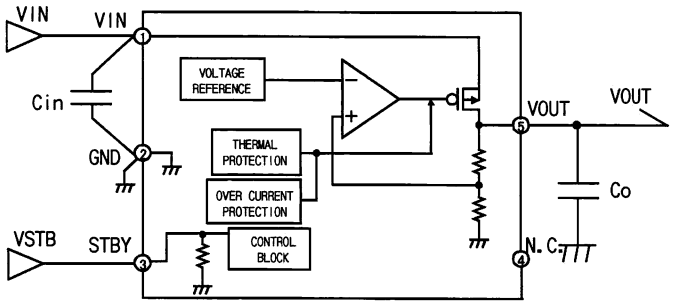
STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT CMOS Type series regulator

TYPE # BH□□MA3WHFV Series

○BLOCK DIAGRAM and APPLICATION CIRCUIT



Cin···1.0μF (Ceramic)

Co ···1.0μF (Ceramic)

Cn ···0.01μF (Ceramic)

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 (Ta=25℃)

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	℃
Storage Temperature Range	Tstg	-55 ～ +125	℃

Note.1 Pd derated at 6.8mW/℃ for temperature above Ta=25℃, mounted on 70mm×70mm×1.6mm glass-epoxy PCB.

Application example

The application circuit is recommended for use. Make sure to confirm the adequacy of the characteristics.

When using the circuit with changes to the external circuit constants, make sure to leave an adequate margin for external components including static and transitional characteristics as well as dispersion of the IC.

Note that ROHM cannot provide adequate confirmation of patents.

The product described in this specification is 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).

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○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℃, VIN=VOUT+1.0V(Note.3), STBY=1.5V, Cin=1μF, Co=1μF, Cn=0.01μF, unless otherwise noted.)

PARAMETER	Symbol	Limit			UNIT	Conditions
		MIN.	TYP.	MAX.		
【REG】						
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	⊿VOUT/⊿T	-	±100	-	ppm/℃	IOUT=1mA, Ta=-40～+85℃
【OCP】						
Limit Current	ILMAX	-	600	-	mA	Vo=VOUT×0.85
Short Current	ISHORT	-	100	-	mA	Vo=0V
【STBY】						
STBY Pull-down Resistor	RSTB	550	1100	2200	kΩ	
STBY Control Voltage ON	VSTBH	1.5	-	VCC	V	
STBY Control Voltage 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

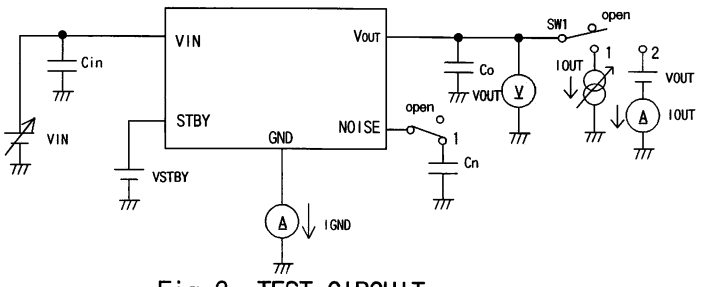

Fig.2 TEST CIRCUIT

○Power Dissipation Reduction

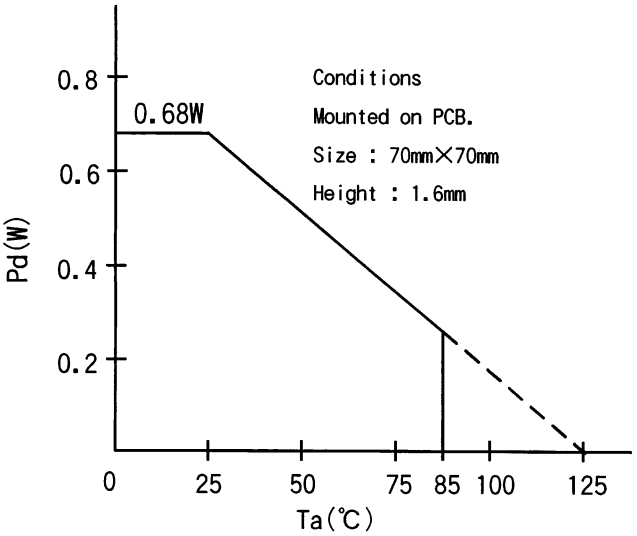

Fig.3 Pd reduction (example)

