

Features

- 4 channels of DC motor BTL driver.
- Built-in suspension function
- Built-in thermal shutdown circuit
- Operating voltage:4.5V~13.2V

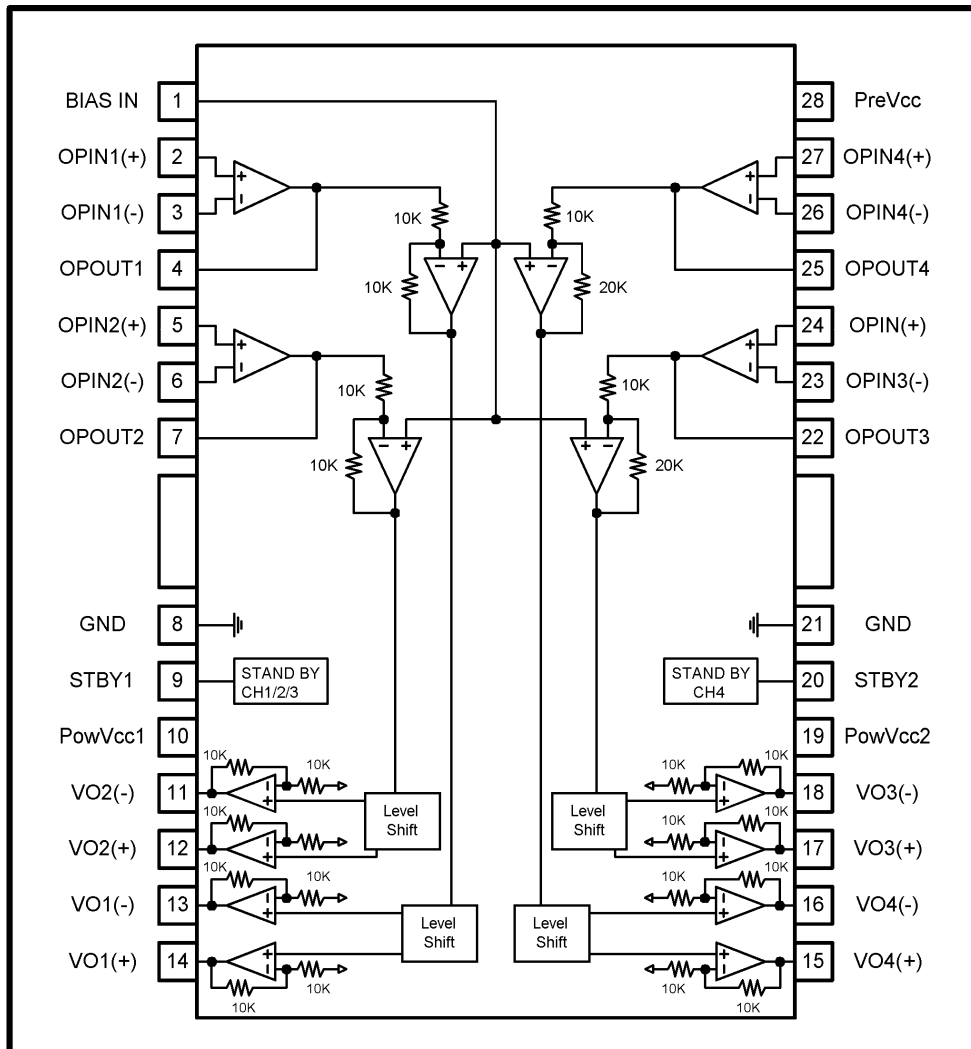
Description

The AT5683 is a 4-channel BTL driver IC for driving the motors in products such as CD/CD-ROM drives. It is Suitable for low operation voltage DSP by wide D-range pre opamp.

Applications

CD / CD-ROM drives.
VCD Player.

Block Diagram



Aimtron reserves the right without notice to change this circuitry and specifications.

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 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 CH3/4 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 x 70mm x 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 P_d and ASO.

