BSTTR28E Series

Product Features

- High reliability
- Wide input voltage range: 15 V to 50 V, nominal input DC voltage 28 V
- Surge voltage resistance: 80 V, 1s
- Output power PO: 40W
- Operating temperature range Tc: -55 ℃ ~ + 125 ℃
- Low starting current
- Small output overshoot
- With inhibit function
- Input undervoltage lockout and output short-circuit protection
- Maximum power density: 41W/in3
- Metal hermetic package

Product Category

Single channel	Dual channel	Multipath
3.3V		
5V	±5V	
5.2V	±8V	5V/±12V
8V	±12V	5V/±15V
12V	±15V	
15V		

Range of application

Aviation, aerospace and other highly reliable electronic systems, as well as some occasions with high requirements for power supply surge resistance.

Product Overview

This series is a DC/DC converter with high reliability and surge immunity (80 V, 1s). The product adopts single-ended flyback circuit topology and pulse width modulation principle. After the sampling signal of output voltage is isolated by optocoupler, the pulse width of the controller is modulated simultaneously with the current sampling signal of the input circuit to form double-loop closed-loop control, so that the product has stable voltage output. This series of products are manufactured by thick film hybrid integration process and packaged in a metal fully sealed case. The design and manufacturing of the product shall meet the requirements of GJB2438A-2002 General Specification for Hybrid Integrated Circuits and detailed product specifications. The input end is connected with a matched power supply filter, which can improve the electromagnetic compatibility of the product.

Technical Performance

BSTTR28E Series Rated Condition

Absolute maximum rating	
Input voltage (continuous): 50 V	Mechanical impact: 1500g
Input voltage (transient, 1s): 80V	Soldering temperature of lead wire: 300 ℃ (10 s)
Output power: 41.5 W	Weight (flangeless/flanged): 47 G/55 G
Storage temperature: -65 ℃ ~ 150 ℃	ESD：2000V

Electrical characteristics of BSTTR28SE series products

NO.	Characteristic	Condition (-55 ℃ ≤ Tc ≤ 125 ℃, Vin = 28V ± 0.5V, unless otherwise specified)		BSTTR28S3R3E BSTTR28S3R3FE		BSTTR28S05R2E BSTTR28S05R2FE		BSTTR28S08E BSTTR28S08FE	
				Minimum Value	Maximum Value	Maximum Value	Maximum Value	Minimum Value	Maximum Value
1	Input voltage/V	High/normal/low temperature		15	50	15	50	15	50
2	Output voltage/V	Full load	Normal temperature	3.25	3.35	5.14	5.26	7.92	8.08
			High and low temperature	3.20	3.40	5.07	5.33	7.88	8.12
3	Output current/A	VIN=15V～50V		—	6.06	—	6	—	4.4
4	Output power/W			0	20	0	31	0	35
5	Output Ripple Voltage/mV	BW = 6MHz, full load		—	50	—	50	—	50
6	Voltage regulation/mV	VIN = 15V ± 50V, full load		—	20	—	20	—	20
7	Load Regulation/mV	No load → full load		—	50	—	50	—	50
8	Input current/mA	When prohibited		—	6	—	6	—	6
		At no load		—	60	—	60	—	60
9	Input Ripple Current/mA	BW = 20 MHz, full load		—	50	—	50	—	50
10	Efficiency	Full load		65	—	72	—	74	—
11	Insulation Resistance /MΩ	Apply 500 V between input, output or to		100	—	100	—	100	—

		enclosure, TA = 25 ° C						
12	Inhibit voltage		0	0.7	0	0.7	0	0.7
13	Open circuit voltage of prohibited end/V	Full load	9	13	10	14	10	14
14	Undervoltage turn-on voltage/V	Full load	12	14.8	12	14.8	12	14.8
15	Undervoltage shutdown voltage/V	Full load	11	14.5	11	14.5	11	14.5
16	Short-circuit protection function		Decreasing flow type		Decreasing flow type		Decreasing flow type	
17	Capacitive load/μF	TA=25℃	—	1000	—	1000	—	500
18	Switching frequency/kHz	Full load	400	550	400	550	400	550
19	External sync frequency range/kHz	*TC = 25 ℃, full load, TTL level (VIH ≥ 4.5V, VIL ≤ 0.8V), duty cycle 40% ~ 60%*	400	550	400	550	400	550
20	Output voltage change during load transient (peak)/mV	50% load → full load Or full load → 50% load	-500	500	-500	500	-500	500
21	Recovery time of output voltage during load	50% load → full load Or full load → 50% load	—	500	—	500	—	500

	transient/μs							
22	Output voltage change during input voltage transient (peak)/mV	Input voltage VIN: 16V → 40V, full load or input voltage VIN: 40V → 16V, full load	-600	600	-600	600	-600	600
23	Recovery time of output voltage during input voltage transient/μs	Input voltage VIN: 16V → 40V, full load or input voltage VIN: 40V → 16V, full load	—	500	—	500	—	500
24	Start-up overshoot (peak)/mV	Input voltage VIN: 0 → 28V, full load	—	15	—	50	—	50
25	Startup delay/ms	Input voltage VIN: 0 → 28V, full load	—	20	—	20	—	20

Electrical characteristics of BSTTR28SE series products

NO.	Characteristic	Condition (-55 ℃ ≤ TC ≤ 125 ℃, Vin = 28V ± 0.5V, unless otherwise specified)		BSTTR28S05E BSTTR28S05FE		BSTTR28S12E BSTTR28S12FE		BSTTR28S15E BSTTR28S15FE	
				Minimum Value	Maximum Value	Minimum Value	Maximum Value	Minimum Value	Maximum Value
1	Input voltage/V	High/normal/low temperature		15	50	15	50	15	50
2	Output voltage/V	Full load	Normal temperature	4.95	5.05	11.88	12.12	14.85	15.15

			High and low temperature	4.88	5.12	11.70	12.30	14.62	15.38
3	Output current/A	Vin=15V～50V		—	6	—	3.33	—	2.67
4	Output power/W			0	30	0	40	0	40
5	Output Ripple Voltage/mV	BW = 6MHz, full load		—	50	—	50	—	50
6	Voltage regulation/mV	Vin = 15V ± 50V, full load		—	20	—	20	—	20
7	Load Regulation/mV	No load → full load		—	50	—	50	—	50
8	Input current/mA	When prohibited		—	6	—	6	—	6
		At no load		—	60	—	60	—	60
9	Input Ripple Current/mA	BW = 20 MHz, full load		—	50	—	50	—	50
10	Efficiency	Full load		72	—	76	—	77	—
11	Insulation Resistance /MΩ	Apply 500 V between input, output or to enclosure, TA = 25 ° C		100	—	100	—	100	—
12	Inhibit voltage			0	0.7	0	0.7	0	0.7
13	Open circuit voltage of prohibited end/V	Full load		10	14	10	14	10	14
14	Undervoltag	Full load		12	14.8	12	14.8	12	14.8

	e turn-on voltage/V							
15	Undervoltage shutdown voltage/V	Full load	11	14.5	11	14.5	11	14.5
16	Short-circuit protection function		Decreasing flow type		Decreasing flow type		Decreasing flow type	
17	Capacitive load/μF	TA=25℃	—	1000	—	500	—	500
18	Switching frequency/kHz	Full load	400	550	400	550	400	550
19	External sync frequency range/kHz	*Tc = 25 ℃, full load, TTL level (VIH ≥ 4.5V, VIL ≤ 0.8V), duty cycle 40% ~ 60%*	400	550	400	550	400	500
20	Output voltage change during load transient (peak)/mV	50% load → full load Or full load → 50% load	-500	500	-700	700	-700	700
21	Recovery time of output voltage during load transient/μs	50% load → full load Or full load → 50% load	—	500	—	500	—	500
22	Output voltage change during input	Input voltage Vin: 16V → 40V, full load or input voltage VIN: 40V	-600	600	-900	900	-900	900

	voltage transient (peak)/mV	→ 16V, full load						
23	Recovery time of output voltage during input voltage transient/μs	Input voltage Vin: 16V → 40V, full load or input voltage Vin: 40V → 16V, full load	—	500	—	500	—	500
24	Start-up overshoot (peak)/mV	Input voltage Vin: 0 → 28V, full load	—	50	—	50	—	50
25	Startup delay/ms	Input voltage Vin: 0 → 28V, full load	—	20	—	20	—	20

