Descriptions

2W isolated, DC-DC converter





RoHS

3 Years Warranty

c UL us UL62368-1

CE Report EN62368-1

UK CA Report BS EN62368-1

Features

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 86%
- High power density
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out

Applications

- Industrial control
- Power
- Instrumentation

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load①(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.		
EN/BS EN	DFS2-A0503	5 (4.5-5.5)	±3.3	±303/±30	71/75	1200
	DFS2-A0505		±5	±200/±20	80/84	1200
	DFS2-A0509		±9	±111/±11	81/85	470
	DFS2-A0512		±12	±83/±8	81/85	220
	DFS2-A0515		±15	±67/±7	82/86	220
	DFS2-A0524		±24	±42/±4	82/86	100
	DFS2-B0503		3.3	400/40	74/78	2400
UL/EN/BS EN	DFS2-B0505		5	400/40	80/84	2400
--	DFS2-B0507		7.2	278/28	80/84	1000
EN/BS EN	DFS2-B0509		9	222/22	81/85	1000
	DFS2-B0512		12	167/17	81/85	560
	DFS2-B0515		15	133/13	82/86	560
UL/EN/BS EN	DFS2-B0524		24	83/8	82/86	220
EN/BS EN	DFS2-A1203	12 (10.8-13.2)	±3.3	±303/±30	71/75	1200
	DFS2-A1205		±5	±200/±20	76/80	1200
--	DFS2-A1207		±7.2	±139/±13	76/80	470
EN/BS EN	DFS2-A1209		±9	±111/±11	78/82	470

UL/EN/BS EN	DFS2-A1212		±12	±83/±8	79/83	220
	DFS2-A1215		±15	±67/±7	79/83	220
EN/BS EN	DFS2-A1224		±24	±42/±4	79/83	100
	DFS2-B1203		3.3	400/40	75/79	2400
UL/EN/BS EN	DFS2-B1205		5	400/40	78/82	2400
EN/BS EN	DFS2-B1209		9	222/22	78/82	1000
UL/EN/BS EN	DFS2-B1212		12	167/17	80/84	560
EN/BS EN	DFS2-B1215		15	133/13	81/85	560
UL/EN/BS EN	DFS2-B1224		24	83/8	82/86	220
--	DFS2-A1505	15 (13.5-16.5)	±5	±200/±20	76/80	1200
	DFS2-A1515		±15	±67/±7	78/82	220
EN/BS EN	DFS2-B1505		5	400/40	76/80	2400
	DFS2-B1515		15	133/13	77/81	560
	DFS2-B1524		24	83/8	77/81	220
	DFS2-A2403	24 (21.6-26.4)	±3.3	±303/±30	70/76	1200
	DFS2-A2405		±5	±200/±20	74/80	1200
--	DFS2-A2407		±7.2	±139/±13	74/80	470
EN/BS EN	DFS2-A2409		±9	±111/±11	75/81	470
	DFS2-A2412		±12	±83/±8	77/83	220
	DFS2-A2415		±15	±67/±7	77/83	220
	DFS2-A2424		±24	±42/±4	77/83	100
	DFS2-B2403		3.3	400/40	70/76	2400
UL/EN/BS EN	DFS2-B2405		5	400/40	74/80	2400
EN/BS EN	DFS2-B2409		9	222/22	75/81	1000
	DFS2-B2412		12	167/17	78/84	560
	DFS2-B2415		15	133/13	80/86	560
UL/EN/BS EN	DFS2-B2424		24	83/8	80/86	220

Note:
①The specified maximum capacitive load for positive and negative output is identical;
②Product images are for reference only; the actual product shall prevail.

Specifications

Product Specifications	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	5VDC input	3.3VDC output	--	534/8	564/--	mA
			5VDC/7.2VDC output	--	477/8	500/--	
			9VDC/12VDC output	--	471/8	494/--	
			15VDC/24VDC output	--	466/8	488/--	
		12VDC input	3.3VDC output	--	223/8	235/--	
			5VDC/7.2VDC output	--	208/8	219/--	
			9VDC output	--	203/8	214/--	
			12VDC/15VDC/24VD	--	201/8	211/--	
		15VDC input	5VDC output	--	167/8	176/--	
			15VDC output	--	163/8	171/--	
			24VDC output	--	165/8	174/--	

