

Features

- Wide 4 : 1 Input Voltage Range (9~36V,18~75V)
- High Power Density
- High Efficiency
- Operating Temperature Range: -40 °C to +85 °C
- Output Short Circuit Protection
- Output Over Voltage Protection
- Remote On /Off Control
- Input/ Output Isolation 3000 VDC
- Shielded Metal Case with Insulated Baseplate
- Lead Free Design, RoHS Compliant
- 24pin DIP Package with Industry-Standard Footprint
- Safety Standard / Approval : IEC/EN60950-1



Applications

- Distributed power system
- Telecommunication application
- Battery powered equipment
- Industrial application
- Process control equipment
- Transportation equipment

Technical Specification

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.

Model Number	Input Voltage Range	Output Voltage (V)	Output Current (mA)		Input Current (mA)		Eff. ⁽²⁾ (%)	Capacitive Load, max. ⁽³⁾ (uF)
			Min. Load ⁽¹⁾	Full. Load	No Load	Full Load		
BOB3-24S0WH3	9~36V Nominal:24Vdc	3.3	22	750	5	143	76	470
BOB3-24S1WH3		5	10	600	4	169	78	330
BOB3-24S2WH3		12	0	250	9	164	80	147
BOB3-24S3WH3		15	0	200	10	14	80	82
BOB3-24D1WH3		±5	0	±300	8	167	79	168
BOB3-24D2WH3		±12	0	±125	14	164	80	47
BOB3-24D3WH3		±15	0	±100	16	164	80	33
BOB3-48S0WH3	18~75V Nominal:48Vdc	3.3	11	750	3	72	76	470
BOB3-48S1WH3		5	10	600	2	84	78	330
BOB3-48S2WH3		12	0	250	5	83	79	100
BOB3-48S3WH3		15	0	200	6	82	80	68
BOB3-48D1WH3		±5	0	±300	5	84	78	168
BOB3-48D2WH3		±12	0	±125	8	83	79	33
BOB3-48D3WH3		±15	0	±100	9	86	77	33

Input Specifications			
Input Voltage	24V nominal input	9-36V	
	48V nominal input	18-75V	
Input filter		Pi Type	
Input surge voltage (100ms max.)	24V input	50V	
	48V input	100V	
Input reflected ripple current	Nominal Vin and full load	72mAp-p typ.	
Remote On/Off control	Converter: ON	Open or $3.5V < V_r < 12V$	
	Converter: OFF	Short ⁽⁴⁾ or $0V < V_r < 1.2V$	
Sourcing current of remote control pin	Nominal Vin	< 0.2 mA	
Idle input current (at Remote OFF state)	Nominal Vin	< 2.5 mA	
Start up time	Nominal Vin and constant resistive load	400ms max.	
Environmental Specifications			
Operating ambient temperature	-40°C to +85°C (with derating)		
Maximum case temperature	+100°C		
Storage temperature range	-55°C to +105°C		
Relative humidity	5% to 95% RH		
Temperature coefficient	±0.02% / °C max.		
Output Specifications			
Output power	3 Watts max.		
Voltage accuracy	Full load and nominal Vin	±2%	
Minimum load	See table		
Line regulation	LL to HL at full load		±0.5%
	25% load to full load	Single	±0.5%
	Balanced load	Dual	±0.5%
Load Regulation	Unbalanced load 25% to 100% full load		±3%
	20MHz bandwidth		60mVp-p max.
Ripple and Noise	3.3Vout models		3.9V
	5Vout models		6.2V
	12Vout models		15V
	15Vout models		18V
Capacitive load	See table		
Over load protection	% of full load	120% min.	
Short circuit protection	Continuous, automatic recovery		
Transient response settling time	50% load step change	1320µs max.	
Transient response over shoot	di/dt=0.8A/µs	≤ ±5% of Vo	

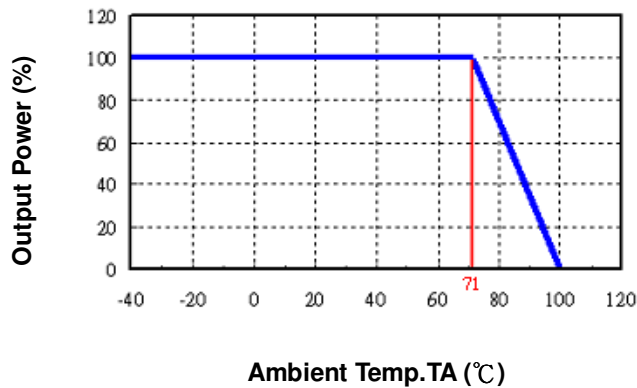
General Specifications

Efficiency	Nominal input	See table
Isolation voltage	Input to output	3000VDC
Isolation resistance	500VDC	10^9 Ohms min.
Isolation capacitance		270pF typ.
Switching frequency		300kHz typ.
Reliability, calculated MTBF		2.53×10^6 Hrs

