2025/08/18 (A/2)

VB100-xxSxxSB Series

DC-DC Converter | 100W | 1/16 Brick Package | 2:1 Wide Input Voltage | 1500VDC Isolation

Features

- 1/16 Brick Package
- Operating Temperature Range: -40℃ to +105℃
- Over-temperature Protection
- Isolation Voltage: 1500VDC
- Withstands 50V Surge Voltage
- Input Under-voltage Protection, Output Short Circuit Protection, and Over-current Protection
- Designed to comply with: IEC/EN/UL62368 Standards

Product Description

The VB100-xxSxxSB Series is a 100W isolated high-performance DC/DC converter with 16~40Vdc input voltage range which come in a rugged, sealed metal 1/16 brick package. It features high efficiency up to 90%, 1500VDC isolation voltage, operating ambient temperature of -40℃ to +105℃.Further features include output voltage trimming, Remote On/Off function and protections. Typical applications are telecom/datacom, battery operated systems, industry control, electricity, intelligent robot and railway systems for on board power distribution.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Output		Full Load Efficiency % (Typ.)	Max. Capacitive Load (μF)*
		Nominal Value	Range Value	Output Voltage (VDC)	Max. Current (A)		
EN pending	VB100-28S03SB	28	16-40	3.3	25.0	89	3300
	VB100-28S05SB	28	16~40	5	20.0	90	3300
	VB100-28S12SB	28	16~40	12	8.34	90	2200
	VB100-28S15SB	28	16~40	15	6.67	90	1800
	VB100-28S24SB	28	16~40	24	4.17	89	1000
	VB100-28S28SB	28	16~40	28	3.58	89	1000

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Voltage Range	Iout=0~100%Io		16	28	40	VDC
Surge Voltage	0.1s		--	--	50	VDC
Under-voltage Protection	Iout=0~100%Io	Modules on	14	--	16	VDC
		Modules off	13	--	15	VDC
Remote On/Off Control Voltage	Modules on	Ctrl pin- Vin or pulled low	0	--	0.7	VDC
	Modules off	Ctrl pin open or pulled high	3.5	--	12	VDC
Stand-by Power Consumption	No-load		--	--	10	W
Temperature Coefficient	Full load		--	--	0.03	%/℃

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Vin=16V~40V, full load		--	--	±2	%
Line regulation	Vin=16V~40V, full load		--	--	±0.5	%
Load regulation	Vin=16V~40V, Iout=0%~100%Io		--	--	±0.5	%
Output ripple voltage (peak-to-peak)	Vin=16V~40V, full load, BW=20MHz	3.3V	--	70	120	mVp-p
		5V	--	70	120	mVp-p
		12V	--	100	140	mVp-p
		15V	--	100	170	mVp-p
		24V	--	140	240	mVp-p
		28V	--	140	260	mVp-p
Over-voltage Protection	Vin=16V~40V, full load		110	--	140	%Vo
Over-current Protection	Hiccup mode, self-recovery after over-current removal		110	--	180	%Io
Trim	When output is adjusted down, ensure Iout≤100%Io; When output is adjusted up, ensure Po≤82.5W/100W		90	--	110	%Vo
Sense	Within output power range		--	--	105	%Vo
Load Dynamic Response	Iout: 50% load → 75% load → 50% load, di/dt=0.1A/μs	Overshoot	--	--	±5	%Vo
		Recovery Time	--	--	500	μs
Start-up Delay Time[e]	Vin=0V→28V, full load		--	--	100	ms
Output Rise Time	Vout from 10% to 90%, full load		--	--	100	ms
Start-up Overshoot	Vin=0V→28V, full load				5	%Vo
Short Circuit Protection	Hiccup Mode		Self-recovery			

Note:

1. The output over-voltage protection mode is hiccup mode. After the over-voltage protection is removed, the output voltage meets the electrical characteristics requirements.
2. This parameter is guaranteed by design and is only tested during qualification or when design or process changes occur.
3. Recovery time refers to the time from the start of the transient until the output voltage returns to within ±2% of the corresponding steady-state value.

4. The start-up delay time can be calculated either from the start of the power supply transient or from when the enable pin is pulled low, until the output voltage rises to 10% of Vout.

5. Capacitive load does not affect DC parameters.

Note: The test circuit for the above specifications refers to the typical application circuit.

