

STRUCTURE	Silicon monolithic integrated circuit
PRODUCT SERIES	Motor driver for ink jet printer (H-bridge driver 2ch, switching regulator 1ch, reset output)
TYPE	BD64560EUV
FUNCTION	<ul style="list-style-type: none"> • External reset input terminal function • Built-in thermal shut down circuit • Built-in UVLO circuit

○Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limit	Unit
Supply voltage	V _M	-0.4~40.0	V
Logic input voltage	V _L	-0.4~5.5	V
RNF voltage (DC)	V _{RNF(DC)}	0.5	V
Power dissipation	P _d	1.70 ^{※1}	W
		4.32 ^{※2}	
Operating temperature range	T _{opt}	-25~+85	°C
Storage temperature range	T _{stg}	-55~+150	°C
Junction temperature	T _{jmax}	150	°C
Motor driver maximum output current (peak500ns)	I _{out(peak)}	8.0	A
Motor driver maximum output current (DC)	I _{out(DC)}	2.5 ^{※3}	A
Switching Reg maximum output current (DC)	I _{out}	1.5	A

※1 70mm × 70mm × 1.6mm glass epoxy board. Derating is done at 13.6mW/°C for operating above Ta=25°C.

※2 4-layer recommended board. Derating is done at 34.6mW/°C for operating above Ta=25°C.

※3 Do not, however exceed P_d, ASO and T_{jmax}=150°C.

○Recommended operating conditions (Ta= -25~+85°C)

Parameter	Symbol	Limit	Unit
Supply voltage	V _M	7~36	V
CLK input frequency	f _{CLK}	1~25	MHz
Switching Reg output voltage range	V _{OUT}	1~V _M × 0.5	V

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

Status of this document

The Japanese version of this document is the formal specification.

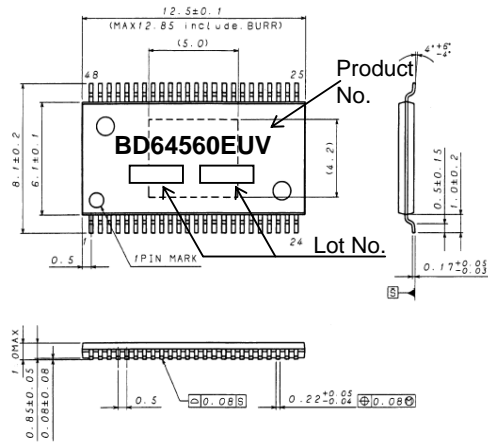
A customer may use this translation version only for a reference to help reading the formal version.

If there are any differences in translation version of this document, formal version takes priority.

○Electrical characteristics (Unless otherwise specified, Ta=25°C, V_M=32V)

