Descriptions

1W isolated , DC-DC converter



RoHS

CE Report EN62368-1

UKCA Report 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 85%
- I/O isolation test voltage 3KVDC
- Industry standard pin-out

Applications

- Industrial control
- Electric 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.		
--	DFN1-F0303	3.3 (2.97-3.63)	3.3	303/30	75/79	2400
	DFN1-F0305		5	200/20	78/82	2400
EN/BS EN	DFN1-F0503	5 (4.5-5.5)	3.3	303/30	70/74	2400
UL/EN/BS EN	DFN1-F0505		5	200/20	78/82	2400
--	DFN1-F0507		7.2	139/13	76/80	1000
EN/BS EN	DFN1-F0509		9	111/12	79/83	1000
	DFN1-F0512		12	84/9	79/83	560
	DFN1-F0515		15	67/7	79/83	560
	DFN1-F0524		24	42/4	81/85	220
	DFN1-F1203	12 (10.8-13.2)	3.3	303/30	71/75	2400
	DFN1-F1205		5	200/20	76/80	2400
	DFN1-F1209		9	111/12	74/78	1200
	DFN1-F1212		12	83/9	76/80	560
	DFN1-F1215		15	67/7	77/81	560
	DFN1-F1224		24	42/5	77/81	220
--	DFN1-F1505	15 (13.5-16.5)	5	200/20	76/80	2400
	DFN1-F1509		9	111/12	76/80	1200
	DFN1-F1515		15	67/7	77/81	560

EN/BS EN	DFN1-F2403	24 (21.6-26.4)	3.3	303/30	69/75	2400
	DFN1-F2405		5	200/20	73/79	2400
	DFN1-F2409		9	111/12	74/80	1200
	DFN1-F2412		12	83/9	75/81	560
	DFN1-F2415		15	67/7	75/81	560
	DFN1-F2424		24	42/5	75/81	220
Notes: *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)	3.3VDC input	3.3VDC output		--	384/12	405/--	mA
			5VDC output		--	370/12	389/--	
		5VDC input	3.3VDC/5VDC output		--	270/8	286/--	
			Other output		--	241/8	254/--	
		12V input	3.3VDC output		--	112/8	118/--	
			5VDC/9VDC/12VDC output		--	105/8	110/--	
			15VDC/24VDC output		--	103/8	109/--	
		15V input	5VDC/9VDC output		--	83/8	88/--	
			15VDC output		--	82/8	87/--	
		24V input	3.3VDC output		--	56/8	61/--	
			5VDC output		--	53/8	58/--	
			9VDC output		--	52/8	57/--	
			12VDC/15VDC/24VDC output		--	52/8	56/--	
	Reflected Ripple Current	Other intput			--	15	--	
		3.3VDC input			--	30	--	
	Surge Voltage (1sec. max.)	3.3VDC input			-0.7	--	5	VDC
		5VDC input			-0.7	--	9	
		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	3.3VDC intput	3.3VDC output	--	13	20	%
				5VDC output	--	11	15	
			5VDC intput	3.3VDC output	--	15	20	
				5VDC/7.2VDC output	--	10	15	
			5VDC intput	9VDC output	--	8	10	
				12VDC output	--	7	10	
				15VDC output	--	6	10	
				24VDC output	--	5	10	

			Other intput	3.3VDC output	--	8	20	
				5VDC output	--	5	15	
				9VDC/12VDC/15V DC output	--	3	10	
				24VDC output	--	2	10	
	Ripple & Noise①	20MHz bandwidth		3.3VDC intput	--	50	100	mVp-p
				Other intput: 24VDC output	--	50	100	
				Other intput: Other output	--	30	75	
	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	Full load, 3.3VDC intput			--	220	--	kHz
		Full load, 5VDC intput			--	270	--	
		Full load, other intput			--	260	--	
	MTBF	MIL-HDBK-217F @ 25℃			3500	--	--	k hours
Mechanical Specifications	Case Material	Black plastic, flame-retardant and heat-resistant (UL94V-0)						
	Dimension	12.70 x 10.16 x 8.20 mm						
	Weight	1.8g (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.

