

Features

- Wide 4 : 1 Input Voltage Range(9~36V,18~75V)
- Remote On/Off
- High Efficiency up to 87%
- Input / Output Isolation Voltage: 1.5K VDC
- Extended Operating Temperature Range: -40°C to +85°C
- Output Short Circuit Protection:
Hiccup, continuous & Auto Recovery
- Over Voltage Protection: Clamp Mode
- Shielded Metal Case with Insulated Baseplate
- Lead Free Design, RoHS Compliant
- 24pin DIP Package with Industry-Standard Footprint
- Customer Design Available
- Safety Standard / Approval : IEC / EN 60950-1



Description

The BOB12W Series are isolated 12W DC/DC converters. Designed with highly efficiency, allow the operating temperature range of these units to be -40°C to +85°C in a 24 pin DIP package with industry-standard footprint. Further features include wide 4 : 1 input voltage range, remote on/off control, short-circuit protection and over voltage protection.

Applications

These converters are well suitable for battery operated equipment, measurement equipment, telecom, wireless network, Industry control system, everywhere where isolated, tightly regulated voltages and compact size are required.

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		
BOB12-24S0W	9~36V Nominal:24V	3.3	0	3500	49	609	83	35700
BOB12-24S1W		5.1	0	2400	58	638	84	9400
BOB12-24S2W		12	0	1000	14	617	85	3530
BOB12-24S3W		15	0	800	17	617	85	2200
BOB12-24D1W		±5	0	±1200	18	642	82	6900
BOB12-24D2W		±12	5	±500	17	617	85	1760
BOB12-24D3W		±15	0	±400	17	617	85	1100
BOB12-48S0W		18~75V Nominal:48V	3.3	0	3500	19	300	84
BOB12-48S1W	5.1		0	2400	24	315	85	12860
BOB12-48S2W	12		80	1000	6	302	87	2300
BOB12-48S3W	15		30	800	6	302	87	1660
BOB12-48D1W	±5		80	±1200	6	317	83	6030
BOB12-48D2W	±12		0	±500	13	309	85	1100
BOB12-48D3W	±15		0	±400	9	304	86	760

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	100mA _{p-p} typ.
Start up time	Nominal Vin and constant resistive load	75ms typ.
Remote ON/OFF	Converter: ON	Open or $3.5V < V_r < 12V$
	Converter: OFF	Short ⁽⁴⁾ or $0V < V_r < 0.5V$
Sourcing current of remote control pin	Nominal Vin	< 0.2 mA
Idle input current (at Remote OFF state)	Nominal Vin	< 7.5 mA
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		12 Watts max.
Voltage accuracy	Full load and nominal Vin	±1.2%
Minimum load		See table
Line regulation	LL to HL at full load	±0.5%
	25% load to full load	Single ±1%
Load Regulation	Balanced load	Dual ±1%
	Unbalanced load 25% to 100% full load	±5%
Ripple and Noise	20MHz bandwidth	85mV _{p-p} max.
Over voltage protection (Zener Diode Clamp)	3.3V _{out} models	3.9V
	5V _{out} models	6.2V
	12V _{out} models	15V
	15V _{out} models	18V
Capacitive load		See table
Over load protection	% of full load at nominal input	150% typ.
Short circuit protection		Hiccup, continuous (Auto Recovery)
Transient response settling time	50% load step change	350µs typ.
Transient response over shoot	di/dt=0.8A/µs	≤ ±5% of V _o

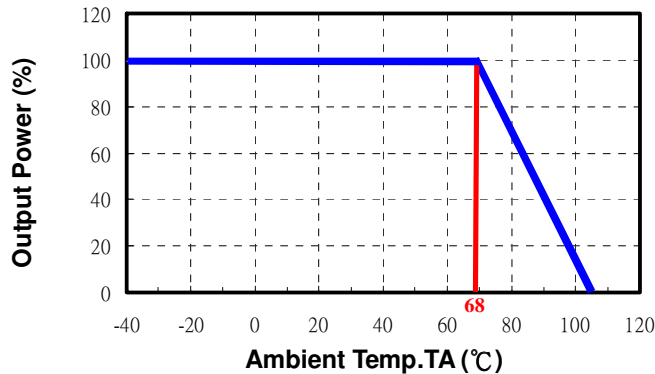
General Specifications

Efficiency	Nominal input	See table
Isolation voltage	Input to output	1500VDC
Isolation resistance	500VDC	10^9 Ohms min.
Isolation capacitance		260pF typ.
Switching frequency		400kHz typ.
Reliability, calculated MTBF		2.11×10^6 Hrs

