

AC100V input, 12V/1000mA output

AC/DC converter

BP5716

Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Conditions
8-pin input voltage	V_D	500	V	
6-pin input voltage	V_{DD}	25	V	
8-pin input current	I_D	500	mA	
6-pin input current	I_{DD}	10	mA	
Maximum Power	P_o	13	W	
Withstanding voltage	V_i	2.5	kV	1s (primary-secondary)
Allowable maximum surface temperature	T_{cmax}	105	°C	Ambient temperature + The module self-heating $\leq T_{cmax}$
Operating temperature range	T_{opr}	-25 to +80	°C	
Storage temperature range	T_{stg}	-40 to +105	°C	

Electrical Characteristics

<Input conditions> (Unless otherwise noted, $V_i=141V$, $T_a=25^\circ C$)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
8-pin input voltage	V_D	—	—	350	V	$I_o=1000mA$
Operating power voltage	V_{DD}^{*1}	8.8	12	20	V	DC, $I_o=1000mA$

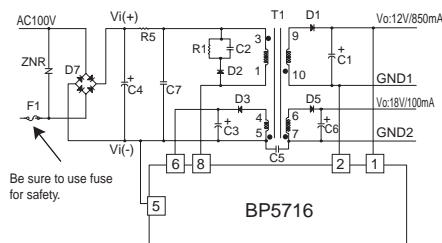
<12V output>

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Output voltage	V_o	11.4	12.0	12.6	V	
Output current	I_o	0	—	1000	mA	Refer to derating curve
Line regulation	V_r	—	10	200	mV	$V_i=113V$ to $170VDC$, $I_o=1000mA$
Load regulation	V_l	—	58	200	mV	$I_o=50mA$ to $1000mA$
Output ripple voltage	V_p^{*2}	—	300	500	mVpp	
Power conversion efficiency	η	75	84	—	%	

^{*1} Operating start voltage is 15.5V to 17.5V.

^{*2} Pulse noise not included.

Application circuit



Be sure to use fuse for safety.

Pin No.	Name	Function
1	V_o	This is the secondary side 12V output voltage control terminal. Insert the output smoothing capacitor 1000 μF between GND.
2	GND	This is the GND terminal for the secondary side 12V output.
5	$V_{in(-)}$	This is the primary side input minus terminal.
6	V_{DD}	This is the internal circuit power supply terminal.
8	V_D	This is the built-in FET of drain terminal. The primary coil minus side of the external transformer, and the snubber circuit for noise reduction are connected to this.

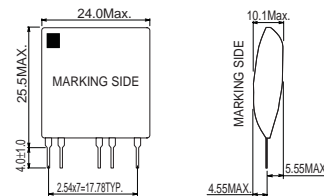
For actual usage, Please kindly evaluate and confirm our part mounted in your product. Especially, Please make sure to confirm whether the load current exceed Max. rated current by using the current probe.

External components setting

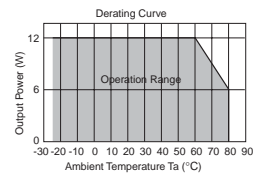
- C1: Capacitor for output voltage smoothing 1000 μF / 35V Low impedance for power supply
- C2: For noise terminal voltage reduction 2200pF / 400V or higher
- C3: Capacitor for output voltage smoothing 10 μF / 50V Low impedance for power supply
- C4: Capacitor for input voltage smoothing 33 μF / 250V
- C5: For noise terminal voltage reduction Please set it, if necessary
- C6: Capacitor for output voltage smoothing 100 μF / 35V Low impedance for power supply
- C7: Noise terminal voltage countermeasure capacitor Please set it, if necessary
- D1: Rectifier diode Limiting element voltage 250V or higher 0.1 to 0.22 μF
- D2: Rectifier diode 60V / 6A
- D3: Rectifier diode 1kV / 1A
- D5: Rectifier diode 80V / 0.1A
- D7: Diode bridge 100V or higher / 1A
- R1: Resistor 800V / 1A
- R5: Noise terminal voltage countermeasure resistor 100k $\Omega \pm 5\%$ 3W Limiting element voltage 300V or higher
- T1: Switching transformer Please set it, if necessary
- F1: Fuse 1W or higher 10 to 22 Ω
- ZNR: Varistor Be sure to use this for safety

Must be use. It protects this part from lightning surge and static electricity.

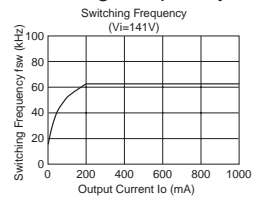
Dimensions (Unit : mm)



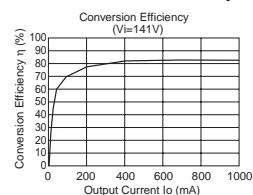
Derating Curve



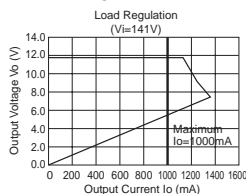
Switching Frequency



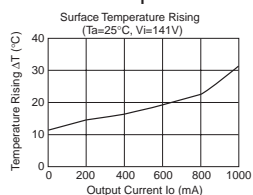
Conversion Efficiency



Load Regulation



Surface Temperature Rising



● Precautions on use of products

- When the capacity of the output smoothing electrolytic capacitor C1 is made large, output may not rise. 1000 μ F to 2200 μ F is recommended. Set the rise time within 10ms.
- Set the Vod electrolytic capacitor C3 to 10 μ F.
- Be sure to use the VG terminal voltage within the operating voltage range.
- Set the external starting resistor (R1+R3) to 720K Ω . When reducing the resistance value, start-up may fail. Take note of the loss of the resistor when it is reduced.
- This product has built-in over current (reset type) protection function to prevent destruction at abrupt error. These protection functions are effective for prevention against destruction owing to abrupt accident, therefore, avoid using them for continuous protection circuit operating, or at transition

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. Cl₂, H₂S, NH₃, SO₂, NO₂) 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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 - [b] Problems arising from the use of the products listed herein
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