

STRUCTURE	Silicon Monolithic Integrated Circuit
PRODUCT SERIES	Single-Phase Full-Wave Motor Pre-Driver for Fan Motor
TYPE	B D 6 7 1 8 F V
FEATURES	Speed controllable by DC,PWM input Current limit circuit

#### ○ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limit	Unit
Supply voltage	Vcc	15	V
Power dissipation	Pd	812.5 *1	mW
Operating temperature	Topr	-40~+95	°C
Storage temperature	Tstg	-55~+150	°C
High side output voltage	VOH	36	V
Low side output voltage	VOL	15	V
Low side output current	Iomax	20	mA
FG signal output current	IFG	8	mA
FG signal output voltage	VFG	15	V
AL signal output current	IAL	8	mA
AL signal output voltage	VAL	15	V
VREF current ability	IVREF	4	mA
HB current ability	IHB	8	mA
Junction temperature	Tjmax	150	°C

\* To use at temperature above Ta=25°C reduce 6.5mW/°C.  
(On 70.0mm×70.0mm×1.6mm glass epoxy board)

#### ○OPERATING CONDITIONS

Parameter	Symbol	Limit	Unit
Operating supply voltage range	Vcc	4.5~14.0	V
Hall input voltage range	VH	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.

#### Status of this document

The Japanese version of this document is the formal specification.

A customer may use this translation version only for a reference to help reading the formal version.

If there are any differences in translation version of this document formal version takes priority.

#### Application example

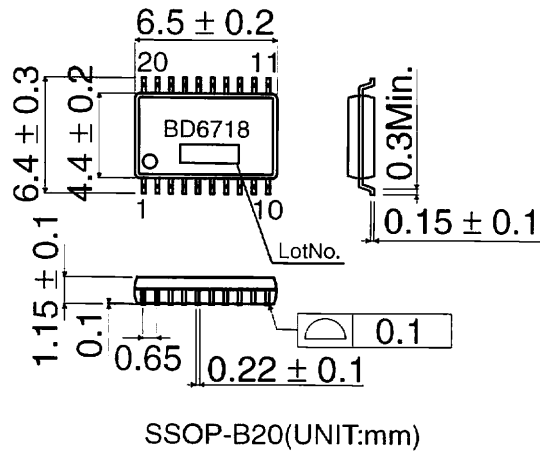
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**○ELECTRICAL CHARACTERISTICS** (Unless otherwise specified Ta=25°C, Vcc=12V)

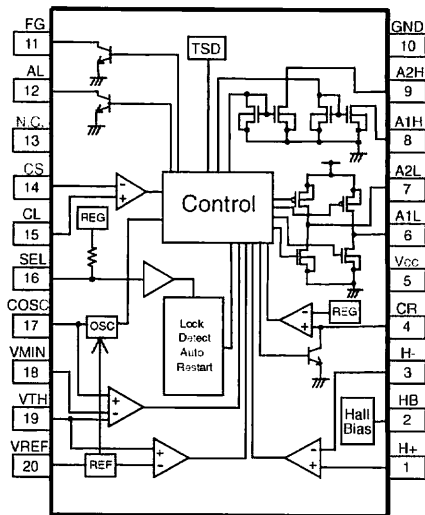
Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Supply current	Icc	4.0	8.0	12.0	mA	
Hall input hysteresis	VHYS	± 5	± 10	± 15	mV	
H side output current	I <sub>H</sub>	5	10	20	mA	
H side output leak current	I <sub>HL</sub>	-	-	100	μA	
L side output H voltage	V <sub>LH</sub>	-	0.2	0.35	V	I <sub>o</sub> =-10mA Voltage between output and Vcc
L side output L voltage	V <sub>LL</sub>	-	0.2	0.35	V	I <sub>o</sub> =10mA
Lock detection ON time1	TON1	0.15	0.3	0.5	sec	SEL(6PIN) : OPEN or H
Lock detection OFF time1	TOFF1	1.5	3.0	5.0	sec	SEL(6PIN) : OPEN or H
Lock detection ON time2	TON2	0.15	0.3	0.5	sec	SEL(6PIN)=L
Lock detection OFF time2	TOFF2	3.0	6.0	10	sec	SEL(6PIN)=L
FG terminal voltage L	V <sub>FGL</sub>	-	0.3	0.4	V	I <sub>FG</sub> =5mA
AL terminal voltage L	V <sub>ALL</sub>	-	0.3	0.4	V	I <sub>AL</sub> =5mA
FG terminal leak current	I <sub>FGL</sub>	-	-	50	μA	V <sub>FG</sub> =15V
AL terminal leak current	I <sub>ALL</sub>	-	-	50	μA	V <sub>AL</sub> =15V
OSC voltage L	V <sub>OSCL</sub>	0.4	0.7	1.0	V	
OSC voltage H	V <sub>OSCH</sub>	1.2	1.5	1.8	V	
OSC frequency	F <sub>OSC</sub>	-	25*	-	kHz	C <sub>OSC</sub> =470pF
VREF voltage	V <sub>REF</sub>	2.2	2.5	2.8	V	I <sub>VREF</sub> =-1mA
Hall bias voltage	V <sub>HB</sub>	1.2	1.5	1.8	V	
CR current ability	I <sub>CR</sub>	3	-	-	mA	V <sub>CR</sub> =1.5V
CR output L voltage	V <sub>CR</sub>	-	0.3	0.5	V	I <sub>CR</sub> =0.5mA
CR discharge time	T <sub>CR</sub>	9	18.5	28	μsec	

