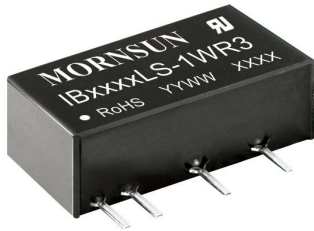


DC/DC Converter

IB_LS-1WR3 Series

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






 CB Report  Patent Protection
 UL 62368-1 EN 62368-1 BS EN 62368-1 IEC 62368-1

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40°C to +85°C
- High efficiency up to 75%
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out

IB_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) Nominal (Range)	Output		Full Load Efficiency (%) Min./Typ.	Capacitive Load (µF) Max.	
			Voltage (VDC)	Current (mA) Max./Min.			
UL/EN/BS EN/IEC	IB1205LS-1WR3	12 (11.4-12.6)	5	200/20	69/73	2400	
	EN/BS EN		IB1209LS-1WR3	9	111/12	69/73	1000
UL/EN/BS EN/IEC	IB1212LS-1WR3		12	83/9	69/73	560	
	IB1215LS-1WR3		15	67/7	71/75	560	
EN/BS EN	IB1505LS-1WR3		15 (14.25-15.75)	5	200/20	69/73	2400
	IB1515LS-1WR3			15	67/7	71/75	560
	IB2403LS-1WR3	24 (22.8-25.2)	3.3	250/25	65/71	2400	
	IB2405LS-1WR3		5	200/20	67/73	2400	
	IB2409LS-1WR3		9	111/12	67/73	1000	
	IB2412LS-1WR3		12	83/9	67/73	560	
	IB2415LS-1WR3		15	67/7	67/73	560	

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	12V input	5VDC/9VDC/12VDC output	--	115/8	121/--	mA
		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			Capacitor 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	%
		5VDC/9VDC/12VDC/15VDC output	--	--	±2	
Ripple & Noise*	20MHz bandwidth	3.3VDC/5VDC/9VDC/12VDC output	--	30	100	mVp-p
		15VDC output	--	80	150	
Temperature Coefficient	100% load		--	±0.02	--	%/°C
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.	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 ≥ 71°C (see Fig.1)	-40	--	85	°C
Storage Temperature		-55	--	125	
Case Temperature Rise	Ta=25°C	--	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, 30 Min. along X, Y and Z			
Switching Frequency	100% load, nominal input voltage	--	260	--	kHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	k hours

Mechanical Specifications

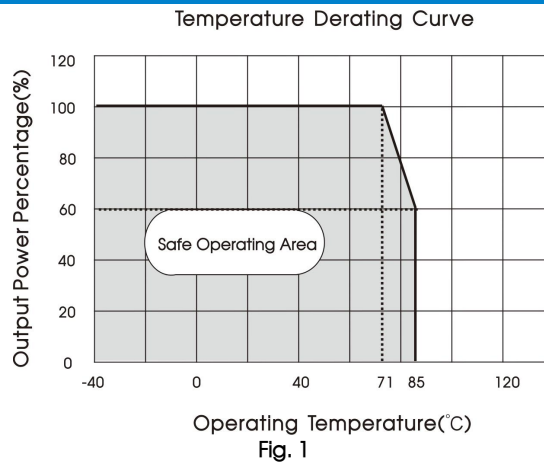
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 6.00 x 10.16mm
Weight	2.1g(Typ.)
Cooling Method	Free air convection

