BSTHF28S3R3F

DC/DC converter

Data Sheet

I. Product Introduction

BSTHF28S3R3F DC/DC converter is a highly reliable isolated DC-DC power supply module manufactured using thick-film hybrid integrated circuit technology. It features a dual-in-line metal fully sealed housing structure and is used in DC power supply systems to achieve DC voltage conversion.

This product is manufactured according to GJB 2438A-2002 "General Specification for Hybrid Integrated Circuits" H-level quality level control.

Fixed switching frequency plus single-ended forward topology ensures high efficiency, fast dynamic response and good electromagnetic compatibility.

II. Product Features

- Single output 3V/ 3A
- Output power 10W
- High efficiency up to 75 %
- High reliability
- Input voltage range 16V ~ 40V
- External synchronization function
- Prohibited functions
- Models with F indicate they have mounting flanges
- Standard UPP3728 steel case package

III. Performance Indicators

Absolute maximum ratings

Unless otherwise specified, T_C=-55℃～+125℃, V_{IN}=+28V±0.5V, full load)

- Input voltage (steady state) 28V_{DC}
- Output power 10W
- Power consumption (full load, T_C = 25℃) 3.5W
- Storage temperature -55℃～+125℃
- Pin soldering temperature 300℃ /10s
- Weight (maximum) (with F) 35g

The electrical characteristics shall be as specified in Table 1.

Table 1. Electrical characteristics

CHARACTERISTIC	SYMBOL	CONDITION (UNLESS OTHERWISE SPECIFIED, -55℃≤ T_C ≤ 125℃, V_I = 28V ± 0.5V)	GROUP A GROUPING	LIMIT VALUE		UNIT
				MINIMUM	MAXIMUM	
Output voltage	V_O	I_O = 3A, V_I =16V～40V	1	3.25	3.35	V
			2,3	3.20	3.40	
Output current	I_O	V_I =16V～40V	1,2,3	-	3	A
Output ripple voltage (peak-to-peak)	V_{RIP}	Output full load, BW= 20MHz	1	-	100	mV
Voltage regulation	S_V	V_I =16V～40V, output full load	1	-	100	mV
Current regulation	S_I	Output load: 0%→100%	1	-	70	mV
efficiency	η	Output full load	1	70	-	%
			2, 3	67	-	
Prohibited functions		Output is fully loaded, INH terminal is grounded	1	-	0.50	V
Insulation resistance	R_I	Apply 500V between the input and output or between any lead (except terminal 6) and the case	1	100	-	MΩ
Short-circuit protection	T_S	Output short circuit	1	5	-	s

IV. Environmental Adaptability

- Operating temperature: -55˚C to 125˚C
- Storage temperature: -55˚C ~ 125˚C
- Salt spray protection: 24h
- ESDS: ≥1 000V

V. Circuit Function Block Diagram

The circuit diagram of this product is shown in Figure 1.

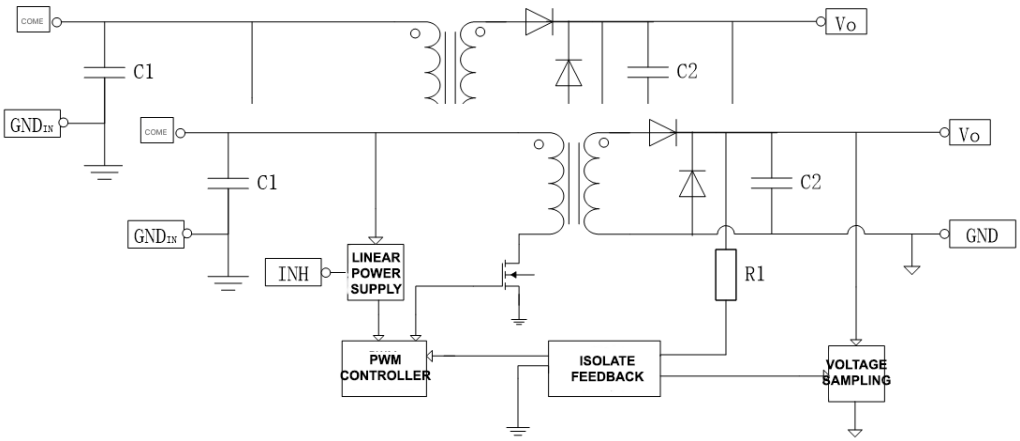

Figure 1. Product circuit diagram

VI. Efficiency vs. Output Current Characteristic Curve

The efficiency vs. output current characteristic curve is shown in Figure 2.

