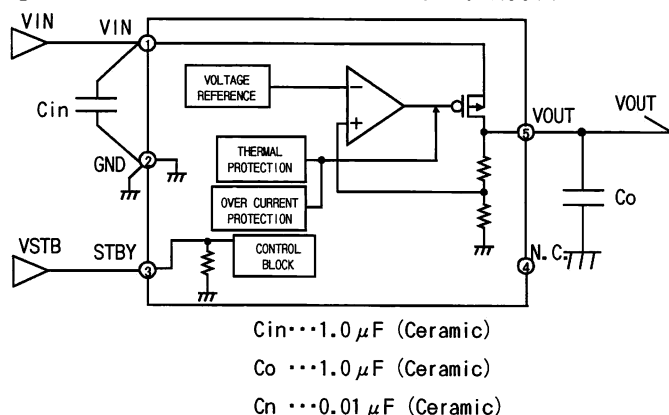


STRUCTURE Silicon Monolithic Integrated Circuit

PRODUCT CMOS Type series regulator

TYPE B H □ □ M A 3 W H F V Series

○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)                     |

Fig.1 BLOCK DIAGRAM and APPLICATION CIRCUIT

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

| PARAMETER                   | Symbol           | Limit        | Unit |
|-----------------------------|------------------|--------------|------|
| Power Supply Voltage        | V <sub>MAX</sub> | -0.3 ~ +6.5  | V    |
| Power Dissipation           | P <sub>d</sub>   | 680 (Note.1) | mW   |
| Operating Temperature Range | T <sub>opr</sub> | -40 ~ +85    | °C   |
| Storage Temperature Range   | T <sub>stg</sub> | -55 ~ +125   | °C   |

Note.1 P<sub>d</sub> derated at 6.8mW/°C for temperature above  $T_a=25^\circ C$ ,  
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°C, VIN=VOUT+1.0V(Notes.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.      |       |                                                  |
| 【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, IOU=10mA                   |
| Input. output voltage difference | VSAT1    | —         | 60   | 90        | mV    | VIN=0.98×VOUT, IOU=100mA (except BH15,18MA3WHFV) |
| Line Regulation                  | VDL1     | —         | 2    | 20        | mV    | IOUT=50mA<br>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/℃ | 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                                                |
|                                  | 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

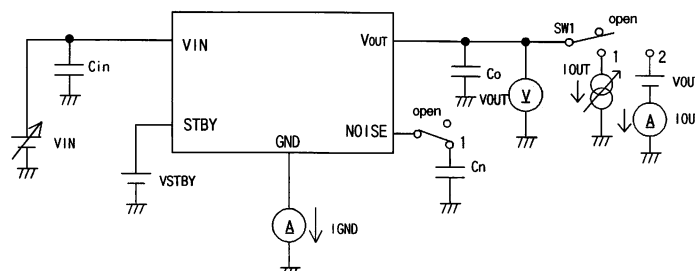


Fig.2 TEST CIRCUIT

○Power Dissipation Reduction

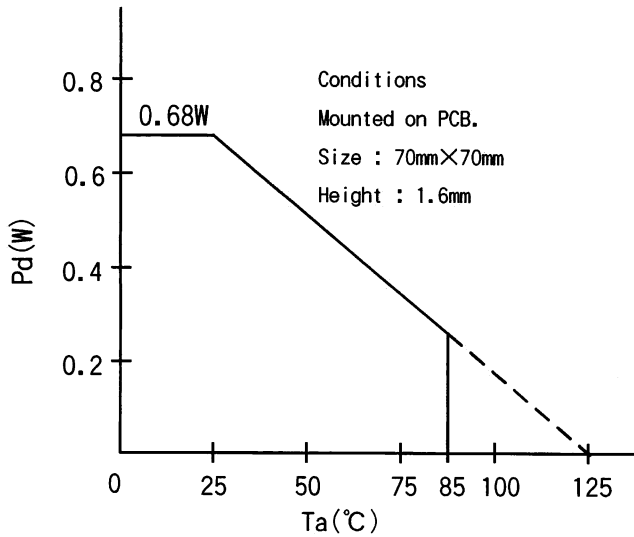


Fig.3 Pd reduction (example)

