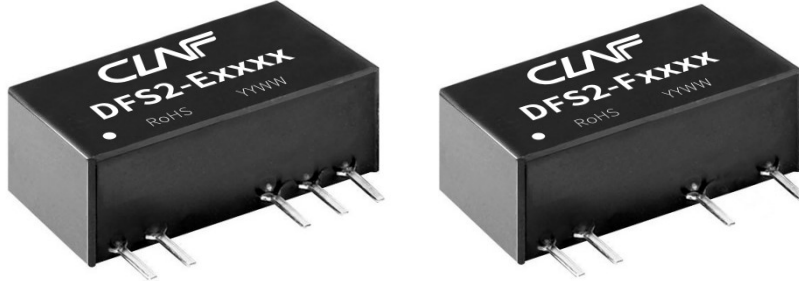


DESCRIPTIONS

2W isolated DC-DC converter Fixed input voltage, unregulated dual/single output



UL62368-1 EN62368-1 BS EN62368-1 IEC62368-1

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +105°C
- High efficiency up to 86%
- High power density
- I/O isolation test voltage 3k 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 Load*(µF) Max.
		Nominal (Range)	Voltage(VDC)	Current (mA) Max./Min.		
EN/BS EN	DFS2-E0503	5 (4.5-5.5)	±3.3	±303/±30	71/75	1200
EN/BS EN	DFS2-E0505		±5	±200/±20	80/84	1200
EN/BS EN	DFS2-E0509		±9	±111/±11	81/85	470
EN/BS EN	DFS2-E0512		±12	±83/±8	81/85	220
EN/BS EN	DFS2-E0515		±15	±67/±7	82/86	220
EN/BS EN	DFS2-E0524		±24	±42/±4	82/86	100
EN/BS EN	DFS2-F0503		3.3	400/40	74/78	2400
UL/EN/IEC/BS EN	DFS2-F0505		5	400/40	80/84	2400
EN/BS EN	DFS2-F0507		7.2	278/28	80/84	1000
EN/BS EN	DFS2-F0509		9	222/22	81/85	1000
EN/BS EN	DFS2-F0512		12	167/17	81/85	560
EN/BS EN	DFS2-F0515		15	133/13	82/86	560
UL/EN/IEC/BS EN	DFS2-F0524		24	83/8	82/86	220

EN/BS EN	DFS2-E1203	12 (10.8-13.2)	±3.3	±303/±30	71/75	1200
EN/BS EN	DFS2-E1205		±5	±200/±20	76/80	1200
EN/BS EN	DFS2-E1207		±7.2	±139/±13	76/80	470
EN/BS EN	DFS2-E1209		±9	±111/±11	78/82	470
EN/BS EN	DFS2-E1212		±12	±83/±8	79/83	220
EN/BS EN	DFS2-E1215		±15	±67/±7	79/83	220
EN/BS EN	DFS2-E1224		±24	±42/±4	79/83	100
EN/BS EN	DFS2-F1205		5	400/40	78/82	2400
--	DFS2-F12X6		6.4	312/31	78/82	1000
--	DFS2-F1209		9	222/22	78/82	1000
UL/EN/IEC/BS EN	DFS2-F1212		12	167/17	80/84	560
EN/BS EN	DFS2-F1215		15	133/13	81/85	560
UL/EN/IEC/BS EN	DFS2-F1224		24	83/8	82/86	220
EN/BS EN	DFS2-E1505		15 (13.5-16.5)	±5	±200/±20	76/80
EN/BS EN	DFS2-E1515	±15		±67/±7	78/82	220
--	DFS2-F1505	5		400/40	76/80	2400
--	DFS2-F1509	9		222/22	76/80	1000
--	DFS2-F1512	12		167/17	77/81	560
--	DFS2-F1515	15		133/13	77/81	560
--	DFS2-F1524	24		83/8	77/81	220
EN/BS EN	DFS2-E2403	24 (21.6-26.4)	±3.3	±303/±30	70/76	1200
EN/BS EN	DFS2-E2405		±5	±200/±20	74/80	1200
EN/BS EN	DFS2-E2407		±7.2	±139/±13	74/80	470
EN/BS EN	DFS2-E2409		±9	±111/±11	75/81	470
EN/BS EN	DFS2-E2412		±12	±83/±8	77/83	220
EN/BS EN	DFS2-E2415		±15	±67/±7	77/83	220
EN/BS EN	DFS2-E2424		±24	±42/±4	77/83	100
--	DFS2-F2403		3.3	400/40	70/76	2400
UL/EN/IEC/BS EN	DFS2-F2405		5	400/40	74/80	2400
--	DFS2-F2407		7.2	278/27	74/80	1000
--	DFS2-F2409		9	222/22	75/81	1000
EN/BS EN	DFS2-F2412		12	167/17	78/84	560
EN/BS EN	DFS2-F2415		15	133/13	80/86	560
--	DFS2-F2418		18	111/11	80/86	220
EN/BS EN	DFS2-F2424	24	83/8	80/86	220	

Note: * The specified maximum capacitive load for positive and negative output is identical.

