Descriptions

2W isolated, DC/DC Converter



RoHS

3 Years Warranty

CE Report EN62368-1

UKCA Report BS EN62368-1

cULus UL62368-1

Features

- High efficiency up to 84%
- The leakage current < 2μA
- Isolation Capacitance as low as 4pF
- Creepage & Clearance Distance > 5mm
- Reinforced insulation, Isolation voltage: 5000VAC or 6000VDC
- Operating ambient temperature range: -40℃ to +105℃
- Continuous short-circuit protection

Applications

- Medical
- Electricity
- IGBT driver

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Voltage(VDC)	Current(mA) Max./Min.		
EN	DFS2-H1203	12 (10.8-13.2)	3.3	400/40	74/78	1000
EN/BS EN/UL	DFS2-H1205		5	400/40	76/80	1000
EN/BS EN	DFS2-H1209		9	222/22	78/82	680
EN/BS EN/UL	DFS2-H1212		12	167/17	80/84	470
EN/BS EN	DFS2-H1215		15	133/14	80/84	470
EN	DFS2-G1203		±3.3	±303/±30	69/73	1000
EN/BS EN	DFS2-G1205		±5	±200/±20	76/80	1000
	DFS2-G1209		±9	±111/±11	78/82	470
	DFS2-G1212		±12	±83/±9	79/83	220
	DFS2-G1215		±15	±67/±7	80/84	220
	DFS2-H1515	15 (13.5-16.5)	15	133/14	79/83	470
	DFS2-G1505		±5	±200/±20	74/78	1000
	DFS2-G1509		±9	±111/±11	76/80	470
	DFS2-G1515		±15	±67/±7	76/80	220
	DFS2-H2405	24 (21.6-26.4)	5	400/40	75/79	2200
	DFS2-H2409		9	222/22	77/81	680
	DFS2-H2412		12	167/17	78/82	470
	DFS2-H2415		15	133/14	80/84	470
	DFS2-H2424		24	83/9	80/84	220

	DFS2-G2405		±5	±200/±20	75/79	1000
	DFS2-G2409		±9	±111/±11	77/81	470
	DFS2-G2412		±12	±83/±9	78/82	220
	DFS2-G2415		±15	±67/±7	77/81	220
Note: *Product 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)	12V input		--	228/15	242/--	mA
		15V input		--	167/15	176/--	
		24V input		--	114/15	121/--	
	Surge Voltage (1sec. max.)	12V input		-0.7	--	18	VDC
		15V input		-0.7	--	21	
		24V input		-0.7	--	30	
	Reflected Ripple Current			--	200	--	mA
	Input Filter			Capacitance filter			
	Hot Plug			Unavailable			
Output Specifications	Voltage Accuracy			See output regulation curve(Fig. 1)			
	Linear Regulation	Input voltage change: ±1%	3.3V output	--	--	1.5	--
			Other output	--	--	1.2	
	Load Regulation	10%-100% load	3.3V/5V output	--	--	20	%
			Other output	--	--	15	
	Ripple & Noise①	20MHz bandwidth	3.3V/5V output	--	100	150	mVp-p
			Other output	--	80	120	
	Temperature Coefficient	100% full load		--	±0.02	--	%/℃
	Short Circuit Protection			Continuous, self-recovery			
General Specifications	Isolation	Input-output, Test for 1 minute, the leakage current < 1mA		5000	--	--	VAC
				6000	--	--	VDC
	Patient Leakage Current②	250VAC, 50/60Hz		--	--	2	μA
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	4	--	pF
	Operating Temperature	Derating when operating temperature≥85℃ (see Fig. 2)		-40	--	+105	℃
	Storage Temperature			-55	--	+125	
	Case Temperature Rise	Ta=25℃		--	25	--	
	Pin Soldering Resistance Temperature③	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
	Switching Frequency	100% load, nominal input voltage		--	200	--	kHz
	MTBF	MIL-HDBK-217F@25℃		19360	--	--	k hours
	Creepage & Clearance Distance			5	--	--	mm
Mechanical	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	19.50 x 9.80 x 12.50 mm					

Specifications	Weight	4.0g(Typ.)
	Cooling Method	Free air convection

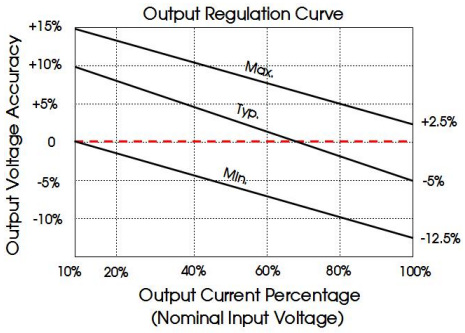
Note:
①The "parallel cable" method is used for Ripple and Noise test.
②Leakage current and reinforced insulation is based on 250 VAC, 50/60 Hz system input voltage;
③The pin soldering temperature tolerance is not the actual temperature set by the soldering iron but the temperature required for proper 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)

