220VAC Input/24VDC (150mA) Output

Non-Isolated AC/DC Converter

BP5047A24

● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	Vi	358	V
Maximum output voltage	IoMAX	150	mApk
ESD endurance	Vsurge	2	kV
Operating temperature range	Topr	–20 to +80	°C
Storage temperature range	Tstg	–25 to +105	°C

● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	249	311	358	V	
Output voltage	Vo	23.0	24.0	25.8	V	Vi=311V, Io=100mA
Output current	Io	0	–	150	mA	Vi=311V ∗1
Line regulation	Vr	–0.20	0.05	0.20	V	Vi=249 to 358V, Io=100mA
Load regulation	Vl	–0.20	0.05	0.20	V	Vi=311V, Io= to mA ∗2
Output ripple voltage	Vp	–	0.07	0.15	Vp-p	Vi=311V, Io= mA
Power conversion effciency	η	65	78	–	%	Vi=31 =1 ∗2

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

● Application Circuit

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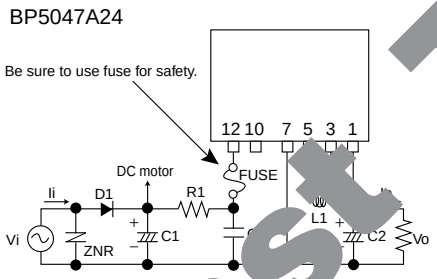


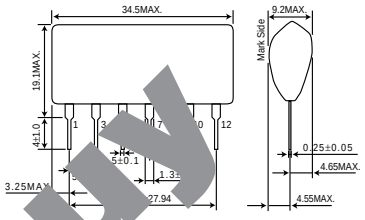
Pin	Function
1	ut terminal Vo(24V)
2	
3	Choke coil connect
4	Skip
5	Choke coil connect
6	Skip
7	COMMON
8	Skip
9	Skip
10	N.C.
11	Skip
12	Input terminal Vi(311VDC)

Please verify operati haracteristics in the customer's circuit before actual usage.
Ensure that the loa rr s not exceed the maximum rating.

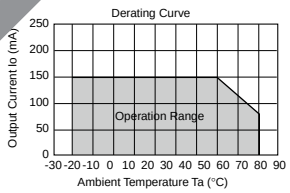
External Co nent Specifications

FUSE: Fu	Use a fuse of 1A.
C1: Input cap	Rated voltage 400V or higher 22 to 820µF Permissible ripple current is 0.13Arms or higher
C2: Output capacitor	Rated voltage 35V or higher, 100 to 470µF Low impedance type Impedance is 0.4Ω max at high frequencies. Evaluate under actual operating conditions.
C3: Noise removal capacitor	Rated voltage 400V or higher 0.1 to 0.22µF Film or ceramic capacitor Evaluate under actual operating conditions. Ripple current 0.25Arms or greater. Capacitor impedance affects the output ripple voltage.
L1: Power inductor	Inductance : 1.5mH Permissible current value 300mA or higher
D1: Rectifier diode	A reverse surge voltage 800V or higher An average rectifying current 0.5A or higher The forward surge current should be 20A or higher.
R1: Noise removal 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.

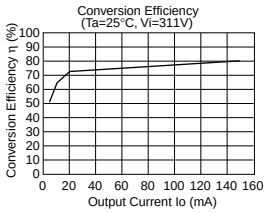
● Dimensions (Unit : mm)



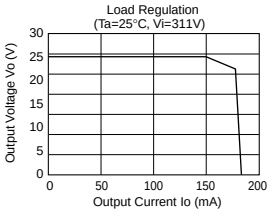
● Derating Curve



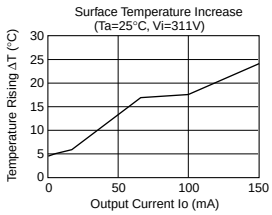
● Conversion Efficiency



● 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':
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   [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, [illegible]an occur
   [d] In places where the products may be in contact with static electricity or electro[illegible]netic 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-solu[illegible]cle 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 f[illegible]se of the products under conditions not recommended herein.
5) The Company should be notified of any product safety issu[illegible]Moreover, product safety issues should be periodically monitored by the customer.

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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 e[illegible]nal components as well as transient and static characteristics. In addition, please be aware that the Com[illegible]has not conducted investigations on whether or not particular changes in the example applica[illegible]uits would result in patent infringement.
2) The application examp[illegible], th[illegible]r constants, and other types of information contained herein are applicable only when the pr[illegible]s are used in accordance with standard methods.
   Therefore, if ma[illegible]duction is intended, sufficient consideration to external conditions must be made.

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3) Although ROHM is continuously working to improve product reliability and quality, semiconductors can break down and malfunction due to various factors.
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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.

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