

STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT SERIES Single-Phase Full-Wave Motor Driver for Fan Motor

TYPE B D 6 7 2 1 F S

FEATURES Speed controllable by DC / PWM input
 Current limit circuit
 PWM soft switching drive

○ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limit	Unit
Supply voltage	Vcc	20	V
Power dissipation	Pd	812.5*	mW
Operating temperature	Topr	-40~+100	°C
Storage temperature	Tstg	-55~+150	°C
Output current	Iomax	1.0* *	A
FG signal output current	IFG	10	mA
FG signal output voltage	VFG	20	V
AL signal output current	IAL	10	mA
AL signal output voltage	VAL	20	V
VREF current ability	IVREF	8	mA
Junction temperature	Tjmax	150	°C

- * Reduce by 6.5mW/°C over Ta=25°C.
 (On 70.0mm×70.0mm×1.6mm glass epoxy board)
- * * This value is not to exceed Pd.

○OPERATING CONDITIONS

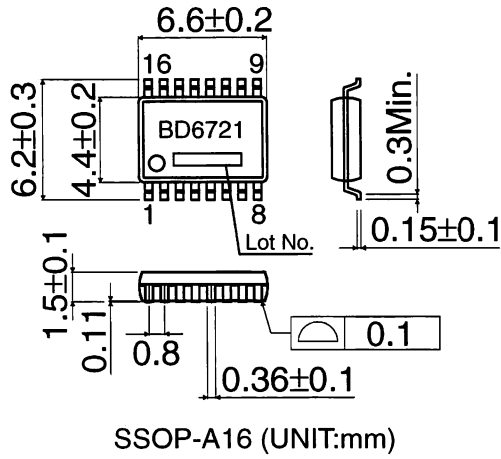
Parameter	Symbol	Limit	Unit
Operating supply voltage range	Vcc	5.0~17.0	V
Hall input voltage range	VH	0~Vcc-2.0	V
VTH input voltage range	VVTH	0~Vcc-2.0	V
VMIN input voltage range	VVMIN	0~Vcc-2.0	V

- * This product is not designed for production against radioactive rays.
- * This document may be strategic data subject to COCOM regulations.

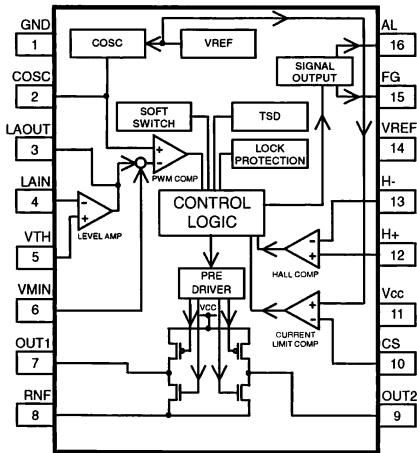
○ELECTRICAL CHARACTERISTICS (Unless otherwise specified Ta=25°C, Vcc=12V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Circuit current	I _{CC}	4.0	7.0	10.0	mA	
Hall input hysteresis	V _{HYS}	±5	±10	±15	mV	
Output voltage	V _O	-	0.6	0.9	V	I _o =300mA Upper and Lower total
Lock detection ON time	T _{ON}	0.3	0.5	0.7	sec	
Lock detection OFF time	T _{OFF}	3.0	5.0	7.0	sec	
FG output low voltage	V _{FGL}	-	0.15	0.3	V	I _{FG} =5mA
FG output leak current	I _{FGL}	-	-	50	μA	V _{FG} =17V
AL output low voltage	V _{ALL}	-	0.15	0.3	V	I _{AL} =5mA
AL output leak current	I _{ALL}	-	-	50	μA	V _{AL} =17V
OSC low voltage	V _{OSCL}	0.8	1.0	1.2	V	
OSC high voltage	V _{OSCH}	2.3	2.5	2.7	V	
OSC charge current	I _{COSC}	-50	-32	-26	μA	
OSC discharge current	I _{DOSC}	26	32	50	μA	
Level amp gain	G _{LA}	50	-	-	dB	
Level amp output low voltage	V _{LAOL}	-	0.2	0.3	V	
Level amp output high voltage	V _{LAOH}	-	1.6	2.0	V	Voltage between LAOUT and V _{CC}
Output ON duty 1	DUTY1	85	90	95	%	V _{TH} =V _{REF} *0.383 Pull down 1kΩ C _{OSC} =470pF
Output ON duty 2	DUTY2	45	50	55	%	V _{TH} =V _{REF} *0.583 Pull down 1kΩ C _{OSC} =470pF
Output ON duty 3	DUTY3	5	10	15	%	V _{TH} =V _{REF} *0.783 Pull down 1kΩ C _{OSC} =470pF
VREF voltage	V _{REF}	2.8	3.0	3.2	V	I _{VREF} =-2mA
Current limit voltage	V _{CL}	290	310	330	mV	
VTH bias current	I _{VTH}	-	-	0.2	μA	
VMIN bias current	I _{VMIN}	-	-	0.2	μA	

○PACKAGE OUTLINES



○BLOCK DIAGRAM



○TERMINAL NAME

PIN No.	Terminal name
1	GND
2	COSC
3	LAOUT
4	LAIN
5	VTH
6	VMIN
7	OUT1
8	RNF
9	OUT2
10	CS
11	VCC
12	H+
13	H-
14	VREF
15	FG
16	AL

○CAUTIONS ON USE

1) Absolute maximum ratings

An excess in the absolute maximum ratings, such as supply voltage, temperature range of operating conditions, etc., can break down the devices, thus making impossible to identify breaking mode, such as a short circuit or an open circuit. If any over rated values will expect to exceed the absolute maximum ratings, consider adding circuit protection devices, such as fuses.