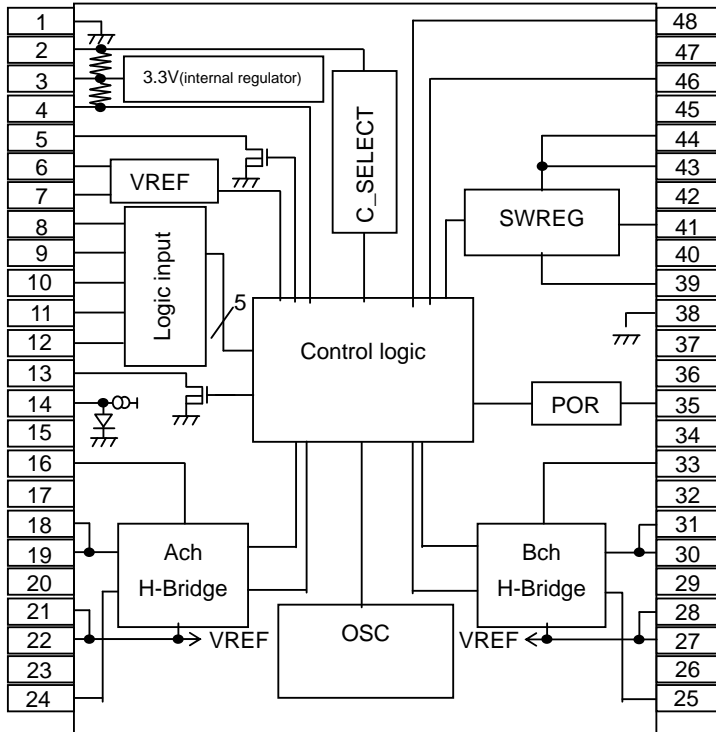
Parameter	Symbol	Limit			Unit	Conditions
		Min.	Typ.	Max.		
Overall						
VM current 1	I _{M1}	-	-	2	mA	SLEEP=L SWREG=OFF
VM current 2	I _{M2}	-	-	15	mA	SLEEP=H SWREG=Max Duty
Control logic (C_SELECT, IRT, SLEEP, STROBE/ENABLE_A, CLK/PHASE_A, DATA/PHASE_B, ENABLE_B)						
High input voltage	V _{LINH}	2.0	-	5.5	V	
Low input voltage	V _{LINL}	0	-	0.8	V	
Input current	I _{LIN}	15	33	50	uA	Input voltage=3.3V
C_SELECT Low input voltage	V _{CSELL}	0	-	0.8	V	
C_SELECT Middle input voltage	V _{CSELM}	1.20	1.65	2.10	V	
C_SELECT High input voltage	V _{CSELH}	2.5	3.3	-	V	
C_SELECT input current	I _{CSEL}	-45	-33	-21	uA	C_SELECT=0V
IRT High input voltage	V _{IRTH}	2.0	-	5.5	V	
IRT Low input voltage	V _{IRTL}	0	-	0.8	V	
IRT input current	I _{IRT}	-50	-33	-15	uA	IRT=0V
H bridge						
Output on resistance (High side)	R _{ONH}	-	0.70	0.84	Ω	I _{OUT} =1A
Output on resistance (Low side)	R _{ONL}	-	0.50	0.60	Ω	I _{OUT} =1A
Output leak current (High side)	I _{LEAKH}	-1	-	1	uA	V _M =40V、OUT _{xx} =0V
Output leak current (Low side)	I _{LEAKL}	-1	-	1	uA	V _M =OUT _{xx} =40V
RNF pin outflow current	I _{RNF}	10	20	30	uA	
VREF-RNF offset voltage	V _{OFST}	-5	0	5	%	VREF=2V GAIN=1/10 or 1/20
※V _{OFST} ={(VREF × GAIN – RNF threshold voltage) / (VREF × GAIN)} × 100%						
VREF voltage range	V _{VREF}	0.8	-	3.0	V	
VREF pin outflow current	I _{VREF}	-1	0	1	uA	VREF=2V
High motor UVLO voltage	V _{UVLOH}	13.5	15.0	16.5	V	
Low motor UVLO voltage	V _{UVLOL}	12.5	14.0	15.5	V	
Switching regulator						
FB threshold voltage	V _{FB}	0.873	0.900	0.927	V	
FB pin outflow current	I _{FB}	-1	0	1	uA	
Output on resistance	R _{ONSW}	-	0.70	0.84	Ω	I _{OUT} =0.5A
Leak current	I _{LEAKSW}	-1	0	1	uA	V _M =40V、SWOUT=0V
FB over voltage protection	V _{FBOVP}	1.10	1.20	1.30	V	Disabled at turn on
FB under voltage protection	V _{FBUVP}	0.55	0.60	0.65	V	Disabled at turn on
ORT pin						
Output voltage	V _{ORT}	-	-	0.4	V	I _{DRAIN} =5mA
Leak current	I _{LEAKORT}	-1	0	1	uA	
VM threshold voltage	V _{POR}	5.9	6.3	6.7	V	No hysteresis
L_OUT pin						
Output voltage	V _{LOUT}	-	-	0.5	V	I _{DRAIN} =5mA
Leak current	I _{LEAKLOUT}	-1	0	1	uA	

○Package outline



HTSSOP-C48 (Unit:mm)

○Block diagram



○Pin No. / Pin name

Pin No.	Pin name	Pin No.	Pin name
1	LGND	48	TEST2
2	C_SELECT	47	NC
3	CC	46	TEST1
4	IRT	45	NC
5	ORT	44	VMSW
6	VREFA	43	VMSW
7	VREFB	42	NC
8	SLEEP	41	SWOUT
9	STROBE /ENABLE_A	40	NC
10	CLK /PHASE_A	39	FB
11	DATA /PHASE_B	38	AGND
12	ENABLE_B	37	NC
13	L_OUT	36	NC
14	TJMON	35	VM
15	NC	34	NC
16	OUTAM	33	OUTBM
17	NC	32	NC
18	VMA	31	VMB
19	VMA	30	VMB
20	NC	29	NC
21	RNFA	28	RNFB
22	RNFA	27	RNFB
23	NC	26	NC
24	OUTAP	25	OUTBP

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 its frame of 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) Actions 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 $T_{jmax}=150^{\circ}\text{C}$, and higher, coil output to the motor and regulator output will be OFF, and reset output will be L. 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) 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.
- (10) TEST pin
Be sure to leave TEST1 pin open and connect TEST2 pin to GND.

Notes

No copying or reproduction of this document, in part or in whole, is permitted without the consent of ROHM CO.,LTD.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products are not designed to be radiation tolerant.

While ROHM always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). ROHM shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain a license or permit under the Law.

Thank you for your accessing to ROHM product informations.

More detail product informations and catalogs are available, please contact your nearest sales office.

ROHM Customer Support System

THE AMERICAS / EUROPE / ASIA / JAPAN

www.rohm.com

Contact us : webmaster@rohm.co.jp