



Typical Features

- ◆ Wide input voltage range 2:1
- ◆ Efficiency up to 93%
- ◆ Low no-load power consumption
- ◆ Operating Temperature from -40°C to +105°C
- ◆ High isolation voltage 1500VDC (input-output)
- ◆ Input under voltage protection, output over current, over voltage, over temperature & short circuit protections
- ◆ Standard 1/8 brick size

ZDD120-48S12 is a high-performance DC-DC modular converter with the rated input voltage 48VDC (full range from 36V to 75VDC), regulated single output 12V/120W without minimum load limit. It has the multi-function of input under-voltage protection, output over-current, over-voltage, over-temperature and short circuit protections, input ON/OFF control, output voltage distal end compensation and output voltage Trim, etc.

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.	Remarks
ZDD120-48S12C	36 - 75	120	12	10	120	91/93	Standard Positive logic
ZDD120-48S12N							Standard Negative logic
ZDD120-48S12C-H							Heatsink Positive logic
ZDD120-48S12C-HP							Heatsink + Plastic Case Positive logic
ZDD120-48S12N-H							Heatsink Negative logic
ZDD120-48S12N-HP							Heatsink + Plastic Case Negative logic

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Max input current	Input voltage 36V, full load	--	--	4	A
No load input current	Rated input voltage	--	--	150	mA
Input Inrush voltage (1sec. max.)	The unit could be permanently damaged by input over this Voltage	-0.7	--	100	VDC
Start-up voltage		--	--	36	
Input under voltage protection	With No-load (The over current protection will work in advance at full load)	--	--	34	
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				Reference voltage -Vin
	Negative logic: CNT no connection or connected to 3.5-15V to turn OFF, connected to 0-1.2V to turn ON the converter				

Output Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Nominal input voltage, 0%-100% load	--	±0.5	±1.0	%
Line Regulation	Full load, input voltage from low to high	--	±0.2	±0.5	
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		-5	--	+5	%
Temperature Drift Coefficient	Full load	-0.02	--	+0.02	%/°C
Ripple & Noise	20MHz bandwidth, with external capacitor >220uF	--	100	120	mVp-p
Output voltage adjustment (TRIM)		-20	--	+10	%
Output voltage distal end compensation (Sense)		--	--	105	%
Over temperature protection	Internal temperature detecting sensor	105	115	125	°C
Over voltage protection		120	--	150	%
Over current protection		11	--	15	A
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	1500	--	--
Insulation resistance	I/P-O/P	@ 500VDC	100	--	--
Switching frequency		--	250	--	KHz
MTBF		150	--	--	K hours

Environmental characteristics

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

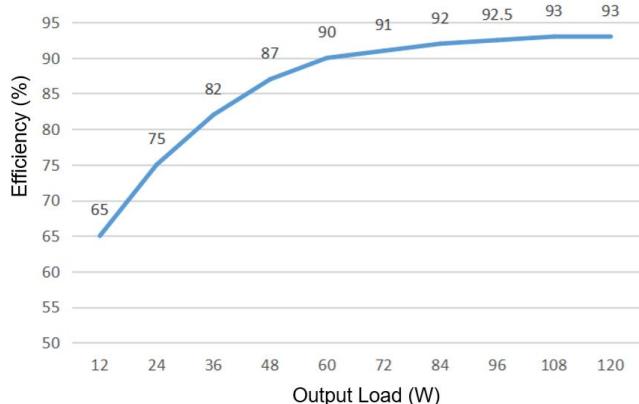
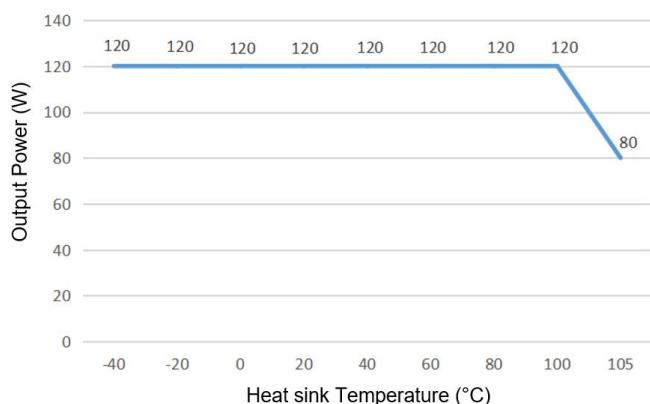
EMC Performances

