Descriptions

2W isolated, DC-DC Converter





RoHS 3 Years Warranty

UL62368-1 EN62368-1 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 3k VDC
- Industry standard pin-out

Applications

- Pure digital circuits
- Low frequency analog circuits
- Relay-driven circuits
- Data switching circuits

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	DFD2-F0503	5 (4.5-5.5)	3.3	400/40	74/78	2400
UL/EN/BS EN	DFD2-F0505		5	400/40	80/84	2400
EN/BS EN	DFD2-F0509		9	222/22	81/85	1000
	DFD2-F0512		12	167/17	81/85	560
	DFD2-F0515		15	133/13	82/86	560
	DFD2-F0524		24	83/8	82/86	220
	DFD2-E0503		±3.3	±303/±30	74/78	1200
	DFD2-E0505		±5	±200/±20	80/84	1200
	DFD2-E0509		±9	±111/±11	81/85	470
	DFD2-E0512		±12	±83/±8	81/85	220
	DFD2-E0515		±15	±67/±7	82/86	220
	DFD2-E0524		±24	±42/±4	82/86	100

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	--	513/8	541/--	mA
			5VDC output	--	477/8	500/--	
			9VDC/12VDC output	--	471/8	494/--	
			15VDC/24VDC output	--	466/8	488/--	
	Reflected Ripple Current			--	15	--	
	Surge Voltage (1sec. max.)			-0.7	--	9	VDC
	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 output	--	--	±1.2	--
	Load Regulation	10%-100% load	3.3VDC output	--	11	20	%
			5VDC output	--	10	15	
			9VDC/12VDC/15VDC output	--	8	10	
			24VDC output	--	6	10	
	Ripple & Noise①	20MHz bandwidth		--	75	200	mVp-p
	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.		3000	--	--	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℃		--	25	--	
	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	100% load, nominal input voltage		--	220	--	kHz
	MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	20.32 x 10.16 x 8.20mm					
	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 (EMI)	CE	CISPR32/EN55032 CLASS B	
	RE	CISPR32/EN55032 CLASS B	
Immunity (EMS)	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV	perf. Criteria B
Note: Refer to Fig.4 for recommended circuit test.			

