220VAC Input/12VDC (1A) Output

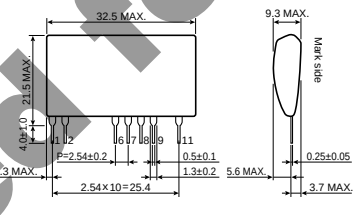
Isolated AC/DC Converter

BP5722A12

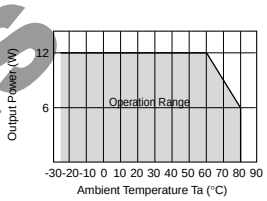
● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Conditions
Pin 11 input voltage	V_D	800	V	
Pin 7,8 input voltage	V_{DD}	25	V	
Pin 11 input Current	I_D	350	mA	
Pin 8 input Current	I_{DD}	10	mA	
Output power	Po	13	W	
Withstand voltage	VI	2.5	kW	1 sec (between primary and secondary)
Maximum allowable surface temperature	Tcmax	105	°C	Ambient temperature + module self-heating ≤ Tcmax
Operating temperature range	Topr	–25 to +80	°C	
Storage temperature range	Tstg	–40 to +105	°C	

● Dimensions (Unit : mm)



● Derating Curve

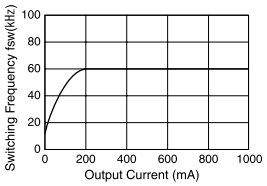


● Electrical Characteristics

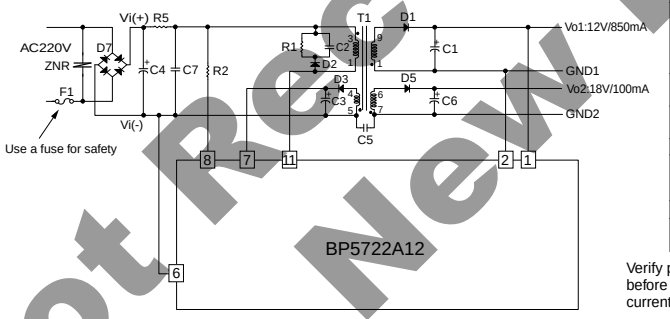
Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Pin 11 input voltage	V_D	–	–	700	V	Io=1000mA
Operating power voltage(Pin 7)	V_{DD}	8.8	12	20	V	DC, Io=1000mA *1
Rated output voltage	Vo	11.4	12.0	12.6	V	
Rated output current	Io	0	–	1000	mA	Refer to derating curve
Line regulation	ΔVr	–	8	200	mV	Vi=217 to 405V DC Io=1000mA
Load regulation	ΔVI	–	30	200	mV	Io=50 to 1000mA
Output ripple voltage	Δγ	–	200	500	mVpp	*2
Power conversion efficiency	η	75	83	–	%	

*1: The operation starting voltage is between 15.5 and 17.5 V.
*2: Pulse noise is not included.

● Switching Frequency



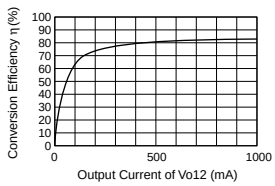
● Sample Application Circuit



Pin No.	Terminal name	Terminal function
1	Vo	Secondary 12V output voltage control terminal. Insert a 1000µF output smoothing capacitor before the GND for use.
2	GND	Secondary 12V output GND terminal.
6	Vi(-)	Primary input negative terminal.
7	V_{DD}	Internal circuit power terminal.
8	Vs	Start-up terminal. Connect to Vi (+) through an external resistor (1.5MΩ).
9	NC	NC pin.
11	V_D	Drain terminal for the built-in FET.

Verify proper operation under actual conditions before use. In particular, confirm that the load current does not exceed the maximum rating.

● Conversion Efficiency

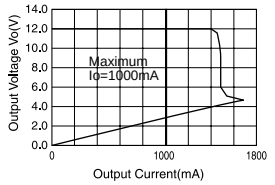


External Component Settings

*C1: Output smoothing capacitor	1000µF/35V Low-impedance type	D3: Rectifier Diode	90V/0.13A
C2: Noise reduction capacitor	4700pF/400V or higher	D5: Rectifier Diode	100V or higher /1A
*C3: Output smoothing capacitor	10µF/50V Low-impedance type	D7: Diode Bridge	800V/1A
C4: Input smoothing capacitor	33µF/450V	R1: Resistor	100kΩ±5%, 3W Limiting element voltage 300V or higher
C5: Noise reduction capacitor	Use if necessary	* R2: Resistor	1.53MΩ±5%, 0.25W Limiting element voltage 600V or higher
C6: Output smoothing capacitor	100µF/35V Low-impedance type	R5: Noise reduction resistor	Use if necessary 1W or higher 10 to 22Ω
C7: Noise reduction capacitor	Use if necessary Limiting element voltage DC 630V or higher 0.1 to 0.22µF	T1: Switching Transformer	
D1: Rectifier Diode	90V/6A	F1: Fuse	Be sure to use this for safety.
D2: Rectifier Diode	1kV/1A	ZNR: Varistor	A varistor is required to protect against lightning surges and static electricity.

*C1, C3, R2:Refer to directions

● Load Regulation



Operation Notes

- An excessively large capacitance at C1 may cause the output to become inactive. Therefore, a capacitance between 1000 and 2200µF is recommended, with a rise time of 10ms 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(sec)=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 V_{DD} 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_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.
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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