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

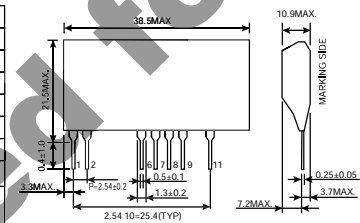
# Isolated AC/DC Converter

**BP5723-33**

## Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Conditions
11 pin input voltage	$V_D$	700	V	
7 pin input voltage	$V_{DD}$	25	V	
11 pin input currents	$I_D$	500	mA	PEAK
8 pin input currents	$I_{DD}$	10	mA	
Maximum output power	$P_o$	10	W	
Withstand voltage	$V_I$	3	kV	1 sec (Primary - Secondary)
Permission temperature	$T_{cmax}$	105	°C	Contain a self-fever
Operating temperature range	$T_{opr}$	-25 to +80	°C	
Storage temperature range	$T_{stg}$	-30 to +105	°C	

## Dimensions (Unit : mm)



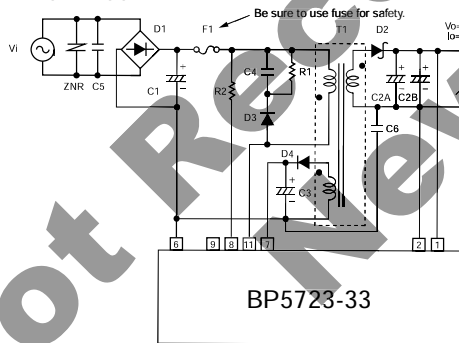
## Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Pin 11 input voltage	$V_D$	-	-	650	V	$V_i=141V$ $I_o=3A$
Operating power voltage(Pin 7)	$V_{DD}$	8.5	14	20	V	$V_i=141V$ $I_o=1A$ *1
Rated output voltage	$V_o$	3.13	3.3	3.47	V	$V_i=141V$ $I_o=2A$
Rated output current	$I_o$	0	-	3.0	A	Refer to derating curve
Line regulation	$\Delta V_r$	-	10	200	mV	$V_i=113$ to $374V$ DC $I_o=2A$
Load regulation	$\Delta V_l$	-	10	200	mV	$V_i=141V$ $I_o=0$ to $2A$
Output ripple voltage	$\Delta \gamma$	-	100	500	mVpp	$V_i=141V$ $I_o=2A$ *2
Power conversion efficiency	$\eta$	70	79	-	%	$V_i=141V$ $I_o=3A$

\*1: Operation start voltage becomes 16 to 18 V.

\*2: Pulse noise does not include it.

## Sample Application Circuit



Pin No.	Name	Terminal function
1	$V_o$	Secondary output voltage control terminals.
2	GND	GND terminals for the Secondary side output.
6	$V_i(-)$	The primary side input minus terminal.
7	$V_{DD}$	The power supply terminal of an inside circuit.
8	$V_s$	Triggering terminal.
9	NC	NC pin.
11	$V_D$	It is the drain terminal of inclusion FET.

## External Component Specifications

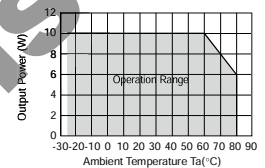
C1: Input Capacitor	33 $\mu$ F / 450V
C2A: Output Capacitor	560 $\mu$ F / 10V High polymer aluminum solid capacitor
C2B: Output Capacitor	560 $\mu$ F / 10V High polymer aluminum solid capacitor
C3: Output Capacitor	10 $\mu$ F / 50V Low impedance type
C4: Noise Removal Capacitor	4700pF / 1kV
C5: Noise Removal Capacitor	Use if necessary
C6: Noise Removal Capacitor	Use if necessary

D1: Diode bridge	-
D2: Shottkey diode	30V / 15A
D3: Rectification Diode	1kV / 1A
D4: Rectification Diode	80V / 0.13A
R1: Resistance	47k $\Omega$ ±5% 3W DC300V or greater
R2: Resistance	1.5M $\Omega$ ±5% 0.25W 750V or greater
T1: Switching transformer	Custom
F1: Fuse	Be sure to use a fuse for the safety.
ZNR: Varistor	A varistor is required to protect against lightning surges and static electricity.

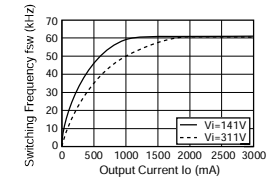
## Operation Notes

- An excessively large capacitance at C2 may cause the output to become inactive. Therefore, a capacitance between 500 to 2200 $\mu$ F is recommended, with a rise time of 10 $\mu$ s or less.
- The capacitance of C3 should be 10 $\mu$ F, since an excessively small value will result in malfunction. The activation time is defined as:  $t(s) \approx R2 \cdot C3 \ln[1 - 17 / (V_i - 30 \mu A \cdot R2)]$ , where  $V_i$  is the DC voltage after smoothing.
- The resistance of R2 should be 1.5M $\Omega$ , 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  $V_{DD}$  exceeds 20V. In order to reset the input capacitor C4 must be discharged and the power turned back on.

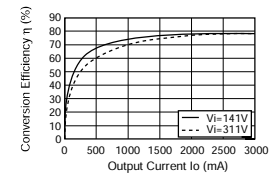
## Derating Curve



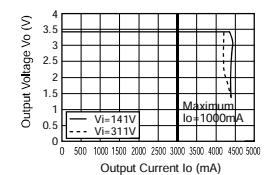
## Switching Frequency



## Conversion Efficiency



## Load Regulation





# 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.

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