

Typical Features

- ◆ Wide input voltage range 350-2000VDC
- ◆ No load power consumption $\leq 1.5W$
- ◆ Efficiency up to 83% (Typ.)
- ◆ Operating temperature from $-30^{\circ}C$ to $+70^{\circ}C$
- ◆ Switching frequency 65KHz
- ◆ Input reverse polarity protection
- ◆ Short circuit, over current, over voltage protections
- ◆ Isolation voltage 4000VAC
- ◆ Altitude during operation 5000m Max
- ◆ OVC II
- ◆ Pollution degree II
- ◆ Suitable for photovoltaic (PV) power generation and high-voltage inverter applications.



Application Field

The **BK15-P4S24W series** features compact, high-efficiency DC-DC modular converters with a wide input voltage range, low ripple, low temperature rise, low standby power consumption, high reliability, safe isolation, and excellent EMC performance. This series is widely used in applications such as photovoltaic (PV) power generation, home energy storage, and industrial control. Multiple protection functions ensure the safety of both the power supply and the load under abnormal operating conditions. For applications with strict EMC requirements, please refer to our recommended EMC application circuit.

Typical Product List

Certificate	Part No	Input Voltage Range		Output Specifications			Max Capacitive Load @800VDC	Ripple & Noise 20MHz (Max)	Efficiency @full load, 800VDC (Typ.)
		Nominal	Range	Power	Voltage	Current			
		(VDC)	(VDC)	P(W)	Vo(VDC)	Io(mA)			
-	*BK15-P4S12W(-T)(-TS)(-TS1)	800	350	15	12	1250	1000	240	80
-	*BK15-P4S15W(-T)(-TS)(-TS1)		-		15	1000	680	240	81
-	BK15-P4S24W(-T)(-TS)(-TS1)		2000		24	625	470	240	83

Note 1: Models marked with an asterisk (*) are currently under development.

Note 2: Typical output efficiency is measured after 30 minutes of operation at full load (burn-in).

Note 3: The tolerance for typical full-load efficiency (% , Typ.) is $\pm 2\%$. Efficiency is calculated as total output power divided by the input power of the module.

Note 4: Ripple & Noise are measured using the parallel cable method. For detailed test configurations, please refer to the "Ripple & Noise Testing Method" section below.

Note 5: All models offer three package variations: μ Ffix "-T" indicates chassis mounting (terminal block), while "-TS" and "-TS1"

indicate DIN-rail mounting (69mm width). All other electrical specifications remain identical.

Note 6: Due to space constraints, this is only a partial product list. For models not listed, please contact our sales department.

Input Specifications

Item	Test Condition	Min.	Typ.	Max.	Unit
Input voltage range	DC input	350	800	2000	VDC
Input current	Input 350VDC	-	-	0.07	A
	Input 800VDC	-	-	0.04	
Surge current	Input 800VDC	-	-	80	A
	Input 1500VDC	-	-	110	
Under voltage protection	Start protection	220	-	340	VDC
	Recovery	250	-	350	
Standby power consumption	Input 2000VDC	-	-	1.5	W
Recommended external fuse	-	4A/2000VDC (Required). Fuse voltage rating must exceed max. input voltage.			
Reverse polarity protection	-	Supported			
Hot-plug	-	Not Supported			

