STRUCTURE Silicon monolithic integrated circuits

PRODUCT SERIES 2ch DC brush motor driver

TYPE **BD63821EFV**

FUNCTION
- PWM constant current controllable two H bridge driver
- Forward, reverse, brake and stop function
- Direct PWM control

○Absolute maximum ratings(Ta=25°C)

Item	Symbol	Ratings	Unit
Supply voltage	$V_{CC1,2}$	-0.3～+36.0	V
Power dissipation	Pd	1.45※1	W
		4.70※2	W
Input voltage for control pin	V_{IN}	-0.3～+7.0	V
RNF voltage	V_{RNF}	0.7	V
Output current	I_{OUT}	1.0※3	A/ch
Output current(peak)※4	$I_{OUTPEAK}$	1.5※3	A/ch
FAULT, LOCK voltage	V_{FAULT}	-0.3～+7.0	V
FAULT, LOCK current	I_{FAULT}	5	mA
Operating temperature range	T_{opr}	-25～+85	°C
Storage temperature range	T_{stg}	-55～+150	°C
Junction temperature	T_{jmax}	+150	°C

※1 70mm×70mm×1.6mm glass epoxy board. Derating in done at 11.6mW/°C for operating above Ta=25°C.
※2 4-layer recommended board. Derating in done at 37.6mW/°C for operating above Ta=25°C.
※3 Do not, however exceed Pd, ASO and Tjmax=150°C.
※4 Pulse width tw≦20ms.

○Operating conditions (Ta=-25～+85°C)

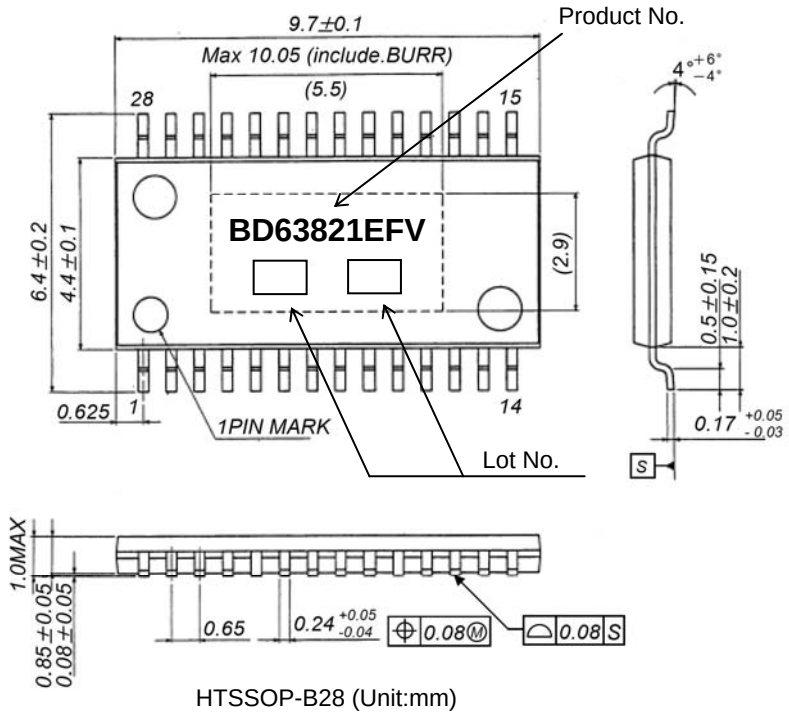
Item	Symbol	Min.	Typ.	Max.	Unit
Supply voltage	$V_{CC1,2}$	19	24	28	V
Input voltage for control pin	V_{IN}	0	-	5.5	V
PWM input frequency	F_{IN}	-	-	100	kHz

This product isn't designed for protection against radioactive rays.

○Electrical characteristics (Unless otherwise specified Ta=25°C, $V_{CC1,2}$=24V)

