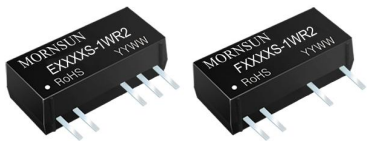


E_S-1WR2 & F_S-1WR2 Series

1W, FIXED INPUT, ISOLATED & UNREGULATED
DUAL/SINGLE OUTPUT DC-DC CONVERTER



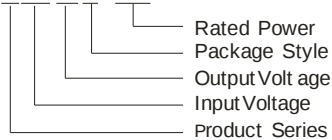
Patent Protection RoHS



Continuous Short
Circuit Protection

PART NUMBER SYSTEM

F0505S-1WR2



PRODUCT FEATURES

- Miniature package
- Efficiency up to 81%
- SIP package
- High power density
- Low Temperature drift
- No External Component Required
- 3000VDC Isolation Voltage
- Operating Temperature Range:
-40°C ~ +105°C
- Industry Standard Pinout
- Continuous Short Circuit Protection
(Automatic Recovery)

APPLICATIONS

The E_S-1WR2 & F_S-1WR2 Series are designed for application where isolated output is required from a distributed power system.

These products apply to where:

- 1) Input voltage variation $\leq \pm 10\%$;
- 2) 3KVDC input and output isolation;
- 3) Regulated and low ripple noise is not required.

Such as: digital circuits, low frequency analog circuits, and IGBT power device driving circuits.

SELECTION GUIDE

Model Number	Input Voltage(VDC) Nominal (Range)	Output Voltage (VDC)	Output Current (mA)		Input Current (mA)(typ.)		Reflected Ripple Current (mA,typ.)	Max. Capacitive Load(μ F)	Efficiency (%, typ.) @Max. Load	Approval
			Max.	Min.	@Max. Load	@No Load				
E0505S-1WR2	5 (4.5-5.5)	± 5	± 100	± 10	250	20	10	100	80	
E0512S-1WR2		± 12	± 42	± 5	250				80	
E0515S-1WR2		± 15	± 33	± 4	248				81	
E0524S-1WR2		± 24	± 21	± 2	248				81	
F0505S-1WR2		5	200	20	250			220	80	
F0512S-1WR2		12	83	9	250				80	
F0515S-1WR2		15	67	7	248				81	
F0524S-1WR2		24	42	5	248				81	
E1205S-1WR2	12 (10.8-13.2)	± 5	± 100	± 10	92	15	5	100	80	
E1212S-1WR2		± 12	± 42	± 5	90				81	
E1215S-1WR2		± 15	± 33	± 4	90				81	
F1205S-1WR2		5	200	20	92			220	80	
F1212S-1WR2		12	83	9	92				80	
F1215S-1WR2		15	67	7	90				81	
E1505S-1WR2	15 (13.5-16.5)	± 5	± 100	± 10	84	10	5	100	80	
E1515S-1WR2		± 15	± 33	± 4	84				81	
F1505S-1WR2		5	200	20	84			220	80	
F1515S-1WR2		15	67	7	84				81	
E2405S-1WR2	24 (21.6-26.4)	± 5	± 100	± 10	53	7	5	100	80	
E2412S-1WR2		± 12	± 42	± 5	51				81	
E2415S-1WR2		± 15	± 33	± 4	51				79	
F2405S-1WR2		5	200	20	56			220	79	
F2412S-1WR2		12	83	9	51				81	
F2415S-1WR2		15	67	7	52				82	

INPUT SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Input Surge Voltage (1sec. max.)	5VDC Input	-0.7	--	9	VDC
	12VDC Input	-0.7	--	18	
Input Surge Voltage (1sec. max.)	15VDC Input	-0.7	--	21	VDC
	24VDC Input	-0.7	--	30	
Input Filter		Capacitance Filter			

OUTPUT SPECIFICATIONS

Item	Test Conditions		Min.	Typ.	Max.	Unit
Output Power			0.1	--	1	W
Output Voltage Accuracy			See tolerance envelope curve			
Output Voltage Balance	Dual Output, Balanced Loads		--	±0.5	±1	%
Line Voltage Regulation	For Vin change of ±1%		--	--	±1.2	
Load Regulation	10% to 100% load	(5V output)	--	10	15	
		(12V output)	--	8	15	
		(15V output)	--	7	15	
		(24V output)	--	6	15	
Temperature Drift	100% full load		--	--	±0.03	%/°C
Ripple & Noise*	20MHz Bandwidth	Output Voltage ≤12V	--	30	--	mVp-p
		Others	--	60	--	
Short Circuit Protection*			Continuous, automatic recovery			

Note: *Ripple and noise tested by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

COMMON SPECIFICATIONS

Item	Test Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Tested for 1 minute and leakage current less than 1 mA	3000	--	--	VDC
Isolation Resistance	Test at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input/Output, 100KHz/0.1V	E/F2424S-1WR2	--	30	pF
		Others	--	20	
Switching Frequency	Full load, nominal input	--	100	300	KHz
MTBF	MIL-HDBK-217F@25°C	3500	--	--	K hours
Case Material	Epoxy Resin (UL94-V0)				
Weight		--	2.4	--	g

