STRUCTURE Silicon monolithic integrated circuit

PRODUCT SERIES H-bridge driver for DC brush motor

TYPE **BD6212FP**

FEATURES
- Voltage setting pin enables for PWM duty control
- Supports PWM control signal input

O ABSOLUTE MAXIMUM RATINGS (Ta=25°C)

Parameter	Symbol	Ratings	Unit
Supply voltage	VCC	7	V
Output current	IOMAX	2.0 *1	A
All other input pins	VIN	-0.3 ~ VCC	V
Operating temperature	TOPR	-40 ~ +85	°C
Storage temperature	TSTG	-55 ~ +150	°C
Power dissipation	Pd	1.45 *2	W
Junction temperature	Tjmax	150	°C

*** Notes: All voltages are with respect to ground.

*1 Do not allow, however exceed Pd and ASO.

*2 Mounted on a 70mm x 70mm x 1.6mm FR4 glass-epoxy board with less than 3% copper foil. Derated at 11.6mW/°C above 25°C.

O OPERATING CONDITIONS (Ta=25°C)

Parameter	Symbol	Limits	Unit
Supply voltage	VCC	3.0 ~ 5.5	V
VREF voltage	VREF	1.5 ~ 5.5	V

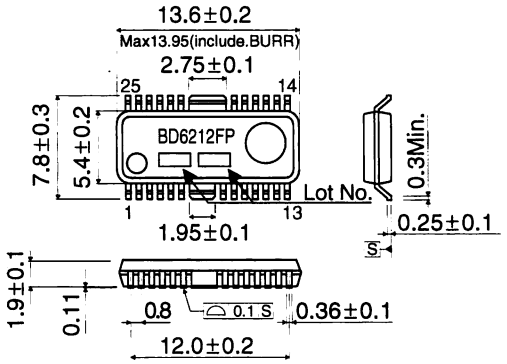
This product is not designed for protection against radioactive rays.

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.

O ELECTRICAL CHARACTERISTICS (Unless otherwise specified, Ta=25°C and VCC=VREF=5V)

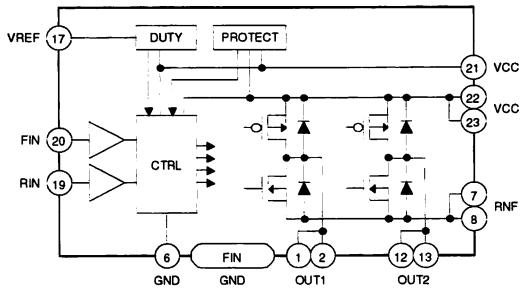
Parameter	Symbol	Limits			Unit	Conditions
		Min.	Typ.	Max.		
Supply current	ICC	0.4	0.7	1.5	mA	Forward / Reverse / Brake
Stand-by current	ISTBY	-	0	10	μA	Stand-by
Input high voltage	VIH	2.0	-	-	V	
Input low voltage	VIL	-	-	0.8	V	
Input bias current	IIH	30	50	100	μA	VIN=5.0V
Output ON resistance	RON	0.2	0.5	1.0	Ω	IO=1.0A, vertically total
VREF bias current	IVREF	-10	0	10	μA	VREF=VCC
Carrier frequency	FPWM	20	25	35	kHz	VREF=3.75V
Input frequency range	FMAX	20	-	100	kHz	FIN / RIN

O PHYSICAL DIMENSIONS AND MARKING



HSOP25 (Unit: [mm])

O BLOCK DIAGRAM



O PIN DESCRIPTIONS

Pin	Name	Pin	Name
1	OUT1	14	NC
2	OUT1	15	NC
3	NC	16	NC
4	NC	17	VREF
5	NC	18	NC
6	GND	19	RIN
7	RNF	20	FIN
8	RNF	21	VCC
9	NC	22	VCC
10	NC	23	VCC
11	NC	24	NC
12	OUT2	25	NC
13	OUT2	FIN	GND

O PRECAUTION 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 lines
Design PCB layout pattern to provide low impedance GND and supply lines. To obtain a low noise ground and supply line, separate the ground section and supply lines of the digital and analog blocks. Furthermore, for all power supply terminals to ICs, connect a capacitor between the power supply and the GND terminal. When applying electrolytic capacitors in the circuit, not that capacitance characteristic values are reduced at low temperatures.

4) Electrical potential at GND
Keep the GND terminal potential to the minimum potential under any operating condition. In addition, check if there is actually any terminal, which provides voltage below GND including transient phenomena.
If there are a small signal GND and a high current GND, it is recommended to separate the patterns for the high current GND and the small signal GND and provide a proper grounding to the reference point of the set not to affect the voltage at the small signal GND with the change in voltage due to resistance component of pattern wiring and high current. Also for GND wiring pattern of the component externally connected, pay special attention not to cause undesirable change to it.

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. Also 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.

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

9) Built-in thermal shutdown circuit
The IC incorporates a built-in thermal shutdown circuit. The thermal shutdown 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 operating this circuit or use the IC in an environment where the operation of this circuit is assumed.

10) Capacitor across output and GND
In the event a large capacitor is connected across output and GND, when VCC and VIN are short-circuited with 0V or GND for some kind of reasons, current charged in the capacitor flows into the output and may destroy the IC. Use a capacitor smaller than 1μF between output and GND.

11) 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.