BOB12 Series

24 pin DIP Package, 12 Watt, Isolated, Regulated

BOTHHAND

Features

- Wide 2 : 1 Input Voltage Range(9~18V,18~36V,36~75V)
- Remote On/Off
- Input / Output Isolation Voltage: 1.5kVDC
- Extended Operating Temperature Range: -40°C to +85°C
- Output Short Circuit Protection:

  Continuous & Auto Recovery
- Over Voltage Protection: Clamp Mode
- High Efficiency up to 88%
- 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 / EN60950-1

Description

The BOB12 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 2 : 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.

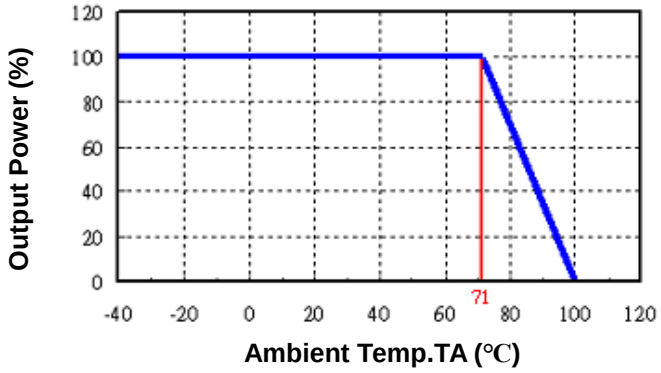
Model Number	Input Voltage Range	Output Voltage (V)	Output Current (mA)		Input Current (mA)		Eff .(1) (%)	Capacitive Load, max. (2) (uF)
			Min. Load	Full. Load	No Load	Full Load		
BOB12-12S9	9~18V Nominal:12V	2.5	0	3500	47	960	80	55100
BOB12-12S0		3.3	0	3500	56	882	82	28000
BOB12-12S1		5.1	0	2400	68	1275	84	19620
BOB12-12S2		12	0	1000	68	1220	86	3530
BOB12-12S3		15	0	800	64	1220	86	2300
BOB12-12D2		±12	0	±500	98	1220	86	1660
BOB12-12D3		±15	0	±400	65	1220	86	1100
BOB12-24S9	18~36V Nominal:24V	2.5	0	3500	22	468	82	59800
BOB12-24S0		3.3	0	3500	24	609	83	36580
BOB12-24S1		5.1	0	2400	31	630	85	18000
BOB12-24S2		12	0	1000	25	602	87	3730
BOB12-24S3		15	0	800	23	595	88	2420
BOB12-24D2		±12	0	±500	26	595	88	1880
BOB12-24D3		±15	0	±400	25	595	88	1100
BOB12-48S9	36~75V Nominal:48V	2.5	0	3500	21	237	81	56090
BOB12-48S0		3.3	0	3500	16	305	83	40550
BOB12-48S1		5.1	0	2400	14	315	85	20000
BOB12-48S2		12	0	1000	13	301	87	3960
BOB12-48S3		15	0	800	10	298	88	2750
BOB12-48D2		±12	0	±500	13	298	88	1990
BOB12-48D3		±15	0	±400	13	301	87	1100

Input Specifications		
Input Voltage	12V nominal input	9-18V
	24V nominal input	18-36V
	48V nominal input	36-75V
Input filter		Pi Type
Input surge voltage (100ms max.)	12V input	25V
	24V input	50V
	48V input	100V
Input reflected ripple current	Nominal Vin and full load	100mAp-p typ.
Start up time	Nominal Vin and constant resistive load	75ms typ.
Remote ON/OFF	Converter: ON	Open or 3.5V＜Vr＜12V
	Converter: OFF	Short (3) or 0V＜Vr＜0.7V
Sourcing current of remote control pin	Nominal Vin	＜0.2 mA
Idle input current (at Remote OFF state)	Nominal Vin	＜6 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%
Load Regulation	25% load to full load Single	±1%
	Balanced load Dual	±1%
	Unbalanced load 25% to 100% full load	±5%
Ripple and Noise	20MHz bandwidth	85mVp-p max.
Over voltage protection (Zener Diode Clamp)	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 at nominal input	150% typ.
Short circuit protection		Continuous, automatic recovery
Transient response settling time	50% load step change	350μs typ.
Transient response over shoot	di/dt=0.8A/μs	≤ ±5% of Vo

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 (Fixed)	Pulse width modulation (PWM)	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.

