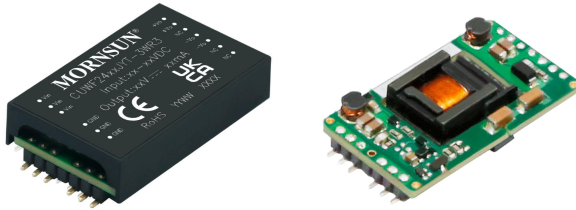


3W isolated DC-DC converter in SMD Package  
Ultra-wide input and regulated single output



## FEATURES

- Ultra-wide 7:1 input voltage range
- High efficiency up to 80%
- I/O isolation test voltage 3k VAC
- Input under-voltage protection, output short-circuit, over-current, over-voltage protection
- Creepage distance is 4.5mm, clearance is 4.2mm
- Operating ambient temperature range: -40°C to +105°C
- EMI meets automotive standards EN55025/CISPR 25 standard Class 4
- AEC-Q100 standards approved
- Production process meets IATF16949 system

CUWF24\_J(Y)T-3WR3 series are isolated 3W DC-DC converter products with an ultra-wide 7:1 input voltage range. They feature efficiencies up to 80%, input to output isolation is tested with 3000 VAC and the converter safely operate ambient temperature of -40°C to +105°C, input under-voltage protection, output short-circuit, over-current, over-voltage protection. They are widely used in applications such as automobile electronic, industrial control, electric power, instruments and communication fields.

## Selection Guide

Certification	Part No. ①	Input Voltage (VDC)		Output			Full Load Efficiency (%) Min./Typ.	Capacitive Load (μF)Max.
		Nominal (Range)	Max. ②	Voltage(VDC)	Current(mA) Max./Min.			
					6≤Vin<9	9≤Vin≤42		
EN/BS EN	CUWF2405J(Y)T-3WR3	24 (6-42)	45	5	480/0	600/0	74/76	1000
	CUWF2412J(Y)T-3WR3			12	200/0	250/0	76/78	470
	CUWF2415J(Y)T-3WR3			15	160/0	200/0	76/78	220
	CUWF2424J(Y)T-3WR3			24	100/0	125/0	78/80	100

Note:  
① CUWF24\_J(Y)T-3WR3 contains 2 types of products, include CUWF24\_JT-3WR3 (SMD package without shell) and CUWF24\_JYT-3WR3 (SMD package with shell);  
② Exceeding the maximum input voltage may cause permanent damage.

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	Nominal input voltage	—	165/8	169/15	mA
Reflected Ripple Current		—	30	—	
Surge Voltage (1sec. max.)		-0.7	—	50	VDC
Start-up Voltage		—	—	6	
Input Under-voltage Protection		3.5	4.5	—	
Start-up Time	Nominal input voltage & constant resistance load	—	10	150	ms
Input Filter		Pi filter			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy ①	5%-100% load	—	±1	±2	%	
Linear Regulation	Input voltage variation from low to high at full load	—	±0.2	±0.5		
Load Regulation	5%-100% load	—	±0.5	±1		
Transient Recovery Time	25% load step change, nominal input voltage		—	300	500	μs
Transient Response Deviation	25% load step change, input voltage range	5V output	—	±4	±8	%
		Others	—	±3	±5	
Temperature Coefficient	Full load	—	—	±0.03	%/°C	
Ripple & Noise ②	20MHz bandwidth, nominal input voltage, 5%-100% load	—	60	100	mVp-p	

Over-voltage Protection	Input voltage range	110	--	160	%Vo
Over-current Protection		110	--	300	%Io
Short-circuit Protection		Continuous, self-recovery			
Note: ① Output voltage accuracy for 0%-5% load is $\pm 3\%$ max; ② Under 0% -5% load conditions, ripple & noise does not exceed 250mV. 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 5mA max.	3000	--	--	VAC
Insulation Resistance	Input-output resistance at 500VDC	1000	--	--	M $\Omega$
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	500	--	pF
Reinforced Isolation	Clearance	4.2	--	--	mm
	Creepage	4.5	--	--	
Operating Temperature	See Fig. 1	-40	--	+105	°C
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Pin Soldering Resistance Temperature*	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	°C
	Wave soldering, 10 seconds	255	260	265	
Vibration		GBT 28046.3-2011 4.1.2.4 Random vibration, passenger car, sprung masses (vehicle body) 1. The r.m.s. acceleration value shall be 27.8 m/s <sup>2</sup> . 2. Use a test duration of 8 hours for each plane of the DUT.			
Switching Frequency ①	PWM mode	--	270	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			
Note: *The pin resistance temperature is not the actual set temperature of the soldering iron, but the temperature required for a good solder joint. The actual set temperature by the customer needs to be comprehensively set based on the thickness of the PCB, the size of the copper cladding, the power of the soldering iron, and the selection of the soldering iron tip. ① Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.					