		24VDC input	3.3VDC output	--	110/8	120/--	
			5VDC/7.2VDC output	--	104/8	112/--	
			9VDC output	--	103/8	111/--	
			12VDC/15VDC/24VD	--	101/8	108/--	
	Reflected Ripple Current			--	15	--	
	Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
		12VDC input		-0.7	--	18	
		15VDC input		-0.7	--	21	
		24VDC input		-0.7	--	30	
	Input Filter			Capacitance filter			
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy			See output regulation curve(Fig. 1)			
	Linear Regulation	Input voltage change:±1%	3.3VDC output	--	--	±1.5	--
			Others	--	--	±1.2	
	Load Regulation	10%-100% load	5VDC input 3.3VDC output	--	10	20	%
			5VDC input 5VDC/7.2VDC output	--	8	15	
			5VDC input 9VDC/12VDC/15VDC output	--	7	10	
			5VDC input 24VDC output	--	5	10	
			12/15/24VDC input 3.3VDC output	--	15	20	
			12/15/24VDC input 5VDC output	--	7	15	
			12/15/24VDC input 7.2VDC output	--	6	15	
			12/15/24VDC input 9VDC output	--	5	15	
			12/15/24VDC input 12VDC output	--	5	10	
			12/15/24VDC input 15VDC output	--	4	10	
			12/15/24VDC input 24VDC output	--	3	10	
	Ripple & Noise①	20MHz bandwidth	5VDC input	--	75	200	mVp-p
			12/15/24VDC input	--	75	180	
	Temperature Coefficient	Full load		--	±0.02	--	%/℃
	Short-circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA		1500	--	--	VDC
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	20	--	pF
	Operating Temperature	Derating when operating temperature≥ 85℃, (see Fig. 2)		-40	--	105	℃
	Storage Temperature			-55	--	125	
	Case Temperature Rise	Ta=25℃	5VDC input	--	25	--	
			12/15/24VDC input	--	15	--	
	Pin Soldering Resistance Temperature②	Soldering spot is 1.5mm away from the case, 10 seconds max.		--	--	+300	
		Wave soldering, maximum 10 seconds		255	260	265	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency	Full load,	5VDC input	--	220	--	kHz

			12/15/24VDC input	--	260	--	
	MTBF	MIL-HDBK-217F @ 25℃		3500	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	19.65 x 7.05 x 10.16mm					
	Weight	2.4g(Typ.)					
	Cooling Method	Free air convection					

Note:
①The "parallel cable" method is used for Ripple and Noise test;
②The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper solder joints. The actual temperature set by the customer should be determined comprehensively based on factors such as PCB thickness, copper coverage, soldering iron power, and soldering iron tip selection.

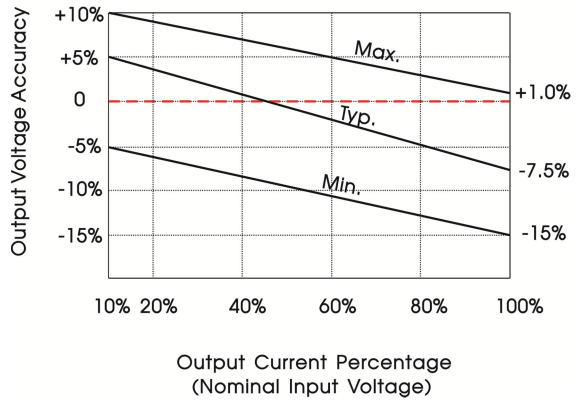
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

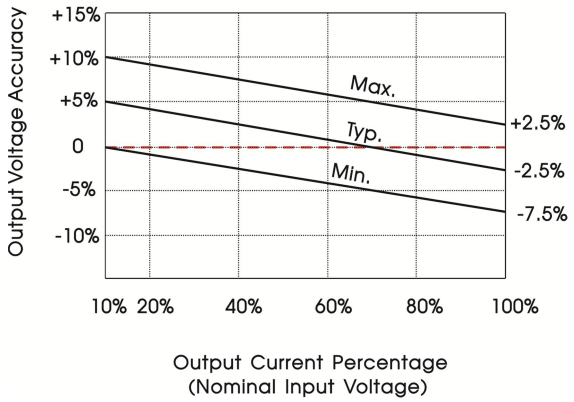
Note: Refer to Fig. 4 for recommended circuit test.