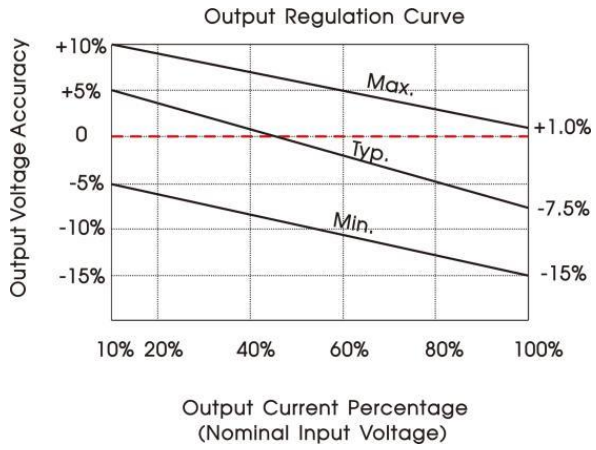
Electromagnetic Compatibility (EMC)

Emissions (EMI)	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
Immunity (EMS)	ESD (5VDC intput)	IEC/EN61000-4-2 Air ±8kV, Contact ±4kV perf. Criteria B
	ESD (Other intput)	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

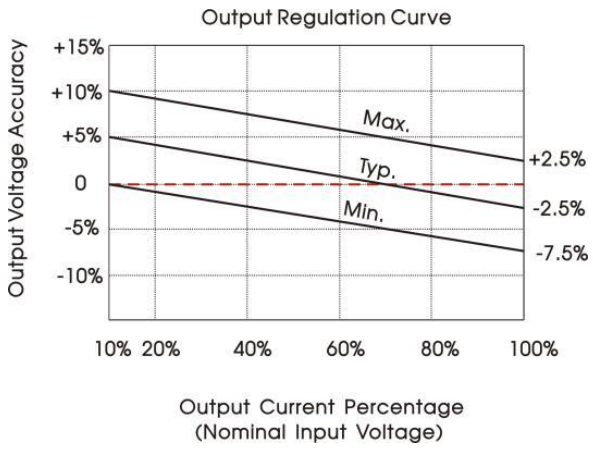
Note: Refer to Fig. 4 for recommended circuit test.

Characteristic Curve

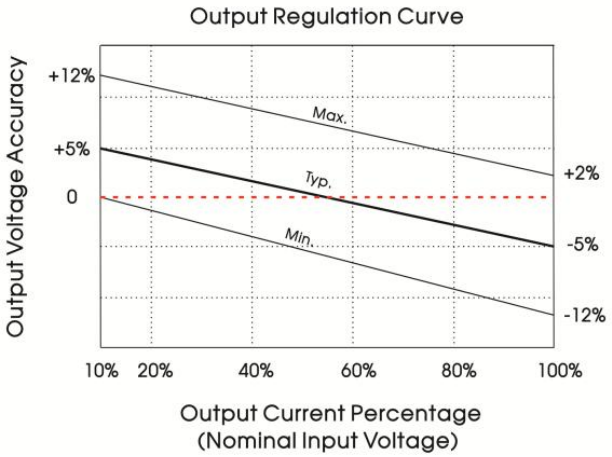
DFN1-F0303



DFN1-F05xx(Except DFN1-F0503)



