150HBRW4_3R series

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



24Vout Version

DC-DC Converter 150 Watt

- 4:1 input voltage range
- 91% efficiency
- Low standby power consumption
- Operating temperature from -40°C to +105°C
- Standard 1/2 brick size
- 3000VDC isolation voltage
- Input under voltage protection
- Output over current protection
- Over voltage protection
- Short circuit protection (SCP)

Introducing our new 150HBRW4_11024S3R series, a high-performance isolated DC-DC converter in standard 1/2 brick size, designed for demanding industrial and power-critical applications. Featuring a 4:1 input voltage range, 3000VDC isolation, and efficiency of up to 91%, the series supports reliable and flexible system integration. With low standby power consumption and an extended operating temperature range from –40°C to +105°C, the 150HBRW4_11024S3 series is well suited for robust, energy-efficient designs. Integrated protection features including input undervoltage protection, output overcurrent protection, overvoltage protection, and short circuit protection (SCP) ensure safe and dependable operation under challenging conditions.

Common specifications

Short circuit protection	Hiccup, continuous, self-recovery
Switching frequency	400 kHz (typ.)
Operation temperature	-40°C ~+105°C (with derating)
Storage temperature	-40°C ~+125°C
Pin Soldering Temperature	+350°C (1.5 mm from the case, soldering time <1.5S)
Humidity	5~95% RH (no condensing)
MTBF: (MIL-HDBK-217F@25°C)	150,000 hours
Cooling requirement	EN60068-2-1
Dry and heat requirements	EN60068-2-2
Moisture and heat requirements	EN60068-2-30
Shock and vibration	IEC/EN 61373 C1 / body mounted class B
Case materials	Metal base + plastic case in black with flame class UL94-V0
Cooling method	Conduction cooling or forced air cooling with fan
Weight	118g

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current Max	Input 43VDC, full load			5	A
No-load current	Rated input voltage			20	mA
Input inrush voltage (1 sec. max.)	The unit could be permanently broken over this voltage	-0.7		185	VDC
Start-up voltage				43	VDC
Under voltage protection	With no load (the over current protection could work in advance at full load)			42	VDC
ON/OFF control (CNT)	• Positive logic: CNT no connection or connected to 3.5-15V to turn ON, connected to 0-1.2V to turn OFF the converter. • Negative logic: CNT no connection or connected to 3.5-15V to turn OFF, connected to 0-1.2V voltage to turn ON the converter.				Reference voltage -Vin

Example:
150HBRW4_11024S3R
150 = 150 Watt; HB = Half-Brick; R = Pinning; W4 = Wide input;
110 = 110Vin; 24 = 24Vout; S = Single Output; 3 = 3kVDC Isolation;
R = Revised version

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	Nominal input voltage, 0% - 100% load		±0.5	±1.0	%
Line regulation	Full load, input voltage from low to high		±0.1	±0.2	%
Load regulation	Nominal input voltage, 10% - 100% load		±0.2	±0.5	%
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	20M bandwidth, with external capacitor ≥220uF		150	240	mVp-p
Output voltage adjustment (TRIM)		-20		+10	%
Distal end compensation (sense)				+5	%
Over temperature protection		105	115	125	°C
Over voltage protection		125		140	%
Over current protection		6.8		10	A

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	• I/P-O/P test 1min, leakage current <3mA	3000			VDC
	• I/P-case test 1min, leakage current <3mA	2100			
	• O/P-case test 1min, leakage current <3mA	1000			
Isolation resistance	I/P-O/P @ 500VDC	100			MΩ

1. The product warranty period 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 fails after operating under wrong or unreasonable conditions.
2. For specific needs, please contact our technical team for directly.

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Specifications subject to change without notice.