Output Specifications

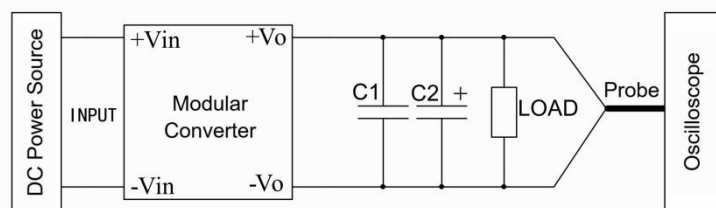
Item	Test Condition	Min.	Typ.	Max.	Unit	
Output voltage accuracy	Input full voltage range, any Load	-	±2.0	±3.0	%	
Line regulation	Rated load	-	±1.0	±1.5		
Load regulation	Nominal input voltage, 0%~100% load	-	±2.0	±2.5		
Minimum load	Single output	0	-	-		
Temperature drift coefficient	-	-	±0.02	-	%/°C	
Turn-on delay time	Nominal Input Voltage (Full Load)	-	-	2000	mS	
Power off hold-up time	350VDC Input (full load)	5	-	-		
	800VDC Input (full load)	20	-	-		
Dynamic response	Overshoot range	25%-50%-25%	-5.0	-	+5.0	%
	Recovery time	50%-75%-50%	-	-	5.0	mS
Output start-up overshoot	Full input voltage range	≤10			%Vo	
Short circuit protection		Continuous, self-recovery			Hiccup	
Over current protection	Full input voltage range	≥120%Io, self-recovery			Hiccup	
Over voltage protection	Output 12VDC	≤16			VDC	
	Output 15VDC	≤25				
	Output 24VDC	≤35				
Ripple & Noise	5%-100% load, 20MHz bandwidth	-	-	240	mVp-p	

Note 1: Ripple & Noise are measured using the parallel cable method. For detailed test methods and configurations, please refer to the "Ripple & Noise Testing Method" section below.

General Specifications						
Item	Test Condition		Min.	Typ.	Max.	Unit
Switching frequency	Full Load Output		-	65	-	KHz
Operating temperature	Refer to the Temperature Derating Graph		-30	-	+70	°C
Storage temperature	-		-30	-	+105	°C
Case temperature rise	Ta=30°C @ Output 100% load		-	55°	-	°K
Soldering temperature	Wave-soldering		260±4°C, time 5-10S			
	Manual-soldering		360±8°C, time 4-7S			
Storage humidity	-		-	-	95	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current ≤5mA	4000	-	-	VAC
Insulation resistance	I/P-O/P	@500VDC	100	-	-	MΩ
MTBF	MIL-HDBK-217F @ 25°C		300	-	-	K Hours
Case material	-		Plastic			
Vibration	-		10-55Hz, 10G, 30 Min, along X, Y, Z			
Safety class	-		CLASS II			
Weights & Dimensions	Part No.	Weight (Typ.)	Dimensions L x W x H			
	BK15-P4S24W	230g	89.00x63.50x25.00 mm		3.504x2.500x0.984 inch	
	BK15-P4S24W-T	310g	134.00x69.00x33.30 mm		5.276x2.717x1.311 inch	
	BK15-P4S24W-TS	380g	134.00x69.00x38.90 mm		5.276x2.717x1.531 inch	
	BK15-P4S24W-TS1	380g	135.00x69.00x38.90 mm		5.315x2.717x1.531 inch	

EMC Performance					
Items		Test Standards	Performance/Class		
EMC	EMI	CE	CISPR32/EN55032	Class A @100% load (with the recommended EMC circuit 2)	
		RE	CISPR32/EN55032	Class A @100% load (with the recommended EMC circuit 2)	
	EMS	ESD	IEC/EN61000-4-2	Contact ±6KV, Air ±8KV Perf. Criteria B	
		RS	IEC/EN61000-4-3	10V/m Perf. Criteria B	
		Surge	IEC/EN61000-4-5	Line to line ±1KV Perf. Criteria B Line to line ±2KV Perf. Criteria B (with the recommended EMC circuit 2)	
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B ±4KV Perf. Criteria B (with the recommended EMC circuit 2)	
		CS	IEC/EN61000-4-6	10Vr.m.s Perf. Criteria A	

