

DESCRIPTIONS

2W, DC-DC Converter



Report

EN62368-1



Report

BS EN62368-1

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 88%
- High power density
- I/O isolation test voltage: 1.5kVDC
- Industry standard pin-out

APPLICATIONS

- Pure digital circuits
- Low frequency analog circuits
- Relay-driven circuits and data switching circuits

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	DFD2-B0303	3.3 (2.97-3.63)	3.3	400/40	74/78	2400
	DFD2-B0305		5	400/40	74/78	2400
	DFD2-A0503	5 (4.5-5.5)	±3.3	±303/±30	74/78	1200
	DFD2-A0505		±5	±200/±20	80/84	1200
	DFD2-A05X7		±7	±143/±14	80/84	470
	DFD2-A0509		±9	±111/±11	81/85	470
	DFD2-A0512		±12	±83/±8	81/85	220
	DFD2-A0515		±15	±67/±7	82/86	220
	DFD2-A0524		±24	±42/±4	82/86	100
	DFD2-B0503		3.3	400/40	74/78	2400
	DFD2-B0505		5	400/40	80/84	2400
	DFD2-B0509		9	222/22	81/85	1000
	DFD2-B0512		12	167/17	81/85	560
	DFD2-B0515		15	133/13	82/86	560
	DFD2-B0524		24	83/8	82/86	220

--	DFD2-A1205	12 (10.8-13.2)	±5	±200/±20	76/80	1200
	DFD2-A1209		±9	±111/±11	78/82	500
	DFD2-A1212		±12	±83/±8	79/83	280
	DFD2-A1215		±15	±67/±7	79/83	280
	DFD2-A1224		±24	±42/±4	81/85	110
	DFD2-B1205		5	400/40	78/82	2400
	DFD2-B1209		9	222/23	78/82	1000
	DFD2-B1212		12	167/17	80/84	560
	DFD2-B1215		15	133/13	81/85	560
	DFD2-B1224		24	83/8	82/86	220
	DFD2-A1515	15 (13.5-16.5)	±15	±67/±7	77/81	280
	DFD2-B1505		5	400/40	75/79	2400
	DFD2-B1509		9	222/23	78/82	1000
	DFD2-B1515		15	133/13	75/79	560
--	DFD2-A2405	24 (21.6-26.4)	±5	±200/±20	74/80	1200
	DFD2-A2409		±9	±111/±11	75/81	500
	DFD2-A2412		±12	±83/±8	77/83	280
	DFD2-A2415		±15	±67/±7	77/83	280
	DFD2-A2424		±24	±42/±4	77/83	110
	DFD2-B2405		5	400/40	76/82	2400
	DFD2-B2409		9	222/23	76/82	1000
	DFD2-B2412		12	167/17	80/86	560
	DFD2-B2415		15	133/13	82/88	560
	DFD2-B2424		24	83/8	82/88	220

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

Specifications

Product characteristics	Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	513/12	541/--	mA
			5VDC output	--	778/12	820/--	
		5VDC input	3.3VDC output	--	513/8	541/--	
			5VDC/7VDC output	--	477/8	500/--	
			9VDC/12VDC output	--	471/8	494/--	
			15VDC/24VDC output	--	466/8	488/--	
		DFD2-A12xx	5VDC output	--	209/8	220/--	
			9VDC output	--	204/8	214/--	
			12VDC/15VDC output	--	201/8	211/--	
			24VDC output	--	197/8	206/--	

Input	Input Current (full load / no-load)	DFD2-B12xx	5VDC/9VDC output	--	204/8	214/--	mA
			12VDC output	--	199/8	209/--	