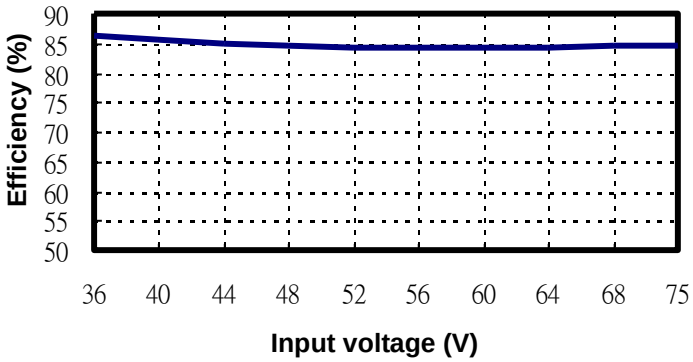
BOB12 Series

Power Derating Curve(4)



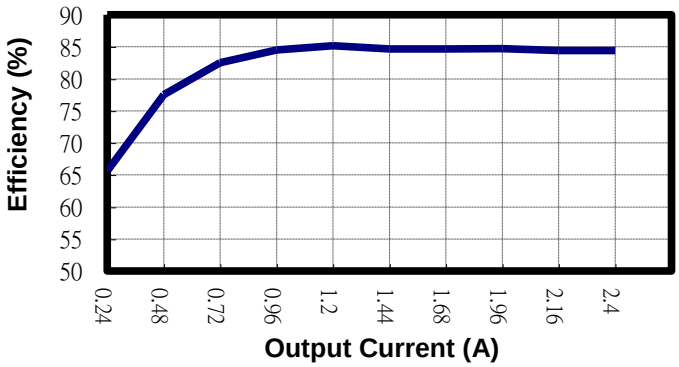
BOB12-48S1

Input voltage vs. Efficiency



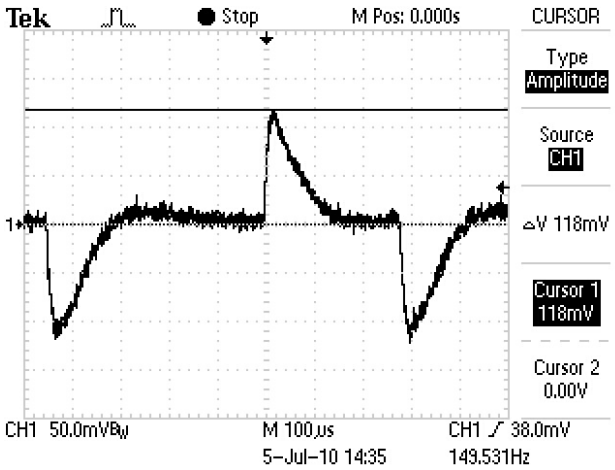
BOB12-48S1

Output Current vs. Efficiency

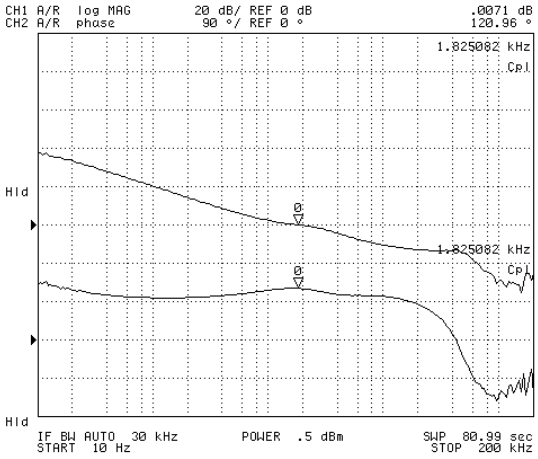


BOB12-48S1

Transient Response at 50%~100% Max Load



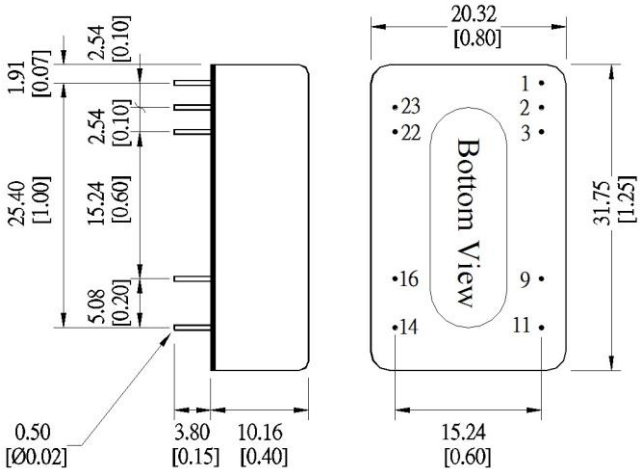
Loop Gain & Phase at Vi=48V,Full Load



Note

1. Typical value, tested at nominal input and full load.
2. For each output.
3. Short to -Vin (Pin 2,3).
4. Based on BOB12-48S1.
5. Specifications subject to change without notice.

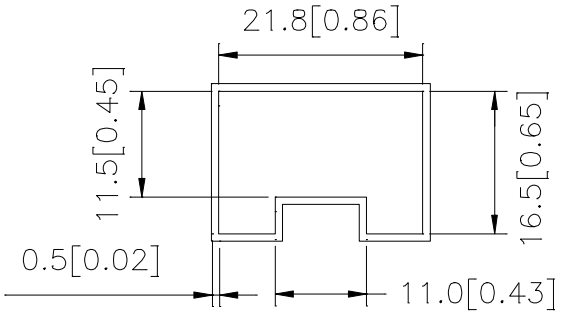
Mechanical Dimensions



Unit: mm [inch]
Tolerance:±0.5[0.02]

Pin Assignment		
Pin	Single	Dual
1	Remote On/Off	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