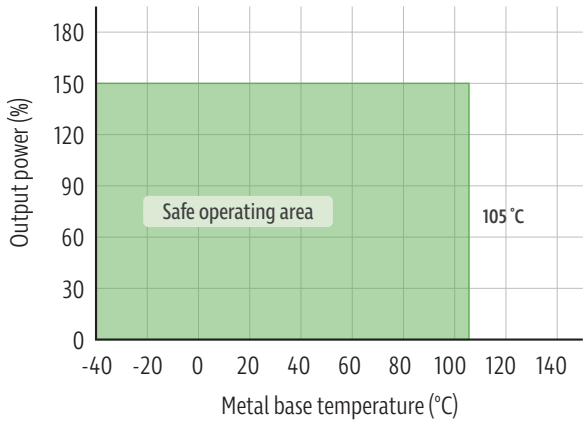
EMC specifications				
EMI	CE	EN50121-3-2 EN55016-2-1	150kHz-500kHz (79dBuV) 500kHz-30MHz (73dBuV)	
EMI	RE	EN50121-3-2 EN55016-2-1	30MHz-230MHz 40dBuV/m at 10m 230MHz-1GHz 47dBuV/m at 10m	
EMS	ESD	IEC/EN61000-4-2/GB/T 17626.2-2006	Contact ±6kV/Air ±8kV	perf. criteria A
EMS	RS	IEC/EN61000-4-3/GB/T 17626.3-2006	10V/m	perf. criteria A
EMS	EFT	IEC/EN61000-4-4/GB/T 17626.4-2008	±2kV 5/50ns 5kHz	perf. criteria A
EMS	Surge	IEC/EN61000-4-5/GB/T 17626.5-2008	Line to line ± 1kV (42Ω, 0.5μF)	perf. criteria A
EMS	CS	IEC/EN61000-4-6/GB/T 17626.6-2008	0.15MHz - 80MHz 10 Vr.m.s	perf. criteria A

Product Selection Guide

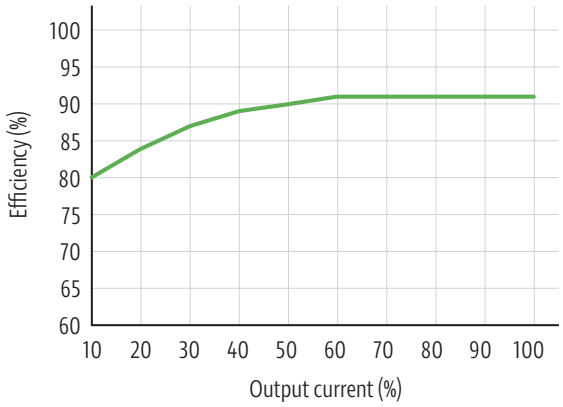
Approval	Part number	Input Voltage Range (VDC)	Output power (W)	Output Voltage (VDC)	Output Current (A)	Ripple & Noise (mVp-p)	Efficiency (%) full load, (typ.)
	150HBRW4_11024S3R	43-160	150	24	6.25	240	91

Typical characteristics

Temperature derating graph



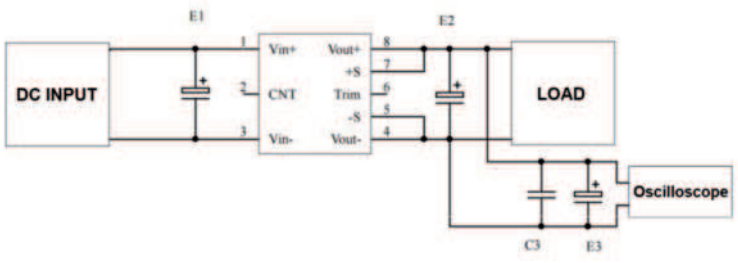
Efficiency vs output load



Note:
1. Both the output power and efficiency in the graphs have been tested with typical values.
2. The data in the temperature derating graph have been tested at Gaptec test conditions. It is recommended to keep the temperature of the Metal base not more than 105 °C when the converter operates at the rated load for the application.

Ripple & noise test

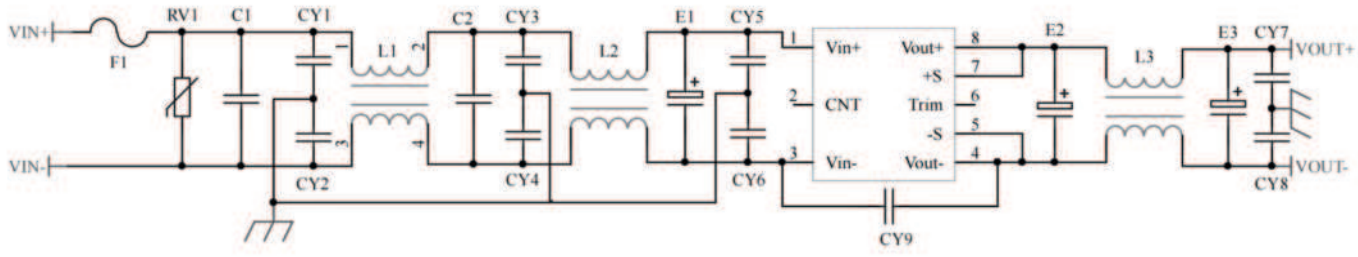
All this series of products will be tested according to this circuit diagram below before shipping.



