DC/DC Converter

BK15-500SXXH2N6 Series

Typical Features

- Wide input voltage range 100-1000VDC
- Standby power consumption ≤0.4W @500VDC
- Efficiency up to 85% (Typ.)
- Switching frequency 65KHz
- Operating temperature from -30°C to +70°C
- Input Anti-reverse protection
- Output over current & short circuit protections
- Isolation voltage 4000VAC
- Altitude during operation 3000m Max
- Compliant with IEC/EN62368
- Conform to CE
- Enclosed plastic case, flame class UL94-V0

Application Field

BK15-500SXXH2N6 Series - High efficiency & high reliability DC/DC modular converters with ultra-wide input voltage range from 100 to1000VDC. This series of products can be widely used for Solar power generation and High voltage inverter, etc. The multi-protection functions can keep the power supply and load safe while operating under abnormal conditions. Additional circuit diagram for EMC is recommended for the application with high EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage Range		Output Specification			Max Capacitive Load (200-1000V)	Ripple & Noise 20MHz (Max)	Efficiency @Full load 500VDC (Typ.)
		Nominal	Range	Power	Voltage	Current			
		(VDC)	(VDC)	(W)	Vo(VDC)	Io(mA)	(u F)	mVp-p	%
-	BK15-500S12H2N6	500	100 - 1000	15	12	1250	2000	200	82
-	BK15-500S15H2N6			15	15	1000	2000	200	82
-	BK15-500S24H2N6			15	24	625	800	200	85

Note 1: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 2: The full load efficiency should be in ±2% of the typical value in this table. The efficiency is calculated by the way that the full output power is divided by the input power.

Note 3: The Ripple and Noise is tested by the Parallel-line method, please refer to the following test instruction.

Note 4: Please contact Aipu sales for other output voltages requirement of this series but not listed in this table.

Note 5: The suffix -T indicates the chassis package, -TS indicates the package of DIN Rail which width is 35mm.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input voltage range	DC Input	100	500	1000	VDC
Input current	100VDC	-	0.305	-	A
	500VDC	-	0.060	-	
Surge current	200VDC	-	7	-	
	600VDC	-	20	-	
Standby power consumption	Input 100VDC	-	-	0.40	W
	Input 500VDC	-	-		
Recommended external fuse	-	2A/1000VDC, Required			
Hot-Plug	-	N/A			
ON/OFF Control	-	N/A			

Output Specifications

Item		Test Condition	Min.	Typ.	Max.	Unit
Output voltage accuracy		Input full voltage range, any load	-	±2.0	±3.0	%
Line regulation		Rated load	-	±0.5	±1.2	
Load regulation		Nominal input voltage, 20%~100% load	-	±1.0	±2.0	
Minimum load		Single Output	10	-	-	%
Turn-on delay		Input 100VDC (Full load)	-	5000	-	mS
		Input 1000VDC (Full load)	-	1000	-	
Power off hold-up time		Input 500VDC (Full load)	-	10	-	
Dynamic response	Overshoot range	25%-50%-25%	-6.0	-	+6.0	%
	Recovery time	50%-75%-50%	-	500	-	mS
Output overshoot		Input full voltage range	≤10			%Vo
Short circuit protection		Input 100-700VDC	Continuous, self-recovery			Hiccup
Temperature Drift coefficient		-	-	±0.05	-	%/℃
Over current protection		Input 200-1000VDC	≥110% Io, self-recovery			Hiccup
Ripple & Noise		-	-	-	200	mV

Note: The Ripple and Noise is tested by the Parallel-line method, please refer to the following test instruction.

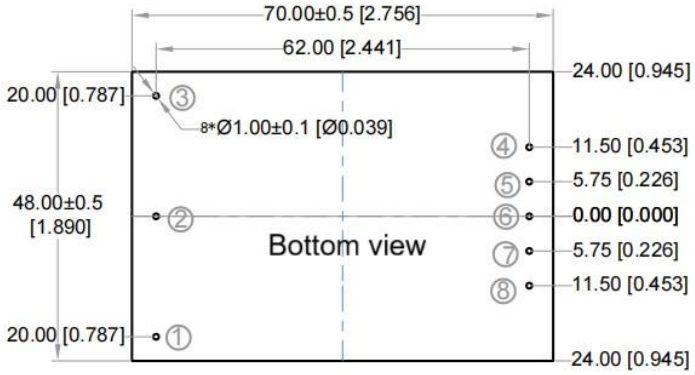
General Specifications

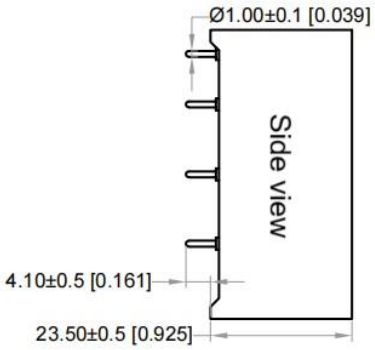
Item	Test Condition		Min.	Typ.	Max.	Unit
Switching frequency	-		-	65	70	KHz
Operating temperature	Please refer to the Temperature Derating Graph		-30	-	+70	℃
Storage temperature	-		-40	-	+85	
Soldering temperature	Wave-soldering		260±5℃，time: 5-10S			
	Manual-soldering		380±10℃，time: 4-7S			
Relative humidity	No condensing		-	-	90	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current ≤5mA	4000	-	-	VAC