ENVIRONMENTAL SPECIFICATIONS

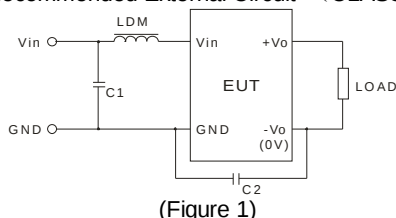
Item	Test Conditions	Min.	Typ.	Max.	Unit
Storage Humidity	Non condensing	--	--	95	%
Operating Temperature	Power derating (above 85°C)	-40	--	105	°C
Storage Temperature		-55	--	125	
Temp. rise at full load		--	25	--	
Soldering Temperature	1.5mm from case for 10 seconds	--	--	300	
Cooling		Free air convection			

EMC SPECIFICATIONS

EMI	CE	CISPR22/EN55022 CLASS B (External Circuit Refer to Figure1)			
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		

EMC RECOMMENDED CIRCUIT

EMI Recommended External Circuit (CLASS B):



E_S-1WR2 Series

Recommended external circuit parameters:

Vin: 5V/12V
 C1: 4.7uF /50V
 LDM: 6.8μH
 Vin: 15V/24V
 C1: 4.7uF /50V
 LDM: 6.8μH
 C2: 470pF/3KV

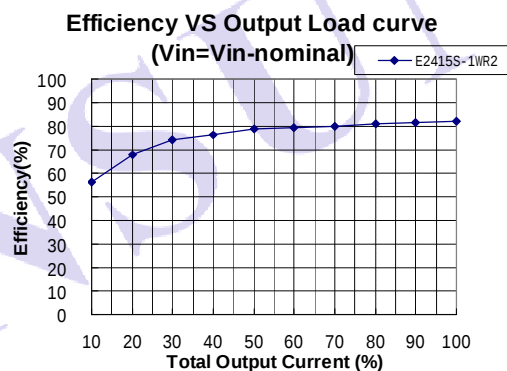
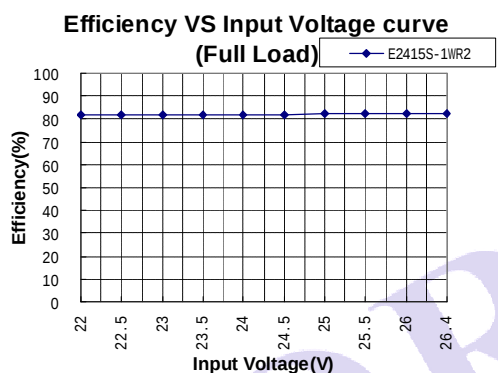
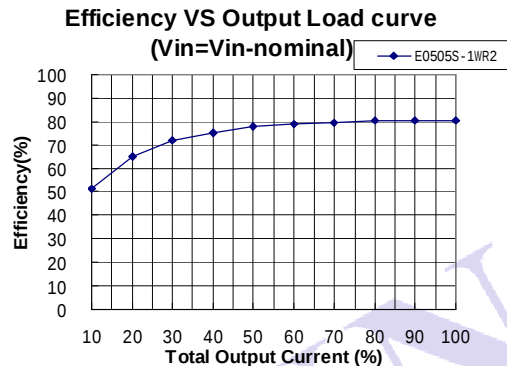
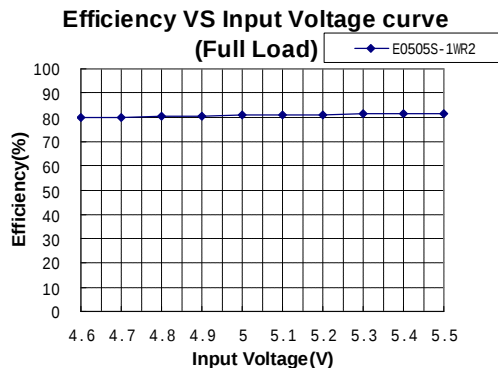
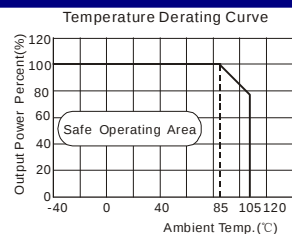
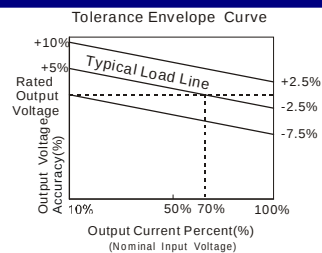
F_S-1WR2 Series

Recommended external circuit parameters:

Vin: 5V/12V
 C1: 4.7uF /50V
 LDM: 6.8μH
 Vin: 15V/24V
 C1: 4.7uF /50V
 LDM: 6.8μH
 C2: 470pF/3KV

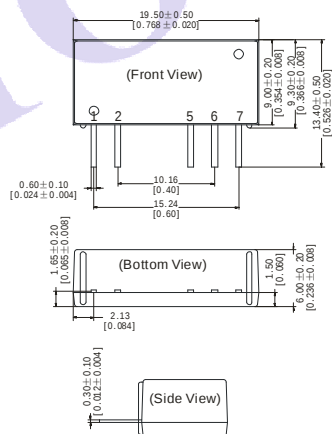
Note: If there is no recommended parameters, the model no require the external component.

