

### Features

- Wide 4 : 1 Input Voltage Range(9~36V,18~75V)
- Remote On/Off
- 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
- Over Temperature Protection
- Shielded Metal Case with Insulated Baseplate
- Lead Free Design, RoHS Compliant
- Industry Standard Pinout
- Adjustable Output Voltage
- Customer Design Available
- Safety Standard / Approval : IEC / EN 60950-1



### Description

The BVA30W Series are isolated 30W DC/DC converters. Designed with highly efficiency, allow the operating temperature range of these units to be -40°C to +85°C in a 50.8×40.6×10.2mm shielded metal case. Further features include wide 4 : 1 input voltage range, remote on/off control, short-circuit protection, over voltage protection and over temperature 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. <sup>(2)</sup> (%)	Capacitive Load, max. <sup>(3)</sup> (uF)
			Min. Load <sup>(1)</sup>	Full. Load	No Load	Full Load		
BVA30-24S8W	9~36V Nominal:24V	1.8	0	8000	88	800	79	65800
BVA30-24S9W		2.5	0	8000	74	1029	84	56000
BVA30-24S0W		3.3	0	6000	96	1031	84	42000
BVA30-24S1W		5	0	6000	116	1506	87	30000
BVA30-24S2W		12	33	2500	51	1506	87	4700
BVA30-24S3W		15	28	2000	55	1506	87	2800
BVA30-24D2W		±12	0	±1250	72	1506	87	2000
BVA30-24D3W		±15	±12	±1000	61	1506	87	1600
BVA30-48S8W	18~75V Nominal:48V	1.8	0	8000	40	400	79	65800
BVA30-48S9W		2.5	0	8000	32	514	85	56000
BVA30-48S0W		3.3	0	6000	43	503	86	42000
BVA30-48S1W		5	0	6000	56	735	89	30000
BVA30-48S2W		12	10	2500	77	735	89	4700
BVA30-48S3W		15	6	2000	72	735	89	2800
BVA30-48D2W		±12	0	±1250	80	735	89	2000
BVA30-48D3W		±15	0	±1000	76	744	88	1600

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	250mAp-p typ.
Start up time	Nominal Vin and constant resistive load	78ms typ.
Remote ON/OFF	Converter: ON	Open or $3.5V < V_r < 12V$
	Converter: OFF	Short <sup>(4)</sup> or $0V < V_r < 0.7V$
Sourcing current of remote control pin	Nominal Vin	< 0.2 mA
Idle input current (at Remote OFF state)	Nominal Vin	< 15 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		95% RH max.
Temperature coefficient		±0.02% / °C max.
Output Specifications		
Output power		30 Watts max.
Voltage accuracy	Full load and nominal Vin	±1%
Minimum load		See table
Line regulation	LL to HL at full load	±0.5% (±1% for 1.8 / 2.5Vout)
	25% load to full load	Single ±1%
Load Regulation	Balanced load	Dual ±0.5%
	Unbalanced load 25% to 100% full load	±3%
Ripple and Noise	20MHz Bandwidth	85mVp-p max.
	1.8Vout Models	3.0V
	2.5Vout Models	3.6V
	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.
Thermal shutdown		115°C typ.
Short circuit protection		Hiccup, continuous(Auto Recovery)
Transient response settling time	50% load step change	300µs typ.

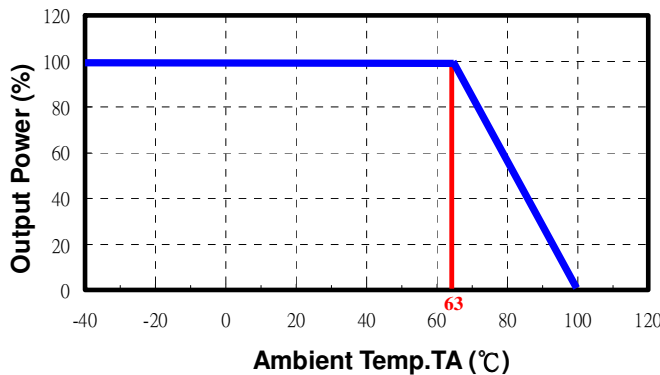
(2.4ms for 1.8 / 2.5 / 3.3Vout)