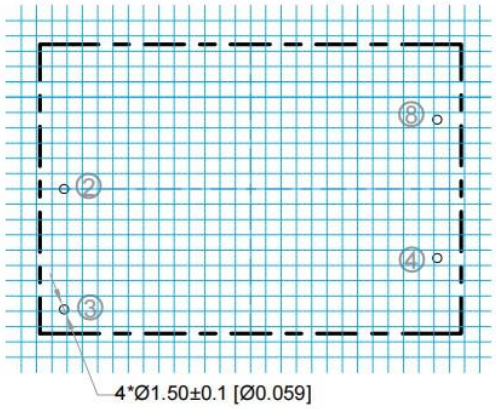
Insulation resistance	I/P-O/P	@DC500V	100	-	-	MΩ
MTBF	MIL-HDBK-217F@25℃		300	-	-	K Hours
Safety standard	-		IEC/EN62368			
Vibration	-		10-55Hz,10G,30 Min, along X, Y, Z			
Safety class	-		CLASS Ⅱ			
Flame class of case	-		UL94-V0			
Cooling method	-		Nature air			

Weights & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H	
	BK15-500SXXH2N6	115g	70.00X48.00X23.50 mm	2.756X1.890X0.925 inch
	BK15-500SXXH2N6-T	160g	96.00X53.80X32.50 mm	3.779X2.118X1.279 inch
	BK15-500SXXH2N6-TS	195g	96.00X53.80X37.00 mm	3.779X2.118X1.456 inch

Mechanical Dimensions







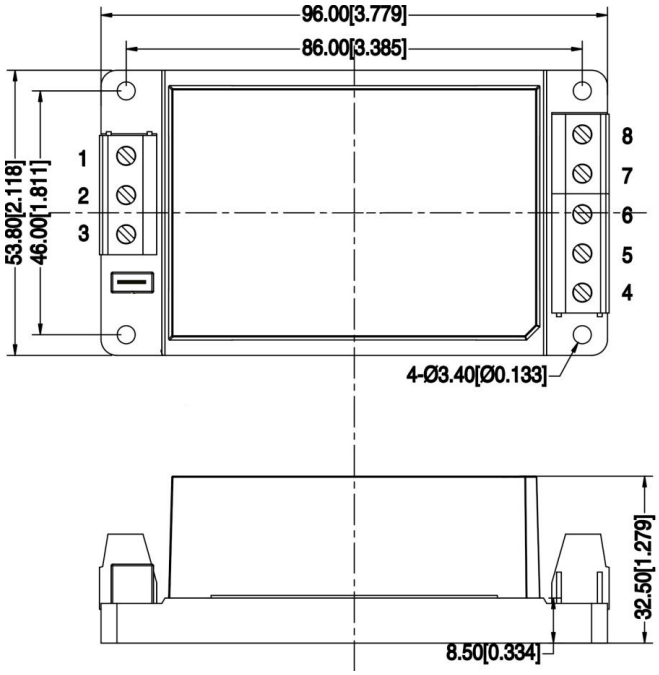
PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

Unit: mm[inch]
Pin diameter tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]

