



100HBAW4_1.5R series

100W - Single Output DC-DC Converter - Wide Input - Isolated & Regulated

DC-DC Converter 100 Watt

- ⊕ 4:1 wide input voltage range
- ⊕ Up to 86% efficiency
- ⊕ Low no-load power consumption
- ⊕ 1500VDC isolation voltage
- ⊕ Standard 1/2 brick size
- ⊕ Operating temperature: -40°C to +105°C
- ⊕ Protection: Input under voltage, output over voltage, short circuit, over current, over temperature

Introducing our robust and efficient 100HBAW4_1.5R series. With a 4:1 wide input voltage range and efficiency reaching up to 86%, this converter is engineered to deliver reliable power in a range of demanding applications. Designed for low no-load power consumption, it's optimized for efficiency without compromising on performance. Featuring a strong isolation voltage of 1500VDC and housed in a standard 1/2 brick size, it seamlessly integrates into various setups. Operating flawlessly from -40°C to +105°C, it's equipped with comprehensive protections: input under-voltage, output over-voltage, short circuit, over-current, and over-temperature. This converter is built to ensure stability, safety, and longevity in diverse environments. Empower your systems with a power solution that's as efficient as it is resilient!



Common specifications	
Short circuit protection	Hiccup, continuous, self-recovery
Switching frequency	250 kHz (typ.)
Operation temperature	-40°C ~+105°C (with derating)
Storage temperature	-50°C ~+125°C
Pin Soldering Temperature	+350°C (1.5mm from the case, time< 1.5S)
Humidity	5~95% RH (no condensing)
MTBF: (MIL-HDBK-217F@25°C)	150,000 hours
Cooling requirements	EN60068-2-1
Dry heat requirement	EN60068-2-2
Damp heat requirement	EN60068-2-30
Shock and vibration	IEC/EN 61373 C1/body mounted class B
Case Materials	Metal bottom shell + plastic case in black with flame class UL94 V-0
Heat sink	Dimension 61.0 x 57.9 x 15.0 mm, weight 65g, aluminum alloy, anodized black
Cooling method H	Conduction cooling or forced air cooling
Product Weight	Standard: 120g, with heatsink: 188g

Input specifications					
Item	Test condition	Min	Typ	Max	Units
Max input current	Input voltage 9V, full load			16	A
No load input current	Rated input voltage			15	mA
Input inrush voltage (1sec. max.)	A permanent damage risk when input over this range	-0.7		50	VDC
Start-up voltage				9	VDC
Input under voltage protection	No-load test, over current protection may start in advance at full load			8.5	VDC
Control (CNT)	<ul style="list-style-type: none"> • Positive logic: CNT is no connection or connected to 3.5-15V to turn on, connected to 0-1.2V to shut off • Negative logic: CNT is no connection or connected to 3.5-15V to shut off, connected to 0-1.2V to turn on 				Ref voltage -Vin

Example:
100HBAW4_2405S1.5R
 100 = 100 Watt; HB = Half-Brick; A = Pinning; W4 = Wide input (4:1);
 24 = 24Vin; 05 = 05Vout; S = Single Output; 1.5 = 1.5kVDC isolation

Output specifications						
Item	Test condition	Min	Typ	Max	Units	
Output voltage accuracy	Rated input voltage, 0%-100% load		±0.2	±1.0	%	
Line regulation	Full load, input voltage from low to high		±0.1	±0.2	%	
Load regulation	Rated input voltage, 10%-100% load		±0.1	±0.2	%	
Transient recovery time	25% load step change (step rate 1A/50uS)		200	250	uS	
Transient response deviation	25% load step change (step rate 1A/50uS)	-5		5	%	
Temperature drift coefficient	Full load	-0.02		+0.02	%/°C	
Ripple & noise	20MHz bandwidth, external capacitor above 220uF		80	100	mVp-p	
Output voltage adjustment (trim)		-10		+10	%	
Output voltage distal end compensation (sense)				5	%	
Over temperature protection	Maximum temperature of metal case surface	105	115	125	°C	
Output over voltage protection				125	140	%
Output over current protection				22	28	A

Isolation specifications					
Item	Test condition	Min	Typ	Max	Units
Isolation voltage	• I/P-O/P Test 1min, leakage current < 3mA			1500	VDC
	• I/P-Case Test 1min, leakage current < 3mA			1500	
	• O/P-Case Test 1min, leakage current < 3mA			500	
Isolation resistance	I/P-O/P @ 500VDC	100			MΩ

- The failed product can be repaired/replaced free of charge if it operates at normal condition. A paid service shall be also provided if the product failed after operating under wrong or unreasonable conditions.
- GAPTEC can provide customization design and filter modules for matching, please contact our technician for details.

