

Dual Output Models



Size: 3.15 x 1.58 x 1.38in (80 x 40 x 35mm)

PSHIC15-5912T



Size: 3.94 x 1.97 x 1.81in (100 x 50 x 30mm)

PSHIC15-512T



Size: 2.76 x 1.9 x 0.91in (70 x 48.01 x 23mm)

OPTIONS

- Dual or Triple Output
- Three or Four Wire Frame for Dual Output

FEATURES

- High Voltage Input Models
- Dual Output Models Work Well with Any Two Phases
- High Efficiency & Reliability
- 3 Year Warranty
- Short Circuit, Over Voltage, & Over Current Protection
- Three Phase Three Wire or Four Wire Open Frame Available for Dual Output Models
- RoHS Compliant
- Safety Class II

DESCRIPTION

The PSHIC15 series of open frame AC/DC converters offers four different high voltage input models with 10.92-18.7 watts of output power. Each model in this series features high efficiency and reliability, is RoHS compliant, and they also have short circuit, over voltage, and over current protection. The dual output models in this series have the option of a three wire or four wire open frame and they work well with any two phases. All models in this series are safety class II and have a 3 year warranty. Please contact factory for order information.

MODEL SELECTION TABLE

Model Number	Input Voltage Range	Output Voltage				Output Current				Maximum Capacitive Load				Efficiency		Output Power
		Vo1	Vo2	Vo3	-Vo2	Io1	Io2	Io3	-Io2	Vo1	Vo2	Vo3	-Vo2	@220 VAC	@230 VAC	
PSHIC15-512D	57-528VAC (80-745VDC)	5.1VDC	12VDC	-		1200mA	400mA	-		400µF	1200µF	-		78%	-	10.92W
PSHIC15-135D		13.5VDC	5VDC	-		1000mA	300mA	-		1300µF	400µF	-		78%	-	15W
PSHIC15-5912T	160-264VAC (226-370VDC)	5.9VDC	12VDC	12VDC	-	1000mA	400mA	100mA	-	2000µF	1000µF	330µF	-	-	79%	15W
PSHIC15-512T	165-264VAC (230-370VDC)	5VDC	12VDC	-	-12VDC	500mA	1200mA	-	150mA	680µF	1000µF	-	330µF	-	78%	18.7W

SPECIFICATIONS

All specifications are based on 25°C, Humidity <75%, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION			TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS								
Input Voltage Range	Dual Output Models		AC Input	57		528	VAC	
			DC Input	80		745	VDC	
	PSHIC15-5912T		AC Input	160		264	VAC	
			DC Input	226		370	VDC	
	PSHIC15-512T		AC Input	165		264	VAC	
			DC Input	230		370	VDC	
Input Frequency				47		63	Hz	
Input Current	PSHIC15-512D, 100VAC					0.4	A	
	PSHIC15-135D, 100VAC					0.5		
	PSHIC15-5912T	160VAC			0.4			
		230VAC			0.3			
	PSHIC15-512T	165VAC			0.4			
		230VAC			0.3			
Inrush Current	Dual Output Models		115VAC		25		A	
			220VAC		40			
	PSHIC15-5912T		160VAC		20			
			230VAC		30			
	PSHIC15-512T		165VAC		23			
			230VAC		30			
Leakage Current	PSHIC15-512D Model Only, 220VAC				0.3		mA	
Recommended External Input	Dual Output Models			3.15A, Slow Fusing, Necessary				
	PSHIC15-512T			2A/250VAC, Slow Fusing				
Input Over-Voltage Protection	PSHIC15-5912T Model Only	Input Voltage <418VAC (Input Limit)	Protection Start	290		325	VAC	
			Protection Release	265		285		