Specifications				15VDC output	--	196/8	206/--		
				24VDC output	--	194/8	204/--		
				DFD2-A15xx	15VDC output	--	165/8		173/--
				DFD2-B15xx	5VDC/15VDC output	--	169/8		178/--
					9VDC output	--	163/8		171/--
				DFD2-A24xx	5VDC output	--	105/8		113/--
					9VDCoutput	--	103/8		112/--
					12VDC/15VDC/24VDC output	--	101/8		109/--
				DFD2-B24xx	5VDC/9VDC output	--	102/8		110/--
					12VDC output	--	97/8		105/--
					15VDC/24VDC output	--	95/8		102/--
				Reflected Ripple Current	3.3V input				--
Others			--		15	--			
Surge Voltage (1sec. max.)	3.3VDC input			-0.7	--	5	VDC		
	5VDC input			-0.7	--	9			
	12V input			-0.7	--	18			
	15V input			-0.7	--	21			
	24V 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	--
				Other output	--	--	±1.2	
	Load Regulation	10%-100% load	3.3VDC input	3.3VDC output	--	15	20	%
				5VDC output	--	20	25	
			5VDC input	3.3VDC output	--	12	20	
				5VDC/7VDC output	--	9	15	
				9VDC/12VDC/15 VDC output	--	7	10	%
			Other input	24VDC output	--	5	10	
				5VDC output	--	7	15	
				9VDC output	--	5	10	
				12VDC output	--	5	10	
				15VDC output	--	4	10	
				24VDC output	--	3	10	
	Ripple & Noise*	20MHz bandwidth	3.3V/5VDC input		--	75	200	mVp-p
			Other input	5/9/12/15VDC output	--	75	180	
				24VDC output	--	75	200	
	Temperature Coefficient	Full load			--	±0.02	--	%/°C
Short-circuit Protection				Continuous, self-recovery				

General	Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
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Specifications	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°C (see Fig. 2)	-40	--	105	°C
	Storage Temperature		-55	--	125	
	Case Temperature Rise	Ta=25°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	100% load, nominal input voltage	3.3/5VDC input	--	220	kHz
			Other input	--	260	
	MTBF	MIL-HDBK-217F@25°C	3500	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)				
	Dimensions	20.32 x 10.16 x 8.20 mm				
	Weight	2.4g(Typ.)				
	Cooling Method	Free air convection				

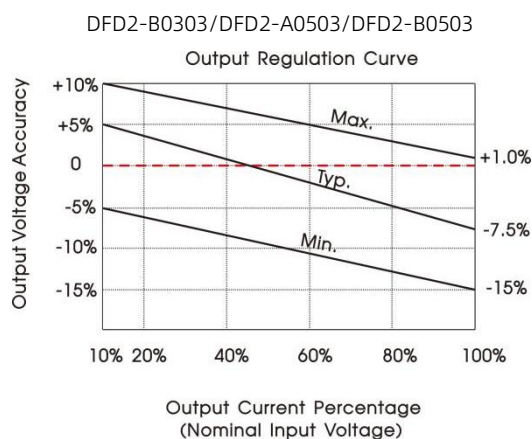
Notes: ① The “parallel cable” method is used for ripple and noise test.

Electromagnetic Compatibility (EMC)

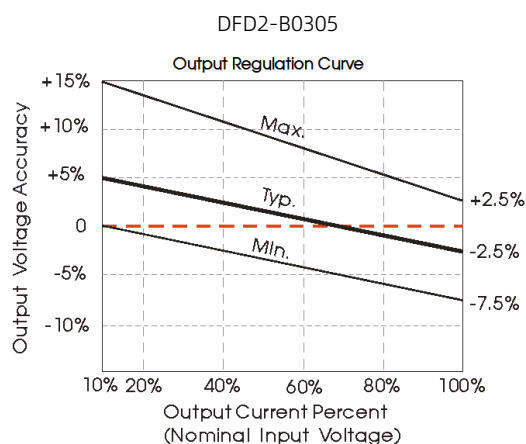
Electromagnetic Compatibility (EMC)	Emissions	CE	CISPR32/EN55032	CLASS B
		RE	CISPR32/EN55032	CLASS B
	Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV perf. Criteria B

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

Characteristic Curve



DFD2-A05xx/DFD2-B05xx/DFD2-Axx05/DFD2-Bxx05
(Except 3.3VDC output)



