Conform to CE

Typical Features

- Wide input voltage range 3:1
- Efficiency 90% (Typ.)
- Low standby power consumption
- Operating Temperature: -40℃ to +105℃
- High isolation voltage: 3000Vac(input-output) & 2100Vac(input-case)
- Input under voltage protection, output over current, over voltage, over temperature, short circuit protection
- Standard 1/2 brick size

ZBD400-110S24A *is a high-performance power supply with rated input voltage of 110VDC & output 24VDC/400W, no minimum load requirement, wide voltage input of 50-160VDC and regulated single output. More advantages include high isolation voltage, operating temperature up to 105℃, input under-voltage protection, output overcurrent, overvoltage, overtemperature and short circuit protections. More functions of remote Control, Sense for distal end compensation, and Trim for output voltage adjustment.*

Typical Product List

Part No.	Input voltage range (VDC)	Output Power (W)	Output Voltage (VDC)	Output Current (A)	Ripple & Noise (mVp-p)	Full load Efficiency (%) Min/Typ.	Remark
ZBD400-110S24AC	50-160	400	24	16.7	240	88/90	Positive logic Standard
ZBD400-110S24AN							Negative logic Standard
ZBD400-110S24AC-H							Positive logic With heat sink
ZBD400-110S24AN-H							Negative logic With heat sink

Note: The output power could be derated linearly at the input voltage range of 50-66V; the maximum output power can be 300W at the input voltage of 50V.

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Input current Max	Input 50VAC@ load 300W	--	--	8	A
No-load current	Rated input voltage	--	--	20	mA
Input inrush voltage (1sec. max.)	Could be permanently broken over this voltage	-0.7	--	185	VDC
Start-up voltage		--	--	50	
Input under-voltage protection	No-load test, overcurrent protection should start in advance at full load	--	--	48	
Remote control (CNT)	Positive logic: CNT no connection or connected to 3.5-15V to turn on the power supply, connected to 0-1.2V to shut off the power supply.			Reference voltage - Vin	
	Negative logic: CNT no connection or connected to 3.5-15V to shut off the power supply, connected to 0-1.2V voltage to turn on the power supply.				

Output Specifications

Item	Working conditions	Min.	Typ.	Max.	Unit
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		-5	--	5	%
Temperature Drift Coefficient	Full load	-0.02	--	+0.02	%/℃
Ripple & Noise	20M bandwidth, test with ≥220uF capacitor	--	150	240	mVp-p
Output voltage adjustable (TRIM)		-20	--	+10	%
Distal end compensation (Sense)		--	--	105	%
Over temp protection	Maximum temperature of the case surface	105	115	125	℃
Output over voltage protection		125	--	140	%
Output over current protection		17.5	--	21	A
Output short circuit protection		Hiccup, continuous, self-recovery			

General Specifications

Item	Operating conditions		Min.	Typ.	Max.	Unit
Isolation Voltage	I/P-O/P	Test 1min, leakage current < 3mA	--	--	3000	VAC
	I/P-Case	Test 1min, leakage current < 3mA	--	--	2100	VAC
	O/P-Case	Test 1min, leakage current < 3mA	--	--	500	VDC
Insulation resistance	I/P-O/P	@ 500VDC	100	--	--	MΩ
Switching frequency			--	400	--	KHz
MTBF	MIL-HDBK-217F@25℃		150	--	--	K hours

Environmental characteristics

Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating Temperature	Refer to temperature derating curve	-40	--	+105	℃
Storage Humidity	No condensing	5	--	95	%RH
Storage Temperature		-40	--	+125	℃
Pin Soldering temperature	1.5mm from the soldering point to the case, < 1.5S	--	--	+350	
Cooling requirements		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			

