Structure	Silicon Monolithic Integrated Circuit
Product Series	System Motor Driver for Portable MD
Type	BD6607KN

Features

- Operates at low power supply voltage (VCC=1.8V min.)
- Incorporates two, 3-phase half-bridge driver circuits (low ON resistance power DMOS 0.85Ω typ.)
- Incorporates two H-bridge driver circuits (low ON resistance power DMOS 0.70Ω typ.)
- Incorporates two comparator circuits for motor BEMF voltage detection
- Incorporates a standby circuit (current at standby 0μA)
- Incorporates thermal shutdown circuit

○Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limits	Unit
Power supply voltage for control circuit	VCC	7	V
Power supply voltage for driver	VM	7	V
Power supply voltage for pre-driver circuit	VG	15	V
Input voltage	VIN	0～VCC	V
Driver output current	Iomax.	*1000	mA
Power dissipation	Pd	**1250	mW
Operating temperature range	Topr	-25～+75	℃
Storage temperature range	Tstg	-55～+150	℃
Junction temperature	Tjmax	150	℃

＊Must not exceed Pd or ASO, Tjmax=150℃.

＊＊Reduced by 10mW/°C over Ta=25°C, when mounted on a glass epoxy board (70mmx70mmx1.6mm).

○Operating conditions (Ta= -25 ～ +75°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage for control circuit	VCC	1.8	2.4	5.0	V
Power supply voltage for driver	VM	0.9	1.2	5.0	V
Power supply voltage for pre-driver circuit	VG	VM+5	-	12	V
Input voltage for logic signal *1	VIL	0	-	VCC	V
Input voltage for analog signal *2	VIA	0	-	VM	V

*1 : 1 STALL, ST1, ST2, FI1, RI1, FI2, RI2, UI1, VI1, WI1, PWM1, UI2, VI2, WI2, PWM2 pins

*2 : CPUI1, CPUVI1, CPWI1, CPCOM1, CPUI2, CPVI2, CPWI2, CPCOM2 pins

This product described in this specification is not judged whether it applies to COCOM regulations.
Please confirm in case of export.
This product is not designed for protection against radioactive rays.

○Electrical characteristics

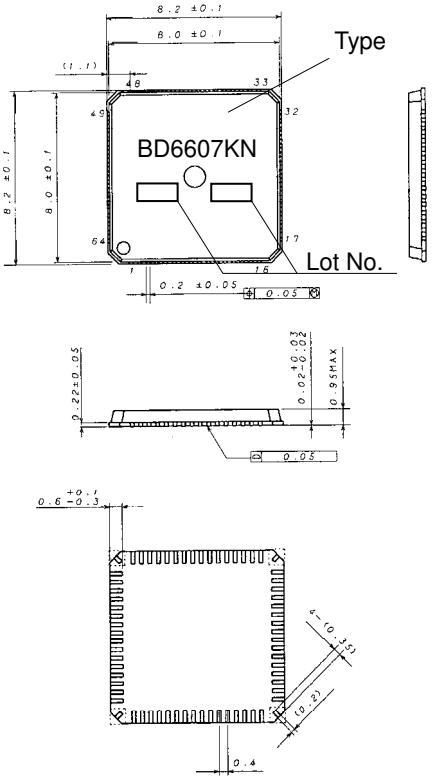
(Unless otherwise specified, Ta=25°C, VCC=2.4V, VM=1.2V, VG=6.8V)

Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Control circuit current at standby	ICCST	-	-	1	μA	STALL=L(*1)
Driver power supply current at standby	IMST	-	-	1	μA	STALL=L(*1)
Pre-driver power supply current at standby	IGST	-	-	1	μA	STALL=L(*1)
Power supply current of control circuit at no signal	ICCN	-	4	10	μA	STALL=L(*1)
Power supply current of pre-driver at no signal	IGN	-	100	160	μA	STALL=L(*1)
Power supply current of control circuit at operation	ICC	-	8	15	μA	STALL=H,ST1=ST2=L(*2)
Power supply current of pre-driver at operation	IG	-	0.7	0.95	mA	STALL=H,ST1=ST2=L(*2)
～Logic input～						
Logic H level input voltage	VIH	VCC x0.8	-	-	V	
Logic L level input voltage	VIL	-	-	VCC x0.2	V	
Logic H level input current	IIH	-	-	1	μA	FI, RI, UI, VI, WI, PWM pins
Logic L level input current	IIL	-1	-	-	μA	FI, RI, UI, VI, WI, PWM pins
ST pin pull-down resistance	RST	0.33	0.6	1.0	MΩ	applied to STALL, ST1,ST2 pins
～BEMF voltage detection comparator～						
Comparator input offset voltage	VOS	-5	-	5	mV	
Comparator input current	ICP	-1	-	1	μA	
Comparator H level output voltage	VOH	VCC x0.8	-	-	V	Isource=500μA
Comparator L level output voltage	VOL	-	-	VCC x0.2	V	Isink=500A
～Power MOS～						
H-bridge output ON resistance	RON1,2	-	0.7	1.30	Ω	upper and lower ON resistance in total
Half-bridge output ON resistance	RONU,V,W	-	0.85	1.55	Ω	upper and lower ON resistance in total