EMI	CE	EN55032-3-2	150kHz-500kHz 66dBuV	
		EN55032-2-1	500kHz-30MHz 60dBuV	
	RE	EN55032-3-2	30MHz-230MHz 50dBuV/m at 3m	
		EN55032-2-1	230MHz-1GHz 57dBuV/m at 3m	
EMS	ESD	IEC/EN61000-4-2	Contact $\pm 6\text{KV}$ /Air $\pm 8\text{KV}$	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	$\pm 2\text{kV}$ 5/50ns 5kHz	perf. Criteria A
	Surge	IEC/EN61000-4-5	Line to line $\pm 2\text{KV}$	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

Physical Characteristics

Case material	Metal base + Plastic case in black, flame class UL94-V0
Heat sink	Dimensions 58.1x23.0x4.0mm, Aluminum
Cooling method	Conduction cooling or forced air cooling with fan
Unit weight	Standard 27g, with Heatsink 42g, with Heatsink & plastic case 48g

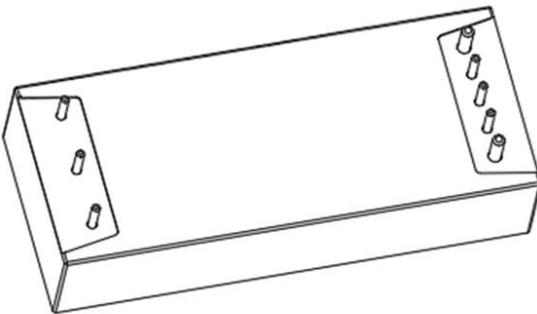
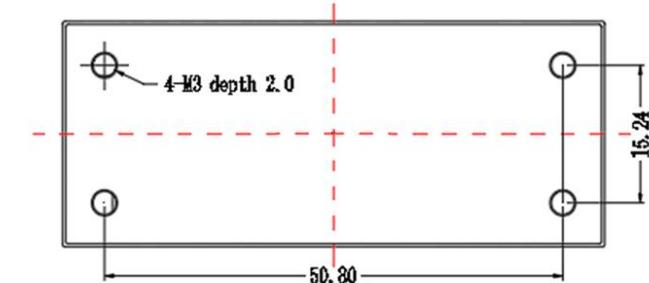
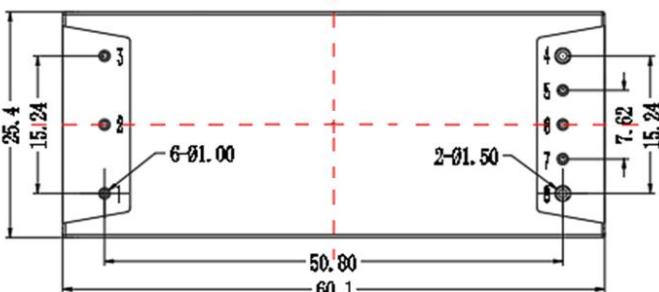
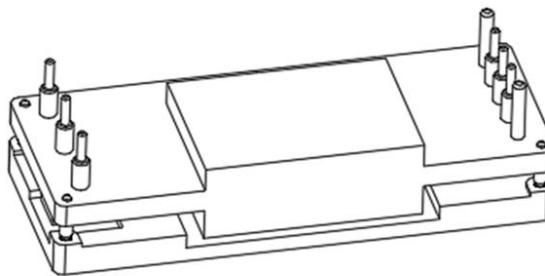
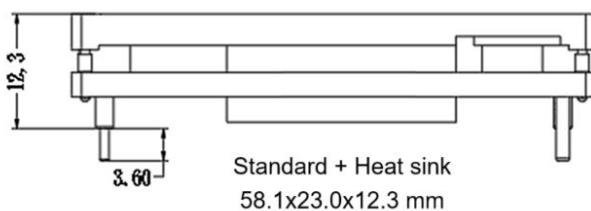
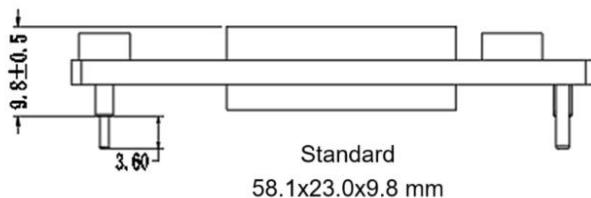
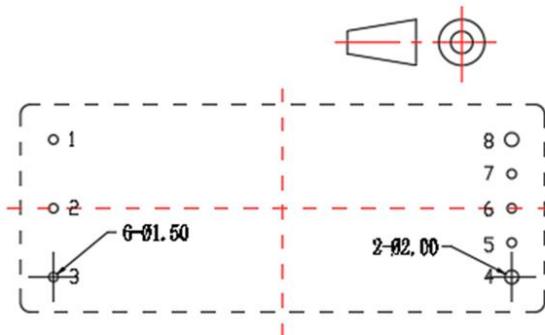
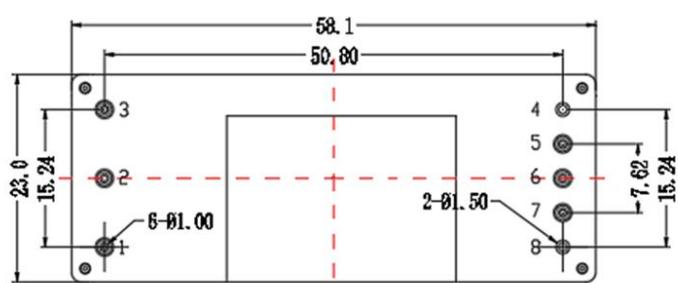
Product Characteristics Graphs