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



1. Ripple & Noise Test Configuration:

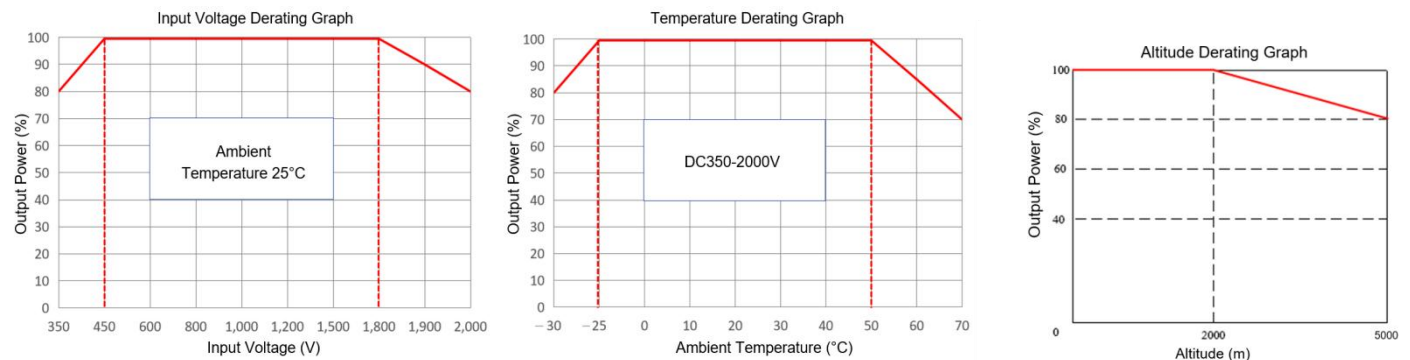
Ripple and noise are measured using the parallel cable method. Set the oscilloscope to 20MHz bandwidth and Sample mode. Use a

100MHz bandwidth probe with the probe cap and ground clip removed. Connect a 0.1μF ceramic capacitor (C1) and a 10μF high-frequency, low-ESR electrolytic capacitor (C2) in parallel at the probe tip.

2. Test Setup Diagram Description:

Connect the input of the module to the power supply, and connect the output to the electronic load via a test jig. Use dedicated sampling wires to measure directly at the output terminals. Ensure that insulated power cables with an appropriate wire gauge are selected based on the actual output current.

Product Characteristics Graphs



Note 1: For input voltages of 350-450VDC and 1800-2000VDC, the output power must be derated according to the input voltage derating curve.

Note 2: This product is designed for natural convection cooling. Please contact us for applications in enclosed environments.

Typical Circuit for Application

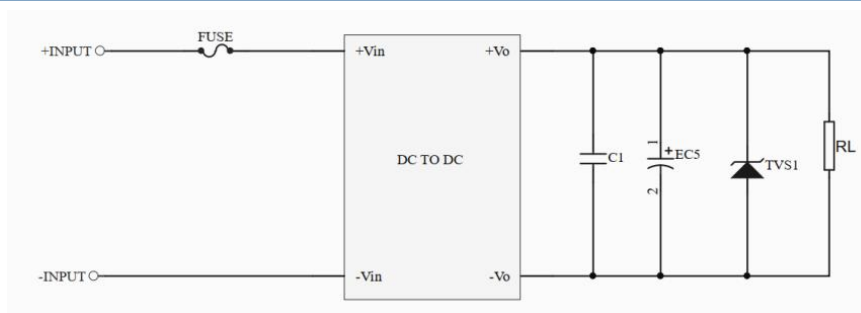


Figure - Circuit 1

Part No.	FUSE	C1	EC5	TVS1
BK15-P4S12W(-T)(-TS)(-TS1)	4A,2000VDC, time-delay fuse (required)	1μF/50V	120μF/16V	SMBJ20A
BK15-P4S15W(-T)(-TS)(-TS1)			120μF/25V	SMBJ20A
BK15-P4S24W(-T)(-TS)(-TS1)			68μF/35V	SMBJ30A