SPECIFICATIONS

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SPECIFICATION				TEST CONDITIONS		Min	Typ	Max	Unit
OUTPUT SPECIFICATIONS									
Output Voltage					See Table				
Voltage Accuracy	Dual Outputs, Balanced Load		Primary Output (Vo1)			±2		%	
			Secondary Output (Vo2)			±10			
	PSHIC15-5912T		Primary Output (Vo1)			±2	±8.3		
			Secondary Output (Vo2, Vo3)			±5			
	PSHIC15-512T		Primary Output (Vo2)						±2
			Secondary Output (-Vo2, Vo1)						±3
Line Regulation	Full Load		Primary Outputs			±0.5		%	
Secondary Outputs				±1.5					
Load Regulation ⁽¹⁾	10%-100% Load		Primary Outputs			±3		%	
			Secondary Outputs			±5			
Output Power					See Table				
Output Current					See Table				
Minimum Load	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T Models				10			%	
	PSHIC15-512T		Primary Output (Vo2)		10				
			Secondary Output (-Vo2/Vo1)		0				
Maximum Capacitive Load					See Table				
Ripple & Noise ⁽²⁾	20MHz BW	PSHIC15-512D	57-582VAC Input	Primary Output (Vo1)			150	mVp-p	
				Secondary Output (Vo2)			250		
			220VAC Input	Primary Output (Vo1)		60			
				Secondary Output (Vo2)		120			
		PSHIC15-135D	Primary Output (Vo1)			150			
				Secondary Output (Vo2)			250		
			PSHIC15-5912T	Primary Output (Vo1)		50	80		
				Secondary Output (Vo2, Vo3)		100	150		
		PSHIC15-512T				100	200		
		Standby Power Consumption	220VAC		PSHIC15-512D				0.30
PSHIC15-135D						0.5			
Hold-Up Time	PSHIC15-512D	220VAC Input, Io=100%			80		mS		
	PSHIC15-135D	220VAC Input, Io=100%			50				
	PSHIC15-5912T	230VAC Input			50				
	PSHIC15-512T	165VAC Input (Vo2)			10				
		230VAC Input (Vo2)			35				
Temperature Coefficient	PSHIC15-512D		Primary Output (Vo1)			±0.02		%/°C	
			Secondary Output (Vo2)			±0.06			
	PSHIC15-135D & PSHIC15-5912T, Primary Output					±0.02			
PROTECTION									
Short Circuit Protection	PSHIC15-512D, PSHIC15-135D, & PSHIC5912T				Hiccup, Continuous, Self-Recovery				
	PSHIC15-512T, Continuous, Self-Recovery		-Vo2, Vo1		Short Circuit, Other Normal Output				
Vo2			All Short Circuit Protection						
Over Current Protection	Self-Recovery	PSHIC15-512D		120		300	%Io		
		PSHIC15-135D		150					
		PSHIC15-5912T		150		350			
		PSHIC15-512T			≥110				
Over Voltage Protection	PSHIC15-512D	Primary Output (Vo1)			≤8	VDC			
		Secondary Output (Vo2)			≤20				
	PSHIC15-135D, Balanced Load	Primary Output (Vo1)			≤16				
		Secondary Output (Vo2)			≤7.5				
	PSHIC15-5912T	5.9VDC Output			≤7.5				
		12VDC Output			≤25				
	PSHIC15-512T	Primary Output (Vo2)		≤20VDC (-Vo2/Vo1 Nominal Output)					
		Secondary Output (-Vo2, Vo1)		No Over Voltage Protection					

SPECIFICATIONS

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SPECIFICATION			TEST CONDITIONS		Min	Typ	Max	Unit
ENVIRONMENTAL SPECIFICATIONS								
Operating Temperature	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T				-40		+70	°C
	PSHIC15-512T				-25		+70	
Storage Temperature	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T				-40		+85	°C
	PSHIC15-512T				-25		+85	
Storage Humidity	PSHIC15-512D, PSHIC15-135D, PSHIC15-512T						90	%RH
	PSHIC15-5912T						95	
Welding Temperature	Wave-Soldering				260±5°C; time: 5-10s			
	Manual-Welding				360±10°C; time: 3-5s			
Power Derating	PSHIC15-512D	-40 to 0°C		0.50			% / °C	
		+60 to +70°C		3.00				
	PSHIC15-135D	-40 to 0°C		1.00				
		+50 to +70°C		2.00				
	PSHIC15-5912T	-40 to -10°C		1.00				
		+55 to +70°C		2.00				
PSHIC15-512T		+55 to +70°C		2.00				
Altitude	Dual Output Models						2000	m
MTBF	MIL-HDBK-217F, @25°C	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T			300,000			hours
		PSHIC15-512T			≥300,000			
Cooling Method					Free Air Convection			
GENERAL SPECIFICATIONS								
Efficiency					See Table			
Switching Frequency						65		kHz
Isolation Voltage	Test Time: 1min	PSHIC15-512D	Input-Output	4000			VAC	
			Output-Output	4000				
		PSHIC15-135D	Input-Output	4000			VAC	
			Output-Output	3000				
		PSHIC15-5912T	Input-Output	4000			VAC	
		PSHIC15-512T	Input-Output	3000			VAC	
	Output (Vo2/-Vo2) – Output (Vo1)	500			VDC			
Insulation Resistance	PSHIC15-512D			100			MΩ	
	PSHIC15-135D			50				
PHYSICAL SPECIFICATIONS								
Weight	Dual Output Models				2.65oz (75g) Typ.			
	PSHIC15-5912T				3.00oz (85g) Typ.			
	PSHIC15-512T				1.98oz (56g) Typ.			
Dimensions (L x W x H)	Dual Output Models				3.15in x 1.58in x 1.38in (80mm x 40mm x 35mm)			
	PSHIC15-5912T				3.94in x 1.97in x 1.81in (100mm x 50mm x 30mm)			
	PSHIC15-512T				2.76in x 1.9in x 0.91in (70mm x 48.01mm x 23mm)			
Cooling Method					Free Air Convection			
SAFETY CHARACTERISTICS								
Safety Class					Class II			
Safety Standards	PSHIC512T Model Only				IEC60950/EN60950/UL60950 ⁽⁹⁾			
EMI	PSHIC15-512D	CE	CISPR22/EN55022	Class B				
		RE	CISPR22/EN55022	Class B				
	PSHIC15-135D & PSHIC15-512T	CE	CISPR22/EN55022	Class A				
		RE	CISPR22/EN55022	Class A				
	PSHIC15-5912T	CE	CISPR32/EN55032	Class B				
		RE	CISPR32/EN55032	Class B				
ESD	IEC/EN61000-4-2	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T	Contact ±6kV/Air±8kV		Perf. Criteria B			
PSHIC15-512T		Contact ±4kV/Air±6kV						
RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A					
EFT	IEC/EN61000-4-4	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T	±4kV		Perf. Criteria B			
		PSHIC15-512T	+2kV		Perf. Criteria B			