	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	470	1	10
48VDC	100	470	1	10
110VDC	68	68	1	10

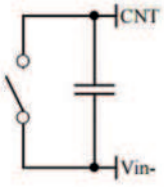
Recommended EMC Circuit

If this circuit diagram recommended below is not adopted, an electrolytic capacitor ≥100 μF should be connected at the input to suppress the possible surge voltage.

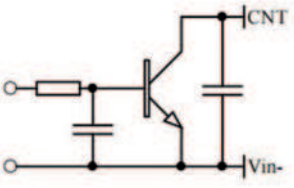


F1	T10A/250V FUSE
RV1	14D 200V varistor
C1, C2	105/450V polyester film capacitor
CY1, CY2, CY3, CY4, CY5, CY6	102/250Vac Y2 capacitor
CY7, CY8	103/2KV Ceramic capacitor
CY9	471/250Vac Y1 capacitor
E1	100μF/200V electrolytic capacitor
E2, E3	220μF/35V Electrolytic capacitor
L1, L2	>3mH, temperature rise less than 25 ° @5A
L3	>100uH, temperature rise less than 25 ° @6.3A

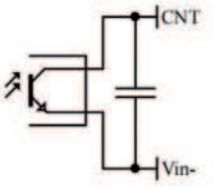
Recommended circuits for the ON/OFF control (CNT)



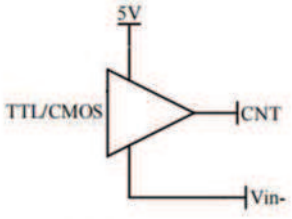
Switch control method



Transistor control method

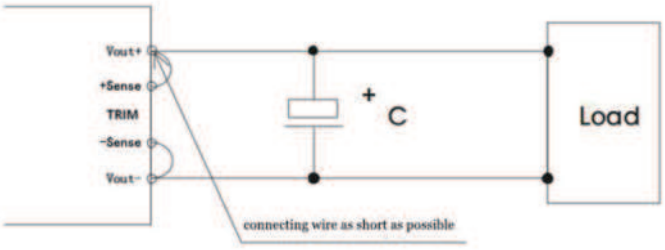


Isolation control method



TTL/CMOS control method

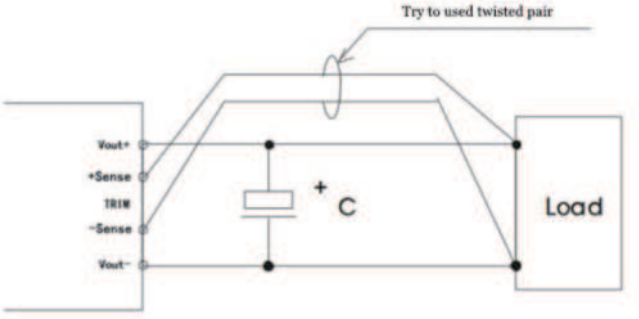
With NO distal end compensation



Notes:
1. Vout+ & Sense+, Vout- & Sense- should be shorted when distal 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.

With distal end compensation



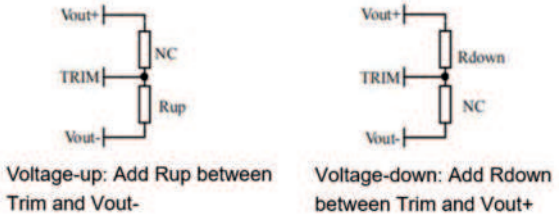
Notes:
1. The output voltage may be unstable if the compensation cables are too long.
2. The twisted pair or shielded cables are recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line voltage drop <0.3V. 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 Rup & Rdown:

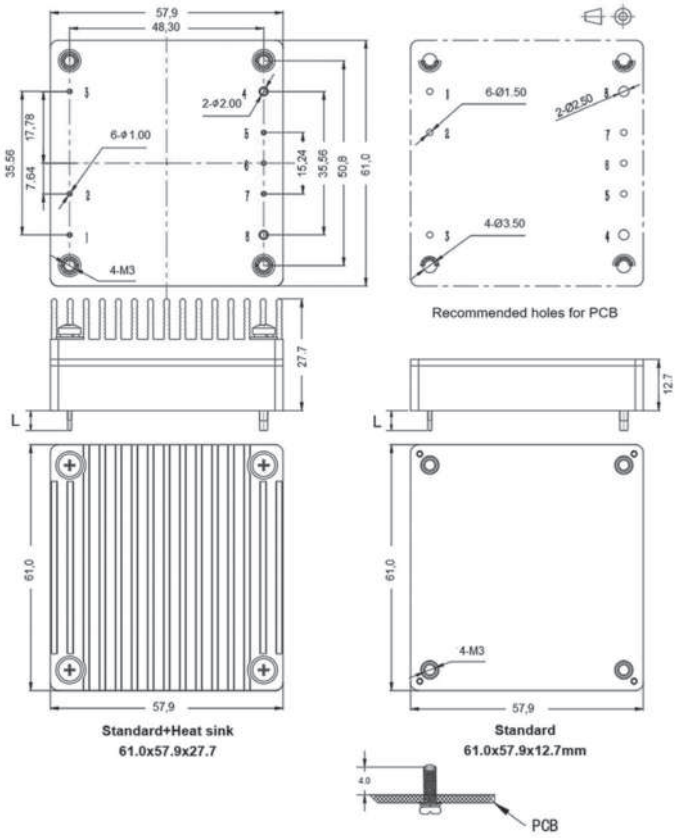
Rup = 70/ΔU-5.1 (KΩ)

Rdown = 28 x (21.5-ΔU)/ΔU -5.1 (KΩ)



Note:
This product is not available to be connected in parallel to increase the output power. Please contact our technical staff for this kind of requirement.

Mechanical dimensions



Note:
Unit: mm
Pin 1, 2, 3, 5, 6, 7 diameter: 1.00mm
Pin 4, 8 diameter: 2.00mm
Tolerance: X.X ±0.5mm, X.XX ±0.1mm
Screwing torque: 0.4N.m Max

Pin Length L = 5.1mm

Pin no.	1	2	3	4	5	6	7	8
Function	Vin+	CNT	Vin-	Vout-	-Sense	TRIM	+Sense	Vout+

150HBRW4_3R series

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



48Vout Version

DC-DC Converter 150 Watt

- 2:1 input voltage range
- Up to 92% efficiency
- Low standby power consumption
- Operating temperature from -40°C to +105°C
- Standard half brick size
- 3000VDC isolation voltage
- Input under voltage protection
- Output over current protection
- Over voltage protection
- Over temperature protection
- Short circuit protection (SCP)

Introducing our new 150HBRW4_11048S3R series – a high-performance DC-DC converter designed to deliver exceptional efficiency and reliability. With a 2:1 input voltage range and up to 92% efficiency, it ensures stable power conversion while keeping energy loss to a minimum. Engineered for demanding environments, it features an operating temperature range from -40°C to +105°C, a standard half brick package, and 3000VDC isolation voltage for maximum safety and durability. To guarantee long-term dependability, the 150HBRW4_11048S3 integrates comprehensive protections including input under-voltage, output over-current, over-voltage, over-temperature, and short-circuit protection (SCP). This series is the perfect solution for industries requiring efficient, rugged, and reliable power conversion.

Common specifications

Short circuit protection	Hiccup, continuous, self-recovery
Switching frequency	400 kHz (typ.)
Operation temperature	-40°C ~+105°C (with derating)
Storage temperature	-40°C ~+125°C
Pin soldering Temperature	+350°C (1.5mm from the case, soldering time <1.5S)
Humidity	5~95% RH (non condensing)
MTBF: (MIL-HDBK-217F@25°C)	150,000 hours
Cooling requirement	EN60068-2-1
Dry and heat requirements	EN60068-2-2
Moisture and heat requirements	EN60068-2-30
Shock and vibration	IEC/EN 61373 C1/Body Mounted Class B
Case materials	Metal base + Plastic case in black with flame class UL94-V0
Heat sink	Dimension 61.0x57.9x15.0mm, weight 72g, Aluminum, anodized black
Cooling method	Conduction cooling or forced air cooling with fan
Weight	118g (typ.)

