Typical Features

- Ultra-wide input voltage range 200-1200VDC(6:1)
- Input anti-reverse, under-voltage protection
- Output short circuit, over-current, over-voltage protection
- Input/Output Isolation Voltage 4000VDC
- High efficiency, high reliability, low Ripple & Noise
- Application on high-voltage inverters & Solar
- Operating Temperature: -30°C~+70°C
- Industrial grade design, international standard size
- Efficiency: 84% (Typ.)

Application Field

BK40-650SXXW2N4 Series *are regulated DC-DC converters with multi-advantages of ultra-wide DC input of 200-1200VDC, high efficiency, high reliability. This type of power supply is widely used in new energy fields such as solar power generation, high-voltage inverter. The converters can output stable voltage to keep safety for input and the load facility with multiple protections at abnormal conditions. The additional circuit is recommended for higher EMC requirement.*

Typical Product List

Certificate	Part No	Output Specification			Max. Capacitive Load	Ripple & noise 20MHz	Output Efficiency 300VDC (Typ.)
		Power	Voltage	Current			
		(W)	Vo (V)	Io (mA)	uF	mVp-p	%
-	BK40-650S12W2N4	40	12	3333	1200	120	83
-	BK40-650S15W2N4		15	2667	1000	120	84
-	BK40-650S24W2N4		24	1667	800	150	85

Note 1: Please contact with Aipu sales for other output voltages requirement in this series which is not in this list.

Note 2: The typical value of efficiency is based on the product tested after half an hour burn-in at full load.

Note 3: 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 4: The suffix -TS is for a kind of packaging of DIN Rail, all the other performances are the same.

Input Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Input Voltage Range	DC Input	200	600	1200	VDC
		Please refer to Input Voltage Derating Curve for output power.			
Input Current	200VDC@75% Load	-	-	210	mA
	600VDC@100% Load	-	-	82	
	1200VDC@100% Load	-	-	43	
Input Under-Voltage Protection	Start voltage	100	-	120	VDC
	Recovery voltage	170		197	

Input no-load Current	No load	-	-	0.6	mA
External Fuse Recommended	--	4A/1500VDC Time-delay fuse(Not optional)			

Output Specifications

Item		Operating Condition		Min.	Typ.	Max.	Unit
Voltage Accuracy		Full Input voltage range, any Load	Vo	-	±2.0	±3.0	%
Minimum Load		Full Input voltage range	Vo	10	-	-	
Line Regulation			Vo	-	±1.0	±1.5	
Load Regulation		20%~100% rated load	Vo	-	±2.0	±3.0	
Turn On Delay Time		Input rated voltage (full load)		-	2000	-	mS
Power off hold up time		Input 500VDC (full load)		-	5	-	
		Input 1000VDC (full load)		-	10	-	
Dynamic Response	Overshoot Range	25%-50%-25% 50%-75%-50%			±5.0	±6.0	%
	Recovery time				--	500	mS
Output overshoot		Input full voltage range		≤15% Vo			%
Overload protection				Self-recovery after overload			Hiccup
Drift coefficient		--		-	±0.03	-	%/℃
Ripple & Noise		20MHz bandwidth (peak-peak value)		-	80	150	mV
Output Protection	over-current	Full input voltage range		≥110% Io, Hiccup, Self-recovery			
	over-voltage			Feedback clamp limit			
	Short-circuit			Continuous @ Hiccup			

General Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Switching Frequency	--	--	65	--	KHz
Operating Temperature	--	-30	--	+70	℃
Storage Temperature	--	-40	--	+85	
Soldering Temperature	Wave-soldering	260±4℃, 5-10S			
	Manual soldering	400±10℃, 4-10S			
Relative Humidity	--	--	--	95	%RH
Isolation Voltage	Between Input & Output /1Min	4000	--	--	VDC
Insulation Resistance	Between Input & Output @500VDC	--	100	--	MΩ
Vibration	--	10-55Hz,10G, 30Min, along X, Y, Z			
Safety standard	--	IEC/EN/UL62368			
Safety level	--	CLASS I			
MTBF	--	SR-332@25℃＞300KH			