Transient response over shoot	$di/dt=0.8A/\mu s$	$\leq \pm 5\%$ of $V_o$ ( $\leq \pm 8\%$ for 1.8/2.5 Vout)
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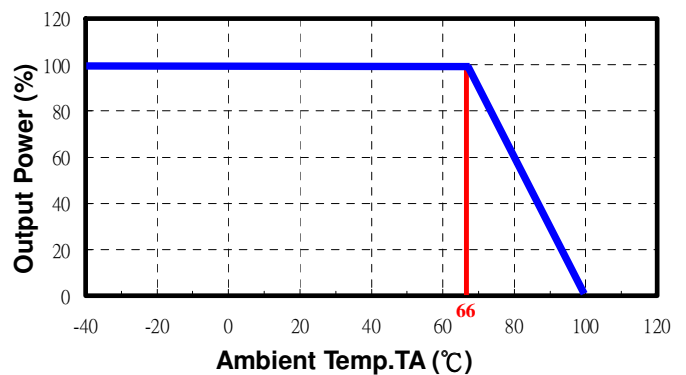
General Specifications		
Efficiency	Nominal input	See table
Isolation voltage	Input to output	1500VDC
Isolation resistance	500VDC	$10^9$ Ohms min.
Isolation capacitance		1200pF typ.
Switching frequency		300kHz typ.
Reliability, calculated MTBF		$1.19 \times 10^6$ Hrs
Physical Specifications		
Case material		Nickel-coated copper
Base material		Non-conductive black plastic
Potting material		Silicon rubber (UL94 V-0)
Dimensions		2.00 × 1.60 × 0.40 Inch (50.8 × 40.6 × 10.2 mm)
Weight		48g (1.69oz) typ.

### BVA30W Series

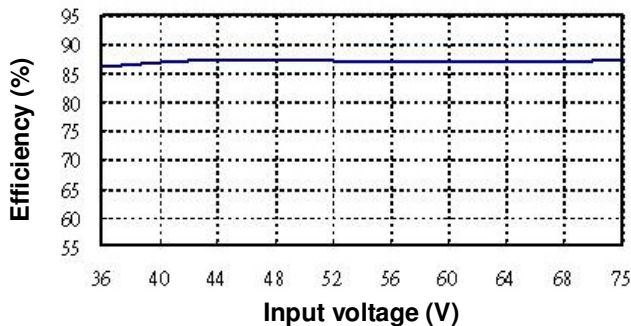
Power Derating Curve<sup>(5)</sup> (Without Heatsink)



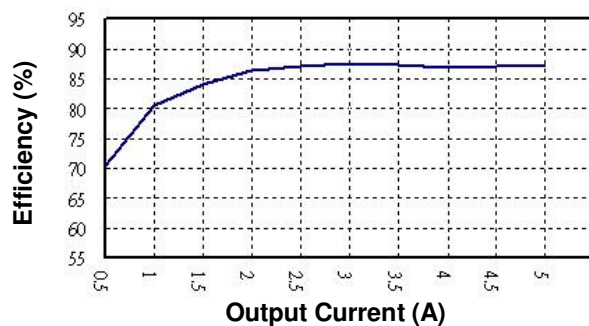
Power Derating Curve<sup>(5)</sup> (With Heatsink)



