

5W, AC/DC Power Converter

SAP05D

SUMMIT
ELECTRONICS



Introduction

SAP05D series are compact size AC/DC power converters offered in 1"x1" package and extremely low profile. The series also feature universal input voltage range, low stand by power consumption, high efficiency. Designed for high reliability industrial applications, these converters are encapsulated to protect from dust and moisture. They are certified to IEC/EN/UL62368, EN60335, EN61558, UKCA, and EMC performance meets CISPR32, EN55032 Class B without support from any external components, ideally suitable for industrial, and critical commercial applications.

Features

- Rated power: 5W Max
- Universal input:
85~305VAC 47~63Hz
- Regulated single output
- Isolation voltage 4000VAC
- Typical efficiency 70 ... 79%
- Energy saving, standby power only less than 0.1W
- Operating temperature range: -40~+85°C
- RoHS compliance
- Compact 1"x1" package
- Low profile 15mm height
- Over voltage, over current and short circuit protection
- Certified to IEC/EN/UL62368-1, EN60335-1, EN61558-1, UKCA
- Meet CISPR32, EN55032 Class B with NO external circuit
- 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.
SAP05D033	85~305VAC 100~430VDC	3.3	1200	70	3000
SAP05D050		5	1000	74	3000
SAP05D090		9	555	78	1200
SAP05D120		12	416	79	1200
SAP05D150		15	333	79	680
SAP05D240		24	208	79	220

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

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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	Notes
Input Voltage Range	V _{IN} = Min. to Max.	-	0.2	1.5	mA	
Input Frequency	V _{OUT} =3.3V Others	-	±2 ±2	±4 ±3	%	
Nominal Input Voltage	V _{IN} = Min. to Max.	-	±0.2	±0.4	%	
Input current	V _{OUT} =3.3, 5V Others	-	±0.6 ±0.3	-	%	
Inrush current Cold start	40°C~+85°C	-	-	±0.03	%/°C	
Leakage current	20MHz bandwidth	-	20	75	mVp-p	
Output voltage accuracy	Peak deviation Recovery time	-	50 0.2	250 1	mV mS	
Line regulation	Full load	-	±0.5	-	%	
Load regulation I _{OUT} =0%~100% of I _{OUT} , rated		-	±1.0	-	%	
Ripple and noise 20MHz band- width, peak to peak		-	50	100	mV	
Temperature coefficient		-	±0.02	-	%/ °C	
Standby power consumption	230 VAC	-	0.1	-	%/ °C	

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Hold up time	115VAC	-	5	-	mS	
Full load	230VAC		50			
Over voltage protection	Vout 3.3, 5V Vout=9, 12V	-	-	7.5 17 20 30	VDC	
Hiccup or clamping by Zener diode	Vout=15V Vout=24V					
Over current protection	Automatic recovery	110	-	-	% Iout	
Short circuit protection		Continuous, hiccup mode, automatic recovery				
Recommended external fuse		1A, 300V, slow blow, *required*				
Minimum load		No minimum load is 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	I/P to O/P	4000	-	-	VAC
Isolation resistance 500VDC, 25°C, 70%RH	I/P to O/P	100	-	-	M Ohm
Switching frequency		-	65	-	KHz
Operating temperature range	See "Derating Curve"	-40	-	85	°C
Storage temperature		-40	-	105	°C
Storage humidity		10	-	95	%RH
Operating altitude		-	-	5000	m
Soldering temperature	Wave Manual	-	260 360	-	°C
Case material		Black plastic UL94-V0			
Cooling method		Free air convection			
Vibration		10Hz to 55Hz, 10G, 30 minutes along X, Y and Z axis			
Class II power		Yes, no FG			
MTBF	MIL-HDBK- 217F	> 1,000,000 Hours, 25°C			
Safety certifications		UL/EN/IEC 62368, EN60335, EN61558, KCA, FCC			