Charactristic Curve

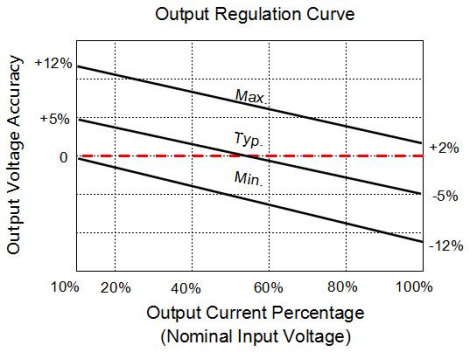
5VDC input 3.3VDC output



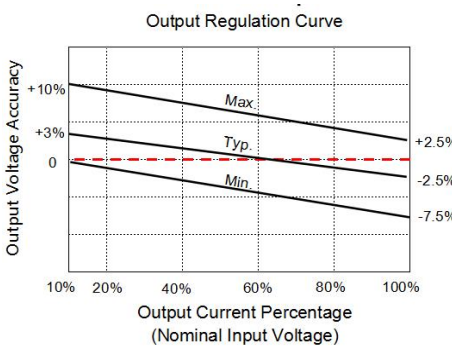
5VDC input other output



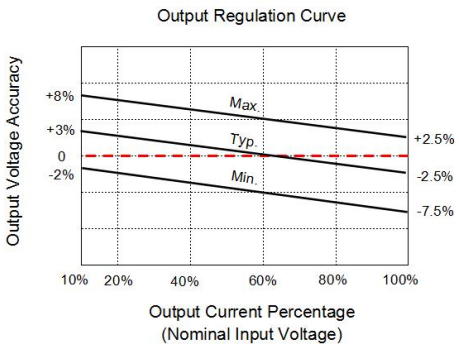
12/15/24VDC input 3.3VDC output

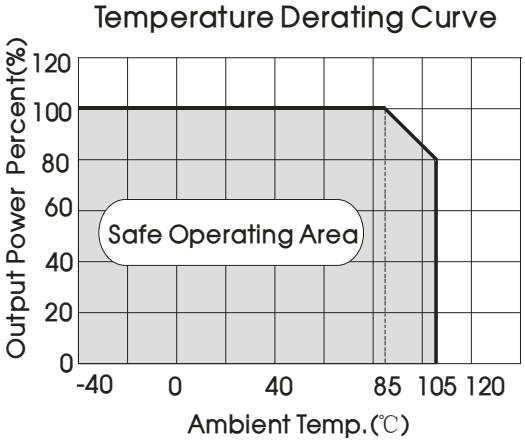


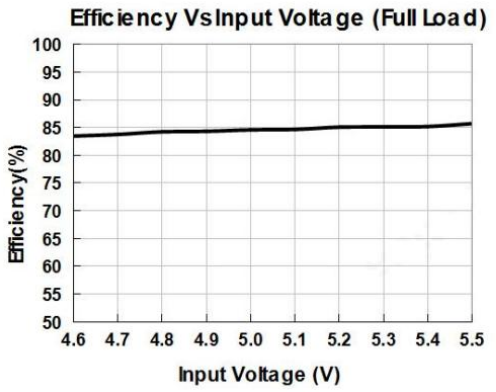
12/15/24VDC input 5/7.2VDC output



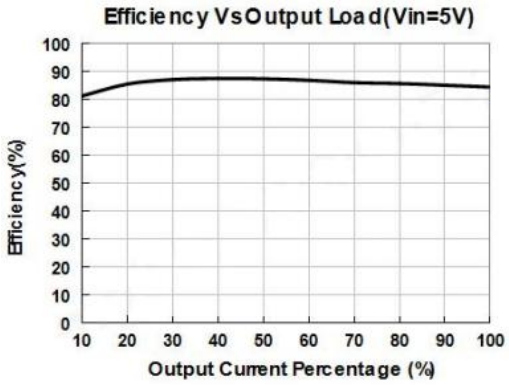
12/15/24VDC input other output







DFS2-B0505



DFS2-B0505

Design Reference

1. Typical application

①Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

②Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

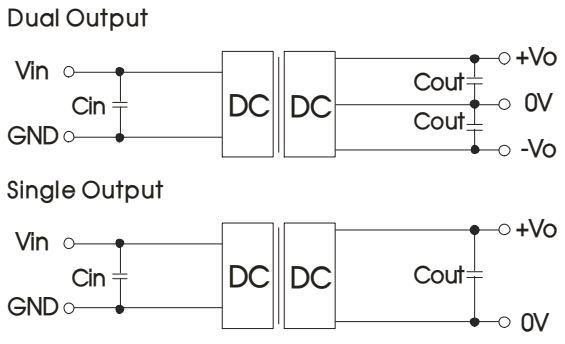


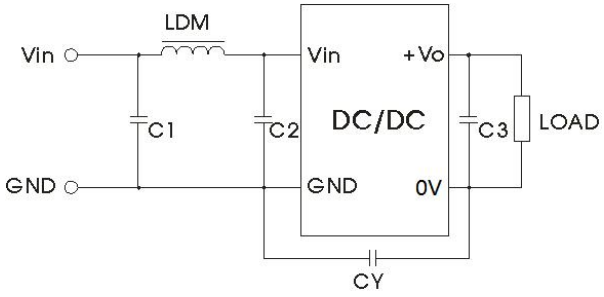
Fig. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
5VDC	10μF/16V	3.3VDC	10μF/16V	±3.3VDC	4.7μF/16V
12VDC	2.2μF/25V	5VDC	10μF/16V	±5VDC	4.7μF/16V
15VDC	2.2μF/25V	7.2VDC	10μF/16V	±7.2VDC	2.2μF/25V
24VDC	1μF/50V	9VDC	2.2μF/25V	±9VDC	2.2μF/25V
--	--	12VDC	2.2μF/25V	±12VDC	1μF/25V
--	--	15VDC	1μF/25V	±15VDC	1μF/25V
--	--	24VDC	1μF/50V	±24VDC	0.47μF/50V