Electrical characteristics of BSTTR28DE series products

NO.	Characteristic	Condition (Unless otherwise specified, -55 ℃ ≤ Tc ≤ 125 ℃, Vin= 28V ± 0.5V)		BSTTR28D05E BSTTR28D05FE		BSTTR28D12E BSTTR28D12FE		BSTTR28D15E BSTTR28D15FE	
				Minimum Value	Maximum Value	Minimum Value	Maximum Value	Minimum Value	Maximum Value
1	Input voltage/V	High/normal/low temperature		15	50	15	50	15	50
2	Output voltage/V	The right way	Normal temperature, full load	4.95	5.05	11.88	12.12	14.85	15.15
		Negative path		-5.05	-4.95	-12.12	-11.88	-15.15	-14.85
		The right way	High and low temperature,	4.93	5.08	11.82	12.18	14.70	15.30

		Negative path	full load	-5.08	-4.93	-12.18	-11.82	-15.30	-14.70
3	Output current/A	VIN=15V～50V		—	3	—	1.67	—	1.33
4	Output power/W			0	30	0	40	0	40
5	Output Ripple Voltage/mV	BW ≤ 20MHz, full load		—	60	—	50	—	50
6	Voltage regulation/mV	The right way	VIN = 16V to 40V, full load	—	50	—	50	—	50
		Negative path		—	50	—	50	—	50
7	Load Regulation/mV	The right way	No load → full load	—	50	—	50	—	50
		Negative path		—	50	—	50	—	50
8	Input current/mA	When prohibited		—	6	—	6	—	6
		At no load		—	60	—	60	—	60
9	Input Ripple Current/mA	BW ≤ 20MHz, full load		—	50	—	50	—	50
10	Efficiency	Full load		73	—	78	—	78	—
11	Insulation Resistance /MΩ	Apply 500 V between input, output or enclosure, Tc = 25 ° C		100	—	100	—	100	—
12	Inhibit voltage			0	0.7	0	0.7	0	0.7
13	Open circuit voltage of prohibited end/V	Full load		10	14	10	14	10	14
14	Undervoltage turn-on voltage/V	Full load		12.0	14.8	12.0	14.8	12	14.8
15	Undervoltage shutdown voltage/V	Full load		11.0	14.5	11.0	14.5	11	14.5

16	Short-circuit protection function		Decreasing flow type		Decreasing flow type		Decreasing flow type	
17	Capacitive load/μF	Tc=25℃	—	500	—	500	—	500
18	Switching frequency/kHz	Full load	400	500	400	500	400	500
19	External sync frequency range/kHz	*Tc = 25 ℃, full load, TTL level (VIH ≥ 4.5V, VIL ≤ 0.8V), duty cycle 40% ~ 60%*	400	500	400	500	400	500
20	Cross regulation/mV	One 30% load, the other Load varies from 30% to 70%	—	650	—	650	—	650
21	Output voltage change during load transient (peak)/mV	50% load → full load Or full load → 50% load	—	400	—	450	—	500
22	Recovery time of output voltage during load transient/μs	50% load → full load Or full load → 50% load	—	350	—	400	—	300
23	Output voltage change during input voltage transient (peak)/mV	Input voltage VIN: 16V → 40V, full load or input voltage VIN: 40V → 16V, full load	—	600	—	900	—	900
24	Recovery time of output voltage during input voltage transient/μs	Input voltage VIN: 16V → 40V, full load or input voltage VIN: 40V → 16V, full load	—	500	—	500	—	500
25	Start-up overshoot (peak)/mV	Input voltage VIN: 0 → 28V, full load	—	50	—	50	—	50

26	Startup delay/ms	Input voltage VIN: 0 → 28V, full load	—	20	—	20	—	20

Electrical characteristics of BSTTR28DE series products

NO.	Characteristic	Condition (Unless otherwise specified, -55℃ ≤ Tc ≤ 125 ℃, VIN = 28V ± 0.5V)		BSTTR28D08E BSTTR28D08FE	
				Minimum Value	Maximum Value
1	Input voltage/V	High/normal/low temperature		15	50
2	Output voltage/V	The right way	Normal temperature, full load	7.92	8.08
		Negative path		-8.08	-7.92
		The right way	High and low temperature, Full load	7.88	8.12
		Negative path		-8.12	-7.88
3	Output current/A	VIN=15V～50V		—	2.2
4	Output power/W			0	35
5	Output Ripple Voltage/mV	BW ≤ 20MHz, full load		—	80
6	Voltage regulation/mV	The right way	VIN = 16V to 40V, full load	—	100
		Negative path		—	100
7	Load Regulation/mV	The right way	No load → full load	—	100
		Negative path		—	100
8	Input current/mA	When prohibited		—	6
		At no load		—	65
9	Input Ripple Current/mA	BW ≤ 20MHz, full load		—	50
10	Efficiency	Full load		74	—
11	Insulation Resistance /MΩ	Apply 500 V between input, output or enclosure, Tc = 25 ° C		100	—
12	Inhibit voltage			0	0.7
13	Open circuit voltage of prohibited end/V	Full load		10	14
14	Undervoltage turn-on	Full load		12.0	14.8

	voltage/V			
15	Undervoltage shutdown voltage/V	Full load	11.0	14.5
16	Short-circuit protection function		Decreasing flow type	
17	Capacitive load/μF	Tc=25℃	—	500
18	Switching frequency/kHz	Full load	400	500
19	External sync frequency range/kHz	Tc = 25 ℃, full load, TTL level (VIH ≥ 4.5V, VIL ≤ 0.8V), duty cycle 40% ~ 60%	400	500
20	Cross regulation/mV	One 30% load, the other Load varies from 30% to 70%	—	650
21	Output voltage change during load transient (peak)/mV	50% load → full load Or full load → 50% load	—	400
22	Recovery time of output voltage during load transient/μs	50% load → full load Or full load → 50% load	—	350
23	Output voltage change during input voltage transient (peak)/mV	Input voltage VIN: 16V → 40V, full load or input voltage VIN: 40V → 16V, full load	—	600
24	Recovery time of output voltage during input voltage transient/μs	Input voltage VIN: 16V → 40V, full load or input voltage VIN: 40V → 16V, full load	—	500
25	Start-up overshoot (peak)/mV	Input voltage VIN: 0 → 28V, full load	—	25
26	Startup delay/ms	Input voltage VIN: 0 → 28V, full load	—	20

Electrical characteristics of BSTTR28TE series products

NO.	Characteristic	Condition (Unless otherwise specified, -55 ℃ ≤ Tc ≤ 125 ℃, VIN = 28V ± 0.5V)		BSTTR28T0512E BSTTR28T0512FE		BSTTR28T0515E BSTTR28T0515FE	
				Minimum Value	Maximum Value	Minimum Value	Maximum Value
1	Input voltage/V	High/normal/low temperature		15	50	15	50
2	Output voltage/V	VO1	Normal	4.95	5.05	4.95	5.05

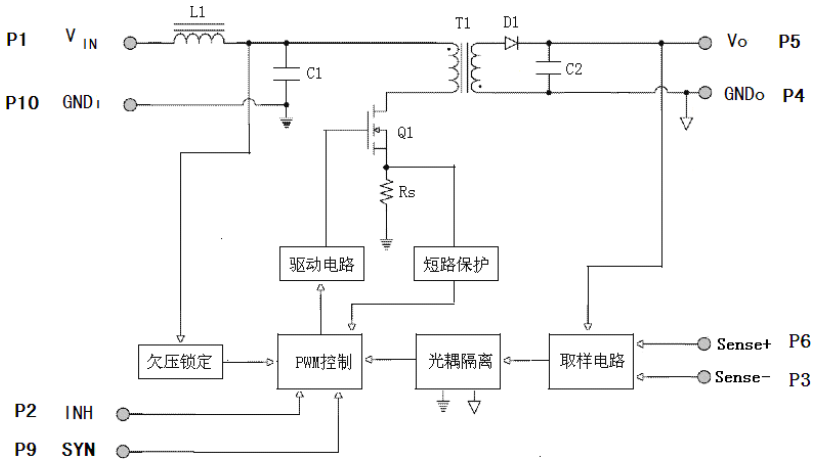
			temperature, full load				
			High and low temperature, full load	4.85	5.15	4.85	5.15
		VO2	Normal temperature, full load	11.88	12.12	14.85	15.15
			High and low temperature, full load	11.64	12.36	14.55	15.45
		VO3	Normal temperature, full load	-12.24	-11.76	-15.30	-14.70
			High and low temperature, full load	-12.48	-11.52	-15.60	-14.40
3	Output current/A	IO1	VIN=15V～50V	—	3	-	3
		IO2		—	0.625	-	0.5
		IO3		—	0.625	-	0.5
4	Output power/W			0	30	0	30
5	Output Ripple Voltage/mV	VRIP1	BW = 6MHz, full load	-	60	-	60
		VRIP2		-	100	-	100
		VRIP3		-	100	-	100
6	Voltage regulation/mV	SV1	VIN = 15V ± 50V, full load	-	50	-	50
		SV2		-	80	-	80
		SV3		-	80	-	80
7	Load Regulation/mV	SI1	IO 1 = 0 → full load, IO 2 = IO3 = full load	-	50	-	50
		SI2	IO2 = IO 3 = 0 → full load (Both outputs change simultaneously), IO 1 = full load	-	80	-	80
		SI3		-	80	-	80