Specifications

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	--	222/8	235/--		
			5VDC/7.2VDC output	--	208/8	219/--		
			9VDC output	--	203/8	214/--		
			12VDC/15VDC/24VDC output	--	201/8	211/--		
		15VDC input	5VDC/9VDC output	--	167/8	176/--		
			12VDC/15VDC/24VDC output	--	165/8	173/--		
			24VDC input	3.3VDC output	--	110/8		119/--
				5VDC/7.2VDC output	--	104/8		112/--
	9VDC output	--		103/8	111/--			
	12VDC output	--		99/8	107/--			
			15VDC/18VDC/24VDC output	--	97/8	104/--		
		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	%
				5/7.2VDC output	--	8	15	
				9/12/15 output	--	7	10	
				24VDC output	--	5	10	
		12/15/24V DC input	3.3VDC output	--	15	20		
			5VDC output	--	7	15		
			6.4VDC output	--	10	15		
			7.2VDC output	--	6	15		
9/12VDC output			--	5	10			
15VDC output			--	4	10			
Ripple & Noise*	20MHz bandwidth	5V input	--	75	200	mVp-p		
		12/15/24V input	--	75	180			
Temperature Coefficient		Full load	--	±0.02	--	%/°C		
Short-circuit Protection			Continuous, self-recovery					
General Specifications	Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		3000	--	--	VDC	
	Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ	
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	20	--	pF	

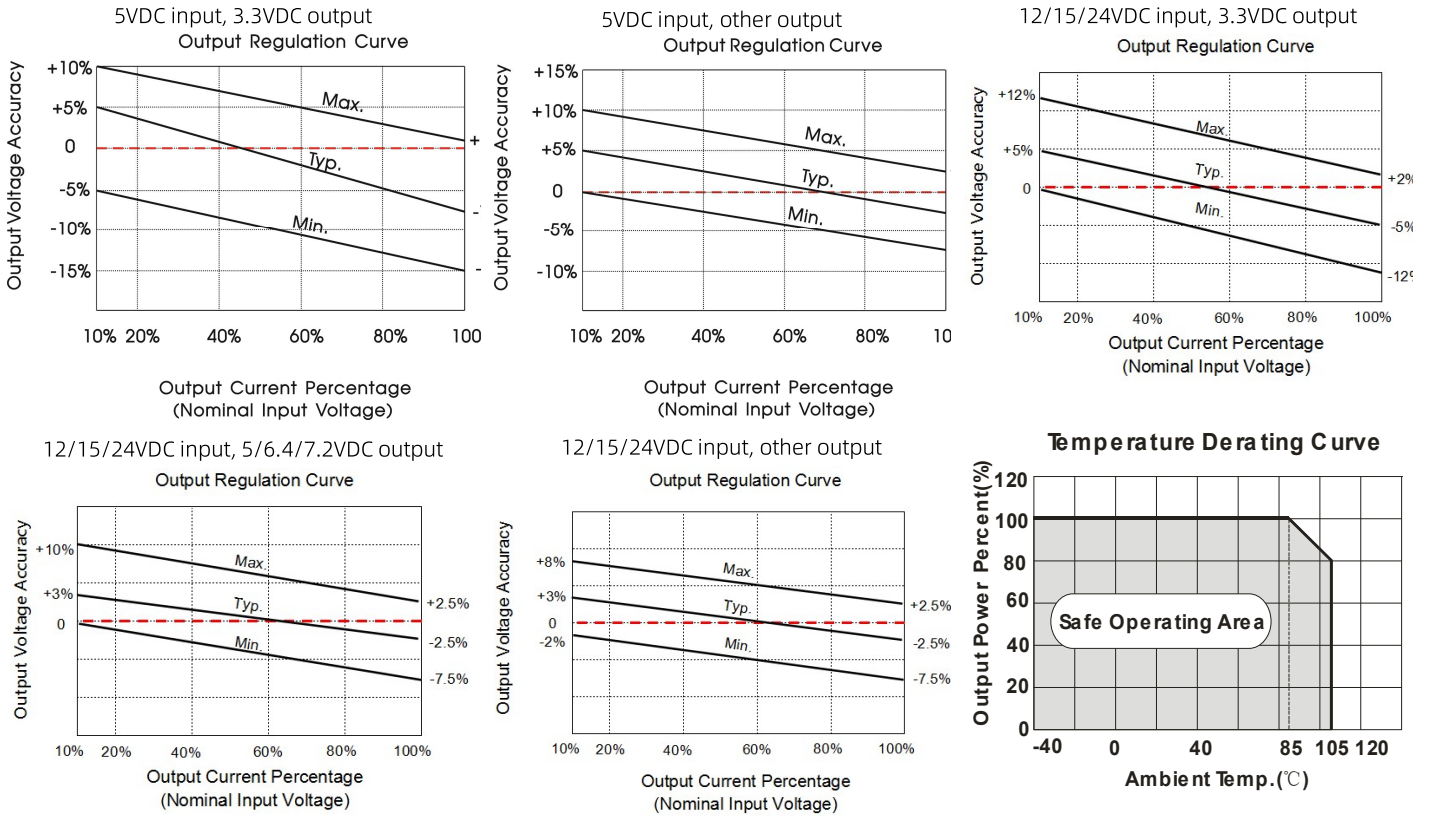
General Specifications	Operating Temperature	Derating when operating temperature $\geq 85^{\circ}\text{C}$ (see Fig. 2)		-40	--	105	$^{\circ}\text{C}$
	Storage Temperature			-55	--	125	$^{\circ}\text{C}$
	Case Temperature Rise	Ta=25 $^{\circ}\text{C}$		--	25	--	
	Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
	Storage Humidity	Non-condensing		5	--	95	%RH
	Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
	Switching Frequency	Full load, nominal input voltage	5V input	--	220	--	kHz
			12/15/24V input	--	260	--	
MTBF	MIL-HDBK-217F @ 25 $^{\circ}\text{C}$		3500	--	--	k hours	
Mechanical Specifications	Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)					
	Dimension	19.65 x 7.05 x 10.16 mm					
	Weight	2.4g(Typ.)					
	Cooling Method	Free air convection					