＊1 : Each input pin=L or H

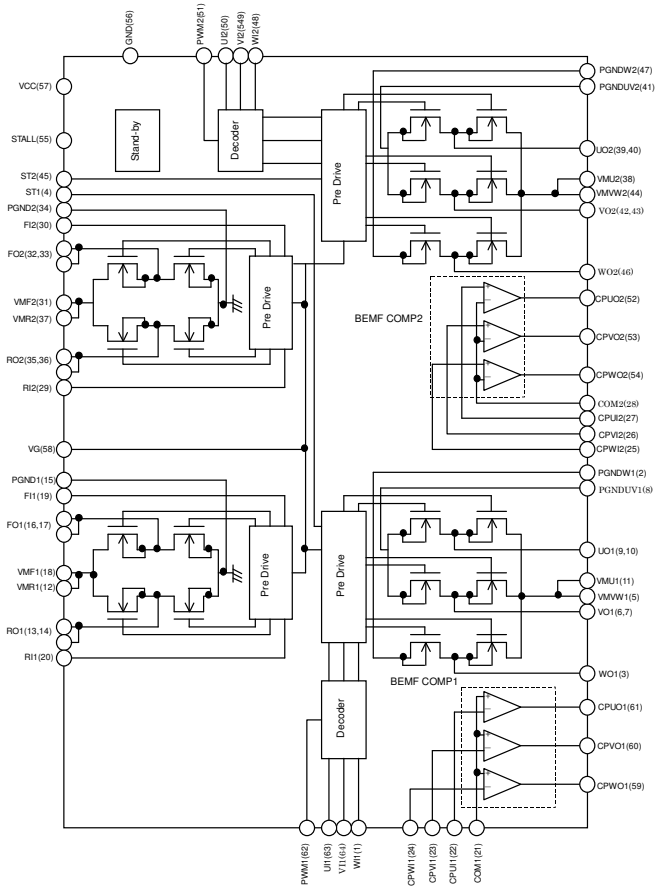
＊2 : PWM1, PWM2 pins=176.4kHz, each H-bridge input pin= 88.2kHz, each 3-phase half-bridge input pin=100Hz

○ Package outlines



UQFN64 outlines (Unit : mm)

○Block diagram



○Pin No./Pin name

NO.	Pin name	NO.	Pin name
1	WI1	33	FO2
2	PGNDW1	34	PGND2
3	WO1	35	RO2
4	ST1	36	RO2
5	VMVW1	37	VMR2
6	VO1	38	VMU2
7	VO1	39	UO2
8	PGNDUV1	40	UO2
9	UO1	41	PGNDUV2
10	UO1	42	VO2
11	VMU1	43	VO2
12	VMR1	44	VMVW2
13	RO1	45	ST2
14	RO1	46	WO2
15	PGND1	47	PGNDW2
16	FO1	48	WI2
17	FO1	49	VI2
18	VMF1	50	UI2
19	FI1	51	PWM2
20	RI1	52	CPUO2
21	COM1	53	CPVO2
22	CPUI1	54	CPWO2
23	CPVI1	55	STALL
24	CPWI1	56	GND
25	CPWI2	57	VCC
26	CPVI2	58	VG
27	CPUI2	59	CPWO1
28	COM2	60	CPVO1
29	RI2	61	CPUO1
30	FI2	62	PWM1
31	VMF2	63	UI1
32	FO2	64	VI1

○Notes on the use

(1) Absolute maximum ratings

If the input voltage or the operating temperature range exceeds absolute maximum ratings, IC may be damaged. No destruction mode (e.g., short-circuiting or open) can be specified in that case. If such special mode as will exceed absolute maximum ratings is assumed, take the physical safety measures, such as a fuse.

(2) Power supply lines

The regenerated current by BEMF of the motor will return. Therefore, take measures, such as the insertion of a capacitor between the power supply and GND as the pass of the regenerated current. Determine the capacitance in full consideration of all the characteristics of the electrolytic capacitor, because the electrolytic capacitor may loose some capacitance at low temperatures. If the connected power supply does not have sufficient current absorption capacity, regenerative current will cause the voltage of the power supply line to rise, which the product and its peripheral circuit may exceed the absolute maximum ratings. It is recommended to implement physical safety measures 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) Design for heat

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

(5) Operation in strong magnetic field

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

(6) ASO

When using the IC, make settings so that the output transistors for the motor will not be used under conditions in excess of the absolute maximum ratings and ASO.

(7) Thermal shutdown circuit

This IC incorporates thermal shutdown circuit(TSD circuit).

When the chip temperature becomes the one shown in below, TSD circuit operates and makes the coil output to motor open. It is designed to shut the IC off from 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[℃] (typ.)	Hysteresis temperature [℃] (typ.)
175	25

(8) Ground wiring pattern

When having both small signal and large current GND, it is recommended to isolate the two GND 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 voltage variations of the small signal GND. Be careful not to change the GND wiring pattern of any external parts, either.

Notes

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