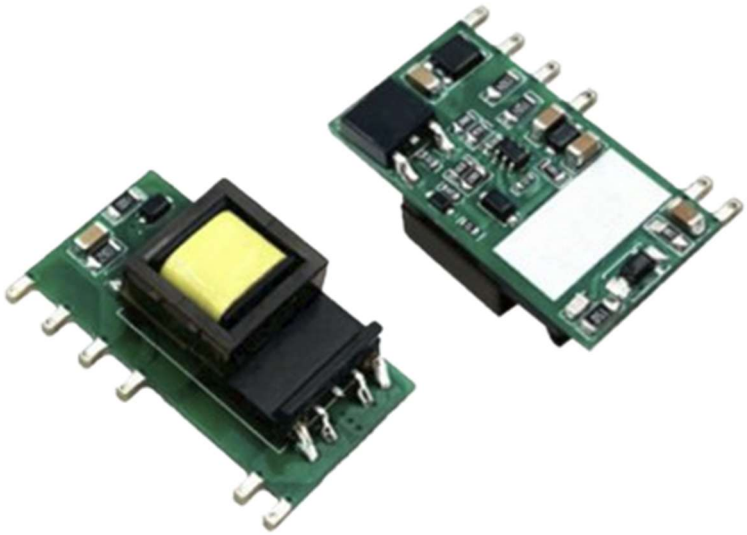
5W, AC/DC Power Converter

SAW05S



Introduction

SAW05S series are compact size and open frame AC/DC power converters, designed for energy meters, and high reliability industrial applications. They feature ultra-wide input voltage range 90~528VAC, low stand by power consumption, high efficiency, and class II reinforced insulation. They are designed to meet IEC/EN/UL62368-1, EN60335-1, EN61558-1, UKCA and EMC performance meets CISPR32, EN55032 Class B with external components, ideally suitable for industrial, and critical commercial applications.

Features

- → Rated power: 5W Max
- → Universal input: 90~528VAC 47~63Hz
- → Regulated single output
- → Isolation voltage 4000VAC
- → Typical efficiency 70 … 79%
- → Energy saving, standby power only 0.1W
- → Operating temperature range: -40~+85°C
- → RoHS compliance
- → SIP installation
- → Over current, and short circuit protection
- → Meet IEC/EN/UL 62368-1, EN 61558-1, EN 60335-1, CISPR32, EN55032 Class B with external circuits
- → 3 year warranty

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Part numbers

Model Number	Input Voltage (VAC)	Output Voltage (VDC)	Output Current [mA] Max	Efficiency [%] Typ.	Capacitive Load [uF] Max.
SAW05S033	90~528VAC 100~745VDC	3.3	1000	70	2200
SAW05S050		5	1000	72	1500
SAW05S090		9	550	73	680
SAW05S120		12	420	79	470
SAW05S150		15	330	79	330
SAW05S240		24	210	79	100
SAW05S033		3.3	1000	70	2200

* Only typical models are listed, other models may be available, upon request.

Electrical characteristics

Unless otherwise indicated, specifications are measured at TA=25°C, humidity <75%, nominal input voltage and rated output load.

Parameter	Condition	Min.	Type	Max.	Unit	Note
Input voltage range	AC in DC in	90 100	-	528 745	VAC VDC	
Nominal input voltage		100	-	480	VAC	
Input frequency		47	-	63	Hz	
Input current	230VAC 480VAC	-	0.10 0.07	-	A	
Inrush current Cold start	230VAC 480VAC	-	17 28	-	A	
Leakage current	230VAC, 50Hz	-	0.2	-	mA RMS	
Output voltage accuracy	V_{OUT}=3.3V Others	-	±3.0 ±2.5	±6.0 ±5.0	%	
Line regulation Full load		-	±1.5	-	%	
Load regulation I_{OUT}=10%~100% of $I_{OUT, rated}$		-	±3.0	-	%	
Ripple and noise 20MHz bandwidth, peak to peak		-	100	180	mV	
Standby power consumption	230VAC	-	0.1	0.3	W	
Temperature coefficiency		-	±0.2	-	%/°C	
Hold up Time	230VAC 380VAC	-	35 100	-	mS	

Minimum load		10	-	-	%	
Over current protection	Automatic recovery	110	-	-	% I_{OUT}	
Short circuit protection	Automatic recovery	Continuous, hiccup mode				
Recommended external fuse		1A, slow blow, *required*				

* Ripple and noise measured at 20MHz of bandwidth by using a 12” twisted pair-wire terminated with a 1uF ceramic capacitor and a 10uF electrolytic capacitor in parallel.

