

Features

- Wide 2 : 1 Input Voltage Range(9~18V,18~36V,36~75V)
- Output Current up to 4A
- Fixed Switching Frequency
- Input / Output Isolation Voltage: 1.5K VDC
- Extended Operating Temperature Range: -40°C to +71°C
- Output Short Circuit Protection:
Continuous & Auto Recovery
- Over Voltage Protection: Clamp Mode
- Shielded Metal Case with Insulated Baseplate
- Lead Free Design, RoHS Compliant
- Industry Standard Pinout
- Customer Design Available
- Safety Standard / Approval : IEC / EN 60950-1



Description

The BUA15L Series are isolated 15W DC/DC converters. Designed with highly efficiency, allow the operating temperature range of these units to be -40°C to +71°C in a 50.8x25.4x10.2mm package with industry-standard pinout. Further features include wide 2 : 1 input voltage range, output 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		
BUA15-12S0L	9~18V Nominal:12V	3.3	200	4000	7	1467	79	10000
BUA15-12S1L		5.1	120	3000	7	1623	81	600
BUA15-12S2L		12	0	1250	18	1543	85	1800
BUA15-12S3L		15	0	1000	21	1524	86	990
BUA15-12D2L		±12	0	±625	28	1543	85	470
BUA15-12D3L		±15	0	±500	29	1524	86	100
BUA15-24S0L	18~36V Nominal:24V	3.3	200	4000	5	724	80	10000
BUA15-24S1L		5.1	95	3000	6	791	83	10000
BUA15-24S2L		12	0	1250	10	762	86	1700
BUA15-24S3L		15	0	1000	11	753	87	660
BUA15-24D2L		±12	0	±625	14	762	86	430
BUA15-24D3L		±15	0	±500	36	762	86	220
BUA15-48S0L	36~75V Nominal:48V	3.3	200	4000	2	362	80	10000
BUA15-48S1L		5.1	120	3000	3	401	82	8440
BUA15-48S2L		12	0	1250	6.5	377	87	1000
BUA15-48S3L		15	0	1000	8	372	88	470
BUA15-48D2L		±12	0	±625	8	377	87	330
BUA15-48D3L		±15	0	±500	8	377	87	160

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		80mA _{p-p} typ.
Start up time	Nominal Vin and constant resistive load		680ms typ.
Environmental Specifications			
Operating ambient temperature			-40°C to +71°C (without 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			15 Watts max.
Voltage accuracy	Full load and nominal Vin		±1%
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	±0.5%
	Unbalanced load 25% to 100% full load		±3%
Ripple and Noise	20MHz Bandwidth		75mV _{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			Continuous, automatic recovery
Transient response settling time	50% load step change		2200μs typ.
Transient response over shoot	di/dt=0.8A/μs		≤ ±5% of V _o

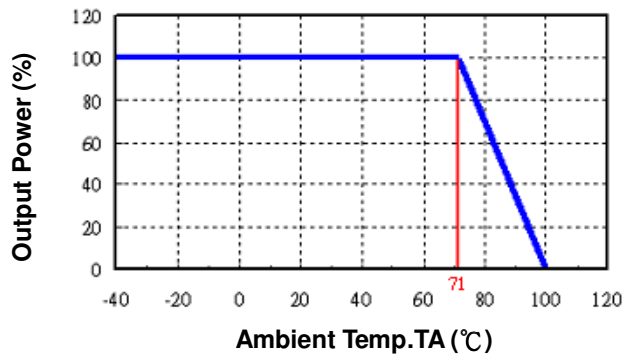
General Specifications

Efficiency	Nominal input	See table
Isolation voltage	Input to output	1500VDC
Isolation resistance		10^9 Ohms min.
Isolation capacitance		580pF typ.
Switching frequency		300kHz typ.
Reliability, calculated MTBF		2.24×10^6 Hrs

