1W, Fixed input voltage , isolated & unregulated dual/single output

Continuous Short Circuit Protection

3 years Warranty

Patent Protection RoHS

FEATURES

- Compact SIP package
- International standard pin-out
- High efficiency up to 81%
- Isolation voltage: 3K VDC
- Operating temperature range: -40℃ to +105℃
- EN60950,UL60950 approval

E_S-1WR2 & F_S-1WR2 series is specially designed for applications where an isolated voltage is required in a distributed power supply system. It is suitable for:

1.Where the voltage of the input power supply is stable (voltage variation: ±10%Vin);

2.Where isolation is necessary between input and output (isolation voltage ≤3000VDC);

3.Where do not has high requirement of line regulation, load regulation and low ripple noise;

4.Such as: pure digital circuits, low frequency analog circuits and relay-driven circuits.etc.

Selection Guide

Certification	Part No.	Input Voltage (VDC)	Output		Efficiency (%,Min./Typ.) @ Full Load	Max. Capacitive Load* (μF)
		Nominal (Range)	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
--	E0312S-1WR2	3.3 (2.97-3.63)	±12	±42/±5	72/76	100
	F0303S-1WR2		3.3	303/30	69/73	220
	F0305S-1WR2		5	200/20	74/78	
	F0324S-1WR2		24	42/5	74/78	
UL/CE	E0505S-1WR2	5 (4.5-5.5)	±5	±100/±10	76/80	100
	E0509S-1WR2		±9	±56/±6	76/80	
	E0512S-1WR2		±12	±42/±5	76/80	
	E0515S-1WR2		±15	±33/±4	77/81	
	E0524S-1WR2		±24	±21/±2	77/81	
--	F0503S-1WR2		3.3	303/30	69/73	220
UL/CE	F0505S-1WR2		5	200/20	76/80	
	F0509S-1WR2		9	111/12	76/80	
	F0512S-1WR2		12	83/9	76/80	
	F0515S-1WR2		15	67/7	77/81	
	F0524S-1WR2		24	42/5	77/81	
--	E0909S-1WR2	9 (8.1-9.9)	±9	±56/±6	76/80	100
	F0909S-1WR2		9	111/12	76/80	220
UL/CE	E1205S-1WR2	12 (10.8-13.2)	±5	±100/±10	76/80	100
	E1212S-1WR2		±12	±42/±5	77/81	
	E1215S-1WR2		±15	±33/±4	77/81	
	E1224S-1WR2		±24	±21/±2	76/80	
--	F1203S-1WR2		3.3	303/30	71/75	220
UL/CE	F1205S-1WR2		5	200/20	76/80	
	F1209S-1WR2		9	111/12	76/80	
	F1212S-1WR2		12	83/9	76/80	
	F1215S-1WR2		15	67/7	77/81	
	F1224S-1WR2		24	42/5	77/81	

--	E1505S-1WR2	15 (13.5-16.5)	±5	±100/±10	76/80	100
	E1515S-1WR2		±15	±33/±4	77/81	
CE	F1505S-1WR2		5	200/20	76/80	220
--	F1509S-1WR2		9	111/12	76/80	
	F1512S-1WR2		12	83/9	76/80	
CE	F1515S-1WR2		15	67/7	77/81	
UL/CE	E2405S-1WR2	24 (21.6-26.4)	±5	±100/±10	76/80	100
	E2409S-1WR2		±9	±56/±6	76/80	
	E2412S-1WR2		±12	±42/±5	77/81	
	E2415S-1WR2		±15	±33/±4	75/79	
	E2424S-1WR2		±24	±21/±2	76/80	
--	F2403S-1WR2		3.3	303/30	71/75	220
UL/CE	F2405S-1WR2		5	200/20	75/79	
	F2409S-1WR2		9	111/12	76/80	
	F2412S-1WR2		12	83/9	77/81	
	F2415S-1WR2		15	67/7	77/81	
	F2424S-1WR2		24	42/5	77/81	

Note: *The capacitive loads of positive and negative outputs are identical.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3 VDC input	--	415/25	--/70	mA
	5 VDC input	--	274/20	--/60	
	9 VDC input	--	139/20	--/55	
	12 VDC input	--	114/15	--/50	
	15 VDC input	--	84/10	--/35	
	24 VDC input	--	58/7	--/30	
Surge Voltage (1sec. max.)	3.3 VDC input	-0.7	--	5	VDC
	5 VDC input	-0.7	--	9	
	9 VDC input	-0.7	--	12	
	12 VDC input	-0.7	--	18	
	15 VDC input	-0.7	--	21	
	24 VDC input	-0.7	--	30	
Input Filter		Capacitor filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy			See tolerance envelope curve(Fig. 1)			
Line Regulation	Input voltage change: ±1%	3.3 VDC output	--	--	±1.5	--
		Other output	--	--	±1.2	
Load Regulation	10%-100% load	3.3VDC output	--	18	--	%
		5VDC output	--	12	--	
		9VDC output	--	9	--	
		12VDC output	--	8	--	
		15VDC output	--	7	--	
		24VDC output	--	6	--	
Ripple & Noise*	20MHz bandwidth	The output voltage is 12VDC and under	--	30	--	mVp-p
		15VDC and 24VDC output voltage	--	60	--	
Temperature Drift Coefficient	100% load		--	--	±0.03	%/℃