Note:

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

Mechanical Dimensions



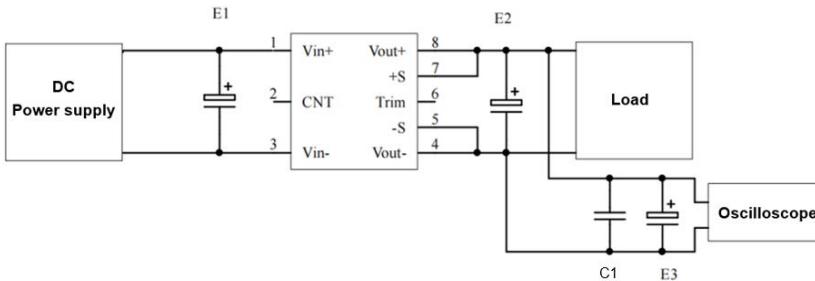
Note:
Unit: mm
Pin 1,2,3,5,6,7 diameter: 1.00mm
Pin 4,8 diameter: 1.50mm
Tolerance: X.X ±0.5, X.XX ±0.1
Screwing torque: 0.4 N.m Max.

No.	1	2	3	4	5	6	7	8
Pin-out	Vin+	CNT	Vin-	Vout-	-Sense	TRIM	+Sense	Vout+
Description	Input V+	ON/OFF Control	Input V-	Output V-	Output distal end compensation S-	Output Voltage Trim	Output distal end compensation S+	Output V+

Recommended circuits for application

1. Ripple and Noise

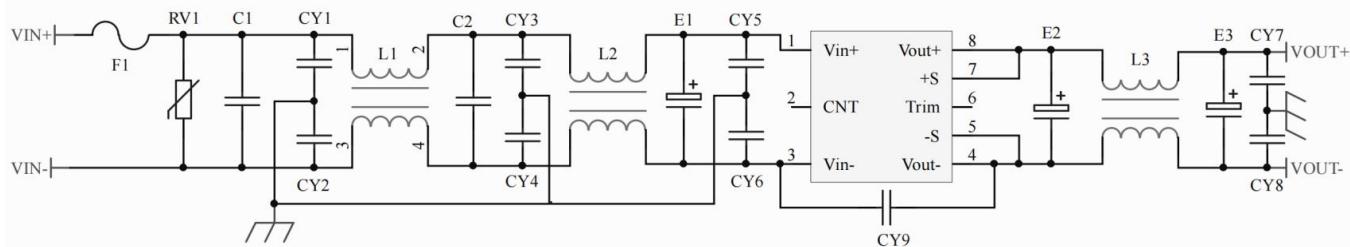
All this series of converters will be tested according to the circuit diagram below before shipping.



