10W, ultra wide input isolated & regulated single output DC-DC converter

Patent Protection RoHS

FEATURES

- Wide range of input voltage (4:1)
- Efficiency up to 86%
- Isolation voltage :1.5K VDC
- Operating temperature range: -40℃ to +85℃
- Output over-voltage protection, Short circuit protection
- Low ripple & noise
- A2S (wring mounting) and A4S (35mm rail mounting) products featuring anti-reverse connection for input
- Meet EN60950, EN50155
- International standard pin-out

URB1D_XD-10W series are isolated 10W DC-DC products with 4:1 input voltage .They feature efficiency up to 86%, 1500VDC isolation, operating temperature of -40℃ ~+85℃ , output over-voltage protection, short-circuit protection. It offers good EMC performance, meet EN60950 and EN50155 standards. All models are particularly suited to railway etc.c. And extension package A2S and A4S also enable them with reverse voltage protection.

Selection Guide

certification	Part No.①	Input Voltage (VDC)		Output		Efficiency ③(%,Min./Typ.) @ Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Max.②	Output Voltage (VDC)	Output Current (mA) (Max./Min.)		
EN60950 EN50155	URB1D05XD-10W	40-160 (110)	170	5	2000/100	79/81	2200
	URB1D12XD-10W			12	833/42	83/85	220
	URB1D15XD-10W			15	667/33	83/85	100
	URB1D24XD-10W			24	416/21	84/86	47

Note:
①series with suffix "A2S" are chassis mounting, with suffix "A4S" are DIN-Rail mounting, for example URB1D05XD-10WA2S is chassis mounting , URB1D05XD-10WA4S is DIN-Rail mounting;
②Absolute maximum rating without damage on the converter, but it isn't recommended;
③The efficiency of "A2S" and "A4S" is approx. 2% lower for the protection of inverse polarity.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)		--	113/3	115/5	mA
Reflected Ripple Current		--	30	--	
Input impulse Voltage (1sec. max.)		-0.7	--	180	VDC
Starting Voltage		--	--	40	
Input Filter		Pi filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±2	%
Line Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5	
Load Regulation	5%-100% load	--	±0.5	±1	
Transient Recovery Time	25% load step change	--	500	1000	μs
Transient Response Deviation		--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/℃
Ripple & Noise*	20MHz bandwidth	--	60	100	mV p-p
Over-voltage Protection	Input voltage range	110	120	140	%Vo

MORNSUN Guangzhou Science & Technology Co., Ltd. reserves the copyright and right of final interpretation

Short circuit Protection		Continuous

Note: * Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Insulation Voltage	Input-output, with the test time of 1 minute and the leak current lower than 1mA.	1500	--	--	VDC
Insulation Resistance	Input-output, insulation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	Derating when operating temperature up to 71℃, (see Fig.1)	-40	--	85	℃
Storage Temperature		-55	--	125	
Storage Humidity	Non-condensing	5	--	95	%
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds.	--	--	300	℃
Vibration		5-150Hz, Displacement range: 7.5mm, Acceleration: 2G			
Switching Frequency	PWM Mode	--	350	--	KHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K hours

Physical Specifications

Casing Material		Aluminum alloy
Dimensions	Horizontal package	50.80*25.40*11.80 mm
	A2S wiring package	76.00*31.50*21.20 mm
	A4S rail package	76.00*31.50*25.80 mm
Weight	Horizontal package/A2S wiring package/A4S rail package	22g/44g/64g (Typ.)
Cooling Methods		Free air convection

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS B (see Fig.3 for recommended circuit)	
	RE	CISPR22/EN55022	CLASS B (see Fig.3 for recommended circuit)	
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
	Surge	IEC/EN61000-4-5	±2KV/±4KV (see Fig.3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-29	0-70%	perf. Criteria B

