

3W isolated DC-DC converter Wide input and regulated single output



## Patent Protection RoHS

### **FEATURES**

- The production process is controlled in accordance with IATF16949, and the components meet the AEC-Q100 standard, which is used in the automotive industry
- High isolation voltage: 4.3k VDC
- Operating temperature range:  $-40^{\circ}$ C to  $+105^{\circ}$ C
- Industry standard pin-out
- Wide input voltage range (2:1)
- High efficiency up to 82%

CWRF1215S-3W product is 3W output power, input voltage range 7-18VDC, isolation voltage 4300VDC, the production process is controlled according to the requirements of the IATF16949 system, and the components meet the AEC-Q100 standard, which is widely used in automotive systems and related equipment.

Selection Guide							
	Input Voltage (VDC)		Output		Full Load	Capacitive	
Part No.	Nominal (Range)	Max.®	Voltage (VDC)	Current (mA) Max./Min.	Efficiency (%) Min./Typ.	Load (µF)Max.	
CWRF1215S-3W	12 (7-18)	20	15	200/10	80/82	680	

Note: ①Exceeding the maximum input voltage may cause permanent damage.

Input Specifications					
Item	Operating Conditions	Min.	Тур.	Max.	Unit
Input Current ( full load/ no-load)			305/30	313/50	~ ^
Reflected Ripple Current			30		mA
Input Surge Voltage (1 minute. max.)		-0.7		30	
Starting Voltage			6.5	7	VDC
No-load power consumption			0.36		W
Input Filter		Capacitor filter			
Hot Plug		Unavailable			

Output Specifications					
Item	Operating Conditions	Min.	Тур.	Max.	Unit
Output Power		0.15		3	W
Output Voltage Accuracy	5%-100% load		±5	±10	
Linear Regulation	Input voltage variation from low to high at full load		±5	±10	%
Load Regulation	5%-100% load		±5	±10	
Temperature Coefficient	Full load			±0.03	<b>%/</b> ℃
Ripple & Noise*	20MHz bandwidth, 5%-100% load		100	200	mVp-p
Short-circuit Protection Input voltage range			No	ne	

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.	Тур.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	4300			VDC
Insulation Resistance	Input-output resistance at 500VDC	1000			MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		30		pF

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## DC/DC Converter

## CWRF1215S-3W

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Operating Temperature	see Fig. 1	-40		105	
Storage Temperature		-55		125	°C
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds			300	
Storage Humidity	Non-condensing	5		95	%RH
Vibration		10-1000H	łz, 10G, 300	Min. along	X, Y and Z
Switching Frequency	PWM mode		380		kHz
MTBF	MIL-HDBK-217F@25°C	1000			k hours

Physical Specifications	
Case Material	Black flame-retardant and heat-resistant plastic (UL94-V0)
Dimensions	22.00 x 9.5 x 12.00mm
Weight	5.0g (Тур.)
Cooling method	Free convection

<b>EMC</b> Specific	cations				
<b>F1</b> (1)	CE	EN55025/CISPR25	CLASS 3 (see Fig.3-2) and Fig.3-3) for recommended circuit	)	
	RE	EN55025/CISPR25	CLASS 3 (see Fig.3-2) and Fig.3-3) for recommended circuit )		
EMS	ESD	IEC/EN61000-4-2	Contact ±4kV	perf. Criteria B	
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A	
	EFT	IEC/EN61000-4-4	±2kV (see Fig.3-① for recommended circuit)	perf. Criteria B	
	Surge	IEC/EN61000-4-5	±2kV (see Fig.3-① for recommended circuit)	perf. Criteria B	
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A	

## Product Characteristic Curve

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## **Design Reference**

#### 1. Typical application

All DC-DC converters of this mode are tested before delivery using the recommended circuit shown in Fig. 2.

Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.



#### 2. EMC compliance circuit



Fig. 3

Note: Part ① in the Fig. 3 is used for EMS test; part ② and part③ are used for EMI filtering; selected based on needs.

Model	CWRF1215S-3W	
FUSE	Choose according to actual input current	
MOV	S14K20	
C0, C1, C2	330uF/50V	
C3	4.7µF/50V	
C4	10µF/50V	
L1	330uH	
C5	0.1µF/50V	
LCM1	10mH	
L2, L3	600 Ω / 100MHz	
C6, C8, C9	0.1nF/50V	
C7	1nF/50V	
CY1, CY2	561k/400VAC	

#### 3. The products do not support parallel connection of their output

4. For additional information please refer to DC-DC converter application notes on <u>www.mornsun-power.com</u>



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## DC/DC Converter CWRF1215S-3W

#### **Dimensions and Recommended Layout**



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Note: Grid 2.54\*2.54mm

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

NC: Pin to be isolated from circuitry

Note: CS is the output terminal of the output rectifier circuit, and an external filter capacitor can further reduce the output Ripple & Noise.

Note:

- 1. For additional information on Product Packaging please refer to <u>www.mornsun-power.com</u>. Packing bag number: 58210004;
- 2. Recommended used in more than 5% load, if the load is lower than 5%, then the ripple index of the product may exceed the specification, but does not affect the reliability of the product;
- 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°C, 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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