Recommended operating conditions (Ta = 25°C)

Parameter	Symbol	Limits	unit
V _{cc} for pre block	PreV _{cc}	4.5~13.2	V
V _{cc} for power block	PV _{cc}	4.5~Pre	V

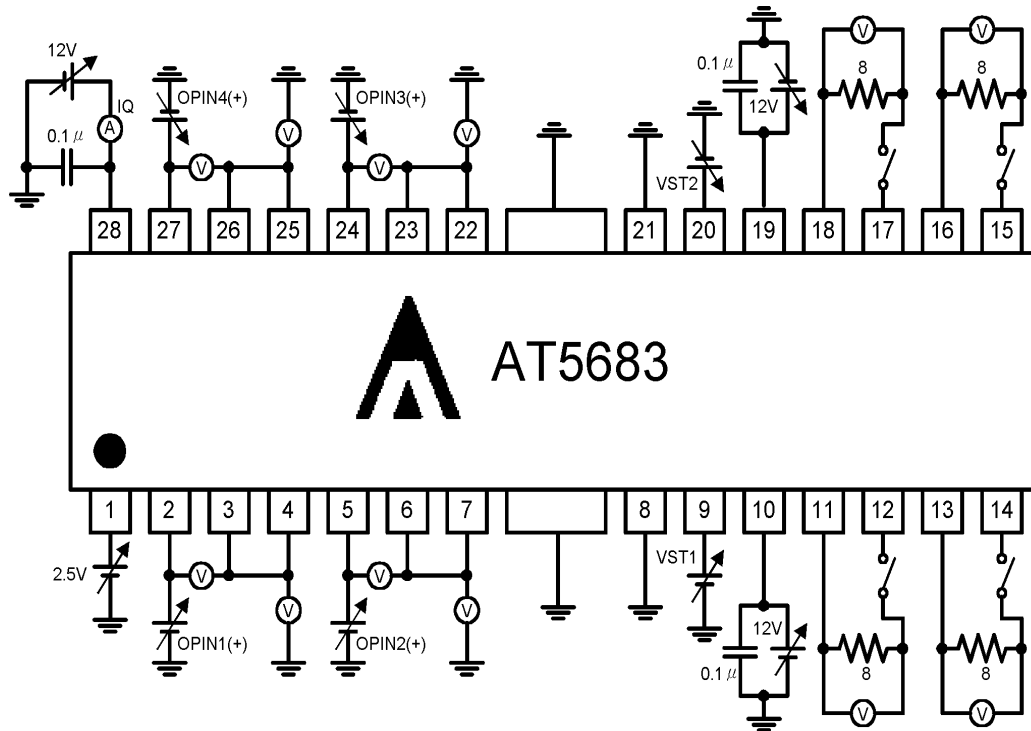
Electrical characteristics

(unless otherwise noted, Ta = 25°C, PreV_{cc} = PowV_{cc2} = 12V, PV_{cc1} = 5V, V_{BIAS} = 2.5V, R_L = 8Ω)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Quiescent current	I _Q	—	20	32	mA	R _L = ∞
CH1/2 Stand-by current	I _{OSt1}	—	6.2	13	mA	R _L = ∞
CH3/4 Stand-by current	I _{OSt2}	—	16	26	mA	R _L = ∞
All channel Stand-by current	I _{OSt3}	—	—	10	μA	R _L = ∞
<Driver block>						
Output offset voltage 1	V _{OOF}	-70	—	70	mV	
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	
<Pre-AMP>						
Common mode input range	V _{ICM}	0	—	6	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	Square wave, 100KHz, 2.5V±1V input

