

AC / DC Converter

BP5048 / BP5048-15 / BP5048-24

The BP5048, BP5048-15 and BP5048-24 are AC / DC converters which can be used to supply DC output from a commercial power supply (200 to 220 V AC). Using these modules enable simple, easy drive of microcomputers, LEDs, and other electronic components without using a transformer. They also allow set PCBs to be kept compact and lightweight, with extremely few attachments.

These products can accommodate the 200V AC power supplies used as household power supplies in Asia and Europe, as well as in buildings and facilities in Japan.

●Applications

Power supply circuits for vacuum cleaners, refrigerators, washing machines, air conditioners, irons, electric carpets, cordless telephones, air purifiers, humidifiers, dehumidifiers, home bakery devices, electric crock pots and rice cookers, illumination devices and other small household appliances, as well as power supply circuits for gas leakage sensors, and other industrial products

●Features

- 1) Elimination of a transformer enables compact, lightweight power supply boards.
- 2) Wide input voltage range. (249 to 358V DC for DC voltage conversion)
- 3) DC power supplies can be easily configured, with few attachments.
- 4) Because no transformer is used, the power supply board is less vulnerable to splitting or cracking from impact or shock.
- 5) Allow easy assemblage of components.

●List of the BP5048 series

	BP5048	BP5048-15	BP5048-24	Unit
Power supply voltage	249~358	249~358	249~358	V
Output voltage	12	15	24	V
Output current	300	200	200	mA

●Absolute maximum ratings (Ta=25°C)

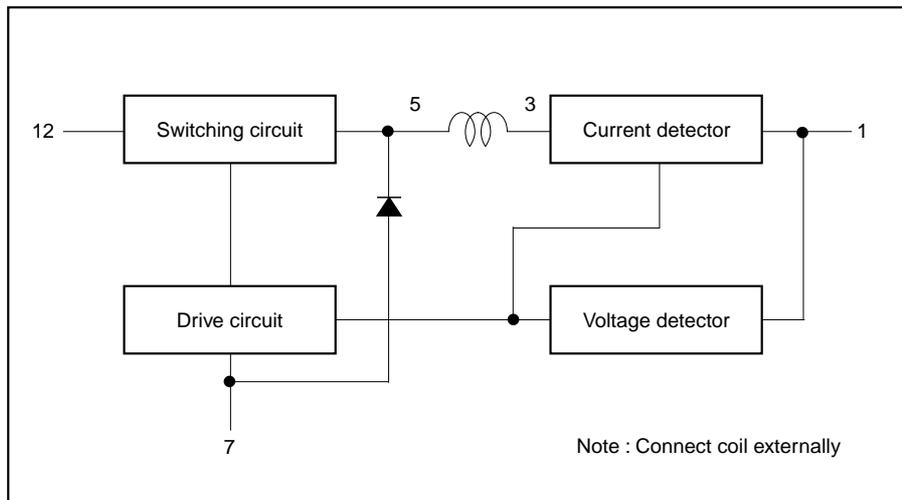
Parameter	Symbol	Limits	Unit
Power supply voltage	V _{IN}	358	V
Operating temperature range	T _{opr}	-20~+80	°C
Storage temperature range	T _{stg}	-25~+105	°C

●Recommended operating conditions (Ta=25°C)

Parameter	Symbol	Min.	Typ.	Max.	Unit
Power supply voltage	V _{IN}	249	311	358	V _(DC)

Power Module

●Block diagram



●Pin descriptions

Pin No.	Pin name
1	V _{OUT}
3	COIL
5	COIL
7	COMMON
10	NC
12	V _{IN}

Pins 2, 4, 6, 8, 9, 11 are removed

●Electrical characteristics (Unless otherwise noted, T_a=25°C)

BP5048

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V _{IN}	249	311	358	V	DC
Output voltage	V _O	11.0	12.0	13.0	V	V _{IN} =311V, I _O =100mA
Output current	I _O	0	–	300	mA	V _{IN} =311V *1
Line regulation	V _r	-0.20	0.05	+0.20	V	V _{IN} =249~358V, I _O =100mA
Load regulation	V _l	-0.20	0.05	+0.20	V	V _{IN} =311V, I _O =0~100mA
Output ripple voltage	V _p	–	0.07	0.15	V _{PP}	V _{IN} =311V, I _O =100mA *2
Conversion efficiency	η	65	78	–	%	V _{IN} =311V, I _O =300mA

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

*2 Spike noise is not included in output ripple voltage.

