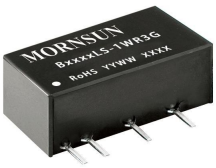
DC/DC Converter
B_LS-1WR3G Series

MORNSUN®

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



Continuous Short Circuit Protection

3 years Warranty

RoHS Patent Protection

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: 1.5k VDC
- Industry standard pin-out

B_LS-1WR3G series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

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.		
--	B0303LS-1WR3G	3.3 (2.97-3.63)	3.3	303/30	75/79	2400
	B0305LS-1WR3G		5	200/20	78/82	2400
	B0309LS-1WR3G		9	111/11	81/85	1000
	B0312LS-1WR3G		12	83/8	78/82	560
	B0315LS-1WR3G		15	67/7	78/82	560
	B0324LS-1WR3G		24	42/4	80/84	220
	B0503LS-1WR3G	5 (4.5-5.5)	3.3	303/30	70/74	2400
	B0505LS-1WR3G		5	200/20	78/82	2400
	B0509LS-1WR3G		9	111/12	79/83	1000
	B0512LS-1WR3G		12	84/9	79/83	560
	B0515LS-1WR3G		15	67/7	79/83	560
	B0524LS-1WR3G		24	42/4	81/85	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	384/10	405/--	mA
		Other output	--	370/18	389/--	
	5VDC input	3.3VDC/5VDC output	--	270/8	286/--	
		9VDC/12VDC output	--	241/12	254/--	
		15VDC/24VDC output	--	241/18	254/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage(1sec. max.)	3.3VDC input		-0.7	--	5	VDC
	5VDC input		-0.7	--	9	
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			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
		Other output	--	--	1.2	

Load Regulation	3.3VDC input 10% -100% load	3.3VDC output	--	12	18	%
		Other output	--	8	15	
	5VDC input 10% -100% load	3.3VDC output	--	15	20	
		5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	
Ripple & Noise*	20MHz bandwidth	24VDC output	--	50	120	mVp-p
		15VDC output	--	50	100	
		Other output	--	30	75	
Temperature Coefficient	Full 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.		1500	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	20	--	pF
Operating Temperature	5VDC input	Derating when operating temperature≥85℃, (see Fig. 2)	-40	--	105	℃
Operating Temperature	3.3VDC input	Derating when operating temperature≥100℃, (see Fig. 2)	-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃		--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
Storage Humidity	Non-condensing		--	--	95	%RH
Switching Frequency	Full load, nominal input voltage	3.3VDC input	--	220	--	kHz
		5VDC input	--	300	--	
MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours

Mechanical Specifications

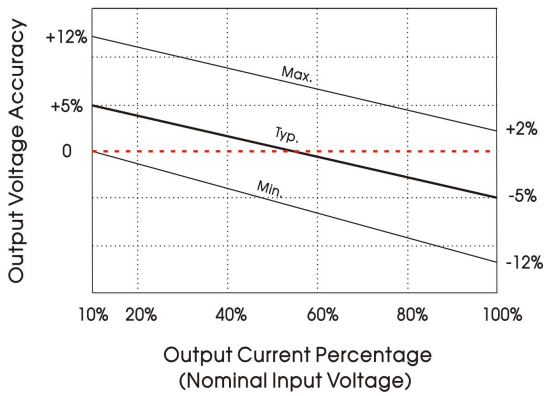
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 6.00 x 10.16mm
Weight	2.1g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

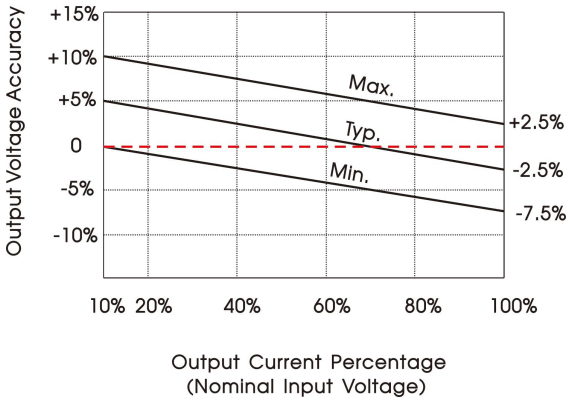
Emissions	CE	CISPR32/EN55032	CLASS B	
	RE	CISPR32/EN55032	CLASS B	
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±6kV	perf. Criteria B
Note: Refer to Fig. 4 for recommended circuit test.				