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EMC	CE	CISPR32, EN55032 Class B
1) With External Circuit as shown in "Figure 1"	ESD	IEC/EN61000-4-2, Contact $\pm 6\text{kV}$, Air $\pm 8\text{kV}$, Criteria B
	RS	IEC/EN61000-4-3, 10V/m , Criteria A
	EFT	IEC/EN61000-4-4, $\pm 2\text{kV}$, Criteria B, (1)
	EFT	IEC/EN61000-4-4, $\pm 4\text{kV}$, Criteria B, (2)
	Surge	IEC/EN61000-4-5, Line to Line $\pm 1\text{kV}$, Criteria B, (1)
	Surge	IEC/EN61000-4-5, Line to Line $\pm 2\text{kV}$, Criteria B, (2)
2) With External Circuit as shown in "Figure 2"	CS	IEC/EN61000-4-6, 10Vrms , Criteria A
	DIP	IEC/EN61000-4-11, 0%, 70%, Criteria A
Size, and Weight		25.4 x 25.4 x 15 mm, 16g
Packing		720pcs/Carton, size: 405x365x245mm, 11.6Kg G.W.

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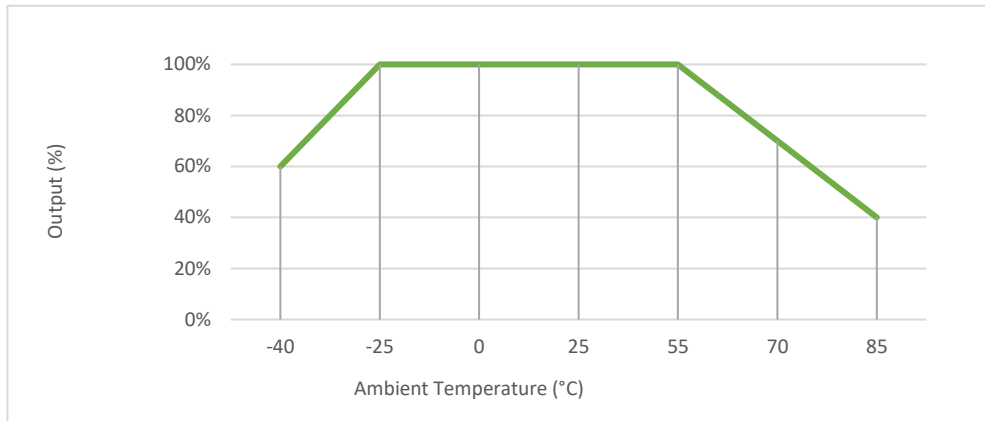
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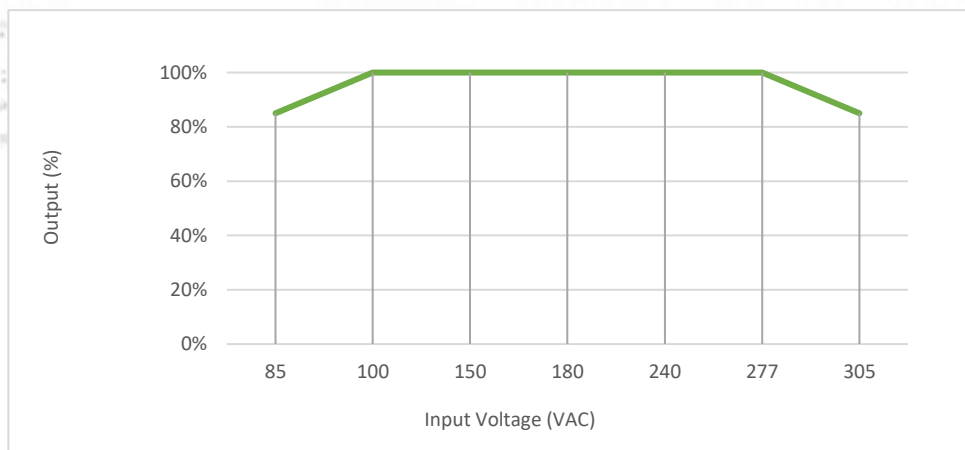
Characteristics Curves

Derating Curve

Output vs Ambient Temperature



Output vs Input Voltage



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Recommended External Circuit

Typical External Circuit

Components with “” are required. The other components are highly recommended.

