220VAC Input/15VDC (80mA) Output

# Non-Isolated AC/DC Converter

**BP5041B15**

## ● Absolute Maximum Ratings

| Parameter | Symbol | Limits | Unit |
|---|---|---|---|
| Input voltage | Vi | 390 | V |
| Output current | Io | 80 | mApk |
| ESD endurance | Vsurge | 2 | kV |
| Operating temperature range | Topr | −25 to +80 | °C |
| Storage temperature range | Tstg | −25 to +105 | °C |

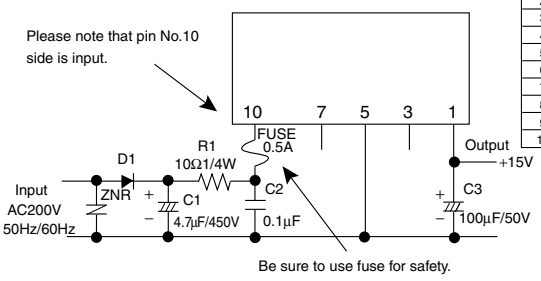
## ● Electrical Characteristics

| Parameter | Symbol | Min. | Typ. | Max. | Unit | Conditions |
|---|---|---|---|---|---|---|
| Input voltage range | Vi | 226 | 282 | 390 | V | DC(160 to 276VAC) |
| Output voltage | Vo | 14.0 | 15.0 | 16.0 | V | Vi=282V, Io=50mA |
| Output current | Io | 0 | – | 80 | mA | Vi=282V ∗1 |
| Line regulation | Vr | – | 0.05 | 0.15 | V | Vi=226 to 390V, Io=50mA |
| Load regulation | Vl | – | 0.05 | 0.15 | V | Vi=282V, Io=0 to 50mA ∗2 |
| Output ripple voltage | Vp | – | 0.05 | 0.15 | Vp-p | Vi=282V, Io=50mA |
| Power conversion efficiency | η | 50 | 64 | – | % | Vi=282V, Io=80mA ∗2 |

∗1 Maximum output current varies depending on ambient temperature ; please refer to derating curve.
∗2 Please refer to Load regulation, Conversion efficiency.

## ● Application Circuit

BP5041B15



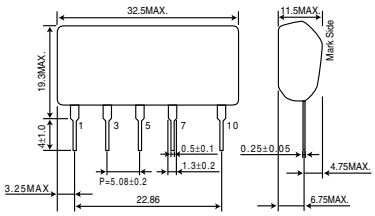

| Pin No. | Function |
|---|---|
| 1 | Output terminal Vo(15V) |
| 2 | Not used |
| 3 | N.C. |
| 4 | Not used |
| 5 | COMMON |
| 6 | Not used |
| 7 | N.C. |
| 8 | Not used |
| 9 | Not used |
| 10 | Input terminal Vi(282VDC) |

Please verify operation and characteristics in the customer's circuit before actual usage.
Ensure that the load current does not exceed the maximum rating.

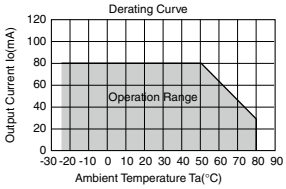
External Component Specifications

| | |
|---|---|
| FUSE: FUSE | Use a fuse of 0.5A |
| C1: Input smoothing capacitor | Capacitance : 3.3 to 22μF<br>Rated voltage : 450V or higher<br>Ripple current 0.13Arms or greater |
| C2: Noise reduction capacitor | Capacitance : 0.1 to 0.22μF<br>Rated voltage : 450V or higher<br>Use a film or ceramic capacitor. Evaluate under actual operating conditions. |
| C3: Output smoothing capacitor | Capacitance : 100 to 470μF<br>Rated voltage : 25V or higher, low impedance part<br>Impedance is 0.39Ω max. at high frequencies<br>Ripple current 0.1Arms above.<br>Capacitor impedance affects the output ripple voltage. |
| D1: Rectifier diode | In the absolute maximum ratings, the reverse surge voltage should be 800V or higher, the average rectifying current should be 0.5A or higher, and the forward surge current should be 20A or higher. |
| R1: Noise reduction resistor | 10 to 22Ω 1/4W<br>Determine the ideal value through actual testing. |
| ZNR: Varistor | A varistor is required to protect against lightning surges and static electricity. |

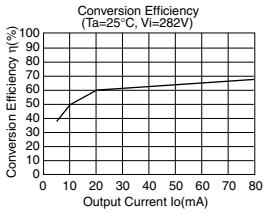
## ● Dimensions (Unit : mm)



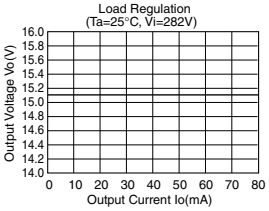

## ● Derating Curve



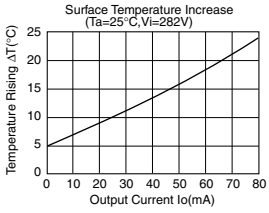

## ● Conversion Efficiency




## ● Load Regulation




## ● Surface Temperature Increase





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# Power Module Usage Precautions

## Safety Precautions

1) The products are designed and manufactured for use in ordinary electronic equipment (i.e. AV/OA/ telecommunication/amusement equipment, home appliances). Please consult with the Company's (ROHM) sales staff if intended for use in devices requiring high reliability (e.g. medical/transport/ aircraft/spacecraft equipment, nuclear power/fuel controllers, automotive/safety devices) and whose malfunction may result in injury or death. In this case, failsafe measures must be taken, including the following:
   [a] Installation of protection circuits in order to improve system safety
   [b] Incorporation of redundant circuits in the case of single-circuit failure
2) The products are designed for use under normal conditions. Application in special environments can cause a deterioration in product performance. Therefore, verification and confirmation of product performance, prior to use, is recommended. The following environments are considered to be 'special':
   [a] Outdoors, exposed to direct sunlight or dust
   [b] In contact with liquids, such as water, oils, chemicals, or organic solvents
   [c] In areas where exposure to the sea air or corrosive gases (i.e. $Cl_2$, $H_2S$, $NH_3$, $SO_2$, $NO_2$) can occur
   [d] In places where the products may be in contact with static electricity or electromagnetic waves
   [e] In proximity to heat-producing items, plastic cords, or flammable materials
   [f] In contact with sealing or coating products, such as resin
   [g] In contact with unclean solder or exposed to water or water-soluble cleaning agents used after soldering
   [h] In areas where dew condensation occurs
3) The products are not designed to be 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.

## Application Notes

1) A sufficient margin must be allowed if changes are made to the peripheral circuit due to variations in the inherent tolerances of the external components as well as transient and static characteristics. In addition, please be aware that the Company has not conducted investigations on whether or not particular changes in the example application circuits would result in patent infringement.
2) The application examples, their constants, and other types of information contained herein are applicable only when the products are used in accordance with standard methods.
   Therefore, if mass production is intended, sufficient consideration to external conditions must be made.

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