

# AC/DC converter

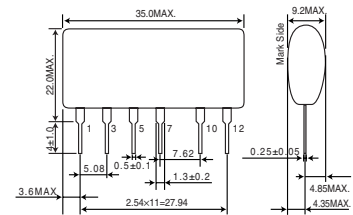
AC220V input, 12V/300mA output

# BP5048

## Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	$V_i$	358	V
Maximum output current	$I_{o\max}$	300	mApk
ESD endurance	$V_{\text{surge}}$	2	kV
Operating temperature range	$T_{\text{opr}}$	-20 to +80	°C
Storage temperature range	$T_{\text{stg}}$	-25 to +105	°C

## Dimensions (mm)

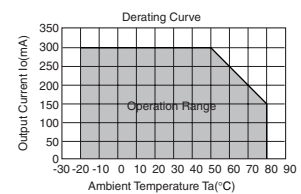


## Electrical Characteristics

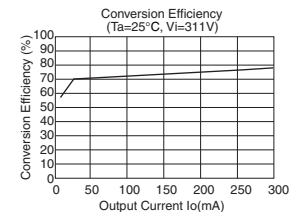
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	$V_i$	249	311	358	V	DC
Output voltage	$V_o$	11.0	12.0	13.0	V	$V_i=311V, I_o=100mA$
Output current	$I_o$	0	-	300	mA	$V_i=311V$ *1
Line regulation	$V_r$	-0.20	0.05	0.20	V	$V_i=249$ to $358V, I_o=100mA$
Load regulation	$V_l$	-0.20	0.05	0.20	V	$V_i=311V, I_o=0$ to $100mA$
Output ripple voltage	$V_p$	-	0.07	0.15	Vp-p	$V_i=311V, I_o=100mA$ *2
Power conversion efficiency	$\eta$	65	78	-	%	$V_i=311V, I_o=300mA$

\*1 Maximum output current varies depending on ambient temperature ; please refer to derating curve.  
\*2 Spike noise is not included in output ripple voltage.

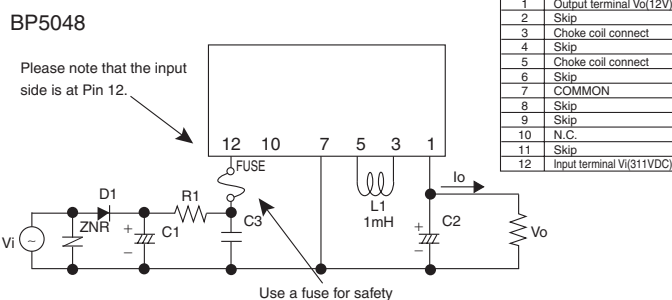
## Derating Curve



## Conversion Efficiency



## Application circuit

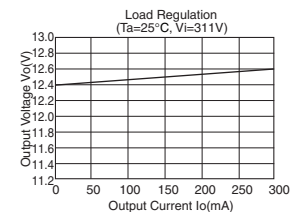


Verify proper operation under actual conditions before use. In particular, confirm that the load current does not exceed the maximum rating.

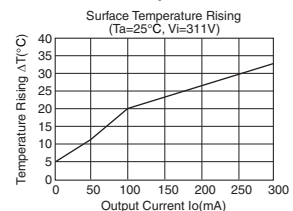
## External components setting

FUSE: FUSE	Please make sure to use fuse 1A.
C1: Input capacitor	Rated voltage 450V or higher 22 to 820 $\mu$ F Permissible ripple current 0.13Arms of higher
C2: Output capacitor	Rated voltage 25V or higher 100 to 470 $\mu$ F Low impedance type Impedance is 0.4 $\Omega$ max at high frequency range. The constant value should be evaluated in the set.
C3: Noise removal capacitor	Rated voltage 450V or higher 0.1 to 0.22 $\mu$ F Film or ceramic capacitor Reduce the noise terminal voltage. The constant value should be evaluated in the set.
L1: Power inductor	Inductance = 1.0mH Permissible current value 600mA or higher Recommended part : C13-FR-GA (MITSUMI) or TSL3135S-102JR78 (TDK)
D1: Rectifier diode	The reverse surge voltage 600V or higher The average rectifying current 0.5A The forward surge current should be 20A or higher.
R1: Noise removal resistor	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 projects this part from lighting surge and static electricity.

## Load Regulation



## Surface Temperature Increase



# 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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