150QBW4_1.5 series

150W - Single Output DC-DC Converter - Wide Input - Isolated & Regulated

DC-DC Converter 150 Watt

- 4:1 input voltage range
- Up to 90% efficiency
- Low no-load power consumption
- High isolation voltage, input-output 1500VDC, input-case 1500VDC
- Operating temperature: -40°C to +105°C
- Protection: Input under voltage, output over voltage, short circuit, over current, over temperature
- Standard 1/4 brick size

Introducing our new high-efficiency 150QBW4_1.5 series in a compact 1/4 brick size. Engineered with a versatile 4:1 input voltage range and efficiency of up to 90%, this converter delivers exceptional performance while minimizing energy waste. Designed for demanding applications, it boasts a low no-load power consumption and high isolation voltage - 1500VDC for both input-output and input-case - ensuring robust safety and reliability. With an operating temperature range from -40°C to +105°C, it's built to withstand extreme environments. The converter is equipped with comprehensive protections, including input under-voltage, output overvoltage, short circuit, overcurrent, and overtemperature safe-guards. Experience a power solution that combines efficiency, resilience, and compact design - perfect for your critical applications!

Common specifications

Short circuit protection	Hiccup, continuous, self-recovery
Switching frequency	300 kHz (typ.)
Operation temperature	-40°C ~+105°C (with derating)
Storage temperature	-40°C ~+125°C
Soldering resistance of pins	+350°C (1.5mm distance from the shell, soldering time< 1.5S)
Humidity	5~95% RH (no condensing)
MTBF: (MIL-HDBK-217F@25°C)	15,000 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 60.4 x 39.0 x 15mm, weight 52g, aluminum alloy, anodized black
Cooling method	Conduction cooling or forced air cooling
Product weight	Standard 70g, with heatsink 125g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Max input current	18V input voltage, full load output			10	A
No load input current	Rated input voltage			30	mA
Input surge voltage (1sec. max.)	Inputs above this range may cause permanent damage	-0.7		100	VDC
Start-up voltage				18	VDC
Input under voltage protection	No-load (overcurrent protected in advance at full load)			17	VDC
Control (CNT)	• Positive logic: No connection or connected to 3.5-15V to turn on, connected to 0-1.2V to turn off • Negative logic: No connection or connected to 3.5-15V to turn off, connected to 0-1.2V to turn on				Refe-rence voltage-VIN

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	Rated input voltage, 0%-100% load		±0.5	±1	%
Line regulation	Full load, input voltage from low to high		±0.2	±0.5	%
Load regulation	Rated input voltage, 10%-100% load		±0.2	±0.5	%
Output voltage setting accuracy	Full input voltage range, 0%-100% load		±1.0	±2.0	%
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, exter-nal capacitor above 220uF		100	120	mVp-p
Output voltage adjustment (TRIM)		-20		+10	%
Output voltage distal end compen-sation (Sense)				105	%
Over temp protection	Maximum temperature of product metal case surface	105	115	125	°C
Output overvol-tage protection		125	--	150	%
Output overcurrent protection		13	--	18	A

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	• I/P-O/P test 1min, leakage current < 3mA • I/P-case test 1min, leakage current < 3mA • O/P-case test 1min, leakage current < 3mA			1500 1500 500	VDC
Insulation resistance	I/P-O/P @ 500VDC	10			MΩ

Example:
150QBW4_4812S1.5
150 = 150 Watt; QB = Quarter-Brick; W4 = Wide input (4:1); 48 = 48Vin; 12 = 12Vout; S = Single Output; 1.5 = 1.5kVDC isolation

1. The warranty period of this product is two years. 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 at wrong or unreasonable conditions.
2. GAPTEC can provide customization design and filter modules for matching, please contact us 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

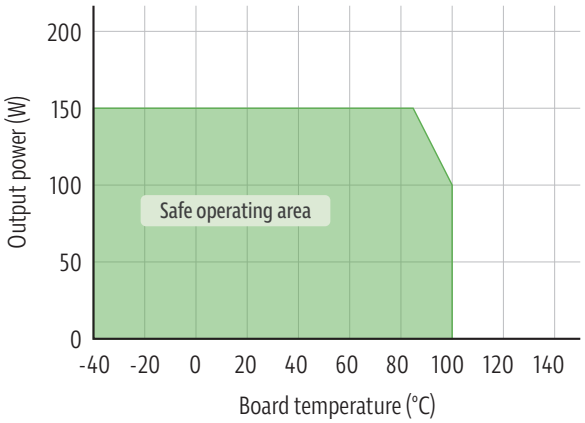
Product Selection Guide

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.)
	150QBW4_4812S1.5	18-75	150	12	12.5	120	88/90