General Specifications

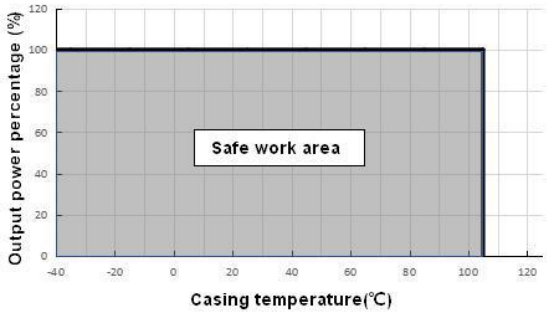
Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	t=1min, set leakage current to 1mA, TA=25℃	Input-Output	1500	--	--	VDC
		Input-Case	1000	--	--	VDC
		Output-Case	1000	--	--	VDC
Insulation Resistance	Add 500VDC between input and output, between input and shell, between output and shell for 10s		100	--	--	MΩ
Solation Capacitance	Input-output capacitance at100kHz/0.1V		--	2200	--	pF
Switching Frequency	Full Load		250	300	350	kHz
Operating Temperature	Case Temperature		-40	--	105	℃
Storage Temperature			-55	--	125	℃
Relative Humidity	No condensation		--	--	95	%
MTBF	MIL-HDBK-217F@25℃		1000	--	--	Kh

Mechanical Specifications

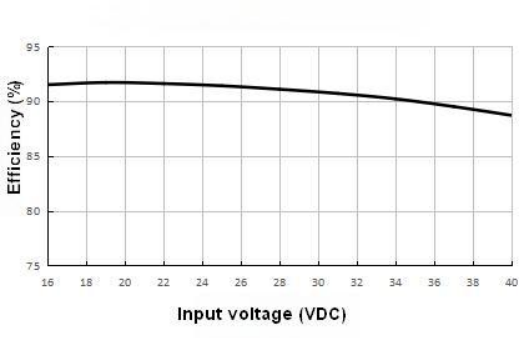
Case Material	Five-sided metal aluminum, anodized matte black
Mechanical Dimensions	36.47*26.31*12.70mm
Weight	39g (typ.)
Cooling Method	Free air convection or forced convection

Product Characteristic Curve

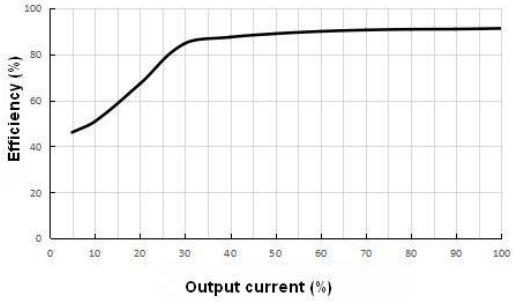
Temperature Derating Curve



Temperature Derating Curve (Full Load, VB100-28S12SB)

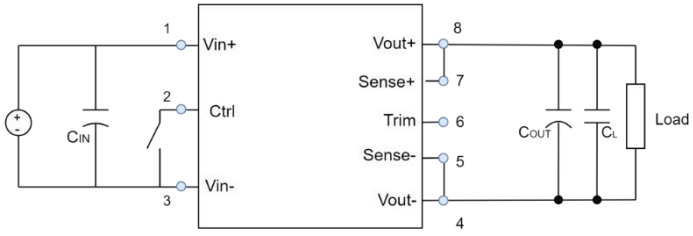


Efficiency Vs Output Load (Vin=28V, VB100-28S12SB)



Design Reference - Application Circuit

Typical Application Circuit



(Fig. 1: Typical Application Wiring Diagram)

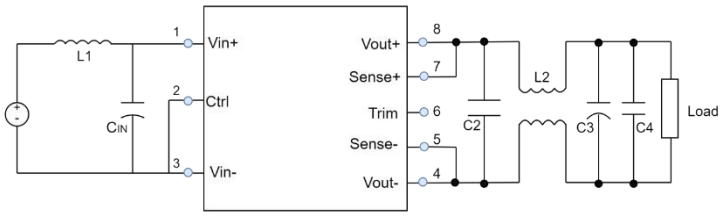
Figure 1 shows the typical application wiring of the module. Due to the large variation in the distance of the input source leads at the module power input, to prevent input oscillation caused by excessively long input lines, it is recommended to add an input capacitor near the input pins of the module. Similarly, add an output capacitor at the output end of the module. Recommended parameters are as follows:

