Descriptions

1W isolated, DC/DC Converter

RoHS

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 +85℃
- High efficiency up to 75%
- I/O isolation test voltage 3k VDC
- Industry standard pin-out

Applications

- Industrial control
- Home appliances
- Instrumentation
- Communication
- Civil applications

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Full Load Efficiency (%)	Capacitive Load (μF)
		Nominal (Range)	Voltage (VDC)	Current (mA) Max./Min.	Min./Typ.	Max.
EN/BS EN	DFS1-IF0503	5 (4.75-5.25)	3.3	250/25	63/67	2400
UL/EN/BS EN	DFS1-IF0505		5	200/20	66/70	2400
EN/BS EN	DFS1-IF0509		9	111/12	67/71	1000
UL/EN/BS EN	DFS1-IF0512		12	84/9	68/72	560
EN/BS EN	DFS1-IF0515		15	67/7	69/73	560
EN/BS EN	DFS1-IF0524		24	41/4	69/73	100
UL/EN/BS EN	DFS1-IF1205	12 (11.4-12.6)	5	200/20	69/73	2400
EN/BS EN	DFS1-IF1209		9	111/12	69/73	1000
EN/BS EN	DFS1-IF1212		12	83/9	69/73	560
EN/BS EN	DFS1-IF1215		15	67/7	71/75	560
EN/BS EN	DFS1-IF1505	15 (14.25-15.75)	5	200/20	69/73	2400
EN/BS EN	DFS1-IF1515		15	67/7	71/75	560
EN/BS EN	DFS1-IF2403	24 (22.8-25.2)	3.3	250/25	65/71	2400
EN/BS EN	DFS1-IF2405		5	200/20	67/73	2400

EN/BS EN	DFS1-IF2409		9	111/12	67/73	1000
EN/BS EN	DFS1-IF2412		12	83/9	67/73	560
EN/BS EN	DFS1-IF2415		15	67/7	67/73	560

Specifications

Product Specifications	Item	Operating Conditions			Min.	Typ.	Max.	Unit
Input Specifications	Input Current (full load / no-load)	5V input	3.3/5VDC output		--	286/8	303/--	mA
			9/12VDC output		--	282/12	299/--	
			15/24VDC output		--	274/18	290/--	
		12V input	5/9/12VDC output		--	115/8	121/--	
			15VDC output		--	112/8	118/--	
		15V input	5VDC output		--	92/8	97/--	
			15VDC output		--	89/8	94/--	
		24V input	3.3VDC output		--	59/8	65/--	
			5/9/12/15VDC output		--	58/8	63/--	
	Reflected Ripple Current				--	15	--	
	Input Filter				Capacitance Filter			
	Hot Plug				Unavailable			
Output Specifications	Voltage Accuracy				--	--	±3	%
	Linear Regulation	Input voltage change: ±1%			--	--	±0.25	
	Load Regulation	10%-100% load		3.3VDC output	--	--	±3	
				Other output	--	--	±2	
	Ripple & Noise*	20MHz bandwidth	5V input	Other output	--	30	75	mVp-p
				24VDC output	--	50	100	
			Other input	Other output	--	30	100	
				15VDC output	--	80	150	
	Temperature Coefficient	100% 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	--	--	V_{DC}
	Insulation Resistance	Input-output resistance at 500VDC			1000	--	--	MΩ
	Isolation Capacitance	Input-output capacitance at 100kHz/0.1V			--	20	--	pF
	Operating Temperature	Derating requirements (see Fig.1)			-40	--	85	℃
	Storage Temperature				-55	--	125	
	Case Temperature Rise	Ta=25℃	5V input	3.3VDC output	--	30	--	
				Other output	--	25	--	
			Other input		--	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	5V input		--	270	--	kHz

		voltage	Other input	--	260	--	
	MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours
Mechanical Specifications	Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)					
	Dimensions	19.65 x 6.00 x 10.16mm					
	Weight	2.1g(Typ.)					
	Cooling Method	Free air convection					
Note: * The "parallel cable" method is used for Ripple and Noise test.							

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. 3 for recommended circuit test.		

