2W, DC/DC Power Converter

SDF02S

Introduction

The SDF02S series are unregulated SIP7 package DC/DC converters with single or dual outputs, and 3KVDC isolation. These converters feature high efficiency, low ripple and noise, continuous short circuit protection, and wide operating temperature range. They are widely used in distributed power system in industrial applications where isolation and voltage converting is needed.

Features

- Rated power: 2W Max
- Input voltage range ±10%
- Unregulated output
- High efficiency, up to 90%
- Small no load input current
- Isolation voltage 3KVDC
- Operating temperature range: -40 ~ +105°C ambient
- RoHS compliant
- Compact SIP7 package
- Continuous short circuit protection
- Designed to meet EN/IEC 62368-1
- 3 year warranty

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Part numbers

Model Number	Input Voltage [VDC] ±10%	Output Voltage (VDC)	Output Current (mA) Max	Output Current (mA) Min	Efficiency (%) Typ.	Capacitive Load (uF) Max.
SDF02S0303	3.3	3.3	400	40	82	2400
SDF02S0305	3.3	5	400	40	83	2400
SDF02S0309	3.3	9	222	22	84	1000
SDF02S0312	3.3	12	167	17	85	820
SDF02S0503	5	3.3	400	40	83	2400
SDF02S0505	5	5	400	40	85	2400
SDF02S0509	5	9	222	22	85	1000
SDF02S0512	5	12	167	17	86	820
SDF02S0515	5	15	133	13	87	680
SDF02S0524	5	24	83	8	88	560
SDF02S1203	12	3.3	400	40	84	2400
SDF02S1205	12	5	400	40	85	2400
SDF02S1209	12	9	222	22	86	1000
SDF02S1212	12	12	167	17	87	820
SDF02S1215	12	15	133	13	88	680
SDF02S1224	12	24	83	8	89	560
SDF02S1503	15	3.3	400	40	84	2400
SDF02S1505	15	5	400	40	85	2400
SDF02S1509	15	9	222	22	86	1000
SDF02S1512	15	12	167	17	87	820
SDF02S1515	15	15	133	13	88	680
SDF02S1524	15	24	83	8	89	560
SDF02S2403	24	3.3	400	40	84	2400

SDF02S2405	24	5	400	40	86	2400
SDF02S2409	24	9	222	22	87	1000
SDF02S2412	24	12	167	17	88	820
SDF02S2415	24	15	133	13	89	680
SDF02S2424	24	24	83	8	90	560
SDF02S0503D	5	±3.3	±303	±30	83	1000
SDF02S0505D	5	±5	±200	±20	85	1000
SDF02S0509D	5	±9	±111	±11	85	560
SDF02S0512D	5	±12	±83	±8	86	560
SDF02S0515D	5	±15	±67	±7	87	220
SDF02S0524D	5	±24	±42	±4	87	100
SDF02S1203D	12	±3.3	±303	±30	84	1000
SDF02S1205D	12	±5	±200	±20	85	1000
SDF02S1209D	12	±9	±111	±11	86	560
SDF02S1212D	12	±12	±83	±8	87	560
SDF02S1215D	12	±15	±67	±7	88	220
SDF02S1224D	12	±24	±42	±4	86	100
SDF02S1505D	15	±5	±200	±20	85	1000
SDF02S1509D	15	±9	±111	±11	86	560
SDF02S1512D	15	±12	±83	±8	87	560
SDF02S1515D	15	±15	±67	±7	88	220
SDF02S2403D	24	±3.3	±303	±30	84	1000
SDF02S2405D	24	±5	±200	±20	86	1000
SDF02S2409D	24	±9	±111	±11	87	560
SDF02S2412D	24	±12	±83	±8	88	560
SDF02S2415D	24	±15	±67	±7	89	220
SDF02S2424D	24	±24	±42	±4	86	100

* Only typical models are listed. Other models may be available upon request.
* For dual output models, max capacitive load stipulated in the above list is for each output.
* See SDM02S series for 1.5KVDC isolation models, and SDG02S series for 6KVDC isolation models.

