

100VAC Input/12VDC (1A) Output

Isolated 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} | 8.8 | 12 | 20 | V | DC, $I_o=1000mA$ *1 |

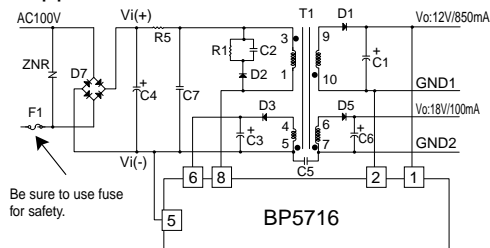
<12V output>

| 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 | - | 300 | 500 | mVpp | *2 |
| 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 | $V_i(-)$ | 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. |

Please verify operation and characteristics in the customer's circuit before actual usage. Ensure that the load current does not exceed the maximum rating.

External Component Specifications

- C1: Output smoothing capacitor 1000 μF / 35V, low impedance
- C2: Noise reduction capacitor 2200pF / 400V or higher
- C3: Output smoothing capacitor 10 μF / 50V, low impedance
- C4: Input smoothing capacitor 33 μF / 250V
- C5: Noise reduction capacitor Use if necessary
- C6: Output smoothing capacitor 100 μF / 35V, low impedance
- C7: Noise terminal voltage countermeasure capacitor Use if necessary
Limiting element voltage 250V or higher, 0.1 to 0.22 μF
- 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 100k $\Omega \pm 5\%$ 3W Limiting element voltage 300V or higher
Use if necessary
- R5: Noise reduction resistor 1W or higher 10 to 22 Ω

T1: Switching transformer

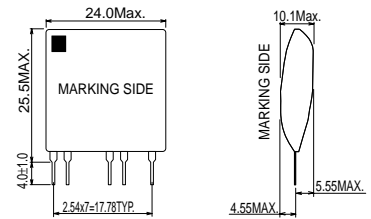
F1: Fuse

ZNR: Varistor

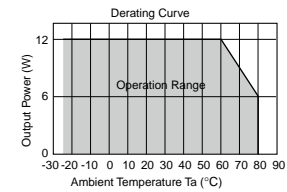
Be sure to use this for safety

A varistor is required to protect against lightning surges and static electricity.

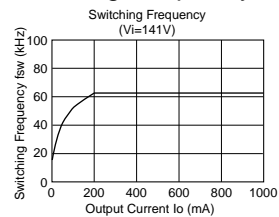
● Dimensions (Unit : mm)



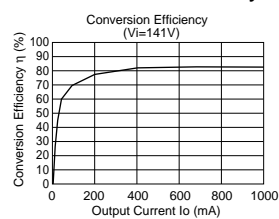
● Derating Curve



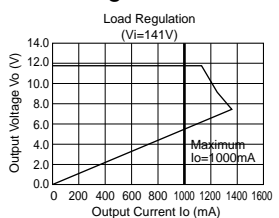
● Switching Frequency



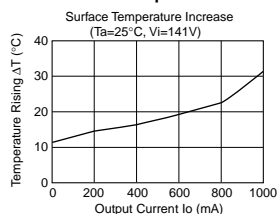
● Conversion Efficiency



● Load Regulation



● Surface Temperature Increase



Power Module Usage Precautions

Safety Precautions

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 - [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.
- 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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