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EMC specifications							
EMI	CE	EN50121-3-2 EN55016-2-1	150kHz-500kHz 79dBuV 500kHz-30MHz 73dBuV				
EMI	RE	EN50121-3-2 EN55016-2-1	30MHz-230MHz 40dBuV/m at 10m 230MHz-1GHz 47dBuV/m at 10m				
EMS	ESD	EN50121-3-2	Contact ±6kV / Air ±8kV				perf. Criteria A
EMS	RS	EN50121-3-2	10V/m				perf. Criteria A
EMS	EFT	EN50121-3-2	±2kV 5/50ns 5kHz				perf. Criteria A
EMS	Surge	EN50121-3-2	Line to line ± 1KV (42Ω, 0.5μF)				perf. Criteria A
EMS	CE	EN50121-3-2	0.15MHz-80MHz 10 Vr.m.s				perf. Criteria A

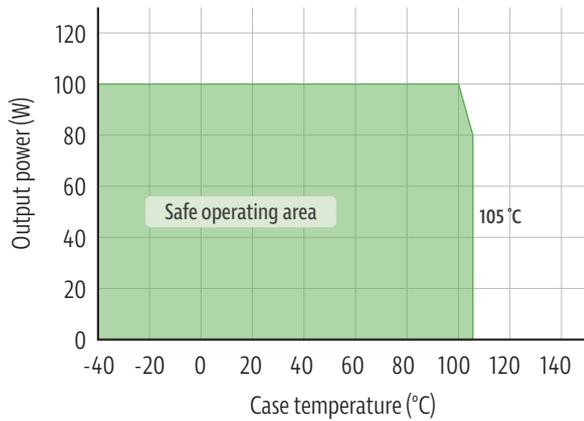
Product Selection Guide

Approval	Part number	Input Voltage Range (VDC)	Output power (W)	Output Voltage (VDC)	Output Current (A)	Ripple & Noise (mVp-p)	Efficiency (%) full load, (Min./Typ.)
	100HBAW4_2405S1.5R	9-36	100	5	20	100	85/86

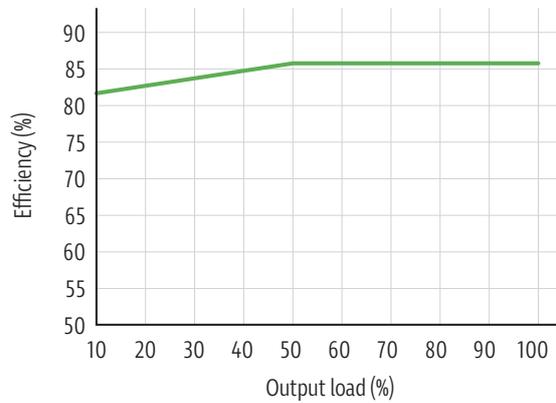
- Please note: please use suffix „P“ for positive logic and suffix „N“ for negative logic (i.e. 100HBAW4_2405S1.5R/P).
- Please add suffix „H“ for the heatsink option (i.e. 100HBAW4_2405SH1.5R).

Typical characteristics

Temperature derating graph



Efficiency vs output load



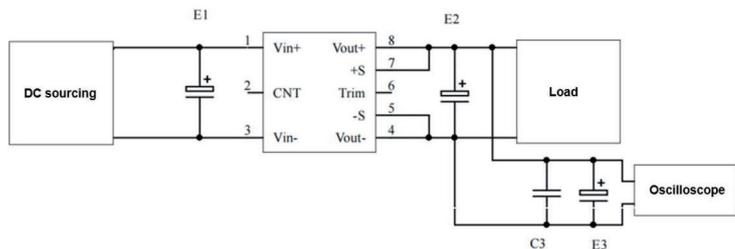
- Note:
- Both the temperature derating curve and the efficiency curve are made by the tested typical values.
 - The temperature derating is tested at Aipu laboratory test conditions. It is recommended to keep the temperature of the aluminum case not more than 100 °C while the converter operating at the rated load range for customer application.