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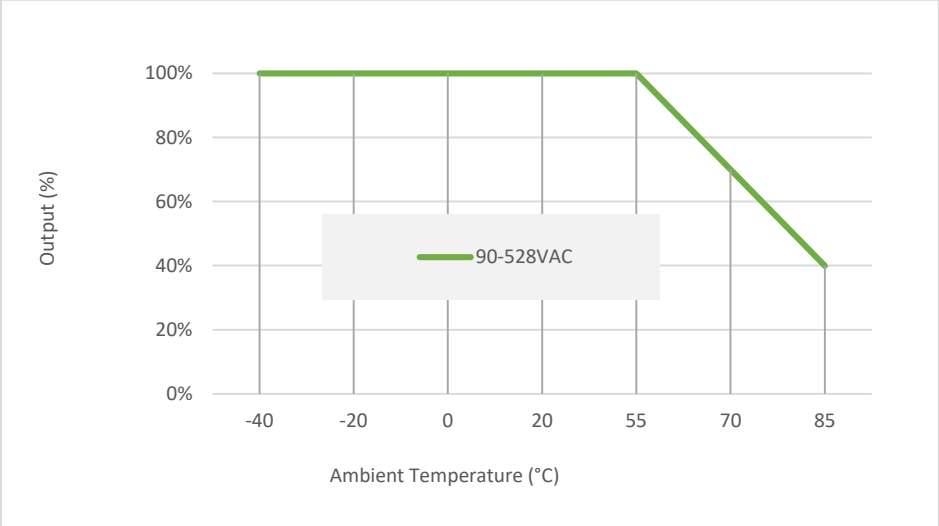
General Specifications

Parameters	Condition	Min.	Typ.	Max.	Unit
Isolation voltage 1 minute, leakage current 5mA max	Input to Output	4000	-	-	VAC
Insulation resistance 500VDC	Input to Output	100			M Ohm
Operating frequency		-	55	-	KHz
Operating temperature range	See “Derating Curve”	-40	-	85	°C
Storage temperature		-40	-	105	°C
Storage humidity		-	-	95	%RH
Soldering temperature	Wave Manual	-	260 360	-	°C
Cooling method		Free air convection			
Safety class		Class II, no FG			
MTBF	MIL-HDBK-217F	>500,000 Hours, 25°C			
Design based on standards		IEC/EN/UL 62368, EN 60335, EN 61558, UKCA			
Safety certifications		IEC/EN 62368-1			
EMC	CE ESD RS EFT EFT Surge Surge CS	CISPR32, EN55032 Class B** IEC/EN61000-4-2, Contact ±6kV, Air ±8kV, Criteria B IEC/EN61000-4-3, 10V/m, Criteria A IEC/EN61000-4-4, ±2kV, Criteria B IEC/EN61000-4-4, ±4kV, Criteria B** IEC/EN61000-4-5, Line to Line ±1kV, Criteria B IEC/EN61000-4-5, Line to Line ±2kV, Criteria B** IEC/EN61000-4-6, 10Vrms, Criteria A			
Size, and Weight		33.5x13x17.2mm, 6.5g			

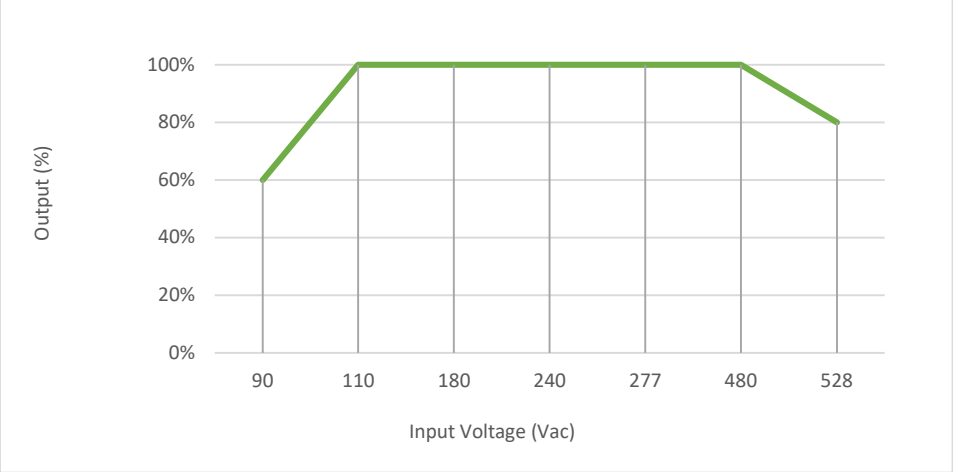
Characteristics Curves

Derating Curve

Output vs Ambient Temperature



Output vs Input Voltage



Recommended External Circuits

Typical External Circuit

This circuit is the basic design reference, components with "" are required for the converter's operating.
FUSE to be 1A, slow blow and is also required for safety. R1* … R4* to be 1M Ohm 1206 SMD resistors, and it is also required.

