

220VAC Input/-5VDC (200mA) Output

Non-Isolated AC/DC Converter **BP5045A5**

Absolute Maximum Ratings

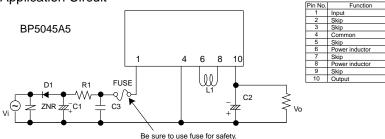
Parameter	Symbol	Limits	Unit
Input voltage	Vi	-390	V
Output voltage	lo	200	mApk
ESD endurance	Vsurge	2	kV
Operating temperature range	Topr	-20 to +80	°C
Storage temperature range	Tstg	-25 to +105	°C

Electrical Characteristics

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Input voltage range	Vi	-113	-311	-390	V	DC
Output voltage	Vo	-4.7	-5.0	-5.3	V	Vi= -311V, Io=200mA
Output current	lo	-	-	200	mA	Vi= -311V *1
Line regulation	Vr	-	0.10	0.15	V	Vi= -113 to -390V, Io=200mA
Load regulation	VI	-	0.10	0.15	V	Vi= -311V, Io=0 to 200mA
Output ripple voltage	Vp	_	0.10	0.20	Vp-p	Vi= -311V, Io=200mA *2
Power conversion efficiency	η	60	65	-	%	Vi= -311V, Io=200mA

*1 Maximum output current must be reduced by ambient temperature.
*2 An output ripple voltage sometimes changes in capacitor to use, the measurement environment.

Application Circuit

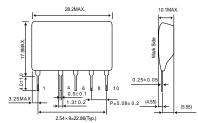


Please verify operation and characteristics in the customer's circuit before actual usage. Ensure that the load current does not exceed the maximum rating.

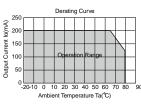
External Component Specifications

FUSE: FUSEUse a fast-acting fuse of 1.0A.C1: Input CapacitorRated voltage : More than 450V Capacitance : 22 to 100μFC2: Output CapacitorRated voltage : More than 25V Capacitance : 100 to 1000μF, low impedance type ESR : Less than 0.18Ω Rated ripple current : More than 0.62Arms Evaluate under actual operating conditions.C3: Noise Removal CapacitorRated voltage : More than 450V Capacitance : 0.1 to 0.22μF ;L1: Power InductorInductance : 1mH Rated Current : More than 0.41A The winding direction will affect the electrical characteristics.R1: Noise Removal ResistorResistance : 10 to 22Ω Power : More than 1/4WD1: Rectifier DiodePeak reverse voltage : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.ZNR: VaristorA varistor is required to protect against lightning surges and static electricity		
Capacitance : 22 to 100μF C2: Output Capacitor Rated voltage : More than 25V Capacitance : 100 to 1000μF, low impedance type ESR : Less than 0.18Ω Rated ripple current : More than 0.62Arms Evaluate under actual operating conditions. C3: Noise Removal Capacitor Rated voltage : More than 450V Film or ceramic capacitor Capacitance : 0.1 to 0.22μF; L1: Power Inductor Inductance : 1mH Rated Current : More than 0.41A The winding direction will affect the electrical characteristics. R1: Noise Removal Resistor Resistance : 10 to 22Ω Power : More than 1/4W D1: Rectifier Diode Peak reverse voltage : More than 800V Mean rectifying current : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.	FUSE: FUSE	Use a fast-acting fuse of 1.0A.
Capacitance : 100 to 1000μF, low impedance type ESR : Less than 0.18Ω Rated ripple current : More than 0.62Arms Evaluate under actual operating conditions. C3: Noise Removal Rated voltage : More than 450V Capacitor Film or ceramic capacitor Capacitance : 0.1 to 0.22μF; L1: Power Inductor Inductance : 1mH Rated Current : More than 0.41A The winding direction will affect the electrical characteristics. R1: Noise Removal Resistor Resistance : 10 to 22Ω Power : More than 1/4W D1: Rectifier Diode Peak reverse voltage : More than 800V Mean rectifying current : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.	C1: Input Capacitor	
Capacitor Film or ceramic capacitor Capacitance : 0.1 to 0.22μF; L1: Power Inductor Inductance : 1mH Rated Current : More than 0.41A The winding direction will affect the electrical characteristics. R1: Noise Removal Resistor Resistance : 10 to 22Ω Power : More than 1/4W D1: Rectifier Diode Peak reverse voltage : More than 800V Mean rectifying current : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.	C2: Output Capacito	Capacitance : 100 to 1000 μ F, low impedance type ESR : Less than 0.18 Ω Rated ripple current : More than 0.62Arms
Environmentation The winding direction will affect the electrical characteristics. R1: Noise Removal Resistor Resistance : 10 to 22Ω Power : More than 1/4W D1: Rectifier Diode Peak reverse voltage : More than 800V Mean rectifying current : More than 1.0A Peak forward surge current : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.		Film or ceramic capacitor
Resistor Power : More than 1/4W D1: Rectifier Diode Peak reverse voltage : More than 800V Mean rectifying current : More than 1.0A Peak forward surge current : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.	L1: Power Inductor	
Mean rectifying current : More than 1.0A Peak forward surge current : More than 20A Full-wave rectification can be used. If the input capacitance is large please use a rectifier diode with ample peak forward surge current.		
ZNR: Varistor A varistor is required to protect against lightning surges and static electricity	D1: Rectifier Diode	Mean rectifying current : More than 1.0A Peak forward surge current : More than 20A Full-wave rectification can be used. If the input capacitance is large please
	ZNR: Varistor	A varistor is required to protect against lightning surges and static electricity.

