AbN
automation

MORNSUN®

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

CE UKCA CB Report 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 5mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage 3k VDC
- Industry standard pin-out

E05_LT-1WR3 & F05_LT-1WR3 series are specially designed for applications where an isolated (two 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/IEC	E0503LT-1WR3	5 (4.5-5.5)	±3.3	±151/±15	70/74	1200
	E0505LT-1WR3		±5	±100/±10	78/82	1200
	E0509LT-1WR3		±9	±56/±6	79/83	470
	E0512LT-1WR3		±12	±42/±5	79/83	220
	E0515LT-1WR3		±15	±34/±4	79/83	220
	E0524LT-1WR3		±24	±21/±2	81/85	100
	F0503LT-1WR3		3.3	303/30	70/74	2400
	F0505LT-1WR3		5	200/20	78/82	2400
	F0509LT-1WR3		9	111/12	79/83	1000
	F0512LT-1WR3		12	84/9	79/83	560
	F0515LT-1WR3		15	67/7	79/83	560
	F0524LT-1WR3		24	42/4	81/85	220

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/24VDC output	--	241/18	254/30	
Reflected Ripple Current*			--	15	--	
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
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	--
		Other outputs	--	--	1.2	

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Load Regulation	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	Other outputs	--	30	75	mVp-p
		24VDC output	---	50	100	
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.		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≥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℃			
Switching Frequency	Full load, nominal input voltage		--	270	--	kHz
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	15.24 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

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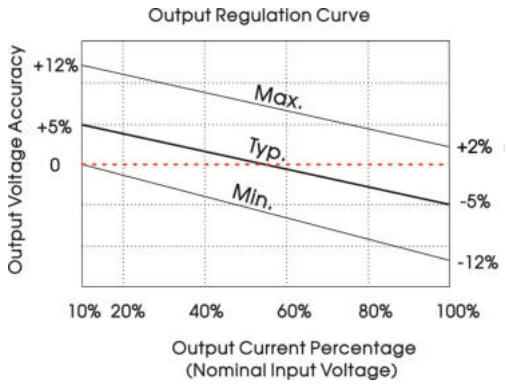
Typical Characteristic Curves

3.3VDC output



Others

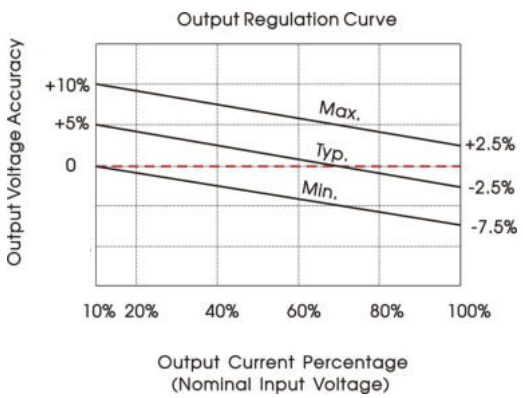
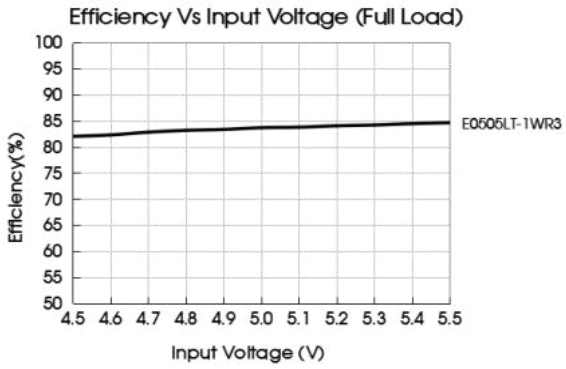
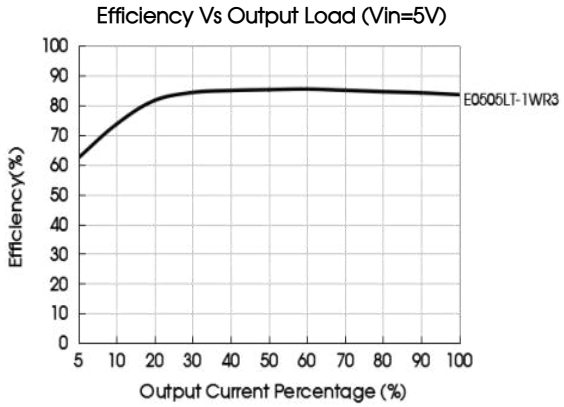
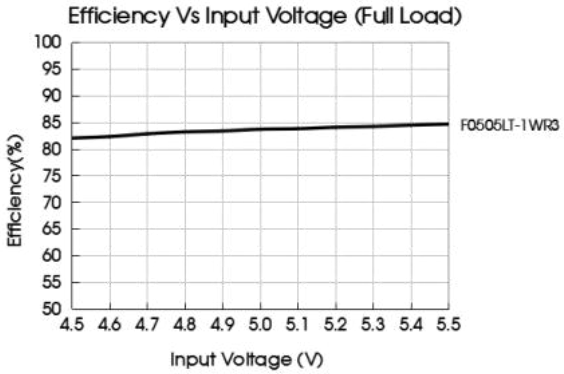
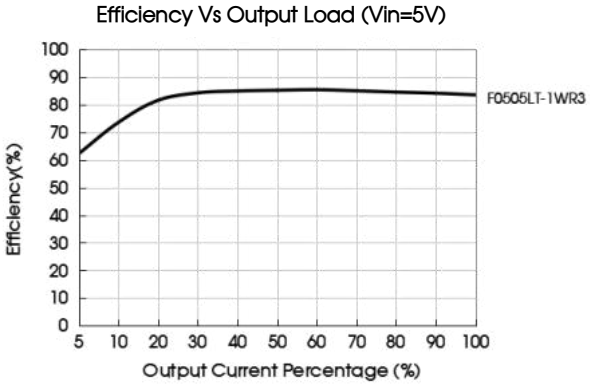


