (approximately $0.1 \mu F$).

(11) Heat dissipation fins are attached to the GND on the inside of the package. Make sure to connect these to the external GND.

Package Outlines (units:mm): HSOP-28
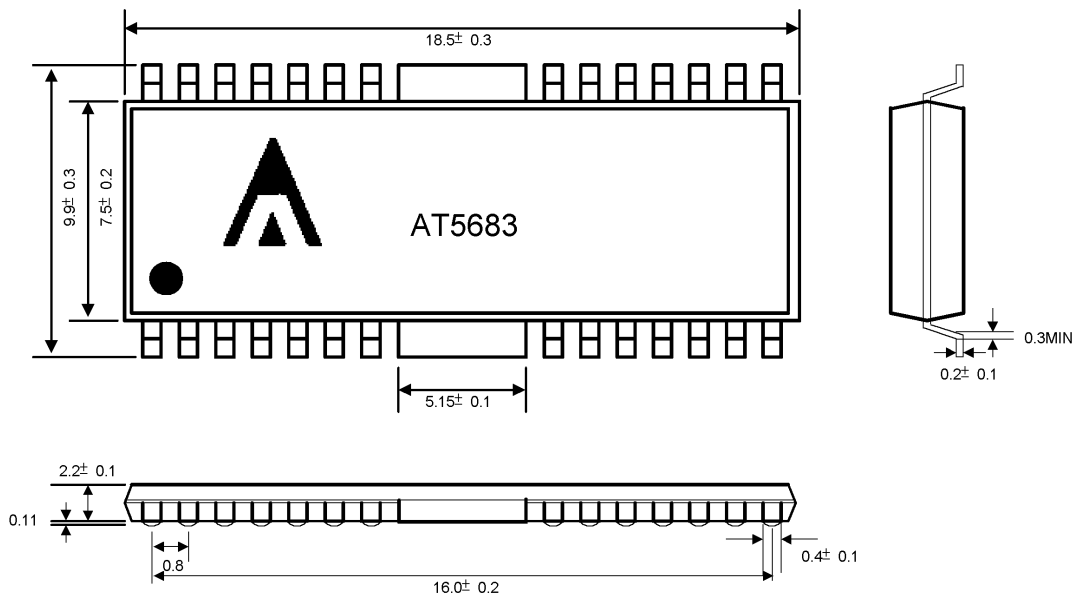
Ordering Information

Part number	Package	Marking
AT5683H	28-pin HSOP	AT5683H