

100VAC Input/15VDC (200mA) Output

Non-Isolated AC/DC Converter

BP5039-15

Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	V_i	170	V
Maximum output current	I_{OMAX}	200	mApk
ESD endurance	V_{surge}	2	kV
Operating temperature range	T_{opr}	-25 to +80	°C
Storage temperature range	T_{stg}	-25 to +105	°C

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	V_i	113	141	170	V	DC(80 to 120VAC)
Output voltage	V_o	14.25	15.00	15.75	V	$V_i=141V, I_o=100mA$
Output current	I_o	0	-	200	mA	$V_i=141V$ *1
Line regulation	V_r	-0.20	0.05	0.20	V	$V_i=113$ to 170V, $I_o=100mA$
Load regulation	V_l	-0.20	0.05	0.20	V	$V_i=141V, I_o=0$ to 100mA *2
Output ripple voltage	V_p	-	0.07	0.15	Vp-p	$V_i=141V, I_o=100mA$
Power conversion efficiency	η	60	74	-	%	$V_i=141V, I_o=200mA$ *2
Surface temperature rising	T_c	-	38	-	K	$V_i=170V, I_o=200mA$
Output current overcurrent1	I_m	240	270	-	mA	$V_i=141V$
Output current overcurrent2	I_s	-	260	290	mA	$V_i=141V$

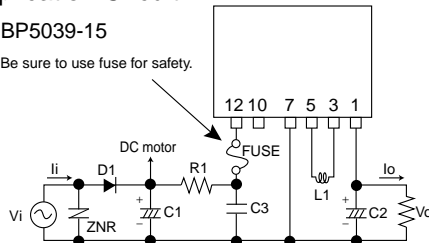
*1 Maximum output current varies depending on ambient temperature ; please refer to derating curve.

*2 Please refer to Load regulation, Conversion efficiency.

Application Circuit

BP5039-15

Be sure to use fuse for safety.



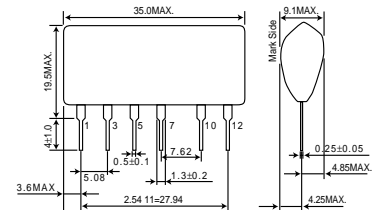
Pin No.	Function
1	Output terminal Vo(15V)
2	Skip
3	Choke coil connect
4	Skip
5	Choke coil connect
6	Skip
7	COMMON
8	Skip
9	Skip
10	N.C.
11	Skip
12	Input terminal Vi(141VDC)

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

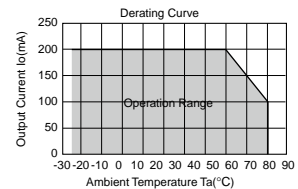
External Component Specifications

FUSE: Fuse	Please make sure to use quick acting fuse (1A)
C1: Input capacitor	Above 250V, 22 to 820 μ F Ripple current 0.13Arms above
C2: Output capacitor	Above 25V, 100 to 470 μ F, Low impedance ESR : 0.4 Ω Max. Ripple current 0.25Arms above Impedance of capacitor effects the output ripple voltage.
C3: Noise reduction capacitor	Above 250V, 0.1 to 0.22 μ F Use a film or ceramic capacitor. Evaluate under actual conditions.
L1: Power inductor	Inductance : 1mH, Rating current : above 600mA Choose components that do not easily get magnetically saturated at high temperature.
D1: Rectifier diode	Use a rectifying diode with a peak reverse voltage of 400V or higher, an average rectification current of 0.5A or larger and a peak surge current of 20A or larger. When using a large capacitance input capacitor select a component strong against inrush current during power up. Full-wave rectification can be used.
R1: Noise reduction resistor	10 to 22 Ω , 1/4W Determine the ideal value through actual testing.
ZNR: Varistor	A varistor must be used to protect against lightning surges and static electricity.

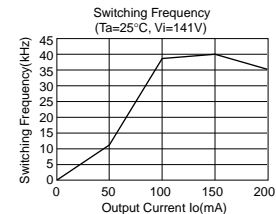
Dimensions (Unit : mm)



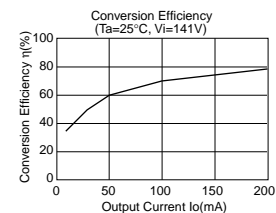
Derating Curve



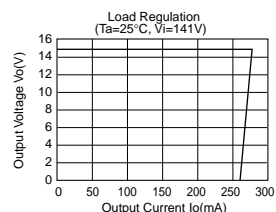
Switching Frequency



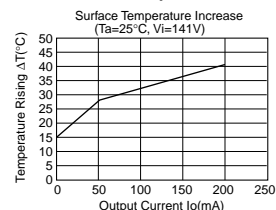
Conversion Efficiency



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. Cl₂, H₂S, NH₃, SO₂, NO₂) 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.

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