100-200VAC Input/12W Output

Isolated AC/DC Converter

BP5728

● Absolute Maximum Ratings

Parameter	Symbol	Limits	Unit
6pin Input Voltage	V_D	800	V
2pin Input Voltage	V_{FB}	−0.2 to +6	V
3pin Input Voltage	V_{DD}	24	V
3pin Input Current	I_{DD}	8	mA
Allowable Loss	P_D	0.64	W
Max Surface Temperature	Tcmax	105	°C
Operating Temperature Range	Topr	−25 to +80	°C
Storage Temperature Range	Tstg	−25 to +105	°C

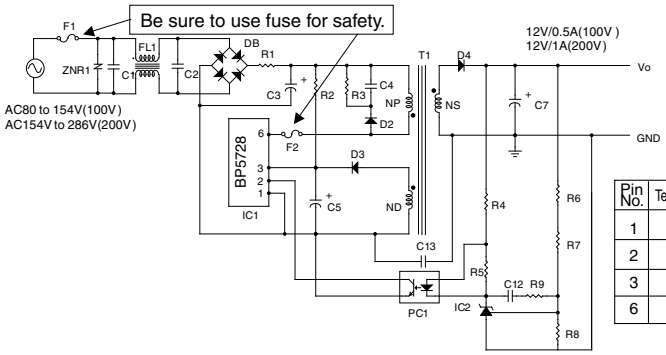
● Electrical Characteristics

(V_{DD}=15V, Vd=15V,I_{FB}=0.1mA,SW1=R1,Ta=25°C, unless otherwise specified)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Conditions
Input voltage	V_{DD}	8.9	12	20	V	–
Output frequency	fo	59	65	71	kHz	I_{FB}=0.5mA
Turn on voltage	V_{DD} on	15.5	16.5	17.5	V	V_{DD}=0→17.5V
Turn off voltage	V_{DD} off	7.7	8.3	8.9	V	V_{DD}=17.5→0V
Maximum Duty	Duty MAX	68	75	82	%	I_{FB}=0.5mA
Zero-Duty I_{FB}	Ioz	0.85	1.15	1.45	mA	I_{FB}=0→1.55mA

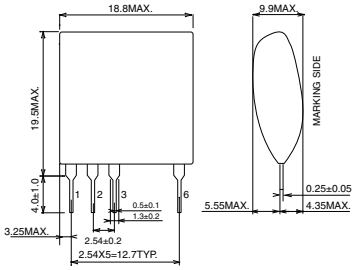
Parameter	Symbol	V_{DD}	Min.	Typ.	Max.	Unit	Conditions
Over drain current protection	Idocp	10V	217	247	281	mA	V_D=0→15V SW1=R2
		15V	269	302	338		
		20V	314	349	388		

● Application Circuit (In case of 12V output)

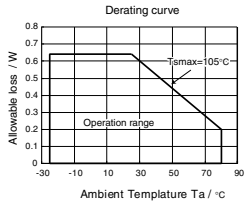


Pin No.	Terminal name	Terminal function
1	COM	Common terminal at primary side
2	FB	Feed back terminal
3	V_{DD}	Power supply terminal for internal drive
6	V_D	Drain terminal for built-in FET

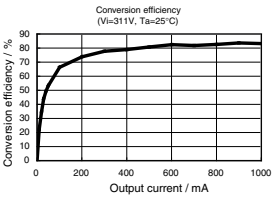
● Dimensions (Unit : mm)



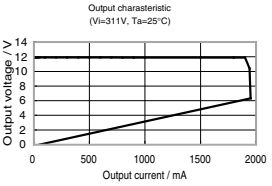
● Derating Curve



● Conversion Efficiency (In case of 12V output)



● Load regulation (In case of 12V output)



Operating Principle

1.When turned on : C5 is charged by R2 when the power is on, and the switching starts when the voltage at V_{DD} pin reaches the voltage threshold (17.5V max.)

2.During operation : Vdd is supplied via Nd and FB current flows to PC1 once Vo exceeds the threshold voltage. Once PC1 turns ON a current Ioz flows through the transistor.
Also, FB current runs to Pin 2 of BP5728 when Vo exceeds the designed voltage and the constant voltage control is executed.

3.In overcurrent conditions : The input current will increase if the output power increases, and the overcurrent protection circuit will turn ON once the Drain current exceeds the specified value (Idocp).

External Component Specifications

C1,C2 :	Noise reduction capacitors	Rated at 300VAC or higher
C3 :	Input smoothing capacitor	0.1 to 0.22µF
C4 :	Noise reduction capacitor	22µF / 450V
C5 :	Vdd smoothing capacitor	2200pF / 1kV
C7 :	Output capacitor	10µF / 50V
C12 :	Phase compensation capacitor	470µF / 35V low impedance
C13 :	Noise reduction capacitor	0.1µF / 50V
D2 :	Rectifier diode	2200pF / AC250V
D3 :	Rectifier diode	FRD 800V / 0.5A
D4 :	Rectifier diode	80V / 0.1A
DB :	Diode bridge	SBD 90V / 3A
F1,F2 :	Fuse	800V / 1A
IC1 :	BP5728	Use for safety BP5728
IC2 :	Shunt regulator	Vref=2.495V
FL1 :	Noise reduction filter	Use if necessary
R1 :	Resistor	0Ω
R2 :	Resistor	750kΩ 0.5W / 600V
R3 :	Resistor	200kΩ / 3W
R4 :	Resistor	51Ω / 0.125W
R5 :	Resistor	1kΩ / 0.1W
R6 :	Resistor	15kΩ / 0.1W
R7 :	Resistor	3kΩ / 0.1W
R8 :	Resistor	4.7kΩ / 0.1W
R9 :	Resistor	1kΩ / 0.1W
PC1 :	Photo coupler	PC817
T1 :	Switching transformer	SRW25ES-47V015(TDK)
ZNR1 :	Varistor	A varistor is required to protect against lightning surges and static electricity.

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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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:
   [a] Infringement of the intellectual property rights of a third party
   [b] Problems arising from the use of the products listed herein
3) The Company prohibits the purchaser from exercising or using the intellectual/industrial property rights or any rights belonging to or are controlled by the Company, other than the right to use, sell, or dispose of the products.

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