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

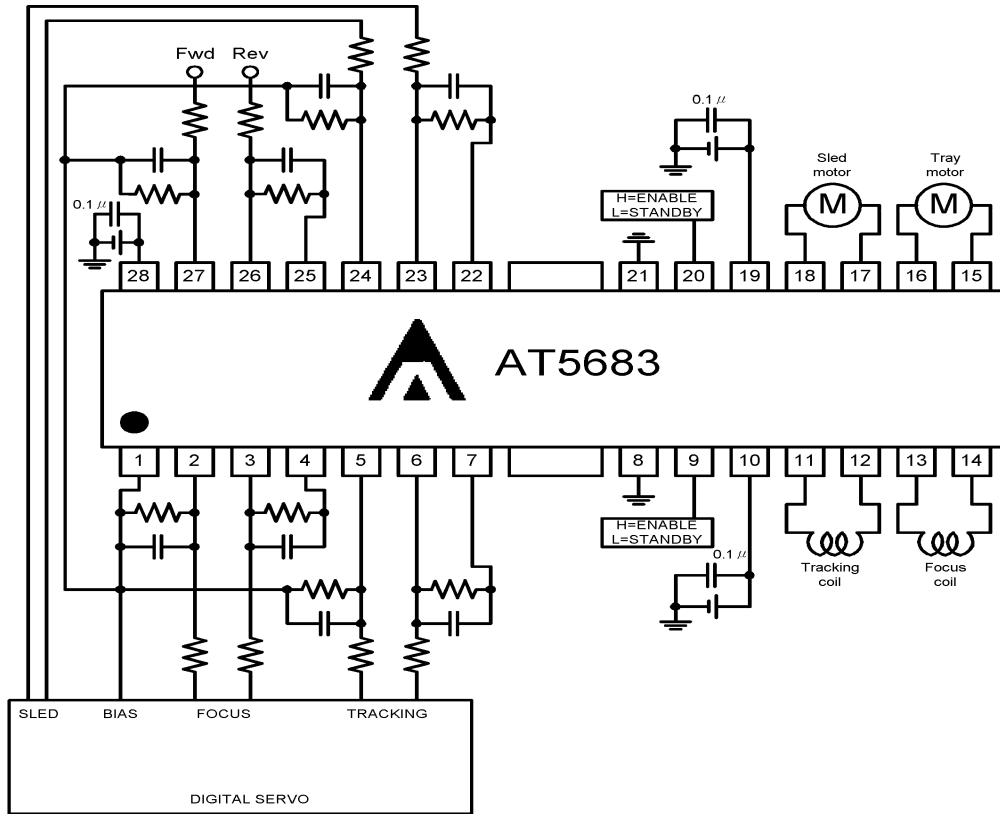
Test Circuit



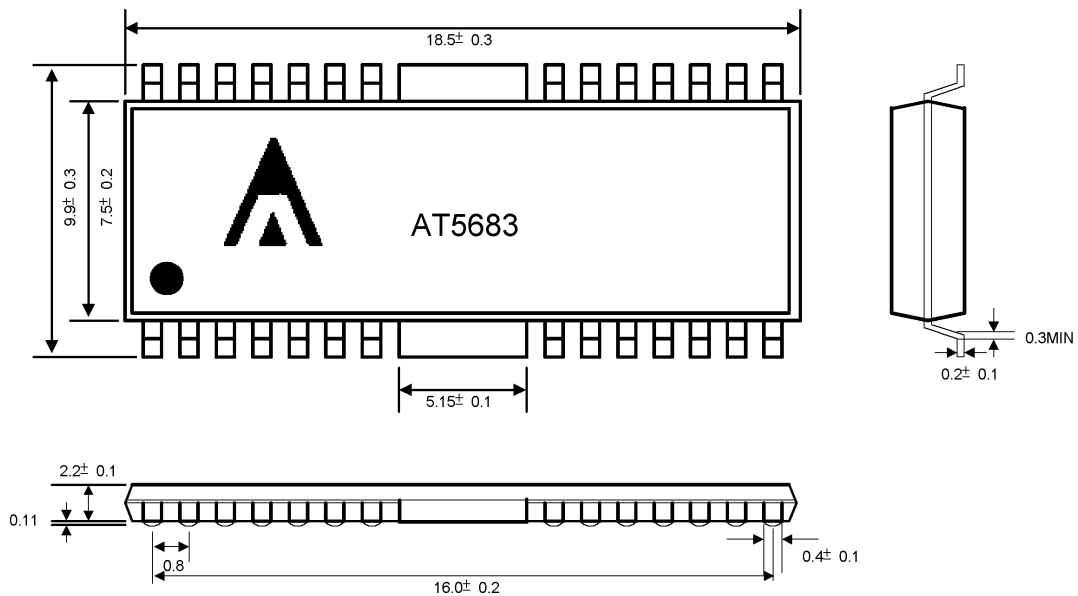
Application Notes

- (1) Thermal-shut-down circuit is built in. In case IC chip temperature rise to 175°C (typ.), thermal-shut-down circuit operates and muted the output current. Next time IC chip temperature falls below 150°C (typ.), the driver blocks start.
- (2) 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 $PowV_{cc}/2$).
- (3) Both of the standby terminals low or open, all circuit circuits shutdown(sleep mode) and all output pin become high impedance.
- (4) Supply voltage of PreVcc should be equal to or higher than PowVcc.
- (5) Insert the by-pass capacitor between Vcc-pin and GND-pin of IC as possible as near (approximately 0.1 μF).

Application Circuit

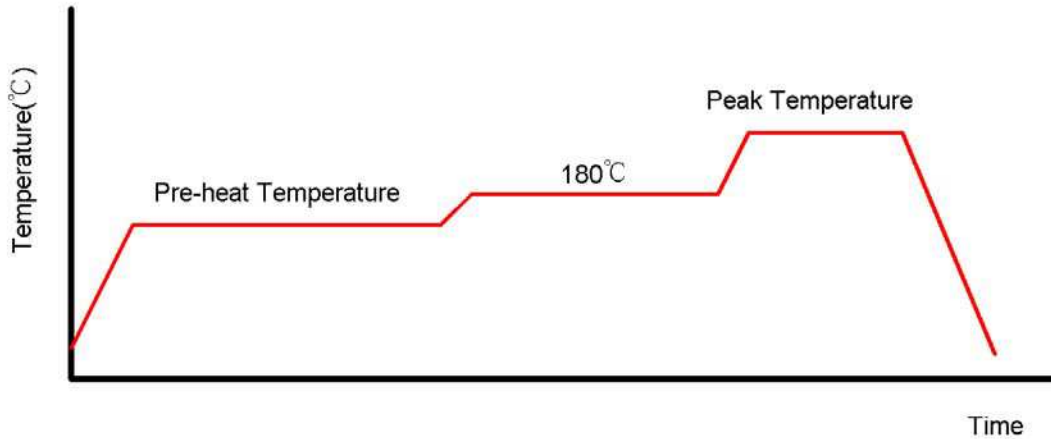


Package Outlines (units:mm): HSOP-28



Reflow Condition (IR/Convection or VPR Reflow)

Reference JEDEC Standard J-STD-020A



Classification Reflow Profiles

	Convection or IR/Convection	VPR
Average Heating Rate(180°C to peak)	5°C/second max.	10°C/second max.
Preheat Temperature(125±20°C)	120 seconds max.	
Temperature maintained above 180°C	10~150 seconds	
Time within 5°C of actual Peak Temperature	10~20 seconds	60 seconds
Peak Temperature Range(Note 1)	219~225°C or 235~240°C	219~225°C or 235~240°C
Cooling Rate	6°C /second max.	10°C/second max.
Time 25°C to Peak Temperature	6 minutes max.	

*1 The maximum peak temperatures for IR and VP reflow are depending on package dimensions.

Package Reflow Conditions

Pkg. Thickness ≥2.5mm and all bags	Pkg. Thickness <2.5mm and Pkg. Volume ≥350 mm ³	Pkg. Thickness <2.5mm and Pkg. Volume <350 mm ³
Convection 219~225°C		Convection 235~240°C
VPR 219~225°C		VPR 235~240°C
IR/Convection 219~225°C		IR/Convection 235~240°C