

STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT SERIES 1ch Motor Driver

TYPE **BD6886GUL**

FEATURES • Built in 1 Constant-Voltage Driver

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limit	Unit
Power supply voltage	VCC	-0.5 to +6.5	V
Motor power supply voltage	VM	-0.5 to +6.5	V
Control input voltage	VIN	-0.5 to VCC+0.5	V
Input voltage for Constant-Voltage setting	VLIM	-0.5 to VM+0.5	V
Power dissipation	Pd	730 ^{*1}	mW
Operating temperature range	Topr	-25 to +85	°C
Junction temperature	Tjmax	150	°C
Storage temperature range	Tstg	-55 to +150	°C
H-bridge output current	Iout	-200 to +200 ^{*2}	mA/ch

^{*1} Reduced by 5.84mW/°C over 25°C, when mounted on a glass epoxy board (50mm × 58mm × 1.75mm; 8 layers)

^{*2} Must not exceed Pd, ASO, or Tjmax of 150°C.

●Operating Conditions (Ta= -25°C to +85°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	VCC	2.5	3.0	5.5	V
Motor power supply voltage	VM	2.5	5.0	5.5	V
Control input voltage	VIN	0	-	VCC	V
Input voltage for Constant-Voltage setting	VLIM	0	-	VM	V
H-bridge output current	Iout	-	-	±150 ^{*3}	mA/ch

^{*3} Must not exceed Pd or ASO.

The product described in this specification is a strategic product (and/or service) subject to COCOM regulations. It should not be exported without authorization from the appropriate government authorities.
This product isn't designed for protection against radioactive rays.

●Package Outline

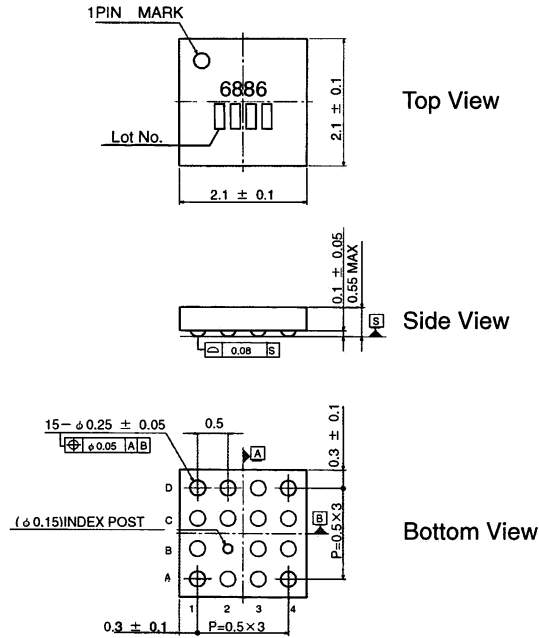


Fig.1 VCSP50L2 Package (Unit: mm)

●Pin Arrangement (Top View)

	1	2	3	4
A	N.C.	OUTA	PS	N.C.
B	VM		INB	INA
C	PGND	VLIM	SEL	VCC
D	N.C.	OUTB	GND	N.C.

Fig.2 BD6886GUL Pin Arrangement (Top View)

●Block Diagram

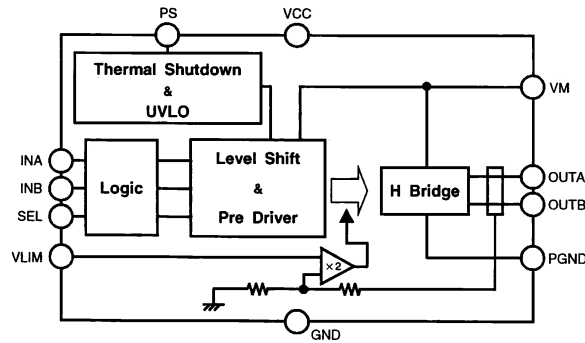


Fig.3 BD6886GUL Block Diagram

●Pin No. and Pin Name

No.	Pin name
1A	N.C.
2A	OUTA
3A	PS
4A	N.C.
1B	VM
2B	
3B	INB
4B	INA
1C	PGND
2C	VLIM
3C	SEL
4C	VCC
1D	N.C.
2D	OUTB
3D	GND
4D	N.C.