Others

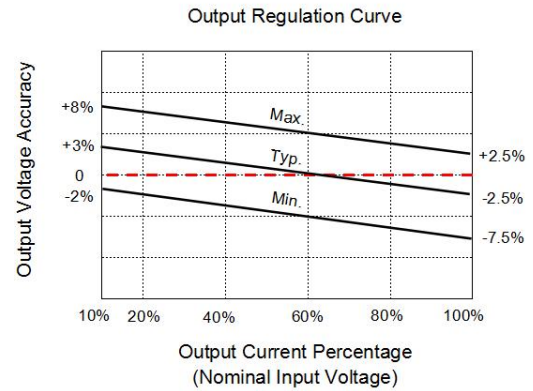
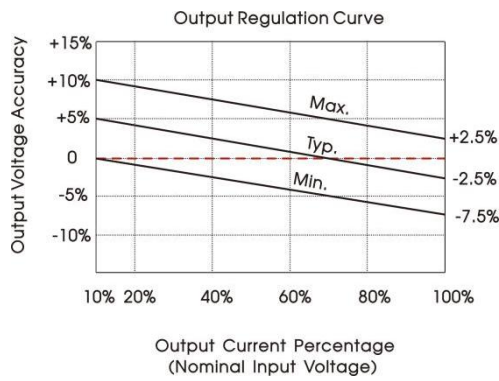


Fig. 1

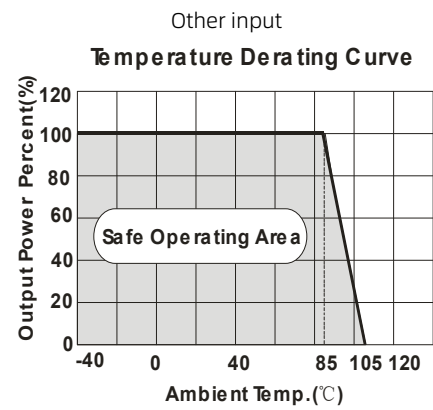
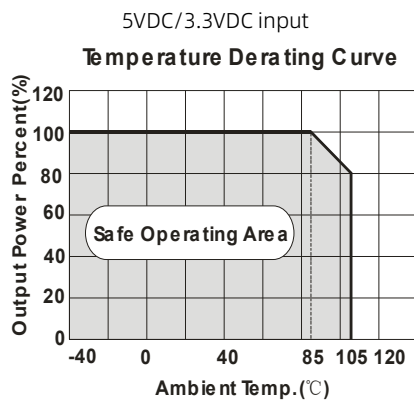
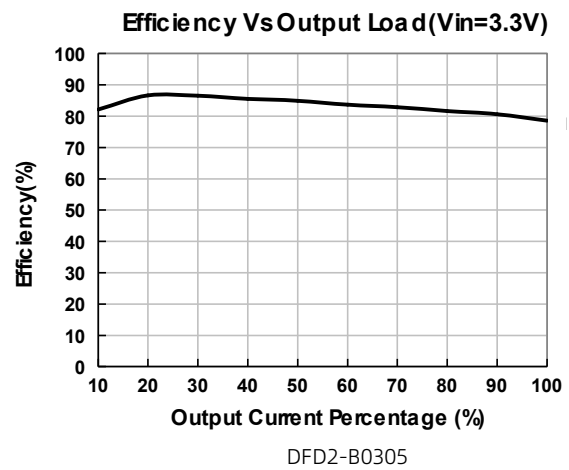
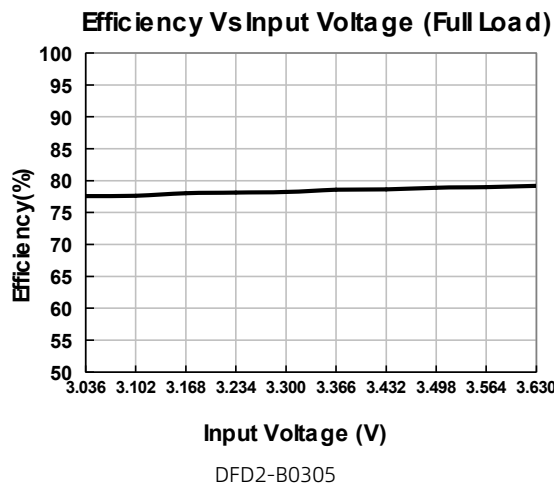
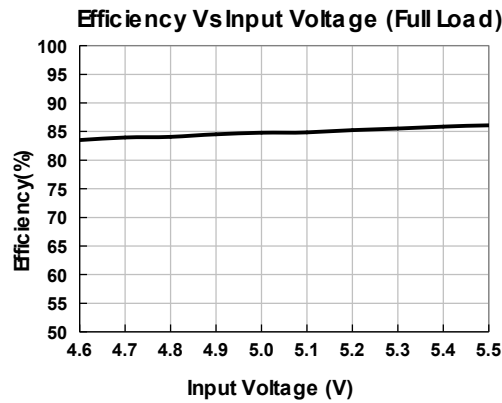
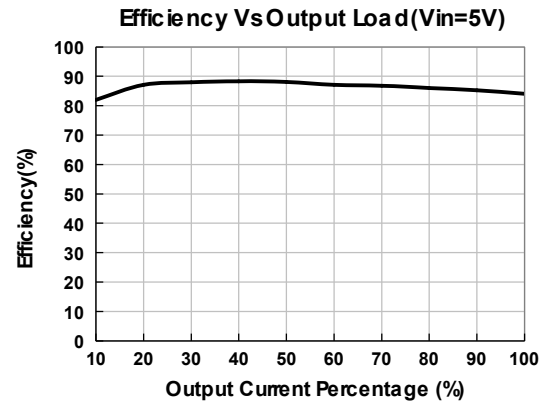