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Ripple & noise test

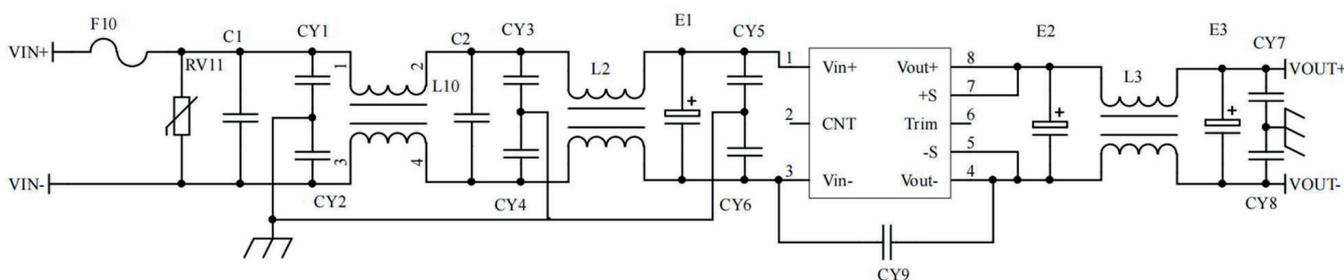
All this series converters will be tested according to this circuit recommended below before shipping.



Output voltage	Capacitor Value			
	E1 (μF)	E2 (μF)	C1 (μF)	E3 (μF)
3.3VDC	100	1000	1	10
5VDC	100	680	1	10
12VDC	100	220	1	10
48VDC	100	220	1	10
110VDC	68	68	1	10

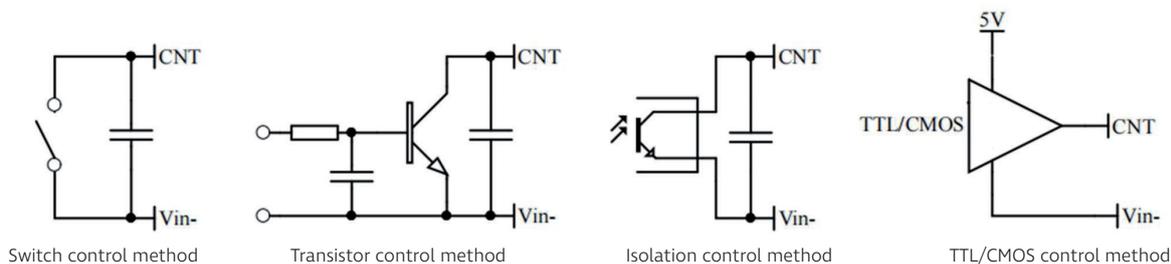
Recommended EMC circuit

If this circuit recommended is not adopted, please connect an electrolytic capacitor $\geq 220 \mu\text{F}$ in parallel at the input to suppress the possible surge voltage at the input.

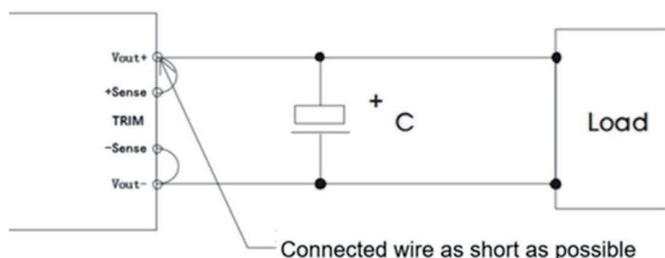


F1	T25A/250VAC fuse
RV1	14D 63V Varistor
C1, C2	105/63V Polyester Film Capacitor
CY1, CY2, CY3, CY4, CY5, CY6	102/250VAC, Y2 capacitor
CY7, CY8	103/2kV Ceramic Capacitor
CY9	471/250VAC, Y2 capacitor
E1	220μF/63V Electrolytic Capacitor
E2, E3	470μF/50V Electrolytic Capacitor
L1, L2	> 3mH, the temperature rise less than 25°K@16A
L3	> 100uH, the temperature rise less than 25°K@20A

Recommended application for remote control terminal (CNT)



