



Typical Features

- ◆ Wide input voltage range 3:1
- ◆ Efficiency 85%(Typ.)
- ◆ Low standby power consumption
- ◆ Operating Temperature: -40°C to +105°C
- ◆ Isolation voltage: 2500Vac(input-output) & 2100Vac(input-case)
- ◆ Input under-voltage protection, output OVP, SCP, OCP, OTP
- ◆ Standard 1/2 brick size

Conform to CE

ZBA200-220S28 is a high-performance AC/DC module power supply, rated input voltage 220VAC, output power 28V/200W, no min-load, wide input 85-264VAC, isolated & regulated single output, operating temperature 105°C Max., with input under-voltage protection, output over-current, over-voltage, over-temperature & short-circuit protections, Sense remote voltage compensation, output voltage Trim and other functions.

Typical Product List

Part No.	Input voltage range (VAC)	Output Power (W)	Output Voltage (VDC)	Output Current (A)	Ripple & Noise (mVp-p)	Full load Efficiency (%) Min/Typ.	Remark
ZBA150-220S28	85-264	200	28	7.15	280	83/85	Positive logic Standard
ZBA200-220S28-H							Positive logic With heat sink

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Input current Max	Input 85VAC, full load	--	--	3	A
Input surge current Max	Input 220Vac, NTC(5.6R/Ø20mm) connected in series	--	--	20	A
Standby power consumption	Rated input voltage	--	--	2	W
Start-up voltage		--	--	85	VAC
Input inrush voltage (1S max.)	Could be permanently broken over this voltage	--	--	315	
Input under-voltage protection	No load	--	--	80	
Input voltage frequency		47	--	63	Hz
PF value	220Vac input, full load output	95	--	--	%

Output Specifications

Item	Working conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Rated input voltage, 10% 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	%/°C
Ripple & Noise	20M bandwidth, test with ≥220uF capacitor	--	150	280	mVp-p

Output voltage adjustable (TRIM)		-10	--	+10	%
SENSE remote voltage compensation		--	--	105	%
Over temp protection	Maximum temperature of the case surface	105	115	125	°C
Output over voltage protection		125	--	140	%
Output over current protection		7.5	--	9	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	--	--	2500	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			--	280	--	KHz
MTBF	MIL-HDBK-217F@25°C		150	--	--	K hours

Environmental characteristics

Item	Operating conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See temperature derating curve	-40	--	+105	°C
Storage Humidity	No condensing	5	--	95	%RH
Storage Temperature		-40	--	+125	°C
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 / Class 1B			

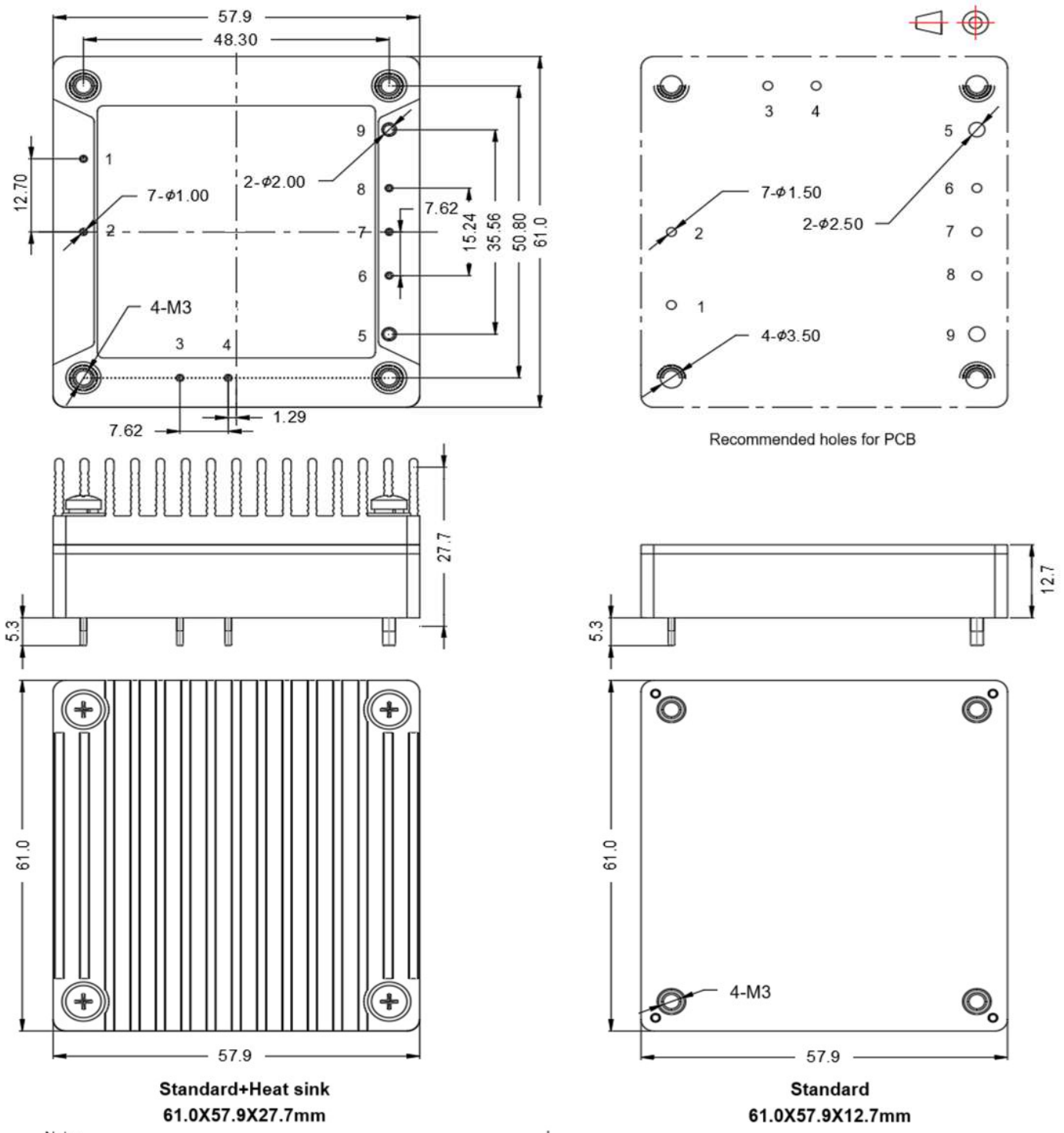
EMC Performances (EN50155)