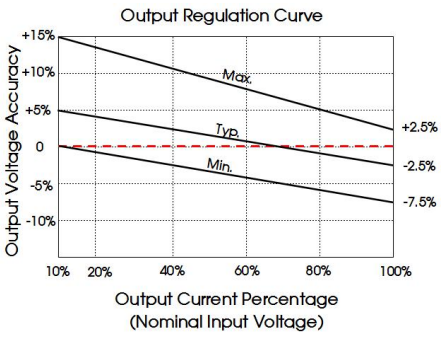
Emissions	CE	Others	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
		DFS2-G15xx DFS2-G24xx	CISPR32/EN55032 CLASS A (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS A (see Fig. 4 for recommended circuit)
	RE	Others	CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS B (see Fig. 4 for recommended circuit)
		DFS2-G15xx DFS2-G24xx	CISPR32/EN55032 CLASS A (see Fig. 4 for recommended circuit) EN60601-1-2/CISPR 11 GROUP1 CLASS A (see Fig. 4 for recommended circuit)
Immunity	ESD		EN60601-1-2 (IEC/EN61000-4-2) Air ±15kV, Contact ±8kV perf. Criteria B

Characteristic Curve

3.3VDC output



5VDC output



Other output

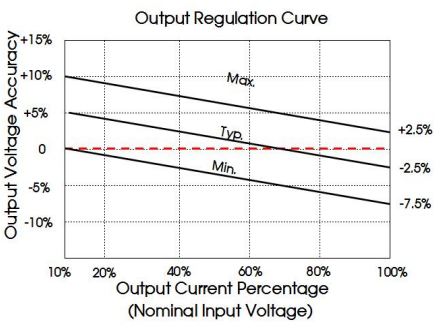


Fig. 1

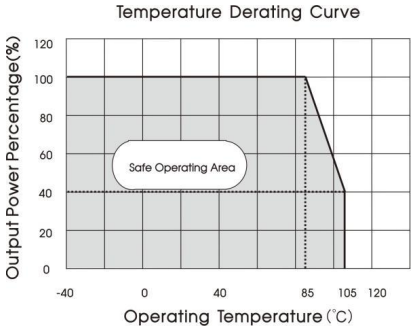


Fig.2

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.

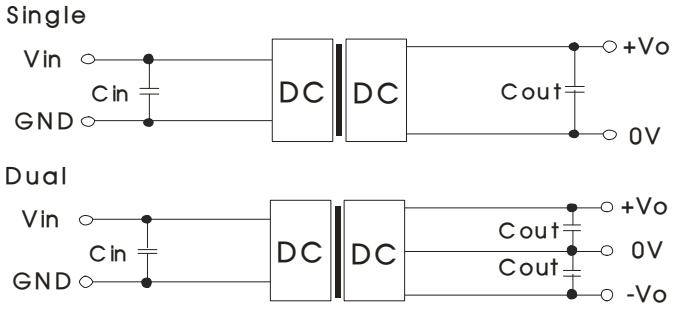


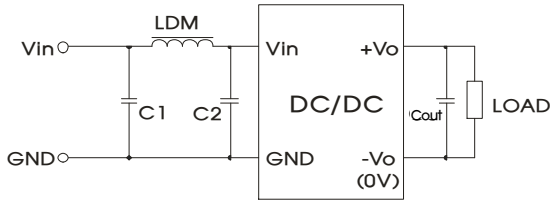
Fig. 3

Table 1: Recommended input and output capacitor values

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

2. EMC compliance circuit

DFS2-G15xx, DFS2-G24xx



DFS2-H12xx/DFS2-G12xx/DFS2-H15xx/DFS2-H24xx

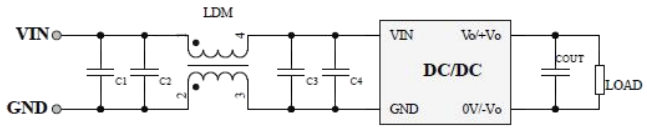


Fig. 4

EMC recommended circuit value table (Table 2)

Input voltage		DFS2-G15xx, DFS2-G24xx
Emissions	C1/C2	4.7μF /50V
	Cout	Refer to the Cout in table 1
	LDM	22μH(Nickel zinc inductance)