Power Module

BP5048-15

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V_{IN}	249	311	358	V	DC
Output voltage	V_O	13.9	15.0	16.1	V	$V_{IN}=311V, I_o=100mA$
Output current	I_o	0	-	200	mA	$V_{IN}=311V$ *1
Line regulation	V_r	-0.20	0.05	+0.20	V	$V_{IN}=249\sim358V, I_o=100mA$
Load regulation	V_l	-0.20	0.05	+0.20	V	$V_{IN}=311V, I_o=0\sim100mA$
Output ripple voltage	V_p	-	0.07	0.15	V_{PP}	$V_{IN}=311V, I_o=100mA$ *2
Conversion efficiency	η	60	75	-	%	$V_{IN}=311V, I_o=200mA$

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

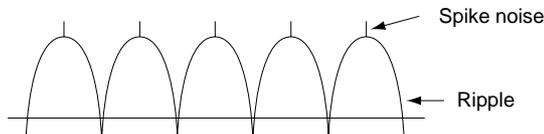
*2 Spike noise is not included in output ripple voltage.

BP5048-24

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V_{IN}	249	311	358	V	DC
Output voltage	V_O	23.0	24.0	25.8	V	$V_{IN}=311V, I_o=100mA$
Output current	I_o	0	-	200	mA	$V_{IN}=311V$ *1
Line regulation	V_r	-0.20	0.05	+0.20	V	$V_{IN}=249\sim358V, I_o=100mA$
Load regulation	V_l	-0.20	0.05	+0.20	V	$V_{IN}=311V, I_o=0\sim100mA$
Output ripple voltage	V_p	-	0.07	0.15	V_{PP}	$V_{IN}=311V, I_o=100mA$ *2
Conversion efficiency	η	65	78	-	%	$V_{IN}=311V, I_o=200mA$

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

*2 Spike noise is not included in output ripple voltage.



●Measurement circuits

BP5048 / BP5048-15

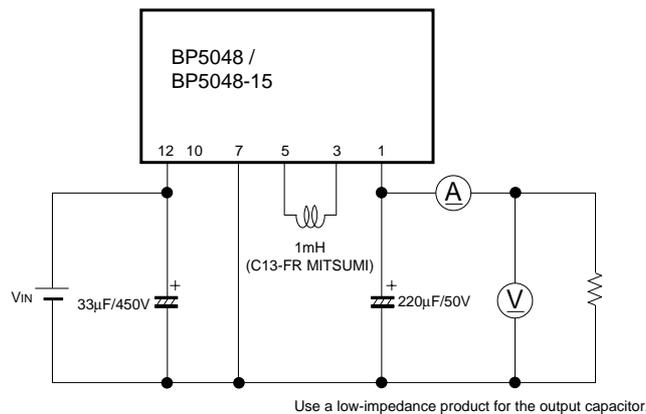


Fig.1

BP5048-24

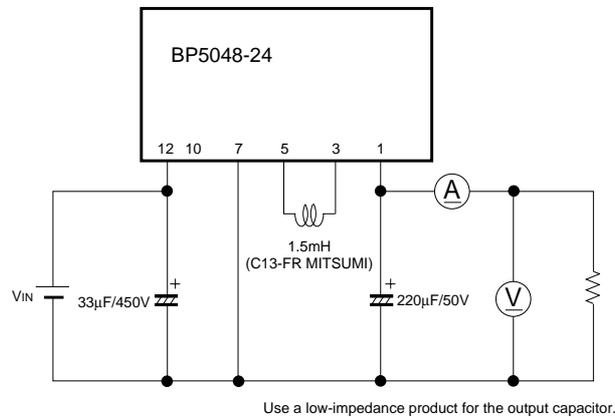
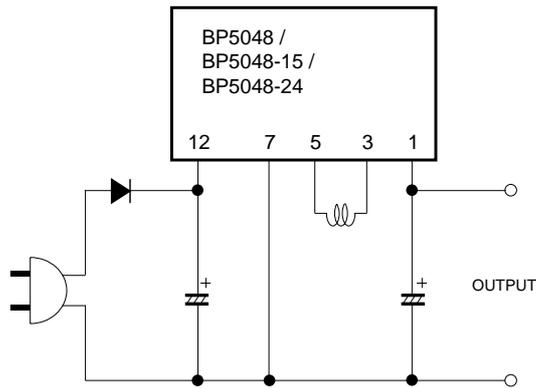


