

DESCRIPTIONS

2W, isolated DC-DC converter



RoHS



Report



Report

EN62368-1

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 86%
- High power density
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out
- Industrial control
- Power
- Instrumentation

APPLICATIONS

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-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	5 (4.5-5.5)	3.3	400/40	74/78	2400
	DFS2-B0505		5	400/40	80/84	2400
	DFS2-B0509		9	222/22	81/85	1000
	DFS2-B0512		12	167/17	81/85	560
	DFS2-B0515		15	133/13	82/86	560
	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-A1209		±9	±111/±11	78/82	470
	DFS2-A1212		±12	±83/±8	79/83	220
UL/EN/ BS EN/IEC	DFS2-A1215		±15	±67/±7	79/83	220
EN/BS EN	DFS2-A1224	12 (10.8-13.2)	±24	±42/±4	79/83	100
--	DFS2-B1203		3.3	400/40	75/79	2400
EN/BS EN	DFS2-B1205		5	400/40	78/82	2400
--	DFS2-B1209		9	222/22	78/82	1000
EN/BS EN	DFS2-B1212		12	167/17	80/84	560
	DFS2-B1215	24 (21.6-26.4)	15	133/13	81/85	560
	DFS2-B1224		24	83/8	82/86	220
	DFS2-A2403		±3.3	±303/±30	70/76	1200
	DFS2-A2405		±5	±200/±20	74/80	1200
	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-B2403	24 (21.6-26.4)	±24	±42/±4	77/83	100
EN/BS EN	DFS2-B2405		3.3	400/40	70/76	2400
--	DFS2-B2409		5	400/40	74/80	2400
EN/BS EN	DFS2-B2412		9	222/22	75/81	1000
	DFS2-B2415		12	167/17	78/84	560
	DFS2-B2424		15	133/13	80/86	560
			24	83/8	80/86	220

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

Specifications

characteristic	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/24VDC output	--	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/--	

Input Specifications	Input Current (full load / no-load)	24VDC input	9VDC output 12VDC/15VDC/24VDC output	--	103/8	111/--	mA	
	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/7.2VDC output	--	8	15	
				9VDC/12VDC/15VDC output	--	7	10	
				24VDC output	--	5	10	
			12/1 5/24 VDC input	3.3VDC output	--	15	20	
		5VDC output		--	7	15		
		7.2VDC output		--	6	15		
		9VDC output		--	5	15		
		12VDC output		--	5	10		
		15VDC output		--	4	10		
		Ripple & Noise*	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 max.		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 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				

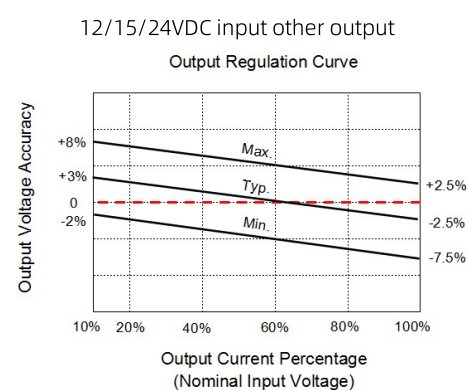
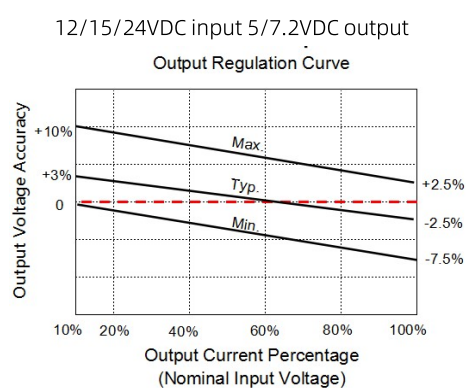
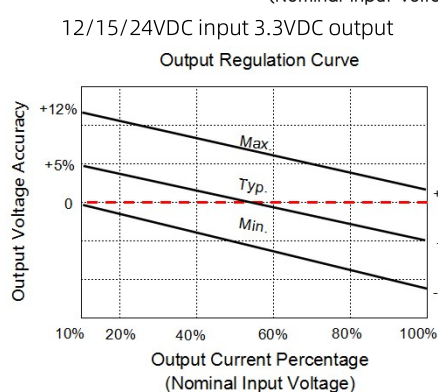
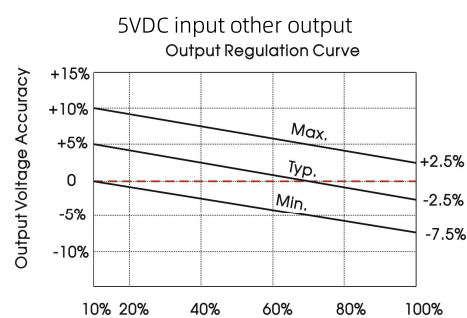
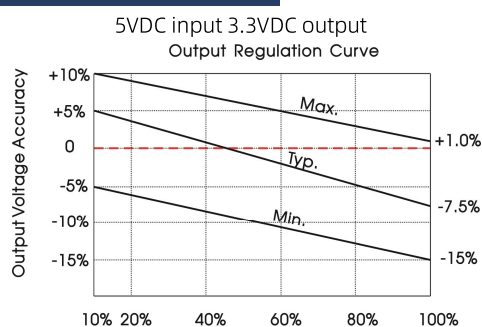
General Specifications	Switching Frequency	Full load, nominal input	5VDC input	--	220	--	kHz
			12/15/24VDC input	--	260	--	
	MTBF	MIL-HDBK-217F @ 25°C		3500	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	19.65 x 7.05 x 10.16mm					
	Weight	2.4g(Typ.)					
	Cooling Method	Free air convection					

