

STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT CMOS Type series regulator

# TYPE B H X X M A 3 W H F V Series

○BLOCK DIAGRAM and APPLICATION CIRCUIT

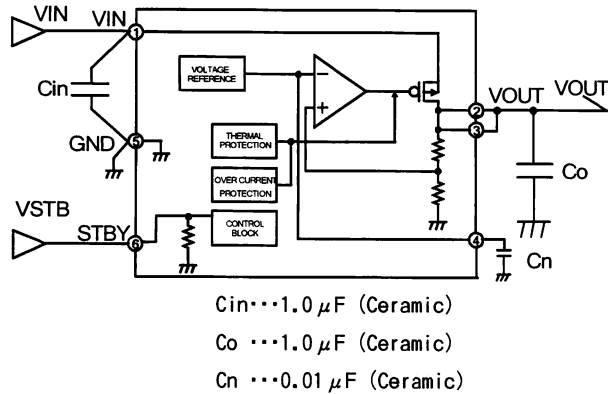


Fig.1 BLOCK DIAGRAM and APPLICATION CIRCUIT

○PIN DESCRIPTION

PIN No.	PIN NAME	DESCRIPTION
1	VIN	INPUT Pin
2	VOUT	OUTPUT Pin
3	VOUT	OUTPUT Pin
4	NOISE	NOISE Decrease Pin, for Connecting External Capacitor
5	GND	GROUND Pin
6	STBY	OUTPUT CONTROL (High:ON, Low:OFF)

○ABSOLUTE MAXIMUM RATINGS ( $T_a=25^\circ C$ )

PARAMETER	Symbol	Limit	Unit
Power Supply Voltage	VMAX	-0.3 ~ +6.5	V
Power Dissipation	Pd	680 (Note.1)	mW
Operating Temperature Range	Topr	-40 ~ +85	$^\circ C$
Storage Temperature Range	Tstg	-55 ~ +125	$^\circ C$

Note.1 Pd derated at 6.8mW/ $^\circ C$  for temperature above  $T_a=25^\circ C$ , mounted on 70mm $\times$ 70mm $\times$ 1.6mm glass-epoxy PCB.

○RECOMMENDED OPERATING RANGE

PARAMETER	Symbol	Limit	Unit
Power Supply Voltage	VIN	2.5~5.5	V
Output Current	IMAX	0~300	mA

● ELECTRICAL CHARACTERISTICS

(Ta=25°C, VIN=VOUT+1.0V(Note.3), STBY=1.5V, Cin=1 μF, Co=1 μF, Cn=0.01 μF, unless otherwise noted.)

PARAMETER	Symbol	Limit			UNIT	Conditions
		MIN.	TYP.	MAX.		
<b>[REG]</b>						
Output Voltage	VOUT	VOUT×0.99	VOUT	VOUT×1.01	V	IOUT=1mA
		VOUT-25mV	VOUT	VOUT+25mV		IOUT=1mA, BH15, 18MA3WHFV only
Circuit Current	IGND	-	65	95	μA	IOUT=1mA
Circuit Current(STBY)	ISTBY	-	-	1.0	μA	STBY=0V
Ripple Rejection Ratio	RR	-	60	-	dB	VRR=-20dBv, fRR=1kHz, IOUT=10mA
Input. output voltage difference	VSAT1	-	60	90	mV	VIN=0.98×VOUT, IOUT=100mA (except BH15, 18MA3WHFV)
Line Regulation	VDL1	-	2	20	mV	IOUT=50mA VIN=VOUT+0.5V to 5.5V (Note.2)
Load Regulation 1	VDL01	-	6	30	mV	IOUT=1mA to 100mA
Load Regulation 2	VDL02	-	18	90	mV	IOUT=1mA to 300mA
Output Voltage temperature	ΔVOUT/ΔT	-	±100	-	ppm/°C	IOUT=1mA, Ta=-40~+85°C
<b>[OCP]</b>						
Limit Current	ILMAX	-	600	-	mA	Vo=VOUT×0.85
Short Current	ISHORT	-	100	-	mA	Vo=0V
<b>[STBY]</b>						
STBY Pull-down Resistor	RSTB	550	1100	2200	kΩ	
STBY Control Voltage	ON	VSTBH	1.5	-	VCC	V
	OFF	VSTBL	-0.3	-	0.3	V

● This product is not designed for protection against radio active rays.

