

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



Continuous Short
Circuit Protection



RoHS

Patent Protection



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 +105°C
- High efficiency up to 83%
- Compact SMD package
- I/O isolation test voltage: 1.5k VDC
- Industry standard pin-out

B_T-1WR3 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.		
EN/BS EN	B0303T-1WR3	3.3 (2.97-3.63)	3.3	303/30	73/77	2400
	B0305T-1WR3		5	200/20	78/82	2400
EN/BS EN/IEC	B0503T-1WR3	5 (4.5-5.5)	3.3	303/30	70/74	2400
	B0505T-1WR3		5	200/20	78/82	2400
	B0509T-1WR3		9	111/12	79/83	1000
	B0512T-1WR3		12	84/9	79/83	560
EN/BS EN	B0515T-1WR3		15	67/7	79/83	470
EN/BS EN	B1205T-1WR3	12 (10.8-13.2)	5	200/20	78/82	2400
	B1209T-1WR3		9	111/12	79/83	1000
	B1212T-1WR3		12	84/9	79/83	560
	B1215T-1WR3		15	67/7	79/83	560

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	394/12	416/--	mA
		5VDC output	--	370/12	389/--	
	5VDC input	3.3VDC/5VDC output	--	270/8	286/--	
		9VDC/12VDC output	--	241/12	254/--	
		15VDC output	--	241/18	254/--	
	12VDC input	5VDC output	--	102/8	107/--	
		9VDC/12VDC/15VDC output	--	101/8	106/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage(1sec. max.)	3.3VDC input		-0.7	--	5	VDC
	5VDC input		-0.7	--	9	
	12VDC input		-0.7	--	18	
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: $\pm 1\%$	3.3/5VDC input	3.3VDC output	--	--	± 1.5	--
			Other output	--	--	± 1.2	
		12VDC input		--	--	± 1.2	
Load Regulation	10%-100% load	3.3VDC input	3.3VDC output	--	11	20	%
			5VDC output	--	10	15	
		5VDC input	3.3VDC output	--	15	20	
			5VDC output	--	10	15	
			9VDC output	--	8	10	
			12VDC output	--	7	10	
			15VDC output	--	7	15	
		12VDC input	5VDC output	--	5	15	
			9VDC output	--	3	10	
			12VDC output	--	3	10	
			15VDC output	--	3	10	
Ripple & Noise*	20MHz bandwidth	3.3VDC input		--	50	100	mVp-p
		5VDC input	Other output	--	30	75	
			15VDC output	--	30	100	
		12VDC input		--	30	75	
Temperature Coefficient	Full 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	--	--	M Ω
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V			--	20	--	pF
Operating Temperature	3.3VDC input	Derating when operating temperature≥85℃, (see Fig. 2)		-40	--	105	℃
	5/12VDC input	Derating when operating temperature≥100℃, (see Fig. 2)					
Storage Temperature				-55	--	125	
Case Temperature Rise	Ta=25℃	5VDC input	3.3VDC output	--	25	--	
			Other output	--	15	--	
		Other input		--	25	--	
Storage Humidity	Non-condensing	5VDC input		--	--	95	%RH
		Other input		5	--	95	
Reflow Soldering Temperature*				Peak temp. ≤245℃, maximum duration time ≤60s over 217℃			
Vibration				10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	3.3VDC input		--	220	--	kHz
		5VDC input	Other output	--	270	--	
			15VDC output	--	300	--	
		12VDC input		--	260	--	
MTBF	MIL-HDBK-217F@25℃			3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1			Level 1			

Note: *For actual application, please refer to IPC/JEDEC J-STD-020D.1.