Electrical characteristics

Unless otherwise indicated, specifications are measured at T_A=25°C, nominal input voltage, full load after warm up.

Parameter	Condition	Min.	Type	Max.	Unit	Note
Input current Full load	V_{IN}=3.3V V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-	768 506 208 167 104	-	mA	
Input current No load		-	4	15	mA	
Reflected Ripple Current		-	15	-	mA	
Surge voltage 1 second max	V_{IN}=3.3V V_{IN}=5V V_{IN}=12V V_{IN}=15V V_{IN}=24V	-0.7 -0.7 -0.7 -0.7 -0.7	-	5 9 18 21 30	VDC	
Output voltage accuracy	All models	Refer to graphic in "Characteristic Curves" section				
Line regulation For V_{IN} change of ±1%	V_{OUT}=3.3V All others	-	±1.5 ±1.2	-	%	
Load regulation I_{OUT}=10% to 100% of $I_{OUT,rated}$	V_{OUT}=3.3V V_{OUT}=5V V_{OUT}=9V V_{OUT}=12V V_{OUT}=15V V_{OUT}=24V	-	14 10 9 8 7 6	-	%	
Temperature coefficiency	Full load	-	-	±0.03	%/°C	

Output ripple and noise	20MHz bandwidth	-	80	200	mVp-p	
Output short circuit protection		Continuous, automatic recovery				
Input filter		Capacitor				
Hot plug		None				

* Operating with less than 10% of rated load will not cause permanent damage to the converters, but the performances data may not fall into the specifications, and reliable operating is not assured.

* Dual output models need to operate with balanced load. The load difference between two outputs over 10% may cause unstable operating of the converter.

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General Specifications

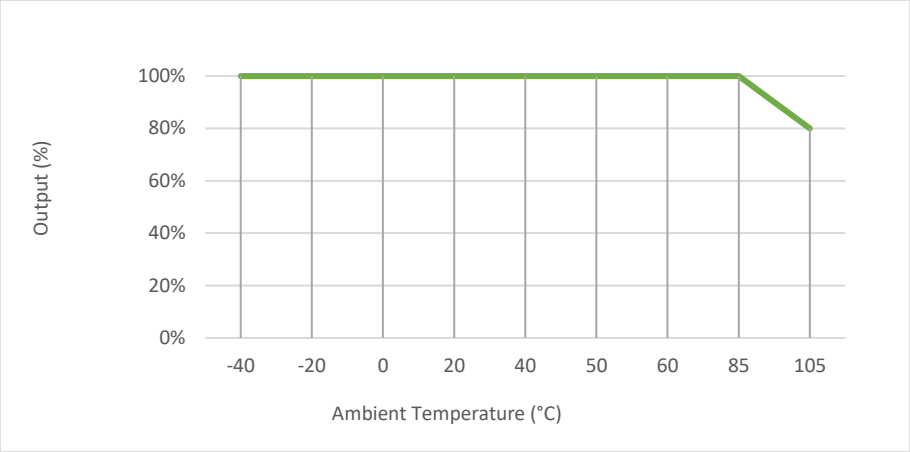
Parameters	Condition	Min.	Typ.	Max.	Unit	Notes
Isolation voltage 1 minute, leakage current 1mA max	Input to Output	3000	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance 100KHz, 0.1V	Input to Output	-	20	-	pF	
Operating temperature	See “Derating Curve”	-40	-	+105	°C	
Storage temperature		-55	-	+125	°C	
Temperature rise at case	Full load	-	25	-	°C	
Storage humidity	Non-condensing	-	-	95	%RH	
Switching frequency Full load	Full load	-	220	-	KHz	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Cooling method		Free air convection				
Case material		Black plastic UL94-V0				
Vibration		10-150Hz, 5G, 0.75mm along X, Y and Z				

Design based on standards		UL/EN/IEC 62368-1
Safety certifications		EN/IEC 62368-1
EMC	Emissions Immunity	CISPR32, EN55032 Class B with External Circuit IEC/EN61000-4-2, Air ±8KV, Contact ±6KV, Criteria B
MTBF	MIL-HDBK-217F	>3,500,000 Hours, T_A=25°C
Size		19.65 x 7.05 x 10.16 mm
Weight		2.4g Typ.