Fig. 2

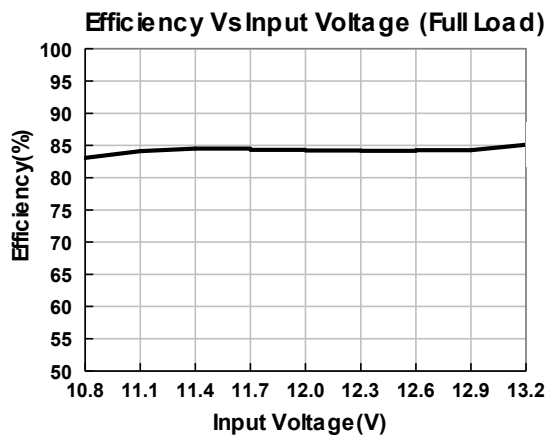




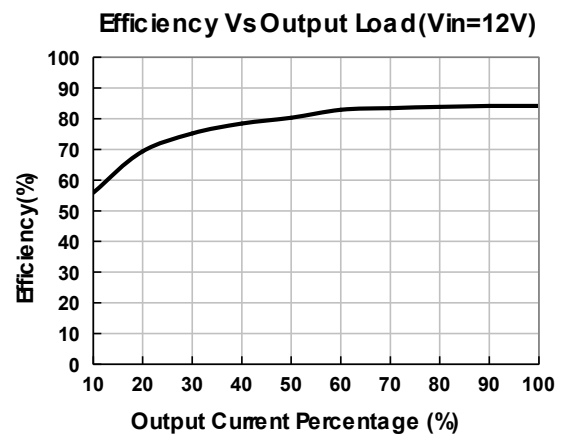
DFD2-B0505



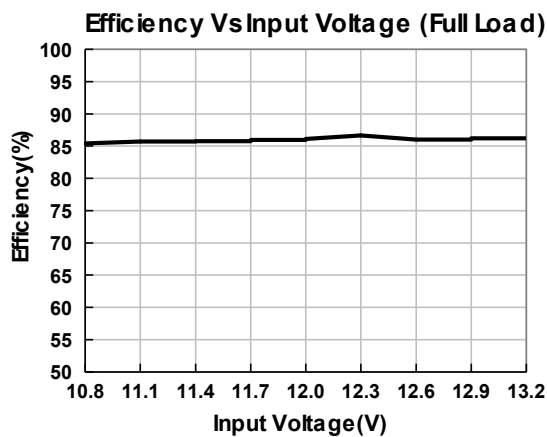
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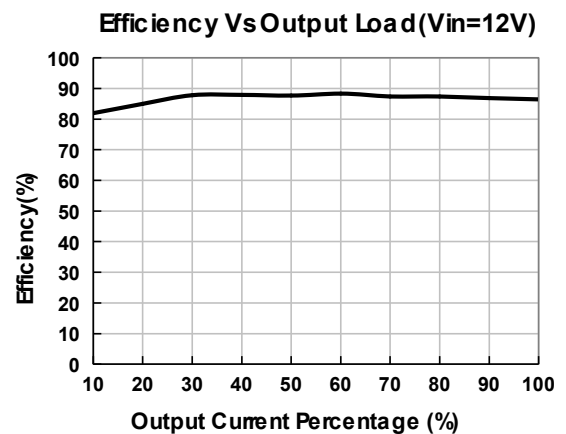
DFD2-A1205



DFD2-A1205



DFD2-B1205



DFD2-B1205

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.

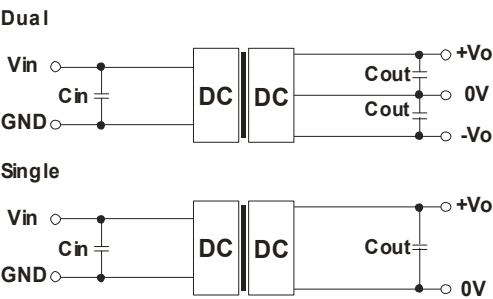


Fig.3

Table 1: Recommended input and output capacitor values

Vin	Cin	Dual Vout	Cout*	Single Vout	Cout
