

220VAC Input/–12VDC (250mA) Output

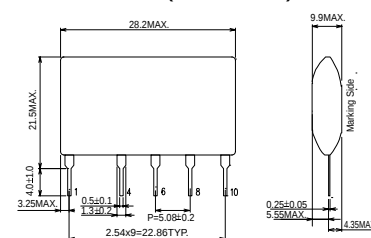
Non-Isolated AC/DC Converter

BP5055-12

Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Conditions
Input voltage	V_i	–600	V	DC
Operating temperature range	T_{opr}	–20 to 80	°C	Refer to derating curve
Storage temperature range	T_{stg}	–25 to 105	°C	
Case temperature	T_{cmax}	105	°C	Ambient temperature + the module self-heating $\leq T_{cmax}$
Output current	I_{omax1}	250	mA	PEAK value of current (V_i to –420V)
	I_{omax2}	130	mA	PEAK value of current (V_i to –420 to –600V)

Dimensions (Unit : mm)



Electrical Characteristics

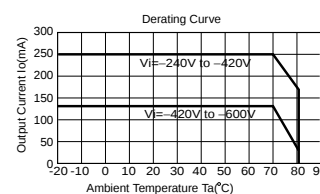
 (Unless otherwise specified $T_a=25^\circ\text{C}$, $V_i=-311\text{V}$, $I_o=250\text{mA}$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	V_i	–240	–311	–600	V	DC
Output voltage	V_o	–12.0	–12.7	–13.4	V	
Output current1	I_{o1}	–	–	250	mA	$V_i=-240\text{V to }-420\text{V}$ *1
Output current2	I_{o2}	–	–	130	mA	$V_i=-420\text{V to }-600\text{V}$ *1
Line regulation	V_r	–	0.07	0.25	V	$V_i=-240\text{V to }-600\text{V}$ $I_o=130\text{mA}$
Load regulation	V_l	–	0.05	0.20	V	$I_o=0$ to 250mA
Output ripple voltage	V_p	–	0.08	0.20	Vp-p	
Conversion efficiency	η	70	77	–	%	

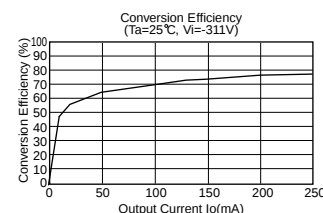
*1 Max output current should be reduced according to the surrounding temperature.

*2 The output ripple voltage may vary depending on the capacitance, environment, and location of peripheral components.

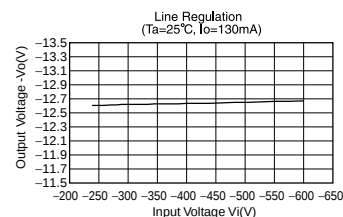
Derating Curve



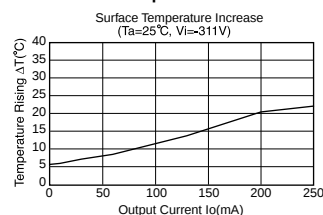
Conversion Efficiency



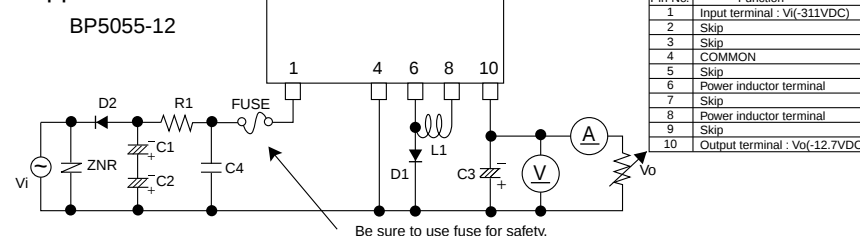
Load Regulation



Surface Temperature Increase



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: fuse	Use a quick-acting fuse (1A)
C1, C2: Input capacitor	above 450V, 22 to 100μF Ripple current 0.7Arms or greater
C3: Output capacitor	above 30V, 220 to 1000μF, low impedance ESR: 0.18Ω Max. Ripple current 0.65Arms or higher Capacitor impedance affects the output ripple voltage.
C4: Noise reduction capacitor	Above 600V, 0.1 to 0.22μF Film or ceramic capacitor. Evaluate under actual operating conditions.
L1: Power inductor	Inductance: 1.0mH, Rating current: above 0.74A Select components that do not easily get magnetically saturated at high temperature. Recommended part: C13-FR 1.0mH (MITSUMI)
D1: Flywheel diode	Above 1000V, current: above 1.0A Fast recovery diode Please note that both the switching and efficiency characteristics of the module are affected by this diode. Recommended products: UF4007 (VISHAY)
D2: Rectifier diode	Use a rectifying diode with a peak reverse voltage of 1kV or higher, an average rectification current of 1A or larger and a peak surge current of 20A or larger. When using a large capacitance input capacitor, select a component that endures the strong inrush current during power up. Full-wave rectification can be used.
R1: Noise reduction resistor	10 to 22Ω, 1W Determine the ideal value through actual testing.
ZNR: Varistor	A varistor is required to protect against lightning surges and static electricity.

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.

Notes

No copying or reproduction of this document, in part or in whole, is permitted without the consent of ROHM Co.,Ltd.

The content specified herein is subject to change for improvement without notice.

The content specified herein is for the purpose of introducing ROHM's products (hereinafter "Products"). If you wish to use any such Product, please be sure to refer to the specifications, which can be obtained from ROHM upon request.

Examples of application circuits, circuit constants and any other information contained herein illustrate the standard usage and operations of the Products. The peripheral conditions must be taken into account when designing circuits for mass production.

Great care was taken in ensuring the accuracy of the information specified in this document. However, should you incur any damage arising from any inaccuracy or misprint of such information, ROHM shall bear no responsibility for such damage.

The technical information specified herein is intended only to show the typical functions of and examples of application circuits for the Products. ROHM does not grant you, explicitly or implicitly, any license to use or exercise intellectual property or other rights held by ROHM and other parties. ROHM shall bear no responsibility whatsoever for any dispute arising from the use of such technical information.

The Products specified in this document are intended to be used with general-use electronic equipment or devices (such as audio visual equipment, office-automation equipment, communication devices, electronic appliances and amusement devices).

The Products specified in this document are not designed to be radiation tolerant.

While ROHM always makes efforts to enhance the quality and reliability of its Products, a Product may fail or malfunction for a variety of reasons.

Please be sure to implement in your equipment using the Products safety measures to guard against the possibility of physical injury, fire or any other damage caused in the event of the failure of any Product, such as derating, redundancy, fire control and fail-safe designs. ROHM shall bear no responsibility whatsoever for your use of any Product outside of the prescribed scope or not in accordance with the instruction manual.

The Products are not designed or manufactured to be used with any equipment, device or system which requires an extremely high level of reliability the failure or malfunction of which may result in a direct threat to human life or create a risk of human injury (such as a medical instrument, transportation equipment, aerospace machinery, nuclear-reactor controller, fuel-controller or other safety device). ROHM shall bear no responsibility in any way for use of any of the Products for the above special purposes. If a Product is intended to be used for any such special purpose, please contact a ROHM sales representative before purchasing.

If you intend to export or ship overseas any Product or technology specified herein that may be controlled under the Foreign Exchange and the Foreign Trade Law, you will be required to obtain 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/>