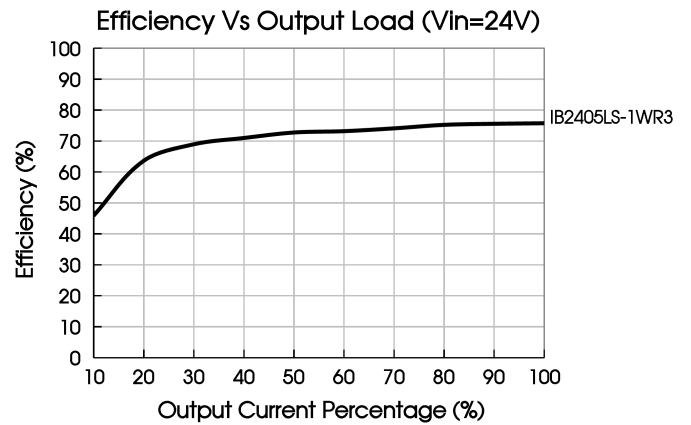
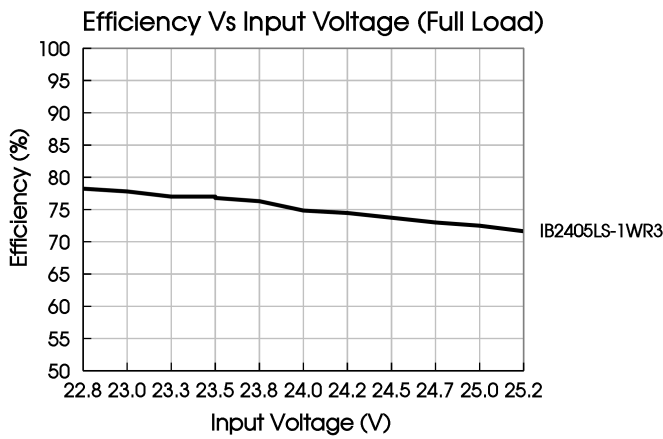
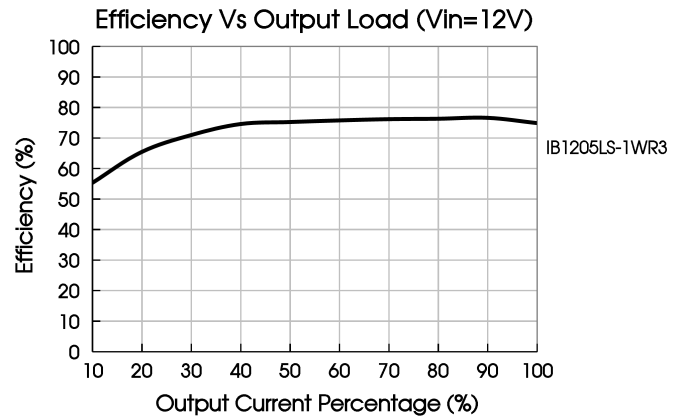
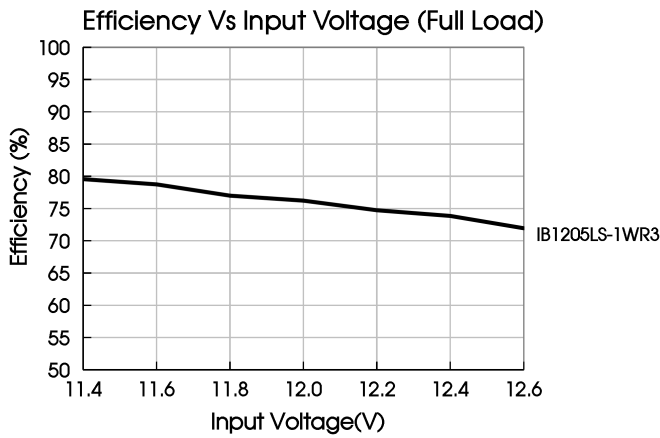
Electromagnetic Compatibility (EMC)

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.

Typical Characteristic Curves





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
12VDC/15VDC	2.2μF/25V	3.3VDC/5VDC	10μF/16V
24VDC	1μF/50V	9VDC	2.2μF/16V
--	--	12VDC	2.2μF/25V
--	--	15VDC	1μF/25V

2. EMC compliance circuit

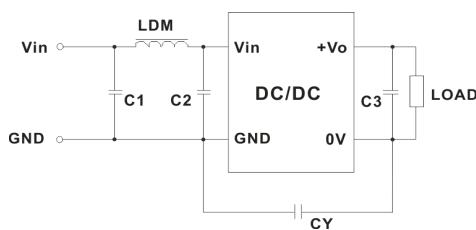


Fig. 3

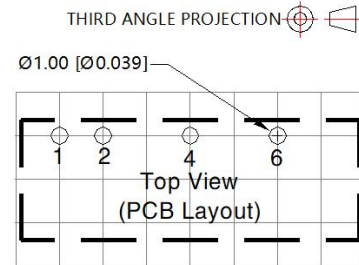
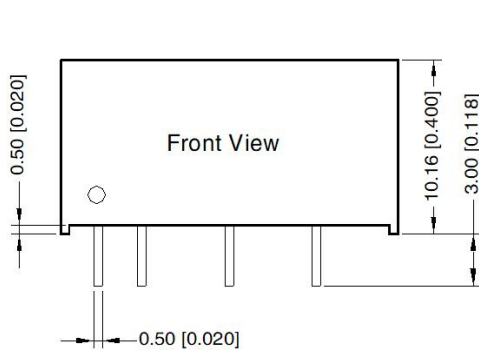
Table 2: Recommended EMC filter values

Emissions	C1/C2	4.7μF /50V
	CY	270pF /2kV
	C3	Refer to the Cout in table 1
	LDM	6.8μH

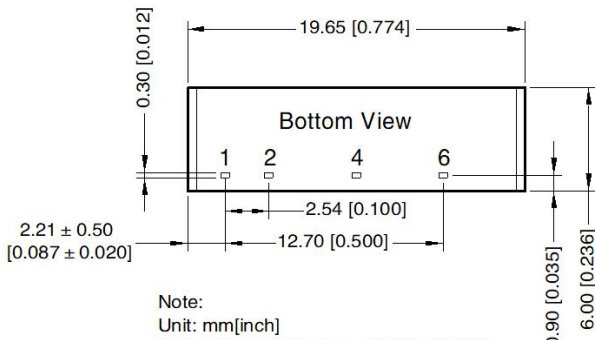
3. For additional information please refer to DC-DC converter application notes on

www.mornsun-power.com

Dimensions and Recommended Layout



Note: Grid 2.54*2.54mm



Note:
Unit: mm[inch]
Pin section tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.25[\pm 0.010]$

Pin-Out	
Pin	Mark
1	Vin
2	GND
4	0V
6	+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 $T_a=25^{\circ}\text{C}$, 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.

MORNSUN Guangzhou Science & Technology Co., Ltd.

Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com