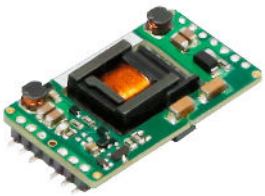
DC/DC Converter

CUWF24_J(Y)T-6WR3 Series

MORNSUN®

6W isolated DC-DC converter in SMD Package
Ultra-wide input and regulated single output



Patent Protection

3 years Warranty

CE EN62368-1

UKCA BS EN62368-1

RoHS

FEATURES

- Ultra-wide 7:1 input voltage range
- High efficiency up to 82%
- 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℃ to +105℃
- EMI meets automotive standards EN55025/CISPR 25 standard Class 4
- AEC-Q100 standards approved
- Production process meets IATF16949 system

CUWF24_J(Y)T-6WR3 series are isolated 6W DC-DC converter products with an ultra-wide 7:1 input voltage range. They feature efficiencies up to 82%, input to output isolation is tested with 3000 VAC and the converter safety operate ambient temperature of -40℃ to +105℃, 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	Current(mA) Max./Min. 9≤Vin≤42		
EN/BS EN	CUWF2405J(Y)T-6WR3	24 (6-42)	45	5	960/0	1200/0	76/78	1000
	CUWF2412J(Y)T-6WR3			12	400/0	500/0	78/80	470
	CUWF2415J(Y)T-6WR3			15	320/0	400/0	78/80	220
	CUWF2424J(Y)T-6WR3			24	200/0	250/0	80/82	100

Notes:
① CUWF24_J(Y)T-6WR3 contains 2 types of products, include CUWF24_JT-6WR3 (SMD package without shell) and CUWF24_JYT-6WR3 (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	--	321/8	329/15	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 Accuracy①	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	%/℃
Ripple & Noise②	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:
①Output voltage accuracy of 5VDC output converter for 0%-5% load is ±3% max, voltage accuracy of other models for 0%-5% load is ±2% max ;
②Under 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	--	--	MΩ
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	℃
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	℃
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^2; 2. Use a test duration of 8 hours for each plane of the DUT.			
Switching Frequency *	PWM mode	--	270	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1	Level 1			

Note: *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-6WR3	43.68 x 23.00 x 10.00mm
	CUWF24_JYT-6WR3	43.68 x 25.00 x 10.64 mm
Weight	CUWF24_JT-6WR3	7.5g (Typ.)
	CUWF24_JYT-6WR3	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 ±6kV	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

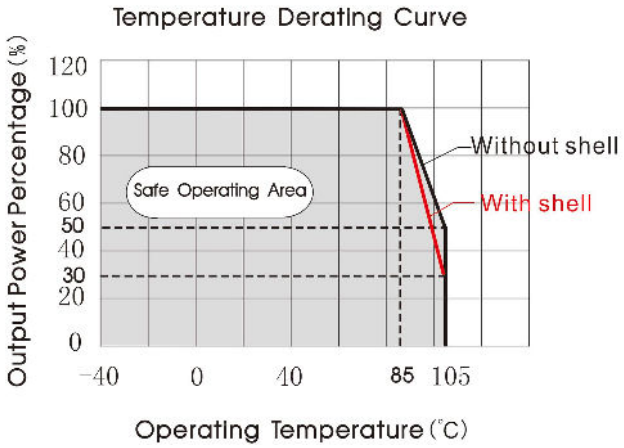


Fig. 1

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 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.

Fig. 2

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

2. EMC compliance circuit

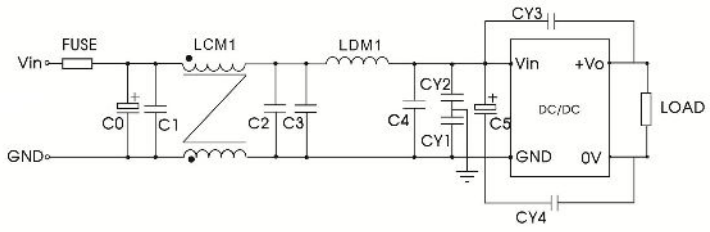


Fig. 3

Parameter description:

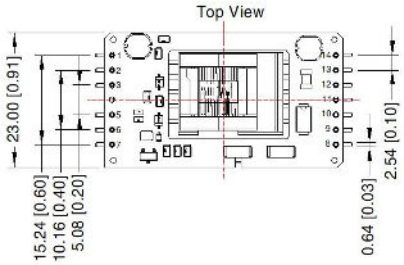
Model	Vin: 24VDC
FUSE	Choose according to actual input current
C0	680μF/63V
C1/C2/C3/C4	10μF/100V
LCM1	1mH(FL2D-10-102)
LDM1	4.7μH/3.1A
C5	82μF/100V
CY1/CY2	100pF/400VAC
CY3/CY4	2200pF/400VAC

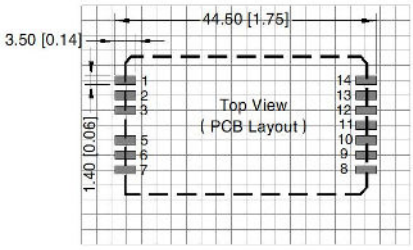
3. The products do not support parallel connection of their output

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

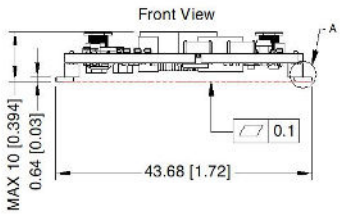
CUWF24_JT-6WR3 Dimensions and Recommended Layout

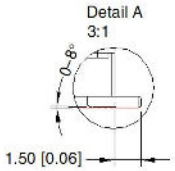
THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm





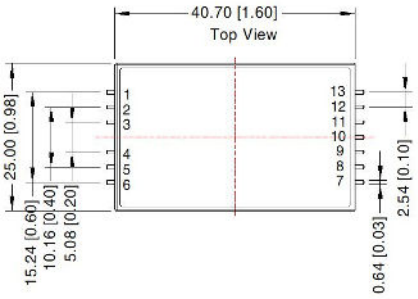
Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]

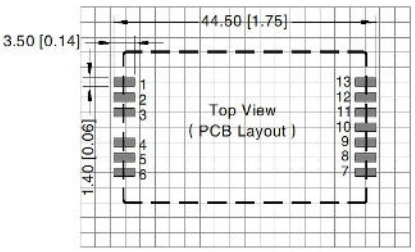
Pin-Out			
Pin	Mark	Pin	Mark
1	Vin	9	NC
2	Vin	10	–Vo
3	Vin	11	–Vo
5	GND	12	NC
6	GND	13	+Vo
7	GND	14	+Vo
8	NC		

NC: Pin to be isolated circuitry

CUW24_JYT-6WR3 Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





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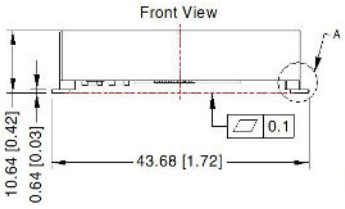

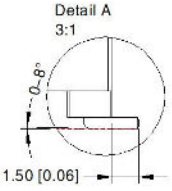

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10[± 0.004]
General tolerances: ± 0.50[± 0.020]

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:

1. For additional information on Product Packaging please refer to 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 Ta=25℃, 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.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Huangpu District, Guangzhou, P. R. China
Tel: 86-20-38601850 Fax: 86-20-38601272 E-mail: info@mornsun.cn www.mornsun-power.com