SPECIFICATIONS

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SPECIFICATION	TEST CONDITIONS			Min	Typ	Max	Unit
SAFETY CHARACTERISTICS (Cont.)							
Surge	IEC/EN61000-4-5	PSHIC15-512D & PSHIC15-135D	Line to Line: ±2kV				Perf. Criteria B
			Line to Line: ±4kV ⁽³⁾				
		PSHIC15-5912T	Line to Line: ±2kV				Perf. Criteria B
		PAHIC15-512T	Line to Line: ±1kV				Perf. Criteria B
			Line to Ground: ±2kV				
CS	IEC/EN61000-4-6	PSHIC15-512D, PSHIC15-135D, PSHIC15-5912T	10Vr.m.s.				Perf. Criteria A
PFM	IEC/EN61000-4-8	PSHIC15-5912T	10A/m				Perf. Criteria A
Voltage Dips, Short Interruptions and Voltage Variations Immunity	IEC/EN61000-4-11	PSHIC15-512D, PSHIC15-135D, & PSHIC15-5912T	0%, 70%				Perf. Criteria B

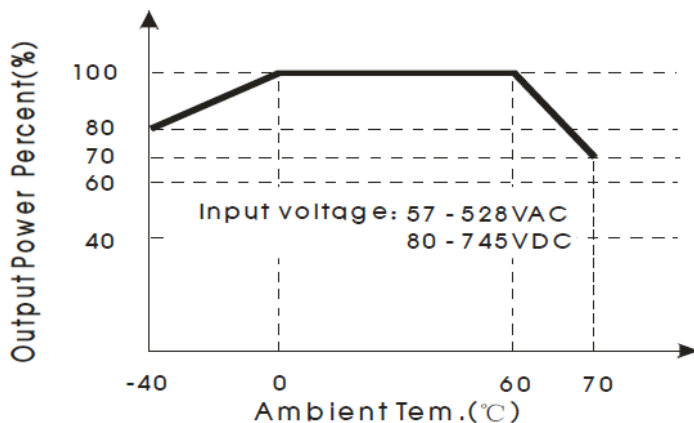
NOTES

- Load regulation for PSHIC15-5912T is isolated triple output (balanced load).
- Ripple and noise are measured by "parallel cable" method.
- See EMC solution for recommended circuit
- If product is not operated within required load range, product performance cannot be guaranteed to comply with all parameters in the datasheet.
- Dual Output Models: In order to improve conversion efficiency when the module is working under high pressure, module may have certain audio noise, but this does not affect the reliability of the product.
- Dual Output Models: Product picture is for reference only. Please refer to actual product.
- PSHIC15-5912T products should be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.
- Product customization is available, please contact factory for more information.
- This product is Listed to applicable standards and requirements by UL.

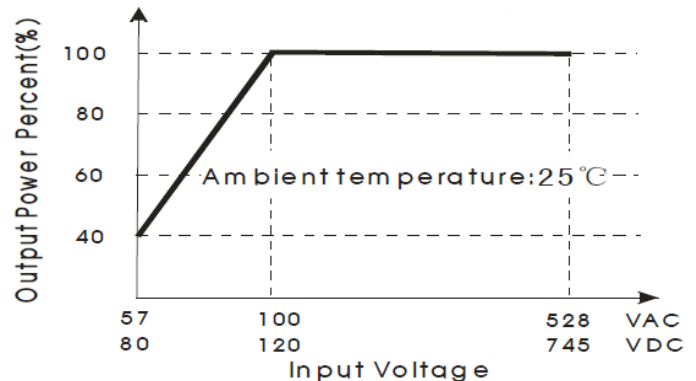
*Due to advances in technology, specifications subject to change without notice.

