10W, AC/DC Power Converter

SAW10S

Introduction

SAW10S 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 85~528VAC, 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: 10W Max
- Universal input: 85~528VAC, 47~63Hz
- Regulated single output
- Isolation voltage 4000VAC
- Typical efficiency 70 … 83%
- Energy saving, standby power only 0.1W typ.
- Operating temperature range: -40~+85°C
- RoHS compliance
- Compact SIP installation
- Over current and short circuit protection
- Meet IEC/EN/UL 62368, EN 61558-1, EN 60335-1, CISPR32, EN55032 Class B with external circuits
- 3 year warranty

Part numbers

Model Number	Input Voltage (VAC)	Output Voltage (VDC)	Output Current [mA] Rated	Ripple & Noise [mVp-p] Max.	Efficiency [%] Typ.	Capacitive Load [uF] Max.
SAW10S033	85~528VAC 100~745VDC	3.3	2,000	180	70	1,500
SAW10S050		5	2,000	180	77	1,500
SAW10S090		9	1,100	180	80	1,000
SAW10S120		12	830	180	82	680
SAW10S150		15	670	180	82	470
SAW10S090		24	420	180	83	330

* 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	85 100	-	528 745	VAC VDC	
Nominal input voltage	AC in	100	-	480	VAC	
Input frequency		47	-	63	Hz	
Input current	85VAC 115VAC 230VAC 380VAC	-	0.23 0.18 0.12 0.09	-	A	
Inrush current Cold start	85VAC 115VAC 230VAC 380VAC	-	11.6 13.5 28.6 42.6	-	A	
Leakage current	480VAC/50HZ	-	0.5	-	mA RMS	
Output voltage accuracy I_{OUT}=10%~100% of $I_{OUT, rated}$	V_{OUT}=3.3V Others	-	±6 ±5	-	%	
Line regulation Full load	V_{OUT}=3.3V Others	-	±2.0 ±1.5	-	%	
Load regulation I_{OUT}=10%~100% of $I_{OUT, rated}$		-	±3.0	-	%	
Ripple and noise	20MHz bandwidth	-	100	180	mVp-p	
Standby power consumption	V_{IN}<115VAC	-	0.20	0.30	W	

	Others	-	0.10	0.15		
Temperature coefficiency		-	±0.2	-	%/°C	
Minimum load		10	-	-	%	
Over current protection	Automatic recovery	110	-	-	% I_{OUT}	
Short circuit protection	Automatic recovery	Continuous, hiccup mode				
Recommended external fuse		2A, 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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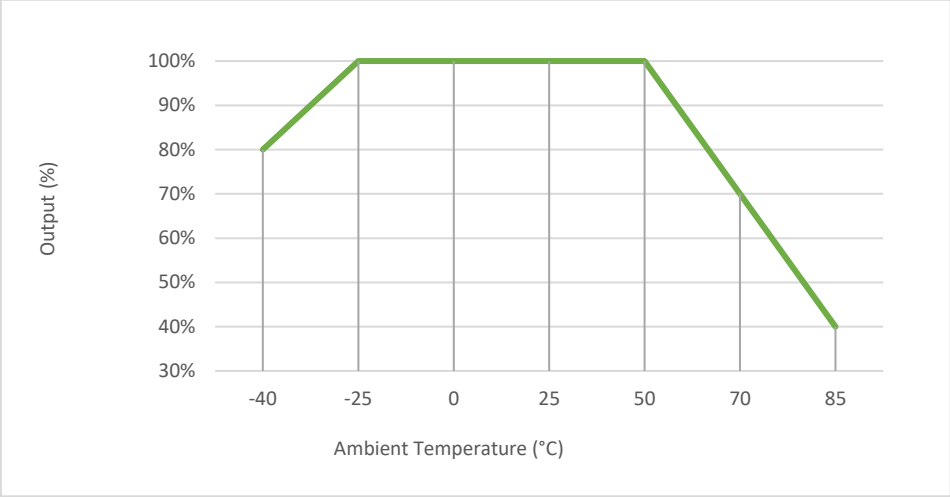
General Specifications

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		-	50	-	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 ±2kV, Criteria B IEC/EN61000-4-5, Line to Line ±4kV, Criteria B** IEC/EN61000-4-6, 10Vrms, Criteria A			
Size, and Weight		38x15.2x20mm, 11g			

