DC/DC Converter
F05_D-1WR3 Series

MORNSUN®

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

Continuous Short Circuit Protection

Patent Protection

3 years Warranty

CE Report EN62368-1 | UKCA Report BS EN62368-1 | CB IEC62368-1 | RoHS

FEATURES

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 83%
- I/O Isolation test voltage: 3k VDC
- Industry standard pin-out

F05_D-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.		
--	F0503D-1WR3	5 (4.5-5.5)	3.3	303/30	70/74	2400
EN/BS EN/IEC	F0505D-1WR3		5	200/20	78/82	2400
	F0512D-1WR3		12	84/9	79/83	560
	F0515D-1WR3		15	67/7	79/83	560

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	3.3VDC output	--	271/8	286/--	mA
		5VDC output	--	244/8	257/--	
		12VDC/15VDC output	--	241/8	254/--	
Reflected Ripple Current*			--	30	--	
Input Filter			Capacitance Filter			
Hot Plug			Unavailable			
Note: * Please refer to DC-DC Converter Application Note for detailed description of Reflected ripple current testing 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	--
		others	--	--	1.2	
Load Regulation	10%-100% load	3.3VDC output	--	7	20	%
		5VDC output	--	5	15	
		12VDC output	--	3	10	
		15VDC output	--	3	10	
Ripple & Noise *	20MHz bandwidth			30	75	mVp-p
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.						

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General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	3000	--	--	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 ⩾85℃, (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	5	--	95	%RH
Vibration		10-150Hz, 5G, 0.75mm, along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	k hours

Mechanical Specifications

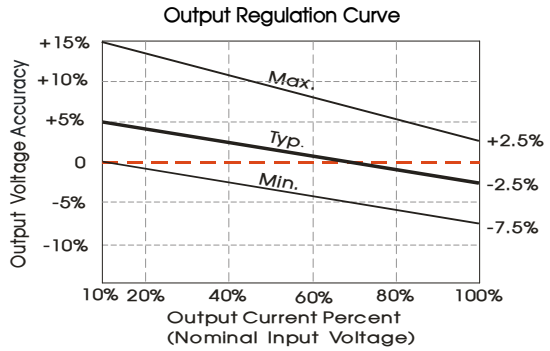
Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	20.00 x 10.00 x 7.00mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

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 ±6kV perf. Criteria B

Typical Characteristic Curves

3.3V Output



Others

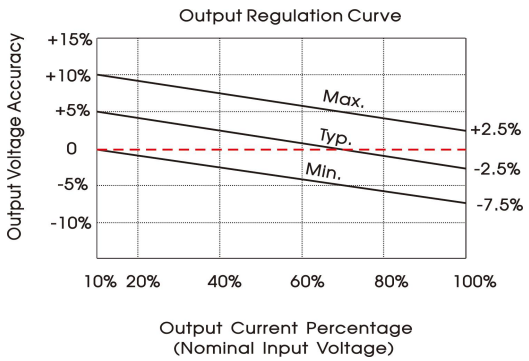


Fig. 1

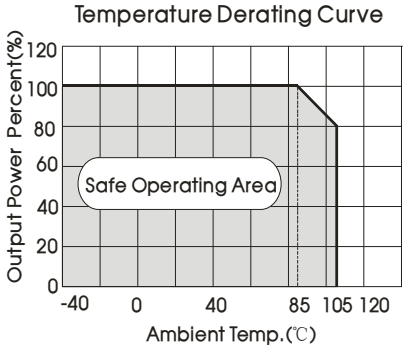


Fig. 2

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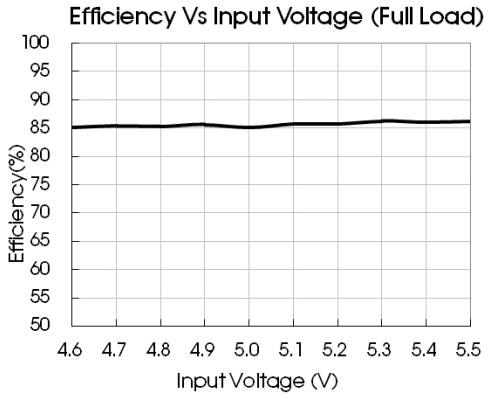