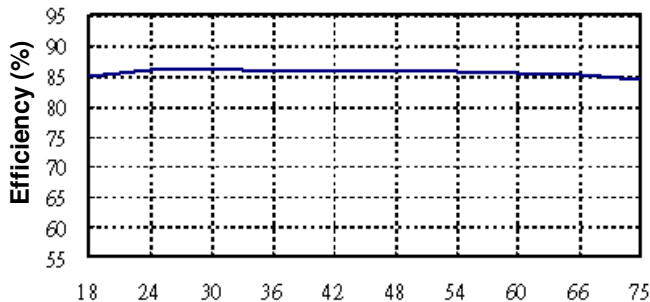
Physical Specifications

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	18g (0.62oz) typ.

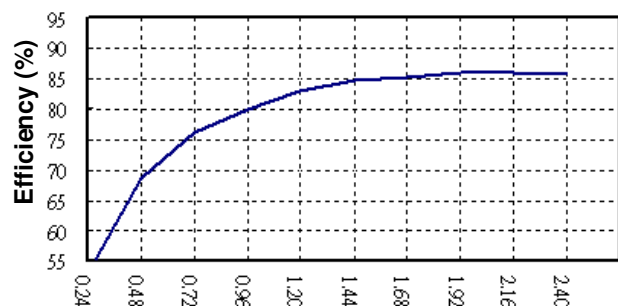
**BOB12W Series
Power Derating Curve⁽⁵⁾**



**BOB12-48S1W
Input voltage vs. Efficiency**



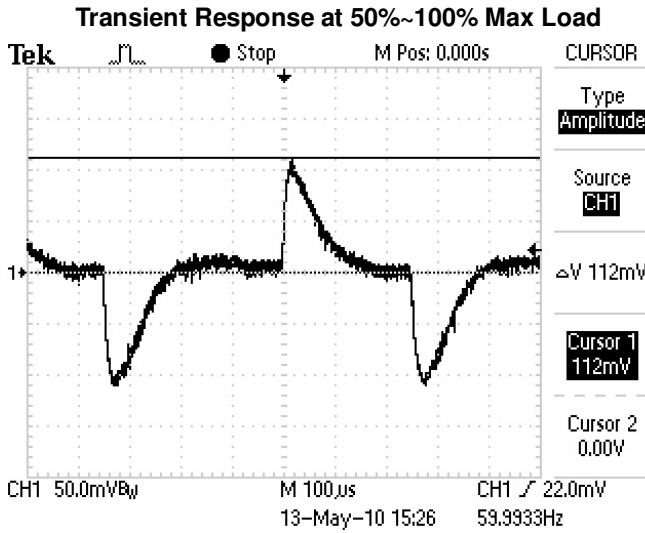
**BOB12-48S1W
Output Current vs. Efficiency**



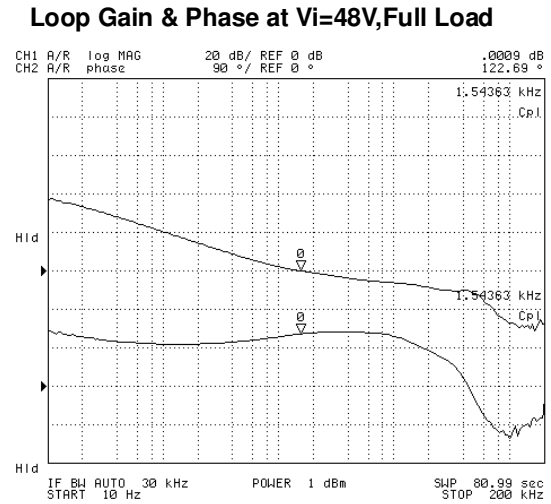
Input voltage (V)

Output Current (A)

BOB12-48S1W



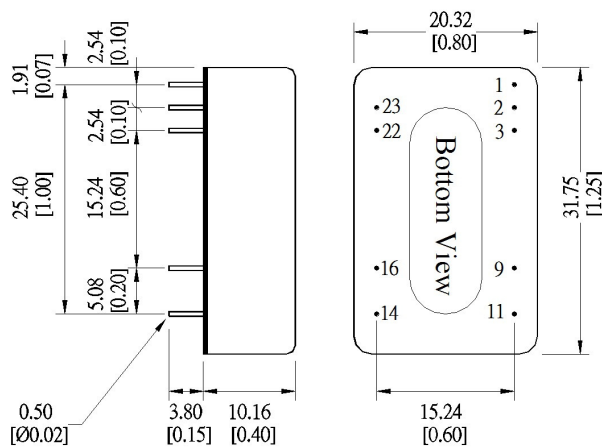
BOB12-48S1W



Note

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 BOB12-48S1W.