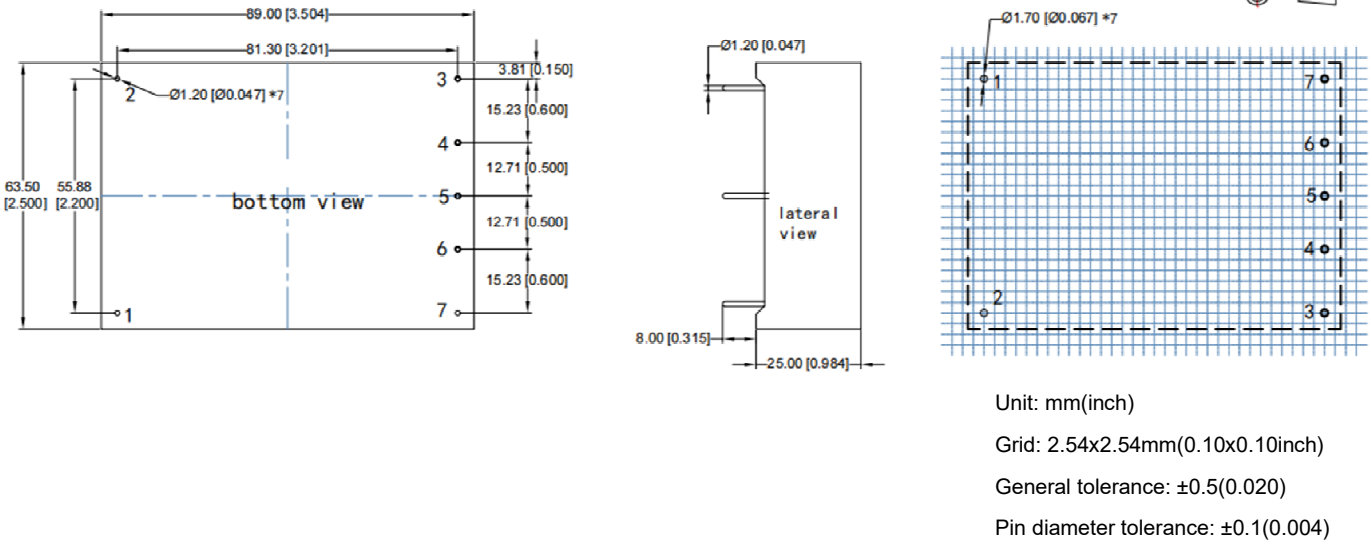
Physical Characteristics

Case Material		Plastic
Package Dimensions	Horizontal package	89.0 X 63.5 X 25.0 mm
Product Weight		236g (TYP)
Cooling method		Nature air

EMC Performances

Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS-A (CLASS-B with additional circuit #2 recommended)
		RE	CISPR32/EN55032	CLASS-A (CLASS-B with additional circuit #2 recommended)
	EMS	RS	IEC/EN61000-4-2	Contact ±6KV Air ±8KV Perf.Criteria B
		CS	IEC/EN61000-4-3	10V/m Perf.Criteria A
		ESD	IEC/EN61000-4-5	±2KV Perf.Criteria B
		Surge	IEC/EN61000-4-4	±2KV Perf.Criteria B
		EFT	IEC/EN61000-4-6	10Vr.m.s Perf.Criteria A

W2 Packaging Dimensions



Unit: mm(inch)

Grid: 2.54x2.54mm(0.10x0.10inch)

General tolerance: ±0.5(0.020)

