DC/DC Converter

B05_T-1WR3 Series

MORNSUN®

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

Continuous Short Circuit Protection

3 years Warranty

CB Report RoHS 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 5mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 83%
- Compact SMD package
- I/O isolation test voltage 1.5k VDC
- Industry standard pin-out

B05_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.		
UL/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
--	B0515T-1WR3		15	67/7	79/83	470

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	3.3VDC/5VDC output	--	270/5	286/10	mA
		9VDC/12VDC output	--	241/12	254/20	
		15VDC output	--	241/18	254/30	
Reflected Ripple Current*			--	15	--	
Surge Voltage (1sec. max.)			-0.7	--	9	VDC
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 curve (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
		Other outputs	--	--	1.2	
Load Regulation	10%-100% load	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	7	15	
Ripple & Noise*	20MHz bandwidth	3.3VDC/5VDC/9VDC/ 12VDC output	--	30	75	mVp-p
		15VDC output	--	30	100	
Temperature Coefficient	Full load		--	±0.02	--	%/℃

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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≥100℃, (see Fig. 2)		-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃	3.3VDC output	--	25	--	
		Other outputs	--	15	--	
Storage Humidity	Non-condensing		--	--	95	%RH
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/5VDC/9VDC/12 VDC output	--	270	--	kHz
		15VDC output	--	300	--	
MTBF	MIL-HDBK-217F@25℃		3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1		Level 1			
Note: *Please refer to IPC/JEDEC J-STD-020D.1.						

Mechanical Specifications

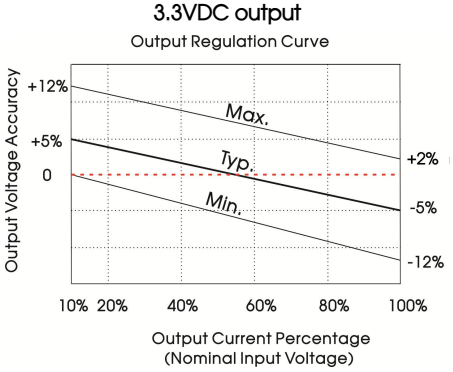
Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	13.20 x 11.40 x 7.25 mm
Weight	1.3g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 4 for recommended circuit)
	RE	CISPR32/EN55032	CLASS B (see Fig. 4 for recommended circuit)
Immunity	ESD	IEC/EN61000-4-2	Air ±8kV, Contact ±4kV perf. Criteria B

Typical Characteristic Curves

3.3VDC output



Others

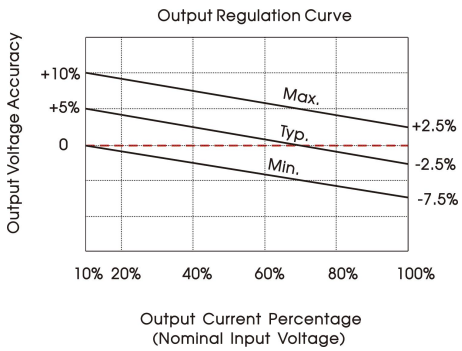


Fig. 1

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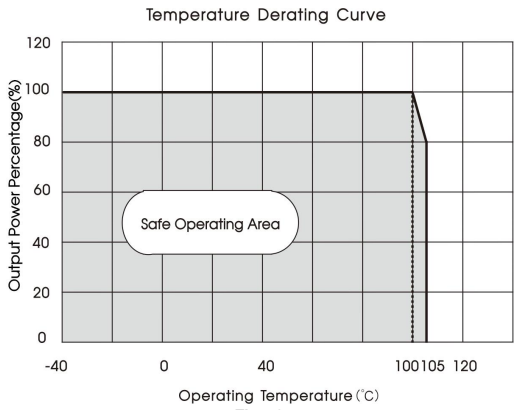
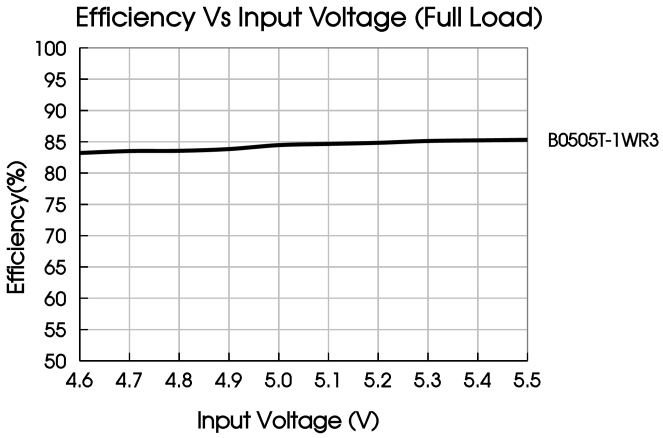
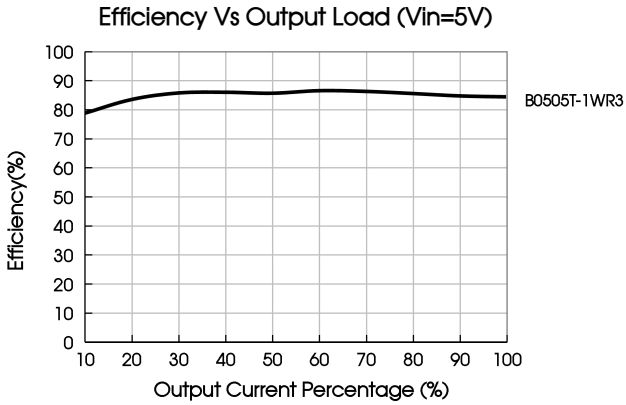


Fig. 2





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.