CHARACTERISTIC CURVES

PSHIC15-512D Temperature Derating Curve



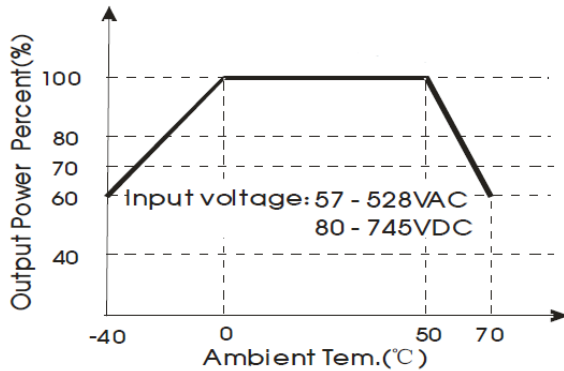
PSHIC15-512D Input Voltage Derating Curve



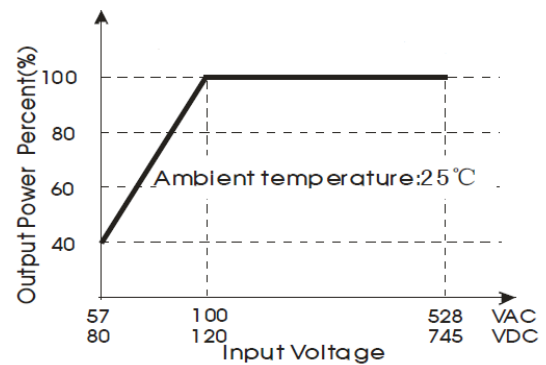
Note:

- Input voltage should be derated based on temperature derating when it is 57-100VAC/80-120VDC
- This product is suitable for use in natural air cooling environments, if in a closed environment, please contact factory for information.

PSHIC15-135D Temperature Derating Curve



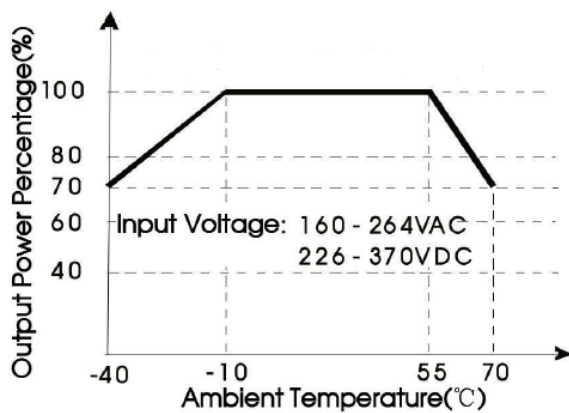
PSHIC15-135D Input Voltage Derating Curve



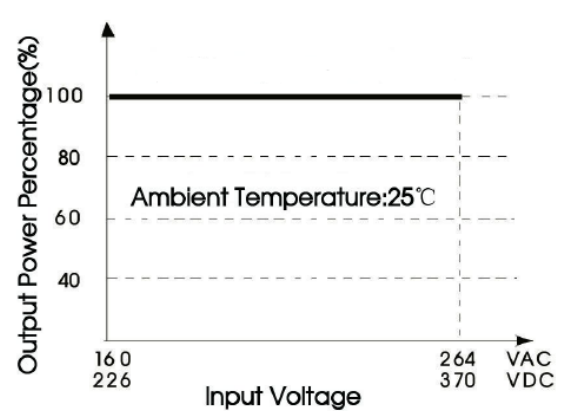
Note:

1. Input voltage should be derated based on temperature derating when it is 57-100VAC/80-120VDC
2. This product is suitable for use in natural air cooling environments, if in a closed environment, please contact factory for information.

PSHIC15-5912T Temperature Derating Curve



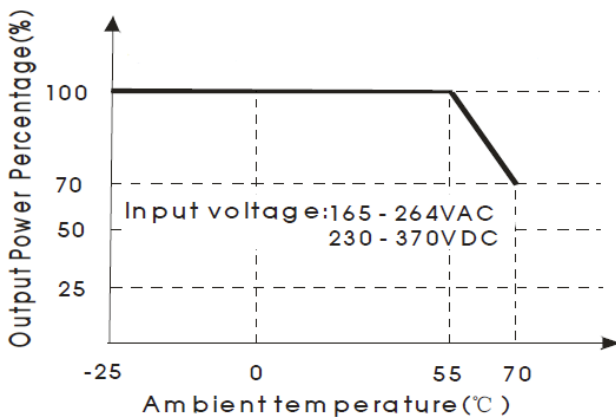
PSHIC15-5912T Input Voltage Derating Curve



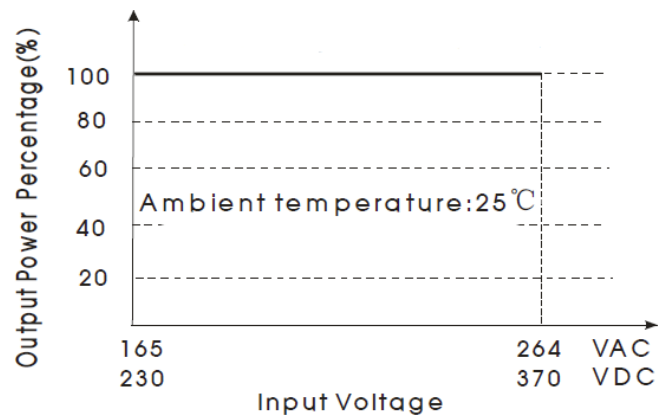
Note:

1. This product is suitable for use in natural air cooling environments, if in a closed environment, please contact factory for information.

