100VAC Input/24VDC (200mA) Output

Non-Isolated AC/DC Converter

BP5039A

● Absolute Maximum Ratings

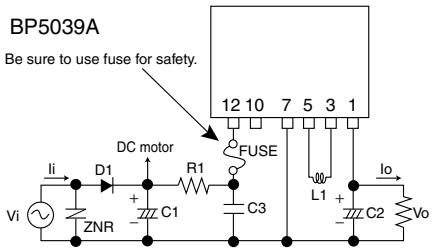
Parameter	Symbol	Limits	Unit
Input voltage	Vcc	170	V
Maximum output current	IoMAX	200	mApk
ESD endurance	Vsurge	2	kV
Maximum surface temperature	TcMAX	105	°C
Operating Temperature range	Topr	−20 to +80	°C
Storage temperature range	Tstg	−25 to +105	°C

● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	113	141	170	V	DC (80 to 120VAC)
Output voltage	Vo	22	24	26	V	Vi=141V, Io=100mA
Output current	Io	0	–	200	mA	Vi=141V ∗1
Line regulation	Vr	−0.50	0.30	0.50	V	Vi=113 to 170V, Io=100mA
Load regulation	Vl	−0.50	0.25	0.50	V	Vi=141V, Io=0 to 100mA ∗2
Output ripple voltage	Vp	–	0.07	–	Vp-p	Vi=141V, Io=100mA
Power conversion efficiency	η	70	82	–	%	Vi=141V, Io=200mA ∗2
Output current at overcurrent	Io1	200	245	–	mA	Vi=170V, Output short, Ta=25°C
	Io2	150	220		mA	Vi=170V, Output short, Ta=80°C

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

● Application Circuit



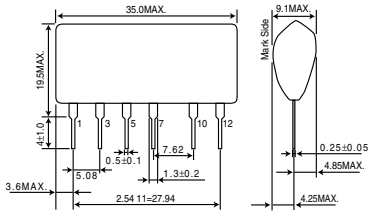
Pin No.	Function
1	Output terminal Vo(24V)
2	Not used
3	Choke coil connect
4	Not used
5	Choke coil connect
6	Not used
7	COMMON
8	Not used
9	Not used
10	N.C.
11	Not used
12	Input terminal Vi(141VDC)

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

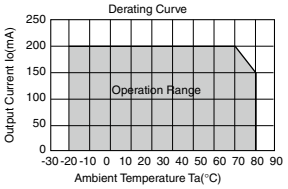
External Component Specifications

FUSE: FUSE	Use a quick-acting fuse of (1A)
C1: Input capacitor	above 250V, 22 to 820µF Ripple current 0.13Arms or above
C2: Output capacitor	above 25V, 100 to 470µF low impedance ESR : 0.4Ω Max. Ripple current 0.25Arms or above Capacitor impedance affects the output ripple voltage.
C3: Noise reduction capacitor	above 250V, 0.1 to 0.22µF Use a film or ceramic capacitor Evaluate under actual operating conditions.
L1: Power Inductor	Inductance : 1.5mH Rating current : above 0.4A
D1: Rectifier diode	In the absolute maximum ratings, the reverse surge voltage should be 400V or above the average rectifier current should be 1A or greater, and the forward surge current should be 20A or more.
R1: Noise reduction resistor	10 to 22Ω 1/4W Determine the ideal value through actual testing.
ZNR: Varistor	A varistor must be used to protect against lightning surges and static electricity.

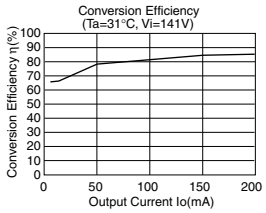
● Dimensions (Unit : mm)



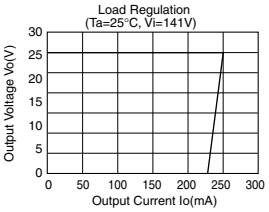
● Derating Curve



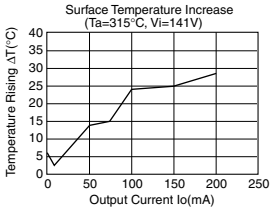
● Conversion Efficiency



● 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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   [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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