

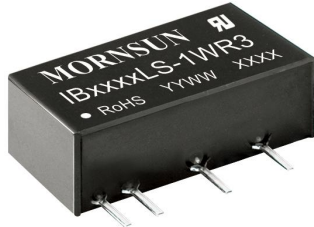
DC/DC Converter

IB_LS-1WR3 Series

MORNSUN®

1W isolated DC-DC converter

Fixed input voltage, regulated single output



Continuous Short
Circuit Protection



RoHS

UL[®] CE Report UK Report CB Patent Protection

UL 62368-1 EN 62368-1 BS EN 62368-1 IEC 62368-1

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.

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

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.		
EN/BS EN	IB0503LS-1WR3	5 (4.75-5.25)	3.3	250/25	63/67	2400
UL/EN/BS EN/IEC	IB0505LS-1WR3		5	200/20	66/70	2400
	IB0509LS-1WR3		9	111/12	67/71	1000
	IB0512LS-1WR3		12	84/9	68/72	560
	IB0515LS-1WR3		15	67/7	69/73	560
EN/BS EN	IB0524LS-1WR3		24	41/4	69/73	100
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
			5	200/20	67/73	2400
			9	111/12	67/73	1000
			12	83/9	67/73	560
			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
		9VDC/12VDC output	--	282/12	299/--	
		15VDC/24VDC output	--	274/18	290/--	
	12V input	5VDC/9VDC/12VDC output	--	115/8	121/--	

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Input Current (full load / no-load)	12V input	15VDC output	--	112/8	118/--	mA
	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	
		Other output	--	--	±2	
Ripple & Noise*	20MHz bandwidth	Other input	--	30	75	mVp-p
	5VDC input	24V input	--	50	100	
		20MHz bandwidth	3.3VDC/5VDC/9VDC/12VDC output	--	30	
	12/15/24VDC input	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	3.3VDC input	--	30	--	°C
		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, 30 Min. along X, Y and Z				
Switching Frequency	100% load, nominal input voltage	5VDC input	--	270	--	kHz
		12/15/24VDC input	--	260	--	
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
	ESD	IEC/EN61000-4-2 Air $\pm 8kV$, Contact $\pm 6kV$ perf. Criteria B

Note: Refer to Fig. 3 for recommended circuit test.

Typical Characteristic Curves

Temperature Derating Curve

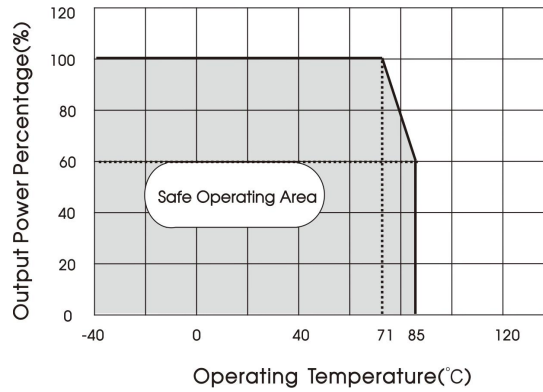
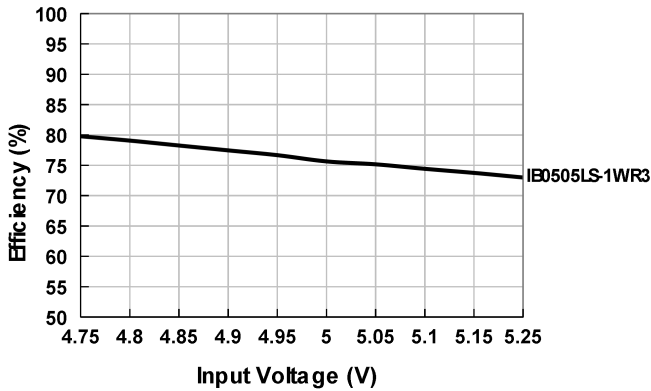
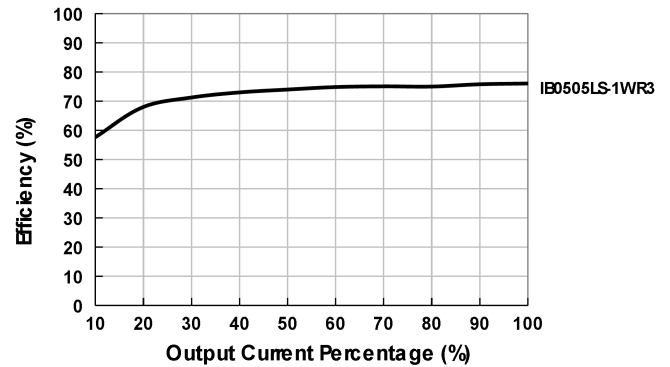


Fig. 1

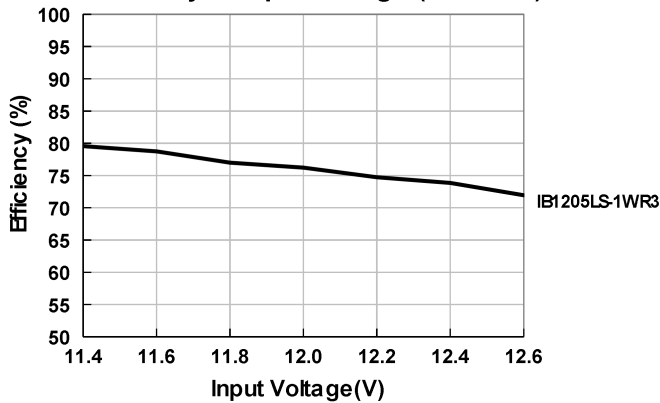
Efficiency Vs Input Voltage (Full Load)