## Mechanical Specifications

Case Material	Black epoxy resin; flame-retardant and heat-resistant (UL94V-0)	
Dimensions	CUWF24_JT-3WR3	43.68 x 23.0 x 10.00 mm
	CUWF24_JYT-3WR3	43.68 x 25.0 x 10.64 mm
Weight	CUWF24_JT-3WR3	7.5g (Typ.)
	CUWF24_JYT-3WR3	10.4g (Typ.)
Cooling Method	Free air convection	

## Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR25/EN55025 CLASS 4 (see Fig.3 for recommended circuit)	
		CISPR32/EN55032 CLASS A (without external components)	
	RE	CISPR25/EN55025 CLASS 4 (see Fig.3 for recommended circuit)	
		CISPR32/EN55032 CLASS A (without external components)	
Immunity	ESD	ISO10605 Contact $\pm 6$ kV	perf. Criteria B
	RS	ISO11452-2 150V/m (see Fig.3 for recommended circuit)	perf. Criteria A
	BCI	ISO11452-4 1MHz-400MHz, 150mA (see Fig.3 for recommended circuit)	perf. Criteria A
	Electrical transient conduction along supply lines only	ISO7637-2 LEVEL III	
		Pulse1 (see Fig.3 for recommended circuit)	perf. Criteria B
Pulse2a (see Fig.3 for recommended circuit)		perf. Criteria A	
	Pulse2b (see Fig.3 for recommended circuit)	perf. Criteria B	

	Pulse3a (see Fig.3 for recommended circuit)	perf. Criteria A
	Pulse3b (see Fig.3 for recommended circuit)	perf. Criteria A

Typical Characteristic Curve

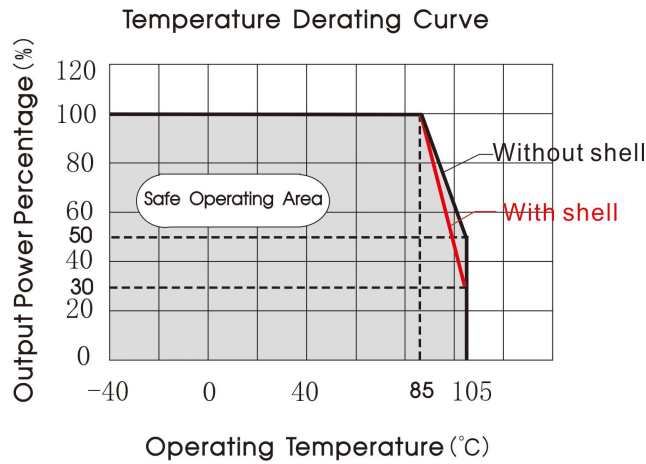


Fig. 1

Design Reference

1. Typical application

All DC-DC converters of this series 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  $C_{in}$  and  $C_{out}$  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.