Component	Recommended Parameters					
C_{IN}	Input Capacitor, 100μF Electrolytic Capacitor, Withstand Voltage ≥450V					
Cout	Output Voltage (V)	5V	12V	15V	24V	28V
	Cout Value (μF)	470μF	330μF	330μF	220μF	220μF
C_L	Output capacitor: 1μF ceramic capacitor					

The above parameters can be adjusted according to actual system application requirements, select appropriate parameter values

Design Reference - EMI Filter Circuit Connection Diagram

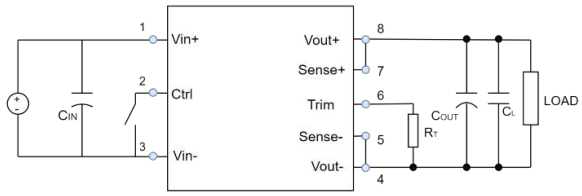
EMI Filter Circuit Design and Application



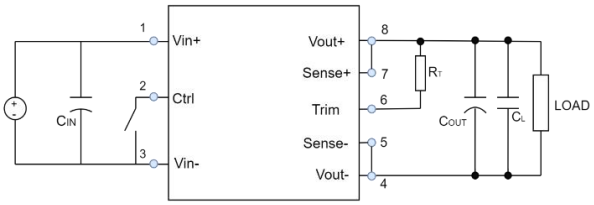
L1, Cin, C2 should be connected close to the product pins; C3, C4 should be connected close to the load. The inductance of L1, L2 and the capacitance of Cin~C4 should be selected based on actual conditions to meet the requirements of the overall system.

Design Reference - Trim Function Application Notes

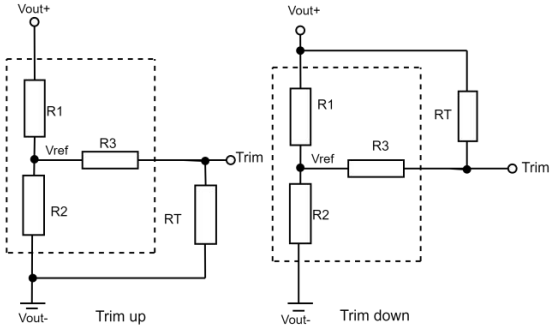
Trim Function Application Recommended Circuit Design and Application



(Figure 2 Output Voltage Positive Adjustment)



(Figure 3 Output Voltage Negative Adjustment)



(Figure 4 Trim Application Circuit
(Dashed Box Indicates Product Interior))

The output voltage can be fine-tuned through external connections. The specific method is: Pin 6 Trim is connected to Pin 4 Vout- via an adjustment resistor for positive adjustment; Pin 6 Trim is connected to Pin 8 Vout+ via an adjustment resistor for negative adjustment.

Trim resistance calculation formula:

up: $R_T = \frac{aR2}{R2-a} - R3$ $\quad a = \frac{Vref}{Vo'-Vref} \cdot R_1$

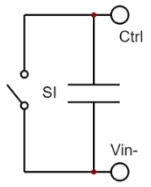
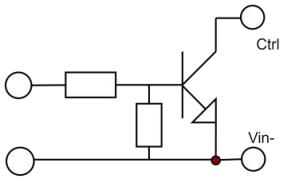
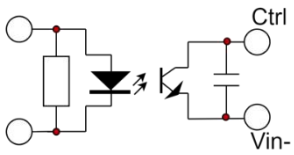
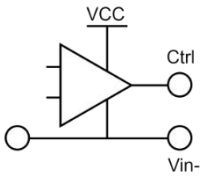
down: $R_T = \frac{aR_1}{R_1-a} - R_3$ $\quad a = \frac{Vo'-Vref}{Vref} \cdot R_2$

R_T is Trim resistance

a is a custom parameter and has no actual meaning.