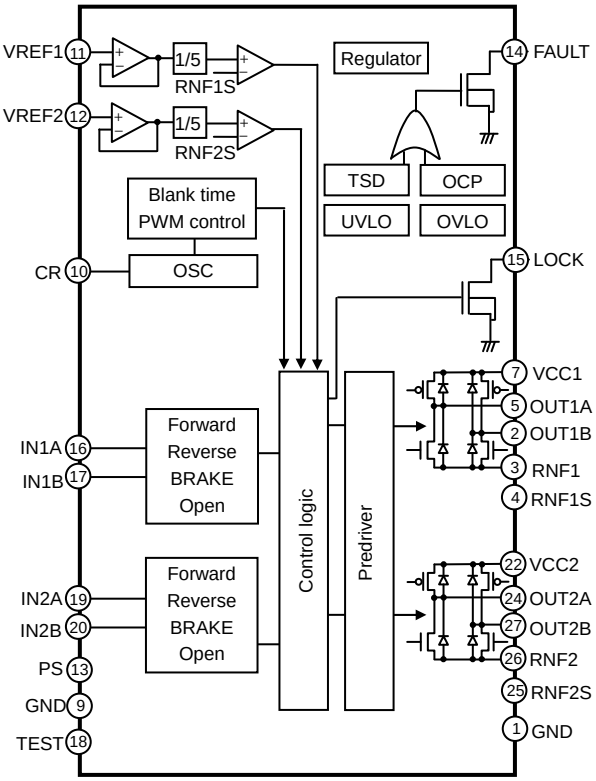
Item	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Whole						
Circuit current at standby	I_{CCST}	-	1.0	2.5	mA	PS=0V
Circuit current	I_{CC}	-	2.5	5.0	mA	PS=IN1A=IN2A=5V
Control input (IN1A, IN1B, IN2A, IN2B, PS)						
H level input voltage	V_{INH}	2.0	-	-	V	
L level input voltage	V_{INL}	-	-	0.8	V	
H level input current	I_{INH}	35	50	100	μA	V_{IN}=5V
L level input current	I_{INL}	-10	0	-	μA	V_{IN}=0V
FAULT LOCK output (FAULT, LOCK)						
Output low voltage	V_{FAULT}	-	50	100	mV	I_{FAULT}=1mA
Output leak current	I_{FAULT_LEAK}	-	-	10	μA	V_{FAULT}=5V
Output (OUT1A, OUT1B, OUT2A, OUT2B)						
Output on resistance	R_{ON}	-	1.90	2.50	Ω	I_{OUT}=0.5A, Sum of upper and lower
Output leak current	I_{LEAK}	-	-	10	μA	
Current control						
RNFXS input current	I_{RNFS}	-2.0	-0.1	-	μA	RNFXS=0V
RNFX input current	I_{RNF}	-40	-20	-	μA	RNFX=0V
VREFX input current	I_{VREF}	-2.0	-0.1	-	μA	VREFX=0V
VREFX input voltage range	V_{REF}	0	-	3.0	V	
Minimum on time (Blank time)	t_{ONMIN}	0.7	1.5	3.0	μs	
Current limit Comparator threshold	V_{CTH}	0.57	0.60	0.63	V	VREFX=3V

○Package outline



HTSSOP-B28 (Unit:mm)

○Block diagram



○Pin No. / Pin name

Pin No.	Pin name	Pin No.	Pin name
1	GND	15	LOCK
2	OUT1B	16	IN1A
3	RNF1	17	IN1B
4	RNF1S	18	TEST
5	OUT1A	19	IN2A
6	NC	20	IN2B
7	VCC1	21	NC
8	NC	22	VCC2
9	GND	23	NC
10	CR	24	OUT2A
11	VREF1	25	RNF2S
12	VREF2	26	RNF2
13	PS	27	OUT2B
14	FAULT	28	NC

NC : Non Connection

○Operation Notes

(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) Power supply lines

As return of current regenerated by back EMF of motor happens, take steps such as putting capacitor between power supply and GND as an electric pathway for the regenerated current. Be sure that there is no problem with each property such as emptied capacity at lower temperature regarding electrolytic capacitor to decide capacity value. 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) GND potential

The potential of GND pin must be minimum potential in all operating conditions.

(4) Metal on the backside (Define the side where product markings are printed as front)

The metal on the backside is shorted with the backside of IC chip therefore it should be connected to GND. Be aware that there is a possibility of malfunction or destruction if it is shorted with any potential other than GND.

(5) Thermal design

Use a thermal design that allows for a sufficient margin in light of the power dissipation (Pd) in actual operating conditions. This IC exposes the metal on the backside of package. Note that this part is assumed to use after providing heat dissipation treatment to improve heat dissipation efficiency. Try to occupy as wide as possible with heat dissipation pattern not only on the board surface but also the backside.

(6) Operation 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.

(7) ASO

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

(8) Thermal shutdown circuit

The IC has a built-in thermal shutdown circuit (TSD circuit). If the chip temperature becomes Tjmax=150°C, and higher, coil output to the motor will be open. The TSD circuit is designed only to shut the IC off to prevent runaway thermal operation. It is not designed to protect or indemnify peripheral equipment. Do not use the TSD function to protect peripheral equipment.

(9) Over current protection circuit

The IC has a built-in over current protection circuit (OCP circuit). The OCP circuit is designed only to shut the IC off to prevent abnormal situations, when absolute maximum output current is exceeded. It is not designed to protect or indemnify peripheral equipment. Do not use the OCP function to protect peripheral equipment.

(10) Ground Wiring Pattern

When using both large current and small signal GND patterns, it is recommended to isolate the two ground patterns, placing a single ground point at the ground potential of application 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.

(11) TEST pin

Be sure to connect TEST pin to GND.

Notes

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