

### ● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	$V_i$	170	V
Output current	$I_o$	30	mA <sub>pk</sub>
ESD endurance	$V_{\text{surge}}$	2	kV
Operating temperature range	$T_{\text{opr}}$	-20 to +80	°C
Storage temperature range	$T_{\text{stg}}$	-20 to +85	°C

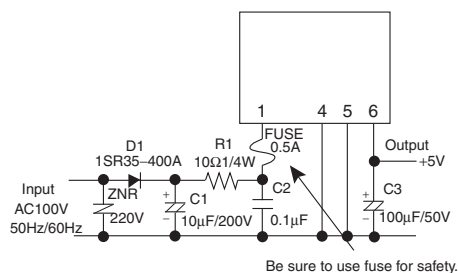
## ● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	113	141	170	V	DC(80 to 120VAC)
Output voltage	Vo	4.7	5.0	5.3	V	Vi=141V, Io=15mA
Output current	Io	0	—	30	mA	Vi=141V
Line regulation	Vr	—	0.1	0.3	V	Vi=113 to 170V, Io=15mA
Load regulation	Vl	—	0.15	0.3	V	Vi=141V, Io=0 to 15mA
Output ripple voltage	Vp	—	0.05	0.15	Vp-p	Vi=141V, Io=15mA
Power conversion efficiency	η	25	33	—	%	Vi=141V, Io=30mA

\*1 Maximum output current varies depending on ambient temperature : please refer to derating curve

### ● Application circuit

BP5038A1



Be sure to use fuse for safety.

For actual usage, Please kindly evaluate and confirm our part mounted in your product,  
Especially, Please make sure to confirm whether the load current exceed Max. rated current  
by using the current probe.

### External components setting

FUSE: Fuse Please make sure to use quick acting fuse (0.5A)

C1: Input capacitor      Above 200V, 3.3 to 22 $\mu$ F  
Ripple current 0.13Arms above

C2: Noise removal capacitor	Above 200V, 0.1 to 0.22μF Film capacitor or Ceramic capacitor Reduce the noise terminal voltage. The constant value should be evaluated in the product.
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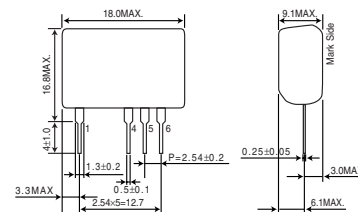
C3: Output capacitor      Above 25V, 100 to 470μF, Low impedance  
ESR : 0.39Ω Max.  
Ripple current 0.1Arms above  
Impedance of capacitor effects the output ripple voltage.

R1: Noise removal resistor      Resistance : 10 to 22Ω. Power : More than 1/4W

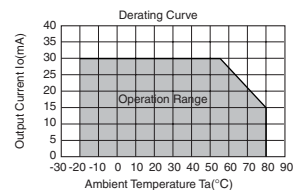
D1: Rectifier diode Use a rectifying diode with the peak reverse voltage of 400V or higher, the average rectification current of 0.5A or larger and the peak surge current of 20A or larger. When using an input capacitor of a large capacity, choose a component that endures the inrush current on power-up. This product is compatible with full-wave rectification.

ZNR: Varistor  
Varistor must be used. It protects this part from lightning surge and static electricity.

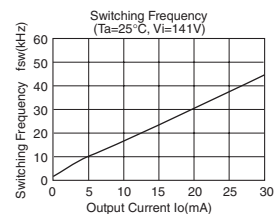
● Dimensions (Unit : mm)



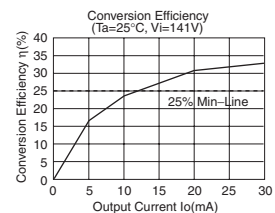
- Derating Curve



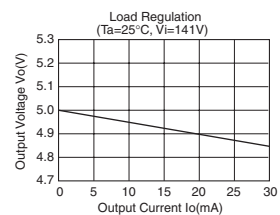
### ● Switching Frequency



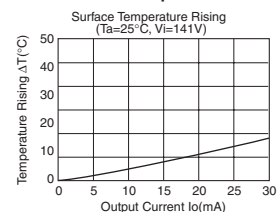
### ● Conversion Efficiency



- Load Regulation



### ● Surface Temperature Rising



# 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

- 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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  - [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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- Products listed in this document are no antiradiation design.

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Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

In case of export from Japan, please confirm if it applies to "objective" criteria or an "informed" (by MITI clause) on the basis of "catch all controls for Non-Proliferation of Weapons of Mass Destruction.