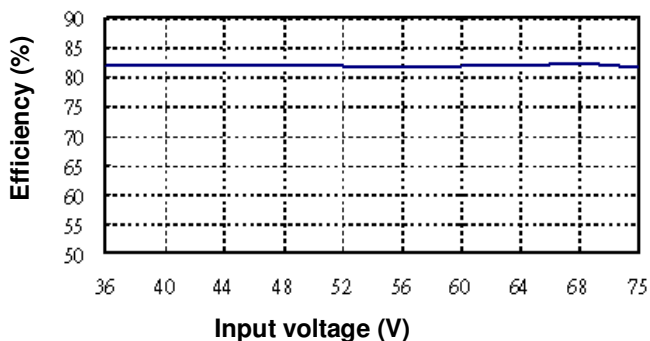
Physical Specifications

Case material	Nickel-coated copper
Base material	Non-conductive black plastic
Potting material	Silicon rubber (UL94V-0)
Dimensions	2.0 × 1.0 × 0.4 Inch (50.8 × 25.4 × 10.2 mm)
Weight	32.0g (1.13oz) typ.

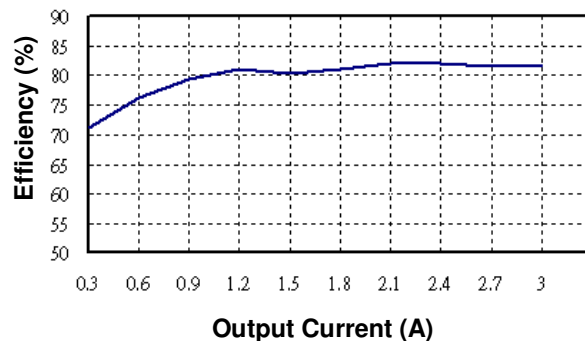
BUA15L Series
Power Derating Curve⁽⁴⁾



BUA15-48S1 L
Input voltage vs. Efficiency

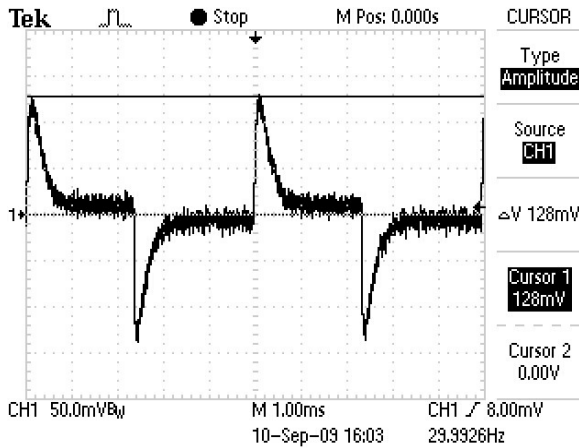


BUA15-48S1L
Output Current vs. Efficiency



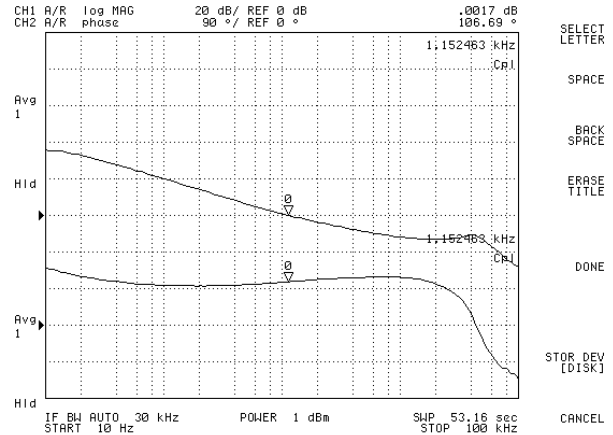
BUA15-48S1L

Transient Response at 50%~100% Max Load



BUA15-48S1L

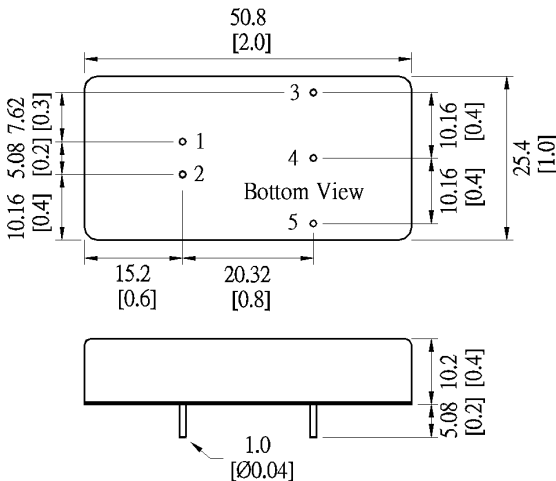
Loop Gain & Phase at Vi=48V, Full Load



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. Based on BUA15-48S1L.

