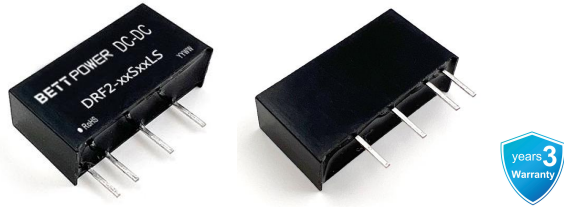


DRF2-xxSxxLS Series

DC-DC Converter | 2W | SIP6 | Fixed voltage input, Regulated Output | 3000VDC



Features

- SIP6 Package
- Operating Temperature Range: -40°C ~ +85°C
- Isolation Voltage: 3000VDC
- Full Load Efficiency: 72% (typ.)
- Regulated Output, Voltage Accuracy 3% (typ.)
- Designed to meet IEC/EN/BS EN/UL 62368

Product Description



The DRF2-xxSxxLS series is 2W regulated DC/DC converters that are an ideal and economical solutions for on-board power applications where an isolated voltage is required. Typical applications are digital interfaces, voltage conversion in distributed power systems, general low-frequency analog circuits, relay drive circuits, data exchange 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.		
EN/UL Pending	DRF2-05S03LS	5 (4.75~5.25)	3.3	0	400	68	2400
	DRF2-05S05LS	5 (4.75~5.25)	5	0	400	72	2400
	DRF2-12S03LS	12 (11.4~12.6)	3.3	0	400	68	2400
	DRF2-12S05LS	12 (11.4~12.6)	5	0	400	72	2400
	DRF2-24S03LS	24 (22.8~25.2)	3.3	0	400	68	2400
	DRF2-24S05LS	24 (22.8~25.2)	5	0	400	72	2400

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	--	460/7	--/20	--/20
	12VDC Input	--	220/8	--/15	mA
	24VDC Input	--	90/6	--/15	mA
Reflected Ripple Current		--	15	--	mA
Input Filter Type		Capacitance Filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy		--	±3	--	%	
Line Regulation	Rated Load	--	±0.25	--	%	
Load Regulation	10%~100% Load	3.3VDC Output	--	±3	--	%
		Others	--	±2	--	%
Ripple & Noise	20MHz Bandwidth (Peak-to-Peak)	24VDC Output	--	50	100	mV
		Otherst	--	30	75	mV
Temperature Coefficient	Full Load	--	±0.02	--	%/°C	
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	Temperature ≥ 71°C Derating (See Temperature derating curve chart)	-40	--	85	°C
Storage Temperature		-55	--	125	°C
Case Temperature Rise	Ta=25°C, nominal input, full load output	--	25	--	°C
Storage Humidity	No condensation	--	--	95	%RH
Soldering Profile	Welding point distance from case 1.5mm, 10 seconds	--	--	300	°C
Switching Frequency	Full load, nominal input voltage	--	250	--	kHz
MTBF	MIL-HDBK-217F@25°C	>3500Kh			

Mechanical Specifications

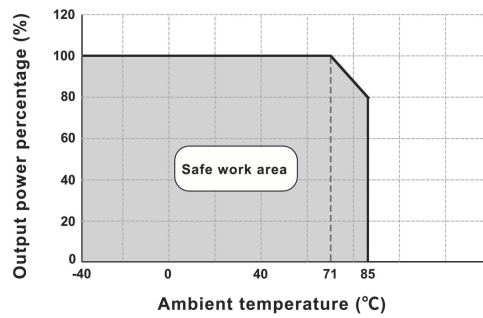
Case Material	Black flame-retardant heat-resistant plastic (UL94V-0)
Mechanical Dimensions	19.60 * 10.10 * 7.05 mm
Weight	2.4 g (typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

EMI	CE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
	RE	CISPR32/EN55032 CLASS B (EMC recommended circuit see Fig. 2)	
EMS	ESD	IEC/EN61000-4-2 Contact ±6KV	perf. Criteria B

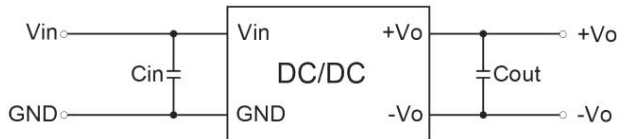
Product Characteristic Curve

Temperature Derating Curve



Design Reference - Application circuit

Application circuit



(Figure 1)