8	Input current/mA	When prohibited		-	6	-	6
		At no load		-	120	-	120
9	Input Ripple Current/mA	BW ≤ 20MHz, full load		—	80	-	80
10	Efficiency	Full load		73	—	75	-
11	Insulation Resistance /MΩ	TA = 25 ℃, apply 500 V DC voltage between the input and output or between any terminal and the enclosure		100	—	100	-
12	Inhibit voltage			0	0.7	0	0.7
13	Open circuit voltage of prohibited end/V	Full load		10	14	10	14
14	Undervoltage turn-on voltage/V	Full load		12.0	14.8	12.0	14.8
15	Undervoltage shutdown voltage/V	Full load		11.0	14.5	11.0	14.5
16	Short-circuit protection function	TA = 25 ℃, current reducing protection, Three output terminals are short-circuited simultaneously		Decreasing flow type		Decreasing flow type	
17	Capacitive load/μF	CL1	Tc=25℃	—	500	—	500
		CL2		—	500	—	500
		CL3		—	500	—	500
18	Switching frequency/kHz	Full load		350	500	350	500
19	External sync frequency range/kHz	TA = 25 ℃, IO1 = full load, IO2 = IO3 = full load, 9 pins connected to TTL level (VIH ≥ 4.5V, 0 ≤ VIL ≤ 0.8V, VIH-VIL = 5V, duty cycle 50%		450	550	450	550
20	Cross regulation/mV	TA=25℃IO1 = full load, IO2 = 70% load, IO3 = 30% load; IO1 = full load, IO2 = 30% load, IO3 = 70% load		—	550	-	550
21	Output voltage	VLT1	IO 2 = IO3 = full	-500	500	-500	500

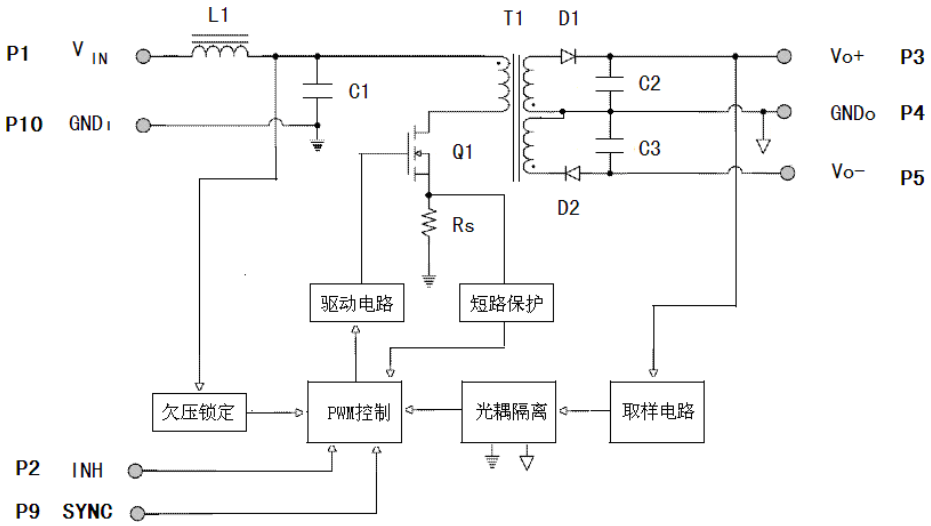
	change during load transient (peak)/mV		load, IO 1:50% load → full load Or full load → 50% load				
		VLT2	IO 1 = full load, IO2 = IO3: 50% load → full load or full load → 50% load	-700	700	-700	700
		VLT3		-700	700	-700	700
22	Recovery time of output voltage during load transient/μs	tLT1	IO 2 = IO3 = full load, IO 1:50% load → full load or full load → 50% load	-	500	-	500
		tLT2	IO 1 = full load, IO2 = IO3: 50% load → full load or full load → 50% load	-	500	-	500
		tLT3		-	500	-	500
23	Output voltage change during input voltage transient (peak)/mV	VVT1	VI: 16V → 40V, full load	-700	700	-700	700
			VI: 40V → 16V, full load				
		VVT2	VI: 16V → 40V, full load	-900	900	-900	900
			VI: 40V → 16V, full load				
		VVT3	VI: 16V → 40V, full load	-900	900	-900	900
			VI: 40V → 16V, full load				
24	Recovery time of output voltage during input voltage transient/μs	tVT1	VI: 16V → 40V, full load	-	800	-	800
			VI: 40V → 16V, full load				
		tVT2	VI: 16V → 40V, full load	-	800	-	800

			VI: 40V → 16V, full load				
		tVT3	VI: 16V → 40V, full load	-	800	-	800
			VI: 40V → 16V, full load				
25	Start-up overshoot (peak)/mV	VTO1	VI: 0 → 28V, full load	-	100	-	100
		VTO2		-	100	-	100
		VTO3		-	100	-	100
26	Startup delay/ms	td1	VI: 0 → 28V, full load	—	20	—	20
		td2					
		td3					