Mechanical Dimensions



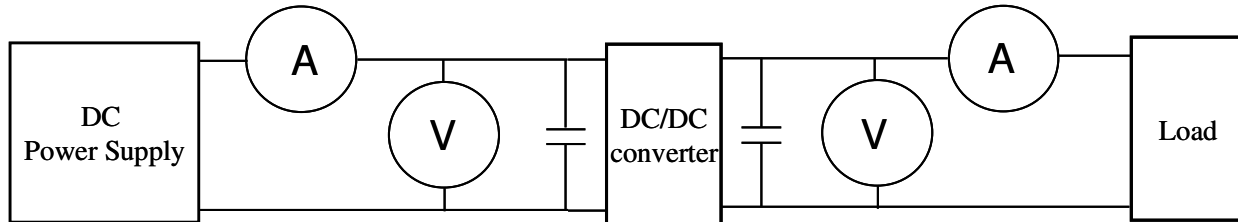
Unit: mm [inch]
Tolerance: ±0.5 [0.02]

Pin Assignment		
Pin	Single	Dual
1	Remote On/Off	
2	-Vin	-Vin
3	-Vin	-Vin
9	No function	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

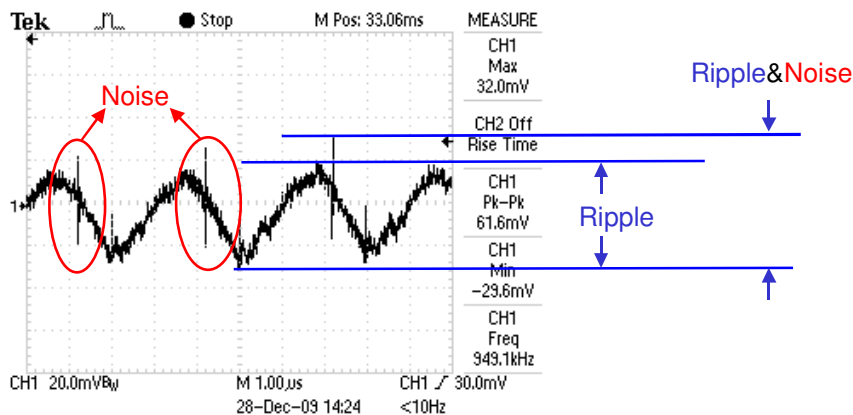
7. **Load regulation :**

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

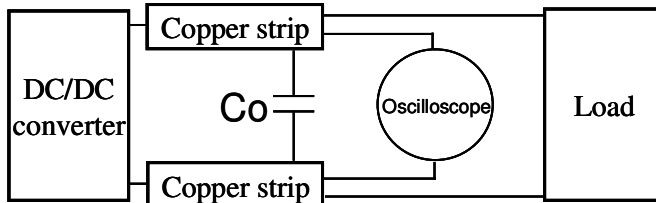
Vout(FL): Output voltage at full load

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

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

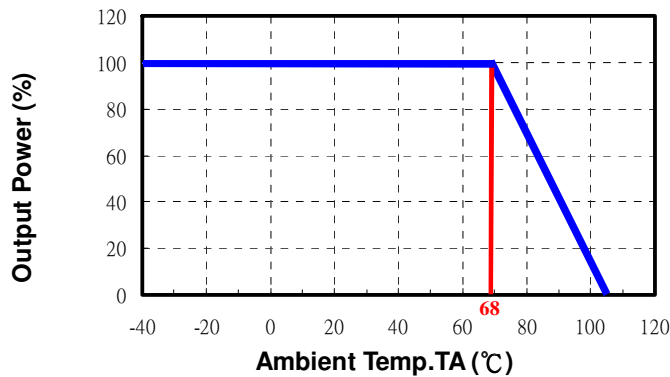


Output Ripple&Noise measurement test circuit: as shown below.



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.