Characteristic Curve

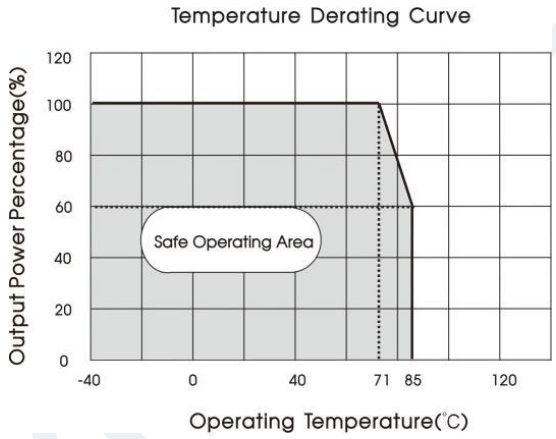
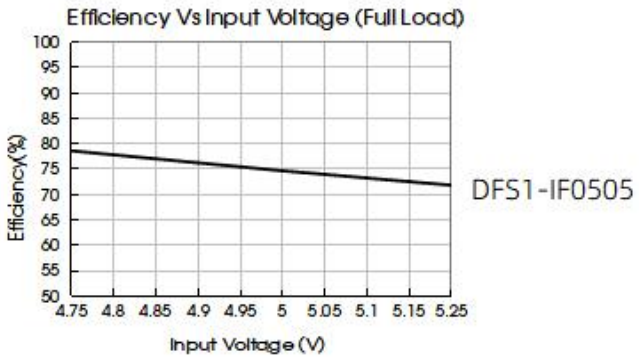
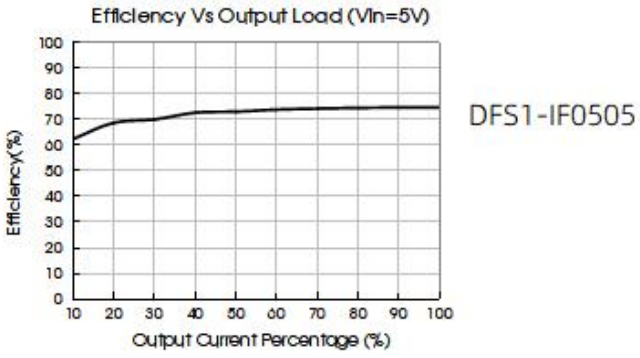
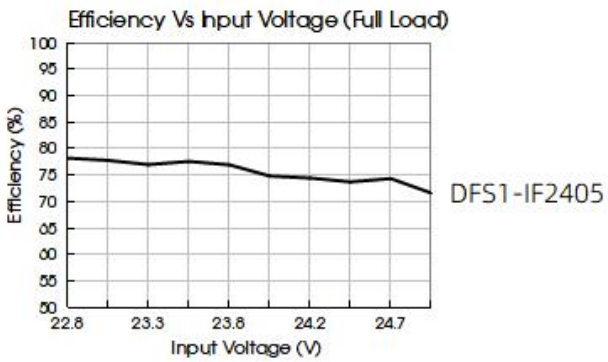
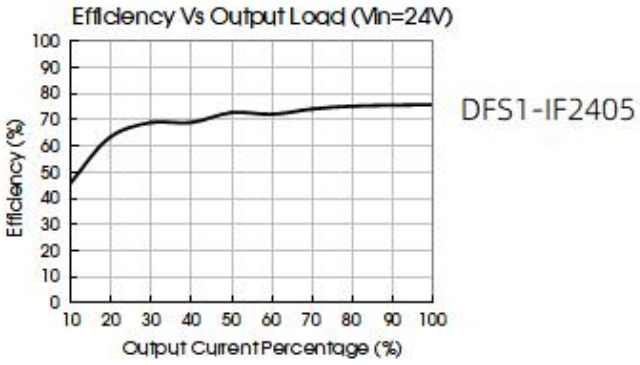


Fig. 1









Design Reference

1. Typical application circuit

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. 2.

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. 2

Table 1: Recommended input and output capacitor values

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

2. EMC compliance circuit

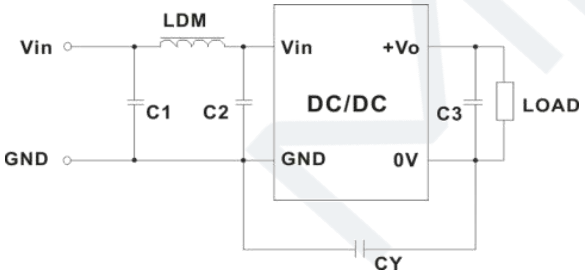
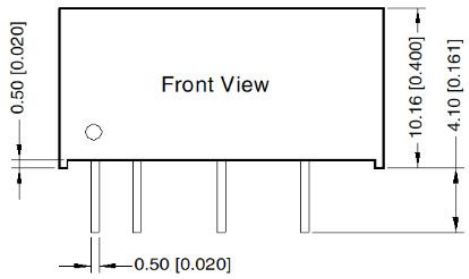


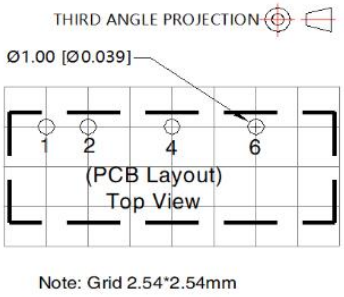
Fig. 3

Table 2: Recommended EMC filter values

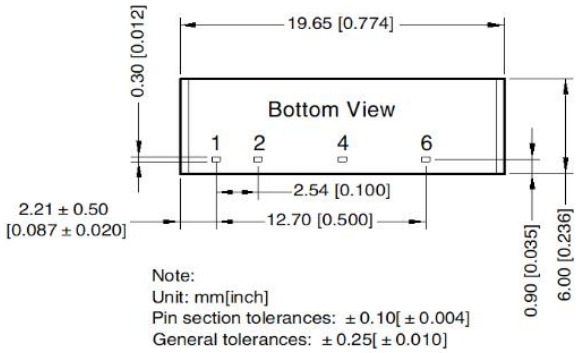
Input voltage		5V input		Other input
Output voltage		3.3/5/9VDC	12/15/24VDC	--
EMI	C1/C2	4.7μF /25V	4.7μF /25V	4.7μF /50V
	CY	100pF /4kV	1000pF /4kV	270pF /4kV
	C3	Refer to the Cout in table 1		
	LDM	6.8μH		

Dimensions and Recommended Layout





Note: Grid 2.54*2.54mm



Pin–Out	
Pin	Mark
1	Vin
2	GND
4	0V
6	+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℃, 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.