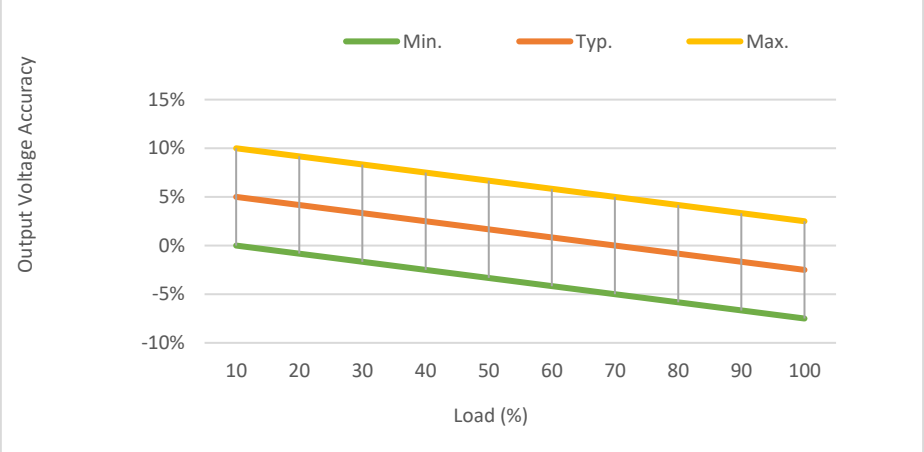
Characteristics Curves

Derating Curve

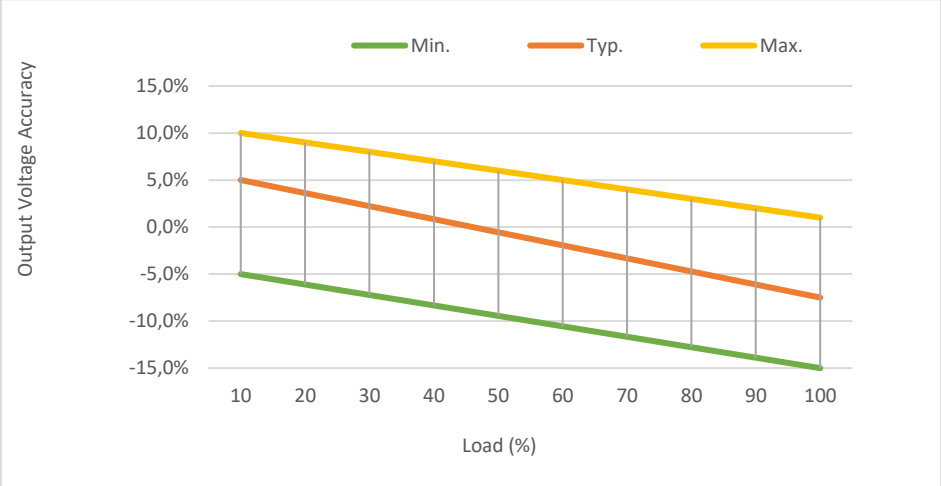
Output vs Ambient Temperature



Output Voltage Accuracy vs Load



None 3.3V output models



3.3V output models

Recommended External Circuit

Typical Application Circuit

*Typical application circuit is to further lower the input and output ripple. It is not required for general use.

*Recommended component specifications are typical values. Excessive external capacitive load may cause startup problem.