Short Circuit Protection**	E03xxS-1WR2/F03xxS-1WR2/E0524S-1WR2/ F0524S-1WR2/ E24xxS-1WR2/ F24xxS-1WR2	--	--	1	s
	Others	Continuous, self-recovery			

Note: * Ripple and noise tested with "parallel cable" method, please see DC-DC Converter Application Notes for specific operation methods.
**Supply voltage must be discontinued at the end of short circuit duration for E03xxS-1WR2/F03xxS-1WR2/E0524S-1WR2/F0524S-1WR2/E24xxS-1WR2/ F24xxS-1WR2 models.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA	3000	--	--	VDC
Isolation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	20	--	pF
Operating Temperature	Derating if the temperature ≥85℃(see Fig. 2)	-40	--	105	℃
Storage Temperature		-55	--	125	
Casing Temperature Rise	Ta=25℃	--	25	--	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	100% load, nominal input voltage	--	100	--	KHz
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K hours

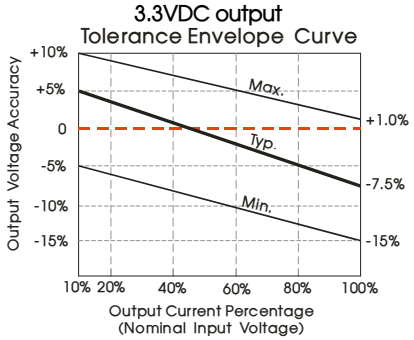
Physical Specifications

Casing Material	Black flame-retardant heat-proof epoxy resin (UL94 V-0)
Package Dimensions	19.50*6.00*9.30 mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

EMC Specifications

EMI	CE		CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
	RE		CISPR32/EN55032 CLASS B (see Fig. 4 for recommended circuit)
EMS	ESD	E_S-1WR2	IEC/EN61000-4-2 Contact ±6KV perf. Criteria B
		F_S-1WR2	IEC/EN61000-4-2 Contact ±8KV perf. Criteria B

Product Characteristic Curve



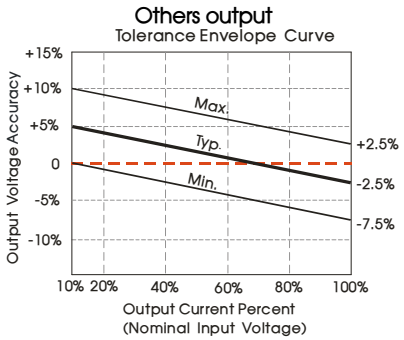


Fig. 1

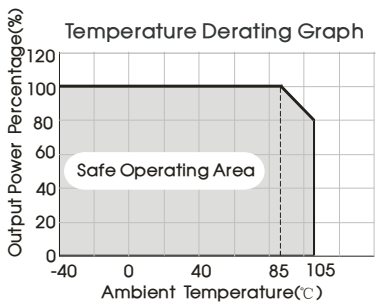
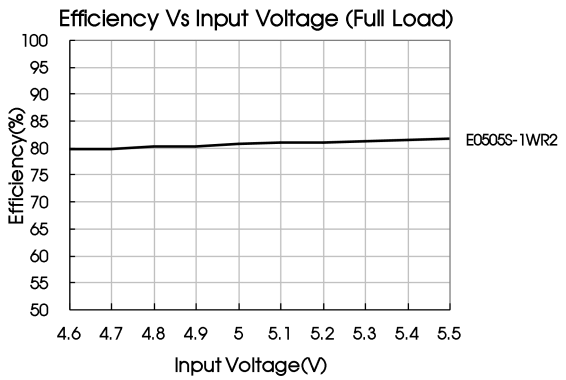
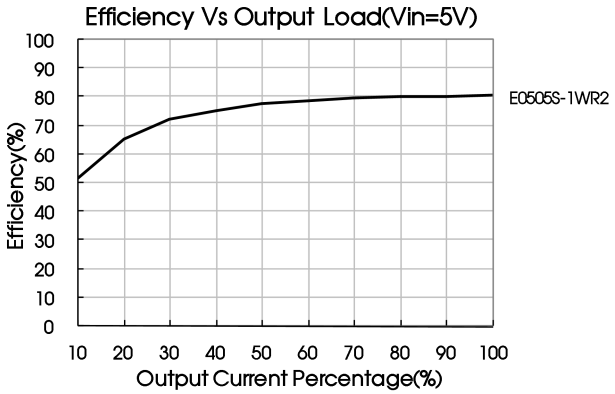
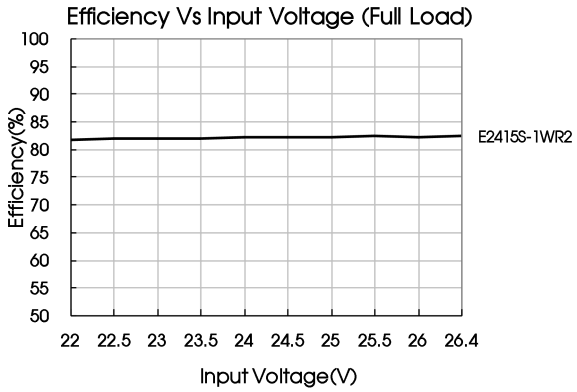
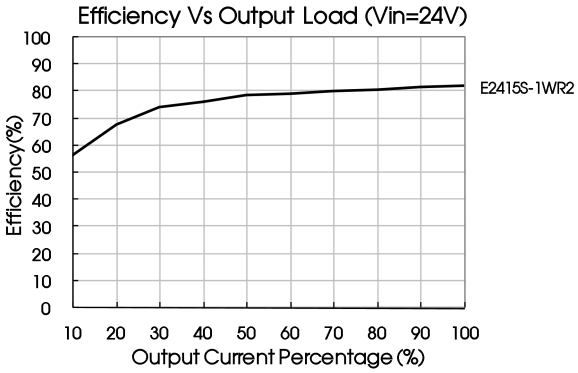


