220VAC Input/15VDC (150mA) Output

Non-Isolated AC/DC Converter

BP5047B15

● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Remark
Input voltage	Vi1	430	V	DC
	Vi2	550	V	Plus 1mSMax.
Operating temperature range	Topr	−20 to +80	°C	Refer to derating curve
Storage temperature range	Tstg	−25 to +105	°C	
Case temperature	TCMAX	105	°C	Ambient temperature+ The module self-heating ≤ Tcmax
Output current	IOMAX1	150	mA	PEAK value of current (Vi=180 to 390V)
	IOMAX2	130	mA	PEAK value of current (Vi=390 to 430V)
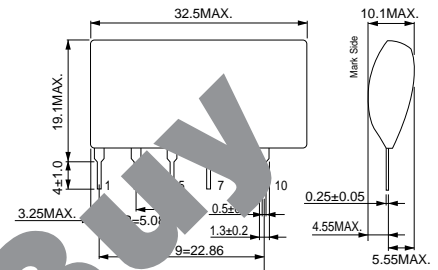
● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	180	311	430	V	DC
Output voltage	Vo	14.2	15.2	16.2	V	Vi=311V, Io=100mA
Output current1	Io1	0	–	150	mA	Vi=180 to 390V
Output current2	Io2	0	–	130	mA	Vi=390 to 430V
Line regulation	Vr	−0.20	0.05	0.20	V	Vi=180 to ___V ___mA
Load regulation	Vl	−0.20	0.05	0.20	V	Vi=311V ___ 100mA
Output ripple voltage	Vp	–	0.07	0.15	Vp-p	Vi=3___ ___100mA
Power conversion efficiency	η	70	75	–	%	V___1V, ___100mA

● Application Circuit

BP5047B15

Be sure to use fuse for safety.
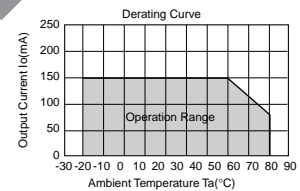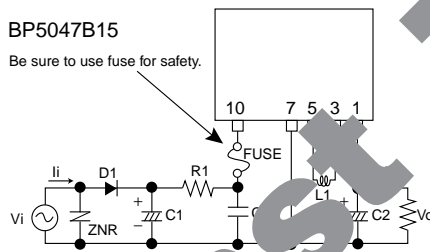
Pin No.	Function
1	Output terminal: Vo(+15VDC)
2	Skip
3	Power inductor terminal
4	Skip
5	Power inductor terminal
6	Skip
7	COMMON
8	Skip
9	Skip
10	Input terminal Vi(+311VDC)

Please verify operation ___ ___characteristics in the customer's circuit before actual usage.
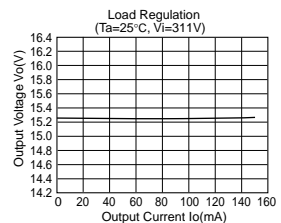Ensure that the load ___ ___ not exceed the maximum rating.

External Component Specification

FUSE: Fu___ ___ Use a quick-acting fuse (1A)

C1: Input Ca___ ___ above 450V, 3.3 to 33µF
Ripple current 0.13Arms or greater

C2: Output Capacitor above 35V, 100 to 470µF, low impedance
ESR : 0.4Ω Max.
Ripple current 0.25Arms or greater
Capacitor impedance affects the output ripple voltage.

C3: Noise reduction capacitor above 450V, 0.1 to 0.22µF
Use a film or ceramic capacitor. Evaluate under actual operating conditions.

L1: Power inductor Inductance : 1mH, Rating current: above 400mA
Select components that do not easily get magnetically saturated at high temperature.
Recommended part : C10-FR 1.0mH(MITSUMI)

D1: Rectifier diode Use a rectifying diode with a peak reverse voltage of 800V or higher, an average rectification current of 1A or larger and a peak surge current of 20A or larger. When using a large capacitance input capacitor, select a component that is strong against inrush current during power up. Full-wave rectification can be used.

R1: Noise reduction resistor 10 to 22Ω 1/4W
Determine the ideal value through actual testing.

