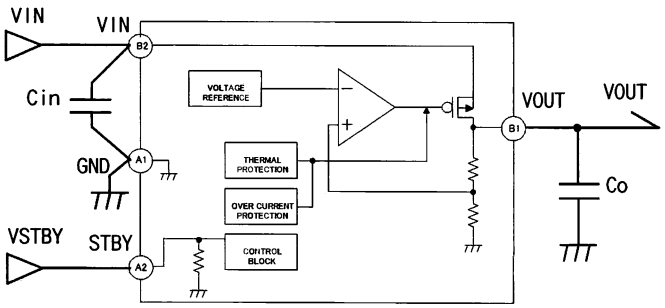
STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT CMOS Type series regulator

TYPE # BH□□RB1WGUT Series

○BLOCK DIAGRAM and APPLICATION CIRCUIT



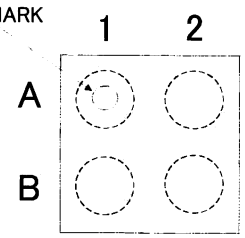
Cin···1.0μF (Ceramic)

Co ···1.0μF (Ceramic)

Fig.1 Block Diagram and Application Circuit

○PIN DESCRIPTION

PIN No.	PIN NAME	DESCRIPTION
B2	VIN	INPUT Pin
B1	VOUT	OUTPUT Pin
A1	GND	GROUND Pin
A2	STBY	OUTPUT CONTROL(High:ON, Low:OFF)



TOP VIEW

○ABSOLUTE MAXIMUM RATINGS (Ta=25℃)

PARAMETER	Symbol	Limit	Unit
Power Supply Voltage	VMAX	-0.3 to +6.5	V
Power Dissipation	Pd	530 (Note.1)	mW
Operating Temperature Range	Topr	-40 to +85	℃
Storage Temperature Range	Tstg	-55 to +125	℃

Note.1 Pd derated at 5.3mW/℃ for temperature above Ta=25℃, mounted on 7×7×0.8mm 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 to 5.5	V
Output Current	IOUT	0 to 150	mA

○ ELECTRICAL CHARACTERSTICS

(Ta=25℃, VIN=VOUT+1.0V (Note.4), STBY=1.5V, Cin=1μF, Co=1μF, unless otherwise noted.)

PARAMETER		Symbol	Limit			Unit	Conditions
			MIN.	TYP.	MAX.		
【Regulator】							
Output Voltage1		VOUT1	VOUT×0.99	VOUT	VOUT×1.01	V	IOUT=1mA, Ta=25℃
			VOUT-25mV	VOUT	VOUT+25mV		IOUT=1mA, Ta=25℃ BH15,18RB1WGUT only
Output Voltage2		VOUT2	VOUT×0.97	VOUT	VOUT×1.03	V	IOUT=1mA Ta=-40℃ to 85℃ (Note.2)
Circuit Current		IGND	-	34	72	μA	IOUT=0mA Ta=-40℃ to 85℃ (Note.2)
Circuit Current (STBY)		ICCST	-	-	1.0	μA	STBY=0V
Ripple Rejection Ratio		RR	-	63	-	dB	VRR=-20dBv, fRR=1kHz, IOUT=10mA
Input output Voltage difference		VSAT	-	100	150	mV	VIN=0.98×VOUT, IOUT=100mA (except BH15,18RB1WGUT)
Line Regulation		VDLI	-	2	20	mV	IOUT=10mA VIN=VOUT+0.5V to 5.5V (Note.3)
Load Regulation		VDLO	-	2	30	mV	IOUT=1mA to 100mA
【Over Current Protection】							
Limit Current		ILMAX	-	300	-	mA	Vo=VOUT×0.98
Short Current		ISHORT	-	40	-	mA	Vo=0V
【Stand-by block】							
STBY Pin Current		ISTBY	0.5	1.3	3.6	μA	Ta=-40℃ to 85℃ (Note.2)
STBY Control Voltage	ON	VSTBH	1.2	-	VCC	V	Ta=-40℃ to 85℃ (Note.2)
	OFF	VSTBL	-0.2	-	0.2	V	Ta=-40℃ to 85℃ (Note.2)

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

Note.2 These specifications are guaranteed by design.

Note.3 VIN=3.0V to 5.5V for BH15,18RB1WGUT. Note.4 VIN=3.5V for BH15,18RB1WGUT.

○RECOMMENDED OPERATING CONDITION

PARAMETER	Symbol	MIN.	TYP.	MAX.	Unit	CONDITION
Input Capacitor	Cin	0.7 (Note.5)	1.0	-	μF	Ceramic capacitor recommended
Output Capacitor	Co	0.7 (Note.5)	1.0	-	μF	Ceramic capacitor recommended

Note.5 Includes temperature coefficient and DC bias of the capacitor. Recommended capacitor type is X5R or X7R.

