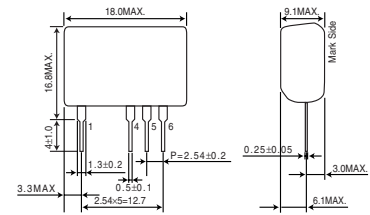


### Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	$V_i$	170	V
Output current	$I_o$	30	mApk
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)

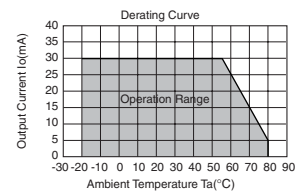


### Electrical Characteristics

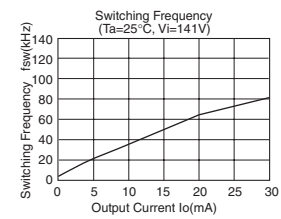
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	$V_i$	113	141	170	V	DC(80 to 120VAC)
Output voltage	$V_o$	11.0	12	13.0	V	$V_i=141V, I_o=30mA$
Output current	$I_o$	0	-	30	mA	$V_i=141V$ *1
Line regulation	$V_r$	-	0.17	0.3	V	$V_i=113$ to $170V, I_o=30mA$
Load regulation	$V_l$	-	0.19	0.3	V	$V_i=141V, I_o=0$ to $30mA$ *2
Output ripple voltage	$V_p$	-	0.05	0.15	Vp-p	$V_i=141V, I_o=30mA$
Power conversion efficiency	$\eta$	40	50	-	%	$V_i=141V, I_o=30mA$ *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

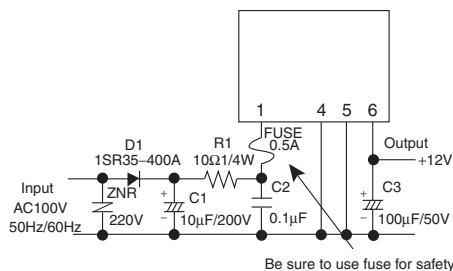


### Switching Frequency



### Application circuit

BP5038A



Be sure to use fuse for safety.

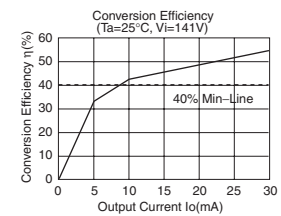
For actual usage, Please kindly evaluate and confirm our part mounted in your product, Especially, Please make sure to confirm whether the load current exceed Max. rated current by using the current probe.

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

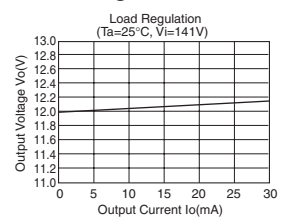
### External components setting

- FUSE:** Fuse Please make sure to use fuse 0.5A
- C1:** Capacitor for input voltage smoothing Capacitance : 3.3 $\mu$ F to 22 $\mu$ F Rated voltage : 250V or higher
- C2:** For noise terminal voltage reduction Capacitance : 0.1 $\mu$ F to 0.22 $\mu$ F 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 : 100 $\mu$ F to 470 $\mu$ F Rated voltage : 25V or higher, Low impedance part Impedance is 0.39 $\Omega$  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 10 $\Omega$  to 22 $\Omega$ , 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.

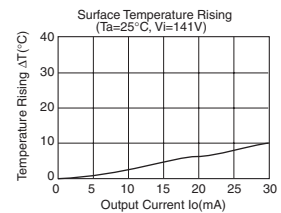
### Conversion Efficiency



### 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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  - [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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