DC/DC Converter

IF_LS-1WR3 Series

MORNSUN®

1W isolated DC-DC converter
Fixed input voltage and regulated single output

Continuous Short Circuit Protection

Patent Protection RoHS

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

IF_LS-1WR3 series is especially designed for distributed power supply systems where an isolated voltage is required. They are suitable for occasions of: pre-interference isolation, ground interference elimination, pure digital circuit, voltage isolation conversion, general low frequency analog circuit, relay drive circuit, etc.

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.		
--	IF0503LS-1WR3	5 (4.75-5.25)	3.3	250/25	63/67	2400
	IF0505LS-1WR3		5	200/20	66/70	2400
	IF1205LS-1WR3	12 (11.4-12.6)	5	200/20	69/73	2400
	IF1209LS-1WR3		9	111/12	69/73	1000
	IF1212LS-1WR3		12	83/9	69/73	560
	IF1215LS-1WR3		15	67/7	71/75	560
	IF1505LS-1WR3	15 (14.25-15.75)	5	200/20	69/73	2400
	IF1515LS-1WR3		15	67/7	71/75	560
	IF2403LS-1WR3	24 (22.8-25.2)	3.3	250/25	65/71	2400
	IF2405LS-1WR3		5	200/20	67/73	2400
	IF2409LS-1WR3		9	111/12	67/73	1000
	IF2412LS-1WR3		12	83/9	67/73	560
	IF2415LS-1WR3		15	67/7	67/73	560

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5V input	3.3VDC/5VDC output	--	286/8	303/--	mA
	12V input	5VDC/9VDC/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/--	
		5VDC/9VDC/12VDC/15VDC output	--	58/8	63/--	
Reflected Ripple Current*			--	15	--	
Input Filter			Capacitance Filter			
Hot Plug			Unavailable			

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			--	--	±3	%
Linear Regulation	Input voltage change: ±1%		--	--	±0.25	
Load Regulation	10%-100% load	3.3VDC output	--	--	±3	

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		Other output		--	--	±2	
Ripple & Noise*	20MHz bandwidth	5V input		--	30	75	mVp-p
		Other input	Other output	--	30	100	
			15VDC output	--	80	150	
Temperature Coefficient	100% load			--	±0.02	--	%/℃
Short-circuit Protection				Continuous, self-recovery			
Note: * The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information.							

General Specifications

Item	Operating Conditions			Min.	Typ.	Max.	Unit
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≥ 71℃ (see Fig.1)			-40	--	85	℃
Storage Temperature				-55	--	125	
Case Temperature Rise	Ta=25℃	5V input	3.3VDC output	--	30	--	
			5VDC 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	5V input		--	--	95	%RH
		Other input		5	--	95	
Vibration	5V input			10-150Hz, 5G, 30 Min. along X, Y and Z			
	Other input			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	100% load, nominal input voltage	5V input		--	300	--	kHz
		Other input		--	260	--	
MTBF	MIL-HDBK-217F@25℃			3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	19.65 x 6.00 x 10.16mm
Weight	2.1g (Typ.)
Cooling Method	Free air convection

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.		

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Typical Characteristic Curves

