1W, DC/DC Power Converter

SDF01D

Introduction

The SDF01D series are DIP14 package DC/DC converters with unregulated single or dual output, 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: 1W Max
- Input voltage range ±10%
- Unregulated output
- High efficiency, up to 89%
- Small no load input current
- Isolation voltage 3KVDC
- Operating temperature range: -40 ~ +105°C ambient
- RoHS compliant
- Standard DIP14 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.
SDF01D0503	5	3.3	303	30	83	4000
SDF01D0505	5	5	200	20	86	4000
SDF01D0512	5	12	84	9	88	1000
SDF01D0515	5	15	67	7	88	680
SDF01D1205	12	5	200	20	86	4000
SDF01D1212	12	12	84	9	87	1000
SDF01D1215	12	15	67	7	88	680
SDF01D1515	15	15	67	7	88	680
SDF01D2405	24	5	200	20	87	4000
SDF01D0503D	5	±3.3	±152	±15	84	2000
SDF01D0505D	5	±5	±100	±10	86	2000
SDF01D0509D	5	±9	±56	±6	86	1000
SDF01D0512D	5	±12	±42	±5	88	560
SDF01D0515D	5	±15	±34	±4	88	220
SDF01D1205D	12	±5	±100	±10	86	2000
SDF01D1209D	12	±9	±56	±5	87	1000
SDF01D1212D	12	±12	±42	±5	87	560
SDF01D1215D	12	±15	±34	±4	88	220
SDF01D1515D	15	±15	±34	±4	88	220
SDF01D2405D	24	±5	±100	±10	87	2000
SDF01D2409D	24	±9	±56	±5	88	1000
SDF01D2412D	24	±12	±42	±5	88	560
SDF01D2415D	24	±15	±34	±4	88	220

* 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.

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	-	370 235 99 80 50	-	mA	
Input current No load		-	3	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	-	10 8 8 7 6 6	-	%	
Output ripple and noise	20MHz bandwidth	-	45	120	mVp-p	

Temperature coefficiency	Full load	-	±0.03	-	%/°C	
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 Tested for 1 minute, leakage current less than 1mA	Input to Output	3000	-	-	VDC	
Isolation resistance Tested at 500VDC	Input to Output	1000	-	-	M ohm	
Isolation capacitance Tested at 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		-	25	-	°C	
Storage humidity	Non-condensing	5	-	95	%RH	
Switching frequency	Full load	-	220	-	KHz	
Pin soldering resistance 1.5mm away from case for 10 sec		-	-	300	°C	
Case material		Black plastic UL94-V0				
Cooling method		Free air convection				
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				

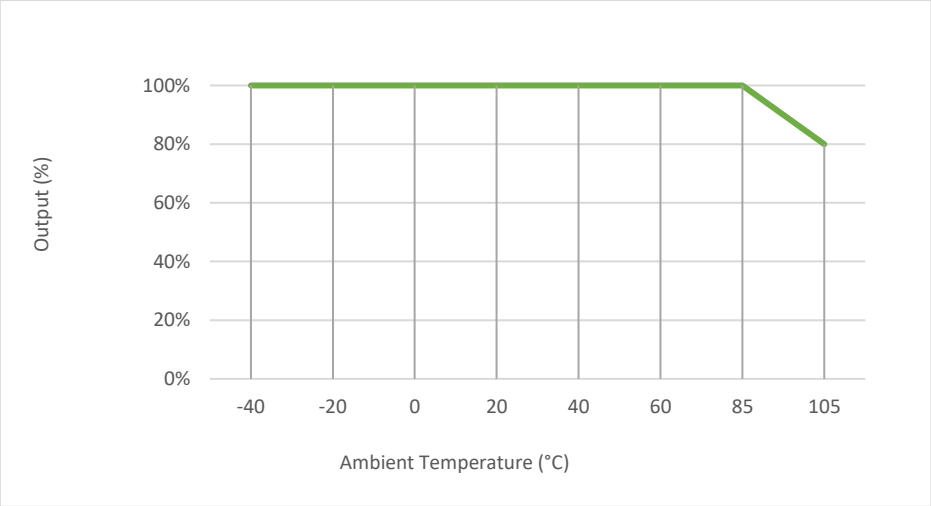
EMC	Emissions Immunity	CISPR32, EN55032 Class B* IEC/EN61000-4-2, Air ±8KV, Contact ±6KV, Criteria B
MTBF	MIL-HDBK-217F	>3,500,000 Hours, T_A=25°C
Size		19.5 x 9.8 x 8.0 mm
Weight		2.4g Typ.