DFN1-F0503/DFN1-F1203/DFN1-F2403



Other

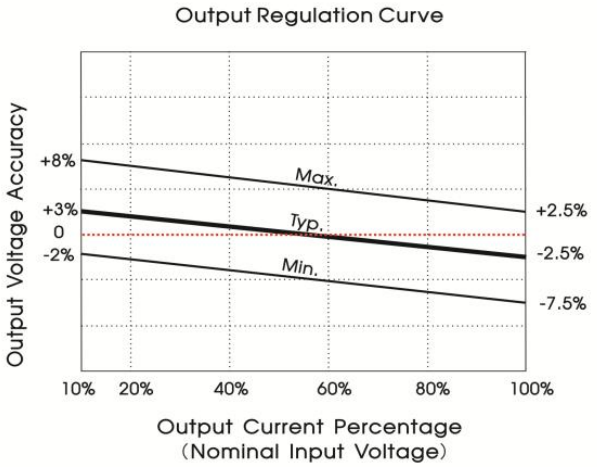


Fig. 1

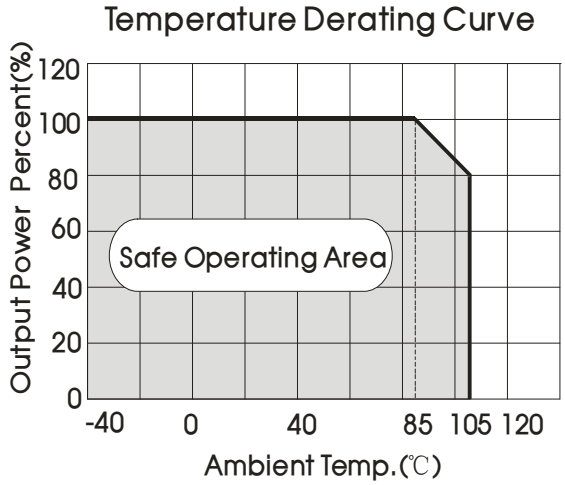
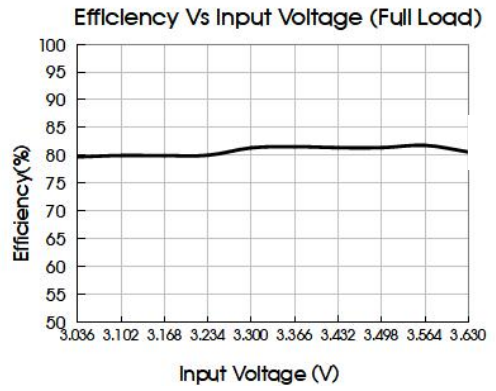
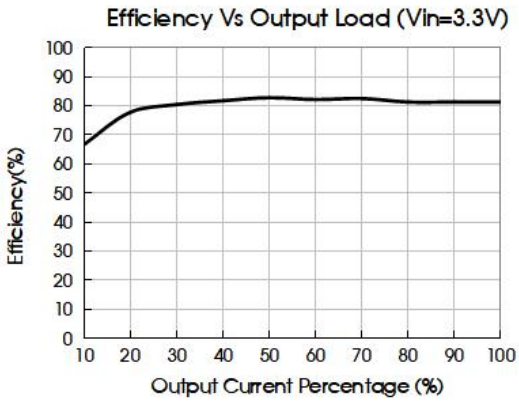