2) Connecting the power supply connector backward

Connecting of the power supply in reverse polarity can damage IC. Take precautions when connecting the power supply lines. An external direction diode can be added.

3) Power supply line

Back electromotive force causes regenerated current to power supply line, therefore take a measure such as placing a capacitor between power supply and GND for routing regenerated current. And fully ensure that the capacitor characteristics have no problem before determine a capacitor value. (when applying electrolytic capacitors, capacitance characteristic values are reduced at low temperatures)

4) GND potential

The potential of GND pin must be minimum potential in all operating conditions. Also ensure that all terminals except GND terminal do not fall below GND voltage including transient characteristics. However, it is possible that the motor output terminal may deflect below GND because of influence by back electromotive force of motor. Malfunction may possibly occur depending on use condition, environment, and property of individual motor. Please make fully confirmation that no problem is found on operation of IC.

5) Thermal design

Use a thermal design that allows for a sufficient margin in light of the power dissipation(Pd) in actual operating conditions.

6) Inter-pin shorts and mounting errors

Use caution when positioning the IC for mounting on printed circuit boards. The IC may be damaged if there is any connection error or if pins are shorted together.

7) Actions in strong electromagnetic field

Use caution when using the IC in the presence of a strong electromagnetic field as doing so may cause the IC to malfunction.

8) ASO

When using the IC, set the output transistor so that it does not exceed absolute maximum ratings or ASO.

9) Thermal shut down circuit

The IC incorporates a built-in thermal shutdown circuit (TSD circuit). Operation temperature is 175°C(typ.) and has a hysteresis width of 25°C(typ.). When IC chip temperature rises and TSD circuit works, the output terminal becomes an open state. TSD circuit is designed only to shut the IC off to prevent thermal runaway. It is not designed to protect the IC or guarantee its operation. Do not continue to use the IC after operation this circuit or use the IC in an environment where the operation of this circuit is assumed.

10) Testing on application boards

When testing the IC on an application board, connecting a capacitor to a pin with low impedance subjects the IC to stress. Always discharge capacitors after each process or step. Always turn the IC's power supply off before connecting it to or removing it from a jig or fixture during the inspection process. Ground the IC during assembly steps as an antistatic measure. Use similar precaution when transporting or storing the IC.

11) GND wiring pattern

When using both small signal and large current GND patterns, it is recommended to isolate the two ground patterns, placing a single ground point at the ground potential of application so that the pattern wiring resistance and voltage variations caused by large currents do not cause variations in the small signal ground voltage. Be careful not to change the GND wiring pattern of any external components, either.

12) Capacitor between output and GND

When a large capacitor is connected between output and GND, if Vcc is shorted with 0V or GND for some cause, it is possible that the current charged in the capacitor may flow into the output resulting in destruction. Keep the capacitor between output and GND below 100uF.

13) IC terminal input

When Vcc voltage is not applied to IC, do not apply voltage to each input terminal. When voltage above Vcc or below GND is applied to the input terminal, parasitic element is actuated due to the structure of IC. Operation of parasitic element causes mutual interference between circuits, resulting in malfunction as well as destruction in the last. Do not use in a manner where parasitic element is actuated.

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available,
please contact your nearest sales office.

Please contact our sales offices for details ;

U.S.A / San Diego	TEL : +1(858)625-3630	FAX : +1(858)625-3670
Atlanta	TEL : +1(770)754-5972	FAX : +1(770)754-0691
Dallas	TEL : +1(972)312-8818	FAX : +1(972)312-0330
Germany / Dusseldorf	TEL : +49(2154)9210	FAX : +49(2154)921400
United Kingdom / London	TEL : +44(1)908-282-666	FAX : +44(1)908-282-528
France / Paris	TEL : +33(0)1 56 97 30 60	FAX : +33(0) 1 56 97 30 80
China / Hong Kong	TEL : +852(2)740-6262	FAX : +852(2)375-8971
Shanghai	TEL : +86(21)6279-2727	FAX : +86(21)6247-2066
Dilian	TEL : +86(411)8230-8549	FAX : +86(411)8230-8537
Beijing	TEL : +86(10)8525-2483	FAX : +86(10)8525-2489
Taiwan / Taipei	TEL : +866(2)2500-6956	FAX : +866(2)2503-2869
Korea / Seoul	TEL : +82(2)8182-700	FAX : +82(2)8182-715
Singapore	TEL : +65-6332-2322	FAX : +65-6332-5662
Malaysia / Kuala Lumpur	TEL : +60(3)7958-8355	FAX : +60(3)7958-8377
Philippines / Manila	TEL : +63(2)807-6872	FAX : +63(2)809-1422
Thailand / Bangkok	TEL : +66(2)254-4890	FAX : +66(2)256-6334

Japan /
(Internal Sales)

Tokyo	2-1-1, Yaesu, Chuo-ku, Tokyo 104-0082	TEL : +81(3)5203-0321	FAX : +81(3)5203-0300
Yokohama	2-4-8, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa 222-8575	TEL : +81(45)476-2131	FAX : +81(45)476-2128
Nagoya	Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya, Aichi 450-0002	TEL : +81(52)581-8521	FAX : +81(52)561-2173
Kyoto	579-32 Higashi Shiokouji-cho, Karasuma Nishi-iru, Shiokoujidori, Shimogyo-ku, Kyoto 600-8216	TEL : +81(75)311-2121	FAX : +81(75)314-6559

(Contact address for overseas customers in Japan)

Yokohama	TEL : +81(45)476-9270	FAX : +81(045)476-9271
----------	-----------------------	------------------------