AC/DC converter

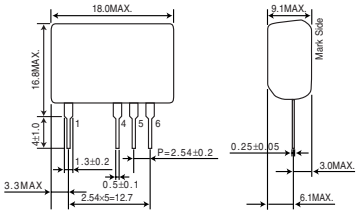
AC100V input, 12V/30mA output

BP5038A

● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	Vi	170	V
Output current	Io	30	mApk
ESD endurance	Vsurge	2	kV
Operating temperature range	Topr	−20 to +80	°C
Storage temperature range	Tstg	−20 to +85	°C

● Dimensions (Unit : mm)

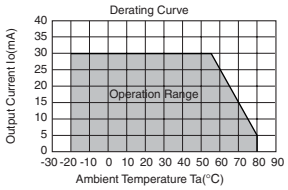


● Electrical Characteristics

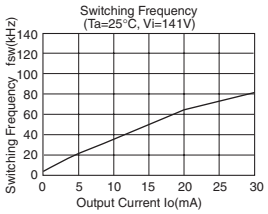
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	113	141	170	V	DC(80 to 120VAC)
Output voltage	Vo	11.0	12	13.0	V	Vi=141V, Io=30mA
Output current	Io	0	–	30	mA	Vi=141V ∗1
Line regulation	Vr	–	0.17	0.3	V	Vi=113 to 170V, Io=30mA
Load regulation	Vl	–	0.19	0.3	V	Vi=141V, Io=0 to 30mA ∗2
Output ripple voltage	Vp	–	0.05	0.15	Vp-p	Vi=141V, Io=30mA
Power conversion efficiency	η	40	50	–	%	Vi=141V, Io=30mA ∗2

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

● Derating Curve



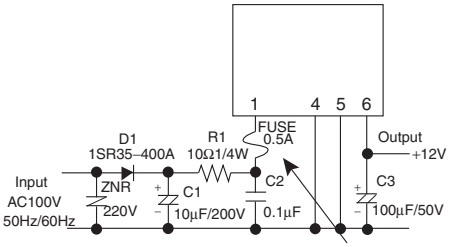
● Switching Frequency



● Application circuit

BP5038A

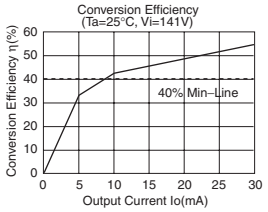
Pin No.	Function
1	Input terminal Vi(141VDC)
2	Skip
3	Skip
4	COMMON
5	COMMON
6	Output terminal Vo(12V)



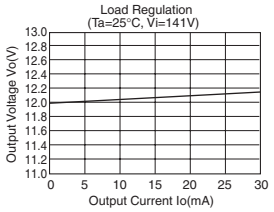
Be sure to use fuse for safety.

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.

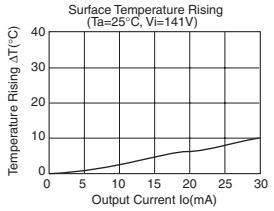
● Conversion Efficiency



● Load Regulation



● Surface temperature Rising



External components setting

FUSE: Fuse	Please make sure to use fuse 0.5A
C1: Capacitor for input voltage smoothing	Capacitance : 3.3μF to 22μF Rated voltage : 250V or higher
C2: For noise terminal voltage reduction	Capacitance : 0.1μF to 0.22μF Rated voltage : 250V or higher Film capacitor or ceramic capacitor. Reduce the noise terminal voltage. The constant value should be evaluated in the set.
C3: Capacitor for Output voltage smoothing	Capacitance : 100μF to 470μF Rated voltage : 25V or higher, Low impedance part Impedance is 0.39Ω max at high frequency range. Ripple current is 0.1Arms above. Impedance of capacitor affects the output ripple voltage.
D1: Rectifier diode	In the absolute maximum ratings, the reverse surge voltage should be 400V or higher, the average rectifying current should be 0.5A or higher, and the forward surge current should be 20A or higher.
R1: For noise terminal voltage reduction	10Ω to 22Ω, 1/4W Reduce the noise terminal voltage. The constant value should be evaluated in set.
ZNR: Varistor	Varistor must be used. It protects this part from lightning surge and static electricity.

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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