Recommended EMC Circuit Diagram

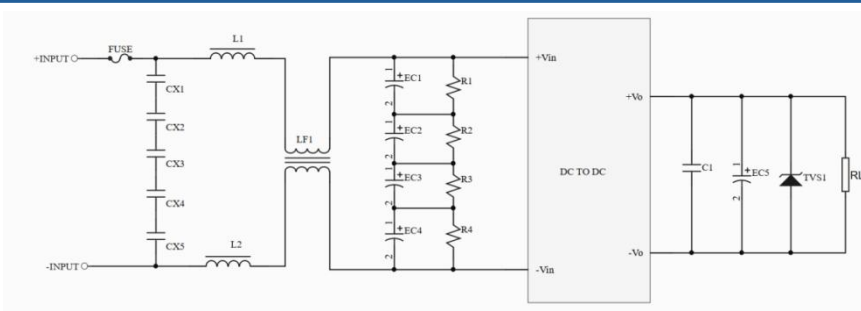
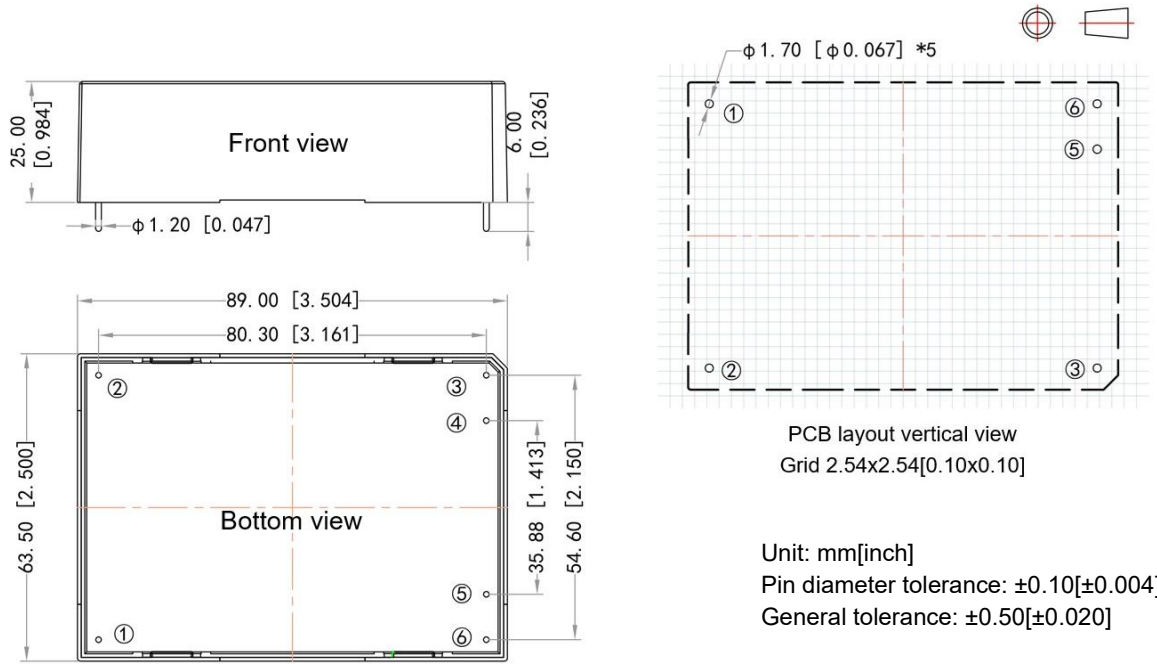


Figure - Circuit 2

Part No.	FUSE	CX1, CX2, CX3, CX4, CX5	L1, L2	LF1	EC1, EC2, EC3, EC4, EC5	R1, R2, R3, R4
BK15-P4SXXW(-T)(-TS)(-TS1)	4A/2000VDC, slow blow fuse (required)	474K/275VAC	190μH/1A	15mH/1A (with TIW wire)	10μF/550VDC	1.5MΩ /2W

Note: In the end product, a UL-compliant Surge Protective Device (SPD) with a maximum VPR/MLV of 4000V must be installed at the input circuit. For other parameters, please refer to Figure 1.