PSHIC15-512T Temperature Derating Curve



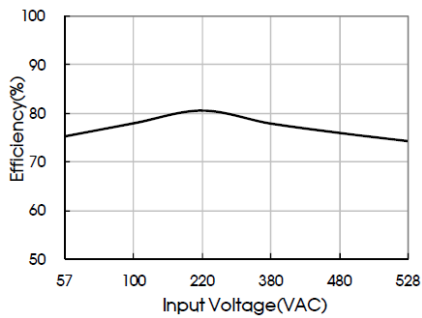
PSHIC15-512T Input Voltage Derating Curve



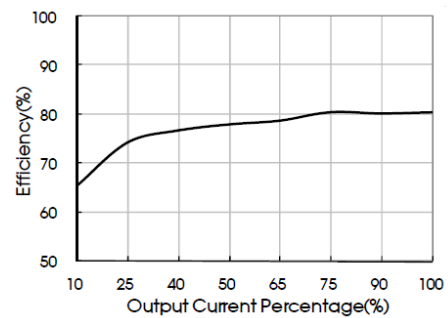
Note:

1. This product is suitable for use in natural air cooling environments, if in a closed environment, please contact factory for information.

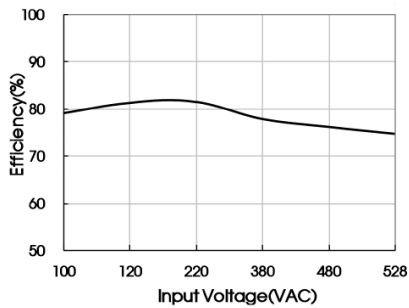
PSHIC15-512D Efficiency vs. Input Voltage (Full Load)



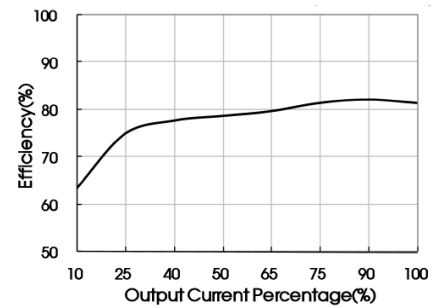
PSHIC15-512D Efficiency vs. Output Load (Vin=220VAC)



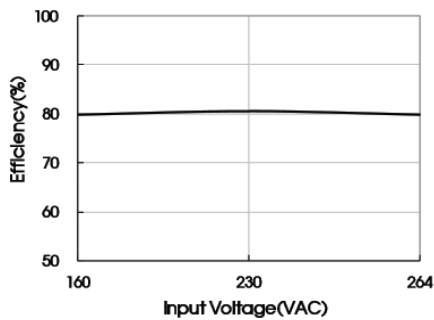
PSHIC15-135D Efficiency vs. Input Voltage (Full Load)



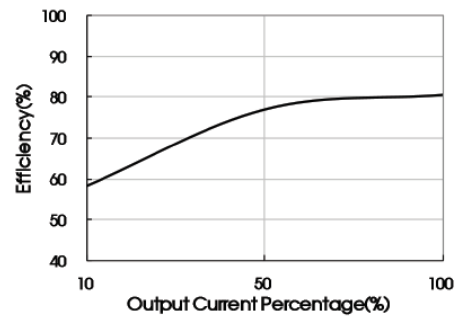
Efficiency vs. Output Load (Vin=220VAC)



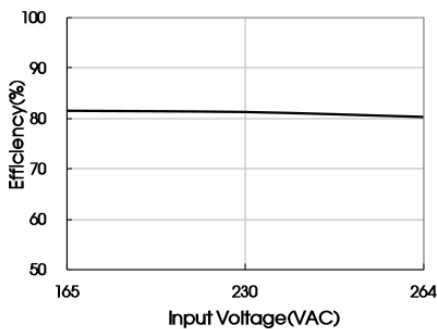
PSHIC15-5912T Efficiency vs. Input Voltage (Full Load)