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, Aluminium in Black
Weight	Standard 120g, with heatsink 188g

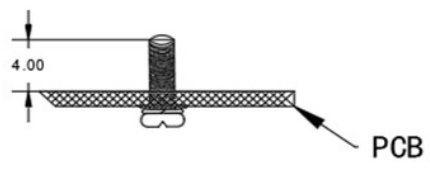
Mechanical Dimensions and Pin-Out



Standard+Heat sink
61.0X57.9X27.7mm

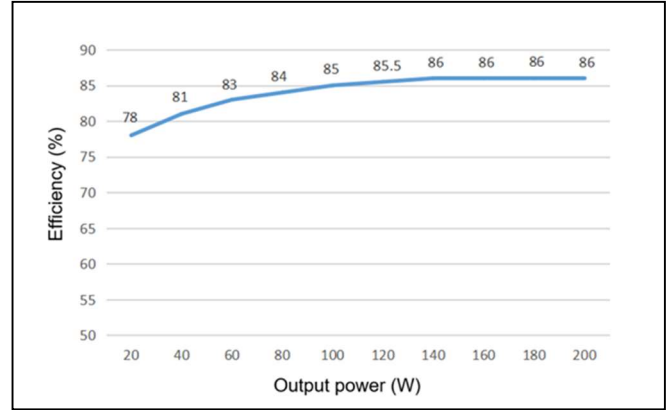
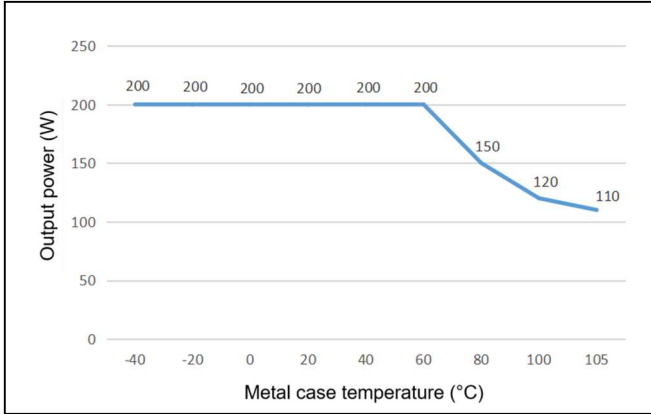
Standard
61.0X57.9X12.7mm

Note:
Unit: mm
Pin 1,2,3,4,6,7,8 diameter: 1.00
Pin 5,9 diameter: 2.00
Tolerance: .X ±0.5, .XX ±0.1
Screwing torque: 0.4N.m Max.



No.	1	2	3	4	5	6	7	8	9
Pin-out	AC1	AC2	BC+	BC-	Vout+	+S	TRIM	-S	Vout-
Function	Input AC1	Input AC2	PFC C+	PFC C-	Output V+	Sense +	TRIM	Sense -	Output V-

Product Performance Curve

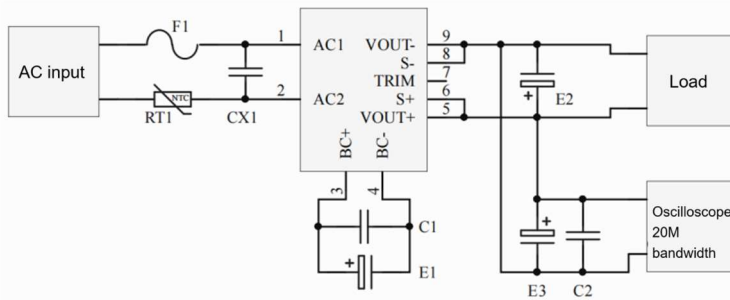


- Note:**
- Both the temperature derating curve and the efficiency curve are tested with typical values
 - The temperature derating had been tested based on Aipu Lab conditions. The product can be used at rated load with the condition the aluminum case temperature lower than 100 °C.

