

AC/DC converter

BP5085-15

AC220V input, output-1 : 15V/80mA, output-2 : 5V/350mA

Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
Input voltage	V_i	400	V
Maximum output current(15V)	I_{150MAX}	80	mA
Maximum output current(5V)	I_{50MAX}	350	mA
ESD endurance	V_{surge}	2	kV
Operating temperature range	T_{opr}	-20 ~ +80	°C
Storage temperature range	T_{stg}	-25 ~ +105	°C

*1 Maximum input voltage at steady mode is 358V, but the over-applied voltage is 400Vpk, within 10 seconds.

*2 Maximum output current is the peak of load current after the output smoothing capacitor. The maximum heating part of this module have to be below 150°C including self-heating and ambient temperature. And the average current must be in the range of electrical characteristics below.

Electrical Characteristics

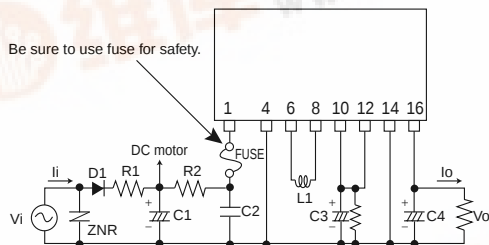
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V_i	226	282	358	V	DC
Output voltage1	V_{15}	14.0	15.0	16.0	V	$V_i=282V, I_{15}=80mA, I_5=0mA$
Output current1	I_{15}	0	—	80	mA	$V_i=282V$ *3
Output voltage2	V_5	4.75	5.0	5.25	V	$V_i=282V, I_{15}=0mA, I_5=200mA$
Output current2	I_5	0	—	350	mA	$V_i=282V$ *3
Line regulation1	V_{r1}	-0.3	0.1	0.3	V	$V_i=226\sim358V, I_{15}=80mA, I_5=0mA$
Line regulation2	V_{r2}	-0.3	0.1	0.3	V	$V_i=226\sim358V, I_{15}=0mA, I_5=350mA$
Load regulation1	V_{l1}	-0.3	0.05	0.3	V	$V_i=282V, I_{15}=0\sim80mA, I_5=0mA$ *4
Load regulation2	V_{l2}	-0.3	0.05	0.3	V	$V_i=282V, I_{15}=0mA, I_5=0\sim350mA$ *4
Output ripple voltage1	V_{p1}	—	0.1	0.2	Vp-p	$V_i=282V, I_{15}=80mA, I_5=0mA$
Output ripple voltage2	V_{p2}	—	0.1	0.2	Vp-p	$V_i=282V, I_{15}=0mA, I_5=350mA$
Power conversion efficiency1	η_1	60	70	—	%	$V_i=282V, I_{15}=80mA, I_5=0mA$ *4
Power conversion efficiency2	η_2	45	55	—	%	$V_i=282V, I_{15}=0mA, I_5=350mA$ *4

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

*2 Please refer to Load regulation, Conversion efficiency.

Application circuit

BP5085-15



Be sure to use fuse for safety.

Pin No.	Function
1	Input terminal V_i (282VDC)
2	Not used
3	Not used
4	COMMON1
5	Not used
6	Choke coil connect
7	Not used
8	Choke coil connect
9	Not used
10	15V output terminal
11	Not used
12	15V input terminal
13	Not used
14	COMMON2
15	Not used
16	Output terminal V_o (5V)

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

C1: Capacitor for input voltage smoothing

C2: For noise terminal voltage reduction

C3: Capacitor for Output (15V output)

C4: Capacitor for Output (5V output)

L1: Choke coil

D1: Rectifier diode

R1: Rush current limiting resistance

R2: For noise terminal

ZNR: Varistor

Please make sure to use quick acting fuse 1A / Please use the fuse resistance for R2.

Capacitance : 33 μ F~820 μ F Rated voltage : 450V or higher

Ripple current is 0.13Arms above.

Capacitance : 0.1 μ F~0.22 μ F Rated voltage : 450V or higher

Film capacitor or ceramic capacitor. Reduce the noise terminal voltage.

The constant value should be evaluated in the set.

Capacitance : 220 μ F~1000 μ F Rated voltage : 35V or higher, ESR is 0.16 Ω max. Ripple current is 0.4Arms above.