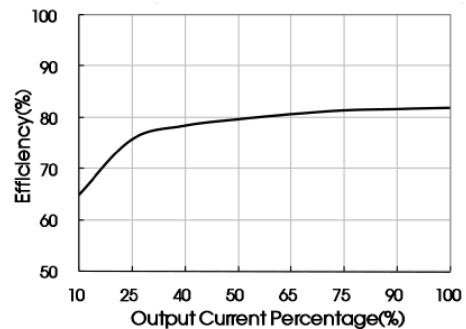
Efficiency vs. Output Load (Vin=230VAC)



Efficiency vs. Input Voltage (Full Load)



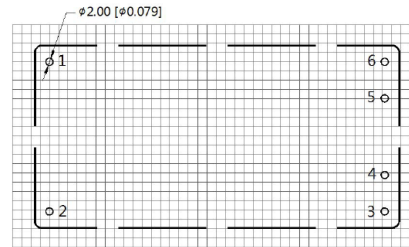
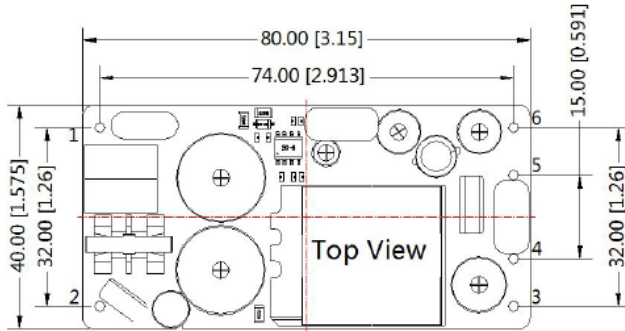
Efficiency vs. Output Load (Vin=230VAC)



MECHANICAL DRAWINGS

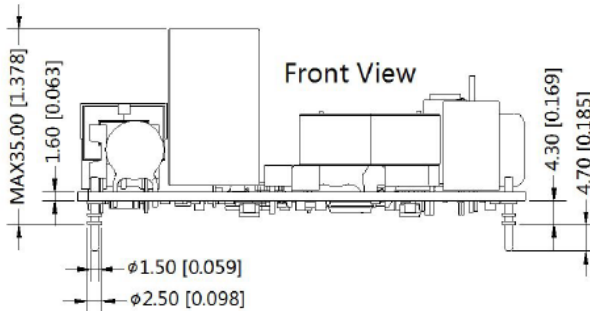
Dual Output Models

THIRD ANGLE PROJECTION



Pin Definition

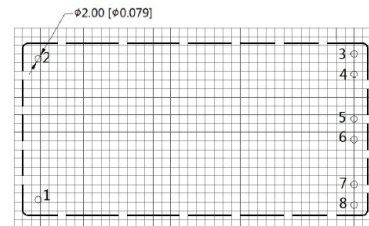
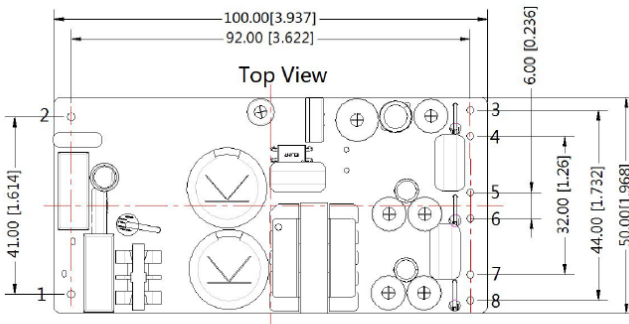
Pin	Name	Function Defined
1	AC(L)	AC voltage line wire (L wire) or DC voltage positive
2	AC(N)	AC voltage neutral wire (N wire) or DC voltage negative
3	+Vo2	The second output positive (+)
4	-Vo2	The second output negative (-)
5	-Vo1	The first output voltage negative (-)
6	+Vo1	The first output voltage positive (+)



Note:
Unit: mm [inch]
General tolerances: $\pm 0.50 [\pm 0.020]$
FR-4, 1.6mm thick double sided glass fiber PCB
The layout of this device is for reference only, please refer to actual product.

