

6W isolated DC-DC converter in DIP package with Automotive Input and Regulated Single Output



Patent Protection RoHS

FEATURES

- Automotive input voltage range
- High efficiency up to 85%
- No-load power consumption as low as 0.06W
- I/O isolation test voltage 1.5k VDC
- Input under-voltage protection, output short-circuit protection, over-current and over-voltage protection
- Operating ambient temperature range -40°C to +105°C
- EMI meets automotive standards EN55025/CISPR 25 standard level 3
- Industry standard pin-out
- Production process meets IATF16949 system requirements

CUWB_YMD-6WR3 series are isolated 6W DC-DC products with automotive input voltage range. They feature efficiencies up to 85%, 1500VDC input to output isolation, operating temperature of -40°C to +105°C, input under-voltage protection, output over-voltage, over-current, short circuit protection. They meet level 3 of EN55025/CISPR 25 EMI standards and they are widely used in applications such as automobile electronic, industrial control, electric power, instruments and communication fields.

Selection Guide

Certification	Part No.	Input Voltage (VDC)		Voltage (VDC)	Output		Full Load Efficiency (%)Min./Typ.	Capacitive Load (µF) Max.	
		Nominal (Range)	Max. ^①		Current (mA)Max./Min.				
						4.5≤Vin<6			6≤Vin≤36
--	CUWB1203YMD-6WR3	12 (4.5-36)	40	3.3	900/0	1500/0	77/79	1800	
	CUWB1205YMD-6WR3			5	720/0	1200/0	81/83	1000	
	CUWB1212YMD-6WR3			12	300/0	500/0	83/85	470	
	CUWB1215YMD-6WR3			15	240/0	400/0	83/85	220	
	CUWB1224YMD-6WR3			24	150/0	250/0	83/85	100	

Notes:

① Absolute maximum stress rating without damage (not recommended);

② We suggest to connect an external electrolytic capacitor if there is a spike voltage at the input, details please refer to typical application circuit.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Input Current (full load / no-load)	12VDC nominal input series, nominal input voltage	3.3V output	--	522/5	536/12	mA
		5V, 12V, 15V output	--	602/5	617/12	
		24V output	--	588/10	602/15	
Reflected Ripple Current	Nominal input voltage	--	20	--		
Surge Voltage (1sec. max.)	12VDC nominal input series	-0.7	--	50	VDC	
Start-up Voltage	12VDC nominal input series	--	--	4.5		
Input Under-voltage Protection	12VDC nominal input series	3	3.5	--		
Input Filter		PI filter				
Hot Plug		Unavailable				

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Voltage Accuracy	0% -100% load	--	±1	±2	%
Linear Regulation	Input voltage variation from low to high at full load	--	±0.2	±0.5	
Load Regulation ^①	5% -100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change, nominal input voltage	--	300	500	µs
Transient Response Deviation		3.3V/ 5V output	--	±5	±8

Transient Response Deviation	25% load step change, nominal input voltage	Others	--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise ^②	20MHz bandwidth, 5% -100% load		--	60	85	mV p-p
Over-voltage Protection	Input voltage range		110	--	160	%Vo
Over-current Protection ^③	Input voltage range	4.5≤Vin<24	110	185	260	%Io
		24≤Vin≤36	190	245	300	
Short-circuit Protection	Input voltage range		Continuous, self-recovery			

Notes:
 ①When testing from 0% -100% load working conditions, load regulation index is ±5%.
 ②The "parallel cable" method is used for Ripple and noise test, please refer to DC-DC Converter Application Notes for specific information. Ripple & Noise at <5% load is 5%Vo max.
 ③Over-current protection all tested at full load with input range of 6V-36V.

General Specification

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric Strength Test for 1 minute with a leakage current of 1mA max.	1500	--	--	VDC
	Input - case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1000	--	--	
	Output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.				
Insulation Resistance	Input-output resistance at 500VDC	100	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig. 1	-40	--	+105	°C
Storage Humidity	Non-condensing	5	--	95	%RH
Storage Temperature		-55	--	+125	°C
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	
Vibration		10-1000Hz, 10G, 1.0mm, 2h			
Switching Frequency *	PWM mode	--	270	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

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	Aluminum alloy
Dimensions	25.40 x 25.40 x 11.70 mm
Weight	14.0g (Typ.)
Cooling method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS A (without external components)	
		CISPR25/EN55025	CLASS 3 (see Fig.3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (without external components)	
		CISPR25/EN55025	CLASS 3 (see Fig.3-② for recommended circuit)	
Immunity	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	line to line ±2KV (see Fig.3-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