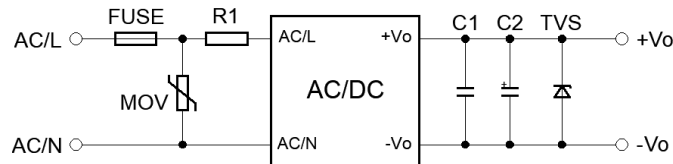


Figure 1: Typical external circuit

Recommended Components

SPEC	FUSE*	MOV	R1*	C1	C2	TVS
V _{OUT} =3.3, 5V	1A, 300V	10D681K	12 Ohm, 3W	1uF, 50V	150uF, 16V	SMBJ7.0A
V _{OUT} =9V	1A, 300V	10D681K	12 Ohm, 3W	1uF, 50V	120uF, 35V	SMBJ12A
V _{OUT} =12, 15V	1A, 300V	10D681K	12 Ohm, 3W	1uF, 50V	120uF, 35V	SMBJ20A
V _{OUT} =24V	1A, 300V	10D681K	12 Ohm, 3W	1uF, 50V	68uF, 35V	SMBJ30A

* For further questions contact one of our sales representatives.

EMC Enhancement for EN55032 Class B

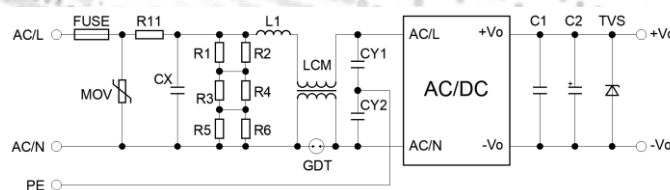


Figure 2. Circuit for EMC Enhancement

Recommended Components

MOV	CX	R11	L1	LCM	GDT	CY1, CY2
14D681K	334K, 305VAC	33 Ohm, 3W	1.2mH, 0.3A	20mH	300V, 1KA	1nF, 400VAC

*FUSE to be 2A, 300V, slow blow. *R1 ... R6 is the bleeder resistance of CX – 1.5Mohm, 150VDC

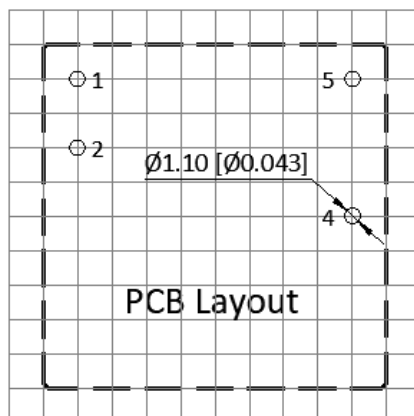
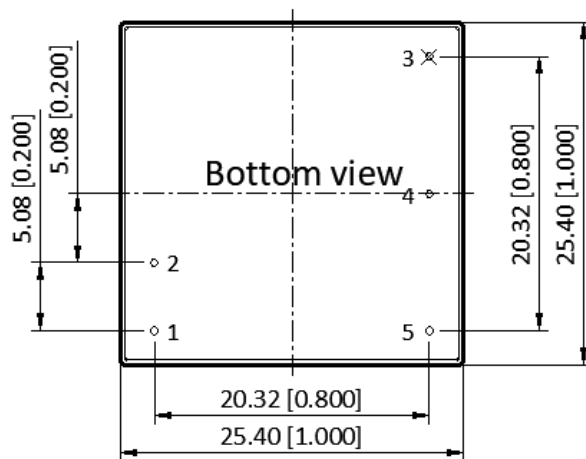
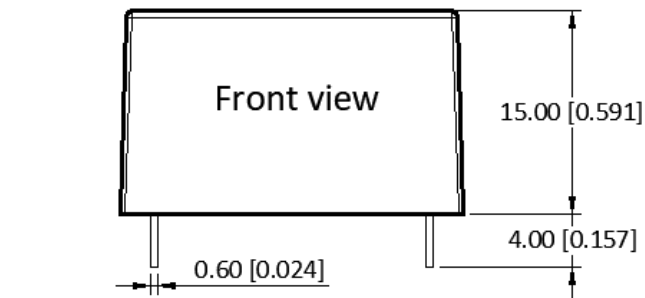
*Other components see the same in Table 1

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Mechanical Specifications



Pin Definition

Pin #	Single Out
1	AC (N)
2	AC (L)
3	No Pin
4	-V _{OUT}
5	+V _{OUT}

* Unless otherwise specified unit:
mm [inch]

* General tolerance: ± 0.50 [± 0.020]

* Pin thickness: ± 0.15 [± 0.006]

* Pin distance: ± 0.50 [± 0.020]

* Footprint grid 2.54 x 2.54 mm

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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