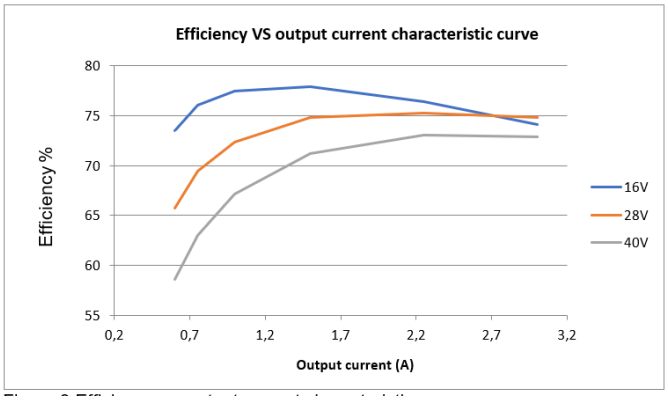

Figure 2. Efficiency vs. output current characteristic curve

VII. Appearance and Size

The outer shape of the housing shall be as specified in Figure 3.

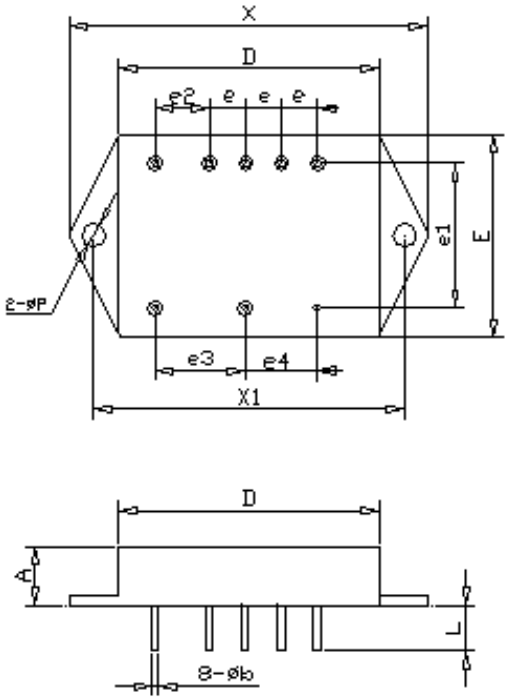

Figure 3. BSTHF28S3R3F dimensions

Table 2

NUMBER	VALUE (IN MM)		
	MINIMUM	NOMINAL	MAXIMUM
A	-	-	8.38
ϕb	0.66	-	0.86
e	-	5.08	-
e1	-	20.32	-
e2	-	7.62	-
e3	-	12.70	-
e4	-	10.16	-
E	-	-	28.58
L	6.05	-	6.60
ϕP	3.17	-	3.43
X	-	-	50.80
X1	43.82	-	44.08
D	-	-	36.96

VIII. Pin Function Description

The terminal arrangement should comply with the requirements of Figure 4.

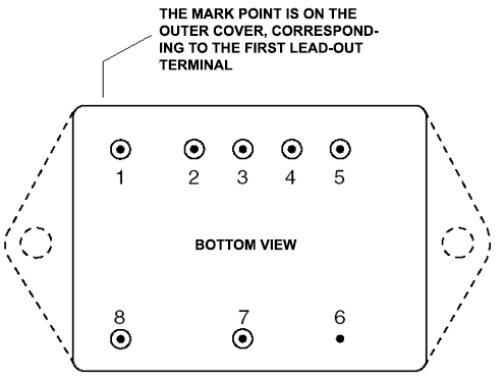

Figure 4. Terminal arrangement (top view, pins facing downwards)

Table 3

PIN NUMBER	SYMBOL	FUNCTION	PIN NUMBER	SYMBOL	FUNCTION
1	INH	Inhibit	5	SYNC	Synchronization
2	NC	No connection	6	GND_C	Case ground
3	GND_O	Output common	7	GND_I	Input common
4	V_O	Positive output	8	V_{IN}	Positive input

IX. Typical Application Diagram

The typical application connection diagram of the product is shown in Figure 5.