*External circuit is required in order to meet Class B, refer to Figure 2 in Recommended External Circuit.

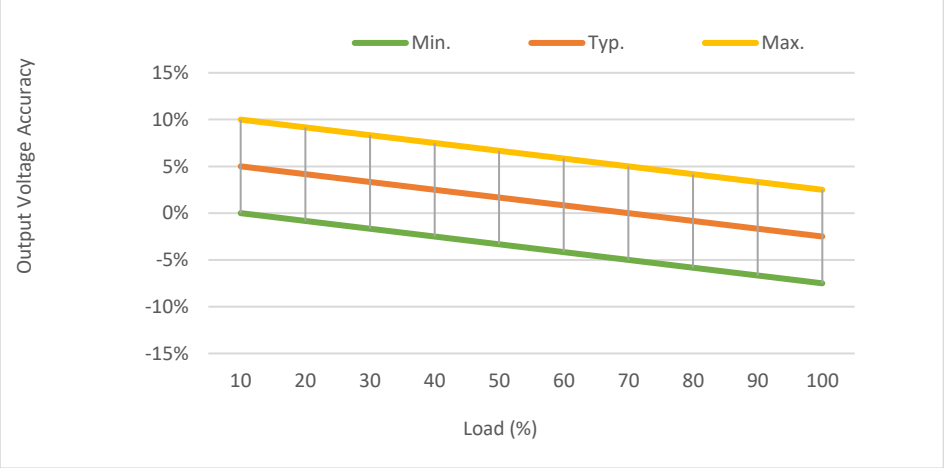
Characteristics Curves

Derating Curve

Output vs Ambient Temperature

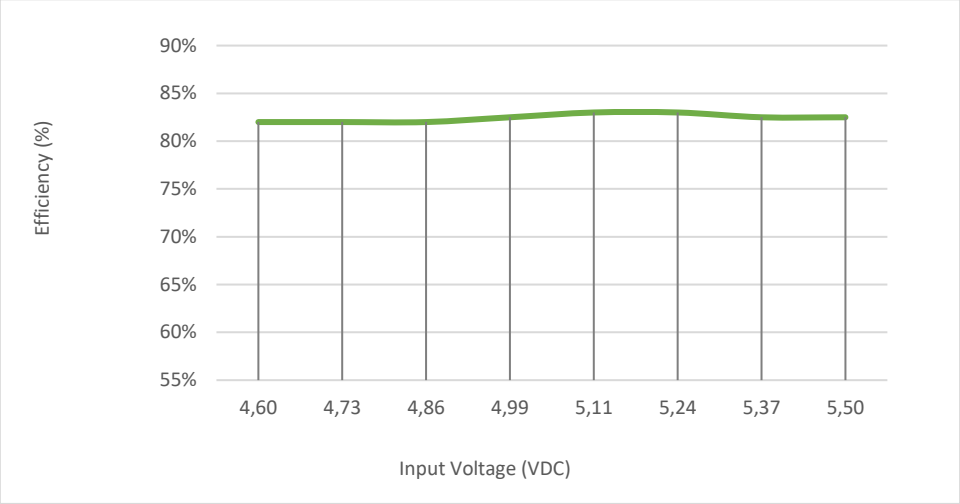


Output Voltage Accuracy vs Load



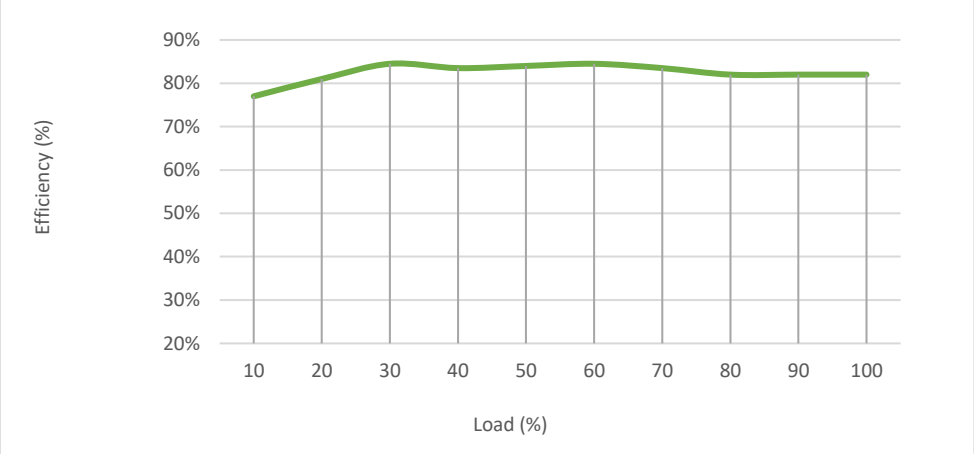
Efficiency Curves