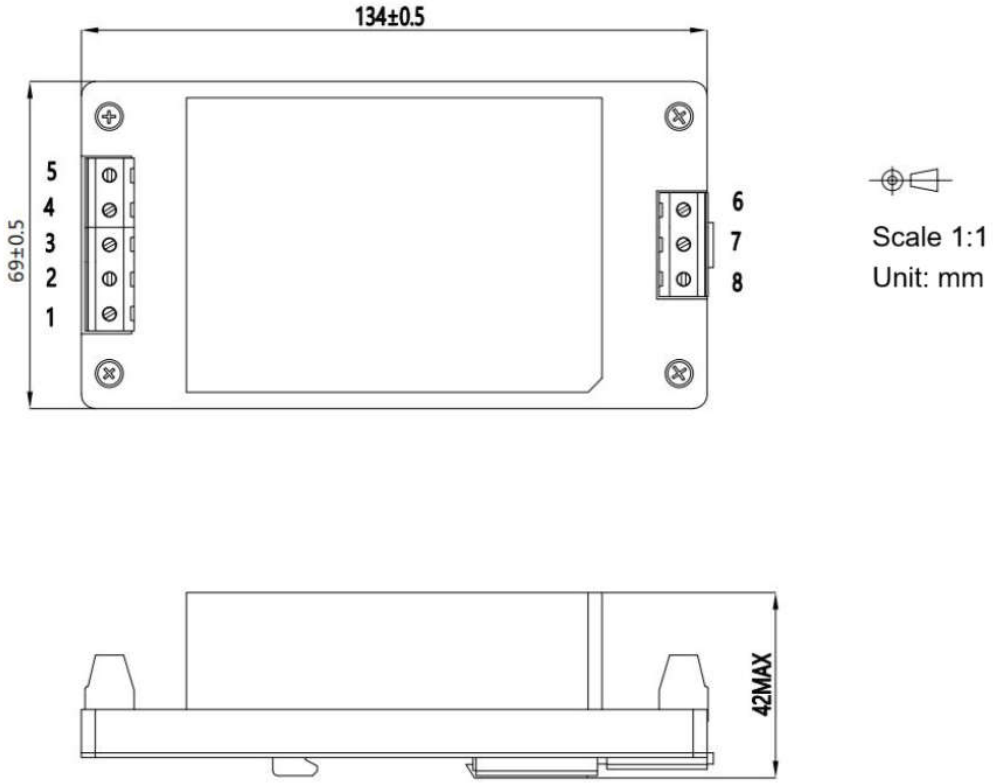
Pin diameter tolerance: ±0.1(0.004)

Part No.	L x W x H	
W2N4	89.0X63.5X25.0 mm	3.504X2.5X0.984 inch

Pin Definition

Pin-Out	1	2	3	4	5	6	7
Single(S)	-Vin	+Vin	NP	NP	-Vo	NP	+Vo

-TS Packaging Dimensions



Part No.	L x W x H	
- TS	134.00x 69.00 x 42.00 mm	5.276 × 2.717 × 1.654 inch

Pin Definition

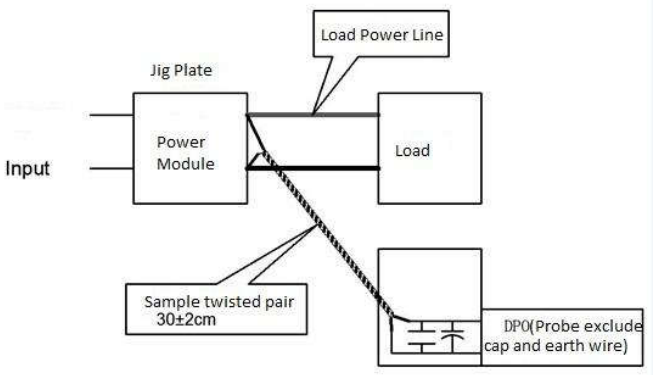
Pin-Out	1	2	3	4	5	6	7	8
Single(S)	Vin+	NC	NC	NC	Vin-	Vo+	Vo-	NC