●BD6886GUL Electrical Characteristics (Unless otherwise specified, Ta=25°C, VCC=3.0V, VM=5.0V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Overall						
Circuit current during standby operation	ICCST	-	0	10	μA	PS=L
Circuit current 1	ICC	-	0.9	1.4	mA	PS=H with no signal
Circuit current 2	IM	-	0.4	0.65	mA	PS=H, and VLIM=5V with no signal
Control input						
High-level input voltage	VINH	2.0	-	-	V	INA, INB, SEL, PS
Low-level input voltage	VINL	-	-	0.7	V	INA, INB, SEL, PS
High-level input current	IINH	15	30	60	μA	INA, INB, SEL, PS; VIN=3V
Low-level input current	IINL	-1	0	-	μA	INA, INB, SEL, PS; VIN=0V
Pull-down resistor	RIN	50	100	200	kΩ	INA, INB, SEL, PS
Input for Constant-Voltage setting						
Input current	IVLIM	-1.5	-0.5	-	μA	VLIM=0V
UVLO						
UVLO voltage	VUVLO	1.6	-	2.4	V	
Constant-Voltage Drive block (ch1)						
Output ON-Resistance	RON	-	0.8	1.2	Ω	Io=±150mA on high and low sides in total
Output high-level voltage	VOH	1.9×VLIM	2.0×VLIM	2.1×VLIM	V	VLIM=1V with 10Ω load
Turn-on time	ton	-	1.5	5.0	μs	Io=±150mA with 10Ω load*4
Turn-off time	toff	-	0.1	2.0	μs	Io=±150mA with 10Ω load*4
Rise time	tr	-	2.0	8.0	μs	Io=±150mA with 10Ω load*4
Fall time	tf	-	0.05	1.0	μs	Io=±150mA with 10Ω load*4

*4 Design target value (No total shipment inspection is made.)

●I/O Truth Table
BD6886GUL I/O Truth Table

Input mode	INPUT				OUTPUT	
	PS	SEL	INA	INB	OUTxA	OUTxB
EN/IN	H	L	L	X	Z	Z
			H	L	H	L
			H	H	L	H
IN/IN		H	H	H	Z	Z
			H	L	H	L
			L	H	L	H
			L	L	L	L
-	L	X	X	X	Z	Z

L: Low, H: High, X: Don't care, Z: High Impedance

The OUTPUTs are provided with feed back resistor. This is so that GND voltage will be output, when the OUTPUT is "Z".

●Operation Notes

(1) Absolute maximum ratings

Use of the IC in excess of absolute maximum ratings such as the applied voltage or operating temperature range (Topr) may result in IC damage. Assumptions should not be made regarding the state of the IC (short mode or open mode) when such damage is suffered. The implementation of a physical safety measure such as a fuse should be considered when use of the IC in a special mode where the absolute maximum ratings may be exceeded is anticipated.

(2) Power supply lines

Regenerated current may flow as a result of the motor's back electromotive force. Insert capacitors between the power supply and ground pins to serve as a route for regenerated current. Determine the capacitance in full consideration of all the characteristics of the electrolytic capacitor, because the electrolytic capacitor may lose some capacitance at low temperatures. If the connected power supply does not have sufficient current absorption capacity, regenerative current will cause the voltage on the power supply line to rise, which combined with the product and its peripheral circuitry may exceed the absolute maximum ratings. It is recommended to implement a physical safety measure such as the insertion of a voltage clamp diode between the power supply and GND pins.

(3) Ground potential

Ensure a minimum GND pin potential in all operating conditions.

(4) Setting of heat

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

(5) Actions in strong magnetic field

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

(6) ASO

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

(7) Thermal shutdown circuit

This IC incorporates a TSD (thermal shutdown) circuit (TSD circuit). If the temperature of the chip reaches the following temperature, the motor coil output will be opened. The thermal shutdown circuit (TSD circuit) is designed only to shut the IC off to prevent runaway thermal operation. 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.

TSD ON temperature [°C] (Typ.)	Hysteresis temperature [°C] (Typ.)
175	25

(8) Ground 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 application's reference point 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.

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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	
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Nagoya	Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya, Aichi 450-0002	
	TEL : +81(52)581-8521	FAX : +81(52)561-2173
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	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
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