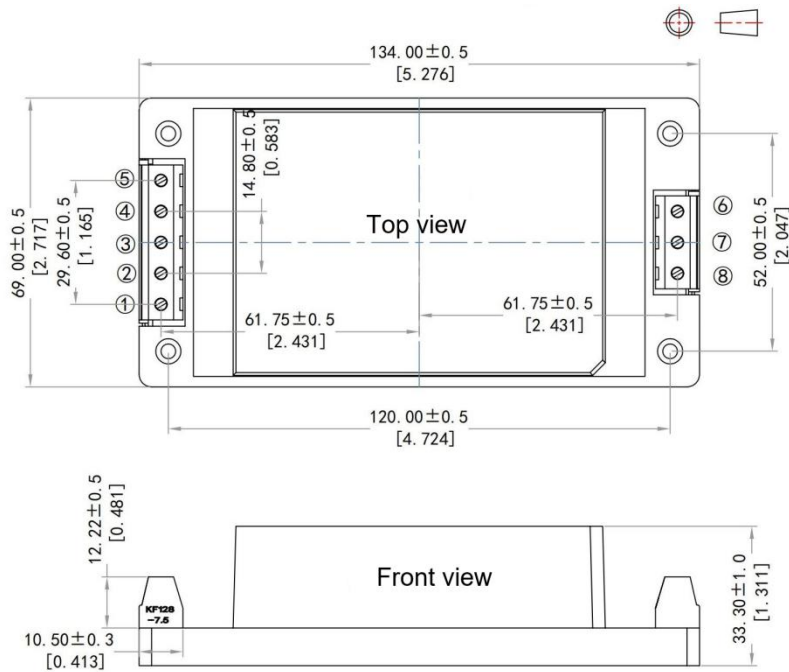
Mechanical Dimensions



Pin-out Function Description

Pin No.	1	2	3	4	5	6
Function	-Vin	+Vin	NC	NP	-Vo	+Vo
	Input Negative	Input Positive	No Connection	No Pin	Output Negative	Output Positive

(-T) Mechanical Dimensions

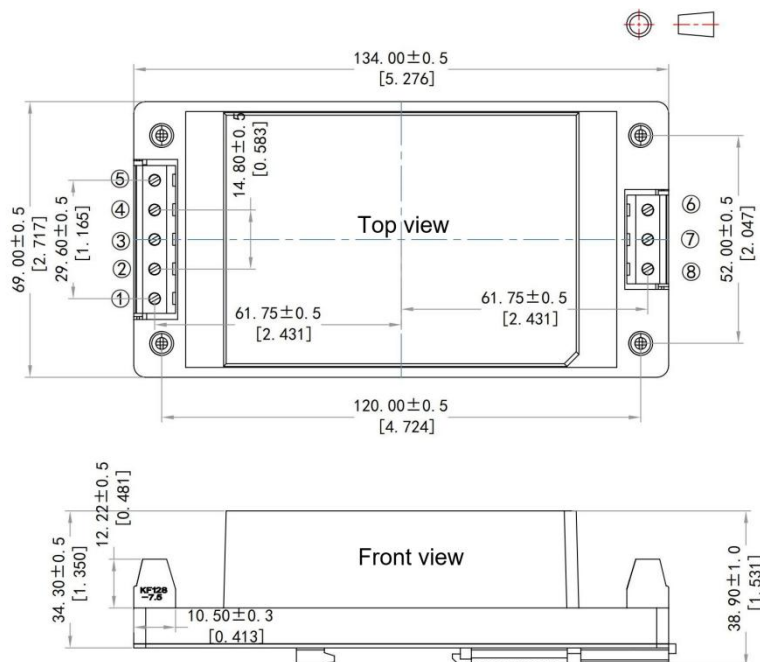


Note:
 Unit: mm[inch]
 Lead wires gauge: 24-12AWG
 Screwing torque: 0.4N.m Max
 General tolerance: $\pm 1.00[\pm 0.039]$