Ripple& Noise Test Instruction (Twisted Test Method, 20MHz bandwidth)

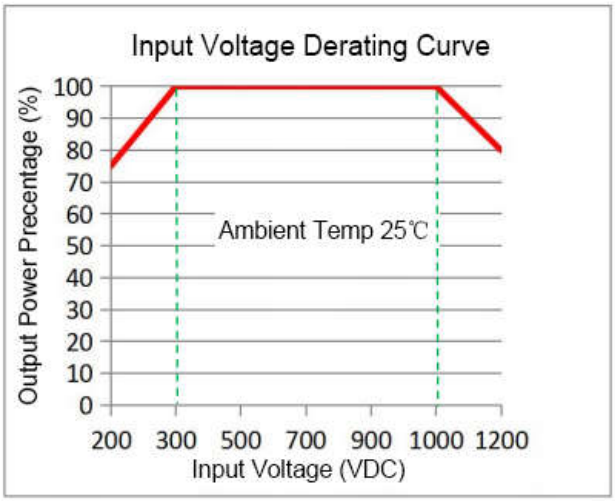
Test Method:

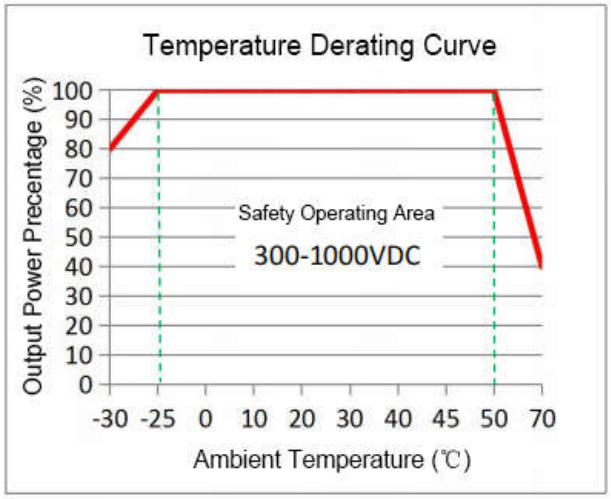
1)Ripple noise test need 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set on the Sample Mode.

2)Please refer to the output ripple noise 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 twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be started after input power on.



Product Performance Curve

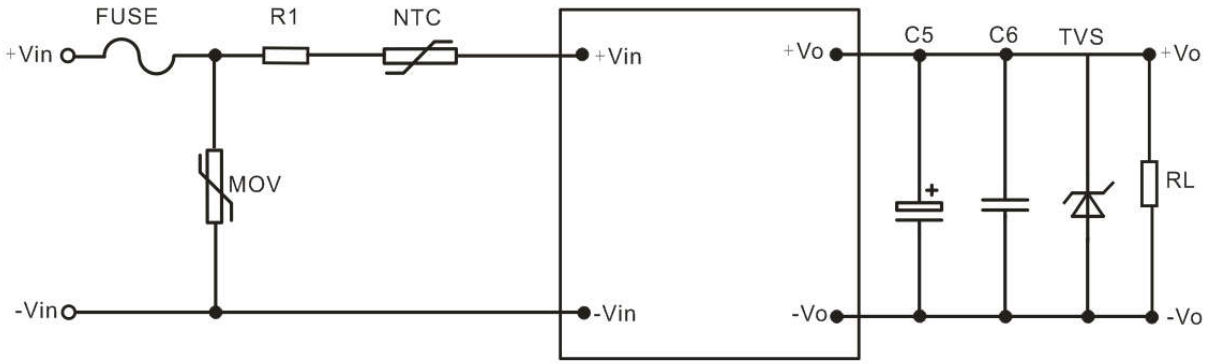




Note 1: The power supply output power should respect the Derating Curve when the input voltage at 200~300VDC/1000~1200VDC.