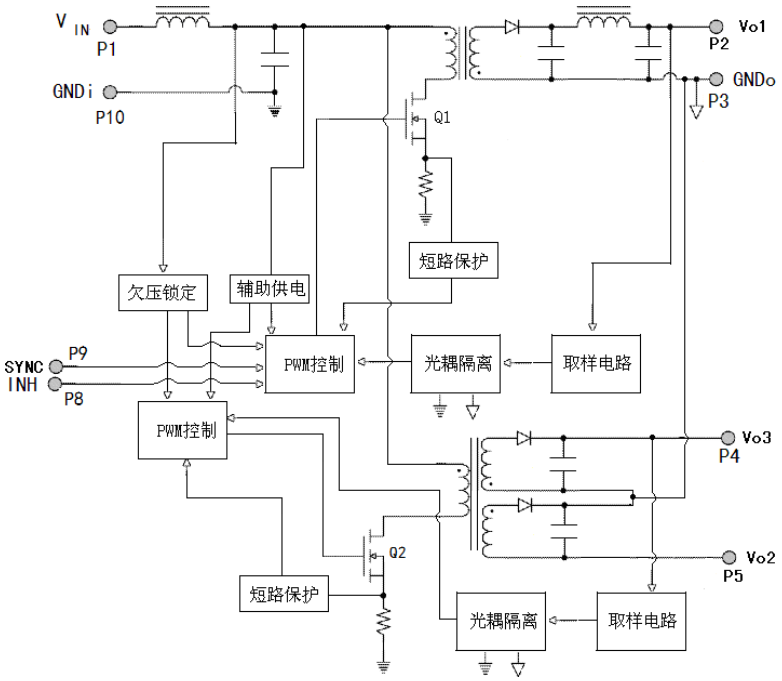
Circuit principle block diagram



BSTTR28SE Series Circuit Schematic Diagram

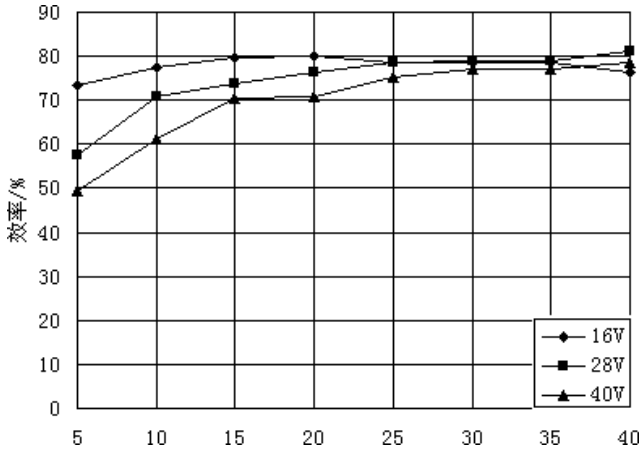


BSTTR28DE Series Circuit Schematic Diagram

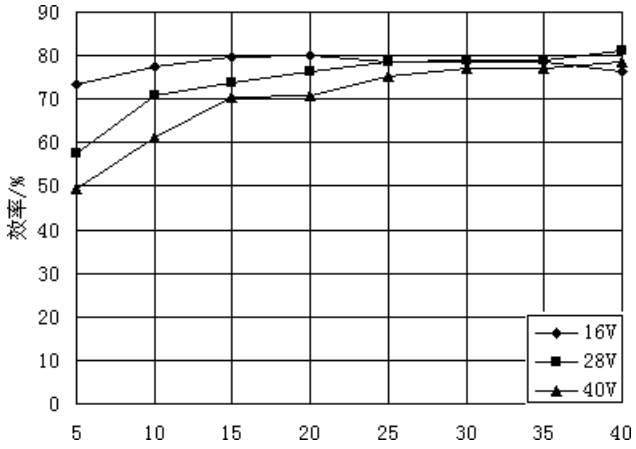


BSTTR28TE Series Circuit Schematic Diagram

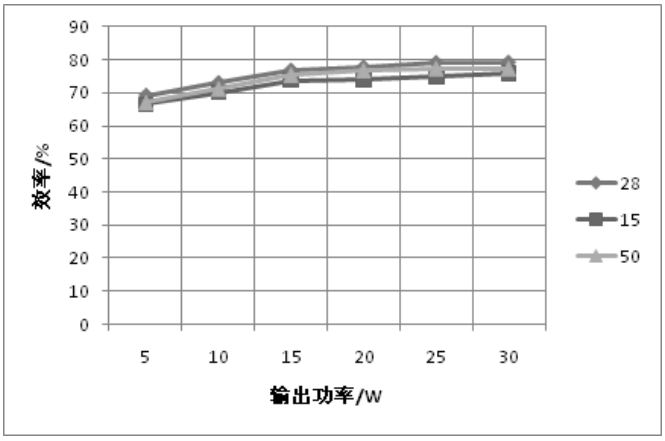
Typical Characteristic Curve



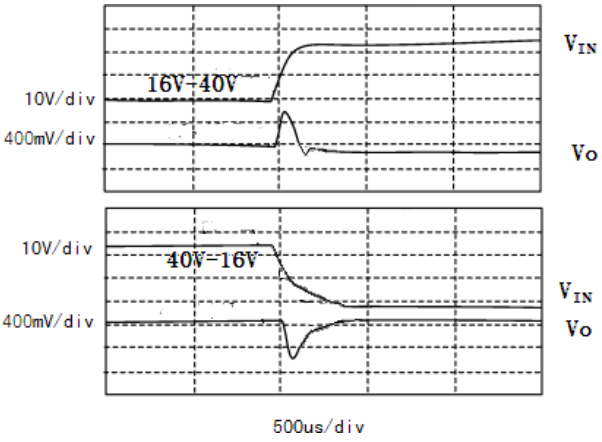
BSTTR28S15E Efficiency Curve



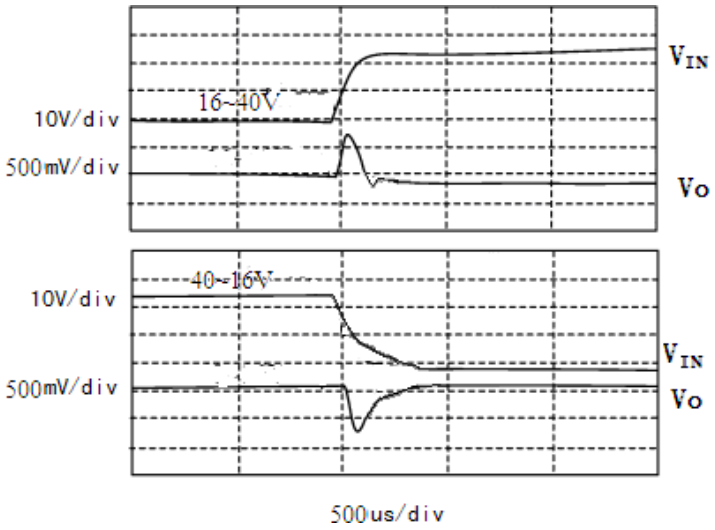
BSTTR28D15E Efficiency Curve



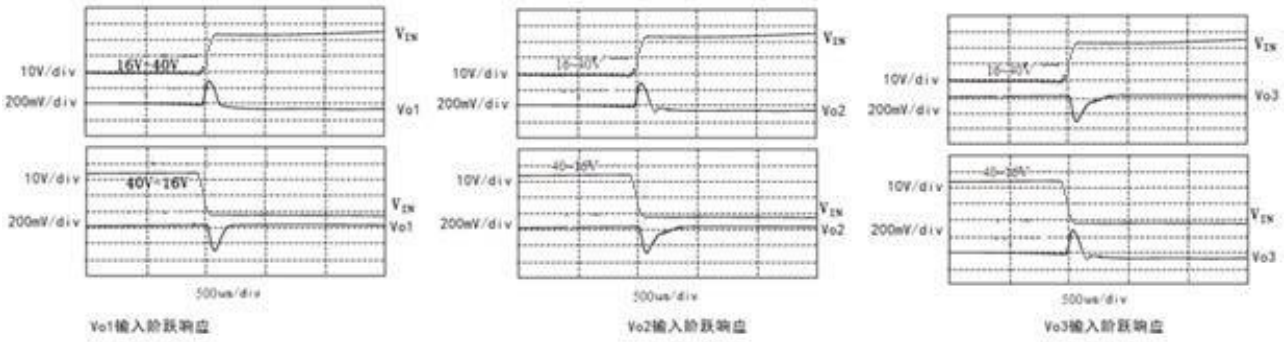
BSTTR28T0515E Efficiency Curve



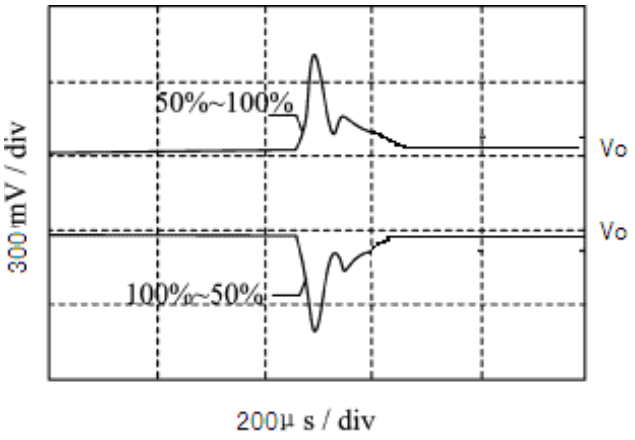
BSTTR28S15E Input Step Response Curve



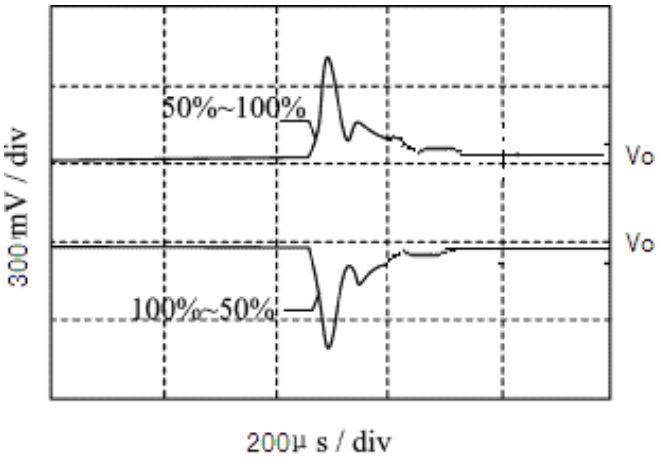
BSTTR28D15E Input Step Response Curve



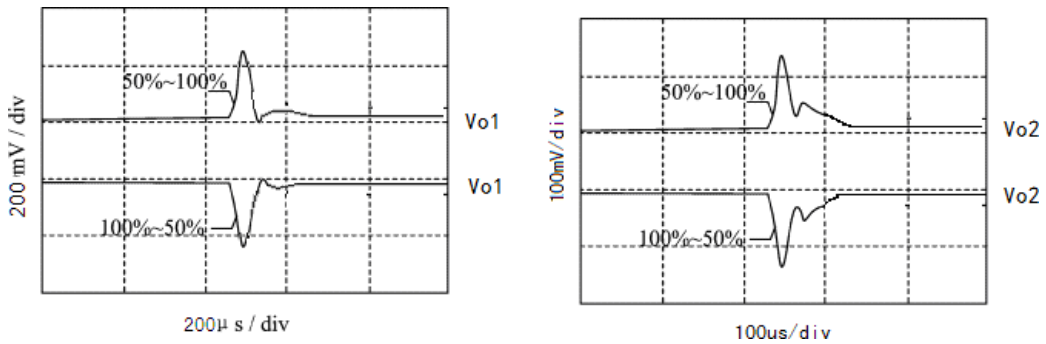