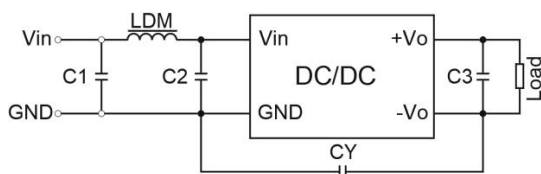
Recommended Capacitive Load Value Table

Vin	Cin	Vo	Cout
5VDC	4.7uF/16V	3.3/5VDC	10μF
12VDC	4.7uF/25V	--	--
24VDC	4.7uF/50V	--	--

1. 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. To ensure efficient and reliable operation of this 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 terminal (the sum of the resistor's power dissipation and the actual used power must be greater than or equal to 10% of the rated power).

Design Reference - EMC Solutions - Recommended Circuits

EMC Recommended Circuit Design and Application



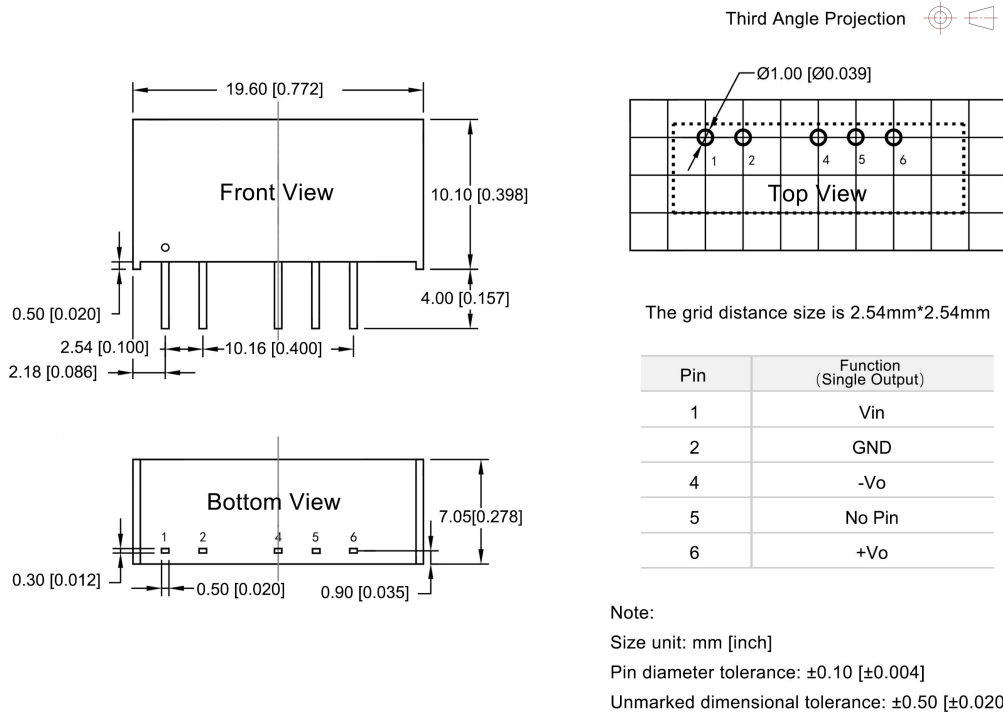
(Figure 2)

Recommended parameter values

C1	4.7μF /25V
C2	4.7μF /25V
C3	Refer to Cout parameter in Figure 1
CY	1000pF/2kV
LDM	6.8μH

Dimensions and Recommended Layout

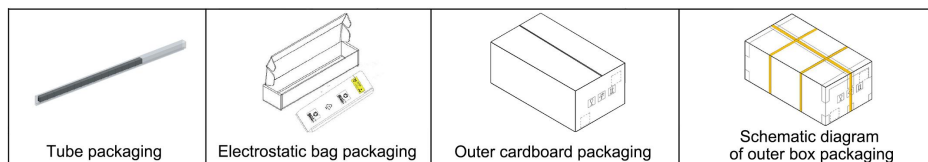
DRF2-xxS/DxxLS Dimensions and Recommended Layout



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)
DRF2-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 $T_a=25\text{ }^\circ\text{C}$, 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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