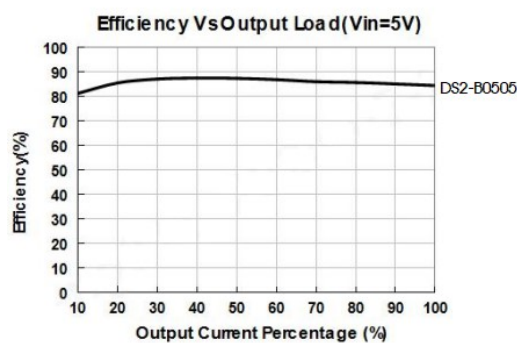
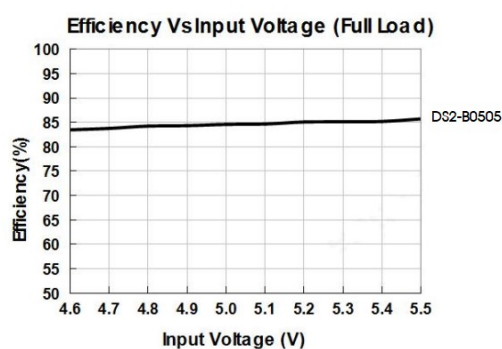
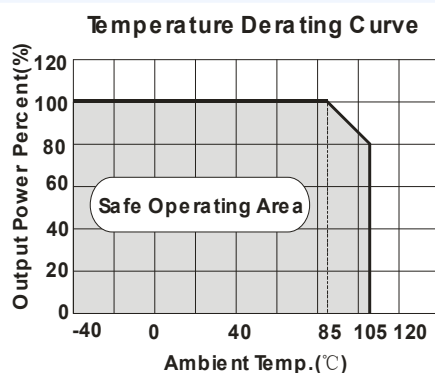
Note: *The "parallel cable" method is used for Ripple and Noise test.

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

Characteristic Curve





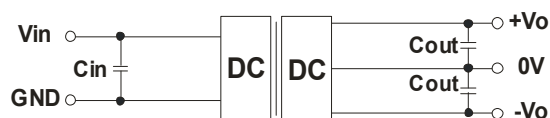
Design Reference

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.

Dual Output



Single Output

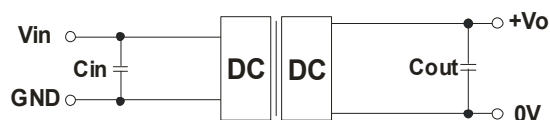


Fig. 3

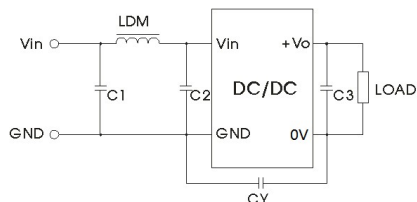
Table 1: Recommended input and output capacitor values

Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
5VDC	10 μ F/16V	3.3VDC	10 μ F/16V	$\pm$ 3.3VDC	4.7 μ F/16V
12VDC	2.2 μ F/25V	5VDC	10 μ F/16V	$\pm$ 5VDC	4.7 μ F/16V
15VDC	2.2 μ F/25V	7.2VDC	10 μ F/16V	$\pm$ 7.2VDC	2.2 μ F/25V
24VDC	1 μ F/50V	9VDC	2.2 μ F/25V	$\pm$ 9VDC	2.2 μ F/25V
--	--	12VDC	2.2 μ F/25V	$\pm$ 12VDC	1 μ F/25V
--	--	15VDC	1 μ F/25V	$\pm$ 15VDC	1 μ F/25V
--	--	24VDC	1 μ F/50V	$\pm$ 24VDC	0.47 μ F/50V

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

2. EMC compliance recommended circuit

Single Output



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

Dual Output

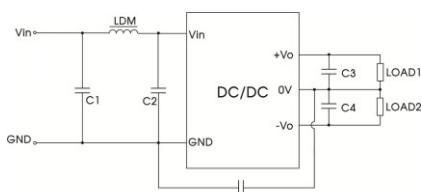
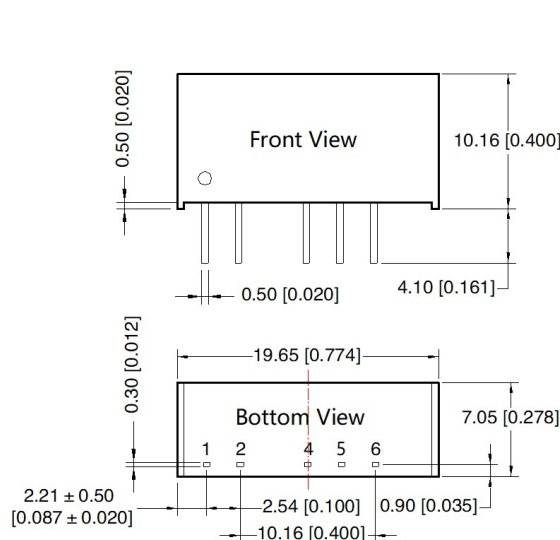


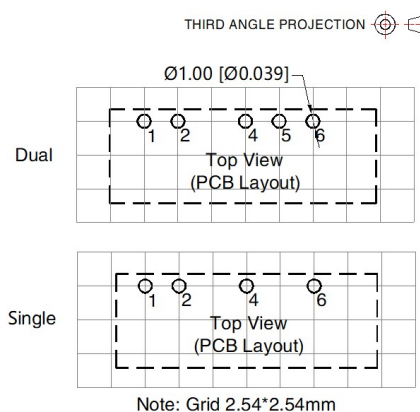
Fig. 4

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

Dimensions and Recommended



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



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°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.