Non-isolated AC/DC converter BP5055-12

AC220V input, −12V/250mA output

● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Conditions
Input voltage	Vi	−600	V	DC
Operating temperature range	Topr	−20 to 80	℃	Refer to derating curve
Storage temperature range	Tstg	−25 to 105	℃	
Case temperature	Tcmax	105	℃	Ambient temperature + the module self-heating≦Tcmax
Output current	Iomax 1	250	mA	PEAK value of current (Vi= to −420V)
	Iomax 2	130	mA	PEAK value of current (Vi=−420 to−600V)

● Electrical Characteristics

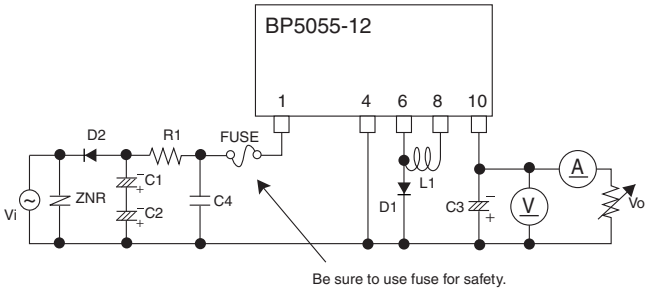
Unless otherwise specified Ta=25°C, Vi=−311V, Io=250mA

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage range	Vi	−240	−311	−600	V	DC
Output voltage	Vo	−12.0	−12.7	−13.4	V	
Output current1	Io1	–	–	250	mA	※1 Vi=−240V to −420V
Output current2	Io2	–	–	130	mA	※1 Vi=−420V to −600V
Line regulation	Vr	–	0.07	0.25	V	Vi=−240V to −600V Io=130mA
Load regulation	Vl	–	0.05	0.20	V	Io=0 to 250mA
Output ripple voltage	Vp	–	0.08	0.20	Vp-p	※2
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.

● Application circuit

BP5055-12



Pin No.	Function
1	Input terminal : Vi(-311VDC)
2	Skip
3	Skip
4	COMMON
5	Skip
6	Power inductor terminal
7	Skip
8	Power inductor terminal
9	Skip
10	Output terminal : Vo(-12.7VDC)

For actual usage, Please kindly evaluate and confirm our part mounted in your product, Especially, Please make sure to confirm the load current does not exceed Max. rated current by using the current probe.

External components setting

FUSE: fuse — Please make sure to use quick acting fuse (1A)

C1, C2: Input capacitor — above 450V, 22 to 100μF
Ripple current 0.7Arms above

C3: Output capacitor — above 30V, 220 to 1000μF, Low impedance
ESR:0.18Ω Max.
Ripple current 0.65Arms above
Impedance of capacitor effects the output ripple voltage.

C4: For noise terminal voltage reduction capacitor — Above 600V, 0.1 to 0.22μF
Film capacitor or Ceramic capacitor
Reduce the noise terminal voltage.
The constant value should be evaluated in the product.

L1: Power inductor — Inductance:1.0mH, Rating current: above 0.74A
Choose components that do not easily get magnetically saturated in high temperature.
Recommended part : C13-FR 1.0mH (MITSUMI)

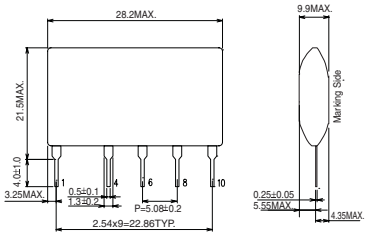
D1: Flywheel diode — Above 1000V, current: above 1.0A
Fast recovery diode
Please note that both the switching and efficiency characteristics of the module are affected by this diode.
Recommended products: UF4007 (VISHAY)

D2: Rectifier diode — Use a rectifying diode with the peak reverse voltage of 1kV or higher, the average rectification current of 1A or larger and the peak surge current of 20A or larger. When using an input capacitor of a large capacity, choose a component that endures the inrush current on power-up.
This product is compatible with full-wave rectification.

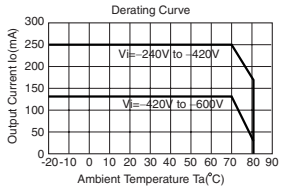
R1: For noise terminal voltage reduction capacitor — 10 to 22Ω, 1W
Reduce the noise terminal voltage.
The constant value should be evaluated in the product.

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

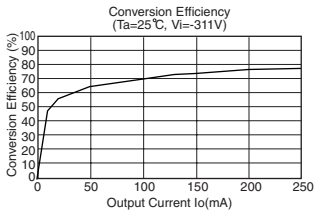
●Dimensions(Unit : mm)



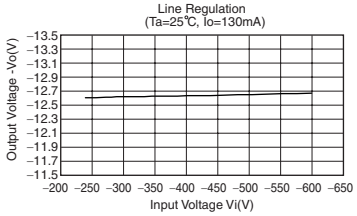
●Derating Curve



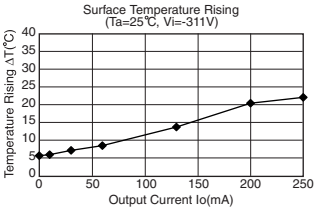
●Conversion Efficiency



●Load Regulation



●Surface Temperature Rising



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_2, H_2S, NH_3, SO_2, NO_2) 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.
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