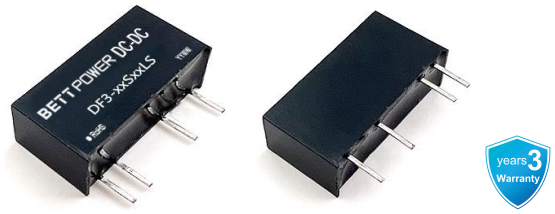
2025/08/18 (A/2)

DF3-xxSxxLS Series

DC-DC Converter | 3W | SIP7 | Fixed voltage input, unregulated output | 3000VDC



Features

- SIP7 Package
- Operating Temperature Range: -40℃ ~ +105℃
- Isolation Voltage: 3000VDC
- Full Load Efficiency: up to 84% (typ.)
- Continuous Short Circuit Protection
- Designed to Comply with: IEC/EN/UL62368 Standards

Product Description

Industrial Automate Power Security

The DF3-xxSxxLS series is 3W unregulated DC/DC converters that are typically used in cost sensitive general purpose power isolation and voltage matching applications. Typical applications are digital interfaces, voltage conversion in distributed powersy stems, general low-frequency analog circuits, relay drive circuits, data switching circuits etc.

Selection Guide

Certification	Part No.	Input Voltage	Output			Full Load Efficiency (%)	Capacitive Load (μF)
		Nominal (Range) (VDC)	Voltage (VDC)	Current (mA) Min.	Current (mA) Max.	Typ.	Max.
EN/UL Pending	DF3-05S03LS	5 (4.5~5.5)	3.3	60	600	80	2400
	DF3-05S05LS	5 (4.5~5.5)	5	60	600	82	2400
	DF3-05S09LS	5 (4.5~5.5)	9	33	333	83	1000
	DF3-12S05LS	12 (10.8~13.2)	5	60	600	82	2400
	DF3-12S12LS	12 (10.8~13.2)	12	25	250	83	820
	DF3-15S15LS	15 (13.5~16.5)	15	20	200	83	560
	DF3-24S12LS	24 (21.6~26.4)	12	25	250	83	560
	DF3-24S24LS	24 (21.6~26.4)	24	12	125	84	220

Note: The above efficiency is measured at nominal input voltage and rated output load.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (Full Load/No-load)	5VDC Input	--	714/10	--/15	mA
	12VDC Input	--	284/15	--/20	mA
	15VDC Input	--	230/15	--/20	mA
	24VDC Input	--	154/15	--/20	mA
Reflected Ripple Current		--	15	--	mA
Surge Voltage	5VDC Input	-0.7	--	9	VDC
	12VDC Input	-0.7	--	18	VDC
	15VDC Input	-0.7	--	21	VDC
	24VDC Input	-0.7	--	30	VDC
Input Filter Type		Capacitance Filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See Output Regulation Curve			
Line Regulation	Input Voltage Variation: ±1%	3.3VDC output	--	±1.5	--	%
		Others	--	±1.2	--	%
Load Regulation	10%~100% load	3.3VDC output	--	15	--	%
		Others	--	10	--	%
Ripple & Noise	20MHz bandwidth (peak-to-peak)		--	80	150	mV
Temperature Coefficient	Full load		--	±0.03	--	%/℃
Short Circuit Protection			Continuous, self-recovery			

Note: Ripple & noise are measured at 20MHz of bandwidth with a 10uF electrolytic capacitor and a 1uF ceramic capacitor connected inparallel at the output.

General specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	3000	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-Output,100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating when operating temperature≥85℃ (See Temperature derating curve chart)	-40	--	105	℃
Storage Temperature		-55	--	125	℃
Case Temperature Rise	Ta=25℃, Nominal Input, Full Load	--	25	--	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	Wave soldering	260±5℃; Time: 5 - 10s			

	Manual soldering	360±10℃; Time: 3 - 5s			
Switching frequency	Full load, nominal input voltage	--	220	--	kHz
MTBF	MIL-HDBK-217F@25℃	>3500Kh			

Mechanical Specifications

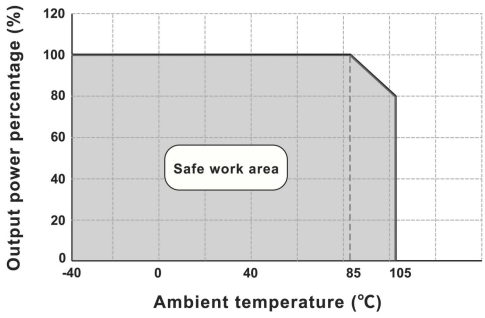
Case material	Black flame-retardant heat-resistant plastic (UL94V-0)
Mechanical dimensions	19.60 * 10.10 * 7.05mm
Weight	1.35g typ.)
Cooling method	Free air convection

EMC characteristics

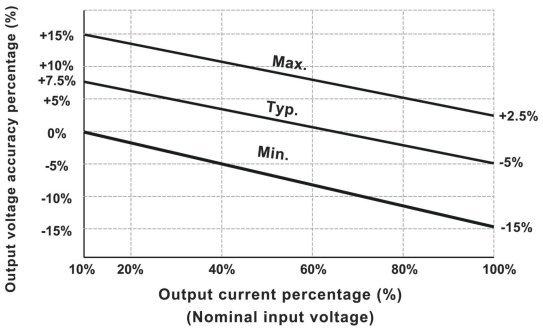
EMI	CE	CISPR32/EN55032 CLASS B (Recommended circuit see Figure 2)	
	RE	CISPR32/EN55032 CLASS B(Recommended circuit see Figure 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±8KV	Perf. Criteria B

