

STRUCTURE	Silicon Monolithic Integrated Circuit
PRODUCT SERIES	Single-Phase Full-Wave Motor Driver for Fan Motor
TYPE	<b>B D 6 7 2 6 F U</b>
FEATURES	Pre-driver compatible for external Tr Speed controllable by DC/PWM input PWM soft switching drive Built-in Speed control circuit by rotation speed feedback

○ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Limit	Unit
Supply voltage	Vcc	20	V
Power dissipation	Pd	874.7 *	mW
Operating temperature	Topr	-40 to +100	°C
Storage temperature	Tstg	-55 to +150	°C
High side output voltage	VOH	36	V
Low side output voltage	VOL	15	V
Low side output current	IOL	10	mA
FG output current	IFG	10	mA
FG output voltage	VFG	20	V
REF current ability	IREF	12	mA
HB current ability	IHB	12	mA
Input voltage (H+, H-, CS, PWMIN)	VIN	7	V
ICT and SHIFT current ability	IIN	100	μA
Junction temperature	Tjmax	150	°C

\* Reduce by 7.0mW/°C over Ta=25°C.  
(On 70.0mm × 70.0mm × 1.6mm glass epoxy board)

\* This product is not designed for production against radioactive rays.

OPERATING CONDITIONS

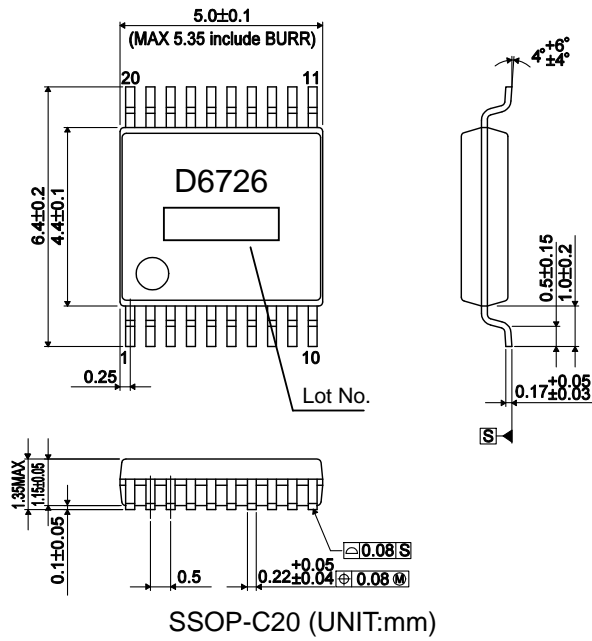
Parameter	Symbol	Limit	Unit
Operating supply voltage range	V <sub>CC</sub>	5.0 to 17.0	V
Input voltage range 1 (H+, H-)	VIN1	0 to V <sub>CC</sub> -2.0	V
		0 to 7.0	V
Input voltage range 2 (P <sub>W</sub> MIN)	VIN2	0 to V <sub>REF</sub>	V
		0 to 6.5	V
Input voltage range 3 (MIN)	VIN3	0 to V <sub>REF</sub>	V
Input voltage range 4 (FIL)	VIN4	0 to V <sub>FILH</sub>	V

less than V<sub>CC</sub>=9.0V  
more than V<sub>CC</sub>=9.0V  
less than V<sub>CC</sub>=7.0V  
more than V<sub>CC</sub>=7.0V