Efficiency vs Input Voltage



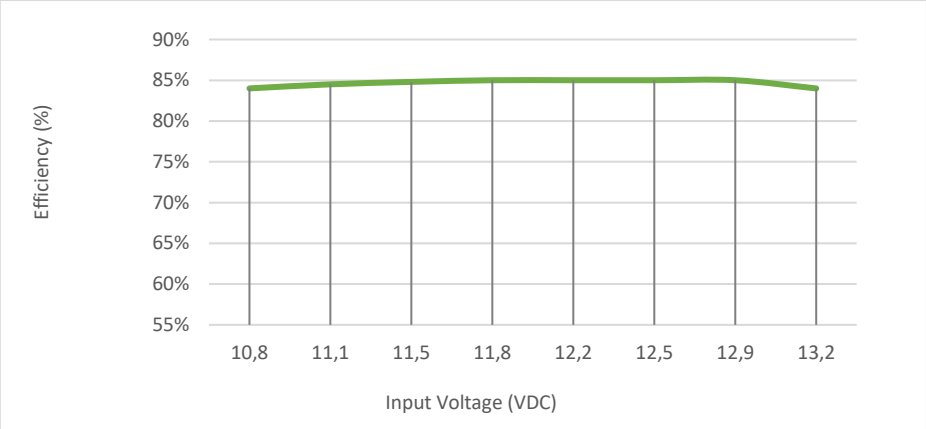
SDF01D0505, with full Load

Efficiency vs Load



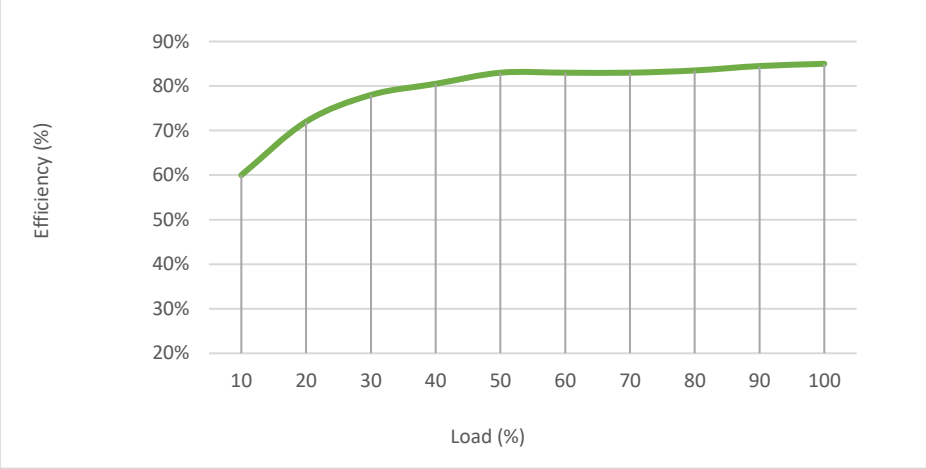
SDF01D0505, with nominal input voltage

Efficiency vs Input Voltage



SDF01D1205, with full Load

Efficiency vs Load



SDF01D1205, with nominal input voltage

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.

