

100VAC Input/15VDC (80mA) Output 1/5VDC (350mA) Output 2

# Non-Isolated Dual-Output AC/DC Converter

**BP5081B15**

## ● Absolute Maximum Ratings

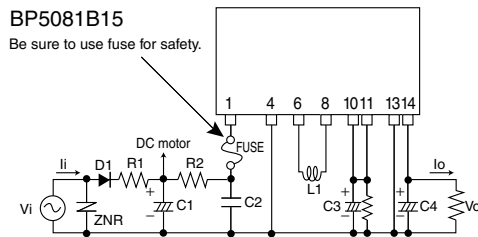
Parameter	Symbol	Limits	Unit
Input voltage	$V_i$	200	V
Maximum Output current(15V)	$I_{15MAX}$	80	mApk
Maximum Output current(5V)	$I_{5MAX}$	350	mApk
ESD endurance	$V_{surge}$	2	kV
Maximum surface temperature	$T_{cmax}$	105	°C
Operating temperature range	$T_{opr}$	-25 to +80	°C
Storage temperature range	$T_{stg}$	-25 to +105	°C

## ● Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	$V_i$	113	141	190	V	DC
Output voltage1	$V_{15}$	14.0	15.0	16.0	V	$V_i=141V, I_{15}=80mA$
Output current1	$I_{15}$	0	-	80	mA	$V_i=141V$ *1
Output voltage2	$V_5$	4.7	5.0	5.3	V	$V_i=141V, I_5=350mA$
Output current2	$I_5$	0	-	350	mA	$V_i=141V$ *1
Line regulation1	$V_{r1}$	-0.2	0.1	0.2	V	$V_i=113$ to 190V, $I_{15}=80mA$
Line regulation2	$V_{r2}$	-0.2	0.1	0.2	V	$V_i=113$ to 190V, $I_5=350mA$
Load regulation1	$V_{l1}$	-0.2	0.05	0.2	V	$V_i=141V, I_{15}=0$ to 80mA *2
Load regulation2	$V_{l2}$	-0.2	0.05	0.2	V	$V_i=141V, I_5=0$ to 350mA *2
Output ripple voltage1	$V_{p1}$	-	0.05	0.2	Vp-p	$V_i=141V, I_{15}=80mA, I_5=0mA$
Output ripple voltage2	$V_{p2}$	-	0.05	0.2	Vp-p	$V_i=141V, I_{15}=0mA, I_5=350mA$
Power conversion efficiency1	$\eta_1$	65	72	-	%	$V_i=141V, I_{15}=80mA, I_5=0mA$ *2
Power conversion efficiency2	$\eta_2$	60	65	-	%	$V_i=141V, I_{15}=0mA, I_5=350mA$ *2

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

## ● Application Circuit



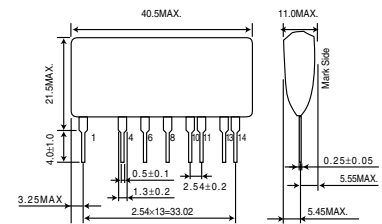
Please verify operation and characteristics in the customer's circuit before actual usage.  
Ensure that the load current does not exceed the maximum rating.

Pin No.	Function
1	Input terminal $V_i$ (141VDC)
2	Not used
3	Not used
4	COMMON
5	Not used
6	Choke coil connect
7	Not used
8	Choke coil connect
9	Not used
10	15V output terminal
11	15V input terminal
12	Not used
13	COMMON
14	Output terminal $V_o$ (5V)

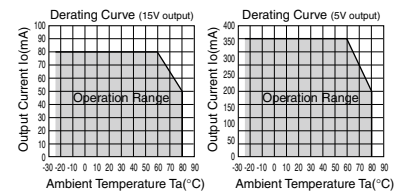
## External Component Specifications

FUSE: FUSE	Use a quick-acting fuse of 1.0A.
C1: Input capacitor	Rated voltage : More than 250V Capacitance : 22 to 820 $\mu$ F Rated ripple current : More than 0.13Arms
C2: Noise removal capacitor	Rated voltage : More than 250V Film or ceramic capacitor Capacitance : 0.1 to 0.22 $\mu$ F
C3: Output capacitor (For 15V output)	Rated voltage : More than 25V Capacitance : 100 to 1000 $\mu$ F, low impedance type ESR : Less than 0.4 $\Omega$ Rated ripple current : More than 0.25Arms Evaluate under actual operating conditions since it affects the output ripple voltage.
C4: Output capacitor (For 5V output)	Rated voltage : More than 16V Capacitance : 100 to 1000 $\mu$ F, low impedance type ESR : Less than 0.4 $\Omega$ Rated ripple current : More than 0.41Arms Evaluate under actual operating conditions since it affects the output ripple voltage.
L1: Power inductor	Inductance : 1.0mH Rated current : More than 0.49A
D1: Rectifier diode	Peak reverse voltage : More than 400V Mean rectifying current : More than 1.0A Peak forward surge current : More than 40A Full-wave rectification can be used.
R1: Inrush current limiting resistor	Inrush current will vary depending on C1. Determine the ideal value through actual testing.
R2: Noise removal resistor	Resistance : 10 to 22 $\Omega$ , Power : More than 1/4W
ZNR: Varistor	A varistor is required to protect against lightning surges and static electricity.

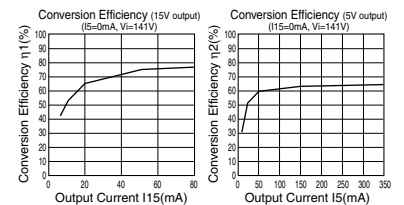
## ● Dimensions (Unit : mm)



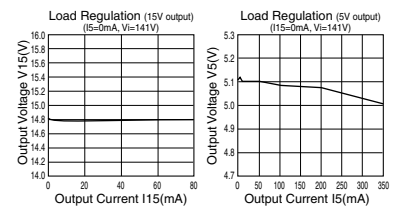
## ● Derating Curve



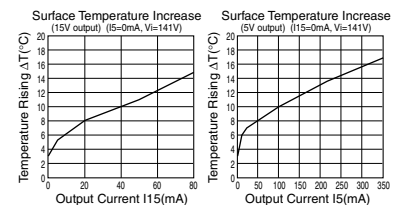
## ● Conversion Efficiency



## ● 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.

## Notes Regarding Industrial Property

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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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