Note 2: This product should operate at a natural air condition. Please contact us if it is used at a closed space.

Typical Application Circuit



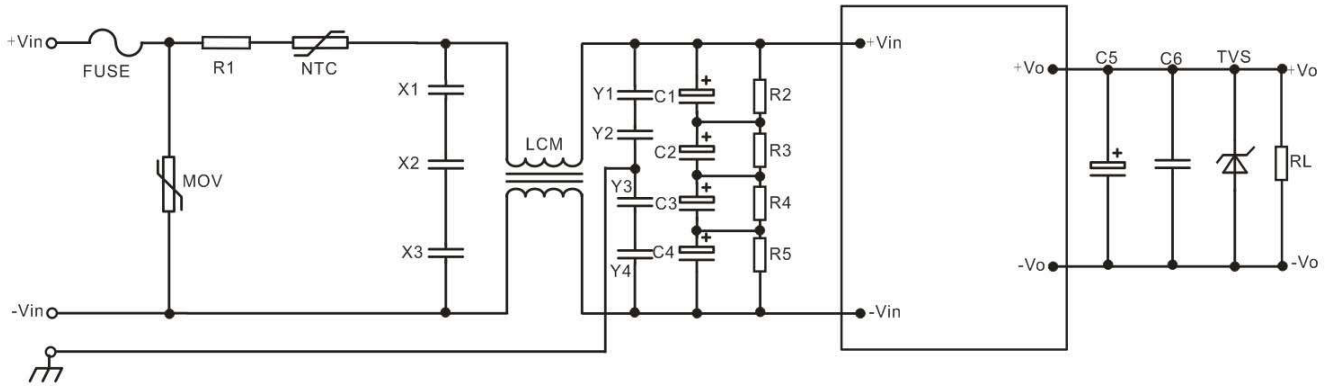
Circuit 1

Output Voltage	FUSE	R1	MOV	NTC	C5	C6	TVS
12V	4A/1500DC Not optional	6.8Ω/10W Linear resistor	20D182K	10Ω/6A /20D	470uF/25V	1uF/50V 1206	SMBJ18A
15V					330uF/50V		SMBJ20A
24V					220uF/50V		SMBJ30A

Note:

Output filter capacitor C5 is recommended to use a high-frequency, low-resistance electrolytic capacitor. For the capacity and current definition, please refer to the technical specifications provided by each manufacturer. The capacitor withstand voltage can be 80% of rated output voltage. C6 is recommended a ceramic capacitor to suppress high-frequency noise. TVS is recommended to protect the output circuits when the convertor operates at abnormal condition.

Recommended Circuit for EMC



Circuit 2

Component	Function	Recommended Spec.	Note
FUSE	Cut off the power when the convertor failed	TBD according to input current	Not optional
R1	Suppress the start-up transient surge current	6.8Ω/10W Liner resistor	
NTC	Suppress the surge current	10Ω/6A/20D	
MOV	Absorb the surges	20D182K	Optional according to actual application
X1/2/3	Suppress the differential mode interference	3x 1.0μF/450V connected in series	
LCM	Suppress the Common mode interference	10mH/0.8A	
Y1/Y2/Y3/Y4		4xY1 2.2nF/400V connected in series	
C1/C2/C3/C4	Low-frequency filter	100uF/400V	
R2/R3/R4/R5	Voltages balance	1MΩ/1W/2512	

Note:

1. The product should be used according to the specifications in this manual, otherwise it could be permanently damaged.
2. A fuse should be used at input.
3. The product performances in this manual cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performances in this manual cannot be guaranteed if it works at over-load condition.
5. Unless otherwise specified, all values or indicators in this manual are tested at Ta=25℃, humidity<75%RH, rated input voltage and rated load (pure resistance load).
6. All values or indicators in this manual had been tested based on Aipupower test specifications.
7. The specifications are specially for the parts listed in this manual, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirement.
8. Aipupower can provide customization service.

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