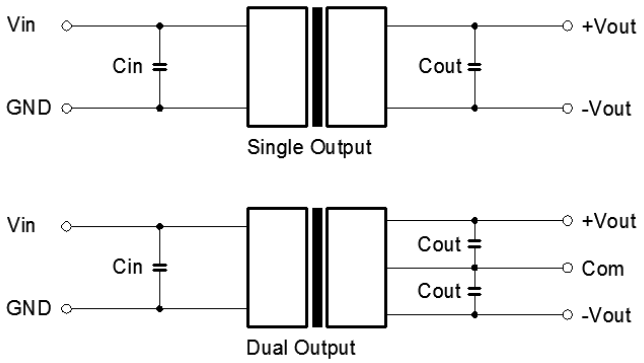


Figure 1: Typical External circuit

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
C_{OUT}	10uF, 16V	2.2uF, 25V	1uF, 50V
Dual Out	**±3.3, ±5V**	**±9, ±12V**	**±15, ±24V**
C_{OUT}	4.7uF, 16V	1uF, 25V	0.47uF, 50V

Circuit for EMC Enhancement

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

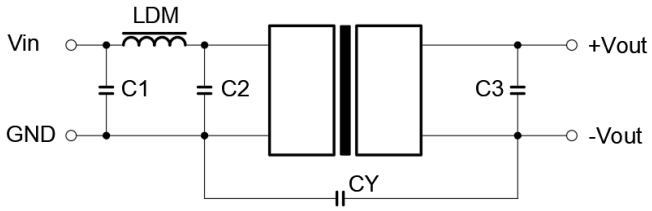


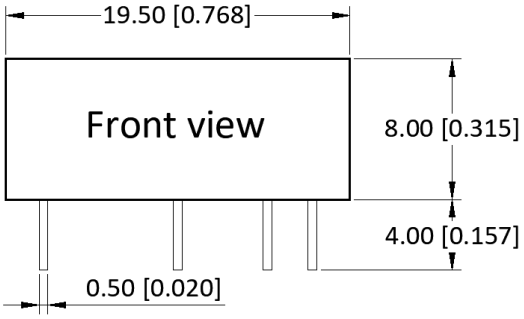
Figure 2: Circuit for EMC Enhancement

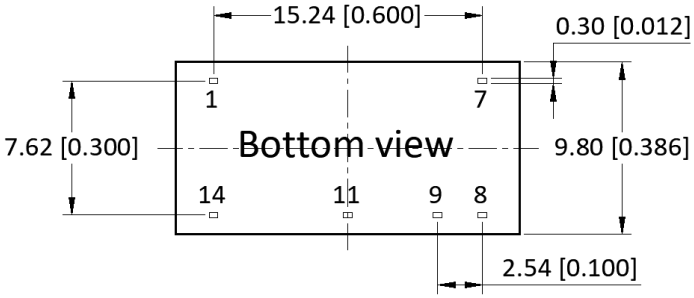
Recommended component spec

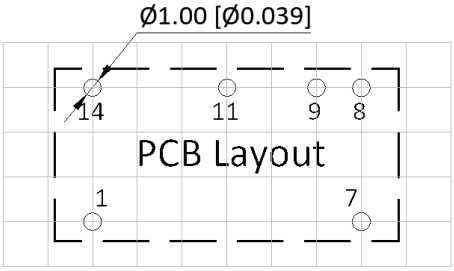
Component	LDM	C1, C2	CY
C_{OUT}	6.8uH	4.7uF, 50V	1nF, 4KV

*C3 refer to C_{OUT} in [Table 2]

Mechanical Specifications







Pin Definition

Pin #	Single Out	Dual Out
1	GND	GND
7	NC	NC
8	$+V_{OUT}$	$+V_{OUT}$
9	No Pin	COM
10	0V	-Vo
14	V_{IN}	V_{IN}

*** 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**

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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	27-08-2025	First issue of document