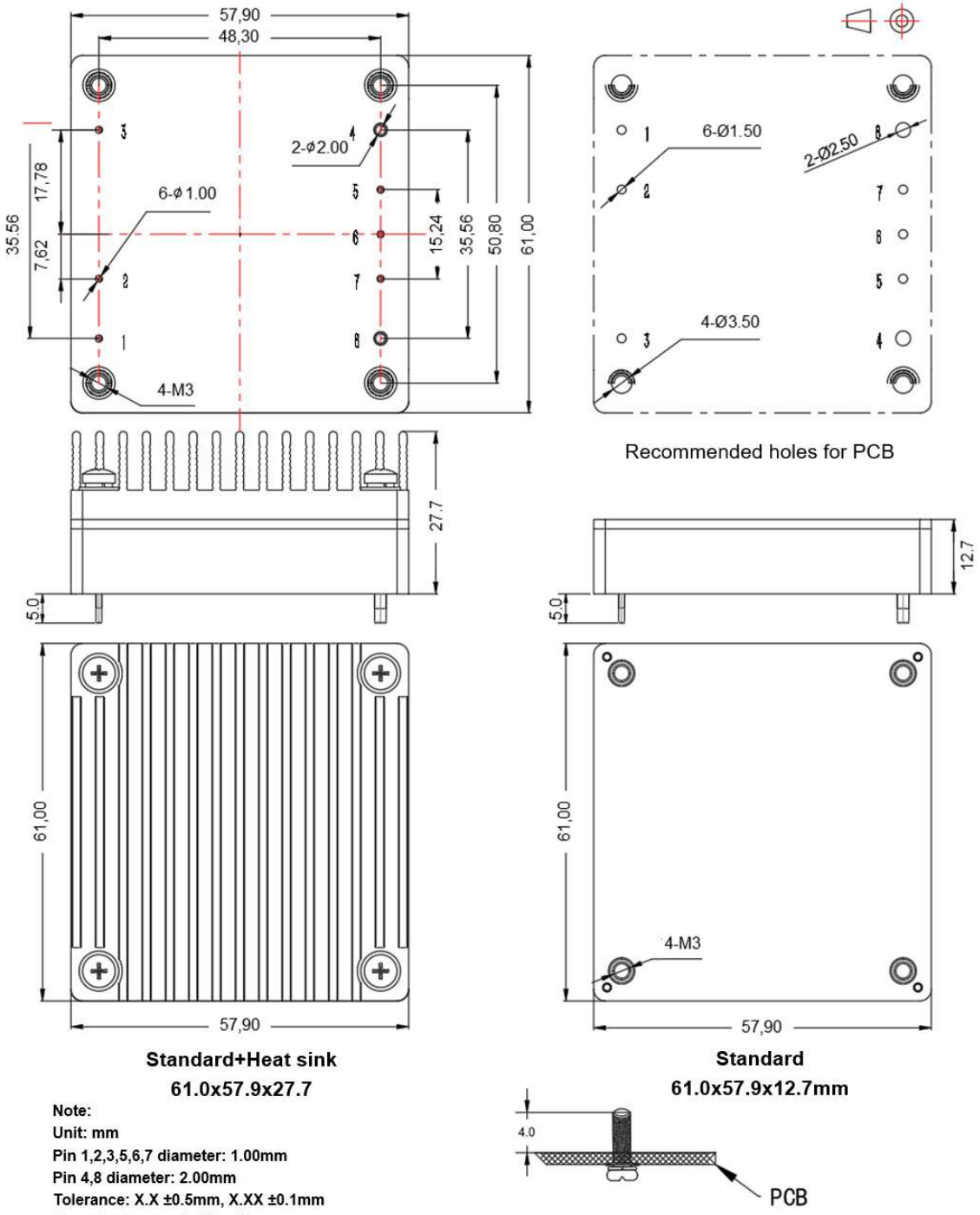
EMC Performances (EN50155)

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

Physical Characteristics

Case Materials	Metal bottom shell + Plastic case in black with flame class UL94 V-0
Heat Sink	Dimension 61x57.9x15mm, weight 65g, Aluminum in black
Cooling Method	Conduction cooling or forced fans cooling
Weight	Standard 120g, with heatsink 188g

