BSTHF28D15(F)

DC/DC Converter

Data Sheet v.1.0

I. Product Introduction

BSTHF28D15(F) is a dual ±15V / 0.666A, 20W output DC/DC converter. It is manufactured using thick-film hybrid integrated circuit technology, has a fully sealed metal casing, and is used in DC power supply systems to realize DC voltage conversion function. It can withstand 80V/1s surge voltage.

II. Product performance indicators

The electrical characteristics shall conform to the specifications in Table 1.

Table 1. Electrical Properties

CHARACTERISTIC	SYMBOL	CONDITION (UNLESS OTHERWISE SPECIFIED) -55℃ ≤T_C≤125℃ V_I = 28 V±0.5 V, C_L =0.1uF)		GROUP A GROUPING	LIMIT VALUE		UNIT
					MINIMUM	MAXIMUM	
Output voltage	V_{O1}	V_I =15V ~ 50V, I_{O1} = I_{O2} =666mA		1	14.85	15.15	V
				2,3	14.78	15.22	
	V_{O2}			1	-15.15	-14.85	
				2,3	-15.30	-14.70	
Output current	I_{O1}	V_I = 15V～50V		1,2,3	-	666	mA
	I_{O2}						
Output ripple voltage (Peak-to-peak value)	V_{RIP1}	I_{O1} = I_{O2} = 666mA BW ≤20MHz		1,2,3	-	60	mV
	V_{RIP2}					60	
Voltage regulation	S_{V1}	V_I =15V ~ 50V, I_{O1} = I_{O2} =666mA	1 5 V road	1,2,3	-	20	S_{V1} S_{V2}
	S_{V2}		-1 5 V road		-	200	
Current regulation	S_{I1}	No-load → Full-load, both outputs change simultaneously.	1 5 V road	1,2,3	-	50	S_{I1} S_{I2}
	S_{I2}		-1 5 V road		-	200	
Cross adjustment degree b	S_C	One circuit is operating at 30% load, while the load on the other circuit changes from 30% to 70%.		1	-	500	mV
				2,3	-	500	
Input current	I_I	No load, prohibit the connection of the terminal to the input ground terminal.		1,2,3	-	6	mA

CHARACTERISTIC	SYMBOL	CONDITION (UNLESS OTHERWISE SPECIFIED) -55℃ ≤T_C≤125℃ V_I = 28 V±0.5 V, C_L =0.1uF)	GROUP A GROUPING	LIMIT VALUE		UNIT
				MINIMUM	MAXIMUM	
		No load, no open circuit allowed		-	65	
Input ripple current b (Peak-to-peak value)	I_{RIP}	BW ≤20MHz, I_{O1} = I_{O2} =666mA	1	-	90	mA
			2,3	-	120	

Table 1. (continued)

CHARACTERISTIC	SYMBOL	CONDITION (UNLESS OTHERWISE SPECIFIED) -55℃ ≤T_C≤125 ℃ V_I = 28 V±0.5 V, C_L =0.1UF)	GROUP A GROUPING	LIMIT VALUE		UNIT
				MINIMUM	MAXIMUM	
Start-up threshold voltage	V_{ION}	Under full load, the input voltage changes from 11V to 28V.	1,2,3	12.0	14.8	V
Undervoltage threshold voltage	V_{IOFF}	At full load, the input voltage changes from 28V to 11V.	1,2,3	11.0	14.5	V
efficiency	η	I_{O1} = I_{O2} = 666mA	1	79	-	%
			2,3	76	-	%
Insulation resistance	R_I	Apply 500VDC between the input/output terminals or between any of the leads (except pins 5 and 6) and the casing. T_A = 25℃	1	100	-	MΩ
Short-circuit power consumption	P_D	Short circuit	1	-	10	W
			2,3	-	12	
capacitive load [a]	C_{L1}	I_{O1} = I_{O2} = 666mA, T_A =25℃	4	-	500	μF
	C_{L2}					
Switching frequency	f_s	I_{O1} = I_{O2} = 666mA	4,5,6	350	500	kHz
Output voltage change (peak value) during load transients [bc]	V_{LT1}	50% load → Full load or Full load → 50% load Each output has a balanced load.	4,5,6	-400	400	mV
	V_{LT2}					
Recovery time of output voltage during load transients [bcd]	t_{LT1}	50% load → Full load or Full load → 50% load Each output has a balanced load.	4,5,6	-	500	μs
	t_{LT2}					
Output voltage change (peak value) during input voltage transients [be]	V_{VT}	Input voltage V_I: 16V →40V, I_{O1} = I_{O2} = 666mA	4,5,6	-900	900	mV
		Input voltage V_I: 40V→16V, I_{O1} = I_{O2} = 666mA				
Output voltage recovery time [bde] during input voltage transient	t_{VT}	Input voltage V_I: 16V →40V, I_{O1} = I_{O2} = 666mA Input voltage V_I: 40V→16V, I_{O1} = I_{O2} = 666mA	4,5,6	-	500	μs

