

STRUCTURE Silicon monolithic integrated circuits

PRODUCT SERIES 1chip motor driver for printer
 (H bridge driver 2ch, switching regulator, series regulator, reset output)

TYPE **BD6794EFV**

FUNCTION • Built-in thermal shut down circuit
 • Built-in UVLO circuit

○Absolute maximum ratings (Ta=25°C)

Parameter	Symbol	Limit	Unit
Supply voltage	VM	36	V
Power dissipation	Pd	1600* ¹	mW
Logic input voltage	VL	-0.4~5.5	V
RIN applied voltage	VRIN	5.5	V
RNF voltage	VRNF	0.5	V
Motor driver maximum output current (peak500nsec)	IOUT(peak)	8.0	A
Motor driver maximum output current (DC)	IOUT(DC)	2.0* ²	A
Switching Reg maximum output current (DC)	IOUT	0.5	A
Series Reg maximum output current (DC)	IOUT	0.25	A
Operating temperature range	TOPR	-25~+85	°C
Storage temperature range	TSTG	-55~+150	°C
Junction temperature	Tjmax	150	°C

*¹ 70mm × 70mm × 1.6mm glass epoxy board. Derating is done at 12.8mW/°C for operating above Ta=25°C.

*² Do not, however exceed Pd, ASO and Tjmax=150°C.

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

Parameter	Symbol	Min	Typ	Max	Unit
Supply voltage	VM	18	24	32	V
SCLK input frequency	FSCLK	-	-	20	MHz
Switching Reg output voltage	Vswreg	3	-	5	V

This product described in this specification isn't judged whether it applies to COCOM regulations.

Please confirm in case of export.

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

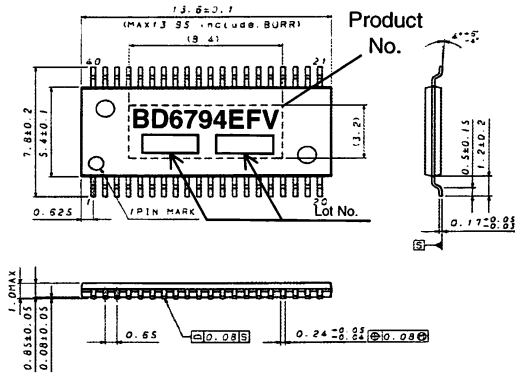
○Electrical characteristics (Unless otherwise specified, Ta=25°C, VM=24V)

Parameter	Symbol	Limit			Unit	Conditions
		Min	Typ	Max		
Overall						
VM current 1	I _{VM1}	-	-	8	mA	VM=7V
VM current 2	I _{VM2}	-	-	12	mA	VM=24V
H bridge 1						
Output on resistance (source side)	R _{ONH1}	-	0.6	0.78	Ω	IOUT=1A
Output on resistance (sinking side)	R _{ONL1}	-	0.4	0.52	Ω	IOUT=1A
Output leak current	I _{LEAK1}	0	-	10	μA	VM=32V
Built-in diode forward direction voltage (source side)	V _{FH1}	0.6	0.9	1.2	V	IOUT=1A
Built-in diode forward direction voltage (sinking side)	V _{FL1}	0.6	0.9	1.2	V	IOUT=1A
H bridge 2						
Output on resistance (source side)	R _{ONH2}	-	0.7	0.91	Ω	IOUT=1A
Output on resistance (sinking side)	R _{ONL2}	-	0.5	0.65	Ω	IOUT=1A
Output leak current	I _{LEAK2}	0	-	10	μA	VM=32V
Built-in diode forward direction voltage (source side)	V _{FH2}	0.6	0.9	1.2	V	IOUT=1A
Built-in diode forward direction voltage (sinking side)	V _{FL2}	0.6	0.9	1.2	V	IOUT=1A
Current control						
VREF voltage range	V _{REF}	0.8	-	3.5	V	
VREF pin outflow current	I _{REF}	-	0	1	μA	
RNF pin outflow current	I _{RNF}	5	15	30	μA	
RNFS pin outflow current	I _{RNFS}	-	0	1	μA	
VREF-RNFS offset voltage	V _{OFFSET}	-15	0	15	mV	VREF=2V
Control logic						
High input voltage	V _{INH}	2.0	-	5.5	V	
Low input voltage	V _{INL}	0	-	0.8	V	
Input current	I _{IN}	21	33	45	μA	Input voltage=3.3V
Switching power source						
DSEN threshold voltage	V _{SWBIAS}	0.873	0.9	0.927	V	
Output on resistance	R _{SWON}	-	2.0	2.4	Ω	IOUT=250mA
Leak current	I _{SWLEAK}	0	-	10	μA	VM=32V
DUTY_MAX value	DMAX	-	92	-	%	
Clock frequency	FSW	130	200	270	KHz	
DSEN pin outflow current	I _{DSEN}	-	0	1	μA	
Series power source						
Output voltage	V _{SOUT}	1.425	1.5	1.575	V	IOUT= 70mA
Leak current	I _{SLEAK}	0	-	10	μA	
RESET pin						
Output voltage	V _{RSTL}	0	-	0.2	V	IDRAIN=1mA
Leak current	I _{RSTLEAK}	0	-	10	μA	
High VM threshold voltage	V _{MPORH}	6.3	6.5	6.7	V	VM at power-on
Low VM threshold voltage L	V _{MPORL}	5.9	6.1	6.3	V	VM at power-on
High motor UVLO voltage	V _{MMTH}	13.5	15	16.5	V	Off motor only
Low motor UVLO voltage	V _{MMTL}	12.5	14	15.5	V	
Reset delay time	T _{POR}	50	80	110	msec	

○Design guarantee (Tj=25°C, VM=24V) ※Not examined in shipping.

