

AC/DC converter

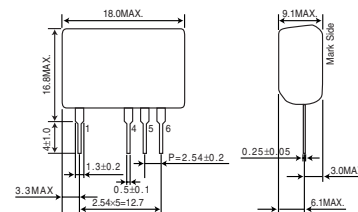
AC100V input, 5V/30mA output

BP5038A1

Absolute Maximum Ratings

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

Dimensions (Unit : mm)

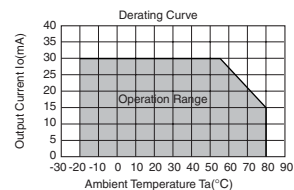


Electrical Characteristics

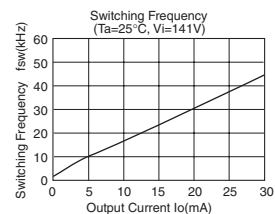
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	V_i	113	141	170	V	DC(80 to 120VAC)
Output voltage	V_o	4.7	5.0	5.3	V	$V_i=141V$, $I_o=15mA$
Output current	I_o	0	—	30	mA	$V_i=141V$ *1
Line regulation	V_r	—	0.1	0.3	V	$V_i=113$ to $170V$, $I_o=15mA$
Load regulation	V_l	—	0.15	0.3	V	$V_i=141V$, $I_o=0$ to $15mA$
Output ripple voltage	V_p	—	0.05	0.15	Vp-p	$V_i=141V$, $I_o=15mA$
Power conversion efficiency	η	25	33	—	%	$V_i=141V$, $I_o=30mA$

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

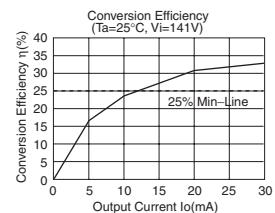
Derating Curve



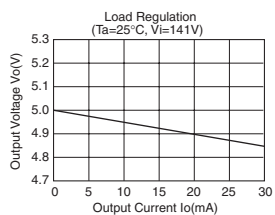
Switching Frequency



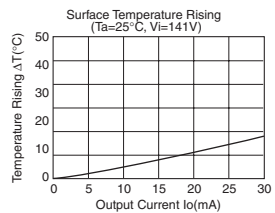
Conversion Efficiency



Load Regulation

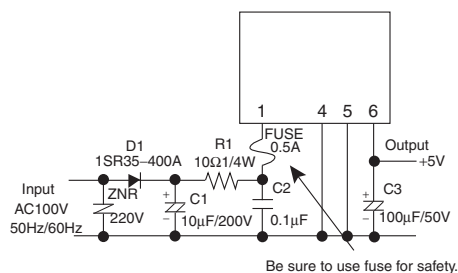


Surface Temperature Rising



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 22μF 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.
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.

Power Module Usage Precautions

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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.

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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.

Appendix

Notes

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- Products listed in this document are no antiradiation design.

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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.