Pin-out Function Description

Pin No.	1	2	3	4	5	6	7	8
Function	No Pin	-Vin	+Vin	+Vo	No Pin	No Pin	No Pin	-Vo

-T Package Mechanical Dimensions

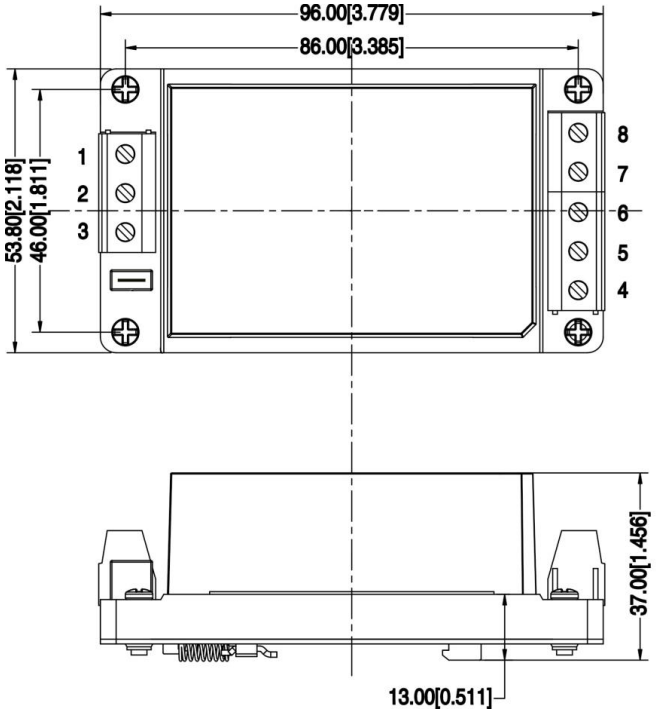


Note:
Unit: mm[inch]
Lead wires gauge: 24-12 AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00[±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6	7	8
Function	NC	-Vin	+Vin	+Vo	NC	NC	NC	-Vo

-TS Package Mechanical Dimensions

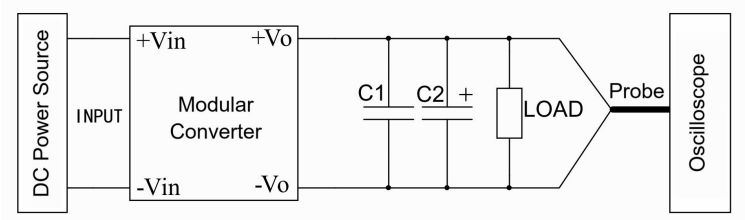


Note:
Unit: mm[inch]
Lead wires gauge: 24-12 AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00[±0.039]

Terminal Function Description

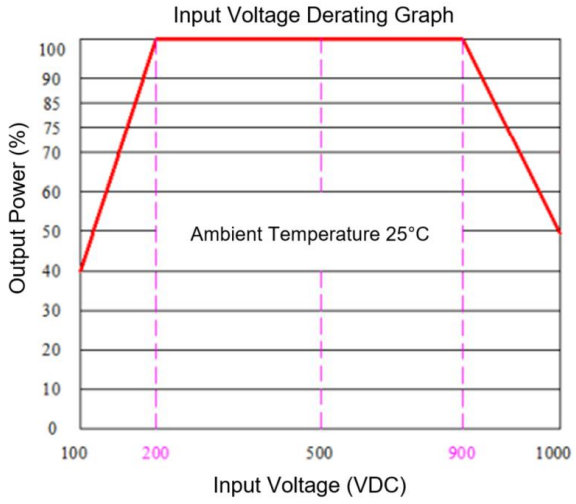
Terminal No.	1	2	3	4	5	6	7	8
Function	NC	-Vin	+Vin	+Vo	NC	NC	NC	-Vo

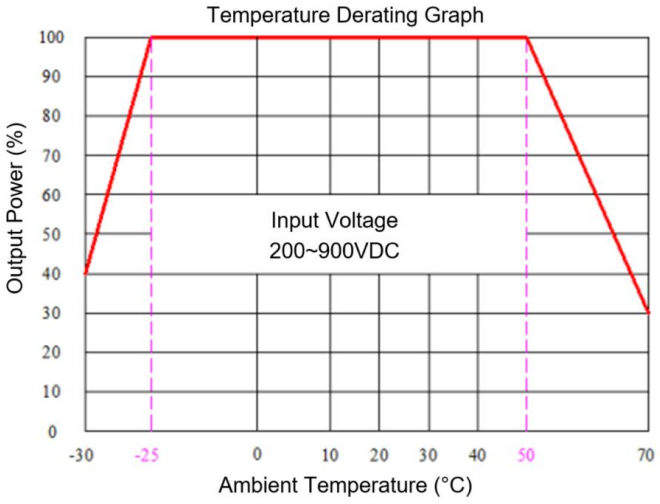
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)

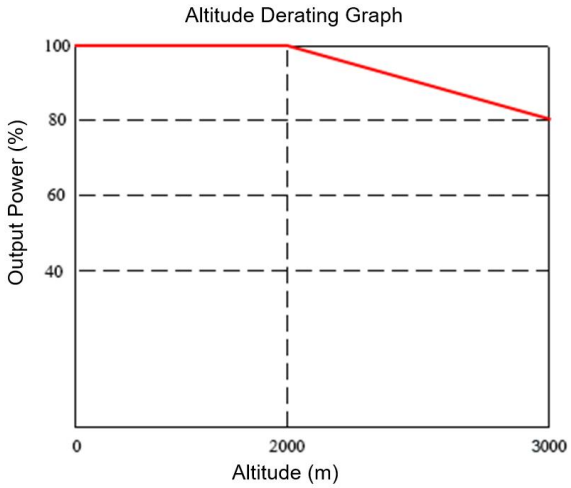


1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high-frequency low-impedance electrolytic capacitor C2(10uF) are connected in parallel with the probe.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The test can start at the converter output terminals after the input power on.