Input specifications

Item	Test condition	Min	Typ	Max	Units
Input current Max	Input 66VDC, full load			3.2	A
No-load current	Rated input voltage			20	mA
Input inrush voltage (1 sec. max.)	The unit could be permanently broken over this voltage	-0.7		185	VDC
Start-up voltage				66	VDC
Under voltage protection	With no load (the over current protection could work in advance at full load)			64	VDC
ON/OFF control (CNT)	• Positive logic: CNT no connection or connected to 3.5-15V to turn ON, connected to 0-1.2V to turn OFF the converter. • Negative logic: CNT no connection or connected to 3.5-15V to turn OFF, connected to 0-1.2V voltage to turn ON the converter.				Reference voltage -Vin

Example:
150HBRW4_11048S3R
150 = 150 Watt; HB = Half-Brick; R = Railway; W4 = Wide input;
110 = 110Vin; 48 = 48Vout; S = Single Output; 3 = 3kVDC Isolation;
R = Revised version

Output specifications

Item	Test condition	Min	Typ	Max	Units
Output voltage accuracy	Nominal input voltage, 0% - 100% load		±0.5	±1.0	%
Line regulation	Full load, input voltage from low to high		±0.1	±0.2	%
Load regulation	Nominal input voltage, 10% - 100% load		±0.2	±0.5	%
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, with external capacitor ≥220uF	--	300	480	mVp-p
Output voltage adjustment (TRIM)		-20		+10	%
Distal end compensation (sense)				+5	%
Over temperature protection	Maximum temperature of the metal base	105	115	125	°C
Over voltage protection		125		140	%
Over current protection		3.5		6.3	A

Isolation specifications

Item	Test condition	Min	Typ	Max	Units
Isolation voltage	• I/P-O/P Test 1 min, leakage current <3mA • I/P-Case Test 1 min, leakage current <3mA • O/P-Case Test 1 min, leakage current <3mA	3000 2100 1000			VDC
Isolation resistance	I/P-O/P @ 500VDC	100			MΩ

1. The product warranty period 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 fails after operating under wrong or unreasonable conditions.
2. GAPTEC can provide filter modules for matching, please contact our team for details.

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Specifications subject to change without notice.

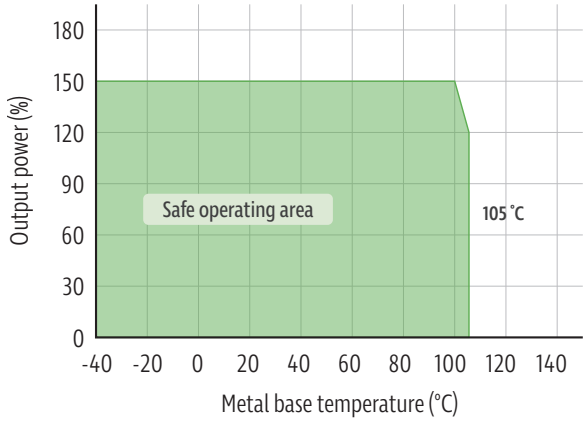
EMC specifications				
EMI	CE	EN50121-3-2 EN55016-2-1	150kHz - 500kHz (79dBuV) 500kHz - 30MHz (73dBuV)	
EMI	RE	EN50121-3-2 EN55016-2-1	30MHz - 230MHz (40dBuV/m at 10m) 230MHz - 1GHz (47dBuV/m at 10m)	
EMS	ESD	IEC/EN61000-4-2/GB/T 17626.2-2006	Contact ±6kV/Air ±8kV	perf. criteria A
EMS	RS	IEC/EN61000-4-3/GB/T 17626.3-2006	10V/m	perf. criteria A
EMS	EFT	IEC/EN61000-4-4/GB/T 17626.4-2008	±2kV 5/50ns 5kHz	perf. criteria A
EMS	Surge	IEC/EN61000-4-5/GB/T 17626.5-2008	Line to line ± 1kV (42Ω, 0.5μF)	perf. criteria A
EMS	CS	IEC/EN61000-4-6/GB/T 17626.6-2008	0.15MHz - 80MHz 10 Vr.m.s	perf. criteria A