Note.2 VIN=3.0V to 5.5V for BH15, 18MA3WHFV. Note.3 VIN=3.5V for BH15, 18MA3WHFV

●RECOMMENDED OPERATING CONDITION

PARAMETER	Symbol	MIN	TYP	MAX	UNIT	CONDITION
Input Capacitor	Cin	1.0	-	-	μF	Ceramic capacitor recommended
Output Capacitor	Co	1.0	-	-	μF	Ceramic capacitor recommended
Noise Decrease Capacitor	Cn	-	0.01	0.22	μF	Ceramic capacitor recommended

○TEST CIRCUIT

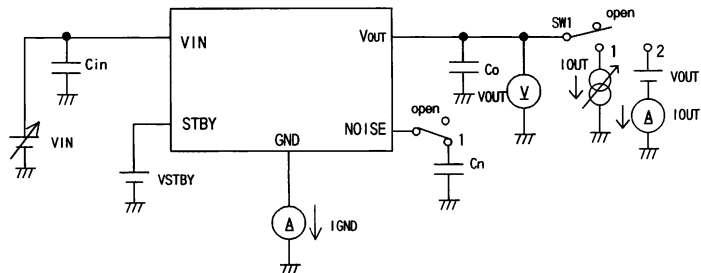


Fig.2 TEST CIRCUIT

○ Power Dissipation Reduction

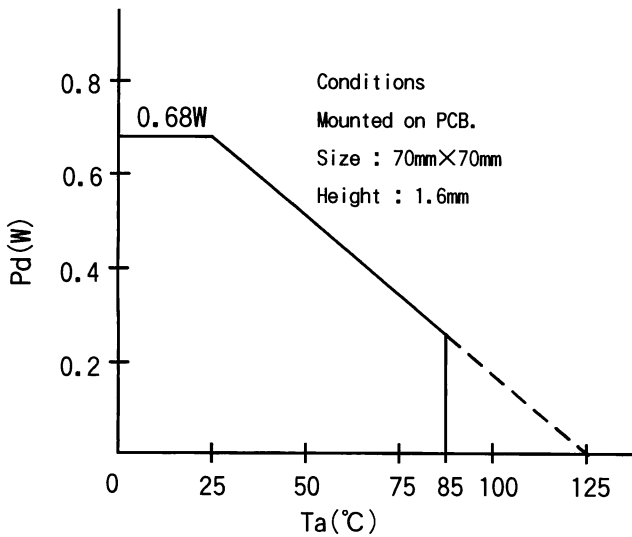


Fig.3 Pd reduction (example)

○ Device Name and Marking

Device Name : **BHXXMA3WHFV**



Symbol	Description		Device Mark
	XX	Output Voltage	
a	15	1.5V typ.	CB
	18	1.8V typ.	CC
	25	2.5V typ.	CD
	28	2.8V typ.	CE
	29	2.9V typ.	CF
	30	3.0V typ.	CG
	31	3.1V typ.	CH
	33	3.3V typ.	CJ

○ Package dimensions (HVS0F6)