BSTTR28T0515E Input Step Response Curve



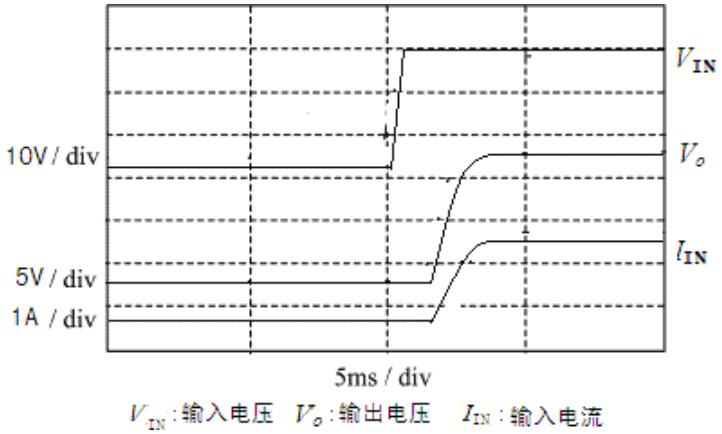
BSTTR28S15E Load Step Response



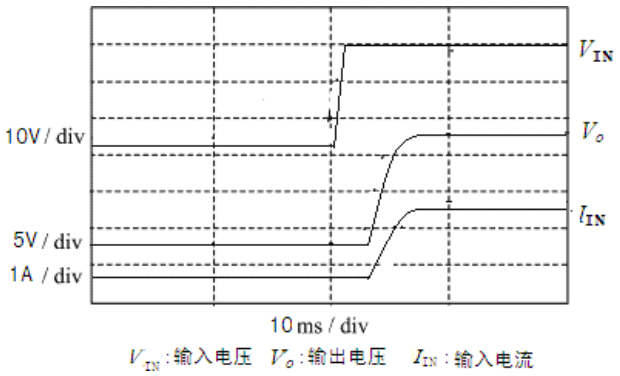
BSTTR28D15E Load Step Response



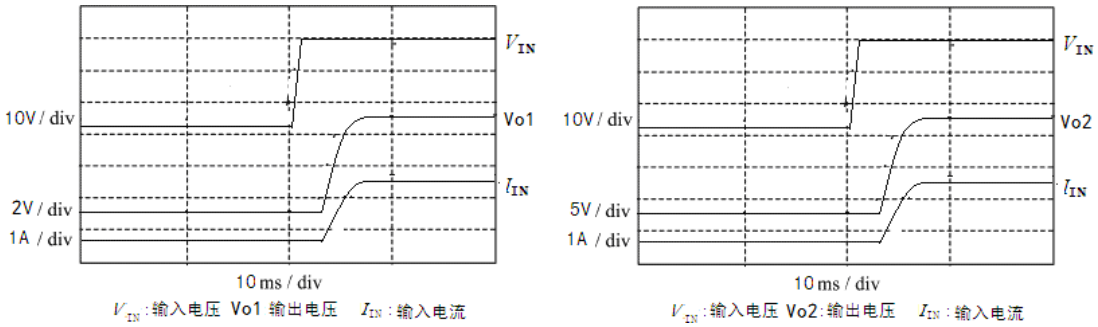
BSTTR28T0515E Load Step Response Curve



BSTTR28S15E Start-up Overshoot/Delay and Start-up Current

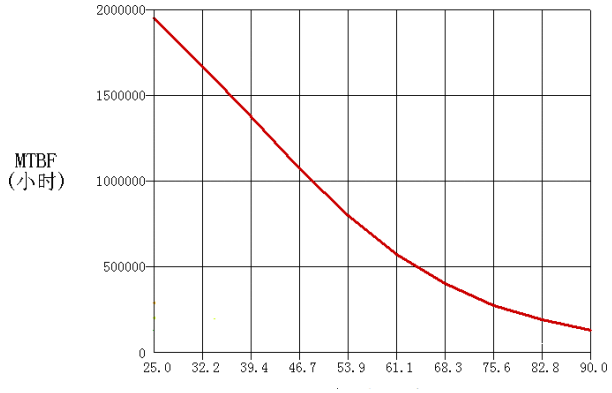


BSTTR28D15E Start-up Overshoot/Delay and Start-up Current Curve



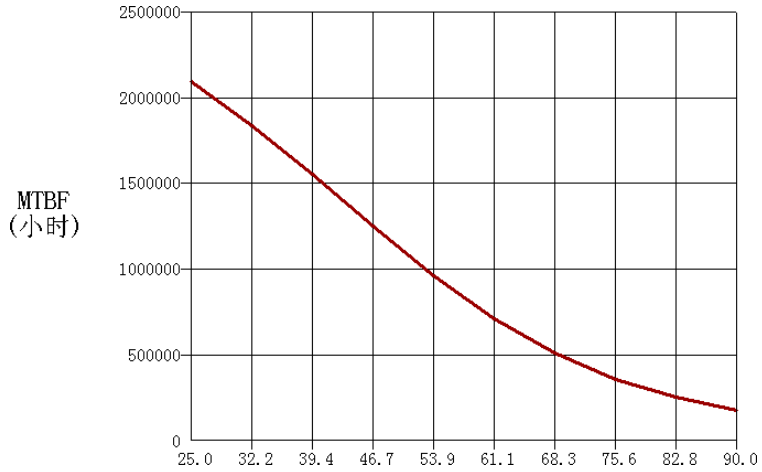
BSTTR28T0515E Start-up Overshoot/Delay and Start-up Current Curve

MTBF curve



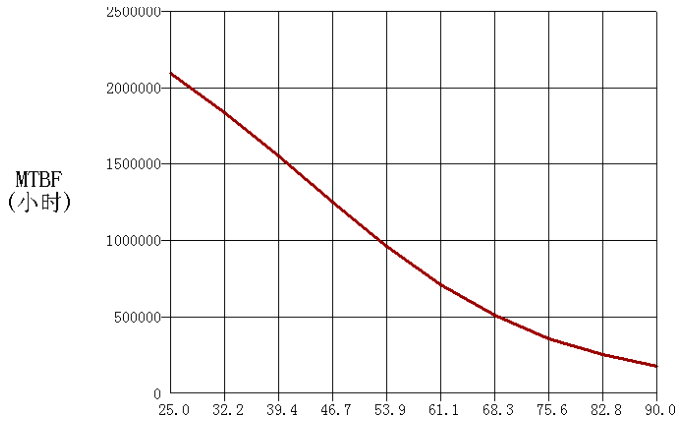
MTBF Temperature Curve (BSTTR28S15E)

(According to GJB/Z 299C-2006, the ground is expected to be in good condition)



MTBF Temperature Curve (BSTTR28D15E)