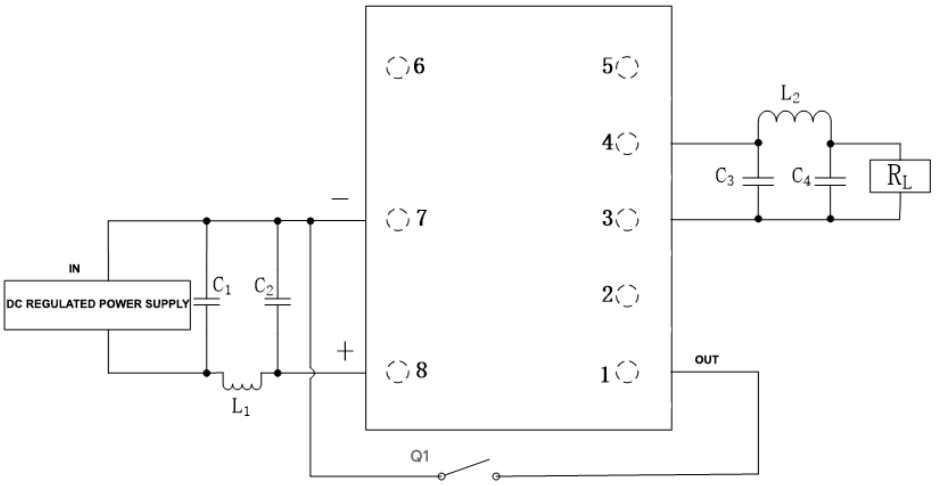

Figure 5.Typical application diagram

1. Recommended values :

C1 ~ C2: 4.7uF ~ 10uF / 100V /1210;

C3 ~ C4: 47uF ~ 100uF/ 10V /1210;

L1: Inductance 2.2uH ~ 10uH;

L2: Inductance 3.3uH ~ 10uH.

2. Application instructions for the Disable Function:

When the disable pin is not in use, leave K1 unconnected.

When the disable function is in use, close K1 (disable when pin 1 is low).

X. Assembly Instructions

This product is recommended to be installed according to the following requirements:

- Reflow soldering, reflow soldering or wave soldering is prohibited for this product (because the soldering temperature exceeds the melting point of the solder paste inside the product). Manual soldering is recommended.
- When the product pins are manually soldered, the soldering iron temperature shall not exceed 300℃, and the soldering time on each lead shall not exceed 10 seconds;
- This product is a power circuit. Under the conditions of T_C = -55℃ ~ +125℃ and V_{IN} = +28V±0.5V, the full-load power consumption is approximately 3.5W. During operation, the product generates heat, causing the case temperature to rise. Therefore, heat dissipation is required during assembly to ensure that the product case temperature is below 125℃. Because the main heating surface of the product is the bottom (lead-out end face), heat dissipation can be achieved by first applying thermal grease to the bottom of the product and then placing the bottom of the product close to the heat sink.
- When installing the product on a PCB or other carrier, pay attention to protecting the product pins to prevent them from being subjected to external stress and causing damage to the glass insulator;

- When installing, pay attention to the "1" pin mark on the product and install the board in the correct installation direction. The pin closest to the "△△" mark on the upper surface of the shell is pin 1;
- When using a soldering iron to solder the pins, solder the outermost 4 pins first, then solder the other pins;
- After the housing pins are inserted into the PCB board, if the product has a mounting flange, they should be fixed to the PCB board with screws first. The product pins should be cut first and then soldered (the length of the lead extending from the board surface should be 1.5mm±0.8mm).

XI. Precautions

- Do not connect the input power supply polarity in reverse, otherwise the product will be burned. For the pin functions of this product, please refer to " 3 Pin Arrangement" in this article;
- Pay attention to the input voltage range. The input voltage range of this product is 16V~40V. Using it beyond the input voltage range may cause product damage.
- There is a glass insulator between the product lead pins and the metal shell. Bending or collision of the lead pins is prohibited.