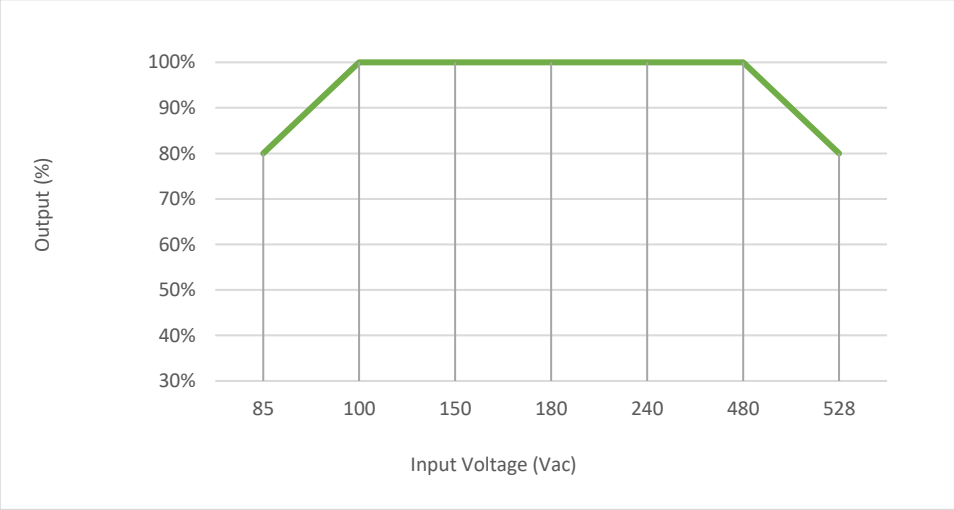
Characteristics Curves

Derating Curve

Output vs Ambient Temperature



Output vs Input Voltage



V_{OUT}=12 … 24V

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. R1*, R11* … R14* refer of that in Table 2.

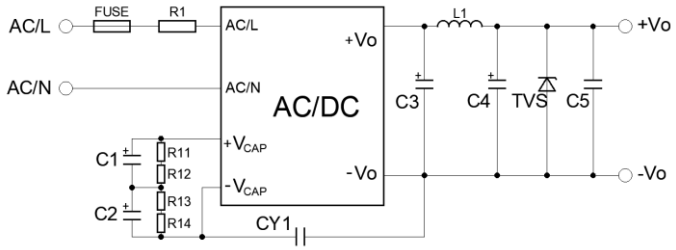


Figure 1. Typical external circuit

Recommended Component

V_{OUT} [V]	C1*, C2*	C3*	C4*	C5	CY1*	L1*	TVS
3.3	47uF, 400V	1500uF, 6.3V	680uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ7.0A
5	47uF, 400V	820uF, 16V	680uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ7.0A
9	47uF, 400V	470uF, 25V	330uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ12A
12	47uF, 400V	470uF, 25V	330uF, 25V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ20A
15	33uF, 400V	470uF, 25V	330uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ20A
24	33uF, 400V	470uF, 35V	100uF, 35V	0.1uF, 50V	1nF, 400VAC	2.2uH, 6.5A	SMBJ30A

Circuit for EMC Enhancement

*This application circuit is recommended for EMC enhancement. It is not mandatory if this is not critical in the application.

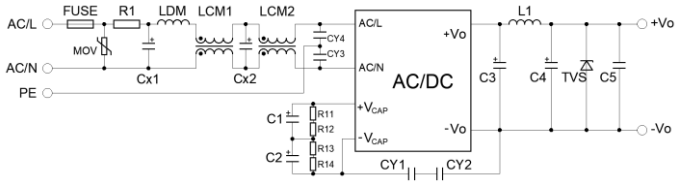


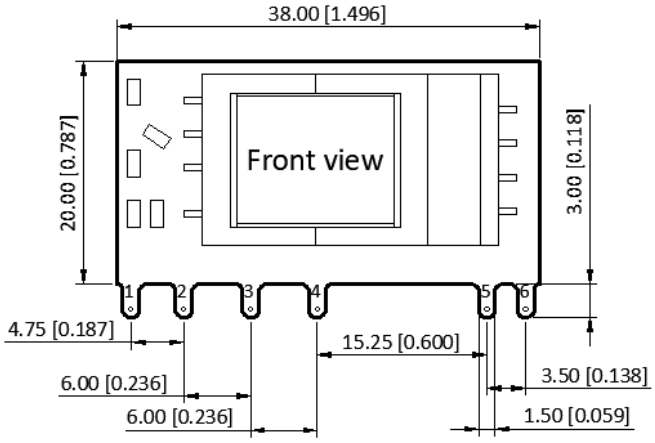
Figure 2. External circuit design for EMC enhancement

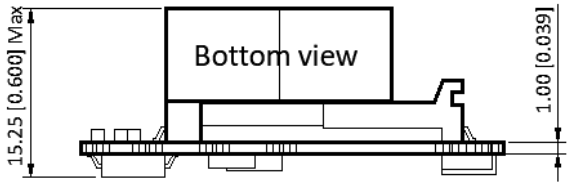
Recommended Component

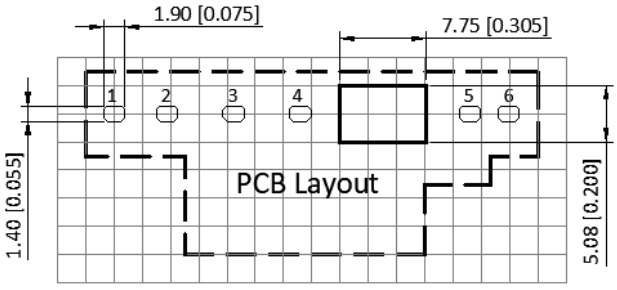
Item	FUSE*	R1*	MOV	LDM	LCM1	LCM2
Spec	2A, 500VAC	6.8 Ohm, 3W	14D911K	2.2mH, 0.35A	200uH, 0.8A	12.6mH 0.5A
Item	**Cx1, Cx2**	**C1*, C2***	**R11* … R14***	**CY1 … CY4**		
Spec	0.1uF, 480VAC	47uF, 400VAC	1M Ohm, 1206	1nF, 400VAC		

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







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