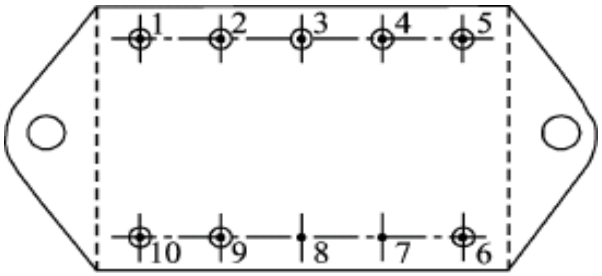
(According to GJB/Z 299C-2006, the ground is expected to be in good condition)



MTBF Temperature Curve (BSTTR28515E)

(According to GJB/Z 299C-2006, the ground is expected to be in good condition)

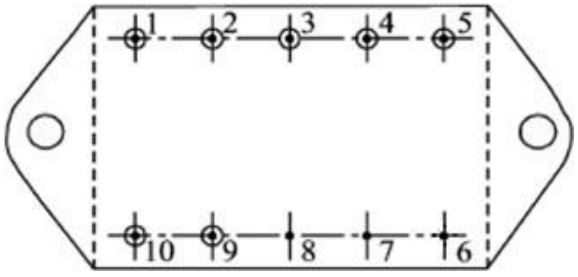
Function description of lead-out terminal



BSTTR28SE Series Enclosure Bottom View

BSTTR28SE Series Pin Function Description

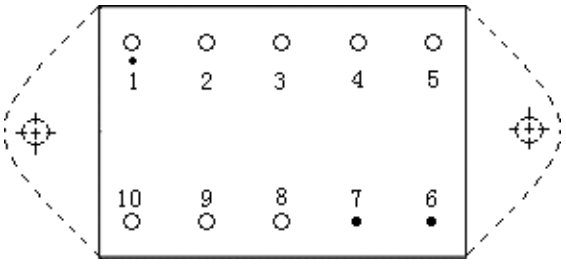
NO.	Symbol	Function
1	VIN	Input positive terminal
2	INH	Prohibited End
3	Sense-	Output negative induction terminal
4	GNDO	Outgoing
5	VO	Output positive terminal
6	Sense+	Output positive sense terminal
7	GNDC	Externally
8	GNDC	Externally
9	SYNC	External Sync Input
10	GNDIN	Input Ground



BSTTR28DE Series Enclosure Bottom View

BSTTR28DE Series Pin Function Description

NO.	Symbol	Function
1	VIN	Input positive terminal
2	INH	Prohibited End
3	VO+	Output positive terminal
4	GNDO	Outgoing
5	VO-	Output negative terminal
6	GNDC	Externally
7	GNDC	Externally
8	GNDC	Externally
9	SYNC	External Sync Input
10	GNDIN	Input Ground



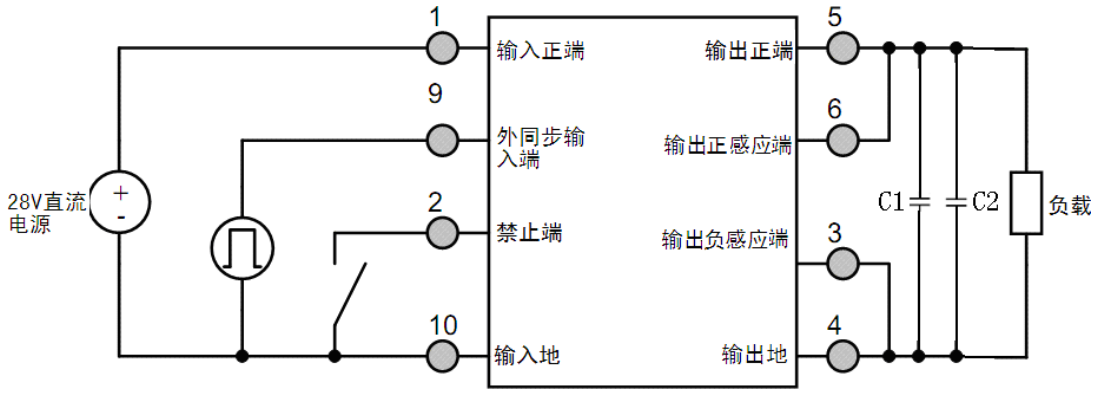
BSTTR28TE Series Enclosure Bottom View

BSTTR28TE Series Pin Function Description

NO.	Symbol	Function	NO.	Symbol	Function
1	VI	Input positive terminal	6	GNDC	Externally
2	VO1	5V output terminal	7	GNDC	Externally
3	GNDO	Outgoing	8	INH	Prohibited End