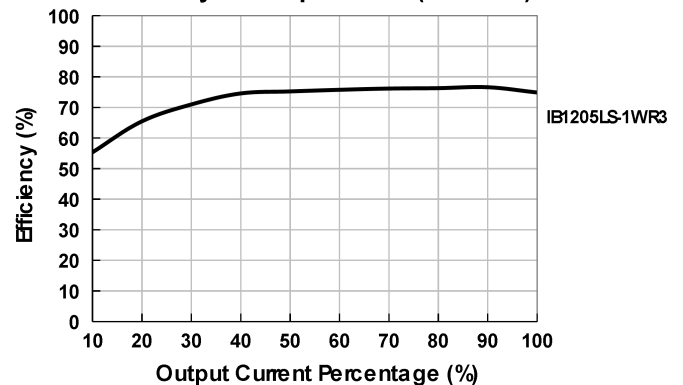
Efficiency Vs Output Load (Vin=5V)



Efficiency Vs Input Voltage (Full Load)



Efficiency Vs Output Load (Vin=12V)



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

V_{in}	C_{in}	V_o	C_{out}
5VDC	4.7 μ F/16V	3.3VDC/5VDC	10 μ F/16V
12VDC/15VDC	2.2 μ F/25V	9VDC	2.2 μ F/16V
24VDC	1 μ F/50V	12VDC	2.2 μ F/25V
--	--	15VDC	1 μ F/25V

2. EMC compliance circuit

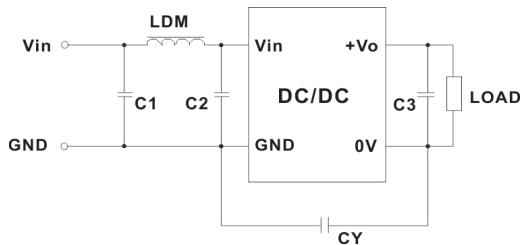


Fig. 3

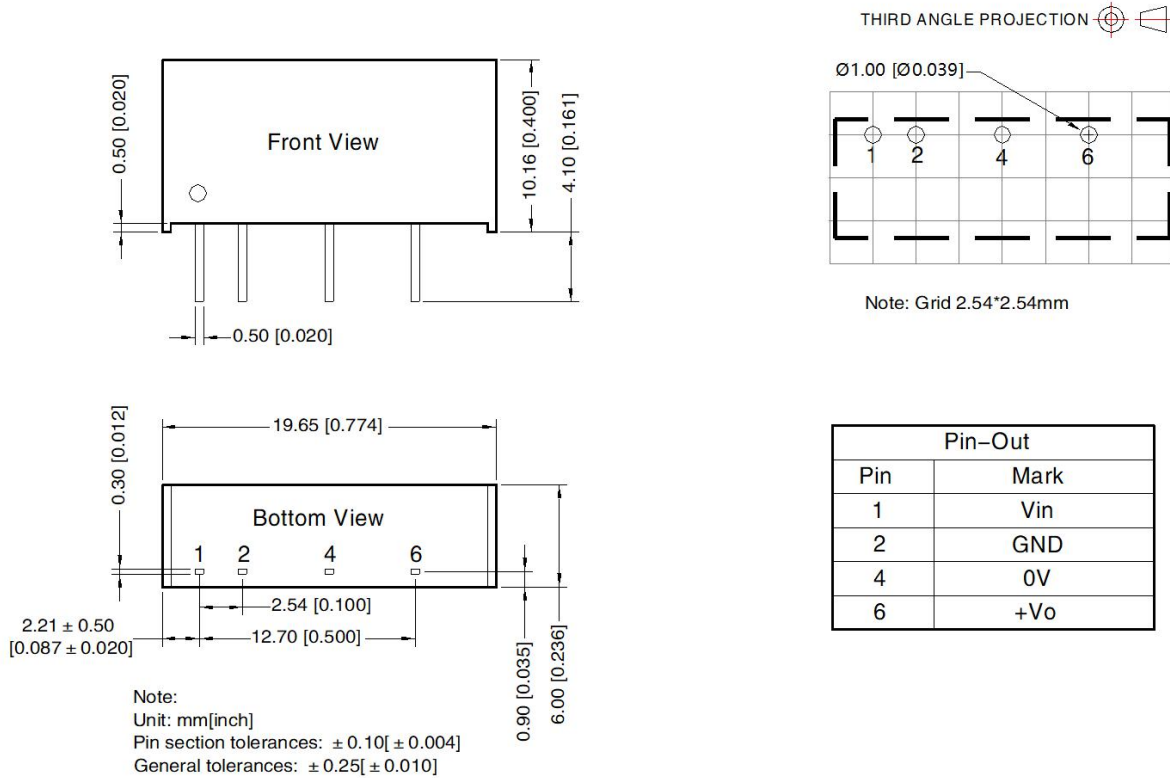
Table 2: Recommended EMC filter values

Input voltage	5DVC		12/15/24DVC
Output voltage	3.3/5/9VDC	12/15/24VDC	--
Emissions	C1/C2	4.7 μ F /50V	4.7 μ F /50V
	CY	100pF	1000pF
	C3	Refer to the C_{out} in table 1	
	LDM	6.8 μ H	

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

www.mornsun-power.com

Dimensions and Recommended Layout



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.

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