Product Characteristic Curve

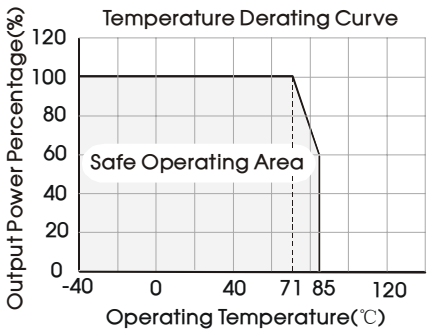
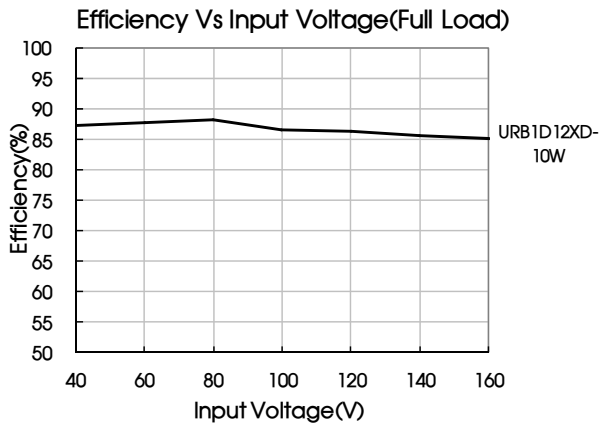
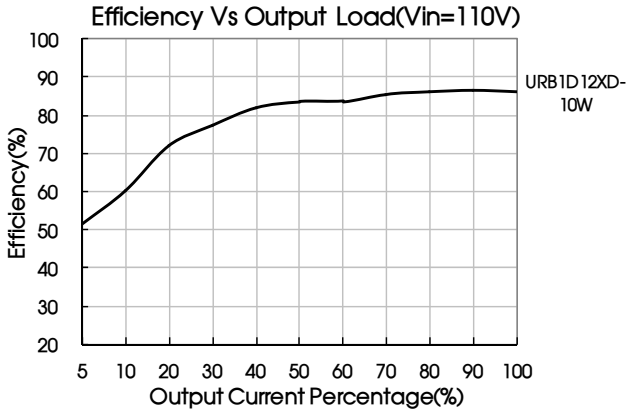


Fig. 1

MORNSUN Guangzhou Science & Technology Co., Ltd. reserves the copyright and right of final interpretation





Design Reference

1. Typical application

All the DC/DC converters of this series are tested according to the recommended circuit (see Fig. 2) before delivery.
If a further decrease of the input and output ripple is required, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance，and ensure the capacitance should be lower than the max. capacitive load of the product.

Fig. 2

Cin	Cout
10μF -47μF	10μF

2. EMC solution-recommended circuit

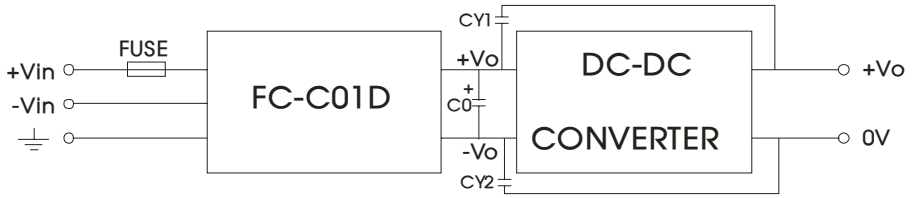


Fig. 3

FC-C01D is the EMC auxiliary component of our company. Input voltage range: 40V-160V;
FUSE: Choose according to customer actual input current;
C0: Recommend to use 100uF/200V electrolytic capacitor;
CY1\CY2:1nF /2KV.

EMC solution-recommended circuit PCB layout

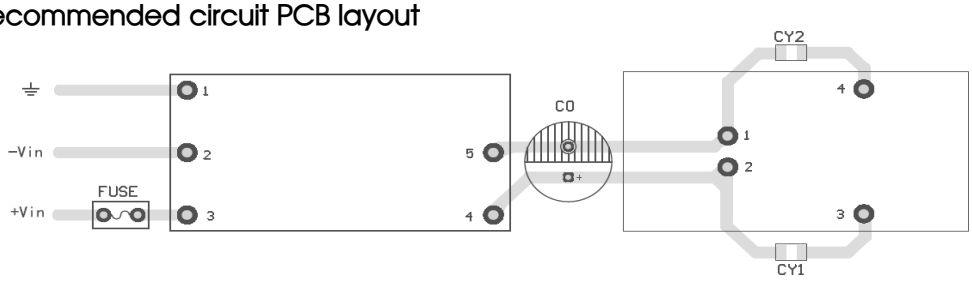


Fig. 4

Note: the min. distance of the bonding pads between input & output isolation capacitors (CY1/CY2) shall be ⩾ 2mm.

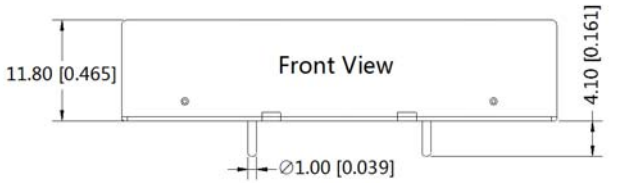
3. It is not allowed to connect modules output in parallel to enlarge the power。

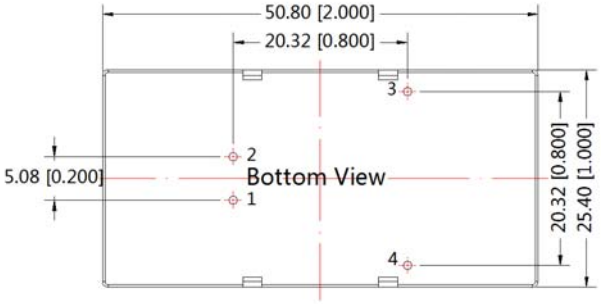
4. For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