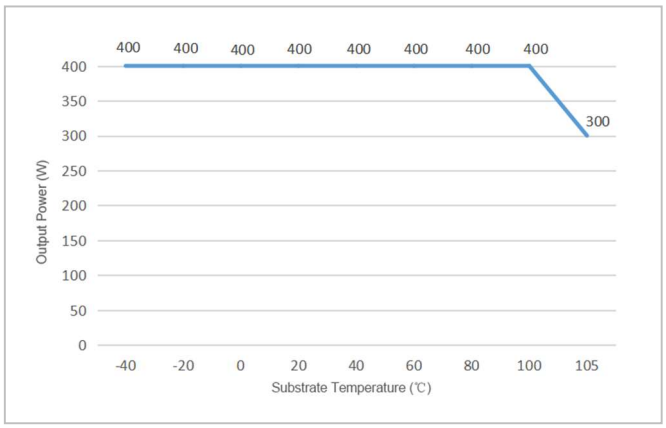
Mechanical Dimensions and Pin-Out

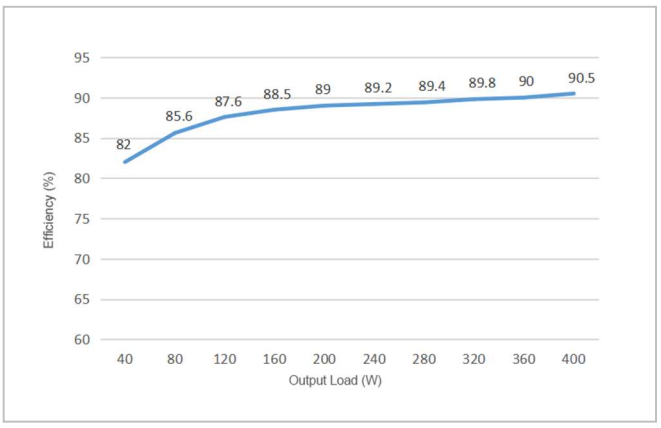


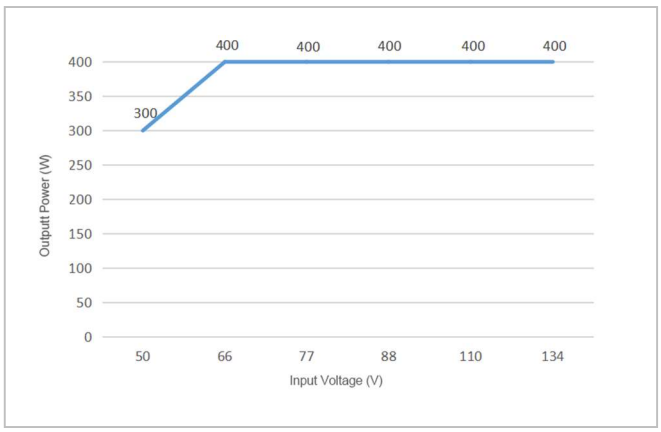
Note:
Unit: mm
Pin 1,2,3,5,6,7 diameter: 1.00mm
Pin 4,8 diameter: 2.00mm
Tolerance: X.X ±0.5mm, X.XX ±0.1mm
Screwing torque: 0.4N.m Max

No.	1	2	3	4	5	6	7	8
Pin-out	**Vin+**	**CNT**	**Vin-**	**Vout-**	**-SENSE**	**TRIM**	**+SENSE**	**Vout+**

Product Performance Curve





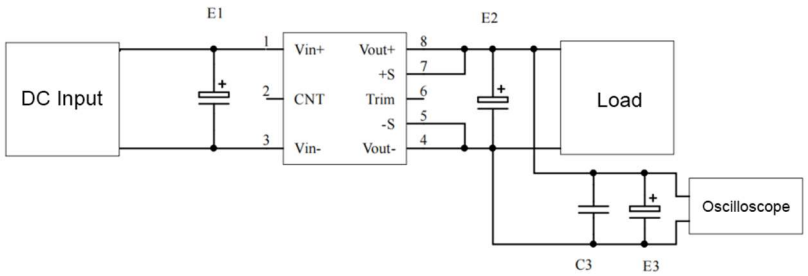


Note:
1. The temperature derating curve and the efficiency curve are tested with typical values.
2. The temperature derating had been tested based on Aipu Lab conditions. The product can be used at rated load with the condition the aluminum case temperature lower than 100 °C.

Recommended circuits for application

1. Ripple & Noise

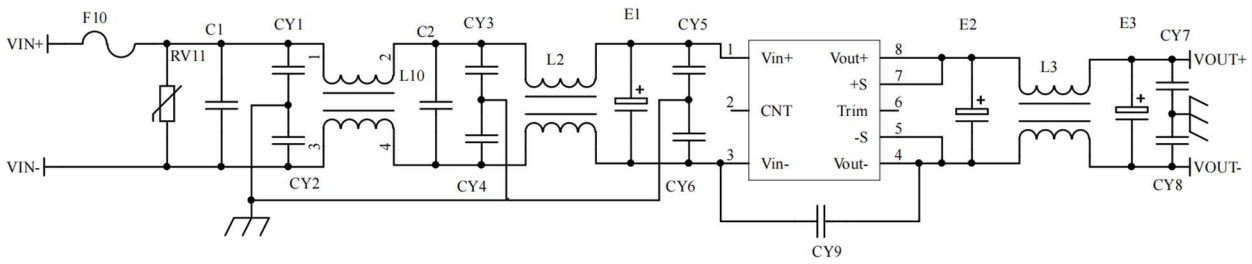
All the products will be tested according to this circuit before shipping.