Recommended circuits for application

1. Ripple & Noise

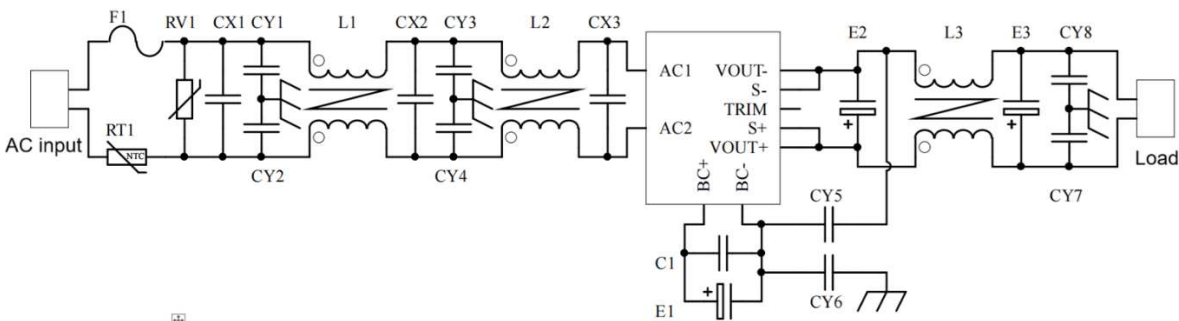
All the products will be tested by FQC according to this circuit before shipping.



Vo	E1 (uF)	E2 (uF)	C1 (uF)	C2 (uF)	E3 (uF)
3.3VDC	100uF	1000uF	1uF/520V	1uF	10uF
5VDC		680uF	1uF/520V		
12VDC		470uF	1uF/520V		
....		220uF	1uF/520V		
48VDC			1uF/520V		
....		68uF	1uF/520V		
110VDC		1uF/520V			

2. Recommended for application

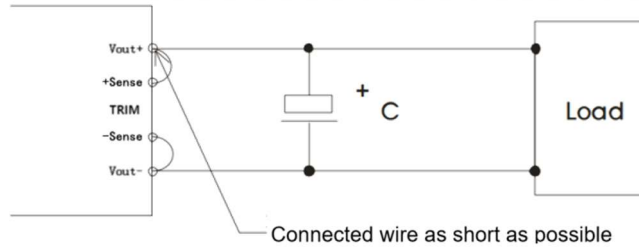
If this recommended circuit is not chosen, C3X should be $\geq 0.47\mu\text{F}$, E1 should be $\geq 100\mu\text{F}$, NTC must be used, C1 should be $\geq 1\mu\text{F}$ at the temperature $\leq -25^\circ\text{C}$. The power supply could be failed if these conditions are not respected.



F1	T6.3A/250V FUSE
RV1	10D 620V TVS
RT1	5.6Ω/20mm NTC
X1,CX2,CX3	224/250VAC/X2 Capacitor
CY1,CY2,CY3,CY4,CY5	102/250Vac/Y2
CY7,CY8	103/2KV
CY6	471/250Vac/Y1
C1	105/630V
E1	220μF/450V
E2, E3	220μf/35V
L1,L2	$\geq 8\text{mH}/3\text{A}$
L3	$\geq 0.5\text{mH}/7.2\text{A}$

3. Application for Sense

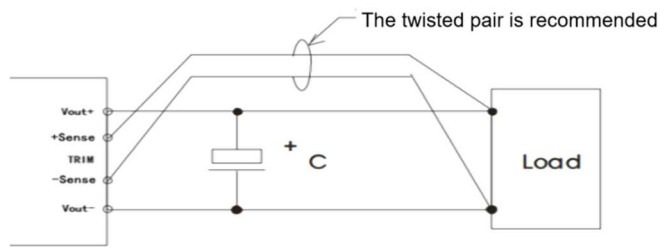
1) Without distal compensation



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.

2) With distal compensation



Notes:

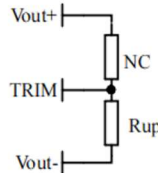
1. The output voltage may be unstable if the compensation cables are too long.
2. Twisted pair or shielded cables is recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line voltage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

4. TRIM & TRIM resistance calculation

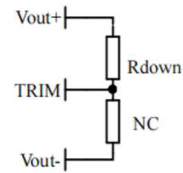
The calculation of ΔU and R_{up} & R_{down} :

$R_{up} = 70 / \Delta U - 5.1 \text{ (K}\Omega\text{)}$

$R_{down} = 28 * (25.5 - \Delta U) / \Delta U - 5.1 \text{ (K}\Omega\text{)}$



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



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

5. 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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