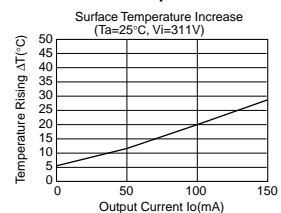ZNR: Varistor A varistor is required to protect against lightning surges and static electricity.

● Dimensions (Unit : mm)

32.5MAX.
10.1MAX.
Mark Side
19.1MAX.
4±1.0
3.25MAX.
0.5±___
5.08
0.25±0.05
4.55MAX.
1.3±0.2
9=22.86
5.55MAX.

● Derating Curve

Derating Curve
Operation Range
Output Current Io(mA)
Ambient Temperature Ta(°C)

● Conversion Efficiency

Conversion Efficiency (Ta=25°C, Vi=311V)
Conversion Efficiency η (%)
Output Current Io(mA)

● Load Regulation

Load Regulation (Ta=25°C, Vi=311V)
Output Voltage Vo(V)
Output Current Io(mA)

● Surface Temperature Increase

Surface Temperature Increase (Ta=25°C, Vi=311V)
Temperature Rising ΔT(°C)
Output Current Io(mA)
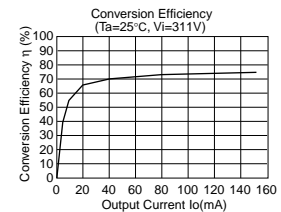
Power Module Usage Precautions

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, 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.

Notes Regarding Industrial Property

1) The specifications included herein contain information related to the Company's industrial property. Their use other than pertaining to the relevant products is forbidden. Duplication and/or disclosure to a third party without express written permission is strictly prohibited.
2) Product information and data, including application examples, contained in the specifications are for reference purposes only; the Company does not guarantee the industrial/intellectual property rights or any other rights of a third party. Accordingly, the Company shall not bear responsibility for:
   [a] Infringement of the intellectual property rights of a third party
   [b] Problems arising from the use of the products listed herein
3) The Company prohibits the purchaser from exercising or using the intellectual/industrial property rights or any rights belonging to or are controlled by the Company, other than the right to use, sell, or dispose of the products.

Notes

1) The information contained herein is subject to change without notice.

2) Before you use our Products, please contact our sales representative and verify the latest specifications.

3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
Therefore, in order to prevent personal injury or fire arising from failure, please take safety measures such as complying with the derating characteristics, implementing redundant and fire prevention designs, and utilizing backups and fail-safe procedures. ROHM shall have no responsibility for any damages arising out of the use of our Poducts beyond the rating specified by ROHM.

4) Examples of application circuits, circuit constants and any other information contained herein are provided only to illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

5) The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM or any other parties. ROHM shall have no responsibility whatsoever for any dispute arising out of the use of such technical information.

6) The Products are intended for use in general electronic equipment (i.e. AV/OA devices, communication, consumer systems, gaming/entertainment sets) as well as the applications indicated in this document.

7) The Products specified in this document are not designed to be radiation tolerant.

8) For use of our Products in applications requiring a high degree of reliability (as exemplified below), please contact and consult with a ROHM representative : transportation equipment (i.e. cars, ships, trains), primary communication equipment, traffic lights, fire/crime prevention, safety equipment, medical systems, servers, solar cells, and power transmission systems.

9) Do not use our Products in applications requiring extremely high reliability, such as aerospace equipment, nuclear power control systems, and submarine repeaters.

10) ROHM shall have no responsibility for any damages or injury arising from non-compliance with the recommended usage conditions and specifications contained herein.

11) ROHM has used reasonable care to ensure the accuracy of the information contained in this document. However, ROHM does not warrants that such information is error-free, and ROHM shall have no responsibility for any damages arising from any inaccuracy or misprint of such information.

12) Please use the Products in accordance with any applicable environmental laws and regulations, such as the RoHS Directive. For more details, including RoHS compatibility, please contact a ROHM sales office. ROHM shall have no responsibility for any damages or losses resulting non-compliance with any applicable laws or regulations.

13) When providing our Products and technologies contained in this document to other countries, you must abide by the procedures and provisions stipulated in all applicable export laws and regulations, including without limitation the US Export Administration Regulations and the Foreign Exchange and Foreign Trade Act.

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