Features

- Wide 2 : 1 Input Voltage Range(9~18V,18~36V,36~75V)
- Remote On/Off
- Input / Output Isolation Voltage: 3.0kVDC
- Extended Operating Temperature Range: -40℃ to +85℃
- Output Short Circuit Protection:
  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



RoHS compliant

Description

The BOB3H3 Series are isolated 3W DC/DC converters. Designed with highly efficiency, allow the operating temperature range of these units to be -40℃ to +85℃ 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

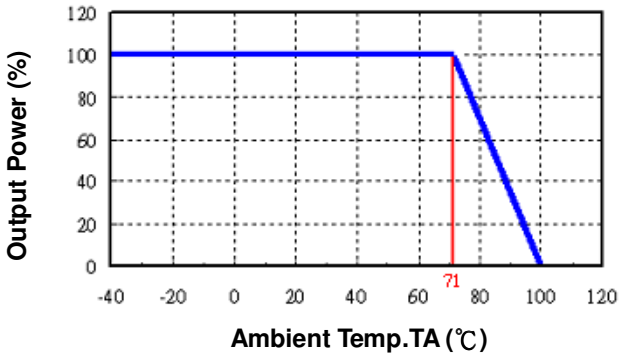
All specifications are typical at nominal input, full load and 25℃ unless otherwise stated.

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		
BOB3-12S0H3	9~18V Nominal:12Vdc	3.3	23	750	14	281	77	820
BOB3-12S1H3		5	0	600	21	333	79	680
BOB3-12S2H3		12	0	250	24	325	81	182
BOB3-12S3H3		15	0	200	25	329	80	100
BOB3-12D1H3		±5	2	±300	21	329	80	330
BOB3-12D2H3		±12	0	±125	27	325	81	82
BOB3-12D3H3		±15	0	±100	35	329	80	47
BOB3-24S0H3	18~36V Nominal:24Vdc	3.3	23	750	8	138	79	820
BOB3-24S1H3		5	0	600	10	164	80	680
BOB3-24S2H3		12	0	250	12	160	82	182
BOB3-24S3H3		15	0	200	14	162	81	100
BOB3-24D1H3		±5	2	±300	11	164	80	330
BOB3-24D2H3		±12	0	±125	16	160	82	82
BOB3-24D3H3		±15	0	±100	17	162	81	47
BOB3-48S0H3	36~75V Nominal:48Vdc	3.3	23	750	5	71	77	820
BOB3-48S1H3		5	0	600	7	84	78	680
BOB3-48S2H3		12	0	250	8	82	80	182
BOB3-48S3H3		15	0	200	8	82	80	100
BOB3-48D1H3		±5	2	±300	9	83	79	330
BOB3-48D2H3		±12	0	±125	10	82	80	82
BOB3-48D3H3		±15	0	±100	12	82	80	47

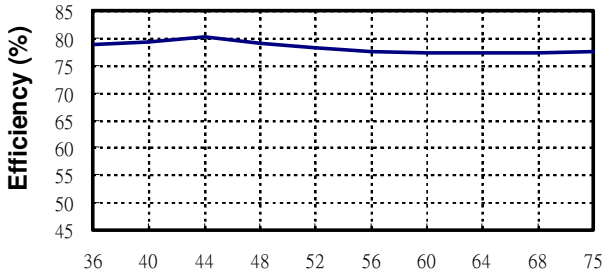
Input Specifications		
Input Voltage	12V nominal input	9-18V
	24V nominal input	18-36V
	48V nominal input	36-75V
Input filter		Pi Type
Input surge voltage (100ms max.)	12V input	25V
	24V input	50V
	48V input	100V
Input reflected ripple current	Nominal Vin and full load	86mAp-p max.
Start up time	Nominal Vin and constant resistive load	1020ms max.
Remote ON/OFF	Converter: ON	Open or 3.5V＜Vr＜12V
	Converter: OFF	Short [4] or 0V＜Vr＜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
Environmental Specifications		
Operating ambient temperature		-40℃ to +85℃ (with derating)
Maximum case temperature		+100℃
Storage temperature range		-55℃ to +105℃
Relative humidity		5% to 95% RH
Temperature coefficient		±0.02% / ℃ 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%
Load Regulation	25% load to full load Single	±0.5%
	Balanced load Dual	±0.5%
	Unbalanced load 25% to 100% full load	±3%
Ripple and Noise	20MHz bandwidth	60mVp-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	1600μs max.
Transient response over shoot	di/dt=0.8A/μs	≤ ±3% of Vo
General Specifications		
Efficiency	Nominal input	See table

Isolation voltage	Input to output	3000VDC
Isolation resistance	500 VDC	10^9 Ohms min.
Isolation capacitance		280pF 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.