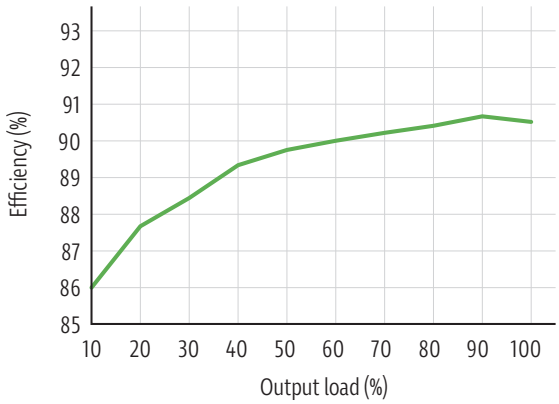
1. Please note: please use suffix „/P“ for positive logic and suffix „/N“ for negative logic (i.e. 150HBAW4_4812S1.5**/P**).
2. Please add suffix „H“ for the heatsink option (i.e. 150HBAW4_4812S**H**1.5).

Typical characteristics

Temperature derating graph



Efficiency vs output load

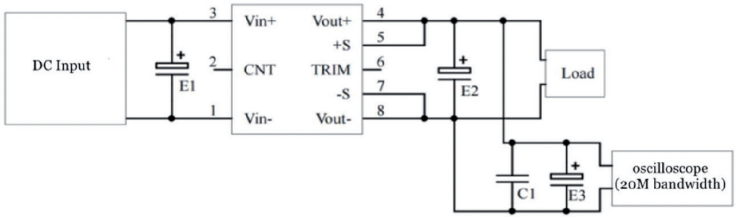


Note:

1. Both the temperature derating curve and the efficiency curve are tested with typical values.
2. The temperature derating curve is tested at laboratory test conditions. The product can be used at rated load with the condition the aluminum case temperature lower than 105 °C.

Ripple & noise test

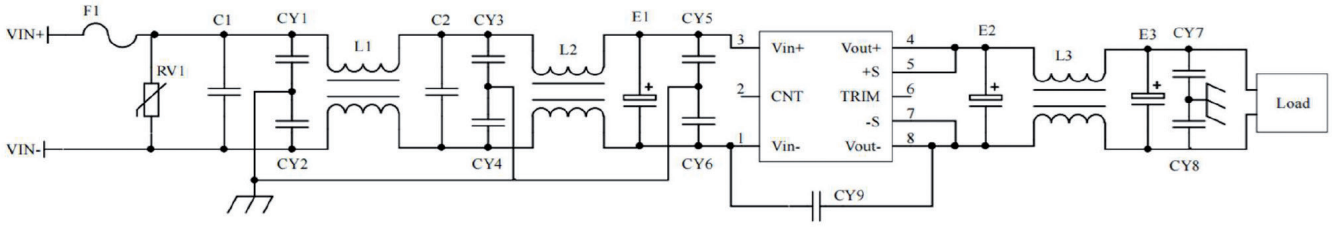
All DC-DC converters of this series are tested according to the test circuit recommended below before shipping.



	Capacitor Value			
Output voltage	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

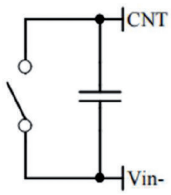
Recommended EMC circuit

If this circuit recommended is not adopted, please connect an electrolytic capacitor of at least 100 µF in parallel at the input to suppress the possible surge voltage at the input.