Fig. 1









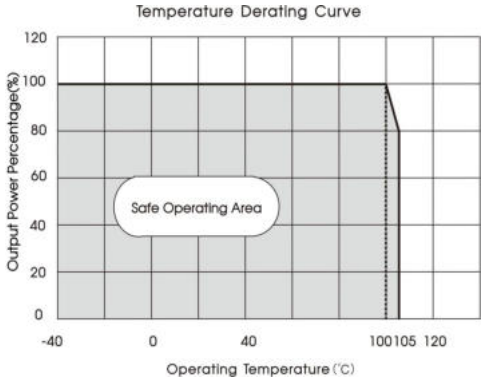


Fig. 2

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Design Reference

1. Typical application circuit

Input and/or output ripple can be further reduced, by connecting 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.

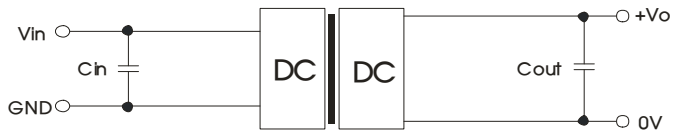

Fig. 3

Recommended capacitive load value table (Table 1)

Vin	Cin	Vo	Cout
5VDC	4.7μF/16V	3.3/5VDC	10μF/10V
		9VDC	4.7μF/16V
		12VDC	2.2μF/25V
		15VDC	1μF/25V
		24VDC	0.47μF/50V

2. EMC (CLASS B) compliance circuit

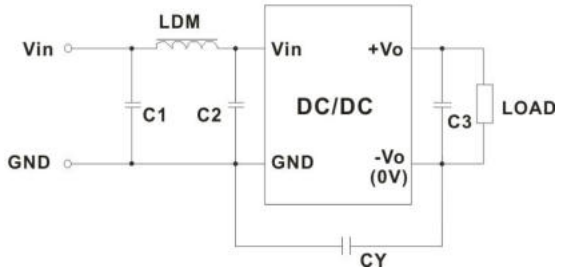

Fig. 4

EMC recommended circuit value table (Table 2)

Output voltage		3.3/5/9VDC	12/15/24VDC
Emissions	C1/C2	4.7μF /25V	4.7μF /25V
	CY	--	1nF /4kVDC VISHAY HGZ102MBP TDK CD45-E2GA102M-GKA
	C3	Refer to the Cout in table 1	
	LDM	6.8μH	6.8μH

Note: In the case of actual use, the requirements for EMI 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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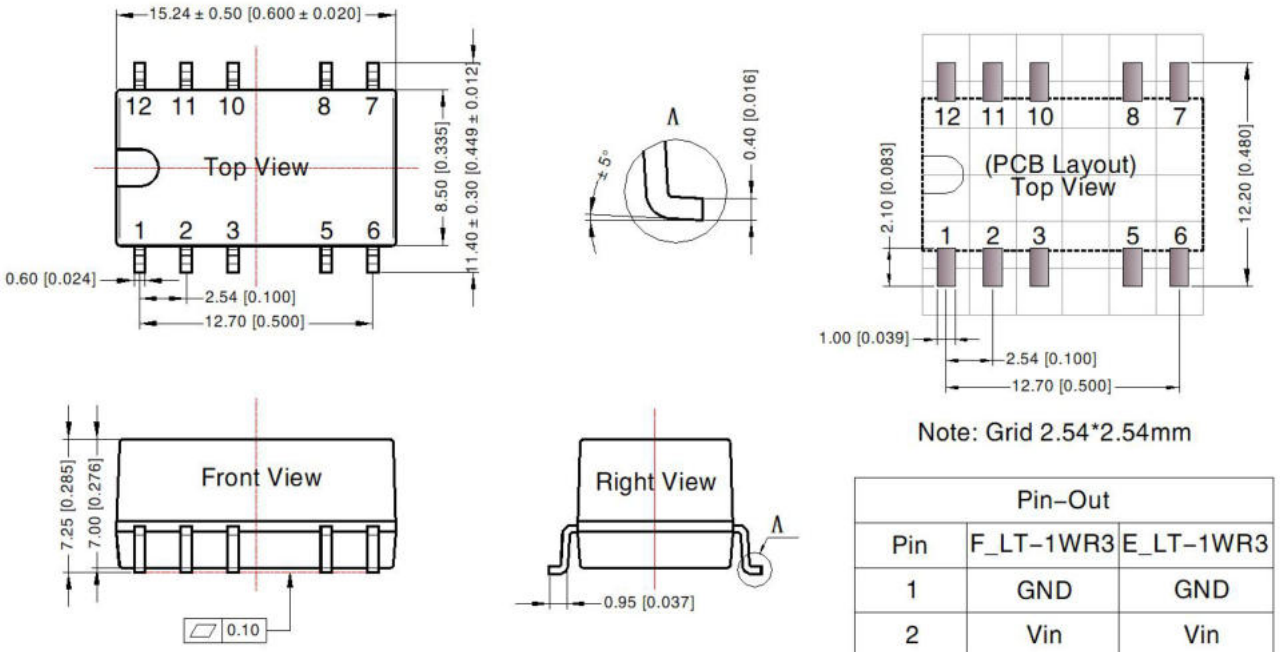
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm

Pin–Out		
Pin	F_LT–1WR3	E_LT–1WR3
1	GND	GND
2	Vin	Vin
5	0V	0V
6	NC	–Vo
8	+Vo	+Vo
Other	NC	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]

Note:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number: 58200023, Roll Packaging bag number: 58200034;
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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