1.3±0.2

30-20-10 0 10 20 30 40 50 60 70 80 90 Ambient Temperature Ta(°C)

1000 1500 2000 2500 3000

Vi=311V 1000 1500 2000 2500 3000

Output Current Io (mA)

Conversion Efficiency

Switching Frequency

Switching Frequency fsw (kHz)

Conversion Efficiency n (%) 70 60 50 40 3

70

60

50 40 30

20

10

2 54 10=25 4(TYP

SIDE

+0.05 3.7MAX.



### 100-220VAC Input/3.3VDC (3A) Output

### Isolated AC/DC Converter **BP5723-33**



#### Electrical Characteristics

Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
Pin 11 input voltage	VD	-	-	650	V	Vi=141V lo=3A
Operating power voltage(Pin 7)	Vdd	8.5	14	20	V	Vi=141V lo=1A *1
Rated output voltage	Vo	3.13	3.3	3.47	V	Vi=141V, lo=2A
Rated output current	lo	0	-	3.0	A	Refer to derating curve
Line regulation	ΔVr	_	10	200	mV	Vi=113 to 374V DC lo=2A
Load regulation	ΔVI	-	10	200	mV	Vi=141V, Io=0 to 2A
Output ripple voltage	Δγ	-	100	500	mѶpp	Vi=141V, lo=2A 2*2
Power conversion efficiency	η	70	79		%	Vi=141V, Io=3A

\*1: Operation start voltage becomes 16 to 18 V. \*2: Pulse noise does not include it.

#### Sample Application Circuit



### 9 NC 11 VD

Terminal function

Secondary output voltage control terminals.

GND terminals for the Secondary side output

The primary side input minus terminal. The power supply termina of an inside circuit.

It is the drain terminal of inclusion FET.

Triggering terminal

NC pin

Name

Vo

GND

Vi(-)

Vdd

Vs

2

6

7

8

Load	Reau	lation

500



Input Capacitor

C1:

33µF / 450V 560µF / 10V High polymer aluminum solid capacitor 560uF / 10V High polymer aluminum solid capacitor  $10 \mu F$  / 50V Low impedance type 4700pF / 1kV

- Use if necessary
- Noise Removal Capacitor Use if necessary C6:

External Component Specifications

D4: **Rectification Diode** R1 Resistance R2: Resistance

D1:

D2:

D3:

Switching transformer T1:

Diode bridge

Shottkey diode

**Rectification Diode** 

- F1: Fuse
- ZNR: Varistor
- 80V / 0.13A 47kΩ±5% 3W DC300V or greater 1.5MΩ±5% 0.25W 750V or greater

30V / 15A

1kV / 1A

Custom Be sure to use a fuse for the safety. A varistor is required to protect against lightning surges and static electricity.



Output Current Io (mA)

Output Current Io (mA)



**Operation Notes** • An excessively large capacitance at C2 may cause the output to become inactive. Therefore, a capacitance between 500 to 2200µF is recommended, with a rise time of 10us or less.

- The capacitance of C3 should be 10μF, since an excessively small value will result in malfunction. The activation time is defined as : t(s)=R2\*C3 ln[1-17/(VI-30μA\*R2)], where VI is the DC voltage after smoothing.
- The resistance of R2 should be 1.5MΩ, since an excessively small value will result in malfunction.
- Overcurrent (reset type) and overvoltage (latch type) protection circuits are built in, preventing damage from occurring due to unexpected conditions. The overvoltage protection circuit shuts down operation once Vop exceeds 20V. In order to reset the input capacitor C4 must be discharged and the power turned back on.

# **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<sub>2</sub>, H<sub>2</sub>S, NH<sub>3</sub>, SO<sub>2</sub>, NO<sub>2</sub>) 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.

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