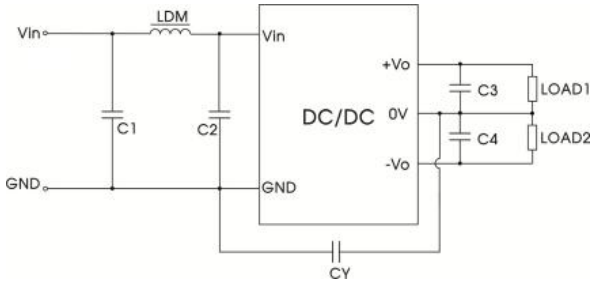
2. EMC compliance recommended circuit

Single Output



Input voltage		5 VDC	12/15/24 VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/2kV	
	C3	Refer to Cout in Fig. 3	
	LDM	6.8μH	

Dual Output

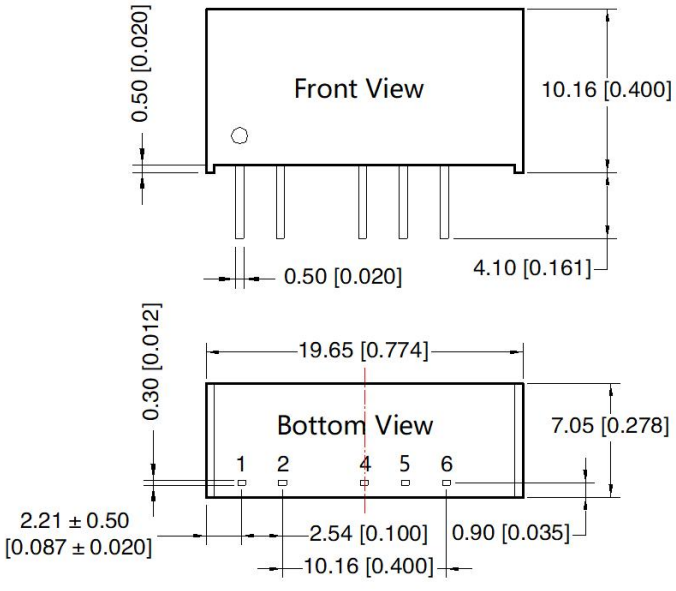


Input voltage		5 VDC	12/15/24 VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/2kV	
	C3/C4	Refer to Cout in Fig. 4	
	LDM	6.8μH	

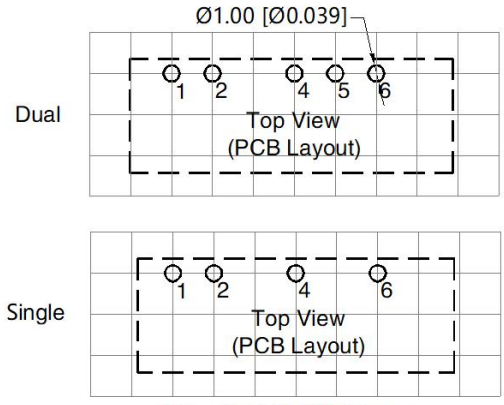
Fig. 4

Dimensions and Recommended

THIRD ANGLE PROJECTION



Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.25[± 0.010]



Note: Grid 2.54*2.54mm

Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
4	0V	–Vo
5	No Pin	0V
6	+Vo	+Vo

Notes:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. Products are related to laws and regulations: see "Features" and "EMC";
6. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units;
7. The image certification marks are for reference only; please refer to the selection table for actual specifications. Certification is based on the physical mark or packaging label.