Product Characteristics Graphs



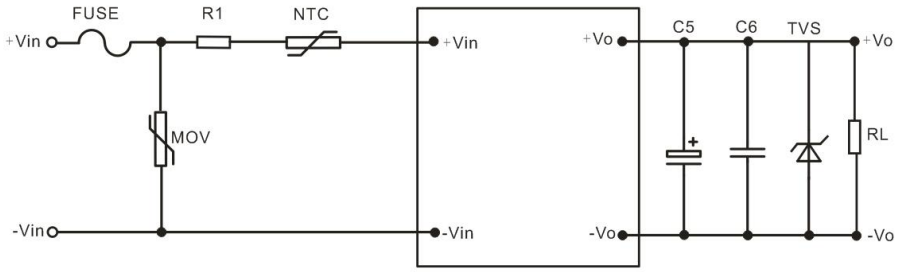




Note 1: The output power should be derated based on the input voltage derating graph at 100~200/900-1000VDC.

Note 2: This product should operate under the condition of natural air, please contact us if it could be used at a closed space.

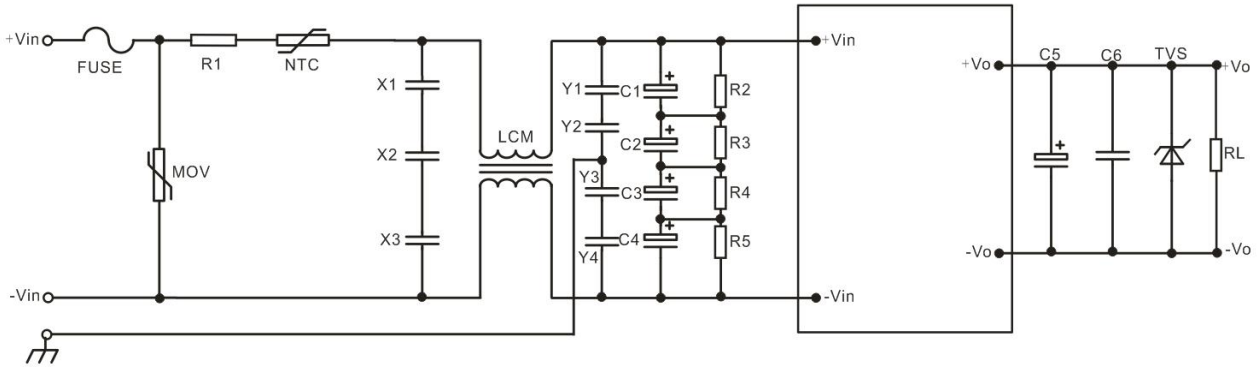
Typical Application Circuit



Output Voltage	C5	C6	TVS
12V	330uF/35V	0.2uF/50V/1206	SMBJ18A
15V	330uF/35V	0.2uF/50V/1206	SMBJ18A
24V	220uF/50V	0.1uF/50V/1206	SMBJ28A

Note: A high-frequency low-impedance electrolytic capacitor is recommended for C5 which capacitance and current should refer to the manufacturer's technical specification, it's withstand voltage should be derated at least 80% of rated. A ceramic SMD capacitor is recommended for C6 which can suppress the high-frequency noise. TVS is recommended to protect the output circuit while the power supply operating under abnormal condition.

Recommended EMC Circuit



Component	Function Description	Recommended Value	Remarks
FUSE	Shut off the input while the converter operating at abnormal condition	TBD according to the actual input current	Required
R1 (Current-Limiting Resistor)	Suppress the start-up transient surge current	300Ω/10W (Cement type resistor)	
NTC	Suppress the surge current	5D-15	
MOV (Metal Oxide Varistor)	Absorb the surges	20D152K/6500A	Optional according to the actual application
X1/X2/X3 (X1 capacitor)	Suppress the differential mode interference	X1/105K/440VAC	
LCM (Common mode Choke)	Suppress the Common mode interference	8mH/0.8A	
Y1/Y2/Y3/Y4 (Y capacitor)		Y1/222M/400VAC	
C1/C2/C3/C4 (E-cap)	Low frequency Filtering	200uF/400V	
R2/R3/R4/R5(SMD resistor)	Voltages balance	1MΩ/2W	

Application Notice

1.The product should be used according to the specifications, otherwise it could be permanently damaged.

2. A fuse should be used at the input.

3. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.

4. The product performance cannot be guaranteed if it works under over-load condition.

5. Unless otherwise specified, all values or indicators on this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

6. All values or indicators on this datasheet have been tested based on Aipupower test specifications.

7.The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.

8. Aipupower can provide customization service.

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