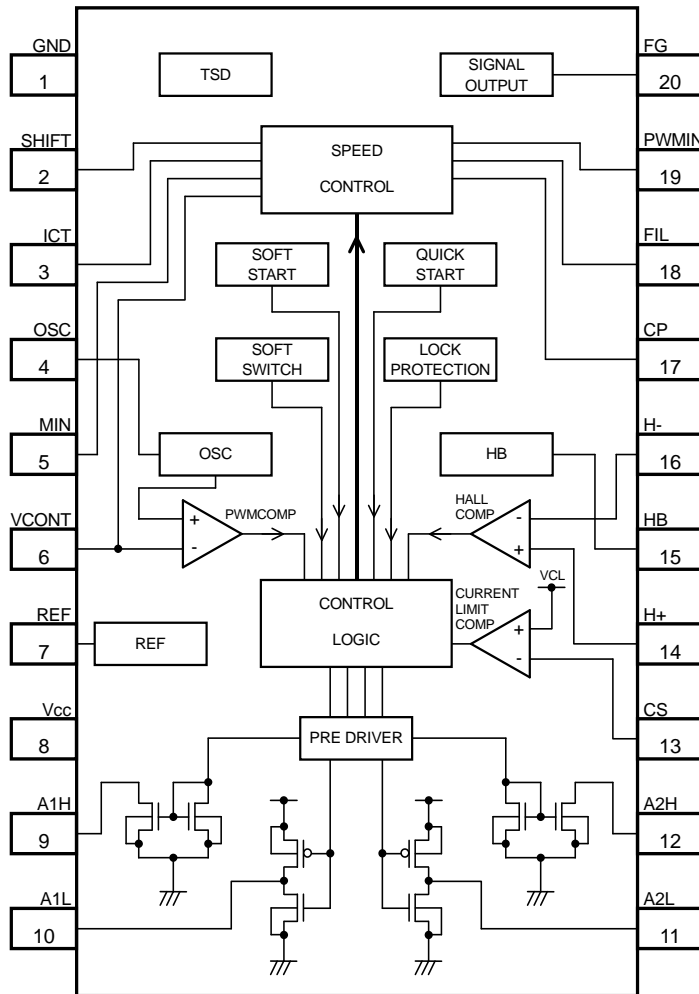
ELECTRICAL CHARACTERISTICS (Unless otherwise specified Ta=25°C, V<sub>CC</sub>=12V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Circuit current	I <sub>CC</sub>	3.0	5.4	8.0	mA	
Hall input hysteresis	V <sub>HYS</sub>	±5	±10	±15	mV	
High side output current	I <sub>H</sub>	5.0	10.5	17.0	mA	V <sub>OH</sub> =12V
High side output leak current	I <sub>HL</sub>	-	-	10	μA	V <sub>OH</sub> =36V
Low side output high voltage	V <sub>LH</sub>	9.3	9.5	-	V	I <sub>OL</sub> =-5mA
Low side output low voltage	V <sub>LL</sub>	-	0.5	0.7	V	I <sub>OL</sub> =5mA
Lock detection ON time	T <sub>ON</sub>	0.18	0.3	0.42	s	
Lock detection OFF time	T <sub>OFF</sub>	3.6	6.0	8.4	s	
FG output low voltage	V <sub>FGL</sub>	-	-	0.3	V	I <sub>FG</sub> =5mA
FG output leak current	I <sub>FGL</sub>	-	-	10	μA	V <sub>FG</sub> =17V
OSC low voltage	V <sub>OSCL</sub>	0.8	1.0	1.2	V	
OSC high voltage	V <sub>OSCH</sub>	2.3	2.5	2.7	V	
OSC charge current	I <sub>OSC</sub>	-50	-32	-20	μA	
OSC discharge current	I <sub>DOSC</sub>	20	32	50	μA	
REF voltage	V <sub>REF</sub>	4.6	5.0	5.4	V	I <sub>REF</sub> =-2mA
Hall bias voltage	V <sub>HB</sub>	1.3	1.5	1.7	V	I <sub>HB</sub> =-2mA
Current limit voltage	V <sub>CL</sub>	130	160	190	mV	
MIN bias current	I <sub>MIN</sub>	-	-	1.0	μA	V <sub>MIN</sub> =0V
CS bias current	I <sub>CS</sub>	-	-	1.0	μA	V <sub>CS</sub> =0V
P <sub>W</sub> MIN bias current	I <sub>P<sub>W</sub>MIN</sub>	15	25	35	μA	V <sub>P<sub>W</sub>MIN</sub> =0V
P <sub>W</sub> MIN input high voltage	V <sub>P<sub>W</sub>MH</sub>	2.3	-	6.5	V	
P <sub>W</sub> MIN input low voltage	V <sub>P<sub>W</sub>ML</sub>	0.0	-	1.0	V	
FIL output high voltage	V <sub>FILH</sub>	1.3	1.5	1.7	V	V <sub>P<sub>W</sub>MIN</sub> =0V
FIL source current	I <sub>FILH</sub>	-25	-15	-10	μA	V <sub>P<sub>W</sub>MIN</sub> =0V
FIL sink current	I <sub>FILL</sub>	10	15	25	μA	V <sub>P<sub>W</sub>MIN</sub> =V <sub>REF</sub>
V <sub>CONT</sub> charge current	I <sub>CVCON</sub>	-145	-100	-60	μA	
V <sub>CONT</sub> discharge current	I <sub>DVCON</sub>	7	11	16	μA	
V <sub>CONT</sub> charge/discharge current ratio	R <sub>VCON</sub>	9.8	10.1	10.4	-	R <sub>VCON</sub> = (I <sub>CVCON</sub> +I <sub>DVCON</sub> )/I <sub>DVCON</sub>
Soft start time	T <sub>SS</sub>	1.2	2.0	2.8	s	

OPACKAGE OUTLINES



OBLOCK DIAGRAM



OTERMAL NAME

PIN No.	Terminal name
1	GND
2	SHIFT
3	ICT
4	OSC
5	MIN
6	VCONT
7	REF
8	Vcc
9	A1H
10	A1L
11	A2L
12	A2H
13	CS
14	H+
15	HB
16	H-
17	CP
18	FIL
19	PWMIN
20	FG

## 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

It is possible that the motor output terminal may deflect below GND terminal because of influence by back electromotive force of motor. The potential of GND terminal must be minimum potential in all operating conditions, except that the levels of the motor outputs terminals are under GND level by the back electromotive force of the motor coil. Also ensure that all terminals except GND and motor output terminals do not fall below GND voltage including transient characteristics. 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 copying or reproduction of this document, in part or in whole, is permitted without the consent of ROHM Co.,Ltd.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products specified in this document are not designed to be radiation tolerant.

While ROHM always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). ROHM shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.



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

### ROHM Customer Support System

<http://www.rohm.com/contact/>