Terminal Function Description

Terminal No.	1	2	3	4	5	6	7	8
Function	+Vin	NC	NC	NC	-Vin	+Vo	-Vo	NC
	Input Positive	No Connection			Input Negative	Output Positive	Output Negative	No Connection

(-TS) Mechanical Dimensions

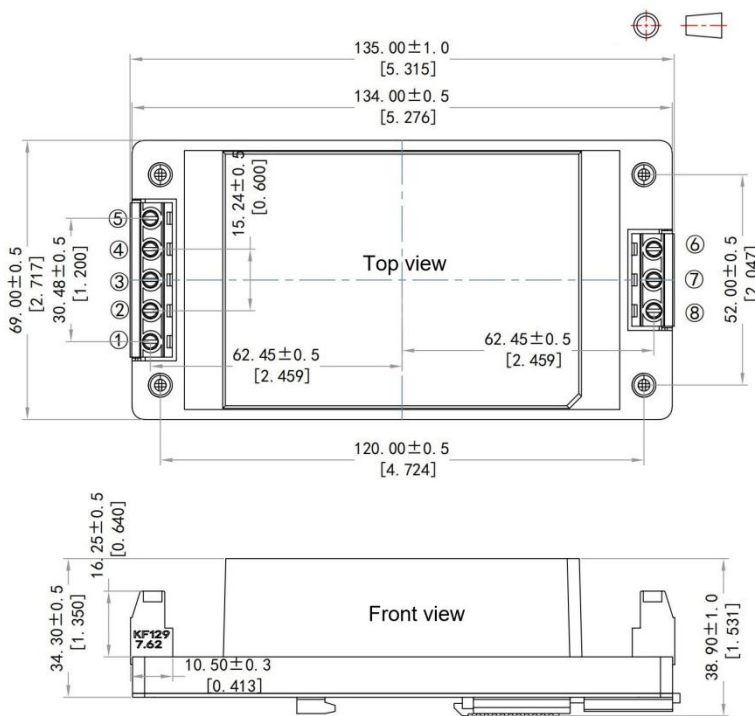


Note:
 Unit: mm[inch]
 Lead wires gauge: 24-12AWG
 Screwing torque: 0.4N.m Max
 General tolerance: $\pm 1.00[\pm 0.039]$

Terminal Function Description

Terminal No.	1	2	3	4	5	6	7	8
Function	+Vin	NC	NC	NC	-Vin	+Vo	-Vo	NC
	Input Positive	No Connection			Input Negative	Output Positive	Output Negative	No Connection

(-TS1) Mechanical Dimensions



Note:
 Unit: mm[inch]
 Lead wires gauge: 24-12AWG
 Screwing torque: 0.4N.m Max
 General tolerance: ±1.00[±0.039]
 NC means No Connection

Terminal Function Description

Terminal No.	1	2	3	4	5	6	7	8
Function	+Vin	NC	NC	NC	-Vin	+Vo	-Vo	NC
	Input	No Connection			Input Negative	Output Positive	Output Negative	No Connection

Application Notice:

1. The product must be operated within the specified parameters; otherwise, permanent damage may occur.
2. An external fuse must be connected to the input terminal.
3. If the product operates below the minimum load requirement, we cannot guarantee that all performance specifications in this manual will be met.
4. If the product operates beyond its specified load range, we cannot guarantee that all performance specifications in this manual will be met.
5. Unless otherwise specified, all specifications are measured at Ta = 25° C, humidity < 75%, nominal input voltage, and rated output load (resistive load).
6. All testing methods for the specifications listed above are based on our corporate standards.
7. The specifications listed above apply to the standard models in this manual. Specifications for non-standard or customized models may vary. For specific details, please contact our technical support team.
8. Aipupower can offer customized power solutions to meet specific requirements.

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