With NO distal end compensation



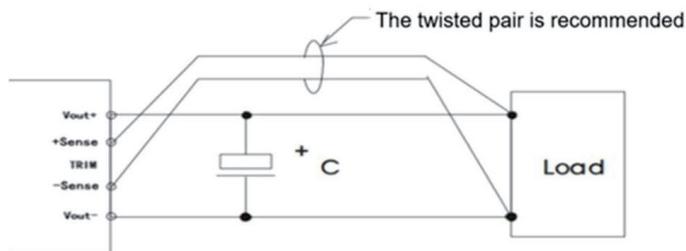
Notes:

1. Vout+ & Sense+, Vout- & Sense- should be shorted when distal end compensation is not needed
2. The lead wire between Vout+ and Sense+, Vout- and Sense- should be as short as possible, and close to the pins, or else the output may be unstable.

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With distal end compensation



Notes:

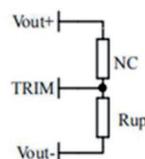
1. The output voltage may be unstable if the compensation cables are too long.
2. Twisted pair or shielded cables are recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line voltage drop <math><0.3V</math>. The target is to keep output voltage within the specified range.
4. The leads wire resistance may create the output voltage oscillation or larger ripples. Please verify it before to use.

TRIM and calculation of TRIM resistance

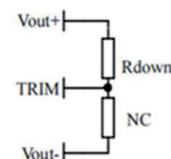
The calculation of ΔU and R_{up} & R_{down} :

$$R_{up} = 25 / \Delta U - 5.1 \text{ (K}\Omega\text{)}$$

$$R_{down} = 10 * (5 - 2.5 \cdot \Delta U) / \Delta U - 5.1 \text{ (K}\Omega\text{)}$$



Voltage-up: Add R_{up} between Trim and Vout-

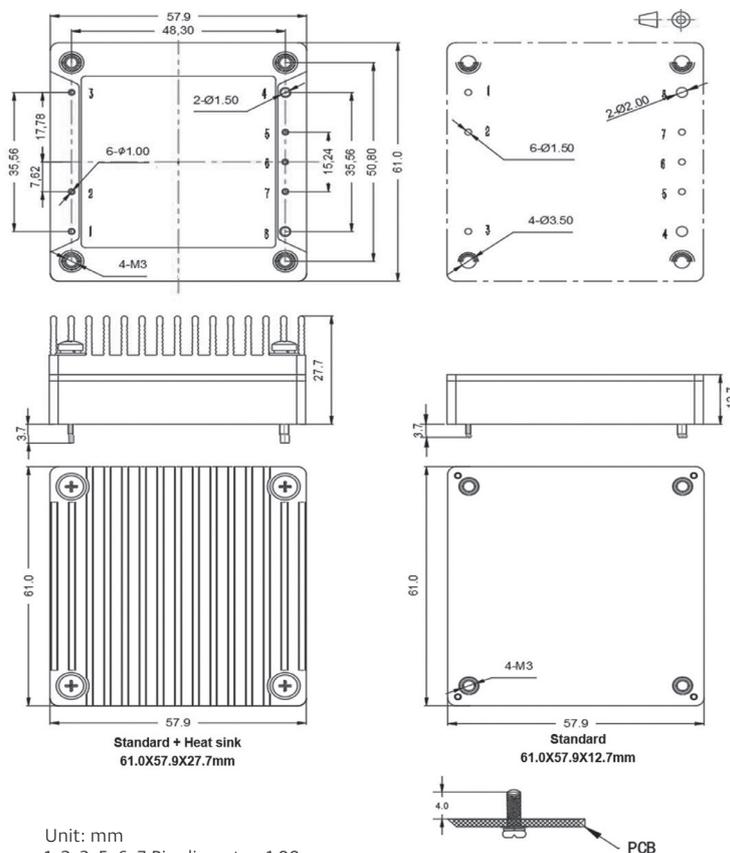


Voltage-down: Add R_{down} between Trim and Vout+

Note:

This product is not available for connection in parallel to increase the output power. Please contact GAPTEC support for this kind of requirement.

Mechanical dimensions



Unit: mm
 1, 2, 3, 5, 6, 7 Pin diameter: 1.00
 4, 8 Pin diameter: 1.50
 Tolerance: X.X ± 0.50 mm, X.XX ± 0.10 mm
 Screwing torque: 0.4 N.m Max