○Device Name and Marking

Device Name : BH□□MA3WHFV

Symbol	Description		Device Mark
	□□	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 (HVSOF6)

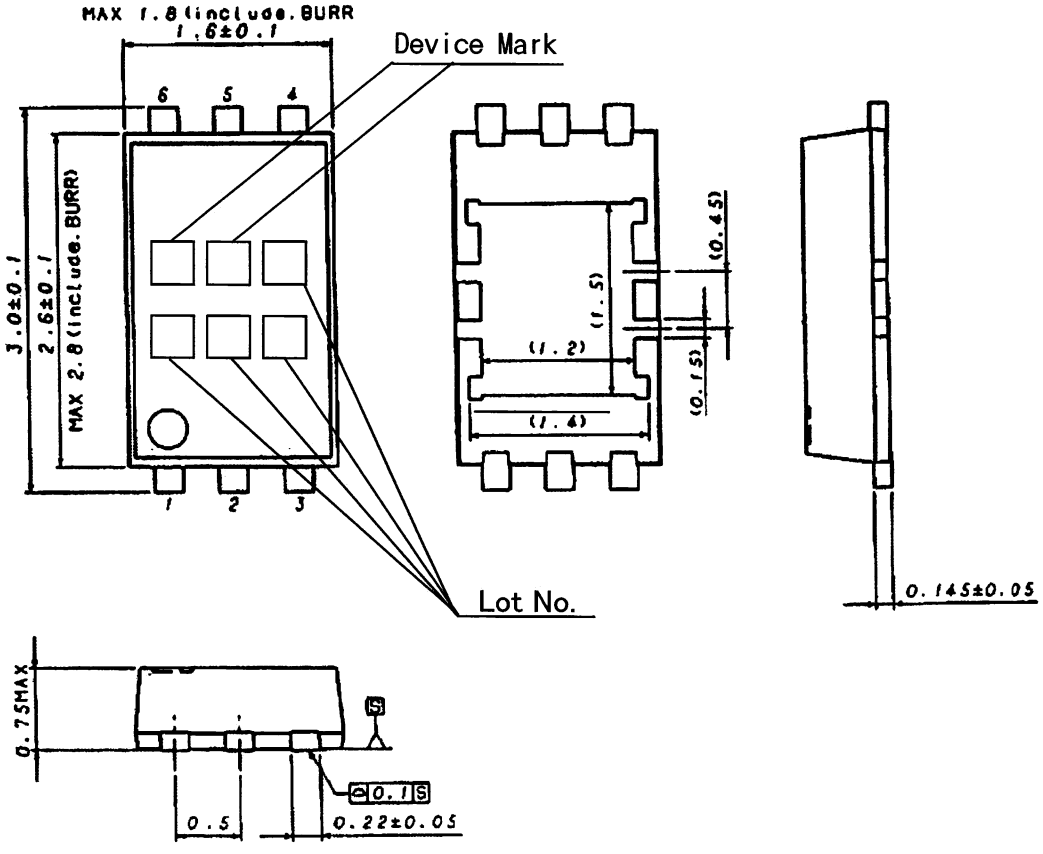

Fig.4 Package dimensions (UNIT:mm)

○Operation Notes

1.) Absolute maximum ratings
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 1.0μF.
As capacitance is larger, stability becomes more stable and characteristic of output load fluctuation is also improved.

Cout=1.0μF Cin=1.0μF Temp=+25℃

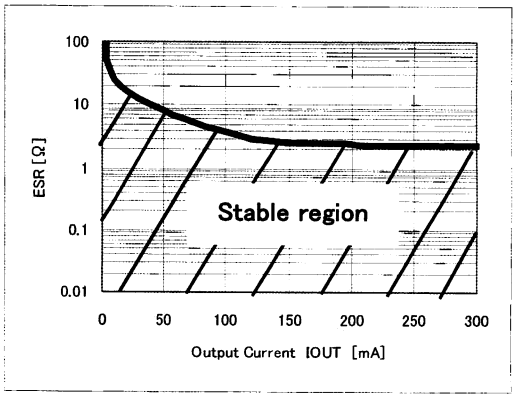

Fig.5 Stable region (Example)

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