Capacitance Output Volt.	E1 (μF)	E2 (μF)	C1 (μF)	E3 (μF)
3.3VDC		1000		
5VDC		680		
12VDC	100			
.....		220		
48VDC				
.....				
110VDC	68	68	1	10

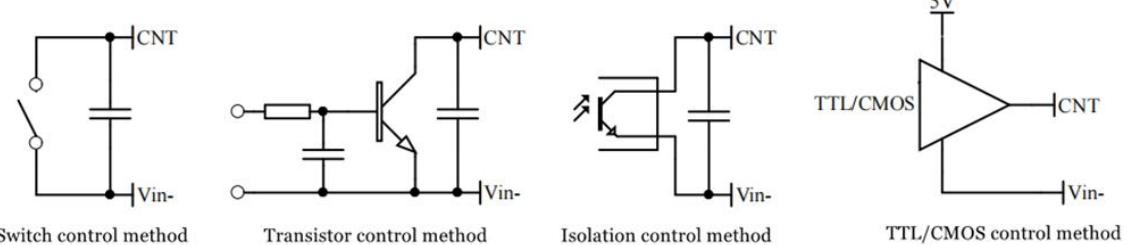
2. Typical circuit diagram for application

If this circuit recommended is not adopted, please connect an electrolytic capacitor $\geq 100 \mu\text{F}$ in parallel at the input to suppress the possible surge voltage.



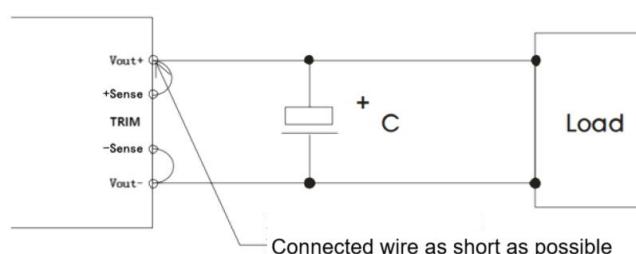
F1	T6.3A/250V Time-delay fuse
RV1	14D 100V Varistor
C1, C2	105/250V Polyester Film Capacitor
CY1, CY2, CY3, CY4, CY5, CY6	102/250Vac Y2 capacitor
CY7, CY8	103/2KV Ceramic Capacitor
CY9	471/250Vac Y2 capacitor
E1	100μF/100V Electrolytic Capacitor
E2, E3	470μF/16V Low ESR Capacitor
L1, L2	>6mH, temperature rise less than 25°@4A
L3	>200uH, temperature rise less than 25°@10A

3. ON/OFF control (CNT) application



4. Application for Sense

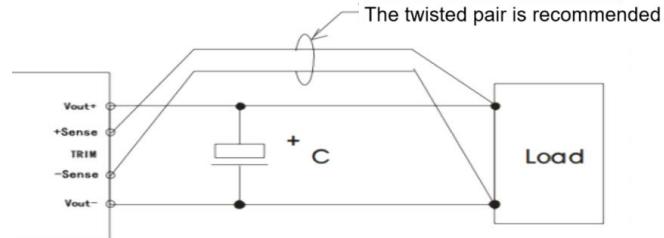
1) With NO distal end compensation



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.

2) With distal end compensation



Notes:

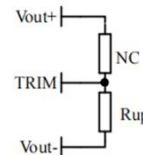
1. The output voltage may be unstable if the compensation cables are too long.
2. The Twisted pair or shielded cables are recommended, the cable length should be as short as possible.
3. Wide copper path on PCB or thick lead wires between the power supply and the load should be used to achieve the line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

5. TRIM & TRIM resistance calculation

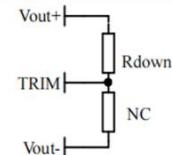
The calculation of ΔU and R_{up} & R_{down} :

$$R_{up}=50/\Delta U-5.1(K\Omega)$$

$$R_{down}=20*(9.5-\Delta U)/\Delta U-5.1 (K\Omega)$$



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



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

6. This series of converters are not available to be connected in parallel to increase the output power. Please contact Aipu technician for this kind of application requirement.

Others

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

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