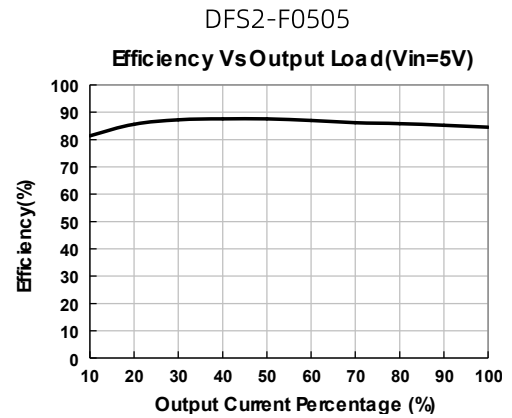
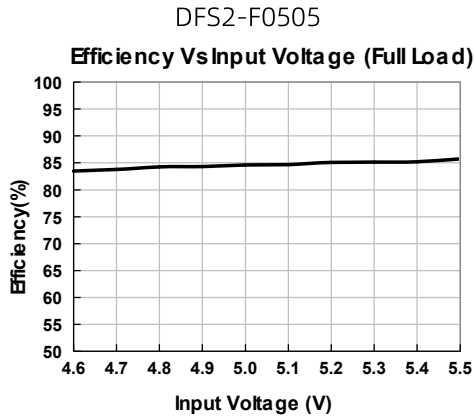
Note: * The "parallel cable" method is used for Ripple and Noise test.

Electromagnetic Compatibility (EMC)

Electromagnetic Compatibility (EMC)	Emissions(EMI)	CE	CISPR32/EN55032 CLASS B		
		RE	CISPR32/EN55032 CLASS B		
	Immunity(EMS)	ESD	IEC/EN61000-4-2 Air $\pm 8\text{kV}$, Contact $\pm 6\text{kV}$		perf. Criteria B

Characteristic Curve





Design Reference

1. Typical application

Input 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.

Choosing 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.