Mechanical Dimensions



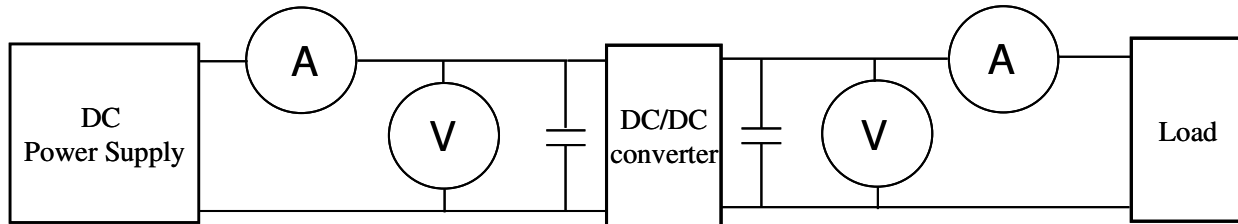
Unit: mm [inch]
Tolerance: ±0.5 [0.02]

Pin Assignment		
Pin	Single	Dual
1	+Vin	+Vin
2	-Vin	-Vin
3	+Vout	+Vout
4	No pin	Common
5	-Vout	-Vout

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:

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

V_{out} : Output voltage

$V_{out}(\text{nominal})$: 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

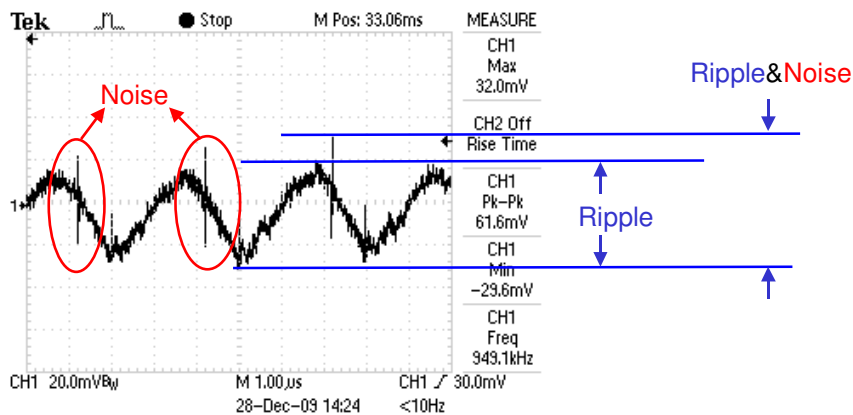
7. **Load regulation :**

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

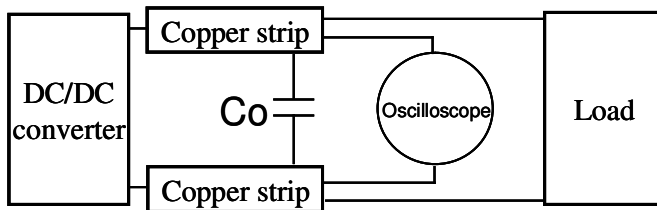
$V_{out(FL)}$: Output voltage at full load

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

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

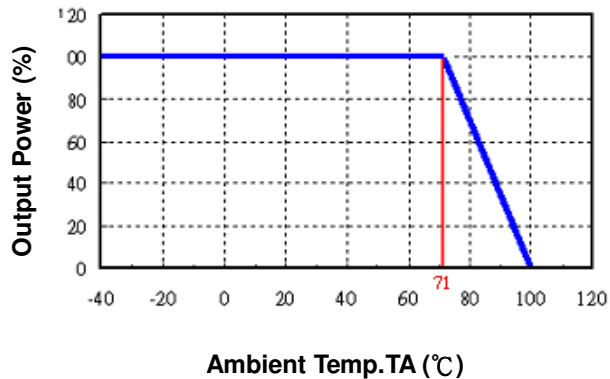


Output Ripple&Noise measurement test circuit: as shown below.



C_o : usually 0.47 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.