

# AC/DC converter

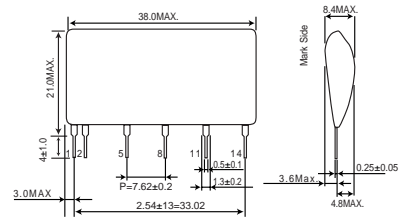
AC220V input, 15V/500mA output type

# BP5042A15

## Absolute Maximum Ratings

| Parameter                   | Symbol      | Limits      | Unit |
|-----------------------------|-------------|-------------|------|
| Input voltage               | $V_i$       | 600         | V    |
| Output current              | $I_o$       | 500         | mA   |
| ESD endurance               | $V_{surge}$ | 2           | kV   |
| Operating temperature range | $T_{opr}$   | -20 to +80  | °C   |
| Storage temperature range   | $T_{stg}$   | -25 to +105 | °C   |

## Dimension (Unit : mm)



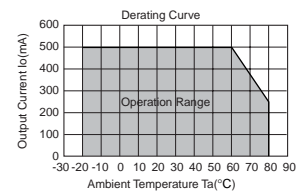
## Electrical Characteristics

| Parameter                   | Symbol   | Min. | Typ. | Max. | Unit | Conditions                      |
|-----------------------------|----------|------|------|------|------|---------------------------------|
| Input voltage range         | $V_{in}$ | 248  | 311  | 390  | V    | DC(160 to 276VAC)               |
| Output voltage              | $V_o$    | 14.1 | 15.2 | 16.3 | V    | $V_i=311V, I_o=500mA$           |
| Output current              | $I_o$    | -    | -    | 500  | mA   | $V_i=311V$ *1                   |
| Line regulation             | $V_r$    | -    | 0.2  | 0.5  | V    | $V_i=248$ to $390V, I_o=500mA$  |
| Load regulation             | $V_l$    | -    | 0.2  | 0.5  | V    | $V_i=311V, I_o=0$ to $500mA$ *2 |
| Output ripple voltage       | $V_p$    | -    | 0.15 | -    | Vp-p | $V_i=311V, I_o=500mA$           |
| Power conversion efficiency | $\eta$   | 68   | 75   | -    | %    | $V_i=311V, I_o=500mA$ *2        |

\*1 Maximum output current varies depending on ambient temperature ; please refer to derating curve.

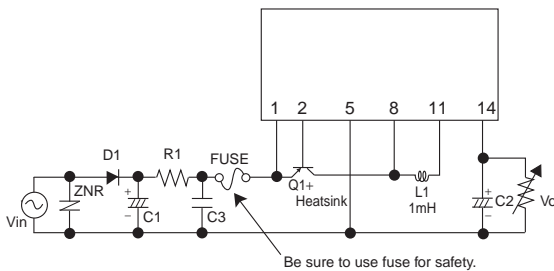
\*2 Spike noise is not included in output ripple voltage.

## Derating Curve



## Application circuit

### BP5042A15



Be sure to use fuse for safety.

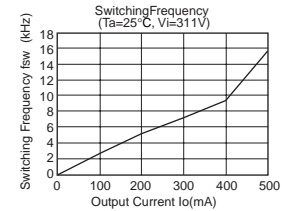
For actual usage, Please kindly evaluate and confirm our part mounted in your product, Especially, Please make sure to confirm the load current does not exceed Max. rated current by using the current probe.

| Pin No. | Function                          |
|---------|-----------------------------------|
| 1       | Input terminal                    |
| 2       | Power transistor connect terminal |
| 3       | Not used                          |
| 4       | Not used                          |
| 5       | COMMON terminal                   |
| 6       | Not used                          |
| 7       | Not used                          |
| 8       | Coil connect                      |
| 9       | Not used                          |
| 10      | Not used                          |
| 11      | Coil connect                      |
| 12      | Not used                          |
| 13      | Not used                          |
| 14      | Output terminal                   |

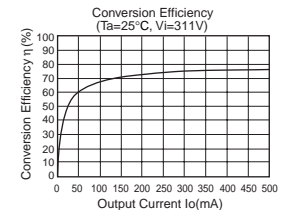
### External components setting

- FUSE:** Fuse  
Please make sure to use quick acting fuse 1A
- C1:** Capacitor for input voltage smoothing  
Capacitance : 33 $\mu$ F to 100 $\mu$ F Rated voltage : 450V or higher
- C2:** Capacitor for output voltage smoothing  
Capacitance : 220 $\mu$ F to 470 $\mu$ F Rated voltage : 35V or higher, ESR is 0.16 max. Ripple current is 0.58Arms above. Output noise voltage is influenced. Please evaluate it in the actual set.
- C3:** For noise terminal voltage reduction  
Capacitance : 0.1 $\mu$ F to 0.22 $\mu$ F Rated voltage : 450V or higher Film capacitor or ceramic capacitor. Reduce the noise terminal voltage. The constant value should be evaluated in the set.
- L1:** Choke coil  
L : 1mH Allowable current : 1A or higher Please use the one that is hard to be magnetic saturated even in the high temperature.
- R1:** For noise terminal voltage reduction  
10 $\Omega$  to 22 $\Omega$  1/4W(short time overload guranteed product) Reduce the noise terminal voltage, please set it, if necessary. The constant value should be evaluated in set.
- D1:** Rectifier diode  
In the absolute maximum ratings, the reverse peak voltage should be 600V or higher, the average rectifying current should be 0.5A or higher, and the peak surge current should be 20A or higher. (Full-wave rectifier can be used in out part.)
- Q1:** Power transistor  
600V/2A Please select a power transistor with high-speed switching. Please make sure to radiate by using heat sink.
- Heat sink**  
Please select appropriate size to protect Q1 from thermal run away. Thermal resistance : 20°C/W or less.
- ZNR:** Varistor  
Varistor must be used. It protects this part from lightning surge and static electricity.

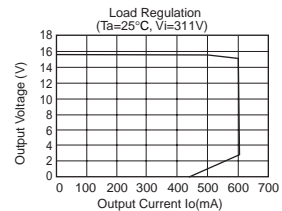
## Switching Frequency



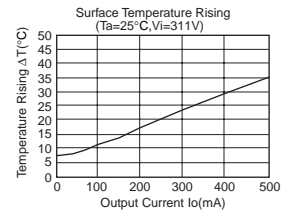
## Conversion Efficiency



## Load Regulation



## Surface Temperature Rising



# Precautions on Use of ROHM Power Module

## Safety Precautions

- 1) The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment etc.).  
If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and sufficient fail-safe measures, please consult with the Company's sales staff in advance. If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:
  - [a] Installation of protection circuits or other protective devices to improve system safety
  - [b] Installation of redundant circuits in the case of single-circuit failure
- 2) The products are designed for use in a standard environment and not in any special environments.  
Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:
  - [a] Use in various types of liquid, including water, oils, chemicals, and organic solvents
  - [b] Use outdoors where the products are exposed to direct sunlight, or in dusty places
  - [c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, and NO<sub>2</sub>
  - [d] Use in places where the products are exposed to static electricity or electromagnetic waves
  - [e] Use in proximity to heat-producing components, plastic cords, or othe flammable items
  - [f] Use involving sealing or coating the products with resin or other coating materials
  - [g] Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering
  - [h] Use of the products in places subject to dew condensation
- 3) The products are not radiation resistant.
- 4) The Company is not responsible for any problems resulting from use of the products under conditions not recommended herein.
- 5) The Company should be notified of any product safety issues. Moreover, product safety issues should be periodically monitored by the customer.

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