Output ripple voltage is influenced. Please evaluate it in the actual set

Capacitance : 220 μ F~1000 μ F Rated voltage : 16V or higher, ESR is 0.25 Ω max. Ripple current is 0.4Arms above.

Output ripple voltage is influenced. Please evaluate it in the actual set.

L : 1mH Allowable current : 600mA or higher.

Please use the one that is hard to be magnetic saturated even in the high temperature.

In the absolute maximum ratings, the reverse peak voltage should be 800V or higher, the average rectifying current should be 1A or higher, and the peak surge current should be 40A or higher.

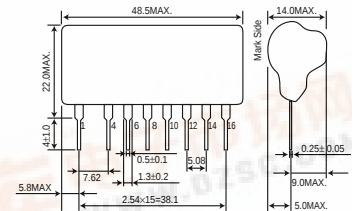
For rush current, to use the large capacity diode for surge current is recommended.

Limiting resistance must be used because rush current at powering up is applied in proportion to the C1 capacitance. Please determine the resistance value after confirming the rising characteristics of the module at powering up.

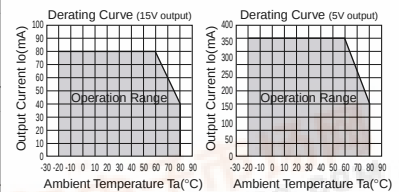
10 Ω ~22 Ω 1/4W Reduce the noise terminal voltage. Please set it, if necessary. The constant value should be evaluated in set.

Varistor must be used. It protects this part from lightning surge and static electricity.

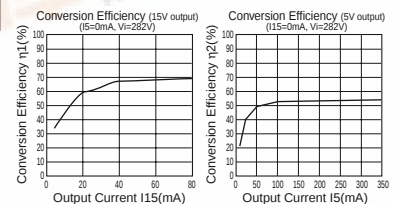
Dimension(Unit : mm)



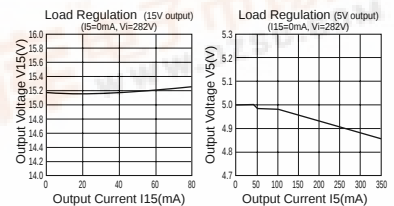
Derating Curve



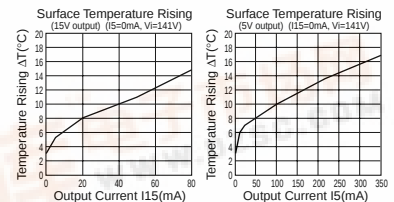
Conversion Efficiency



Load Regulation



Surface Temperature Rising



Precautions on Use of ROHM Power Module

Safety Precautions

- 1) The products are designed and produced for application in ordinary electronic equipment (AV equipment, OA equipment, telecommunication equipment, home appliances, amusement equipment etc.). If the products are to be used in devices requiring extremely high reliability (medical equipment, transport equipment, aircraft/spacecraft, nuclear power controllers, fuel controllers, car equipment including car accessories, safety devices, etc.) and whose malfunction or operational error may endanger human life and sufficient fail-safe measures, please consult with the Company's sales staff in advance. If product malfunctions may result in serious damage, including that to human life, sufficient fail-safe measures must be taken, including the following:
 - [a] Installation of protection circuits or other protective devices to improve system safety
 - [b] Installation of redundant circuits in the case of single-circuit failure
- 2) The products are designed for use in a standard environment and not in any special environments. Application of the products in a special environment can deteriorate product performance. Accordingly, verification and confirmation of product performance, prior to use, is recommended if used under the following conditions:
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 - [b] Use outdoors where the products are exposed to direct sunlight, or in dusty places
 - [c] Use in places where the products are exposed to sea winds or corrosive gases, including Cl₂, H₂S, NH₃, SO₂, and NO₂
 - [d] Use in places where the products are exposed to static electricity or electromagnetic waves
 - [e] Use in proximity to heat-producing components, plastic cords, or other flammable items
 - [f] Use involving sealing or coating the products with resin or other coating materials
 - [g] Use involving unclean solder or use of water or water-soluble cleaning agents for cleaning after soldering
 - [h] Use of the products in places subject to dew condensation
- 3) The products are not radiation resistant.
- 4) The Company is not responsible for any problems resulting from use of the products under conditions not recommended herein.
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Appendix

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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.