Part No.	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
VB100-28S03SB	4.11	2.49	6.8	1.25
VB100-28S05SB	2.52	2.49	6.8	2.495
VB100-28S12SB	9.50	2.49	6.8	2.495
VB100-28S15SB	12.5	2.49	6.8	2.495
VB100-28S24SB	21.4	2.49	6.8	2.495
VB100-28S28SB	25.5	2.49	6.8	2.495

Design Reference - Enable Control (CTRL Pin)

Switching Method	Transistor Control Method	Optocoupler Isolation Control Method	Logic Gate Control Method
			

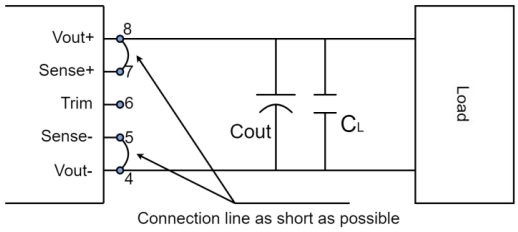
The functions of positive and negative enable logic are as follows:

For positive logic enable, the module operates normally when the control pin is connected to a high level or left floating, and shuts down when connected to ground or a low level. For negative logic enable, the module operates normally when the control pin is connected to ground or a low level, and shuts down when connected to a high level or left floating.

This model has a negative logic enable pin. When the enable pin is left floating (or connected to a high level), the product has no output. It can be left floating when not in use. When using the enable pin, connect it to input ground (or a low level) via a switch or other method to enable output.

Design Reference - Sense Function Application Description

Design and Application Without Remote Sense Circuit

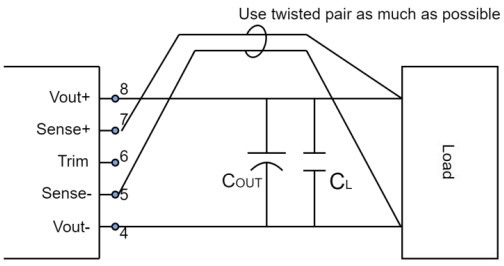


Notes:

1.When not using remote sense, ensure Vout+ is shorted to Sense+ and Vout- is shorted to Sense-; do not leave the sense pins floating.

2. The connections between Vout+ and Sense+, and Vout- and Sense- should be as short as possible and close to the terminals to avoid forming a large loop area. If noise enters this loop, it may cause module instability.

Using Remote Sense



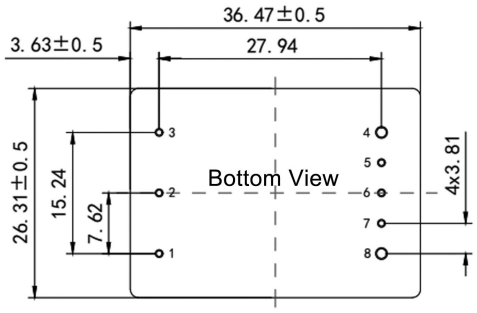
Notes:

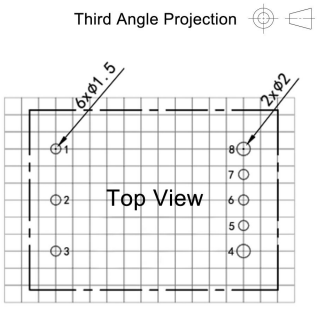
1.If the remote sense leads are too long, it may cause output voltage instability. If long remote sense leads are necessary, please contact our technical personnel.

2. When using remote sense, use twisted pair or shielded wires, and keep the leads as short as possible.

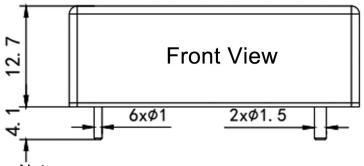
Dimensions and Recommended Layout

VB100-xxSxxSB Dimensions and Recommended Layout





The grid distance size is 2.54mm*2.54mm



Note:
Size unit: mm [inch]
Pin diameter tolerance: ±0.10 [±0.004]
Unmarked dimensional tolerance: ±0.50 [±0.020]
Pin 4 and Pin 8 are1.5[0.059] dia

Pin	Symbol	Function
1	Vin+	Input positive pin
2	Ctrl	Enable control pin
3	Vin-	Input negative pin
4	Vout-	Negative output pin
5	Sense-	Output Sense negative pin
6	Trim	Output voltage adjustment pin
7	Sense+	Output Sense positive pin
8	Vout+	Output positive pin

Product precautions

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this manual are based on our company's corporate standards;
6. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
7. Product specifications are subject to change without prior notice.

Manufacturer contact information

Bettpower Guangzhou Electronic Technology Co., Ltd.

Website: www.bettpower.com

Telephone: +86 - 020 - 32166256

Email: info@bettpower.com

Address: Room 2514-2515, Building A1,1 Doutang Road, Huangpu District, Guangzhou, China