**BVA30-48S1W**  
Input voltage vs. Efficiency

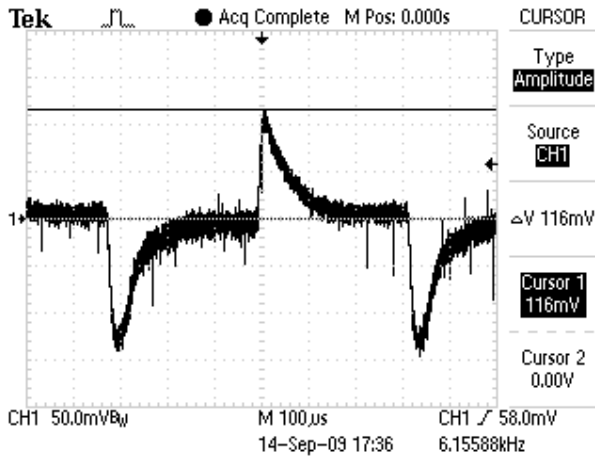


**BVA30-48S1W**  
Output Current vs. Efficiency



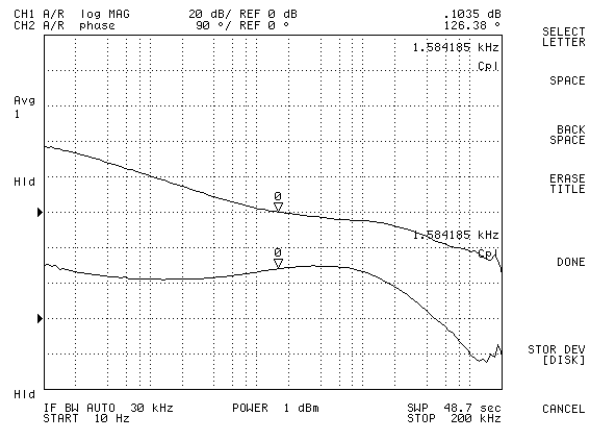
### BVA30-48S1W

#### Transient Response at 50%~100% Max Load



### BVA30-48S1W

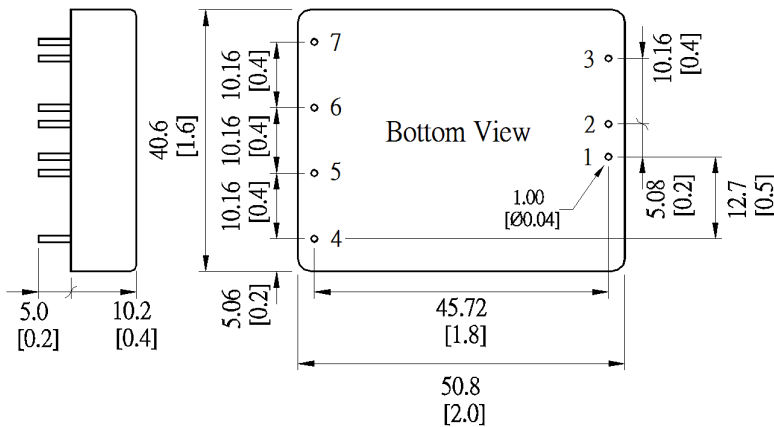
#### Loop Gain & Phase at Vi=48V, Full Load



#### 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).
5. Based on BVA30-48S1W.

#### Mechanical Dimensions



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

Pin Assignment		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	Remote On/Off	Remote On/Off
4	No pin	+Vout
5	+Vout	Common
6	-Vout	-Vout
7	Trim	Trim

### Heat-sink

Material: Aluminum

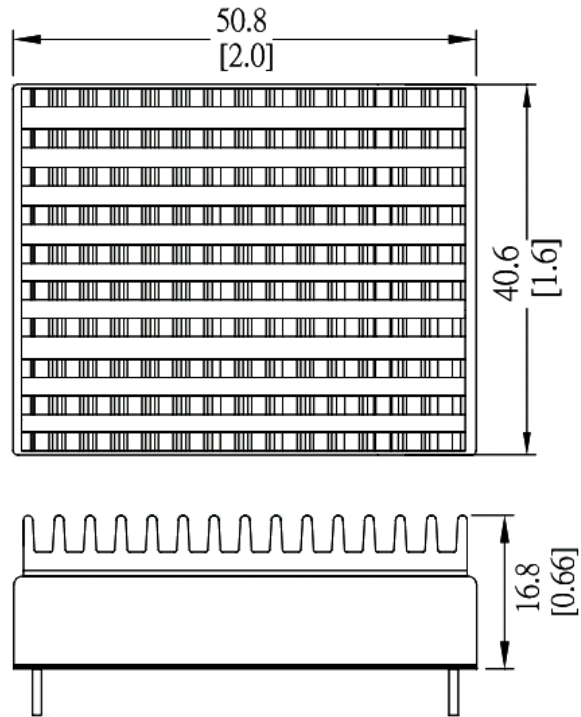
Weight: 16g (0.56oz) (without converter)

**Note:**

The product label on converter has to be removed before mounting the heat-sink.

For volume orders, converters will be supplied with heat-sink already mounted. Please contact factory for quotation.

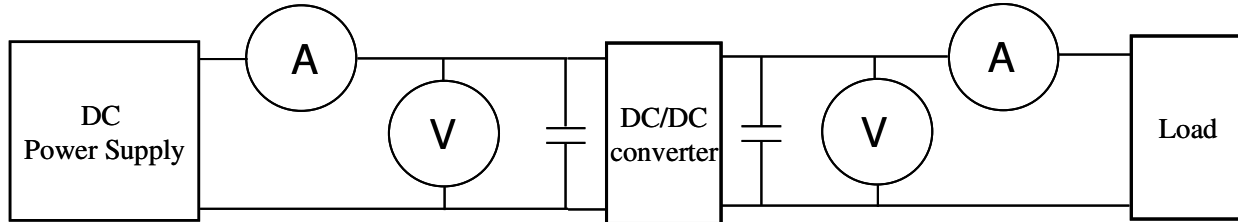
Separate heat-sinks are only available for prototypes and small quantity orders.