3.3VDC	10μF/16V	±3.3VDC	4.7μF/16V	3.3VDC	10μF/16V
5VDC	4.7μF/16V	±5/±7VDC	4.7μF/16V	5VDC	10μF/16V
12VDC	2.2μF/25V	±9VDC	1μF/16V	9VDC	2.2μF/25V
15VDC	2.2μF/25V	±12/±15VDC	1μF/25V	12VDC	2.2μF/25V
24VDC	1μF/50V	±24VDC	0.47μF/50V	15VDC	2.2μF/25V
--	--	--	--	24VDC	1μF/50V

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

2. EMC compliance circuit

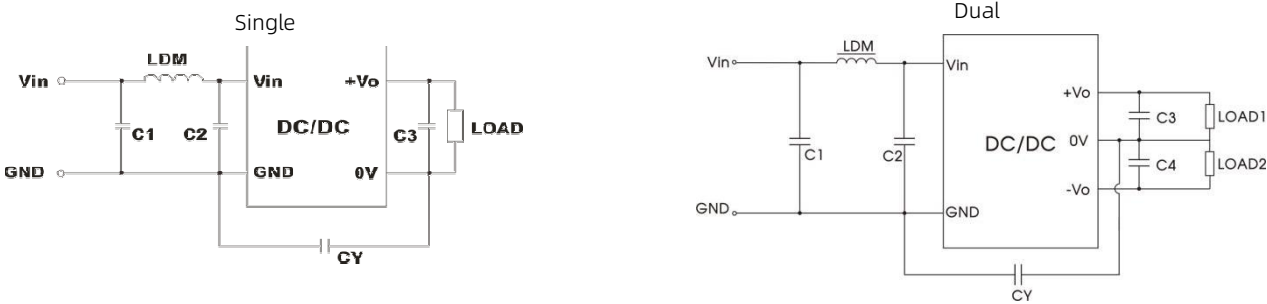


Fig.4

Emissions	C1/C2	4.7μF/50V
	CY	270pF/2kV
	C3/C4	Refer to the Cout in Fig.3
	LDM	6.8μH