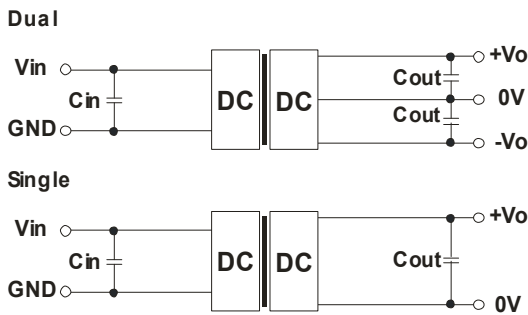


Fig. 3: Typical circuit diagram

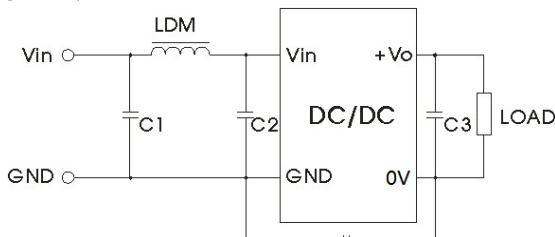
Table 1: Recommended input and output capacitor values

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	6.4VDC	4.7μF/16V	±7.2VDC	2.2μF/25V
24VDC	1μF/50V	7.2VDC	2.2μF/25V	±9VDC	2.2μF/25V
--	--	9VDC	2.2μF/25V	±12VDC	1μF/25V
--	--	12VDC	2.2μF/25V	±15VDC	1μF/25V
--	--	15VDC	1μF/25V	±24VDC	0.47μF/50V
--	--	18VDC	1μF/50V	--	--
--	--	24VDC	1μF/50V	--	--

Note: *The capacitor value of the positive and the negative output is identical.

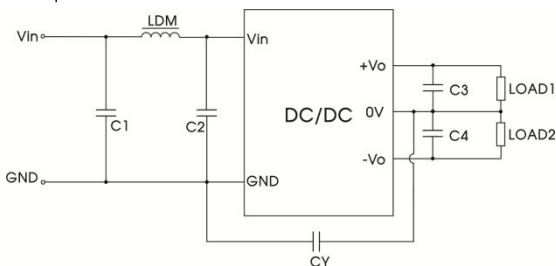
2. EMC compliance recommended circuit

Single Output



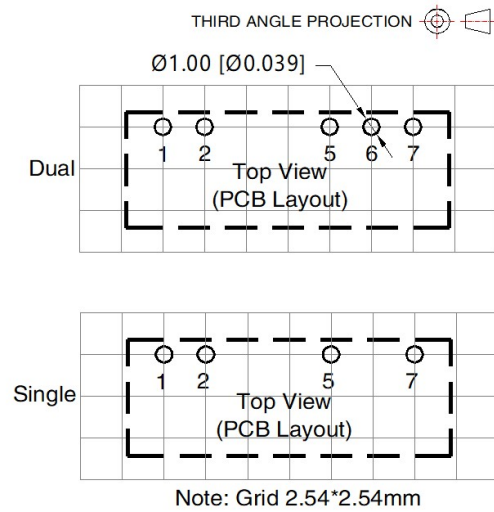
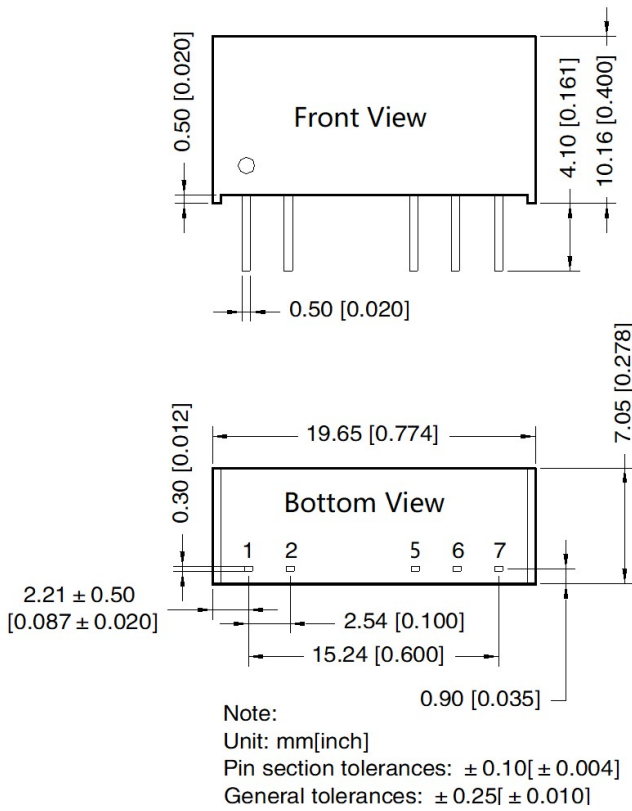
Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/4kV	
	C3	Refer to Cout in Fig. 3	
	LDM	6.8μH	

Dual Output



Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/4kV	
	C3/C4	Refer to Cout in Fig. 3	
	LDM	6.8μH	

Dimensions and Recommended



Pin-Out		
Pin	Single	Dual
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+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°C, 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.