Characteristic Curve

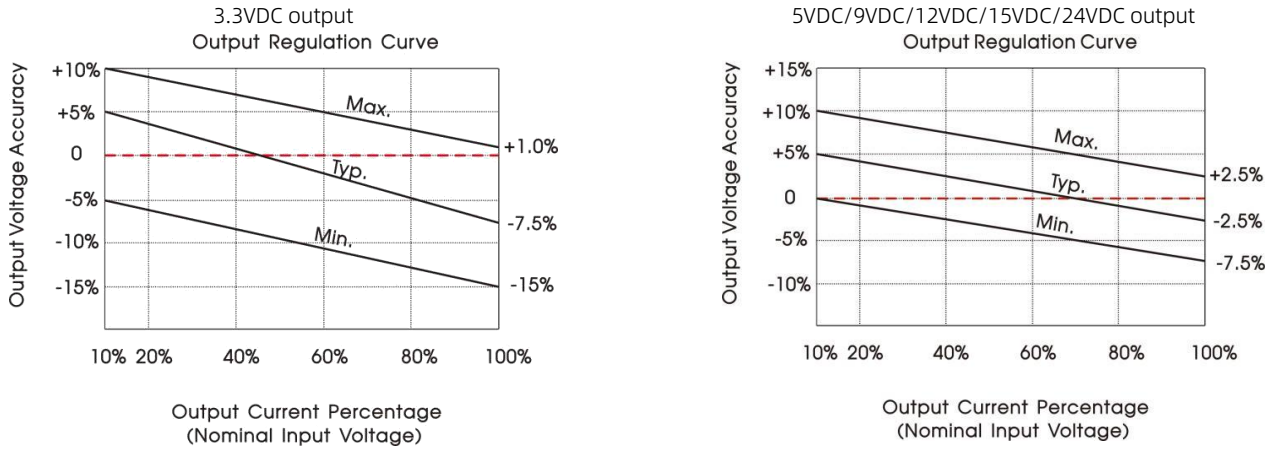


Fig. 1

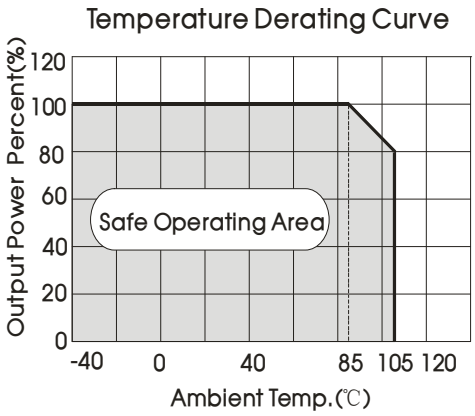
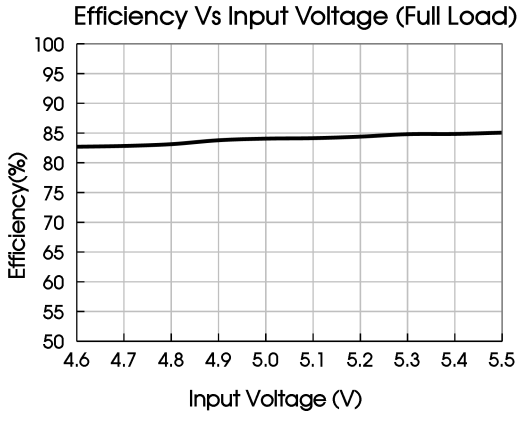
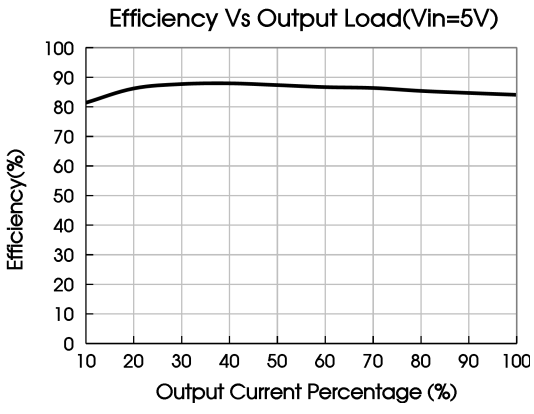


Fig. 2

DFD2-F0505



DFD2-F0505



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.

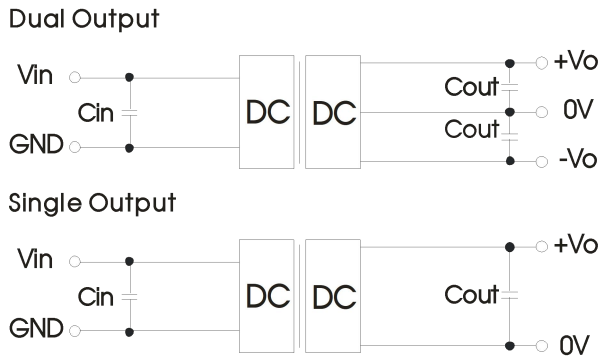


Fig.3

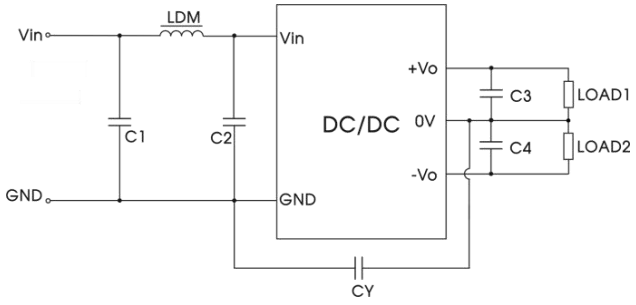
Table 1: Recommended input and output capacitor values