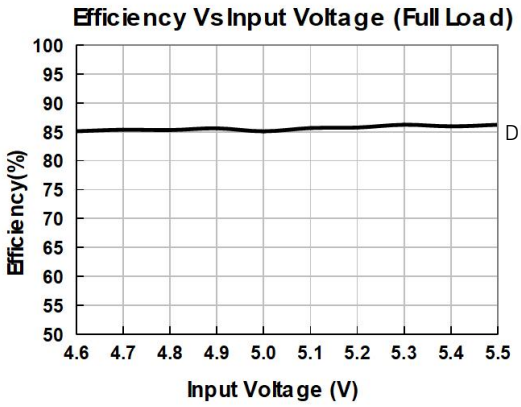
Fig. 2



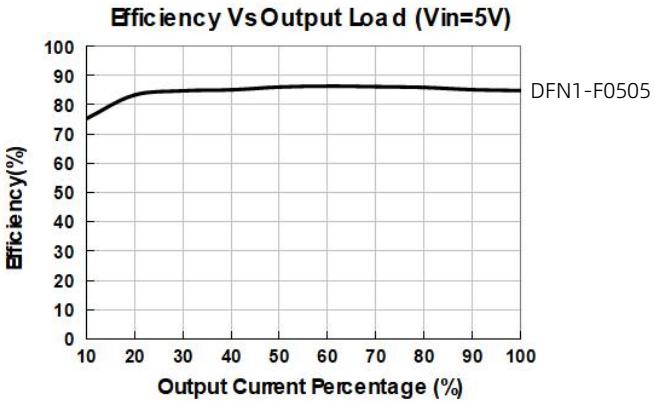
DFN1-F0305



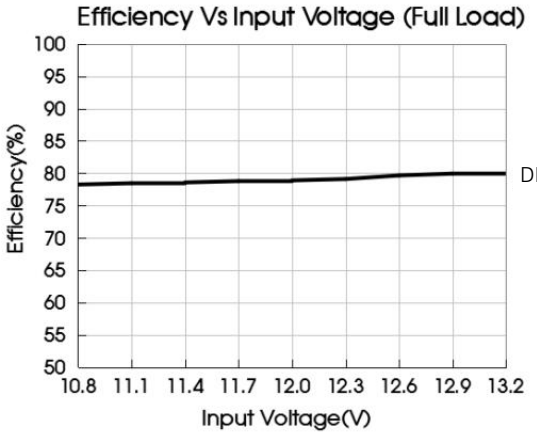
DFN1-F0305



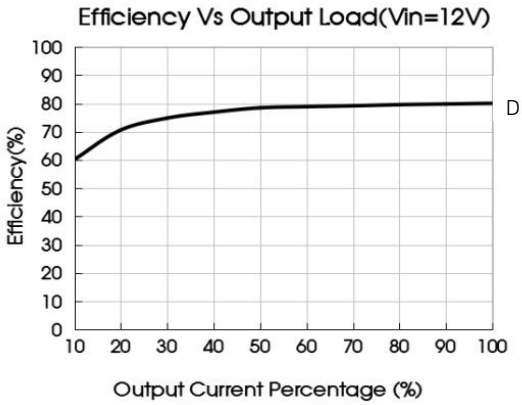
DFN1-F0505



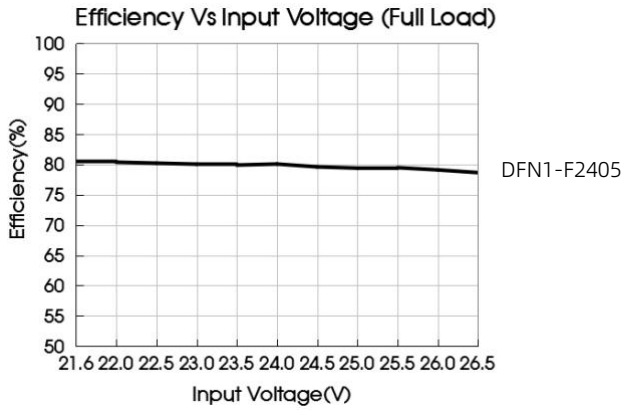
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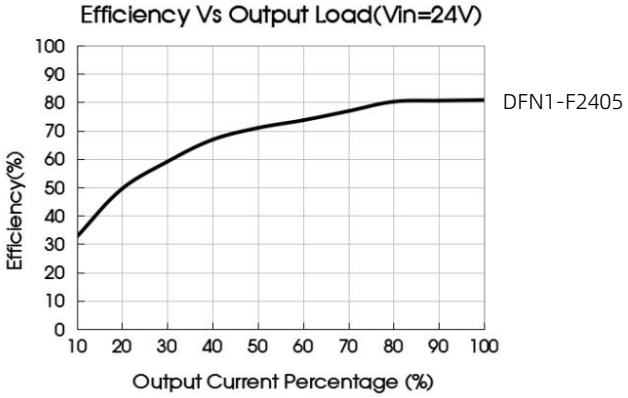


DFN1-F1205



DFN1-F1205





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.