Physical Specifications

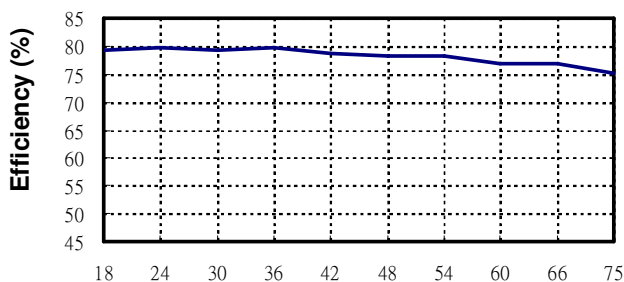
Case material	Nickel-coated copper
Base material	Non-conductive black plastic
Potting material	Silicon rubber (UL94V-0)
Dimensions	1.25 × 0.80 × 0.40 Inch (31.75 × 20.32 × 10.16 mm)
Weight	17.2g (0.59oz) typ.

BOB3WH3Series
Power Derating Curve(5)



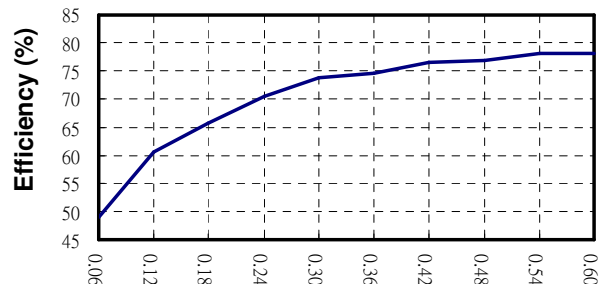
BOB3-48S1WH3

Input voltage vs. Efficiency



BOB3-48S1WH3

Output Current vs. Efficiency



Input voltage (V)

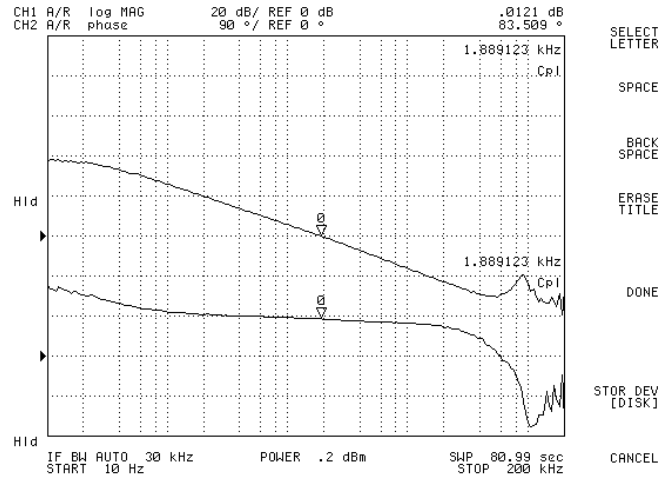
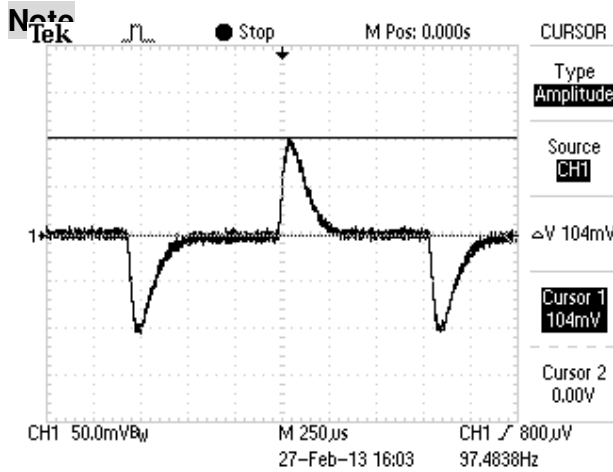
Output Current (A)