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	13.20 x 11.40 x 7.25 mm
Weight	1.3g(Typ.)
Cooling Method	Free air convection

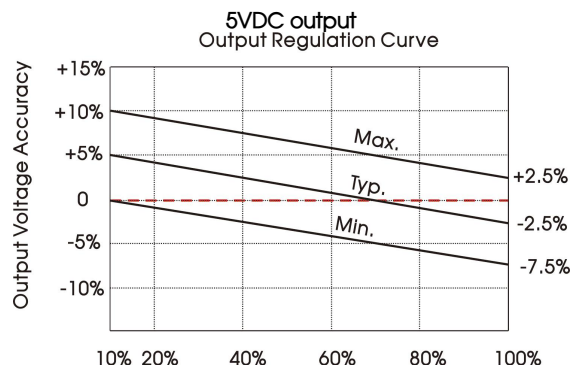
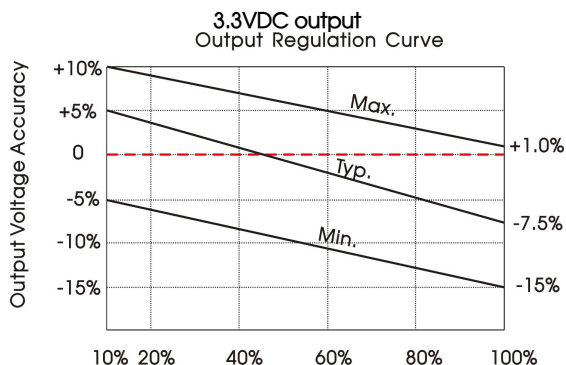
Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B
	RE	CISPR32/EN55032	CLASS B
Immunity	ESD	5VDC input	IEC/EN61000-4-2 Air $\pm 8\text{kV}$, Contact $\pm 4\text{kV}$ perf. Criteria B
		Others input	IEC/EN61000-4-2 Air $\pm 8\text{kV}$, Contact $\pm 6\text{kV}$ perf. Criteria B

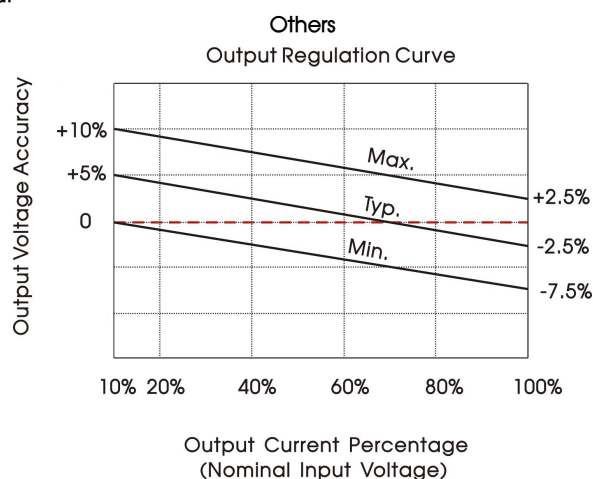
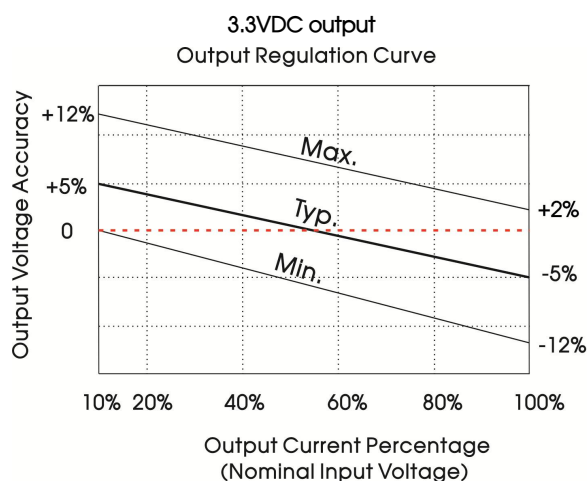
Note: Refer to Fig. 4 for recommended circuit test.