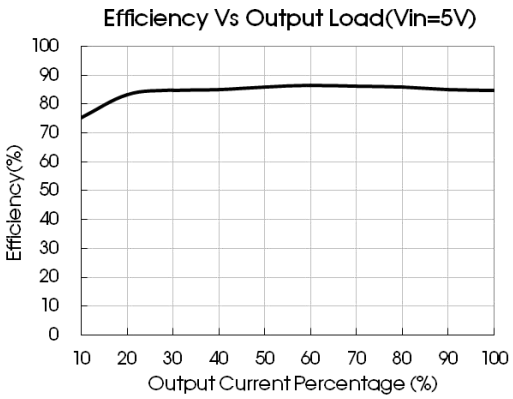

Design Reference

1. Typical application circuit

Input and/or output ripple can be further reduced by connecting capacitor filters to the input and/or output terminals of the DC-DC converter as shown in Fig. 3.

Also, the capacitance of the output filter capacitor must be properly selected. If the capacitor value that is too high, the converter may not be able to properly start up. To ensured safe and reliable operation, the specified filter capacitor value in Table 1 must not be exceeded.

Fig. 3

Table 1 Recommended capacitive load value table

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

2. EMC compliance circuit

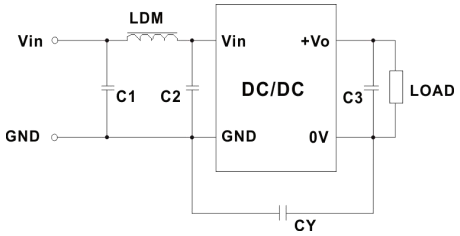

Fig. 4

Output voltage		3.3/5VDC	12/15VDC
Emissions	C1/C2	4.7μF /50V	4.7μF /50V
	CY	100pF /3kVDC	1000pF /3kVD
	C3	Refer to the Cout in table 1	
	LDM	6.8μH	6.8μH

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

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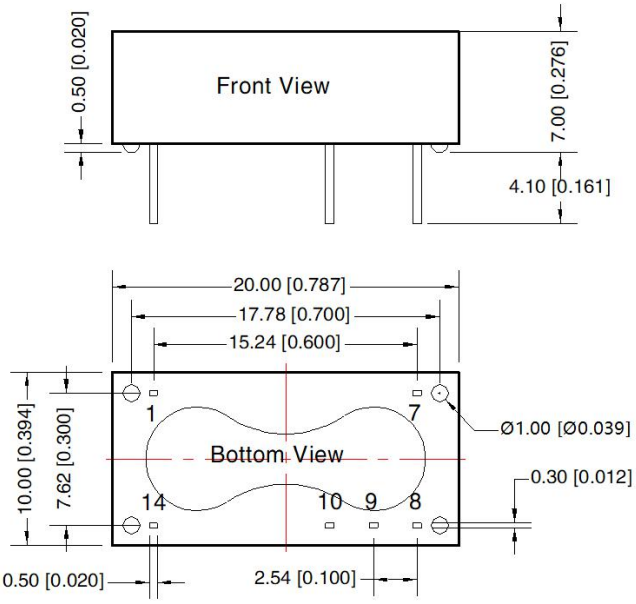
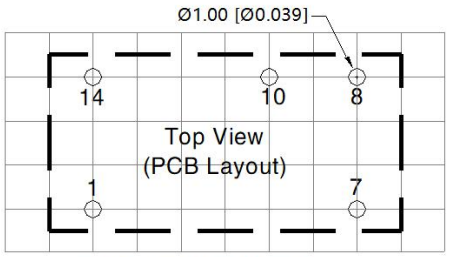
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm

Pin–Out	
Pin	Mark
1	GND
7	NC
8	+Vo
9	No Pin
10	0V
14	Vin

NC: Pin to be isolated circuitry

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

F_D-1WR3-V0

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58200009;
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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