

STRUCTURE                      Silicon Monolithic Integrated Circuit  
 PRODUCT SERIES              1ch Motor Driver  
 TYPE                              **BD6875GSW**  
 FEATURES                        • Built in 1 Full-ON Driver

Under Developing

● Absolute maximum ratings (Ta=25°C)

| Parameter                   | Symbol | Limit                      | Unit  |
|-----------------------------|--------|----------------------------|-------|
| Power supply voltage        | VCC    | -0.5 to +7.0               | V     |
| Motor power supply voltage  | VM     | -0.5 to +7.0               | V     |
| Control input voltage       | VIN    | -0.5 to VCC+0.5            | V     |
| Power dissipation           | Pd     | 425 <sup>*1</sup>          | mW    |
| Operating temperature range | Topr   | -25 to +85                 | °C    |
| Junction temperature        | Tjmax  | 125                        | °C    |
| Storage temperature range   | Tstg   | -55 to +125                | °C    |
| H-bridge output current     | Iout   | -200 to +200 <sup>*2</sup> | mA/ch |

\*1 Reduced by 4.25mW/°C over 25°C, when mounted on a glass epoxy board (114.3mm × 76.2mm × 1.6mm)

\*2 Must not exceed Pd, ASO, or Tjmax of 125°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     |
| H-bridge output current    | Iout   | -    | -    | ±100 <sup>*3</sup> | 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

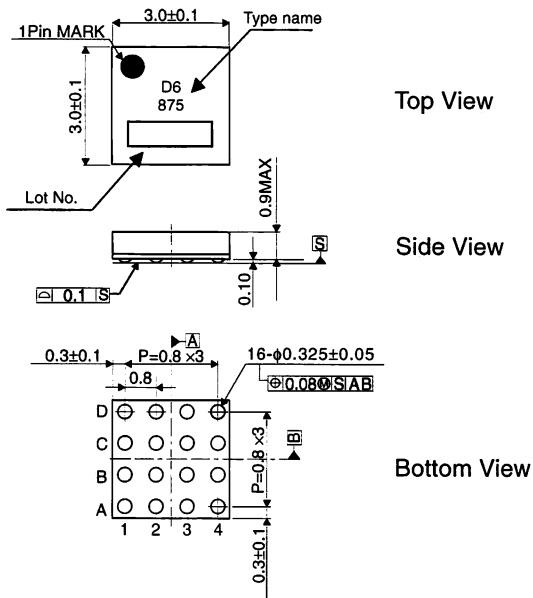


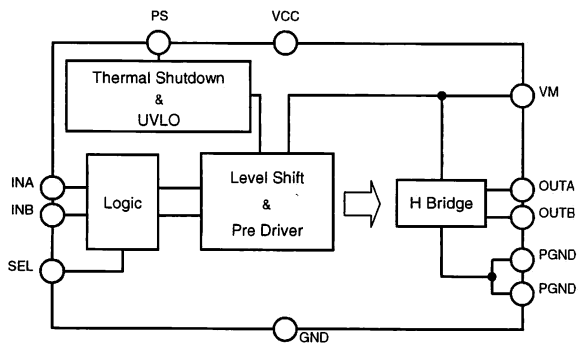
Fig.1 BGA016W030 Package (Unit: mm)

●Pin Arrangement (Top View)

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

Fig.2 BD6875GSW Pin Arrangement (Top View)

●Block Diagram



●Pin No. and Pin Name

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

## ●BD6875GSW Electrical Characteristics (Unless otherwise specified, Ta=25°C, VCC=3.0V, VM=5.0V)

| Parameter                                | Symbol | Target Limit |      |      | Unit | Conditions  |
|--|--------|--------------|------|------|------|---|
|  |        | Min.         | Typ. | Max. |      |   |
| <b>Overall</b>                           |        |              |      |      |      |   |
| Circuit current during standby operation | ICCST  |              | 0    |      | μA   | PS=L  |
| Circuit current                          | ICC    |              | 0.9  |      | mA   | PS=H with no signal   |
| <b>Control input</b>                     |        |              |      |      |      |   |
| High level input voltage                 | VINH   |              | -    |      | V    | INA, INB, SEL, PS   |
| Low level input voltage                  | VINL   |              | -    |      | V    | INA, INB, SEL, PS   |
| High level input current                 | IINH   |              | 30   |      | μA   | INA, INB, SEL, PS; VIN=3V   |
| Low level input current                  | IINL   |              | 0    |      | μA   | INA, INB, SEL, PS; VIN=0V   |
| Pull-down resistor                       | RIN    |              | 100  |      | kΩ   | INA, INB, SEL, PS   |
| <b>UVLO</b>                              |        |              |      |      |      |   |
| UVLO voltage                             | VUVLO  |              | -    |      | V    |   |
| <b>Full-ON Drive block (ch1)</b>         |        |              |      |      |      |   |
| Output ON-Resistance 1                   | RON1   |              | 1.2  |      | Ω    | Io=±200mA on high and low sides in total                            |
| Turn-on time 1                           | ton1   |              | 0.6  |      | μs   | With 20Ω load   |
| Turn-off time 1                          | toff1  |              | 0.08 |      | μs   | With 20Ω load   |
| Rise time 1                              | tr1    |              | 0.15 |      | μs   | With 20Ω load   |
| Fall time 1                              | tf1    |              | 0.03 |      | μs   | With 20Ω load   |
| Output ON-Resistance 2                   | RON2   |              | 1.7  |      | Ω    | Io=±100mA on high and low sides in total, VCC=VM=2.5V <sup>*4</sup> |
| Turn-on time 2                           | ton2   |              | 0.6  |      | μs   | VCC=VM=2.5V <sup>*4</sup>   |
| Turn-off time 2                          | toff2  |              | 0.08 |      | μs   | VCC=VM=2.5V <sup>*4</sup>   |
| Rise time 2                              | tr2    |              | 0.15 |      | μs   | VCC=VM=2.5V <sup>*4</sup>   |
| Fall time 2                              | tf2    |              | 0.03 |      | μs   | VCC=VM=2.5V <sup>*4</sup>   |

<sup>\*4</sup> Design target value (No total shipment inspection is made.)

●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]<br>(Typ.) | Hysteresis temperature [°C]<br>(Typ.) |
|-----------------------------------|---------------------------------------|
| 150                               | 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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