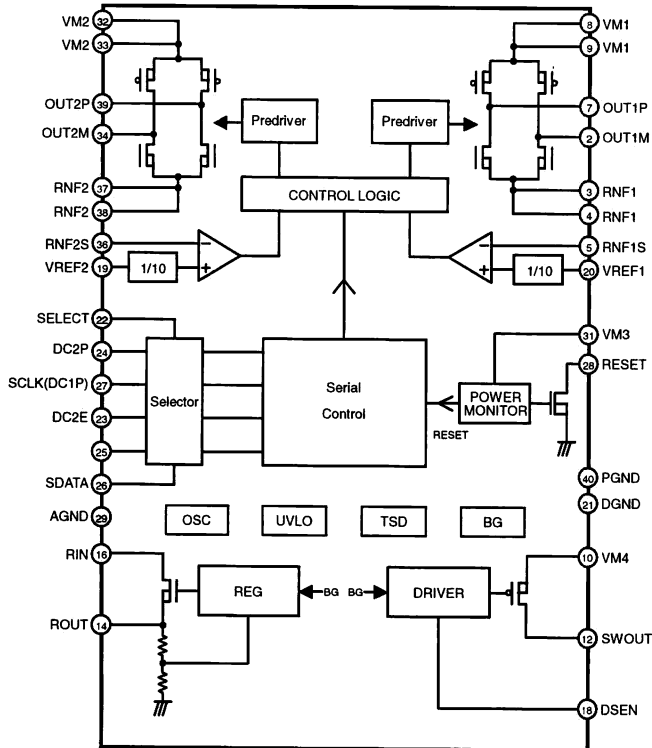
Parameter	Symbol	Limit			Unit	Conditions
		Min	Typ	Max		
Soft start time	T _{SS}	17	24	30	msec	
Glitch mask time	T _{PORM}	1.5	2.5	3.5	μ sec	
Reset output pulse width	T _{POR}	25	40	55	msec	
Internal reference clock frequency	F _{BASE}	5	8	11	MHz	

○Package outline



HTSSOP-B40 (Unit: mm)

○Block diagram



○Pin No. / Pin name

Pin No.	Pin name	Pin No.	Pin name
1	N.C.	21	DGND
2	OUT1M	22	SELECT
3	RNF1	23	DC2E
4	RNF1	24	DC2P
5	RNF1S	25	STROBE
6	N.C.	26	SDATA
7	OUT1P	27	SCLK
8	VM1	28	RESET
9	VM1	29	AGND
10	VM4	30	N.C.
11	N.C.	31	VM3
12	SWOUT	32	VM2
13	N.C.	33	VM2
14	ROUT	34	OUT2M
15	N.C.	35	N.C.
16	RIN	36	RNF2S
17	N.C.	37	RNF2
18	DSEN	38	RNF2
19	VREF2	39	OUT2P
20	VREF1	40	PGND

○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. This IC exposes its frame 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.

(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.

Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.

Thank you for your accessing to ROHM product informations.
More detail product informations and catalogs are available,
please contact your nearest sales office.

Please contact our sales offices for details ;

U.S.A / San Diego	TEL : +1(858)625-3630	FAX : +1(858)625-3670
Atlanta	TEL : +1(770)754-5972	FAX : +1(770)754-0691
Dallas	TEL : +1(972)312-8818	FAX : +1(972)312-0330
Germany / Dusseldorf	TEL : +49(2154)9210	FAX : +49(2154)921400
United Kingdom / London	TEL : +44(1)908-282-666	FAX : +44(1)908-282-528
France / Paris	TEL : +33(0)1 56 97 30 60	FAX : +33(0) 1 56 97 30 80
China / Hong Kong	TEL : +852(2)740-6262	FAX : +852(2)375-8971
Shanghai	TEL : +86(21)6279-2727	FAX : +86(21)6247-2066
Dilian	TEL : +86(411)8230-8549	FAX : +86(411)8230-8537
Beijing	TEL : +86(10)8525-2483	FAX : +86(10)8525-2489
Taiwan / Taipei	TEL : +866(2)2500-6956	FAX : +866(2)2503-2869
Korea / Seoul	TEL : +82(2)8182-700	FAX : +82(2)8182-715
Singapore	TEL : +65-6332-2322	FAX : +65-6332-5662
Malaysia / Kuala Lumpur	TEL : +60(3)7958-8355	FAX : +60(3)7958-8377
Philippines / Manila	TEL : +63(2)807-6872	FAX : +63(2)809-1422
Thailand / Bangkok	TEL : +66(2)254-4890	FAX : +66(2)256-6334

Japan /
(Internal Sales)

Tokyo	2-1-1, Yaesu, Chuo-ku, Tokyo 104-0082	TEL : +81(3)5203-0321	FAX : +81(3)5203-0300
Yokohama	2-4-8, Shin Yokohama, Kohoku-ku, Yokohama, Kanagawa 222-8575	TEL : +81(45)476-2131	FAX : +81(45)476-2128
Nagoya	Dainagayo Building 9F 3-28-12, Meieki, Nakamura-ku, Nagoya, Aichi 450-0002	TEL : +81(52)581-8521	FAX : +81(52)561-2173
Kyoto	579-32 Higashi Shiokouji-cho, Karasuma Nishi-iru, Shiokoujidori, Shimogyo-ku, Kyoto 600-8216	TEL : +81(75)311-2121	FAX : +81(75)314-6559

(Contact address for overseas customers in Japan)

Yokohama	TEL : +81(45)476-9270	FAX : +81(045)476-9271
----------	-----------------------	------------------------