\* This value is reference, not guarantee.

○PACKAGE OUTLINES



○BLOCK DIAGRAM



○Terminal name

Pin No.	Terminal name
1	H+
2	HB
3	H-
4	CR
5	Vcc
6	A1L
7	A2L
8	A1H
9	A2H
10	GND
11	FG
12	AL
13	N.C.
14	CS
15	CL
16	SEL
17	COSC
18	VMIN
19	VTH
20	VREF

## ○CAUTIONS

- 1) Absolute maximum ratings  
There is possibility of destruction in using beyond the absolute maximum rating. In case of destruction, a failure mode can not be defined (short mode or open mode). Therefore when special mode is envisaged where absolute maximum rating may be exceeded, please take a physical safety measure such as fuse.
- 2) Reverse connection of power supply connector  
Reverse connection of power supply connector may break IC. Take a measure against reverse connection destruction such as inserting a diode between power supply and Vcc terminal.
- 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
- 4) GND potential  
Ensure that the potential of GND terminal is the minimum potential in any operating condition. 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  
Consider the power dissipation under actual use condition and apply thermal design with sufficient margin.
- 6) Mounting failures  
In attaching IC to printed board, pay enough attention to the direction and dislocation of IC. Mounting failures may break IC. In addition, destruction is also possible when circuit is shorted by foreign substance brought between outputs or between output and power supply - GND.
- 7) Operation in strong electromagnetic field  
Use in strong electromagnetic field may cause malfunction, please be careful.
- 8) ASO  
Please consider that the output Tr does not exceed the absolute maximum rating and ASO.
- 9) Thermal shut down circuit  
This IC has thermal shut down (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 simply for the purpose of intercepting IC from overheating, and not for protecting and assuring IC. Therefore do not continue to use IC thereafter with this circuit operating and do not use IC assuming the operation of this circuit.
- 10) Inspection with a set board  
When connecting a capacitor to a pin with low impedance in inspection on a set board, stress may possibly be applied to IC, therefore be sure to apply discharging in each process. In attaching to and detaching from jigs in inspection process, be sure to turn off power before connecting, and turn off power before removing IC. In addition, apply grounding to assembling process as a measure of anti-static electricity, and use full caution in transporting and storing.
- 11) GND wiring pattern  
When there are small signal GND and large current GND, separate the large current GND pattern from small signal GND pattern. It is recommended to apply one-point grounding at the reference point of the set in order that resistance of wiring pattern and large current do not cause change of voltage of small signal GND. Please be cautious not to fluctuate the wiring pattern of GND of external mounted parts.
- 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.

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