AC/DC converter

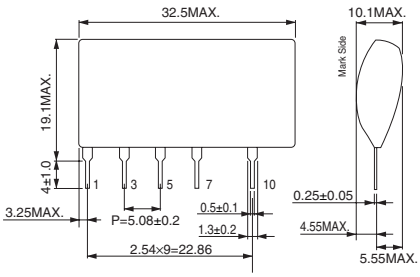
BP5047B15

AC220V input, 15V 150mA output

● 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)

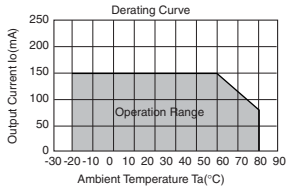
● Dimensions (Unit : mm)



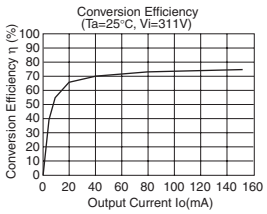
● Electrical Characteristics

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 430V, Io=100mA
Load regulation	Vl	–0.20	0.05	0.20	V	Vi=311V, Io=0 to 100mA
Output ripple voltage	Vp	–	0.07	0.15	Vp-p	Vi=311V, Io=100mA
Power conversion efficiency	η	70	75	–	%	Vi=311V, Io=100mA

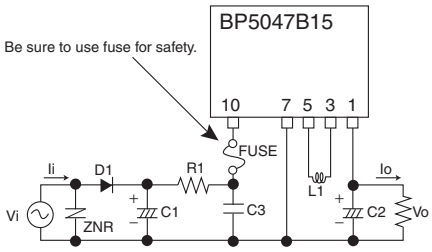
● Derating Curve



● Conversion Efficiency



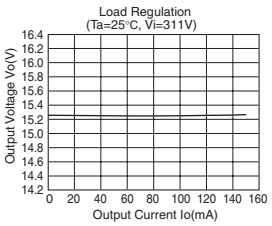
● Application circuit



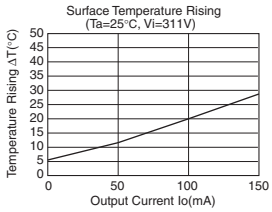
Pin No.	Function
1	Output terminal: Vo(+15VDC)
2	Skip
3	Power inductor terminal
4	Skip
5	Power inductor terminal
6	Skip
7	COMMON
8	Skip
9	Skip
10	Input terminal Vi(+311VDC)

Verify proper operation under actual conditions before use. In particular, confilm that the load current dose not exceed the maximumrating.

● Load Regulation



● Surface Temperature Rising



External components setting

FUSE: Fuse	Please make sure to use quick acting fuse (1A)
C1: Input Capacitor	above 450V, 3.3μF to 33μF Ripple current 0.13Arms above
C2: Output Capacitor	above 35V, 100μF to 470μF, Low impedance ESR : 0.4Ω Max. Ripple current 0.25Arms above Impedance of capacitor effects the output ripple voltage.
C3: For noise terminal voltage reduction capacitor	above 450V, 0.1μF to 0.22μF Film capacitor or Ceramic capacitor reduce the noise terminal voltage. The constant value should be evaluated in the product.
L1: Power inductor	Inductance : 1mH, Rating current: above 400mA Choose components that do not easily get magnetically saturated in high temperature. Recommended part : C10-FR 1.0mH(MITSUMI)
D1: Rectifier diode	Use a rectifying diode with the peak reverse voltage of 800V or higher, the average rectification current of 1A or larger and the peak surge current of 20A or larger. When using an input capacitor of a large capacity, choose a component that endures the inrush current on power-up. This products is compatible with full-wave rectification.
R1: For noise terminal voltage reduction resistor	10Ω to 22Ω 1/4W Reduce the noise terminal voltage. The constant value should be evaluated in the product.
ZNR: Varistor	Varistor must be used. It protects this part from lightning surge and static electricity.

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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