Typical Performance Curves

3.3VDC input



5VDC input



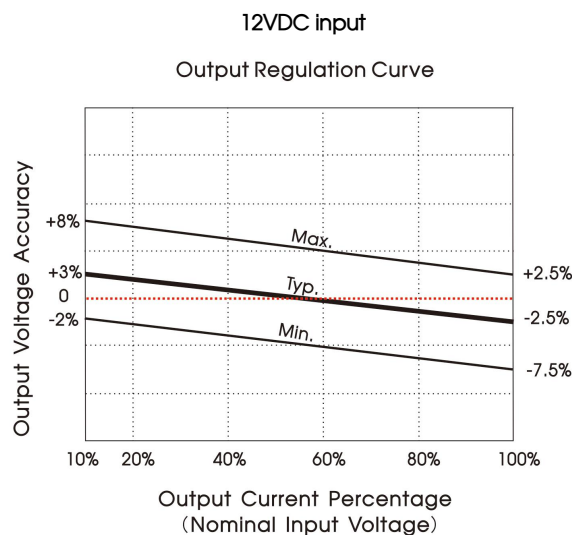


Fig. 1

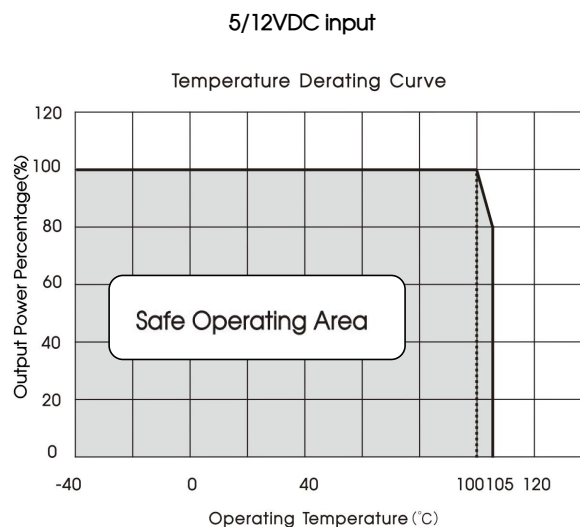
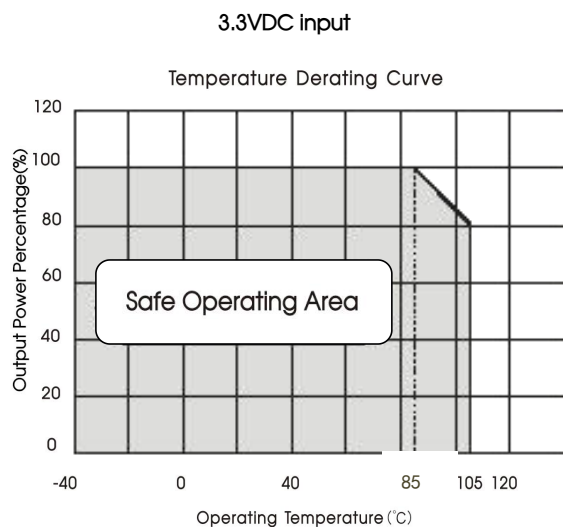
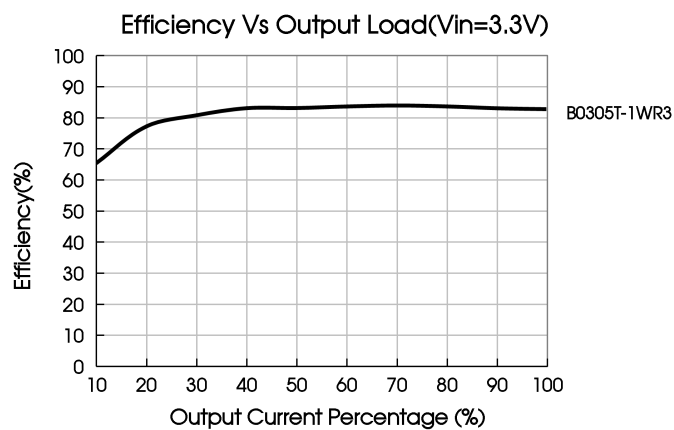
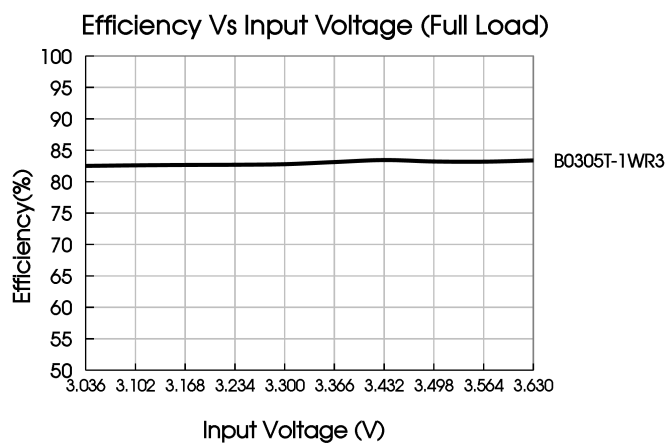
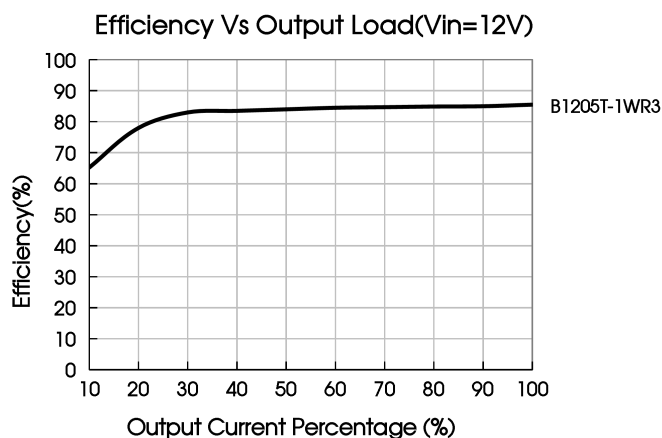
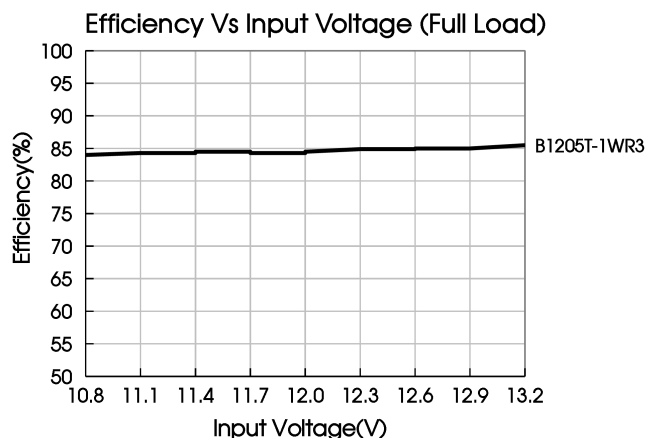