BOB3-48S1WH3

BOB3-48S1WH3

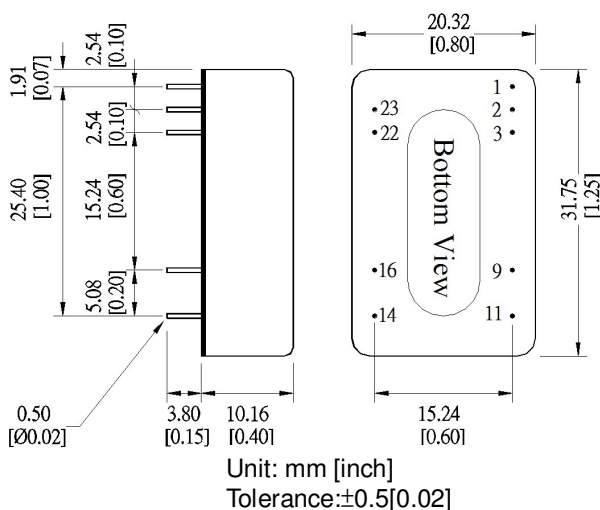
Transient Response at 50%~100% Max Load

Loop Gain & Phase at Vi=48V, Full Load



1. Io below this value will not damage these converters, however, they may not meet all listed specifications.
2. Typical value, tested at nominal input and full load.
3. For each output.
4. Short to -Vin (Pin 2,3).
5. Based on BOB3-48S1WH3.

Mechanical Dimensions

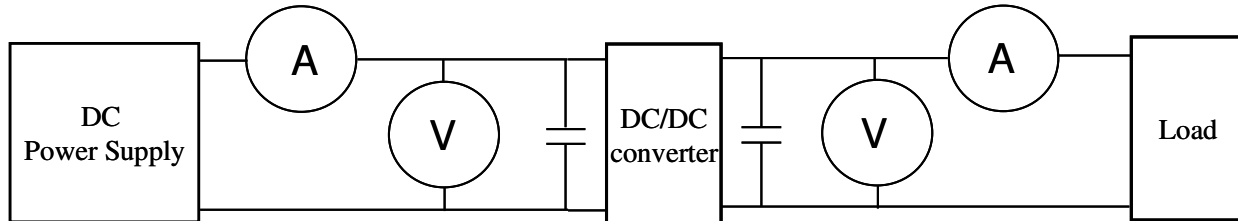


Pin Assignment		
Pin	Single	Dual
1	Remote On/Off	Remote On/Off
2	-Vin	-Vin
3	-Vin	-Vin
9	No pin	Common
11	No function	-Vout
14	+Vout	+Vout
16	-Vout	Common
22	+Vin	+Vin
23	+Vin	+Vin

Specifications subject to change without notice.

Test Configurations

All specifications are typical at nominal input, full load and 25°C unless otherwise stated.



- ⊙DC Power Supply: It offers a wide voltage and current range precisely.
- ⊙Current meter (A): Accuracy → 200μA ~ 200mA 4 ranges ±(0.2% rdg + 2 digits)
2000mA ~ 20A 2 ranges ±(0.3% rdg + 2 digits).
- ⊙Voltage meter (V): Accuracy → ±(0.03% rdg + 4 digits).
- ⊙Load: At full load.
- ⊙Wires: The resistance of the wires must be small.

1. Input voltage range: Narrow input voltage range (±10%)、wide input voltage range (2:1 and 4:1)。

EX: Narrow input voltage range (±10%)

5V nominal input	→	4.5~5.5V
12V nominal input	→	10.8~13.2V
24V nominal input	→	21.6~26.4V

Wide input voltage range 2:1

5V nominal input	→	4.5~9V
12V nominal input	→	9~18V
24V nominal input	→	18~36V
48V nominal input	→	36~75V

Wide input voltage range 4:1 (W)

24V nominal input	→	9~36V
48V nominal input	→	18~75V

2. Input power :

$$P_{in} = V_{in} \times I_{in}$$

V_{in} : Input voltage
 I_{in} : Input current

3. Output power :

$$P_{out} = V_{out} \times I_{out}$$

V_{out} : Output voltage
 I_{out} : Output current

4. Efficiency :

$$\text{Efficiency} = \frac{P_{out}}{P_{in}} \times 100\%$$

P_{out} : Output power
 P_{in} : Input power

5. Voltage accuracy:

$$\frac{|V_{out} - V_{out}(\text{nominal})|}{V_{out}} \times 100\%$$

Vout : Output voltage

Vout(nominal) : Nominal output voltage

6. **Line regulation:** (1) Wide input voltage range and regulated output voltage series.