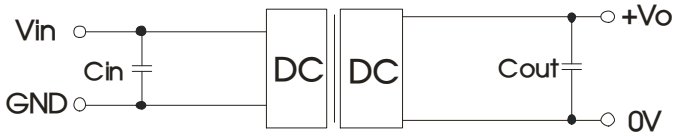


Fig. 3: Typical circuit diagram

Table 1: Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	10μF/6V	3.3/5/7.2VDC	10μF/6V
5VDC	4.7μF/16V	9VDC	4.7μF/25V
12VDC	2.2μF/25V	12VDC	2.2μF/25V
15VDC	2.2μF/25V	15/24VDC	1μF/50V
24VDC	1μF/50V	--	--

2. EMC compliance recommended circuit

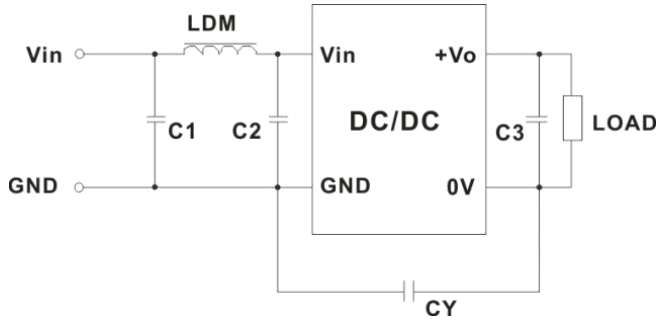
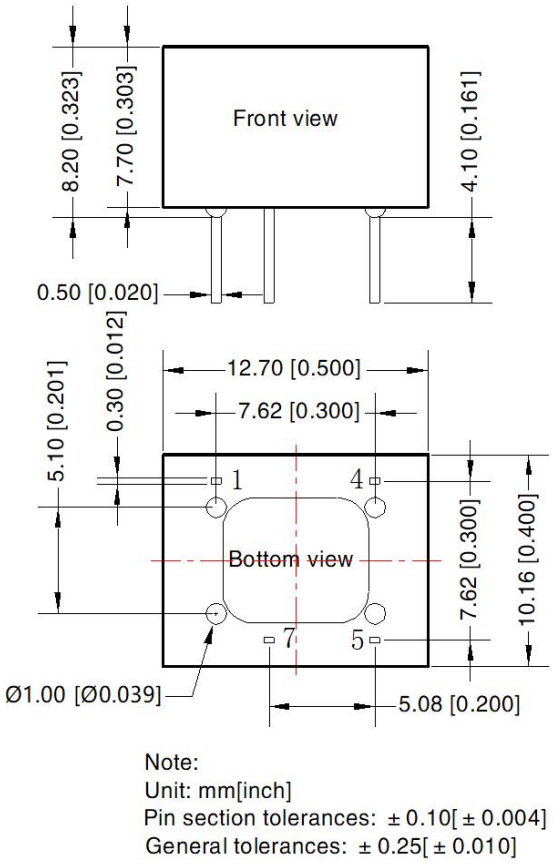


Fig. 4

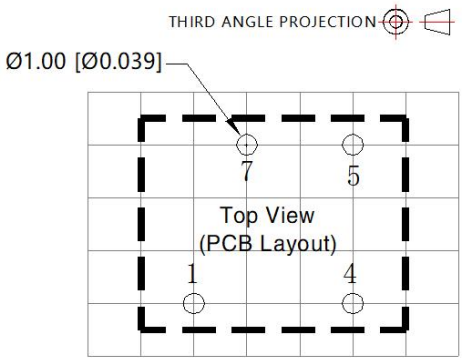
Table 2: Recommended EMC filter values

Input voltage		5VDC		Others
Output voltage		3.3/5/7.2/9VDC	12/15/24VDC	--
Emissions	C1/C2	4.7μF /25V	4.7μF /25V	4.7μF /50V
	CY	100pF/4kVDC	1nF /4kVDC	270pF /4kVDC
	C3	Refer to the Cout in table 1		
	LDM	6.8μH		

Dimensions and Recommended Layout



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



Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	GND
4	Vin
5	+Vo
7	0V

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.