○Device Name and Marking

Device Name : BH□□MA3WHFV

| Symbol | Description <sup>a</sup> |                | 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 (HVS0F6)

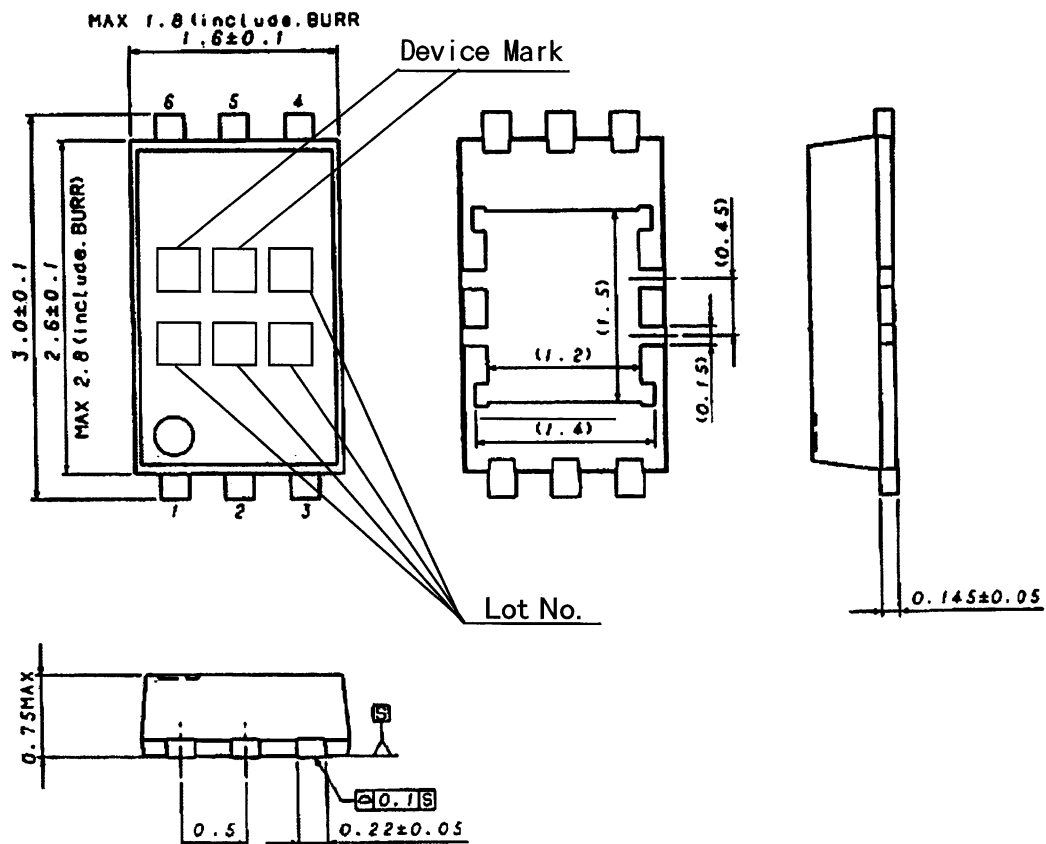


Fig.4 Package dimensions (UNIT:mm)

## ○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  $P_d$  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.

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

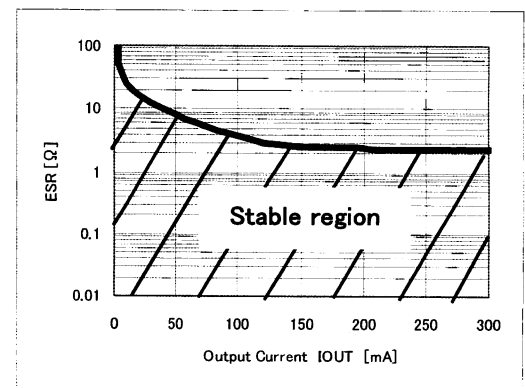


Fig.5 Stable region (Example)

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