Fig. 2





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.

Table 1: Recommended input and output capacitor values



Fig. 3

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

2. EMC compliance circuit

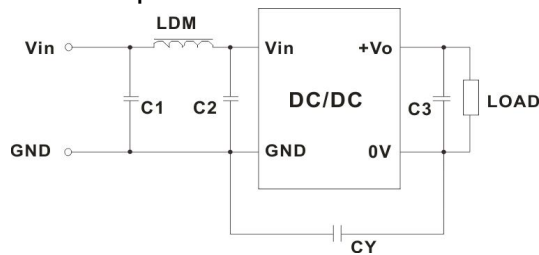


Fig. 4

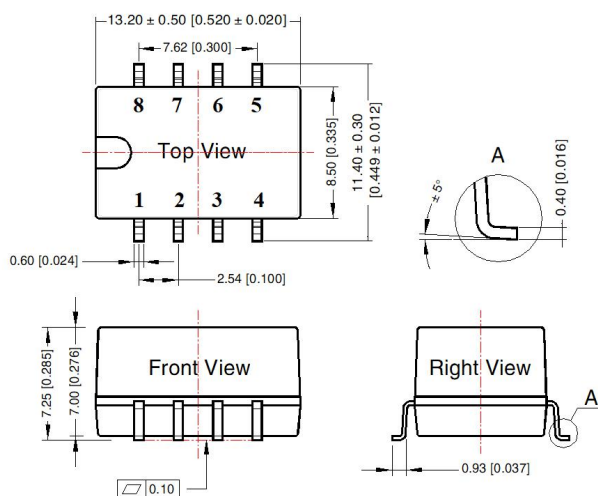
Table 2: EMC recommended circuit value table