capacitor value / Output voltage	E1 (μF)	E2 (μF)	C1 (μF)	E3 (μF)
3.3VDC	100	1000	1	10
5VDC		680		
12VDC		220		
.....				
48VDC				
.....	68	68		
110VDC				

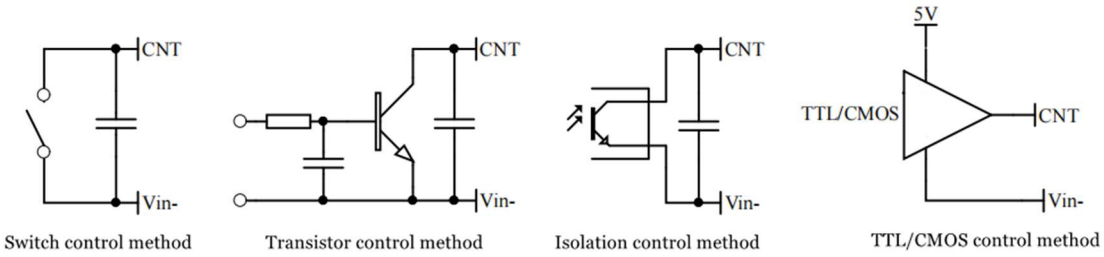
2. Recommended for application

If this recommended circuit is not chosen, an electrolytic capacitor≥220 μF must be connected at the input to suppress the surge voltage that may be generated.



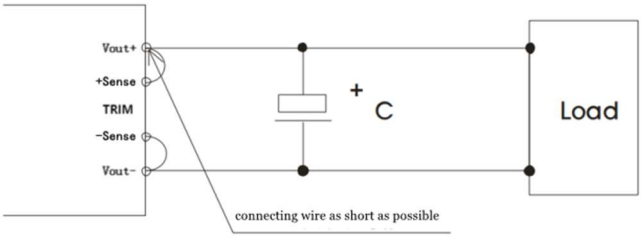
F1	T10A/250V FUSE
RV1	14D 200V Varistor
C1,C2	105/450V Polyester film capacitor
CY1,CY2,CY3,CY4,CY5,CY6	102/250Vac Y2 capacitor
CY7,CY8	103/2KV Ceramic capacitor
CY9	471/250Vac Y1 capacitor
E1	330μF/200V Electrolytic capacitor
E2，E3	470μf/35V Electrolytic capacitor
L1,L2	≥5mH/Temperature rise less than 25° K@8A
L3	≥220Uh/Temperature rise less than 25° K@17A

3. Recommended application circuits for the Remote control (CNT)



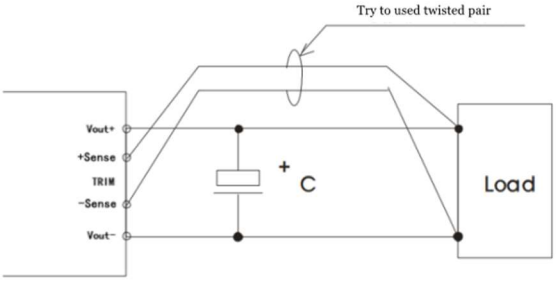
4. Application for Sense

1)Without 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.

2) With distal end compensation



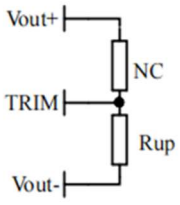
Notes:
1. The output voltage may be unstable if the compensation cables are too long.
2. Twisted pair or shielded cables is recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the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

5. TRIM and calculation of TRIM resistance

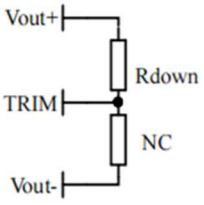
The calculation of △U and Rup & Rdown:

Rup=70/△U-5.1（KΩ）

Rdown=28*(21.5-△U)/△U -5.1（KΩ）



Voltage-up: Add Rup between Trim and Vout-



Voltage-down: Add Rdown between Trim and Vout+

6. This product does not support for connection in parallel to increase the output power. Please contact Aipu technician for this kind of requirement.

Others

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 Aipupower can provide customization design and filter modules for matching, please contact our technician for details.

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