

# AC100V input, 12V/1000mA output

# AC/DC converter

## **BP5716**

#### Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit	Conditions
8-pin input voltage	Vd	500	V	
6-pin input voltage	Vdd	25	V	
8-pin input current	lo	500	mA	
6-pin input current	Idd	10	mA	
Maximum Power	Po	13	W	
Withstanding voltage	Vi	2.5	kV	1s (primary-secondary)
Allowable maximum surface temperature	Tcmax	105	°C	Ambient temperature + The module self-heating $\leq$ Tcmax
Operating temperature range	Topr	-25 to +80	°C	
Storage temperature range	Tstg	-40 to +105	°C	

#### Electrical Characteristics

<input conditions=""/>					(Unle	ess otherwise noted, Vi=141V, Ta=25°C)
Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions
8-pin input voltage	Vd	-	-	350	V	lo=1000mA
Operating power voltage	Vdd *1	8.8	12	20	V	DC, Io=1000mA
<12V output>						
Parameter	Symbol	Min.	Тур.	Max.	Unit	Conditions

i aramotor			1.26.	1	Onic	Conditionio
Output voltage	Vo	11.4	12.0	12.6	V	
Output current	lo	0	-	1000	mA	Refer to derating curve
Line regulation	Vr	-	10	200	mV	Vi=113V to 170VDC, Io=1000mA
Load regulation	VI	-	58	200	mV	Io=50mA to 1000mA
Output ripple voltage	Vp *2	-	300	500	mVpp	
Power conversion efficiency	η	75	84	-	%	
*1 Operating start voltage is1	5.5V to 17.5V.					suo menerato dar

\*1 Operating start voltage is \*2 Pulse noise not included.

#### Application circuit



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

#### Dimensions (Unit : mm)



#### Derating Curve



Switching Frequency



Conversion Efficiency

(9	100.	C	onversi (V	on Effic i=141V	iency		
۷	100						
F	90						
Conversion Efficiency n (%)	80	/					
ie.	70	1					
Ξ.	50	1					
ш С	40	1					
ō	30						
20	20						
ž	10						
ã	10						
0	Č	20	0 4	00 6	3 00	300	1000
			Output (	Current	lo (mA	.)	

Load Regulation

Output Voltage Vo (V)

				Reg /i=14	ulatio	on			
14.0									
12.0			-						
10.0			_					<u> </u>	
8.0							$\backslash$		
							$\geq$		
6.0			-						
4.0			-		$\sim$	Ma	timu	h –	
2.0			$\sim$	r		lo=	1000	mΑ	
0.0									
	0 20	0 4/	0 6		00 10	00.42	00 14	00.10	00
	0 20				rent l			00 10	00

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.  $1000\mu$ F to  $2200\mu$ F is recommended. Set the rise time within 10ms.
- Set the Vod electrolytic capacitor C3 to  $10\mu$ F.
- Be sure to use the VG terminal voltage within the operating voltage range.
- Set the external starting resistor (R1+R3) to 720KΩ. 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. 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 /

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- 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:
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  [b] Problems arising from the use of the products listed herein
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