220VAC Input/24VDC (200mA) Output

Non-Isolated AC/DC Converter

BP5048-24

● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	Vcc	358	V
Maximum Output current	IOMAX	200	mApk
ESD endurance	Vsurge	2	kV
Maximum surface temperature	TCMAX	105	°C
Operating temperature range	Topr	−20 to +80	°C
Storage temperature range	Tstg	−25 to +105	°C

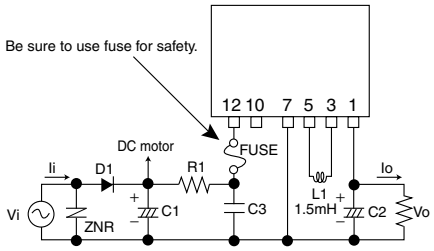
● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	228	311	358	V	DC
Output voltage	Vo	23.0	24.0	25.8	V	Vi=311V, Io=100mA
Output current	Io	0	–	200	mA	Vi=311V ∗1
Line regulation	Vr	−0.20	0.05	0.20	V	Vi=249 to 358V, Io=100mA
Load regulation	VI	−0.20	0.05	0.20	V	Vi=311V, Io=0 to 100mA ∗2
Output ripple voltage	Vp	–	0.07	0.15	Vp-p	Vi=311V, Io=100mA
Power conversion efficiency	η	65	78	–	%	Vi=311V, Io=200mA ∗2

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

● Application Circuit

BP5048-24



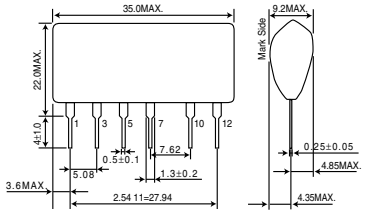
Pin No.	Function
1	Output terminal Vo(24V)
2	Skip
3	Choke coil connect
4	Skip
5	Choke coil connect
6	Skip
7	COMMON
8	Skip
9	Skip
10	N.C.
11	Skip
12	Input terminal Vi(311VDC)

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

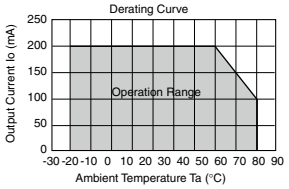
External Component Specifications

FUSE: Fuse	Use a fuse of 1A.
C1: Input capacitor	Rated voltage 400V or higher, 22 to 820μF Permissible ripple current 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. Permissible ripple current 0.25Arms or higher 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.
L1: Power inductor	Inductance = 1.5mH Permissible current value 450mA or higher
D1: Rectifier diode	A reverse surge voltage 800V or higher An average rectifying current of 0.5A 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.

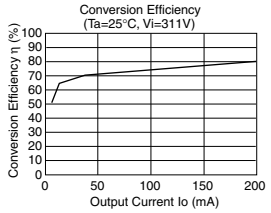
● Dimensions (Unit : mm)



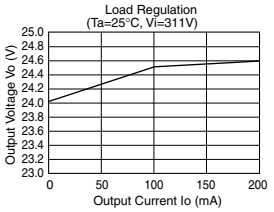
● Derating Curve



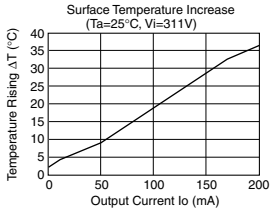
● Conversion Efficiency



● Load Regulation



● Surface Temperature Increase



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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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.

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