Typical Performance Curves

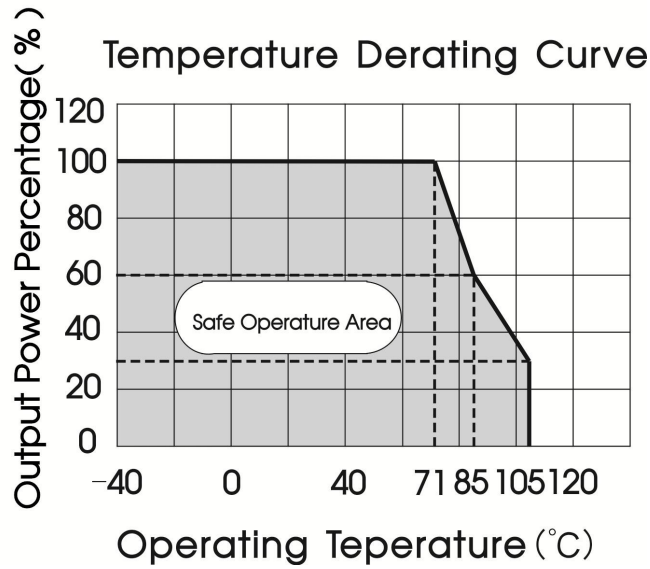
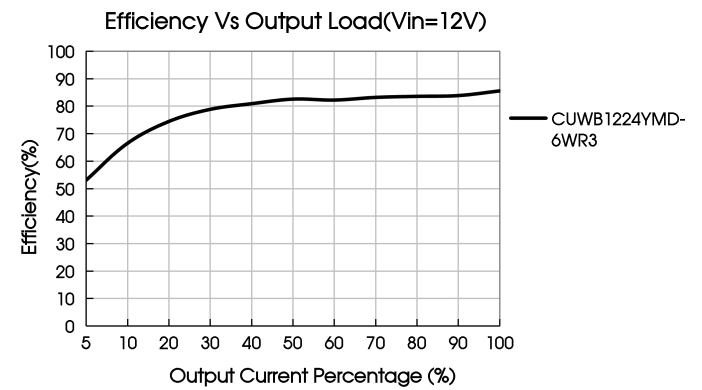
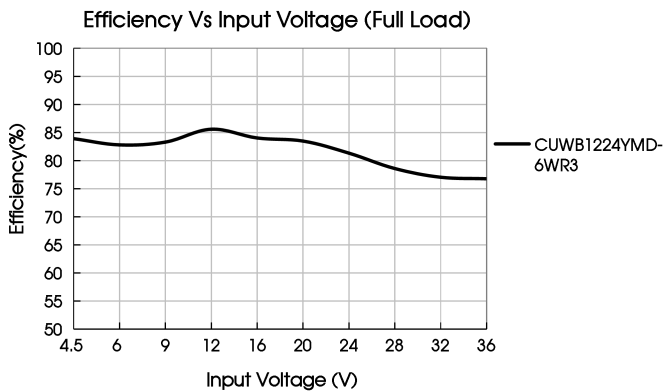
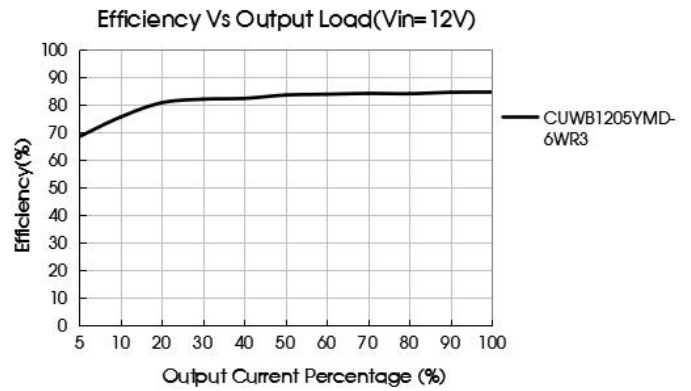
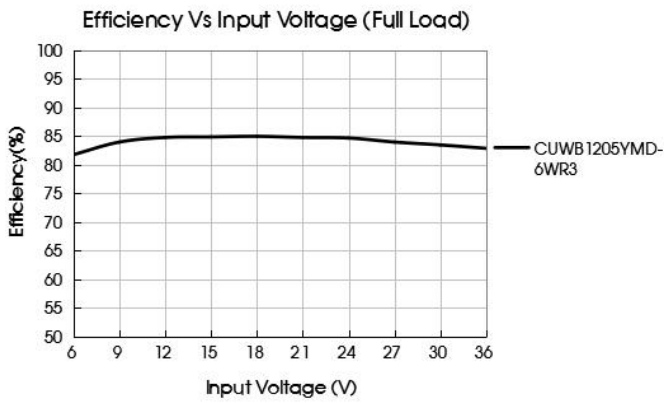