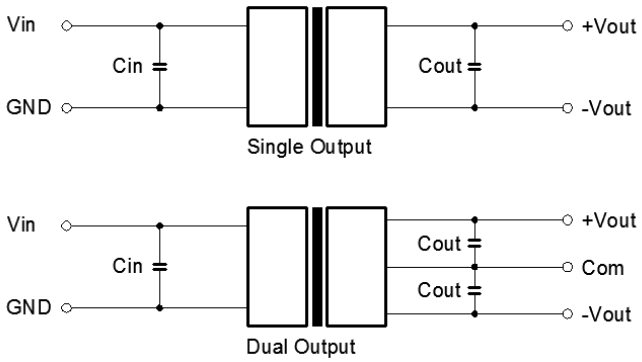


Figure 1: Typical External circuit

Recommended component spec

V_{IN}	3.3, 5V	12, 15V	24V
C_{IN}	4.7uF, 16V	2.2uF, 25V	1uF, 50V

Recommended component spec

Single Out	3.3, 5V	9, 12V	15, 24V	Single Out	3.3, 5V
C_{OUT}	10uF, 16V	2.2uF, 25V	1uF, 50V	C_{OUT}	10uF, 16V

Circuit for EMC Enhancement

*Use this application circuit to meet Class B EMC performance.

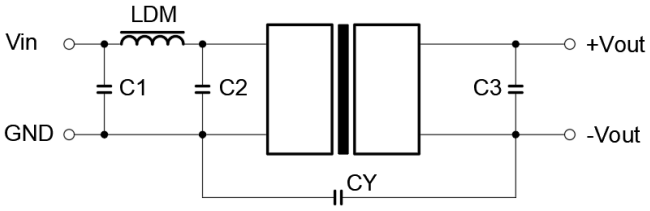


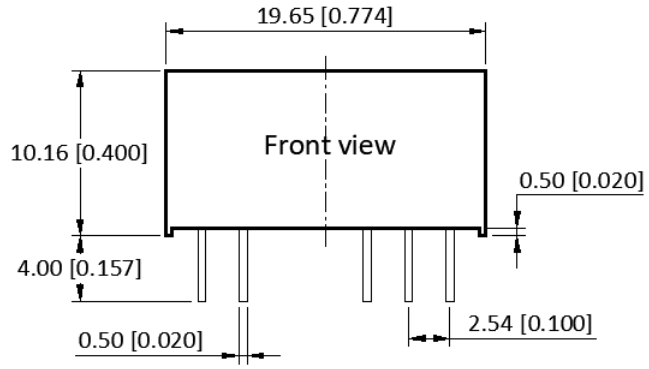
Figure 2: Circuit for EMC Enhancement

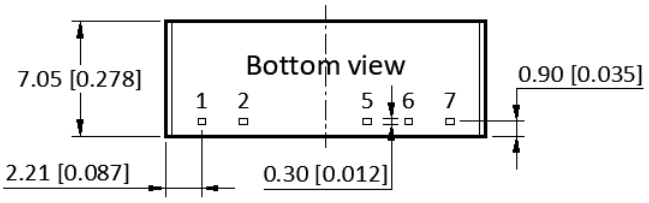
Recommended component spec

Component	LDM	C1, C2	CY
C_{OUT}	6.8uH	4.7uF, 50V	1nF, 4KV

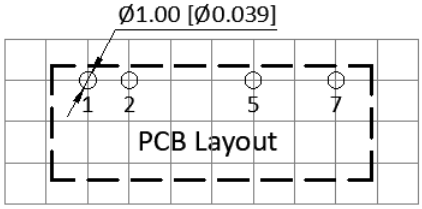
*C3 refer to C_{OUT} in

Mechanical Specifications

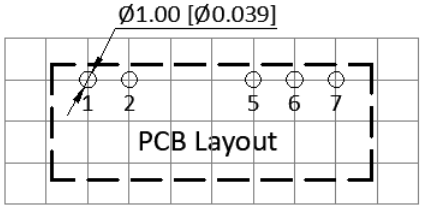




Single



Dual



Pin Definition

Pin #	Single Out	Dual Out
1	V_{IN}	V_{IN}
2	GND	GND
5	0V	$-V_{OUT}$
6	No Pin	0V
7	$+V_{OUT}$	$+V_{OUT}$

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

*** General tolerance: ±0.50 [±0.020]**

*** 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	27-08-2025	First issue of document