4	VO3	-15V output/-12V output	9	SYN	External Synchronization
5	VO2	15V output/12V output	10	GNDI	Input Ground

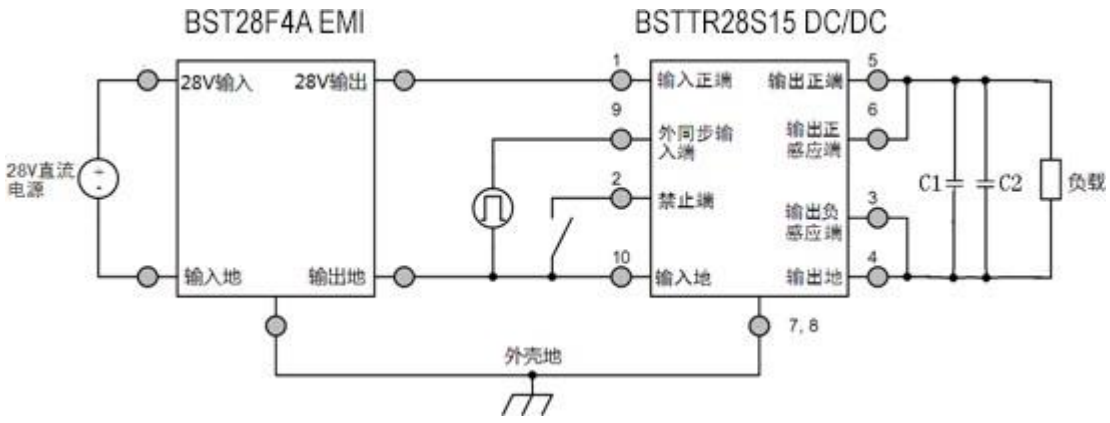
Typical Application Connection Diagram



C1 = 10 μF, C2 = 0.1 μF, C1, C2 monolithic

BSTTR28SE Series Product Usage Connection Diagram

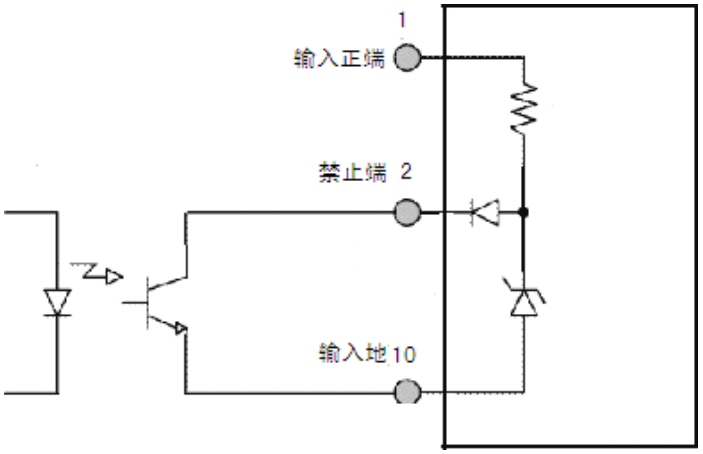
EMI filter connection diagram



C1 = 10 μF, C2 = 0.1 μF, C1, C2 monolithic

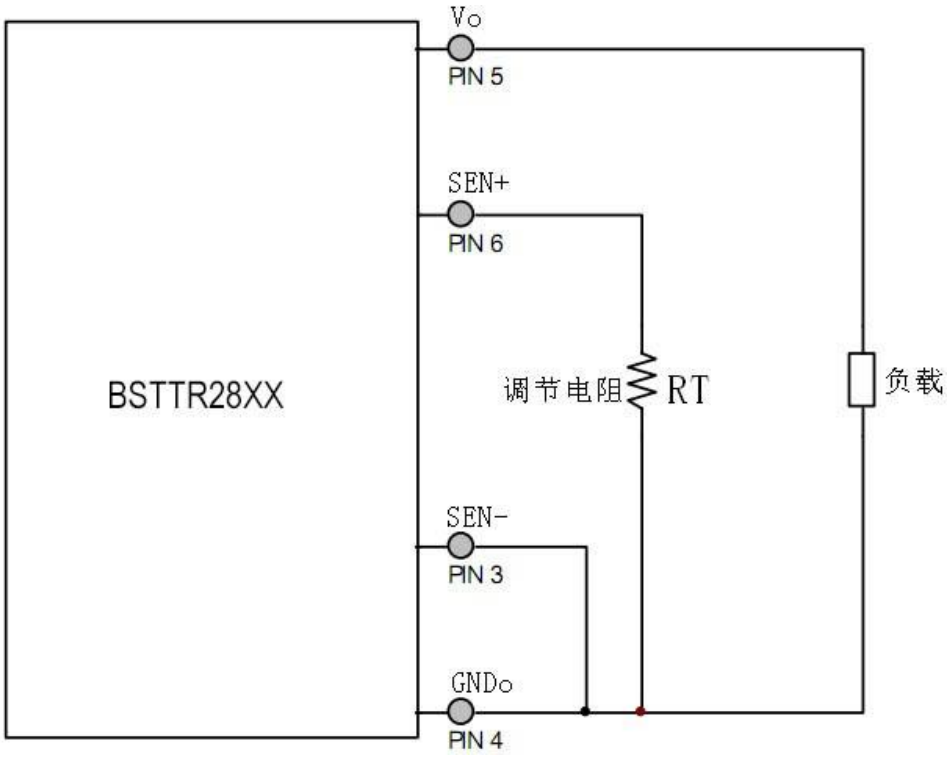
BSTTR28SE Series EMI Filter Connection Diagram

Disable the drive circuit



BSTTR28SE series inhibit drive circuit

Output voltage adjustment connection diagram

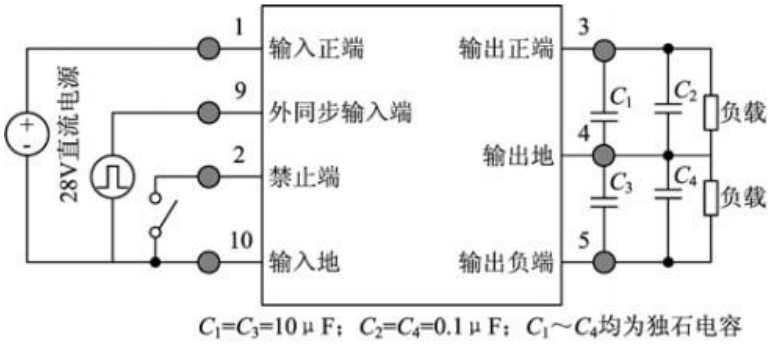


BSTTR28SE Series Inductive Terminal Voltage Regulation Diagram

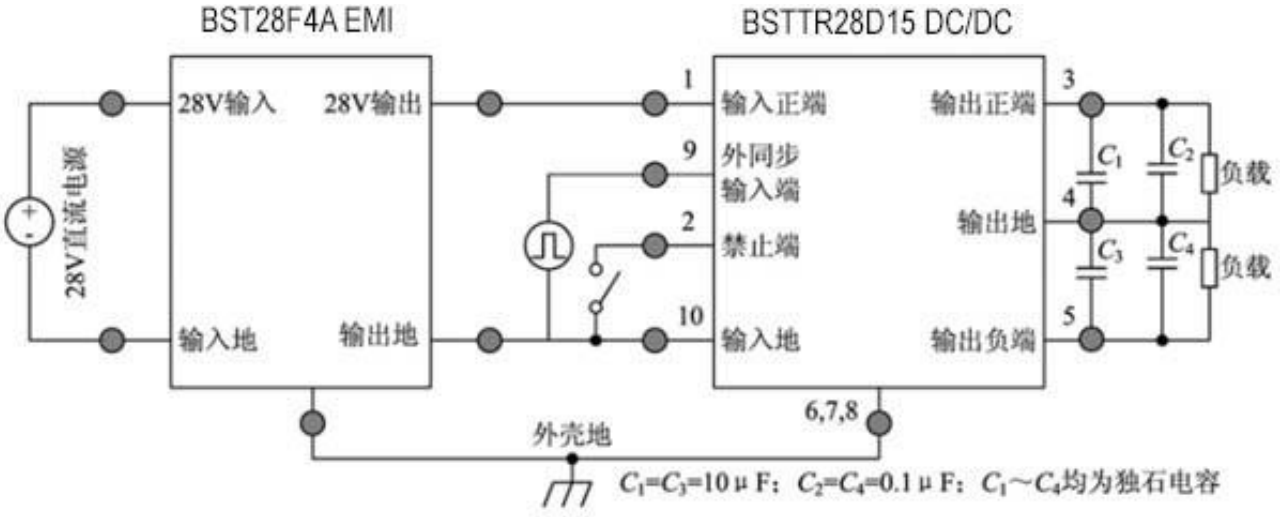
BSTTR28SE Output Voltage vs Regulating Resistor RT

BSTTR28S3R3E		BSTTR28S05FE		BSTTR28S05R2FE		BSTTR28S08FE		BSTTR28S12FE		BSTTR28S15FE	
VO	RT	VO	RT	VO	RT	VO	RT	VO	RT	VO	RT
3.35	RT off	5.056	RT off	5.238	RT off	8.15	RT off	12.15	RT off	15.15	RT off
3.4	1.51kΩ/0.125W	5.1	1.72kΩ/0.125W	5.3	1.65kΩ/0.125W	8.2	16.21kΩ/0.125W	12.2	32.8kΩ/0.125W	15.2	38.2kΩ/0.125W
3.45	710Ω/0.125W	5.2	642Ω/0.125W	5.4	645Ω/0.125W	8.3	5.33kΩ/0.125W	12.3	8.25kΩ/0.125W	15.3	10.10kΩ/0.125W
3.5	496Ω/0.125W	5.3	385Ω/0.125W	5.5	398Ω/0.125W	8.4	3.12kΩ/0.125W	12.4	4.95kΩ/0.125W	15.4	6.12kΩ/0.125W
3.55	362Ω/0.125W	5.4	280Ω/0.25W	5.6	290Ω/0.25W	8.5	2.22kΩ/0.125W	12.5	3.48kΩ/0.125W	15.5	4.33kΩ/0.125W
3.6	281Ω/0.125W	5.5	222Ω/0.25W	5.7	226Ω/0.25W	8.6	1.76kΩ/0.125W	12.6	2.71kΩ/0.125W	15.6	3.38kΩ/0.125W
						8.7	1.46kΩ/0.125W	12.7	2.21kΩ/0.125W	15.7	2.76kΩ/0.25W
						8.8	1.22kΩ/0.125W	12.8	1.89kΩ/0.25W	15.8	2.32kΩ/0.25W
								12.9	1.63kΩ/0.25W	15.9	2.02kΩ/0.25W
								13	1.44kΩ/0.25W	16	1.77kΩ/0.25W
								13.1	1.28kΩ/0.25W	16.1	1.59kΩ/0.25W
								13.2	1.16kΩ/0.25W	16.2	1.45kΩ/0.25W
										16.3	1.31kΩ/0.25W
										16.	1.21kΩ/0.