○TEST CIRCUIT

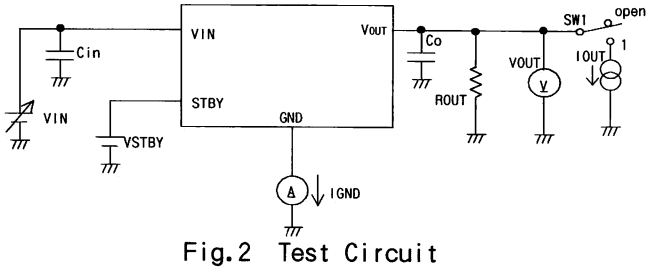


Fig.2 Test Circuit

○Power Dissipation Reduction

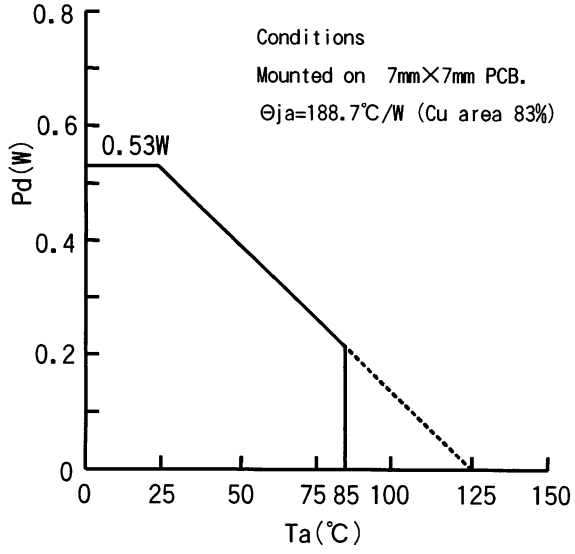
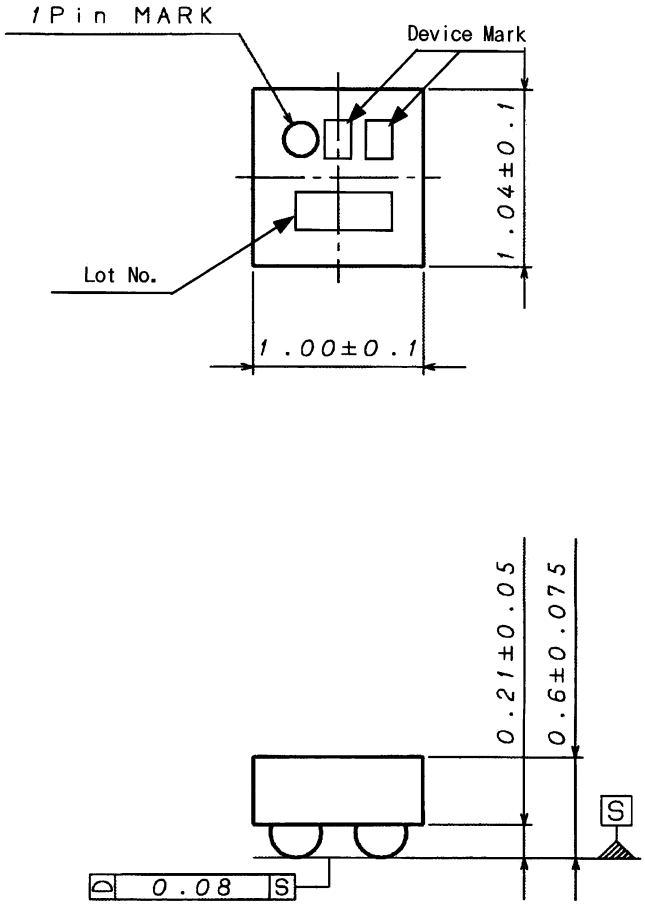


Fig.3 Pd reduction (example)

○ Package dimensions (VCSP60N1)



(Unit:mm)

○Device Name and Marking

Device Name : BH□□RB1WGUT

a

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

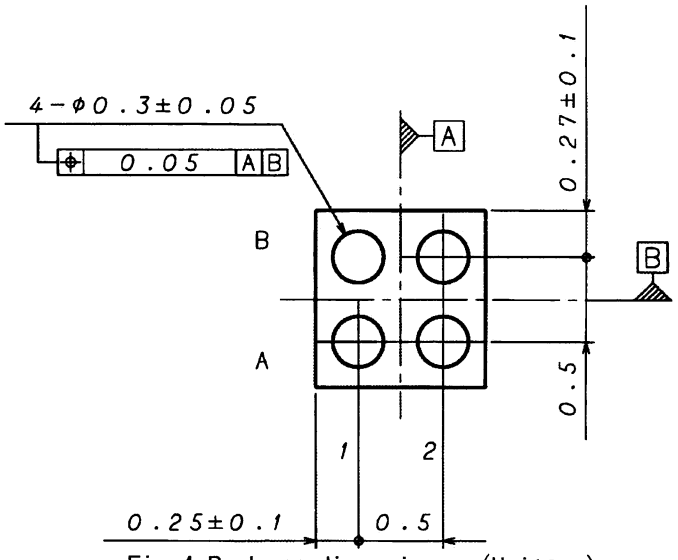


Fig.4 Package dimensions (Unit:mm)

○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 0.2V. For normal operation, set the pin voltage beyond 1.2V. It is not recommended to set STB voltage between 0.2V and 1.2V, 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.)Actions under strong light

A strong light like a halogen lamp may be caused malfunction. In our testing, fluorescence light and white LED causes quite little effects for the IC. But infrared light that causes strong effects for the IC, the IC should be shielded from the light like a sunray or halogen lamp.

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

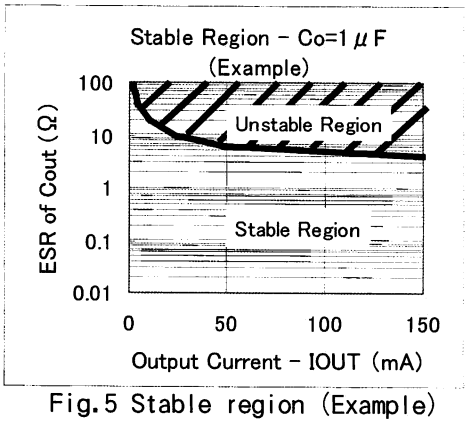


Fig.5 Stable region (Example)

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