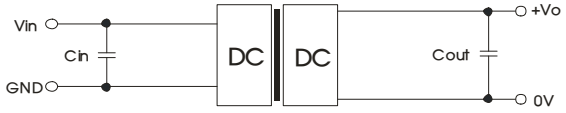


Fig. 3

Table 1: Recommended input and output capacitor values

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

2. EMC (CLASS B) compliance circuit

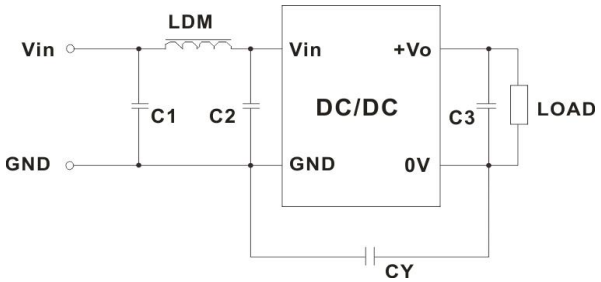


Fig. 4

Table 2: Recommended EMC filter values

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

Note: In the case of actual use, the requirements for emissions are high, it is subject to CY.

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

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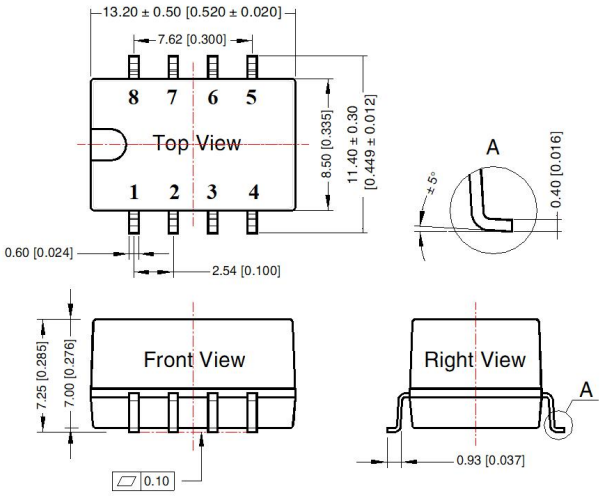
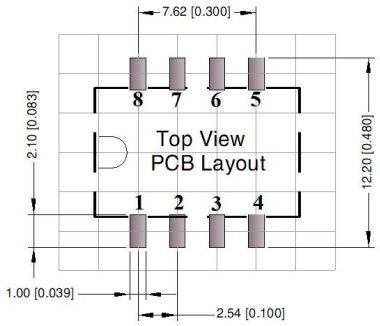
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





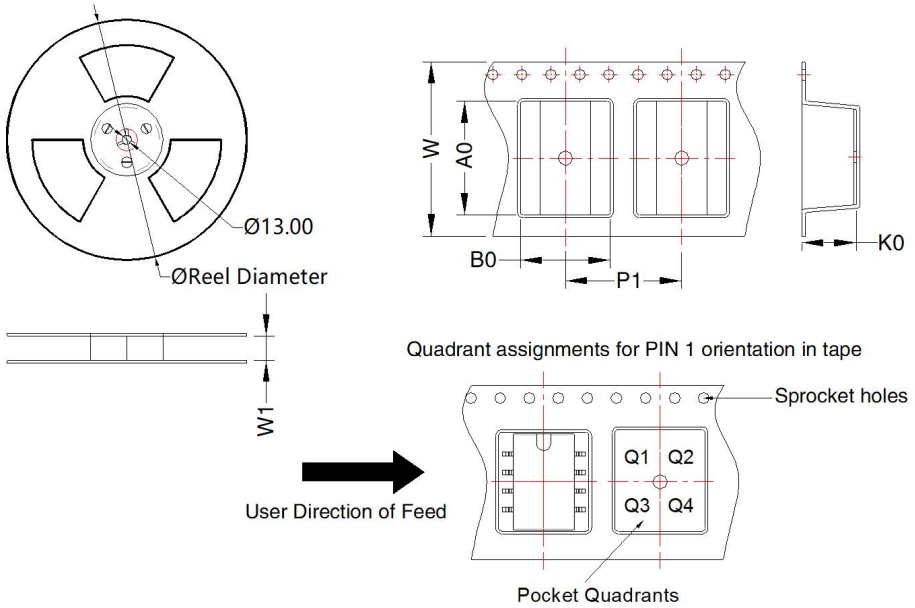
Note: Grid 2.54*2.54mm

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

NC: Pin to be isolated from circuitry

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

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

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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 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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