Dimensions (Unit : mm)



Derating Curve



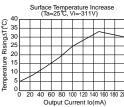
Conversion Efficiency

. 70		'	Con (Ta	vers =25	sion ℃, \	Effi /i=-:	cien 311	cy V)		
Conversion Efficiency (%) 0 0 0 0 0 0 0 0 0										
200					\sim					
. <u>ē</u> 50										
₩ 40		Y								
5 30	H		-		-					
S 20	⊬									
≧ 10	⊢		-		-			_		
	L_{12}				0.10	0.1	20.1	10.16	0.19	30 20
	52	0 4		tput						10 20

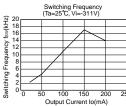
Load Regulation

		l (Ta	_oad I ⊫25℃	Regul C, Vi=	ation -311\	()		
(^)07- 00000000000000000000000000000000000								
\$ 5.00								
eger age								
2 3.00								
1 2.00						17		
õ ^{1.00}						1		
0.00) 5		00 15 Itput 0				00	3

Surface Temperature Increase



Switching Frequency



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. Cl₂, H₂S, NH₃, SO₂, NO₂) 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

- 1) The specifications included herein contain information related to the Company's industrial property. Their use other than pertaining to the relevant products is forbidden. Duplication and/or disclosure to a third party without express written permission is strictly prohibited.
- 2) Product information and data, including application examples, contained in the specifications are for reference purposes only; the Company does not guarantee the industrial/intellectual property rights or any other rights of a third party. Accordingly, the Company shall not bear responsibility for:
 [a] Infringement of the intellectual property rights of a third party
 [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.

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. Cl₂, H₂S, NH₃, SO₂, NO₂) 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

- 1) The specifications included herein contain information related to the Company's industrial property. Their use other than pertaining to the relevant products is forbidden. Duplication and/or disclosure to a third party without express written permission is strictly prohibited.
- 2) Product information and data, including application examples, contained in the specifications are for reference purposes only; the Company does not guarantee the industrial/intellectual property rights or any other rights of a third party. Accordingly, the Company shall not bear responsibility for:
 [a] Infringement of the intellectual property rights of a third party
 [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.

	copying or reproduction of this document, in part or in whole, is permitted without the asent of ROHM Co.,Ltd.
The	e content specified herein is subject to change for improvement without notice.
"Pr	e content specified herein is for the purpose of introducing ROHM's products (hereinafte oducts"). If you wish to use any such Product, please be sure to refer to the specifications ich can be obtained from ROHM upon request.
illu	amples of application circuits, circuit constants and any other information contained herein strate the standard usage and operations of the Products. The peripheral conditions mus taken into account when designing circuits for mass production.
Ho	eat care was taken in ensuring the accuracy of the information specified in this document wever, should you incur any damage arising from any inaccuracy or misprint of such prmation, ROHM shall bear no responsibility for such damage.
exa imp oth	e technical information specified herein is intended only to show the typical functions of an imples of application circuits for the Products. ROHM does not grant you, explicitly o plicitly, any license to use or exercise intellectual property or other rights held by ROHM and er parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the of such technical information.
equ	Products specified in this document are intended to be used with general-use electronic upment or devices (such as audio visual equipment, office-automation equipment, commu ation devices, electronic appliances and amusement devices).
The	Products specified in this document are not designed to be radiation tolerant.
	ile ROHM always makes efforts to enhance the quality and reliability of its Products, a duct may fail or malfunction for a variety of reasons.
aga fail sha	ase be sure to implement in your equipment using the Products safety measures to guard ainst the possibility of physical injury, fire or any other damage caused in the event of the ure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM all bear no responsibility whatsoever for your use of any Product outside of the prescribed uppe or not in accordance with the instruction manual.
sys ma ins cor of t	e Products are not designed or manufactured to be used with any equipment, device o tem which requires an extremely high level of reliability the failure or malfunction of which y result in a direct threat to human life or create a risk of human injury (such as a medica trument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel- ntroller or other safety device). ROHM shall bear no responsibility in any way for use of any the Products for the above special purposes. If a Product is intended to be used for any other special purpose, please contact a ROHM sales representative before purchasing.
be	ou intend to export or ship overseas any Product or technology specified herein that ma controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to ain a license or permit under the Law.



Thank you for your accessing to ROHM product informations. More detail product informations and catalogs are available, please contact us.

ROHM Customer Support System

http://www.rohm.com/contact/