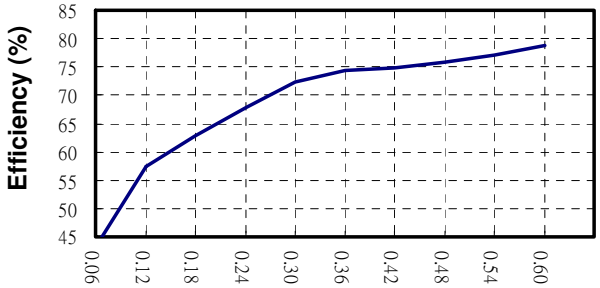
BOB3H3 Series
Power Derating Curve(5)



BOB3-48S1H3
Input voltage vs. Efficiency

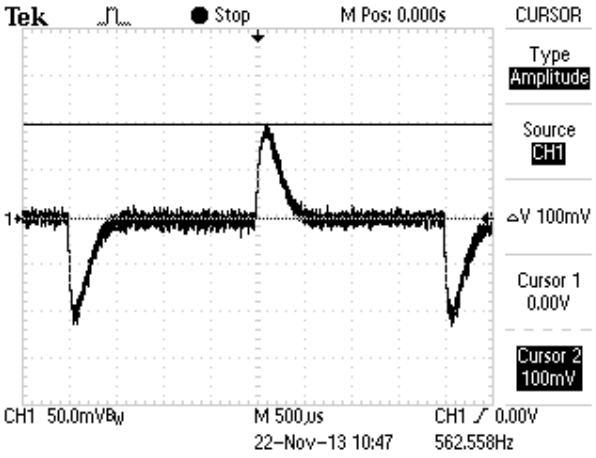


BOB3-48S1H3
Output Current vs. Efficiency



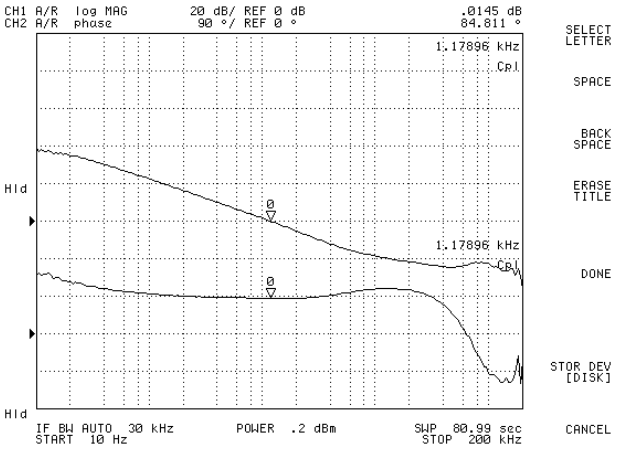
BOB3-48S1H3

Transient Response at 50%~100% Max Load



BOB3-48S1H3

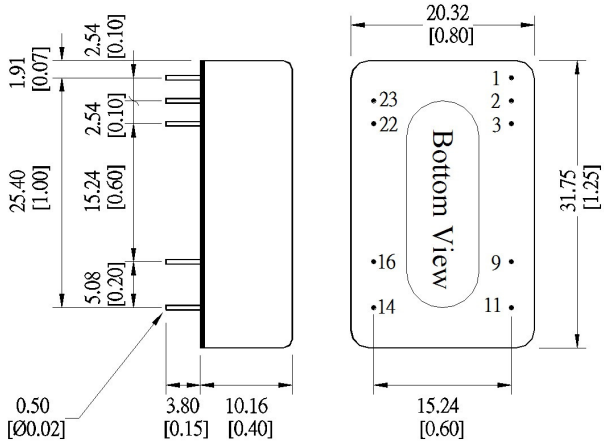
Loop Gain & Phase at Vi=48V,Full Load



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 BOB3-48S1H3.