(Except DFS2-H1203/DFS2-G1203)

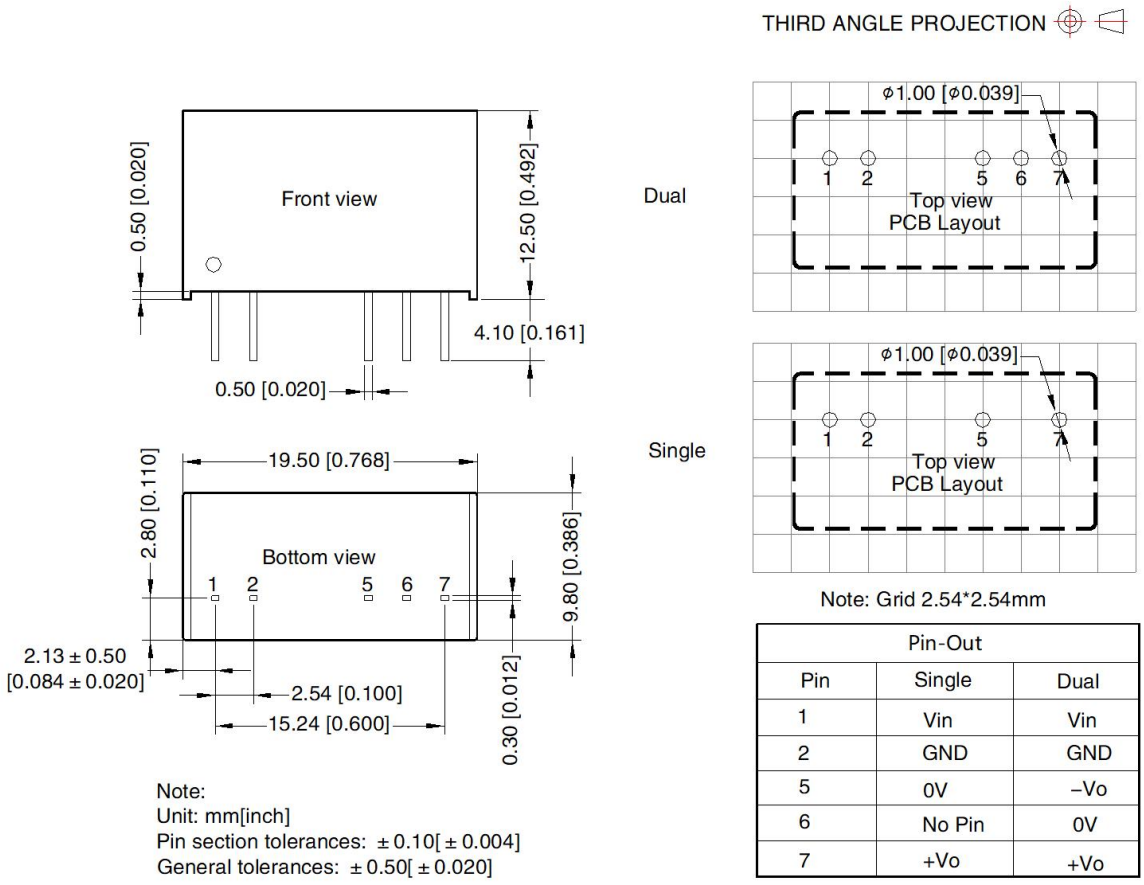
Input voltage			12/15/24VDC
Emissions	C1/C2		4.7μF /50V
	C3	DFS2-H2424	100μF /50V
		Other output	4.7μF /50V
	C4	DFS2-H2424	--
		Other output	4.7μF /50V
	COUT		Refer to the Cout in table 1
	LCM		22μH(Nickel zinc inductance)

Series		DFS2-H1203	DFS2-G1203
EMI	C0/C0A	4.7μF /50V	
	C1/C2	4.7μF /50V	
	C3	4.7μF /50V	
	C4	4.7μF /50V	
	COUT	Refer to the Cout in table 1	
	LCM	EFL2D-0.5-140	

3. Minimum Output Load Requirement

For a reliable and efficient operation of the converter, the minimum load should never be less than 10% of the rated output load. If the total required output power is below 10%, a parallel bleeding resistor is required on the output, ensuring that the sum of the power consumption is always maintained at 10% minimum.

Dimensions and Recommended



Note:
Unit: mm[inch]
Pin section tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]

Note: Grid 2.54*2.54mm

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

Note:

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% 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.