

STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT SERIES 5ch Motor Driver

TYPE **BD6879KN**

FEATURES • Built in 4 Constant-Voltage Drivers
 • Built in 1 Linear Constant-Current Driver

●Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limit	Unit
Power supply voltage	VCC	0 to +6.5	V
Motor power supply voltage	VM	0 to +6.5	V
Control input voltage	VIN	0 to VCC	V
Power dissipation	Pd	875 ^{*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	-800 to +800 ^{*2}	mA/ch

^{*1} Reduced by 7.0mW/°C over 25°C, when mounted on a glass epoxy board (70mm × 70mm × 1.6mm).

^{*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
H-bridge output current	Iout	-	-	±500 ^{*3}	mA

^{*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

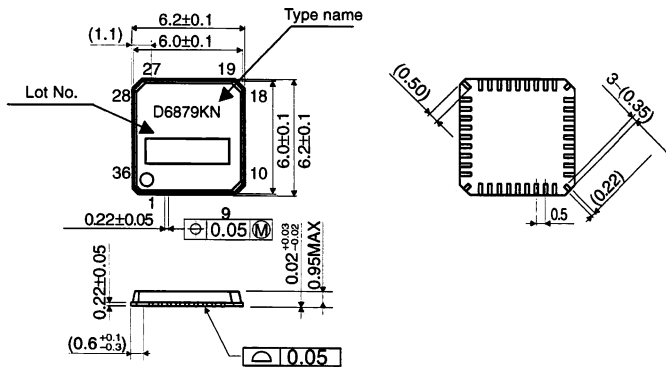


Fig.1 VQFN36 Package (Unit: mm)

●Pin Arrangement (Top View)

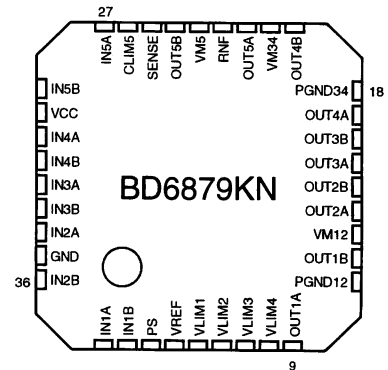


Fig.2 BD6879KN Pin Arrangement (Top View)

●Block Diagram

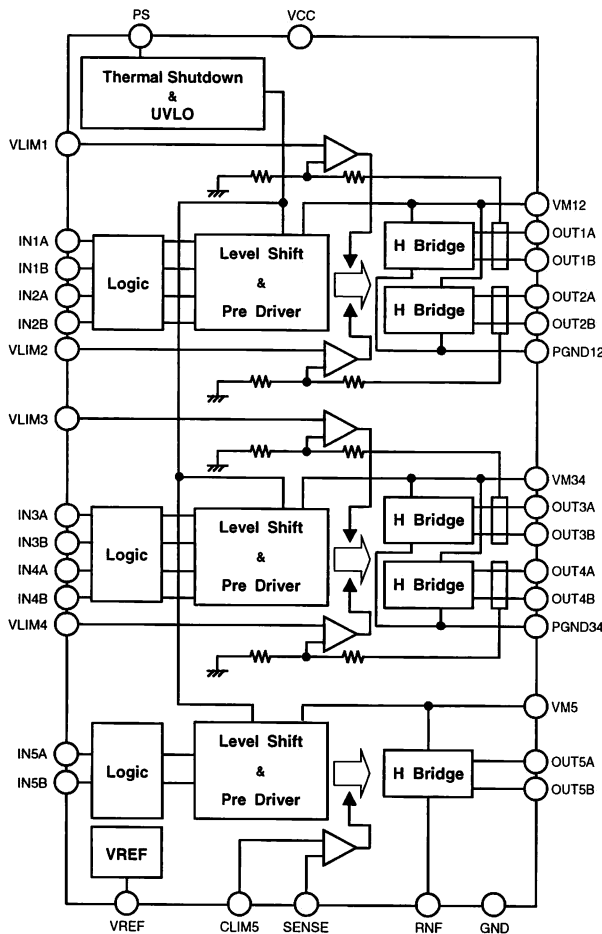


Fig.3 BD6879KN Block Diagram

●Pin No. and Pin Name

No.	Pin name	No.	Pin name
1	IN1A	19	OUT4B
2	IN1B	20	VM34
3	PS	21	OUT5A
4	VREF	22	RNF
5	VLIM1	23	VM5
6	VLIM2	24	OUT5B
7	VLIM3	25	SENSE
8	VLIM4	26	CLIM5
9	OUT1A	27	IN5A
10	PGND12	28	IN5B
11	OUT1B	29	VCC
12	VM12	30	IN4A
13	OUT2A	31	IN4B
14	OUT2B	32	IN3A
15	OUT3A	33	IN3B
16	OUT3B	34	IN2A
17	OUT4A	35	GND
18	PGND34	36	IN2B

●BD6879KN 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	ICC	-	1.2	2.0	mA	PS=H with no signal
Power-saving						
High level input voltage	VPSH	2.0	-	-	V	
Low level input voltage	VPSL	-	-	0.7	V	
High level input current	IPSH	15	30	60	μA	PS =3V
Low level input current	IPSL	-1	0	-	μA	PS =0V
Control input						
High level input voltage	VINH	2.0	-	-	V	IN1A~5B
Low level input voltage	VINL	-	-	0.7	V	IN1A~5B
High level input current	IINH	15	30	60	μA	IN1A~5B; VIN=3V
Low level input current	IINL	-1	0	-	μA	IN1A~5B; VIN=0V
Pull-down resistor	RIN	50	100	200	kΩ	
UVLO						
UVLO voltage	VUVLO	1.6	-	2.4	V	
Constant-Voltage Drive block (ch1 to ch4)						
Output ON-Resistance (ch1 to ch3)	RON	-	1.5	2.0	Ω	Io=±400mA on high and low sides in total
Output ON-Resistance (ch4)	RON	-	1.2	1.5	Ω	Io=±400mA on high and low sides in total
Output high-level voltage	VOH	5.7 × VLIM	6.0 × VLIM	6.3 × VLIM	V	VLIMx=0.5V
Turn-on time	ton	-	3.0	10.0	μs	With 10Ω load, VLIMx=VM
Turn-off time	toff	-	0.1	2.0	μs	With 10Ω load, VLIMx=VM
Rise time	tr	-	2.5	8.0	μs	With 10Ω load, VLIMx=VM
Fall time	tf	-	0.05	1.0	μs	With 10Ω load, VLIMx=VM
Linear Constant-Current Drive block (ch5)						
Output ON-Resistance	RON	-	1.2	1.5	Ω	Io=±400mA on high and low sides in total
VREF output voltage	VREF	1.16	1.20	1.24	V	Iout=0~1mA
Output limit voltage	VOL	194	200	206	mV	RNF=0.5Ω, CLIM5=0.2V
Turn-on time	ton	-	1.0	5.0	μs	With 10Ω load
Turn-off time	toff	-	0.1	2.0	μs	With 10Ω load
Rise time	tr	-	0.5	8.0	μs	With 10Ω load
Fall time	tf	-	0.03	1.0	μs	With 10Ω load

●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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