Product Selection Guide

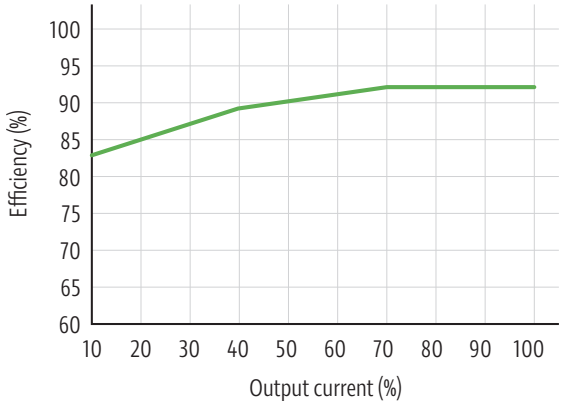
Approval	Part number	Input Voltage Range (VDC)	Output power (W)	Output Voltage (VDC)	Output Current (A)	Ripple & Noise (mVp-p)	Efficiency (%) full load, (min./typ.)
	150HBRW4_11048S3R	66-160	150	48	3.13	480	90/92

Typical characteristics

Temperature derating graph



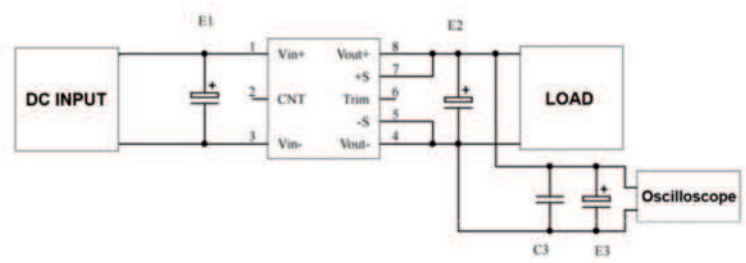
Efficiency vs output load



Note:
1. Both the output power and efficiency in the graphs have been tested with typical values.
2. The data in the temperature derating graph have been tested at our laboratory test conditions. It is recommended to keep the temperature of the metal base not more than 100 °C when the converter operates at the rated load for the application.

Ripple & Noise test

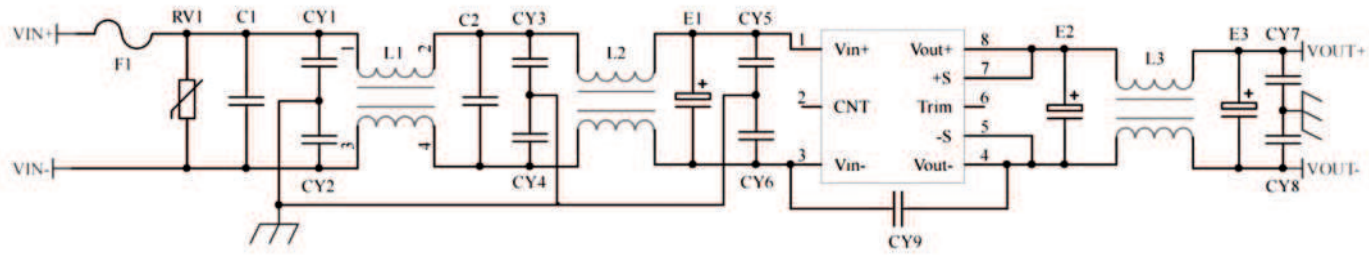
All this series of products will be tested according to this circuit diagram below before shipping.



	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	470	1	10
48VDC	100	470	1	10
110VDC	68	68	1	10

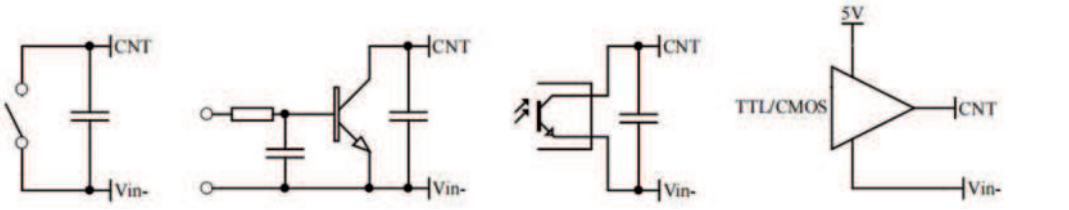
Recommended EMC Circuit

If this circuit diagram recommended below is not adopted, an electrolytic capacitor ≥100 μF should be connected at the input to suppress the possible surge voltage.