Input voltage		5VDC		others
Output voltage		3.3/5/9 VDC	12/15 VDC	--
Emissions	C1/C2	4.7μF /25V	4.7μF /25V	4.7μF /50V
	CY	--	1nF /2kVDC HEC C1206X102K202T JOHANSON 202R18W102KV4E	270pF/2kVDC
	C3	Refer to the Cout in table 1		
	LDM	6.8μH		

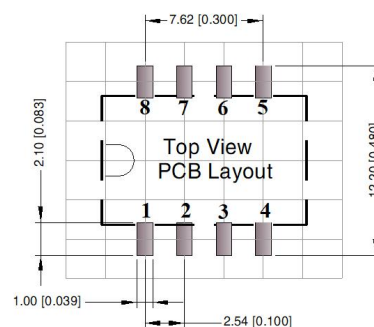
3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



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

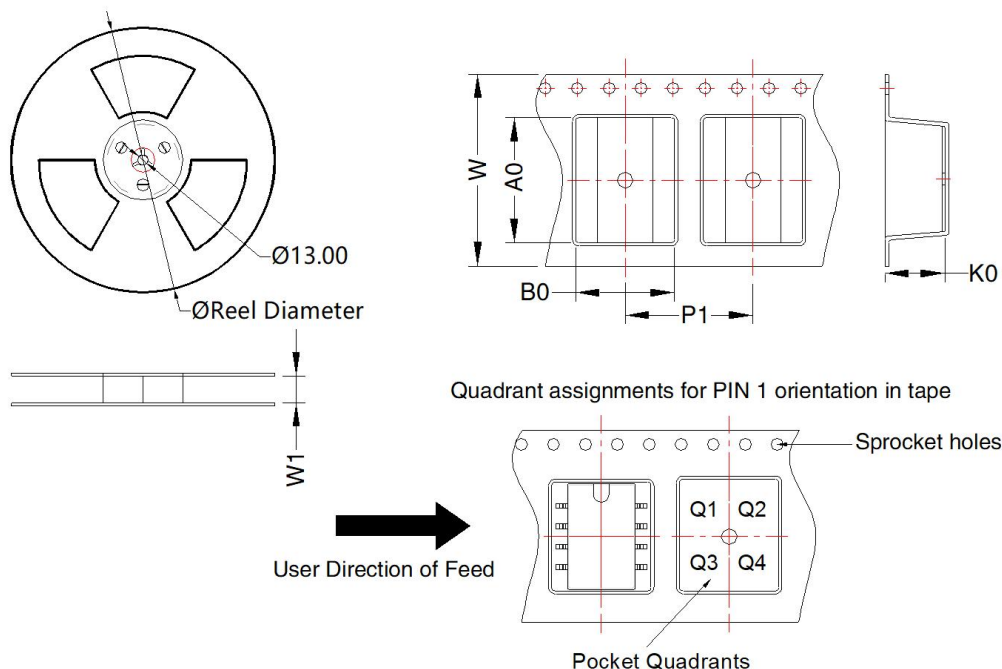


Note: Grid 2.54*2.54mm

Pin-Out	
Pin	Mark
1	GND
2	Vin
4	0V
5	+Vo
3, 6, 7, 8	NC

NC: Pin to be isolated from circuitry

Tape and Reel Info



Device	Package Type	Pin	SPQ	Reel Diameter (mm)	Reel Width W1 (mm)	A0 (mm)	B0 (mm)	K0 (mm)	P1 (mm)	W (mm)	Pin1 Quadrant
B_T-1WR3	SMD	8	500	330.0	24.5	13.4	11.7	7.5	16.0	24.0	Q1

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number: 58210024, Roll Packaging bag number: 58200054;
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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