Mechanical Dimensions



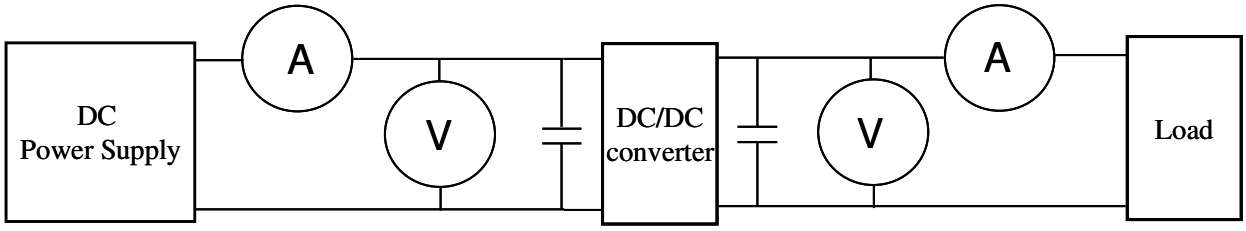
Unit: mm [inch]
Tolerance:±0.5[0.02]

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

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

Pout: Output power
Pin: Input power

5. Voltage accuracy:

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

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

6. Line regulation: (1) 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

(2) Narrow input voltage range（±10%）and unregulated output voltage series.

$$\text{Line regulation} = \left| \frac{\Delta Vout}{\Delta Vin} \right|$$

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

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

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

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

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

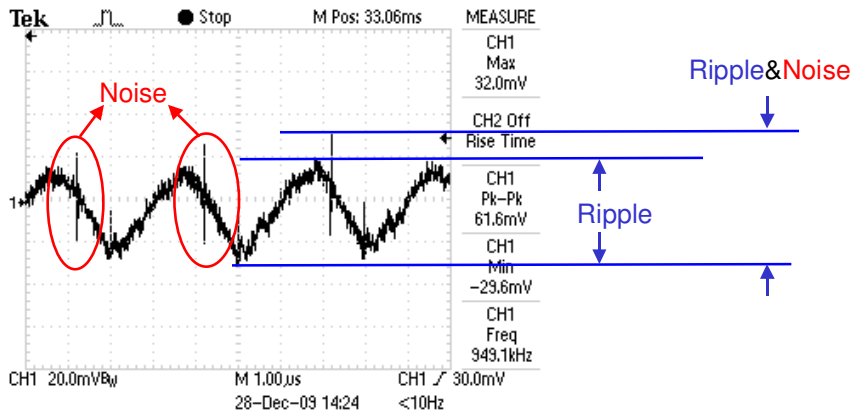
Vin(nominal)：Nominal Input voltage

7. Load regulation :

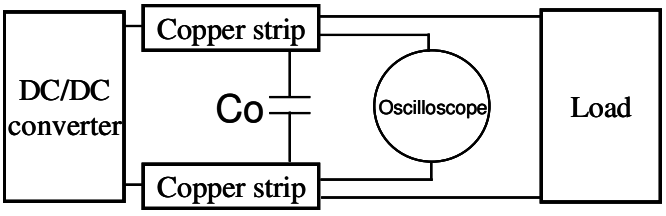
$$\frac{|\,Vout(FL)-Vout(NL)\,|}{Vout(FL)} \times 100\%$$

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.

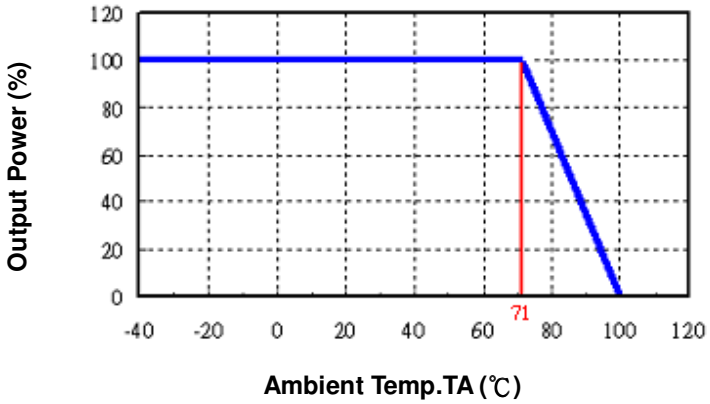


Output Ripple&Noise measurement test circuit: as shown below.



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.