Fig.2

●Application example

Half wave rectifier circuit



Full wave rectifier circuit

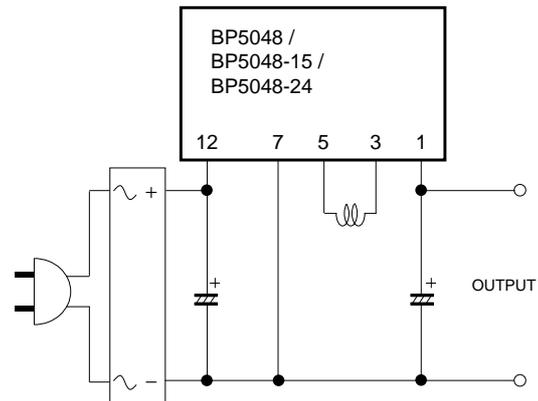


Fig.3

●Operation notes

- (1) Output current should be reduced with increasing ambient temperature.
- (2) Over current and shorted circuit
The overcurrent protection circuit limits the current to about 330mA (BP5048), 240mA (BP5048-15), 230mA (BP5048-24) with drooping model. If there is any danger of the load being shorted or overcurrent being produced, always use a protective device such as a fuse.
- (3) Insulation
These products are not insulated on the primary side, and there is a danger of electrical shock if they are touched.
- (4) Avoid subjecting these products to strong impact.
- (5) Lead pins should be securely connected. If lead pins are not securely connected, irregular voltages could be produced, causing breakdowns and damage.