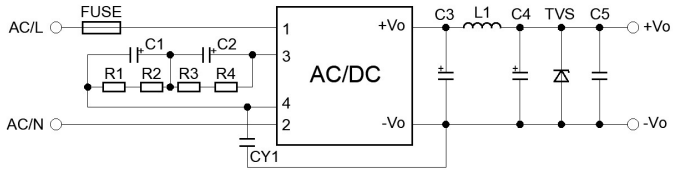


Figure 1. Typical External Circuit

Recommended Component

V_{OUT} [V]	C1*, C2*	C3*	C4*	C5	CY1*	L1*	TVS
5	47uF, 400V	470uF, 16V	150uF, 25V	0.1uF, 25V	1nF, 400VAC	2.2uH, 6A	SMBJ7.0A
9, 12	47uF, 400V	470uF, 16V	100uF, 25V	0.1uF, 25V	1nF, 400VAC	2.2uH, 6A	SMBJ12A
15, 24	47uF, 400V	220uF, 35V	47uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6A	SMBJ20A

EMC Enhancement for EN55032 Class B

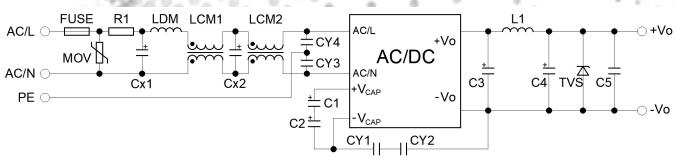


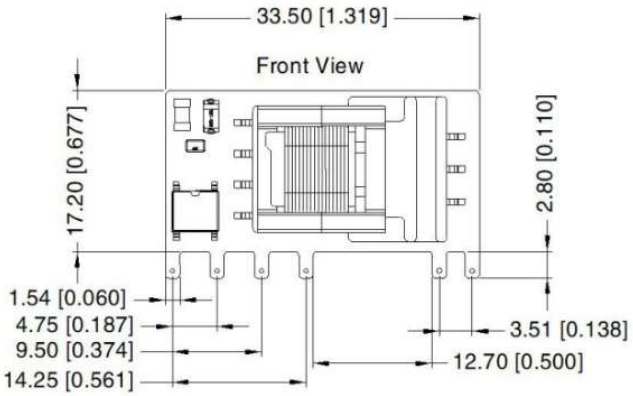
Figure 2. Circuit for EMC enhancement

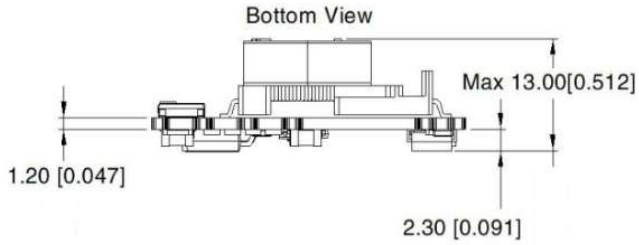
Recommended Component

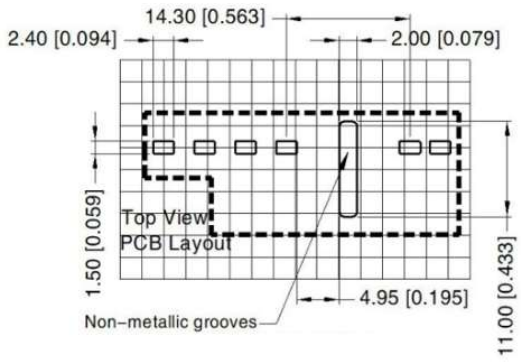
Item	FUSE*	R1*	MOV	LDM	LCM1	LCM2
Spec	2A, 500VAC	12 Ohm, 3W	14D561	2.2Mh, 0.24A	200uH, 0.8A	12.6mH 0.5A
Item	**Cx1, Cx2**	**CY1, CY2**	**CY3, CY4**	**C1, C2**		
Spec	0.1uF, 480VAC	2.2nF, 400VAC	1nF, 400VAC	47uF, 400VAC		

Components above with "" are required for the converter's operating. "R1" is wire-wound resistor.
*Refer to Table 1 for the output circuit configuration.

Mechanical Specifications







Recommended Footprint

Pin Definition

Pin #	Single Out	
1	AC (L)	
2	AC (N)	
3	+V (CAP)	
4	-V (CAP)	
5	$-V_{OUT}$	
6	$+V_{OUT}$	

*** Unless otherwise specified unit: mm [inch]**

*** General tolerance: ±1.00 [±0.040]**

*** Pin thickness: ±0.10 [±0.004]**

*** Footprint grid 2.54 x 2.54 mm**

Ordering information

Ordering can be done via www.summit-electronics.com or via info@summit-electronics.com. Please contact us for more information. Customisation of the product is available on request.

Technical support

For all product questions please contact us via info@summit-electronics.com

Document revision

Rev	Date	Changes
2025v0.1	26-08-2025	First issue of document