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

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

2. EMC compliance circuit

Dual Output



Single Output

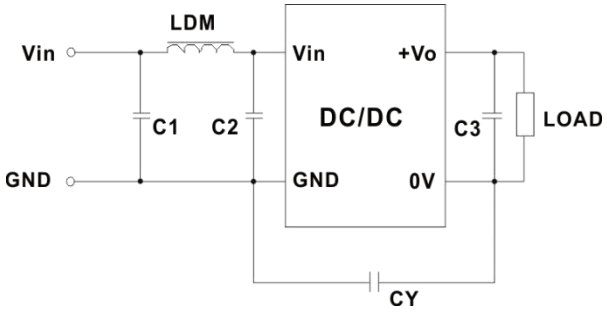
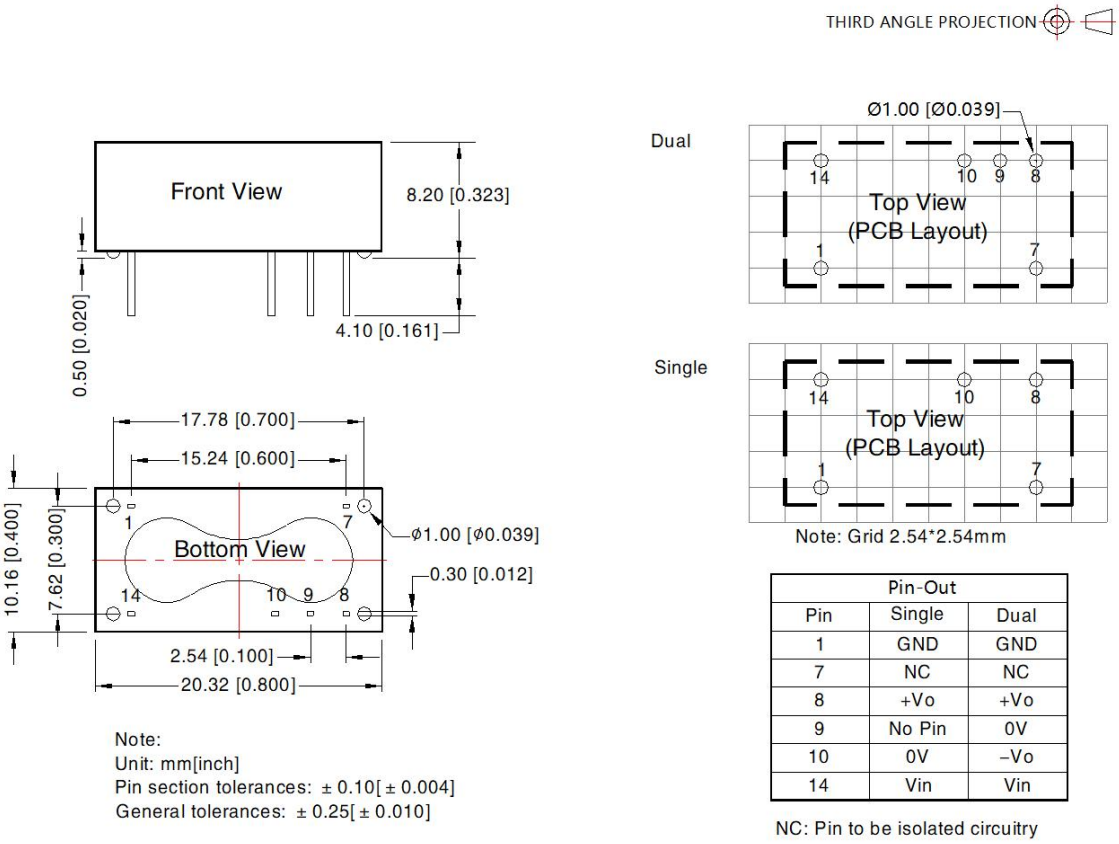


Fig. 4

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

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	GND	GND
7	NC	NC
8	+Vo	+Vo
9	No Pin	0V
10	0V	-Vo
14	Vin	Vin

NC: Pin to be isolated circuitry

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.