

## 100VAC Input/15VDC (200mA) Output

# Non-Isolated AC/DC Converter

#### BP5039-15

#### Absolute Maximum Ratings

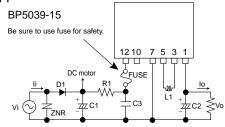
Parameter	Symbol	Limits	Unit
Input voltage	Vi	170	V
Maximum output current	Іомах	200	mApk
ESD endurance	Vsurge	2	kV
Operating temperature range	Topr	-25 to +80	°C
Storage temperature range	Tstg	-25 to +105	°C

#### Electrical Characteristics

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Input voltage range	Vi	113	141	170	V	DC(80 to 120VAC)
Output voltage	Vo	14.25	15.00	15.75	V	Vi=141V, Io=100mA
Output current	lo	0	_	200	mA	Vi=141V *1
Line regulation	Vr	-0.20	0.05	0.20	V	Vi=113 to 170V, Io=100mA
Load regulation	VI	-0.20	0.05	0.20	V	Vi=141V, Io=0 to 100mA *2
Output ripple voltage	Vp	_	0.07	0.15	Vp-p	Vi=141V, Io=100mA
Power conversion efficiency	η	60	74	_	%	Vi=141V, Io=200mA *2
Surface temperature rising	Тс	_	38	_	K	Vi=170V, Io=200mA
Output current overcurrent1	lm	240	270	_	mA	Vi=141V
Output current overcurrent2	Is	_	260	290	mA	Vi=141V

<sup>\*1</sup> Maximum output current varies depending on ambient temperature; please refer to derating curve

#### Application Circuit



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)

Above 250V, 22 to  $820\mu\text{F}$  Ripple current 0.13Arms above C1: Input capacitor

C2: Output capacitor Above 25V, 100 to 470µF, Low impedance

Impedance of capacitor effects the output ripple voltage.

C3: Noise reduction capacitor

Above 250V, 0.1 to 0.22μF 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.

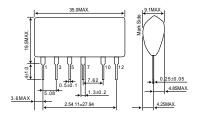
R1: Noise reduction resistor

10 to  $22\Omega,\,1/4W$ Determine the ideal value through actual testing.

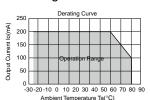
ZNR: Varistor A varistor must be used to protect against lightning surges and static

electricity.

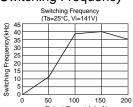
## Dimensions (Unit : mm)



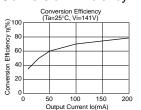
#### Derating Curve



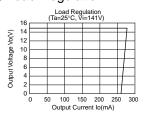
### Switching Frequency



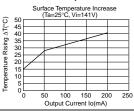
#### Conversion Efficiency



## Load Regulation



#### Surface Temperature Increase



<sup>\*2</sup> Please refer to Load regulation. Conversion efficiency

# 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<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>) 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

- 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 /

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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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