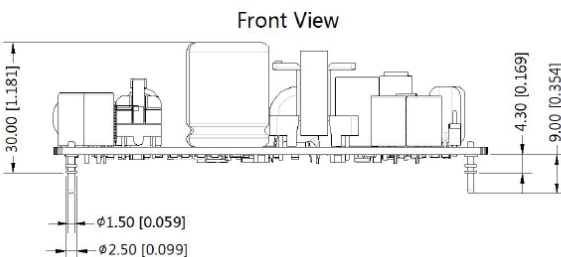
PSHIC15-5912T

THIRD ANGLE PROJECTION



Pin Definition

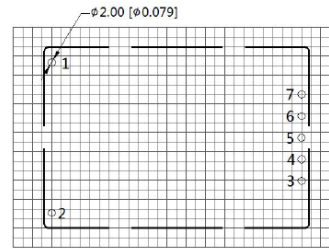
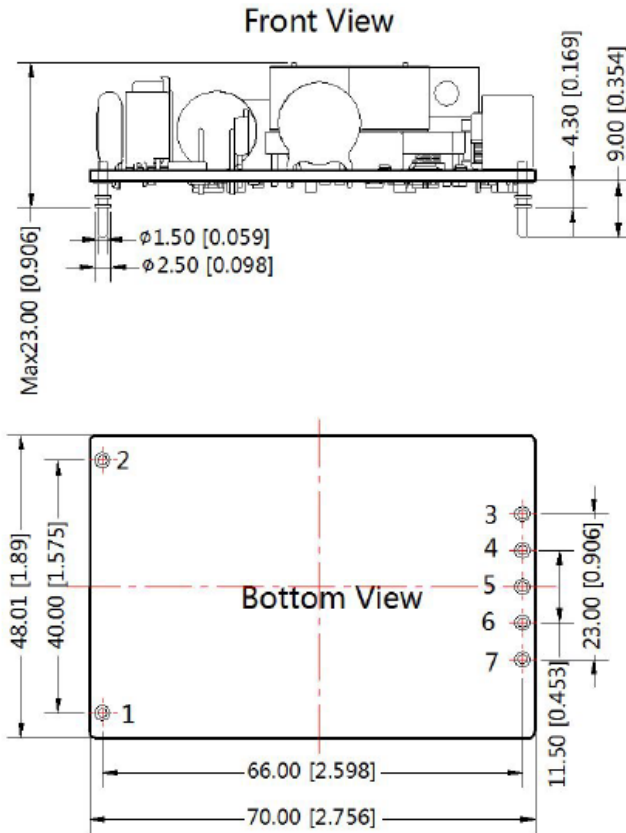
Pin	Name	Function Definition
1	AC(N)	AC voltage neutral wire (N wire) or DC voltage negative
2	AC(L)	AC voltage line wire (L wire) or DC voltage positive
3	+Vo1	The first output voltage positive (+)
4	-Vo1	The first output voltage negative (-)
5	+Vo2	The second output voltage positive (+)
6	-Vo2	The second output voltage negative (-)
7	+Vo3	The third output voltage is positive (+)
8	-Vo3	The third output voltage negative (-)



Note:
Unit: mm [inch]
General tolerances: $\pm 1 [\pm 0.039]$
The layout of this device is for reference only, please refer to actual product.

PSHIC15-512T

THIRD ANGLE PROJECTION



Note: Grid 2.54 * 2.54mm
Pin Definition

Pin	Name	Function Definition
1	AC(L)	AC voltage line wire (L wire) or DC voltage positive
2	AC(N)	AC voltage neutral wire (N wire) or DC voltage negative
3	-Vo1	The first output voltage negative (-)
4	+Vo1	The first output positive (+)
5	-Vo2	The second output negative (-)
6	COM	The second output common port
7	+Vo2	The second output voltage positive (+)

Note:
Unit: mm [inch]
General tolerances: $\pm 0.50 [\pm 0.020]$

DESIGN REFERENCE

Typical Application Circuit (Dual Output Models)

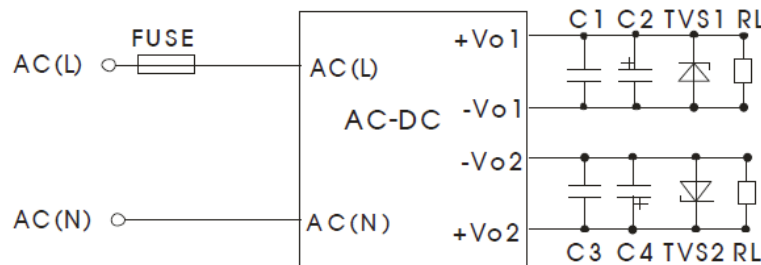


Fig. 1

PSHIC15-512D:

Output filtering capacitor C2/C4 is an electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor (recommended value, C2: 220 μ F/10V; C4: 100 μ F/25V). Capacitor withstand voltage derating should be 80% or above. C1/C3 is a ceramic capacitor, which is used to filter high-frequency noise, and it is recommended to use 0.1 μ F/50V. It is recommended that the 5.1V main output circuit adds TVS1 (P6KE6.8A) and the 12V auxiliary output circuit adds TVS2 (P6KE15A) to protect post-circuits (if converter fails).

PSHIC15-135D:

Output filtering capacitor C2/C4 is an electrolytic capacitor, it is recommended to use high frequency and low impedance electrolytic capacitor (recommended value, C2: 100 μ F/25V; C4: 47 μ F/25V). Capacitor voltage reduced to at least 80%. C1/C3 is a ceramic capacitor, which is used to filter high-frequency noise, and it is recommended to use 0.1 μ F/50V. It is recommended that the 13.5V main output circuit adds TVS1 (P6KE20A) and the 5V auxiliary output circuit adds TVS2 (P6KE7.0A) to protect post-circuits (if converter fails).