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  $\pm(0.2\% \text{ rdg} + 2 \text{ digits})$   
2000mA ~ 20A 2 ranges  $\pm(0.3\% \text{ rdg} + 2 \text{ digits})$ .
- ⊙Voltage meter (V): Accuracy →  $\pm(0.03\% \text{ rdg} + 4 \text{ digits})$ .
- ⊙Load: At full load.
- ⊙Wires: The resistance of the wires must be small.

#### 1. Input voltage range: Narrow input voltage range ( $\pm 10\%$ )、wide input voltage range (2:1 and 4:1)。

EX: Narrow input voltage range ( $\pm 10\%$ )

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:

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

$V_{out}$  : Output voltage  
 $V_{out(nominal)}$  : 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.

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

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

$V_{out(+10\%)}$  : Output voltage at  $V_{in} = 1.1 \times V_{in}(\text{nominal})$  & full load

$V_{out(-10\%)}$  : Output voltage at  $V_{in} = 0.9 \times V_{in}(\text{nominal})$  & full load

$V_{out}$  : Output voltage at  $V_{in} = V_{in}(\text{nominal})$  & full load

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

$V_{in(+10\%)}$  : Input voltage =  $1.1 \times V_{in}(\text{nominal})$

$V_{in(-10\%)}$  : Input voltage =  $0.9 \times V_{in}(\text{nominal})$

$V_{in}(\text{nominal})$  : Nominal Input voltage

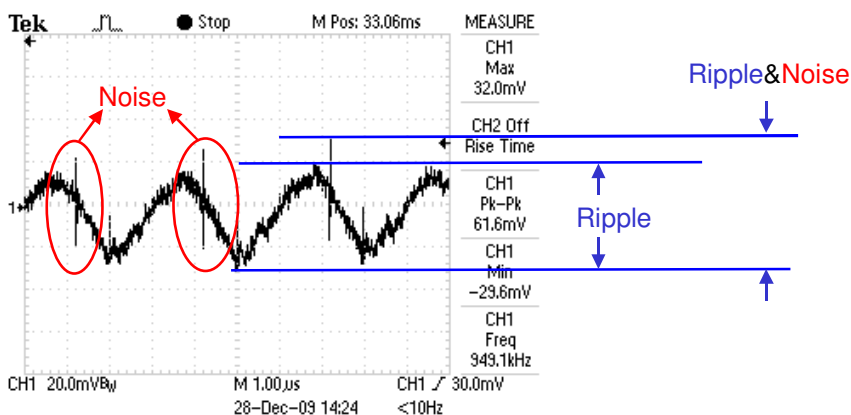
7. **Load regulation :**

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

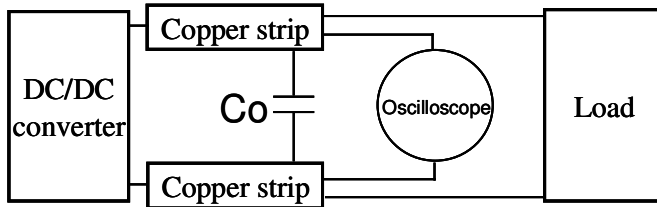
$V_{out(FL)}$ : Output voltage at full load

$V_{out(NL)}$ : Output voltage at 25% full load or 10% full load

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

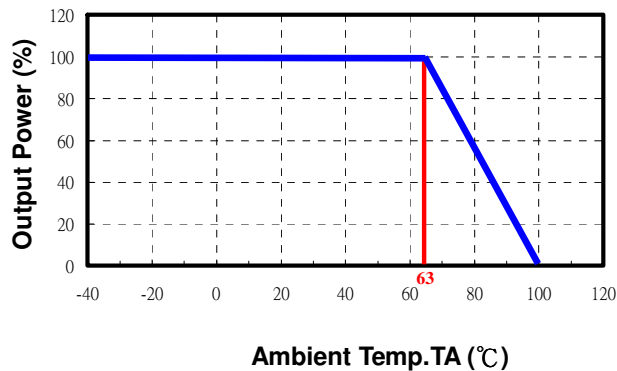


Output Ripple&Noise measurement test circuit: as shown below.



$C_o$ : usually 0.47 $\mu$ 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.