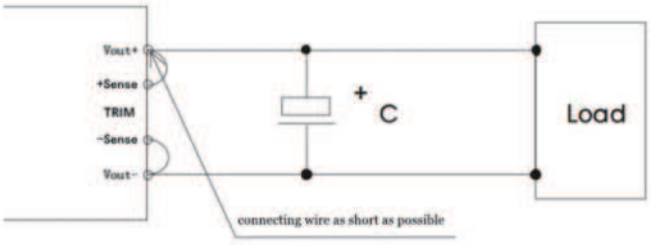
F1	T6.3A/250V FUSE
RV1	14D 200V Varistor
C1, C2	105/450V Polyester film capacitor
CY1, CY2, CY3, CY4, CY5, CY6	102/250VAC Y2 capacitor
CY7, CY8	103/2kV Ceramic capacitor
CY9	471/250VAC Y1 capacitor
E1	100μF/200V Electrolytic capacitor
E2,E3	220μF/63V Electrolytic capacitor
L1, L2	>5mH, temperature rise less than 25°@3.2A
L3	>220uH, temperature rise less than 25°@3.2A

Recommended circuits for the ON/OFF control (CNT)



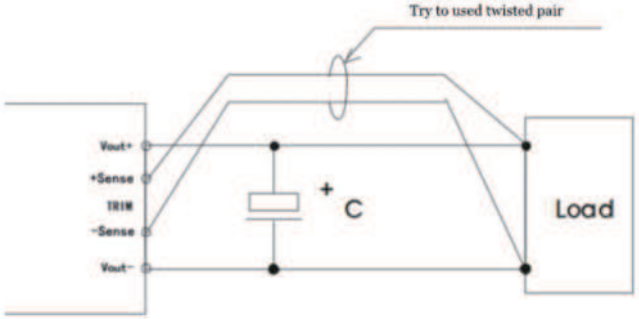
Switch control method | Transistor control method | Isolation control method | TTL/CMOS control method

With no distal end compensation



Note:
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.

With distal end compensation



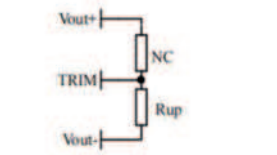
Notes:
1. The output voltage may be unstable if the compensation cables are too long.
2. The twisted pair or shielded cables are recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line voltage drop <0.3V. 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

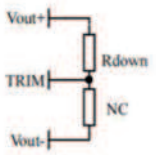
The calculation of ΔU and Rup & Rdown:

Rup = 107.5/ΔU-5.1(KΩ)

Rdown = 43 x (48-2.5-ΔU)/ΔU -5.1(KΩ)



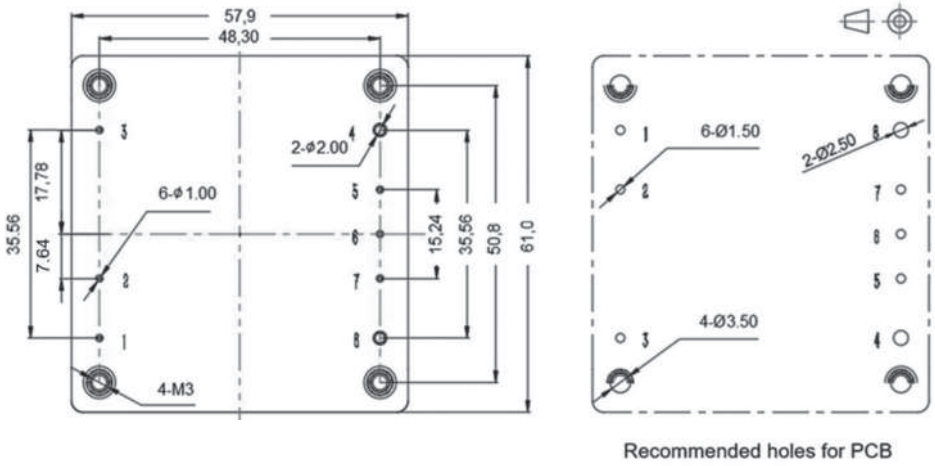
Voltage-up: Add Rup between Trim and Vout-



Voltage-down: Add Rdown between Trim and Vout+

Note:
This series of products are not available to be connected in parallel to increase the output power. Please contact technical service for this kind of requirement.

Mechanical dimensions



Recommended holes for PCB

Note:
Unit: mm
Pin 1, 2, 3, 5, 6, 7 diameter: 1.00mm
Pin 4, 8 diameter: 2.00mm
Tolerance: x.x ±0.5mm, x.xx ±0.1mm
Screwing torque: 0.4N.m max

Pin No.	1	2	3	4	5	6	7	8
Function	Vin+	CNT	Vin-	Vout-	-Sense	TRIM	+Sense	Vout+