$$\frac{|V_{out(LL)} - V_{out(HL)}|}{V_{out(LL)}} \times 100\%$$

LL: Low Line input voltage
HL: High Line input voltage

- (2) Narrow input voltage range ($\pm 10\%$) and unregulated output voltage series.

$$\text{Line regulation} = \left| \frac{\Delta V_{out}}{\Delta V_{in}} \right|$$

$$\Delta V_{out} = \frac{V_{out(+10\%)} - V_{out(-10\%)}}{V_{out}} \times 100\%$$

Vout(+10%) : Output voltage at Vin = 1.1xVin(nominal)&full load

Vout(-10%) : Output voltage at Vin = 0.9xVin(nominal)&full load

Vout : Output voltage at Vin = Vin(nominal)&full load

$$\Delta V_{in} = \frac{V_{in(+10\%)} - V_{in(-10\%)}}{V_{in(nominal)}} \times 100\%$$

Vin(+10%) : Input voltage = 1.1xVin(nominal)

Vin(-10%) : Input voltage = 0.9xVin(nominal)

Vin(nominal) : Nominal Input voltage

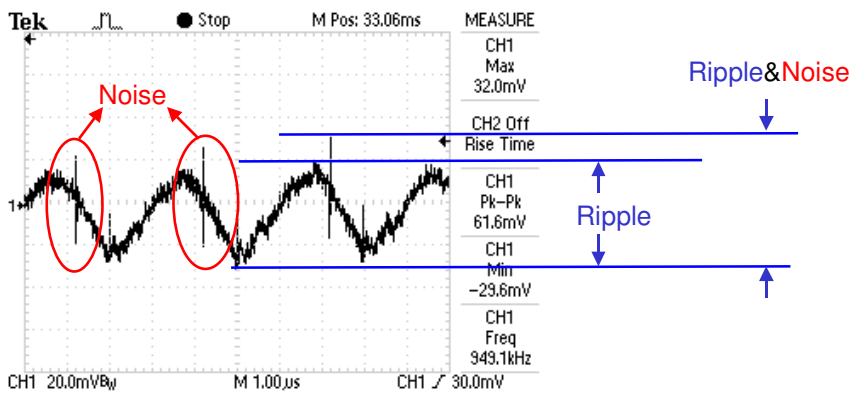
7. **Load regulation :**

$$\frac{|V_{out(FL)} - V_{out(NL)}|}{V_{out(FL)}} \times 100\%$$

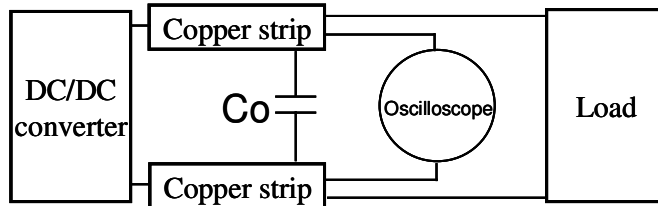
Vout(FL): Output voltage at full load

Vout(NL): Output voltage at 25% full load or 10% full load

8. **Ripple and Noise:** as shown below. The bandwidth is 0-20MHz.

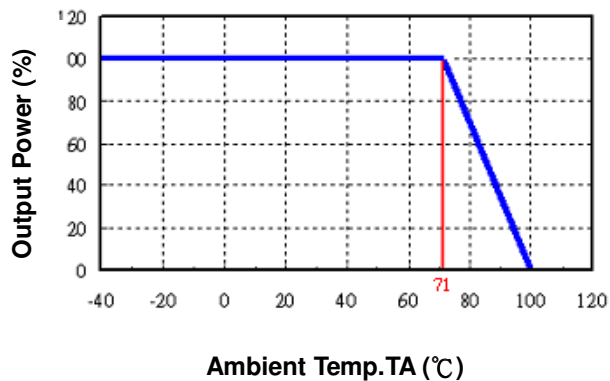


Output Ripple&Noise measurement test circuit: as shown below.



C_o : usually 0.47 μ F.

9. [Temperature derating curve](#): The DC-DC converter will operate over a wider temperature range if less power is drawn from the output and the device is already running. The temperature derating curve shows the operating power-temperature range. As shown below.



10. [Switching frequency](#): The nominal operating frequency of the DC-DC converters.
11. [Input to output isolation](#): The dielectric breakdown strength test between input and output circuits. This is the isolation voltage the device is capable of withstanding for a specified time, usually 1 second or 1 minute.