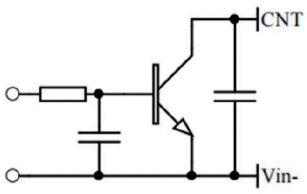


F1	T10A/250VAC fusing
RV1	14D 82V Varistor
C1,C2	105/250V Polyester Film Capacitor
CY1, CY2, CY3, CY4, CY5, CY6	472/250VAC safety Y2 capacitor
CY7, CY8	103/2KV Ceramic Capacitor
CY9	471/250VAC safety Y1 capacitor
E1	100µF/100V Electrolytic Capacitor
E2, E3	220µf/25V Electrolytic Capacitor
L1, L2	≥10mH, temperature rise less than 25°K@10A
L3	≥1mH, temperature rise less than 25°K@13A

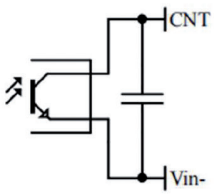
Remote control (CNT) application



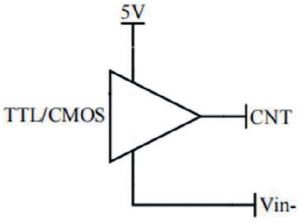
Switch control method



Transistor control method

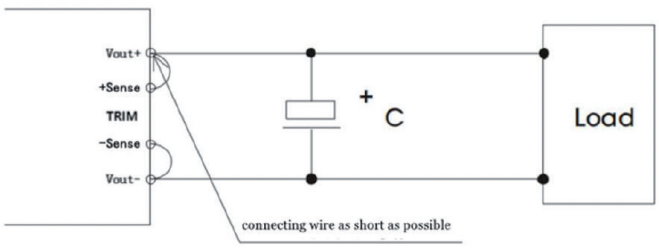


Isolation control method



TTL/CMOS control method

With NO distal end compensation



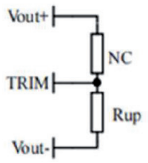
Notes:
1. Vout+ & Sense+, Vout- & Sense- should be shorted when distal compensation is not needed
2. The lead wire between Vout+ and Sense+, Vout- and Sense- should be as short as possible, and close to the pins, or else the output may be unstable.

TRIM and calculation of TRIM resistance

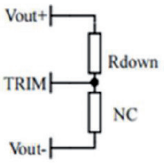
The calculation of ΔU and Rup & Rdown:

Rup=25/ΔU-5.1 (KΩ)

Rdown=10*(12-2.5-ΔU)/ΔU -5.1 (KΩ)



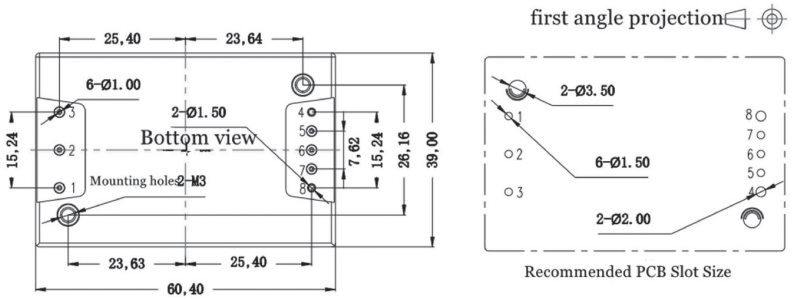
Voltage-up: Add Rup between Trim and Vout-

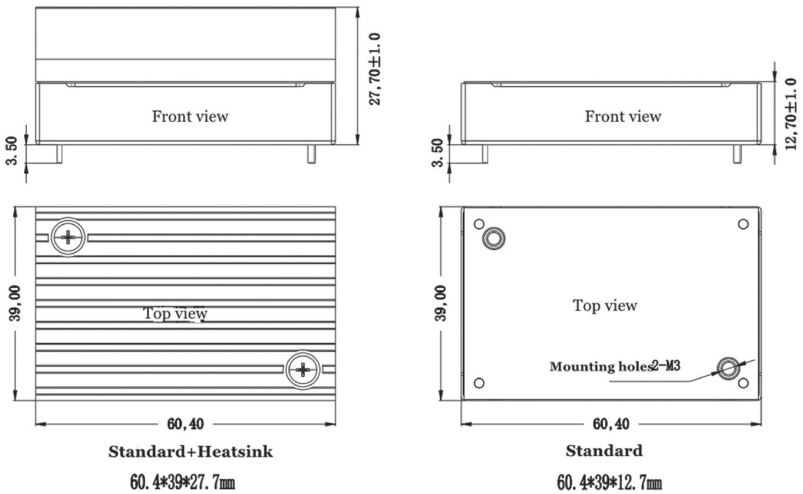


Voltage-down: Add Rdown between Trim and Vout+

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

Mechanical dimensions





Note:
Unit:mm
Pin 1, 2, 3, 5, 6, 7 dia: 1.00
Pin 4,8 dia: 1.50
General tolerance: +0.10
Mounting hole tightening torque: Mar 0.4N*m