Fig. 2

Vout (VDC)	Cin	Cout
5	100μF/63V	100μF/16V
12/15		100μF/35V
24		47μF/35V

2. EMC compliance circuit

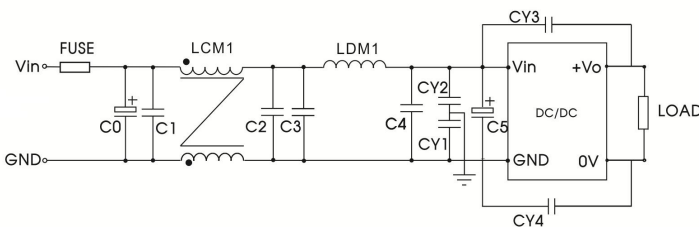


Fig. 3

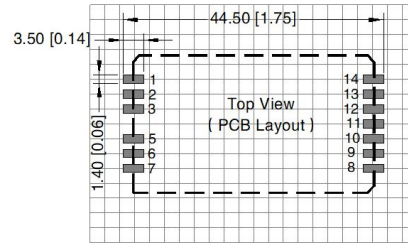
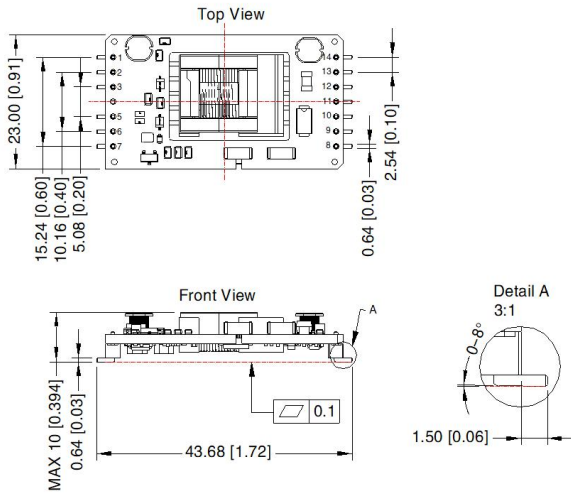
Parameter description:

Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0	680μF/63V
C1/C2/C3/ C4	10μF/100V
LCM1	1mH(FL2D-10-102)
LDM1	4.7μH/3.1A
C5	82μF/100V
CY1/CY2	100pF/400VAC
CY3/CY4	2200pF/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 [www.mornsun-power.com](http://www.mornsun-power.com)

CUWF24\_JT-3WR3 Dimensions and Recommended Layout



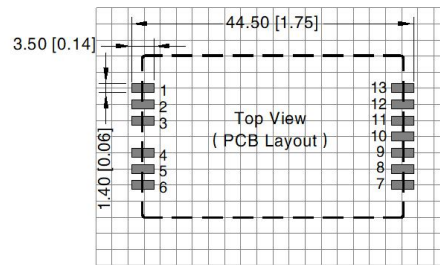
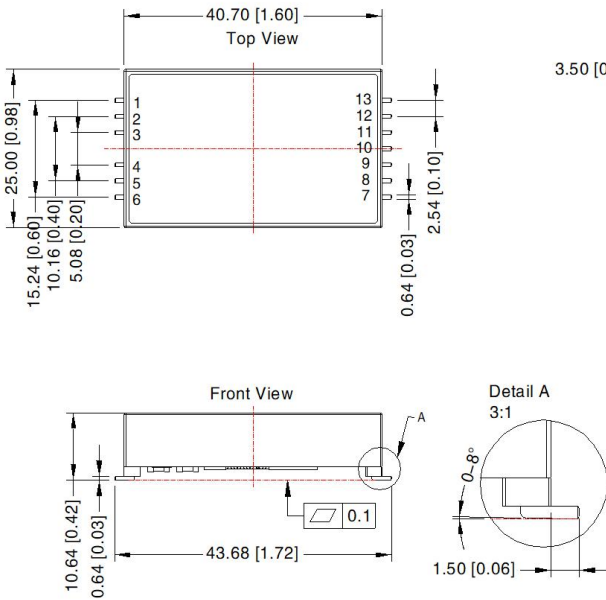
Note: Grid 2.54\*2.54mm

Pin-Out			
Pin	Mark	Pin	Mark
1	Vin	9	NC
2	Vin	10	-Vo
3	Vin	11	-Vo
5	GND	12	NC
6	GND	13	+Vo
7	GND	14	+Vo
8	NC		

NC: Pin to be isolated circuitry

Note:  
Unit: mm[inch]  
Pin diameter tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.50[\pm 0.020]$

CUW24\_JYT-3WR3 Dimensions and Recommended Layout



Note: Grid 2.54\*2.54mm

Pin-Out			
Pin	Mark	Pin	Mark
1	Vin	8	NC
2	Vin	9	-Vo
3	Vin	10	-Vo
4	GND	11	NC
5	GND	12	+Vo
6	GND	13	+Vo
7	NC		

NC: Pin to be isolated circuitry

Note:  
Unit: mm[inch]  
Pin diameter tolerances:  $\pm 0.10[\pm 0.004]$   
General tolerances:  $\pm 0.50[\pm 0.020]$

Note:

1. For additional information on Product Packaging please refer to [www.mornsun-power.com](http://www.mornsun-power.com). Packaging bag number: 58220085(without shell);58210109(with shell);
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of  $T_a=25^{\circ}\text{C}$ , humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. 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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