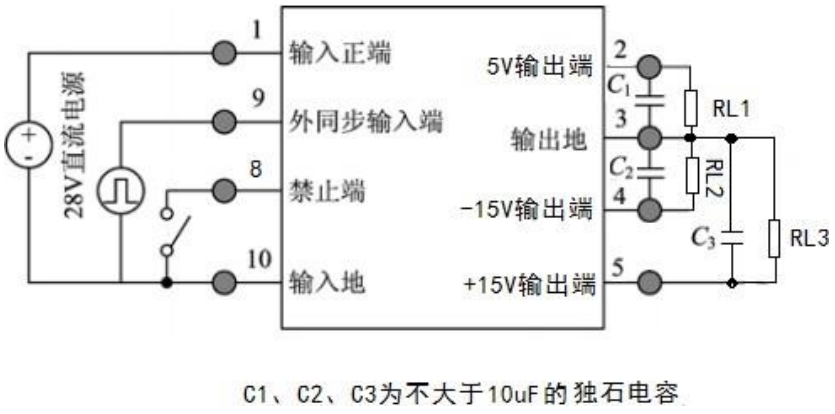
										4	25W
										16.5	1.16kΩ/0.25W



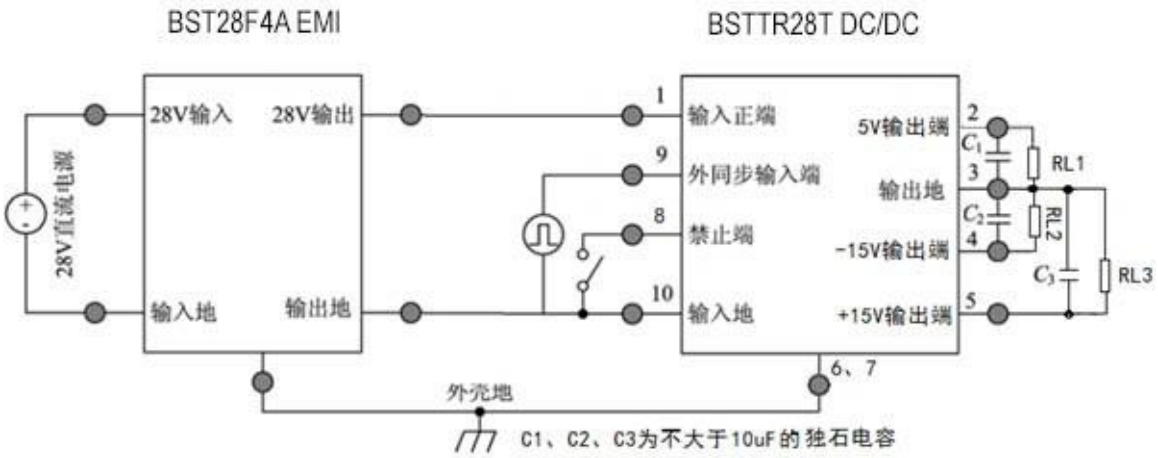
BSTTR28DE Series Product Usage Connection Diagram



BSTTR28DE Series EMI Filter Connection Diagram



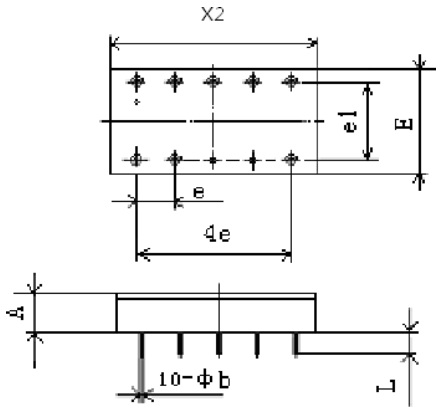
BSTTR28TE Series Product Usage Connection Diagram



BSTTR28TE Series EMI Filter Connection Diagram

Dimensions and description of package outline drawings

BSTTR28SE, BSTTR28DE Series Package Outline Bottom and Side Views



Bottom and side view

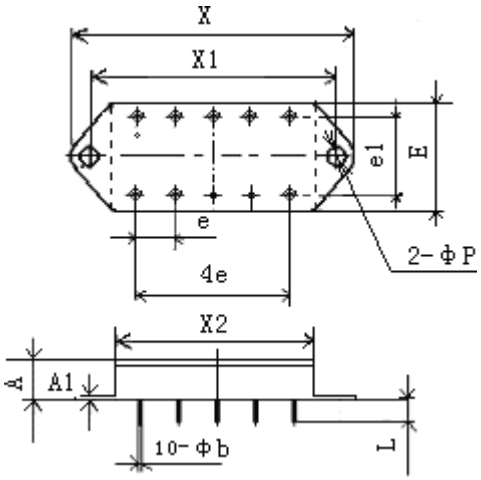


Table 1. Package Size Parameter

Dimension symbol	Value (mm)		
	Minimal	Nominal	Max.
A	-	-	10.66
A1	1.20	-	1.80
φb	0.87	-	1.13

e	-	10. 16	-
e1	-	20. 32	-
E	-	-	29.00
L	5.40	-	-
ϕP	3.80	-	4.40
X	-	-	74.00
X1	64.27	-	65.27
X2	-	-	54.40
Note: e and E1 are interchangeability dimensions, which are guaranteed by shell manufacturing and inspection, and are not required to be examined in this specification.			

Encapsulation Case Description

Enclosure Model	Base Material	Base Plating	Cover plate (Cap) material	Cover plate (Cap) coating	Lead Wire Material	Lead Wire Plating	Sealing Way	Remark
UPP5429-10j (Without flange)	Cold-rolled steel（10#）	Ni	Iron-nickel alloy Gold (4J42)	Ni	Copper core Compound	Ni/Au	Parallel Seam welding	The grounding pin is plated with Ni.
UPP5429-10n (With flange)	Cold-rolled steel （10#）	Ni	Iron-nickel alloy Gold (4J42)	Ni	Copper core Compound	Ni/Au	Parallel Seam welding	The grounding pin is plated with Ni.

BSTTR28TE Series Package Outline Bottom and Side View

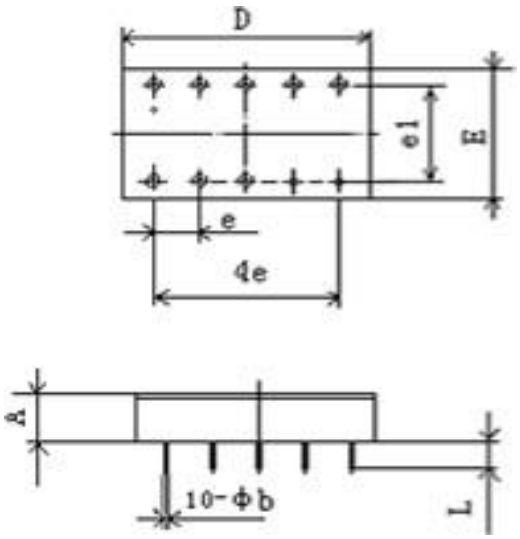
- 

Table1. Package Size Parameter

Dimension symbol	Value (mm)		
	Minimal	Nominal	Max.
A	-	-	10.29
φb	0.87	-	1.14
D	-	-	49.53
e	-	10. 16	-
e1	-	25. 40	-
E	-	-	34.29
L	6.05	-	-

-

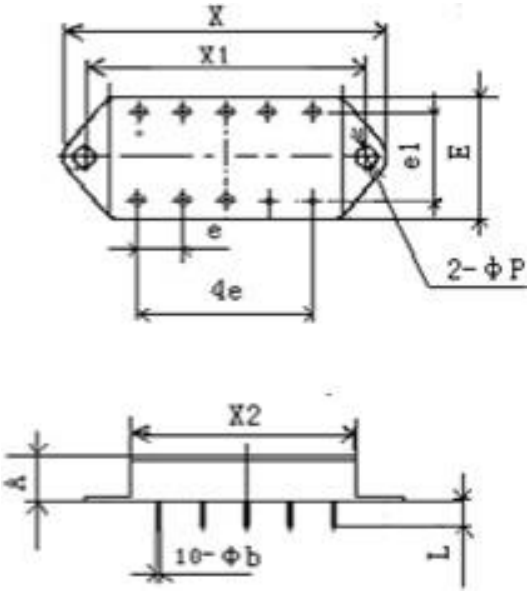


Table 2. Package Size Parameter

Dimension symbol		Value (mm)		
		Minimal	Nominal	Max.
A		-	-	10.79
ϕb		0.87	-	1.13
e		-	10. 16	-
e1		-	25. 40	-
E		-	-	34.71
L		6.05	-	-
ϕP		3.97	-	4.23
X		-	-	69.59
X1		59.70	-	60.44
X2		-	-	49.95

Encapsulation Case Description

Enclosure Model	Base material	Base lating	Cover plate (Cap) material	Cover plate (Cap) coating	Lead Wire Material	Lead Wire Plating	Sealing Way	Remark
UPP4934-10f (Without flange)	Cold-rolled steel（10#）	Ni	Iron-nickel alloy Gold (4J42)	Ni	Copper core Compound	Ni/Au	Parallel Seam welding	The grounding pin is plated with Ni.
UPP4934-10g (Flanged)	Cold-rolled stee（10#）	Ni	Iron-nickel alloy Gold (4J42)	Ni	Copper core Compound	Ni/Au	Parallel Seam welding	The grounding pin is plated with Ni.