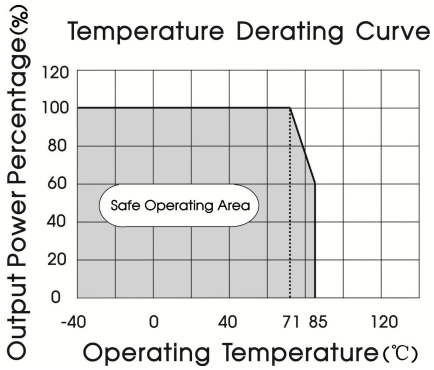
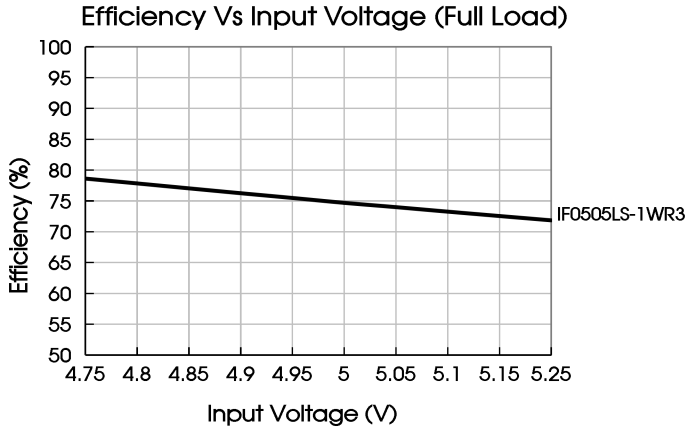
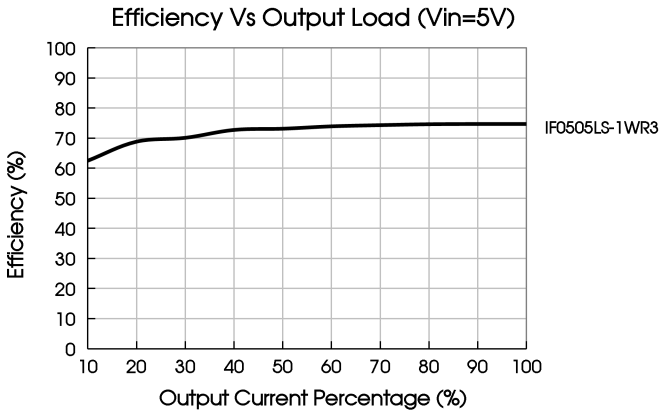
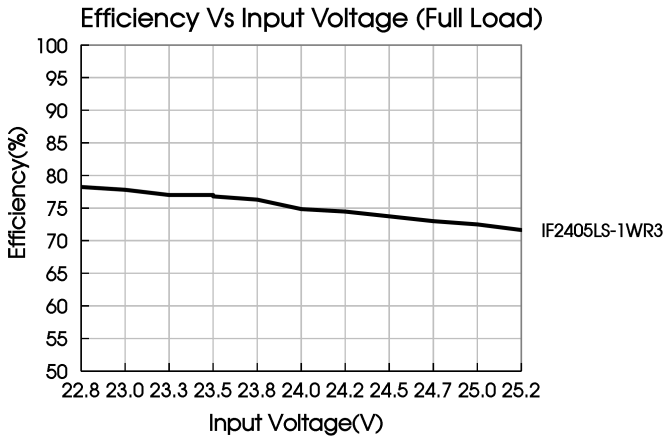
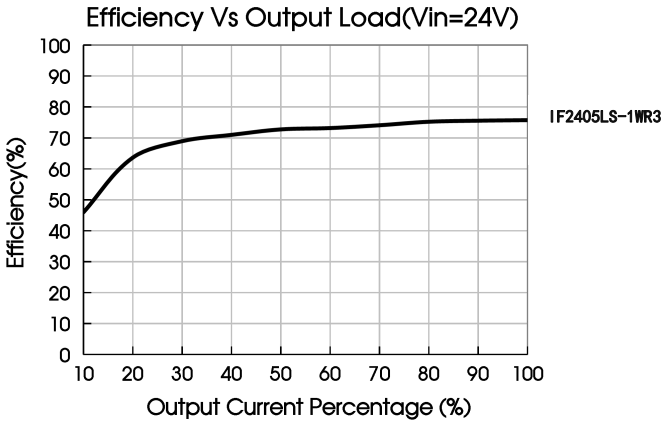


Fig. 1









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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.

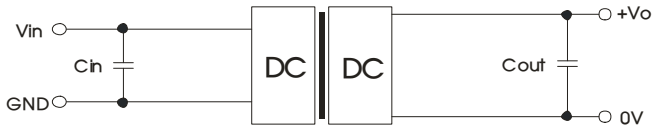

Fig.2

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

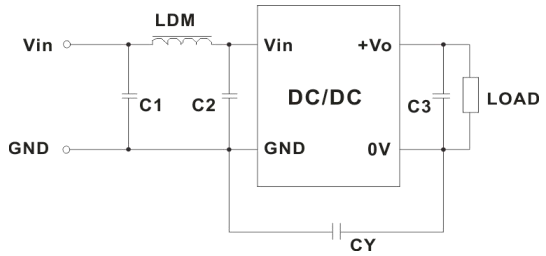

Fig. 3

Table 2: Recommended EMC filter values

Input voltage		5VDC	Other input
EMI	C1/C2	4.7μF /25V	4.7μF /50V
	CY	100pF /4kV	270pF/3kV
	C3	Refer to the Cout in table 1	
	LDM	6.8μH	

3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com.

Dimensions and Recommended Layout

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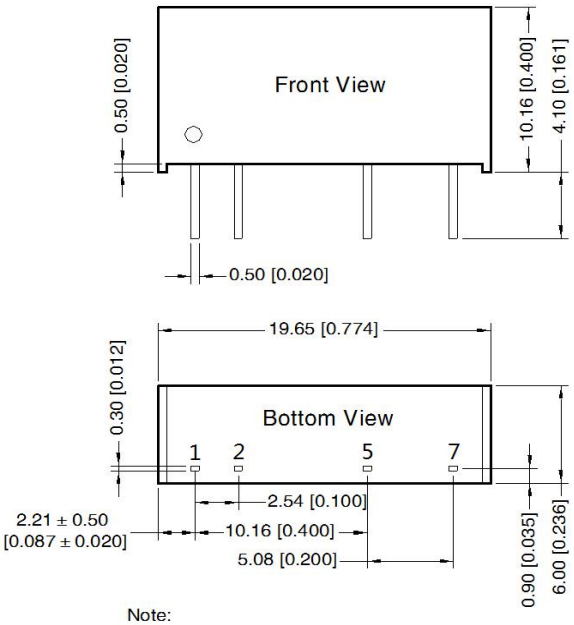
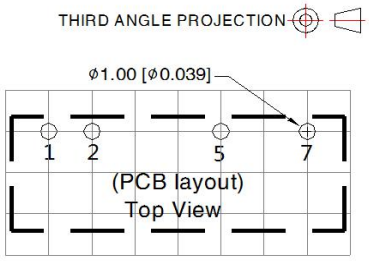


Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.25[±0.010]



Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	Vin
2	GND
5	0V
7	+Vo

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200001;
2. 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;
3. The maximum capacitive load offered were tested at input voltage range and full load;
4. 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;
5. All index testing methods in this datasheet are based on our company corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Products are related to laws and regulations: see "Features" and "EMC";
8. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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