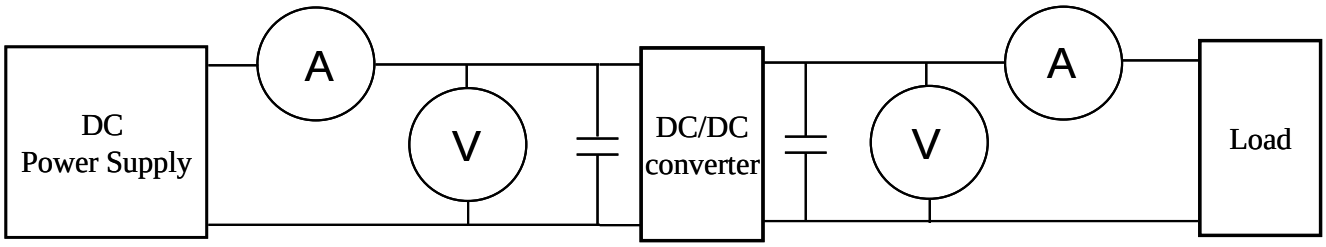
Package Information



PS:
Unit: mm [inch]
L= 350 mm[13.78 inch] ; ONE TUBE = 10 PCS
L= 520 mm[20.47 inch] ; ONE TUBE = 15 PCS

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 :

Pin = Vin x Iin

Vin：Input voltage
Iin：Input current

3. Output power :

Pout = Vout x Iout

Vout：Output voltage
Iout：Output current

4. Efficiency :

$$\text{Efficiency} = \frac{Pout}{Pin} \times 100\%$$

Pout: Output power
Pin: Input power

5. Voltage accuracy:

$$\frac{|\,Vout-Vout(nominal)\,|}{Vout} \times 100\%$$

Vout：Output voltage
Vout(nominal)：Nominal output voltage

6. Line regulation: Wide input voltage range and regulated output voltage series.

$$\frac{|\,Vout(LL)-Vout(HL)\,|}{Vout(LL)} \times 100\%$$

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

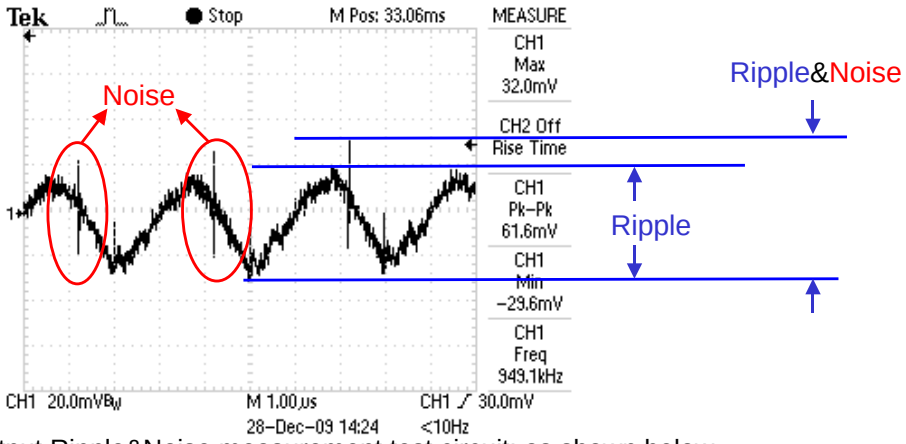
7. Load regulation :

$$\frac{|\,Vout(FL)-Vout(NL)\,|}{Vout(FL)} \times 100\%$$

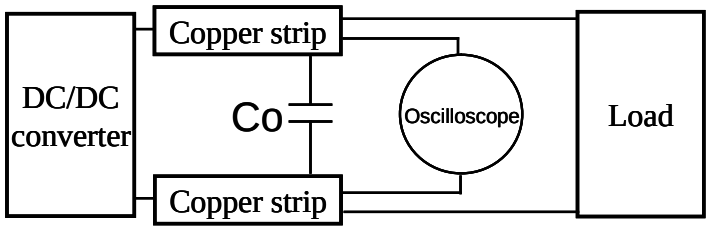
Vout(FL): Output voltage at full load

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

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

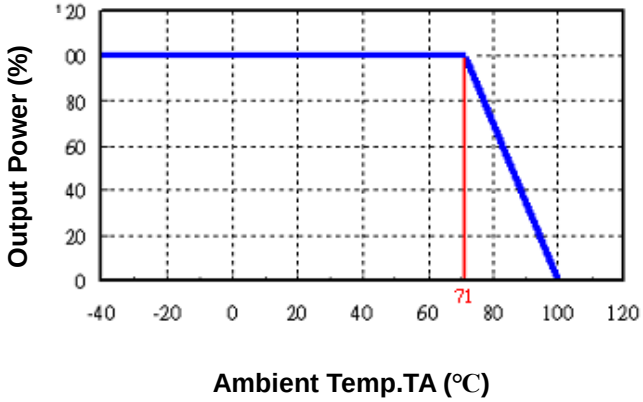


Output Ripple&Noise measurement test circuit: as shown below.



Co: usually 0.47uF.

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.