Start-up overshoot (peak value)	V_{TO1}	Input voltage V_I: 0V→28V, I_{O1} = I_{O2} = 666mA	4,5,6	-	50	mV
	V_{TO2}			-	50	
Startup delay [f]	t_{d1}	Input voltage V_I: 0V→28V, I_{O1} = I_{O2} = 666mA	4,5,6	-	20	ms
	t_{d2}				20	

a. Capacitive load can be any value from 0 to the maximum limit, without affecting DC parameters;
b. This parameter is guaranteed by design and is only tested during initial qualification testing and design or process changes.
c. The jump time of the load should be greater than 10μs;
d. The recovery time refers to the time from the start of the jump until the output voltage returns to within ±1% of the corresponding stable value;
e. The jump time of the input voltage should be greater than 10μs;
f. The start-up delay time can be calculated either from the power supply transition or from when the grounded prohibition terminal is disconnected.

III. Shape and Dimensions

The outer casing shape should conform to the specifications in Figure 1.

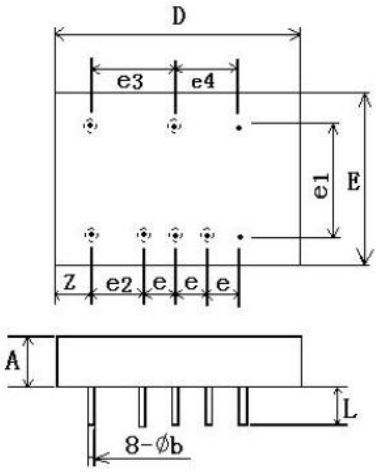

Figure 1a. BSTHF28D15 Dimensions

Table 2

Units in millimeter

SIZE SYMBOL	NUMERICAL VALUES		
	MINIMUM	NOMINAL	MAXIMUM
A	—	—	8.50
Φb	0.71	—	0.81
D	—	—	37.13
Z	—	—	5.41
e	—	5.08	—
e_1	—	20.32	—
e_2	—	7.62	—

SIZE SYMBOL	NUMERICAL VALUES		
	MINIMUM	NOMINAL	MAXIMUM
e_3	—	12.70	—
e_4	—	10.16	—
E	—	—	28.74
L	6.10	—	6.60

Notes:

- 1. Unspecified tolerances shall comply with grade m in GB/T 1804-2000;
- 2. The interchangeability of the dimensions of e and e1~e4 is guaranteed by the housing manufacturing process and is not subject to assessment requirements in this specification.

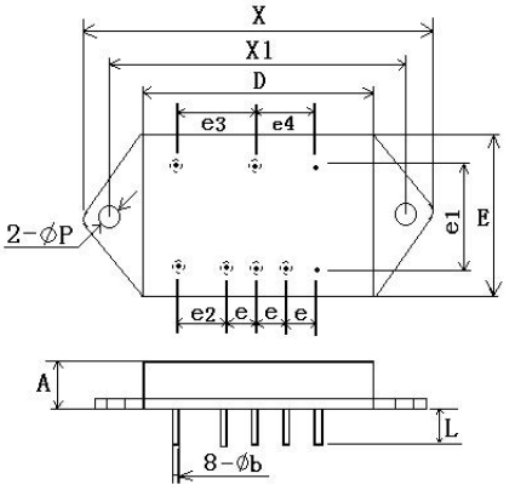

Figure 1b. BSTHF28D15F Dimensions

Table 3

SIZE SYMBOL	NUMERICAL VALUES		
	MINIMUM	NOMINAL	MAXIMUM
A	—	—	8.50
Φb	0.71	—	0.81
e	—	5.08	—
e_1	—	20.32	—
e_2	—	7.62	—
e_3	—	12.70	—
e_4	—	10.16	—
E	—	—	28.74
L	6.10	—	6.60
ΦP	—	3.30	—
X	—	—	50.80
X_1	—	43.95	—
D	—	—	37.13

V. Functional Description of Lead-Out Pins

The arrangement of the leads should conform to the specifications in Figure 2.

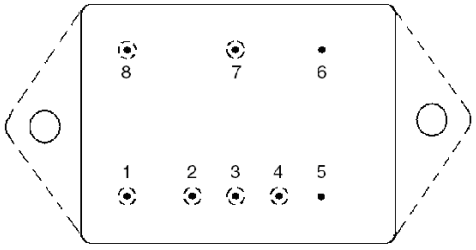

Figure 2. Arrangement of lead-out ends (top view)

Table 4

LEAD-OUT SERIAL NUMBER	SYMBOL	FUNCTION	LEAD-OUT SERIAL NUMBER	SYMBOL	FUNCTION
1	INH	Inhibit	5	GND_C	Case
2	V_{01}	Output positive	6	GND_C	Case
3	GND_O	Output common	7	GND_{IN}	Input common
4	V_{02}	Output negative	8	V_{IN}	Input positive