Product Characteristic Curve

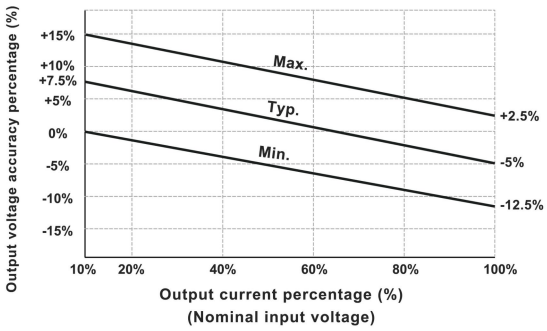
Temperature Derating Curve



Output Regulation Curve(3.3V Output)

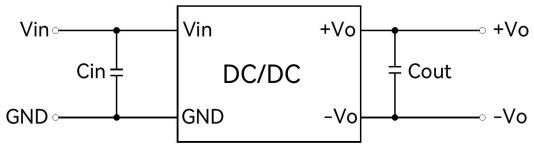


Output Regulation Curve (Others)



Design Reference - Application circuit

Typical Circuit Design and Application



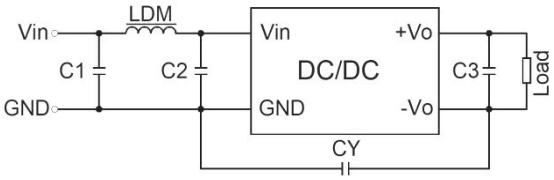
(Figure 1)

Recommended Capacitive Load Value Table			
Vin	Cin	Vo	Cout
5VDC	10uF/16V	3.3/5VDC	10μF
12VDC	4.7uF/25V	9/12VDC	2.2μF
15VDC	2.2uF/25V	15/24VDC	1.0μF
24VDC	1.0uF/50V	--	--

All DC/DC converters in this series are tested according to the recommended application circuit (Figure 1) before the shipment. If further reduction of input and output ripple is required, the external capacitors Cin and Cout can be increased or capacitors with low series equivalent impedance can be selected. For each output, under safe and reliable operating conditions, the maximum capacitance of the filter capacitor must not exceed the maximum capacitive load of the product.

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



(Figure 2)

Recommended parameter values	
C1	4.7μF /50V
C2	4.7μF /50V
C3	Refer to the Cout parameter in Figure 1
CY	1nF/4KV
LDM	6.8μH

Note:

1. Typical Application

If further reduction of input and output ripple is required, a Capacitance Filter network can be connected at the input and output terminals, as shown in the application circuit in Figure 1. However, appropriate filter capacitors should be selected. If the capacitor is too large, it may cause startup issues. For each output, under conditions ensuring safe and reliable operation, the recommended capacitive load values are detailed in the table.

2. EMC Recommended Circuit: See Figure 2

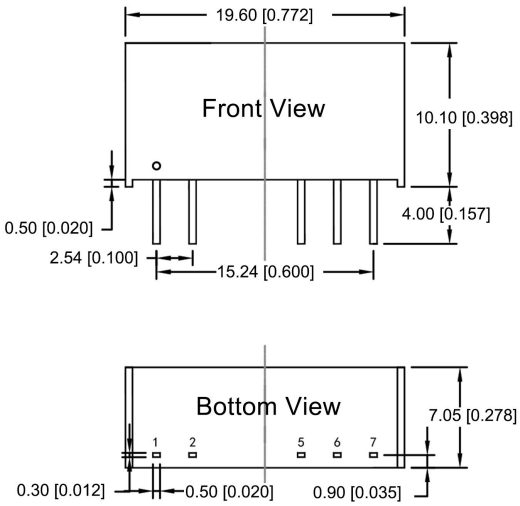
3. Output Load Requirements

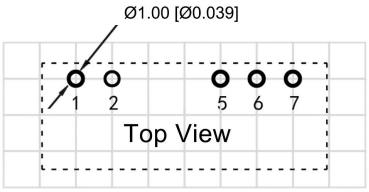
To ensure efficient and reliable operation of the module, the minimum output load during use must not be less than 10% of the rated load. If the required power is indeed small, please connect a resistor in parallel at the output (the sum of the resistor's power dissipation and the actual power used must be greater than or equal to 10% of the rated power).

Dimensions and Recommended Layout

DF3-xxSxxLS Dimensions and Recommended Layout

Third Angle Projection





The grid distance size is 2.54mm*2.54mm

Pin	Function
1	Vin
2	GND
5	-Vo
6	No Pin
7	+Vo

Note:

Size unit: mm [inch]

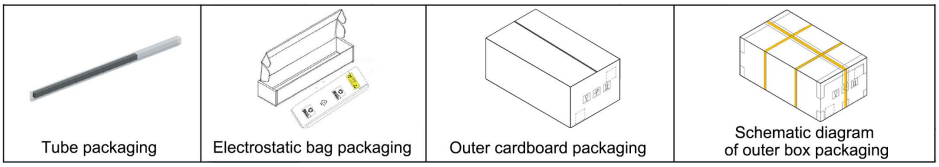
Pin diameter tolerance: ±0.10 [±0.004]

Unmarked dimensional tolerance: ±0.50 [±0.020]

Packaging Information

Model series (Tube packaging)	Quantity per tube (pcs/ tube)	Quantity of electrostatic bag (pcs/ bag)	Quantity of inner box (pcs/ box)	Full box Quantity (pcs)
DF3-xxSxxLS	26	416	1664	6656

The schematic diagram of tube packaging is shown below:



Product precautions

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. The maximum capacitive load is tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
5. All indicator testing methods in this manual are based on our company's corporate standards;
6. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
7. Product specifications are subject to change without prior notice.

Manufacturer contact information

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