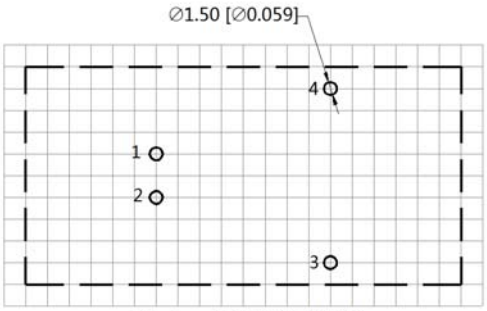
MORNSUN Guangzhou Science & Technology Co., Ltd. reserves the copyright and right of final interpretation

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION







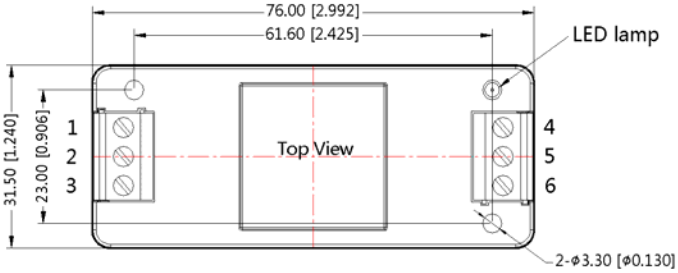
Note : Grid 2.54*2.54mm

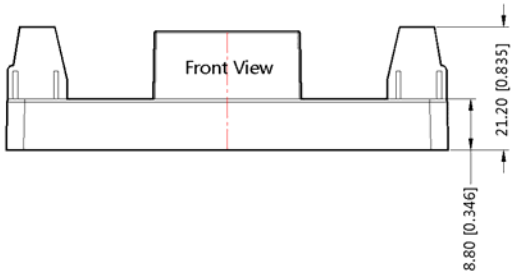
Pin-Out	
Pin	Function
1	GND
2	Vin
3	+Vo
4	0V

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

URB1D_XD-10WA2S Wiring Package

THIRD ANGLE PROJECTION





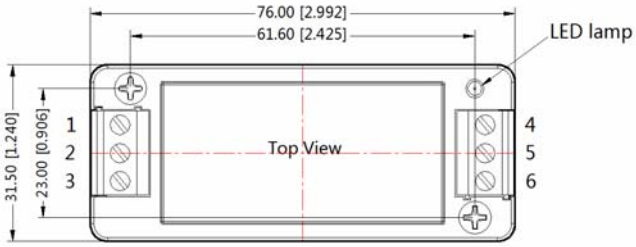
Pin-Out						
Pin	1	2	3	4	5	6
Single	NC	GND	Vin	0V	NC	+Vo

Note:
Unit:mm[inch]
Wire range:24~12 AWG
General tolerances:±0.50[±0.020]

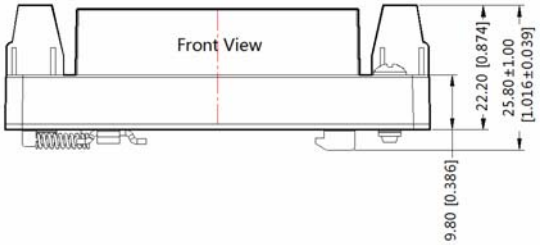
MORNSUN Guangzhou Science & Technology Co., Ltd. reserves the copyright and right of final interpretation

URB1D_XD-10WA4S Rail Package

THIRD ANGLE PROJECTION



Pin-Out						
Pin	1	2	3	4	5	6
Function	NC	GND	Vin	0V	NC	+Vo



Note:
Unit:mm[inch]
Wire range : 24~12 AWG
General tolerances:±0.50[±0.020]

Note:

1. Packing Information please refer to 'Product Packing Information'. The Packing bag number of Horizontal package : 58200035, the Packing bag number of A2S/A4S package:58220022;
2. Recommend to use module with more than 5% load, if not, the ripple of the product may exceeds the specification, but does not affect the reliability of the product;
3. The max. capacitive load should be tested within the input voltage range and under full load conditions;
4. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25℃, humidity<75% when inputting nominal voltage and outputting rated load;
5. All index testing methods in this datasheet are based on our Company's corporate standards;
6. The performance indexes of the product models listed in this datasheet are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact our technicians for specific information;
7. We can provide product customization service;
8. Specifications of this product are subject to changes without prior notice.

Mornsun Guangzhou Science & Technology Co., Ltd.
Address: No. 5, Kehui St. 1, Kehui Development Center, Science Ave., Guangzhou Science City, Luogang District, Guangzhou, P. R. China
Tel: 86-20-38601850-8801 Fax: 86-20-38601272 E-mail: info@mornsun.cn

MORNSUN Guangzhou Science & Technology Co., Ltd. reserves the copyright and right of final interpretation