Power Module

●Electrical characteristic curves

BP5048

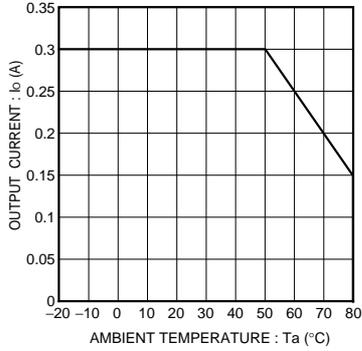


Fig.4 Derating curve

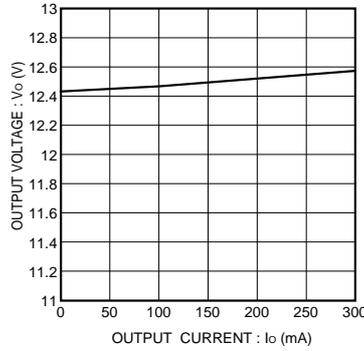


Fig.5 Load regulation

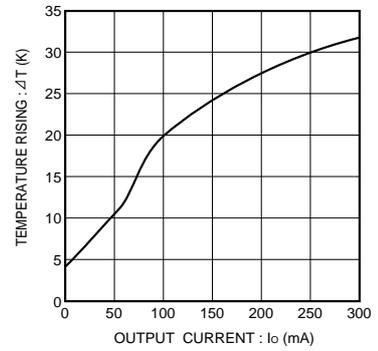


Fig.6 Surface temperature rise

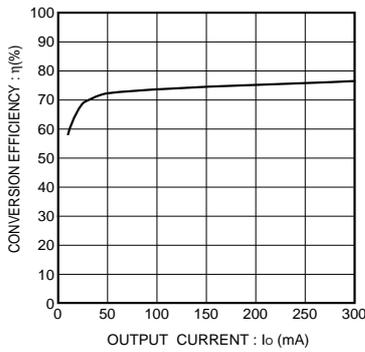


Fig.7 Conversion efficiency

BP5048-15

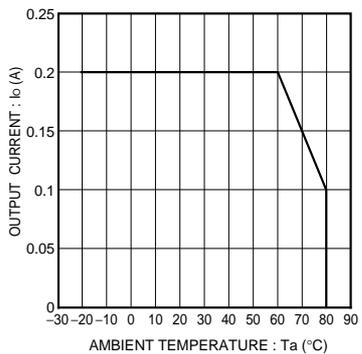


Fig.8 Derating curve

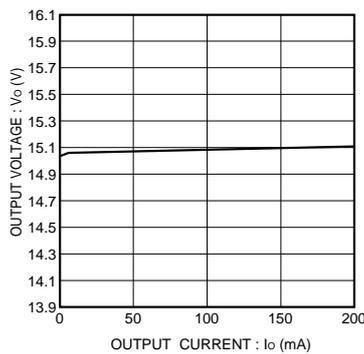


Fig.9 Load regulation

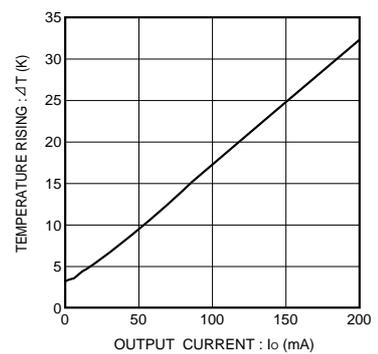


Fig.10 Surface temperature rise

Power Module

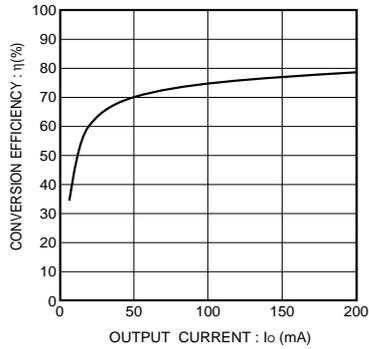


Fig.11 Conversion efficiency

BP5048-24

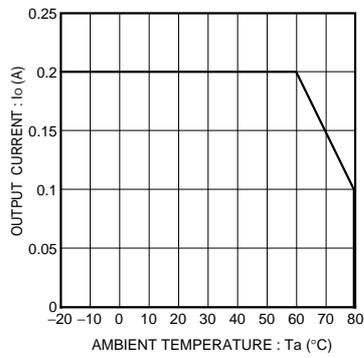


Fig.12 Derating curve

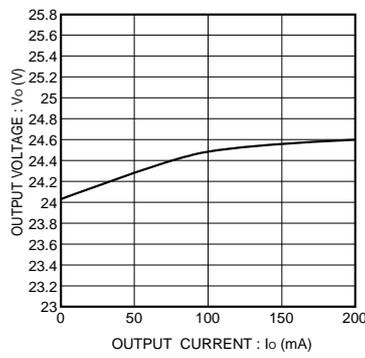


Fig.13 Load regulation

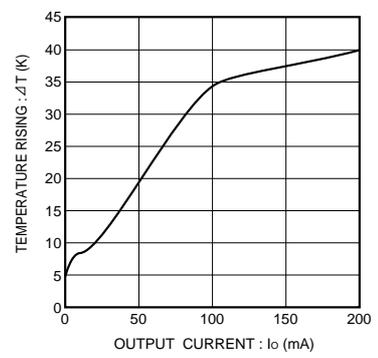


Fig.14 Surface temperature rise

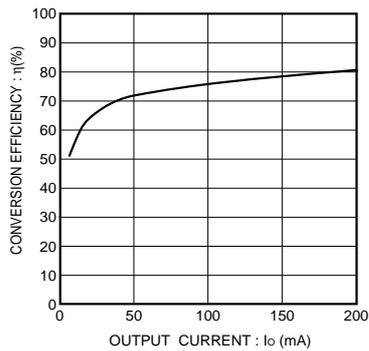
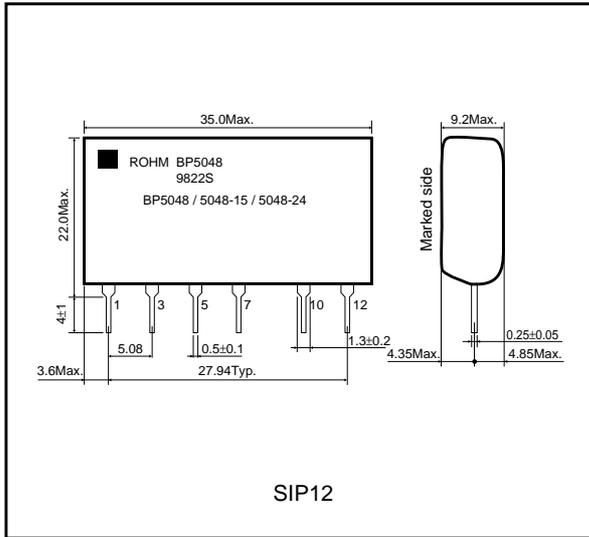


Fig.15 Conversion efficiency

Power Module

●External dimensions (Units : mm)



Notes

- No technical content pages of this document may be reproduced in any form or transmitted by any means without prior permission of ROHM CO.,LTD.
- The contents described herein are subject to change without notice. The specifications for the product described in this document are for reference only. Upon actual use, therefore, please request that specifications to be separately delivered.
- Application circuit diagrams and circuit constants contained herein are shown as examples of standard use and operation. Please pay careful attention to the peripheral conditions when designing circuits and deciding upon circuit constants in the set.
- Any data, including, but not limited to application circuit diagrams information, described herein are intended only as illustrations of such devices and not as the specifications for such devices. ROHM CO.,LTD. disclaims any warranty that any use of such devices shall be free from infringement of any third party's intellectual property rights or other proprietary rights, and further, assumes no liability of whatsoever nature in the event of any such infringement, or arising from or connected with or related to the use of such devices.
- Upon the sale of any such devices, other than for buyer's right to use such devices itself, resell or otherwise dispose of the same, no express or implied right or license to practice or commercially exploit any intellectual property rights or other proprietary rights owned or controlled by
- ROHM CO., LTD. is granted to any such buyer.
- Products listed in this document use silicon as a basic material.
Products listed in this document are no antiradiation design.

The products listed in this document are designed to be used with ordinary electronic equipment or devices (such as audio visual equipment, office-automation equipment, communications devices, electrical appliances and electronic toys).

Should you intend to use these products with equipment or devices which require an extremely high level of reliability and the malfunction of which would directly endanger human life (such as medical instruments, transportation equipment, aerospace machinery, nuclear-reactor controllers, fuel controllers and other safety devices), please be sure to consult with our sales representative in advance.

About Export Control Order in Japan

Products described herein are the objects of controlled goods in Annex 1 (Item 16) of Export Trade Control Order in Japan.

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.