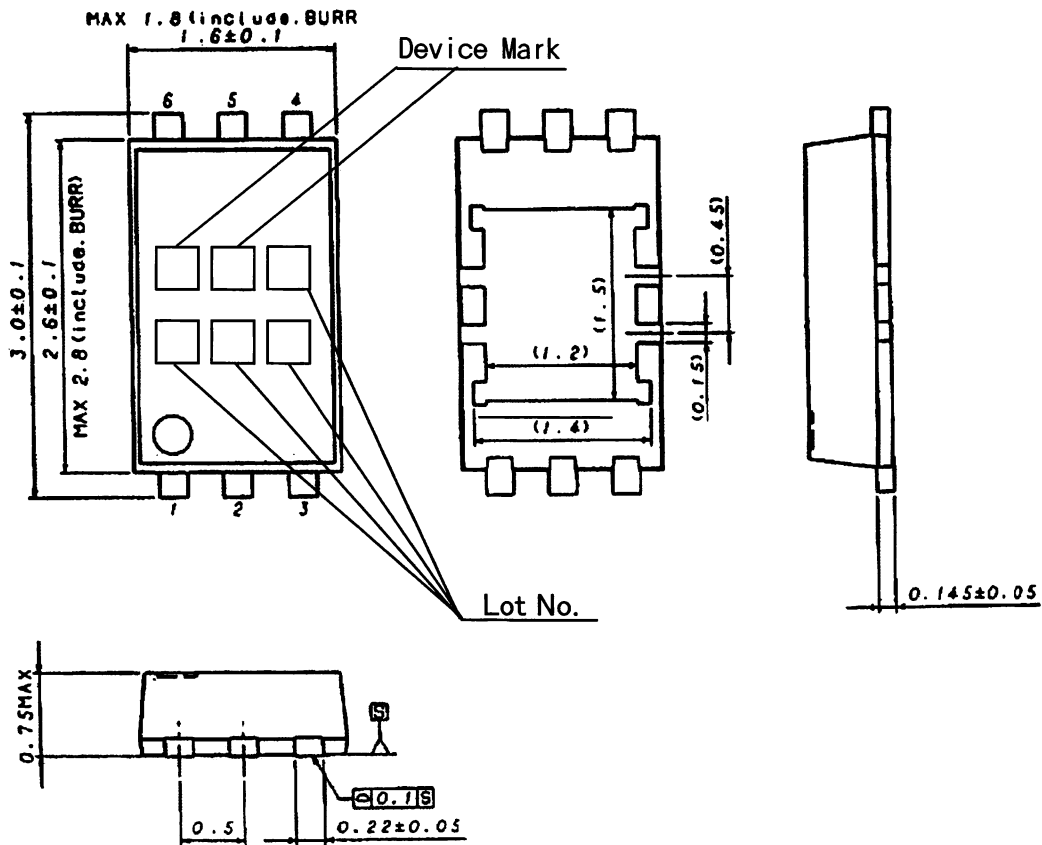


Fig.4 Package dimensions (UNIT:mm)

## ○Operation Notes

### 1.) Absolute maximum ratings

This product is produced with strict quality control, however, may be destroyed if it is operated beyond its absolute maximum ratings. If the device is destroyed in exceeding the recommended maximum ratings, the failure mode will be difficult to determine. (E.g. short mode, open mode) Therefore, physical protection counter-measures (like fuse) should be implemented when operating conditions are beyond the absolute maximum ratings specified.

### 2.) GND potential

GND potential must be the lowest potential no matter what may happen. Actually, including transitional states, all pins except GND must not be the voltage below GND.

### 3.) Setting of heat

Consider Pd of actually using states, carry out the heat design that have adequate margin.

### 4.) Pin short and mistake fitting

When mounting the IC on the PCB, pay attention to the orientation of the IC. If there is a placement mistake, the IC may be burned up.

### 5.) Actions in strong magnetic field

Using the IC within a strong magnetic field may cause a malfunction.

### 6.) Mutual impedance

Use short and wide wiring tracks for the power supply and ground to keep the mutual impedance as small as possible. Use a capacitor to keep ripple to a minimum.

### 7.) Voltage of STB pin

For standby mode, set STB voltage below 0.3V. For normal operation, set the pin voltage beyond 1.5V. It is not recommended to set STB voltage between 0.3V and 1.5V, and it may cause improper operation.

### 8.) Over current protection circuit

Over current and short circuit protection is built-in at the output, and IC destruction is prevented at the time of load short circuit. These protection circuits is effective in the destructive prevention by the sudden accident, please avoid use to which a protection circuit operates continuously.

### 9.) Thermal shutdown

In cases of operation at high temperature, thermal shut-down will be activated and output will be turned off. Once IC is returned on normal operating temperature, the output will be turned back on.

### 10.) NOISE Pin

NOISE pin can drive quite small current, because the pin is directly connected to reference voltage circuit. It may be that output voltage is dropping when the load of NOISE pin is more than 100nA. If the pin is connected to a capacitor, please use a ceramic capacitor for small leak current. Please take care that output noise is smaller as NOISE pin capacitor is larger, but startup time is longer.

### 11.) Output capacitor

To prevent oscillation at output, it is recommended that the IC be operated at the stable region show as Fig.5. It operates at the capacitance of more than  $1.0\mu\text{F}$ .

As capacitance is larger, stability becomes more stable and characteristic of output load fluctuation is also improved.

$C_{out}=1.0\mu\text{F}$   $C_{in}=1.0\mu\text{F}$   $\text{Temp}=+25^\circ\text{C}$

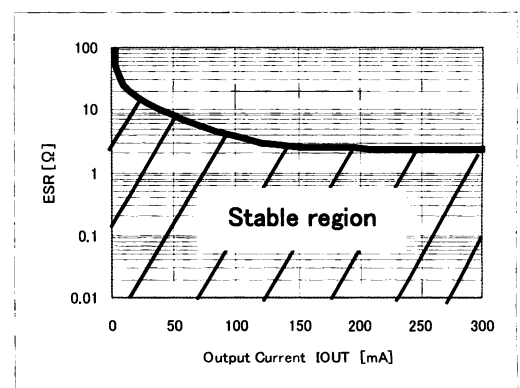


Fig.5 Stable region (Example)

### 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
----------	-----------------------	------------------------