Fig. 1



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

$V_{in}(VDC)$	$C_{in}(\mu F)$	$C_{out}(\mu F)$
12	100	10

2. EMC compliance recommended circuit

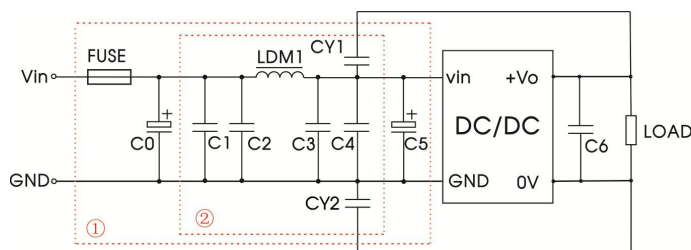


Fig. 3

Note: For EMC tests we use part ① in Fig. 3 for Immunity and part ② for Emissions test.

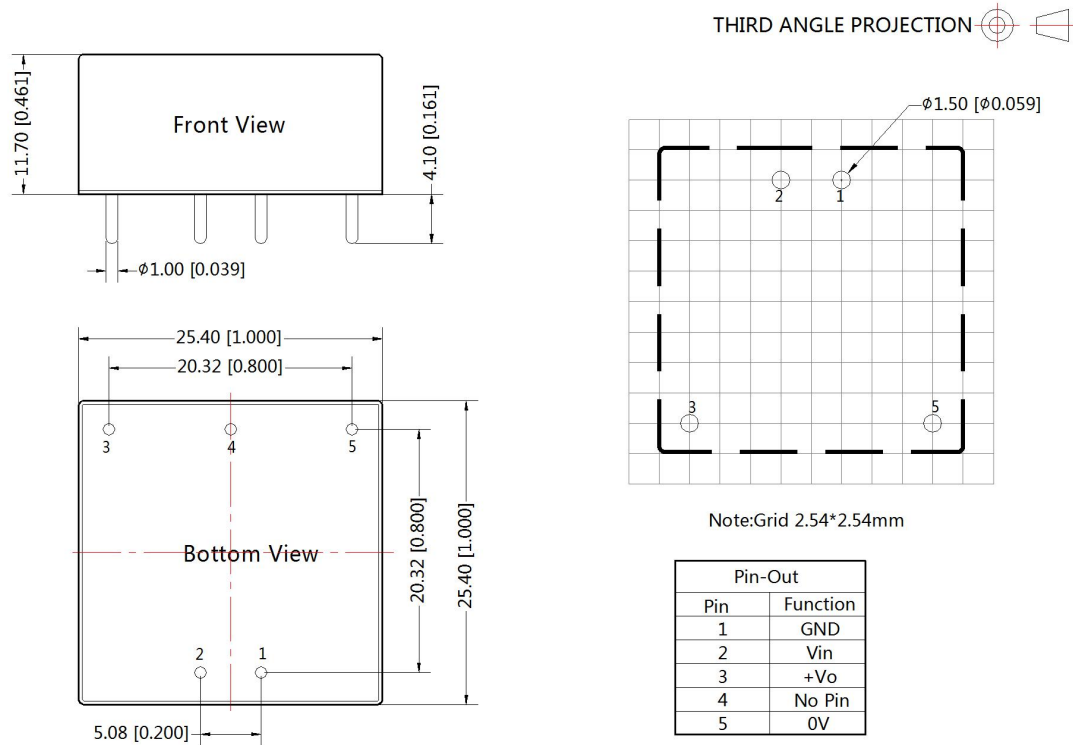
Parameter description:

Model	$V_{in}: 12V$
FUSE	Select FUSE value according to actual input current
C0, C5	470 μF /50V
C1, C2, C3, C4	10 μF /50V
C6	Refer to the C_{out} in Fig.2
LCM1	10 μH
CY1, CY2	1nF/2KV

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

Dimensions and Recommended Layout



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

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210003;
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 our company's 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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