PRODUCT TYPICAL CURVE



OUTLINE DIMENSIONS, RECOMMENDED FOOTPRINT & PACKAGING

MECHANICAL DIMENSIONS

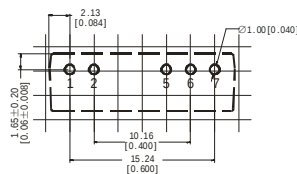


FOOTPRINT DETAILS

PIN	E_S-1WR2	F_S-1WR2
1	Vin	Vin
2	GND	GND
5	-Vo	0V
6	0V	No Pin
7	+Vo	+Vo

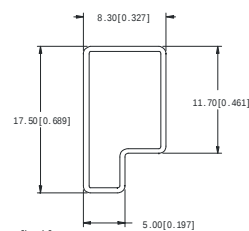
Note:
Unit: mm[inch]
Pinsection tolerances: $\pm 0.10\text{mm}[\pm 0.004\text{inch}]$
General tolerances: $\pm 0.25\text{mm}[\pm 0.010\text{inch}]$

RECOMMENDED FOOTPRINT



Note: grid 2.54*2.54mm.

TUBE OUTLINE DIMENSIONS

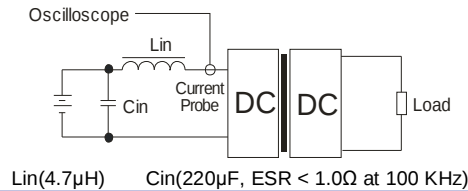


Note:
Unit: mm[inch]
General tolerances: $\pm 0.50\text{mm}[\pm 0.020\text{inch}]$
L=530mm[20.866inch] Devices per tube quantity: 25pcs
L=220mm[8.661inch] Devices per tube quantity: 10pcs
Short tube inner package dimensions: 255*170*80mm
Short tube outer package dimensions (with six inner package box): 375*280*270mm
Long tube inner package dimensions: 580*200*100mm
Long tube outer package dimensions (with two inner package box): 600*215*220mm
Long tube outer package dimensions (with three inner package box): 600*215*325mm

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor L_{in} and Capacitor C_{in} to simulate source impedance.



DESIGN CONSIDERATIONS

1) Requirement on output load

To ensure this module can operate efficiently and reliably, During operation, the minimum output load **could not be less than 10% of the full load**. If the actual output power is very small, please connect a resistor at the output end in parallel to increase the load, or use our company's products with a lower rated output power .

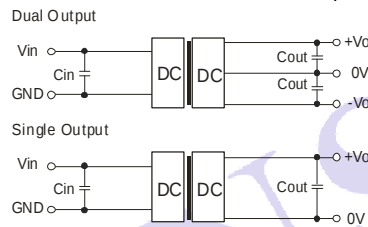
2) Overload Protection

Under normal operating conditions, the output circuit of these products has no protection against overload. The simplest method is to add a circuit breaker to the circuit.

3) Recommended circuit

If you want to further decrease the input/output ripple, a capacitor filtering network may be connected to the input and output ends of the DC/DC converter, see (Figure 2).

It should also be noted that the capacitance of filter capacitor must be proper. If the capacitance is too big, a startup problem might arise. For every channel of output, provided the safe and reliable operation is ensured, the recommended capacitance of its filter capacitor sees (Table 1).



(Figure 2)

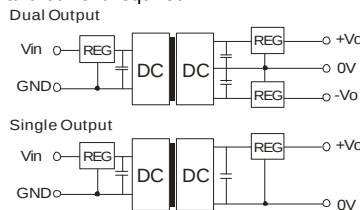
EXTERNAL CAPACITOR TABLE (Table 1)

V_{in} (VDC)	C_{in} (μF)	Single V_o (VDC)	C_{out} (μF)	Dual V_o (VDC)	C_{out} (μF)
5	4.7	5	10	± 5	4.7
12	2.2	12	2.2	± 12	1
15	2.2	15/24	1	$\pm 15/\pm 24$	0.47
24	1	--	--	--	--

It's not recommended to connect any external capacitor in the application field with less than 0.5 watt output.

4) Output Voltage Regulation and Over-voltage Protection Circuit

The simplest device for output voltage regulation, over-voltage and over-current protection is a linear regulator and an capacitor filtering network with overheat protection that is connected to the input or output end in series (Figure 3), the recommended capacitance of its filter capacitor sees (Table 1), linear regulator based on the actual voltage and current required.



(Figure 3)

5) Cannot use in parallel and hot swap

Note:

1. Operation under minimum load will not damage the converter; However, they may not meet all specification listed.
2. Max. Capacitive Load tested at input voltage range and full load.
3. All specifications measured at $T_a=25^\circ C$, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on our corporate standards.
5. All characteristics are for listed model only, non-standard models may perform differently, please contact our technical person for more detail.
6. Contact us for your specific requirement.
7. Specifications subject to change without prior notice.

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