2. EMC Solution-Recommended Circuit (Dual Output Models)

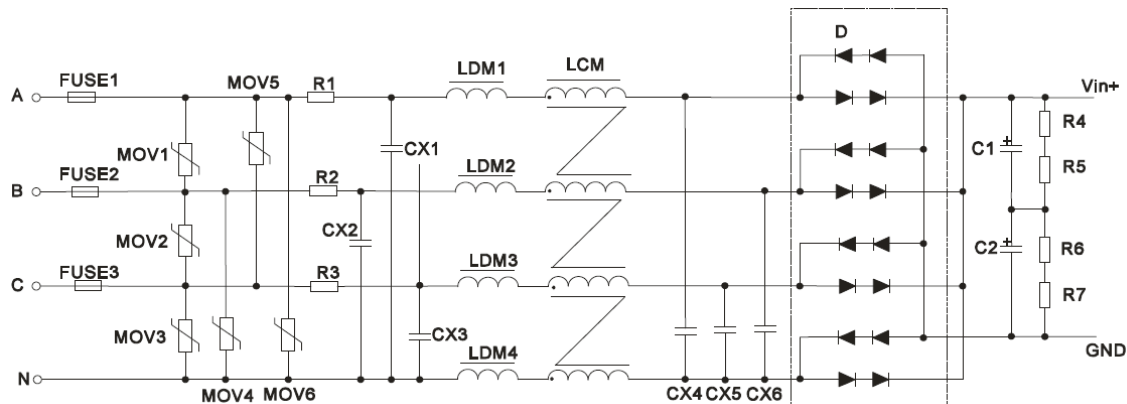


Fig. 2: Recommended circuit for applications which require 4KV differential-mode inrush standard (full-wave rectification)

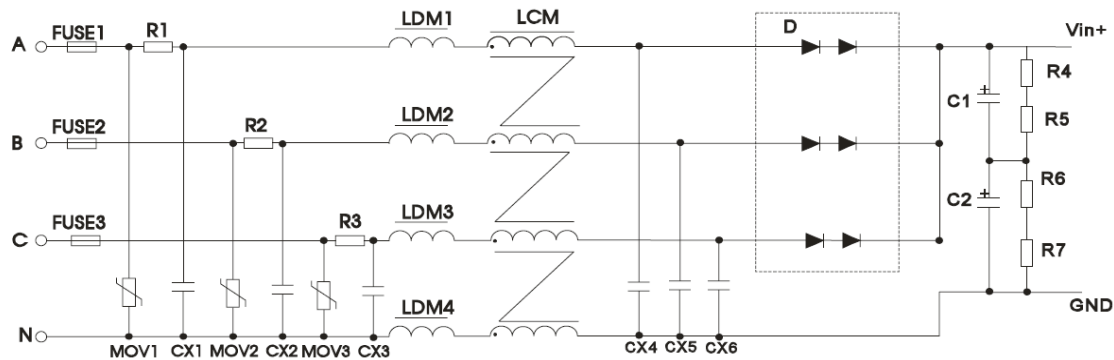


Fig. 3: Recommended circuit for applications which require 4KV differential-mode inrush standard (half-wave rectification).

Recommended Parameter for Higher EMC Standard Circuit

Element Model	Recommended Value
MOV1, MOV2, MOV3, MOV4, MOV5, MOV6	S20K550
CX1, CX2, CX3, CX4, CX5, CX6	0.15μF
LDM1, LDM2, LDM3, LDM4	56μH
LCM	3mH
C1, C2	47μF/400VDC
R4, R5, R6, R7	560kΩ/1206
D	2A/1000V
R1, R2, R3	5Ω/5W
FUSE1, FUSE2, FUSE3	3.15A, slow fusing, necessary

3. Typical Application Circuit (PSHIC15-512T)

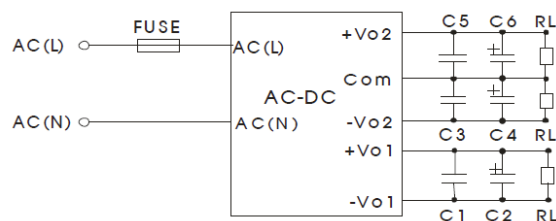


Fig. 3

Note: Output filtering capacitors C2, C4, C6, are electrolytic capacitors, it is recommended to use high frequency and low impedance electrolytic capacitor. For capacitance and current of capacitor please refer to the datasheet. Capacitor withstand voltage derating should be 80% or above. C1, C3, C5 are ceramic capacitors, which is used to filter high-frequency noise. External input FUSE model is recommended to use 2A/250V slow fusing, necessary.

Model	C1,C3,C5(μF)	C2,C4,C6(μF)
PSHIC15-512T	1	100

COMPANY INFORMATION

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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