V. Typical Application Diagram

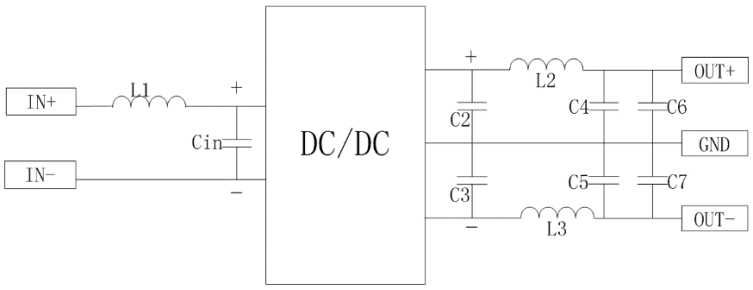

Figure 2. Typical application diagram

Reference values

(ceramic capacitors are recommended; if tantalum capacitors are used, the recommended voltage rating is at least 3 times the voltage derating):

- Cin: withstand voltage ≥50V, capacitance 4.7uF~10uF, recommended package 3225 (1210);
- C1= C2=C4=C5: Withstand voltage ≥ 25 V, capacitance 10uF~ 47uF, recommended package 3225 (1210);

- C3=C6: Withstand voltage ≥25 V, capacitance 1uF~ 2.2uF, recommended package 2012 (0805);
- Depending on the actual board space, current value, and derating, the inductance of L1 can be selected from 2.2uH to 5.6uH;
- L2 = L3. Depending on the actual board space, current value, and derating, the inductance can be selected from 4.7uH to 10uH.

VI. Application Instructions

Instructions for using the disable function: When the disable function is not in use, please leave the disable terminal empty; the product will still output an output.

- When the function is disabled, please connect the input location; the product will have no output.
- When the disable function is connected to a high level (7.5V-36V), the product still outputs power.
- When the disable function is connected to a low level (below 6.9V), the product has no output.

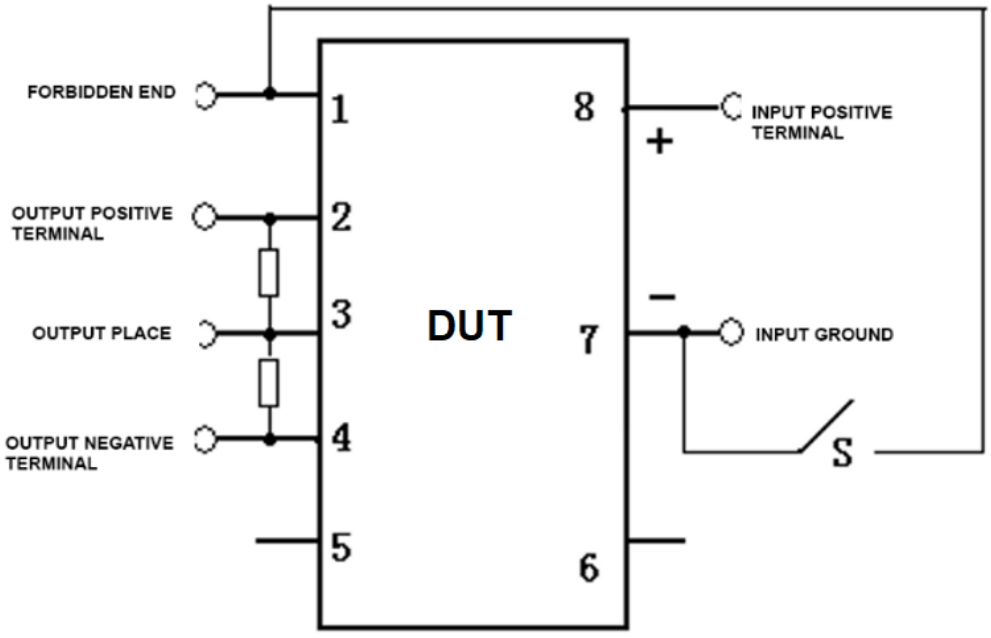

Figure 3. Schematic diagram of prohibited terminal wiring

VII. Precautions

1. Prevent product collisions.

2. The lead-out feet (excluding the outer casing feet) are connected to the metal casing by glass insulators. Bending or impacting the lead-out feet is prohibited. For products with flanges, the product should be fixed to the structural components before welding the lead-out feet.

3. Do not reverse the power supply polarity; pay attention to the input voltage range.

4. Heat sinks or other heat dissipation measures should be installed to ensure that the case temperature is below the maximum operating temperature specified for the product.

5. Pay attention to the "1" pin marking and install and weld the plate according to the correct installation direction.

6. For products with mounting flanges, pay attention to the tightening torque values during installation; see the attached table for details.

7. The soldering temperature for the 6 leads should be less than 300 ℃, and the soldering time should not exceed 10 seconds.