Fig. 2









Design Reference

1. Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important , start-up problems may be caused by too large capacitance. To ensured the modules running well, the recommended capacitive load values as shown in Table 1.

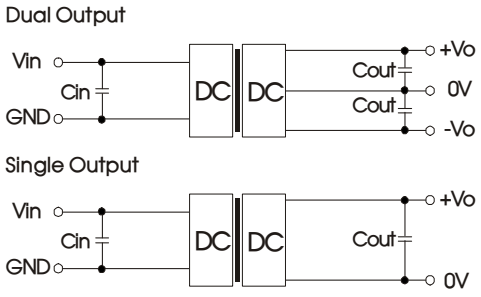


Fig.3

Recommended capacitive load value table (Table 1)

Vin (VDC)	Cin (μF)	Single output (VDC)	Cout (μF)	Dual output (VDC)	Cout (μF)
3.3/5	4.7	3.3/5/9	10	±5	4.7
9/12	2.2	12	2.2	±9/±12	1
15	2.2	15/24	1	±15/±24	0.47
24	1	--	--	--	--

2. EMC typical recommended circuit (CLASS B)

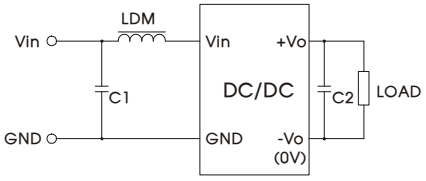


Fig. 4

Input voltage(VDC)		3.3/5/9/12/15/24
EMI	C1	4.7μF /50V
	C2	Refer to the Cout in Fig.3
	LDM	6.8μH

Note: It is not needed to add the component in the peripheral circuit when parameter with the symbol of "--"

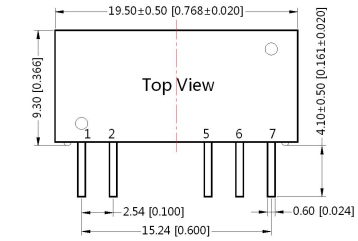
3. Output load requirements

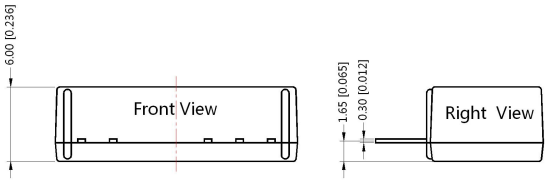
In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor on the output side (The sum of the efficient power and resistor consumption power is not less than 10%).

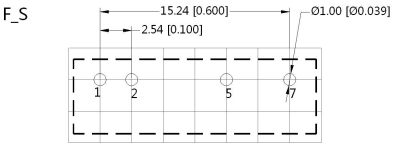
4. For more information please find the application notes on www.mornsun-power.com

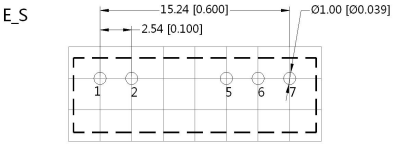
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION









Note: Grid 2.54*2.54mm

Pin-Out		
Pin	F_S	E_S
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No Pin	0V
7	+Vo	+Vo

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

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58200029;
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's 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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