Typical Performance Curves

3.3VDC output
Output Regulation Curve



5VDC input other output
Output Regulation Curve



3.3VDC input other output
Output Regulation Curve

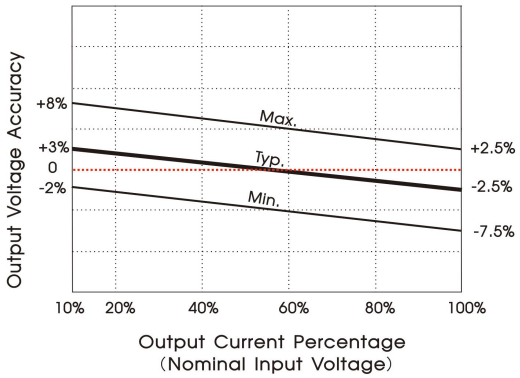
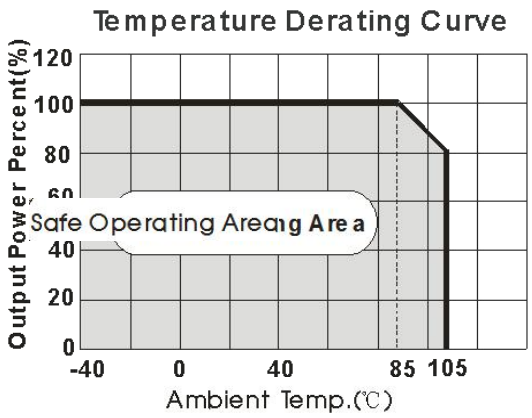


Fig. 1

5VDC input
Temperature Derating Curve



3.3VDC input
Temperature Derating Curve

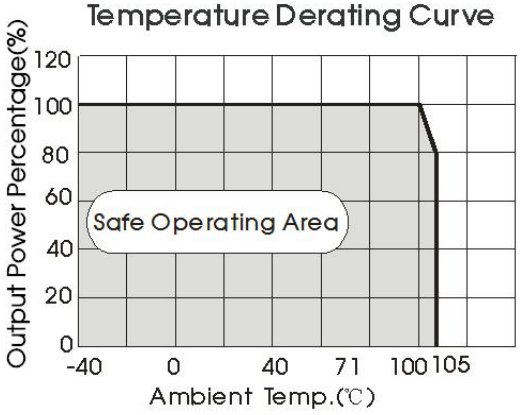


Fig. 2

Design Reference

1. Typical application

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. 3.

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. 3

Table 1: Recommended input and output capacitor values

Vin	Cin	VOUT	Cout
3.3VDC	10μF/16V	3.3VDC	10μF/16V
5VDC	4.7μF/16V	5VDC	10μF16V
--	--	9VDC	2.2μF/16V
--	--	12VDC	2.2μF/25V
--	--	15VDC	1μF/25V
--	--	24VDC	1μF/50V

2.EMC compliance circuit

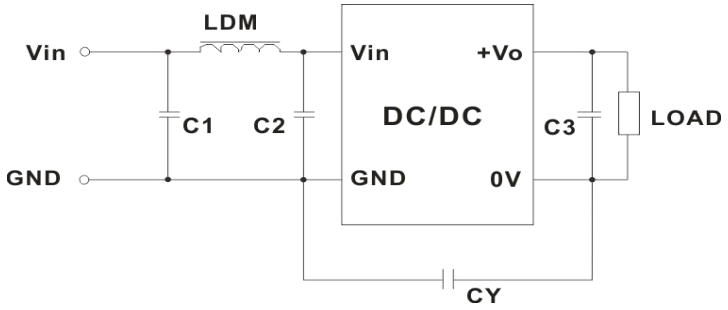


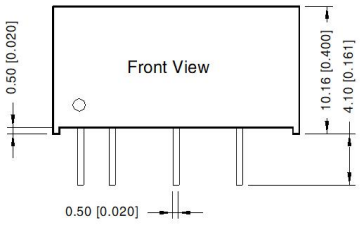
Fig. 4

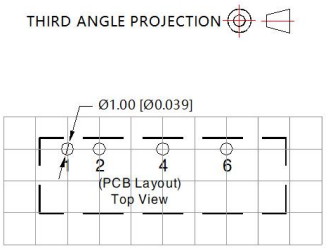
Table 2: EMC recommended circuit value table

Input voltage		3.3VDC		5VDC	
Output voltage		3.3/5VDC	9/12/15/24VDC	3.3/5/9VDC	12/15/24VDC
EMI	C1/C2	4.7uF/16V	4.7uF/16V	4.7uF/25V	4.7uF/25V
	CY	--	270pF /4kVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA	100pF/4kV	1000pF/4kV
	C3/C4	Refer to the Cout in table 1			
	LDM	6.8μH			

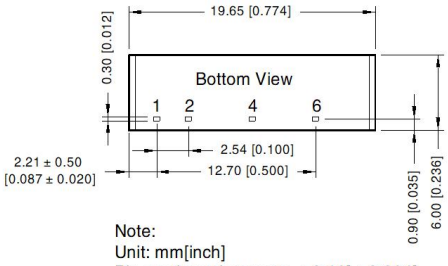
3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout





Note: Grid 2.54*2.54mm



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