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

Patent Protection RoHS CE

FEATURES

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

The URB1D_XD-10W series offer 10W of output, with 4:1 wide input voltage of 40-160VDC .It is suitable for 72 V, 96 V, 110 V standard input of the bus voltage,single output and 1500VDC isolation, over voltage and short-circuit protection.It offers good EMC performance,meet EN60950 and EN50155 standards.All models are particularly suited to railway etc.c.

Selection Guide

Part No.①	Input Voltage (VDC)		Output		Efficiency ③(%,Typ.) @ Full Load	Max. Capacitive Load (μF)	certification
	Nominal (Range)	Max.②	Output Voltage (VDC)	Output Current (mA) (Max./Min.)			
URB1D05XD-10W	40-160 (110)	170	5	2000/100	81	2200	CE
URB1D12XD-10W			12	833/42	85	220	
URB1D15XD-10W			15	667/33	85	100	
URB1D24XD-10W			24	416/21	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 impulse Voltage (1sec. max.)		-0.7	--	180	VDC
Starting Voltage		--	--	40	
Input Filter		Pi filter			

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 Drift Coefficient	Full load	--	--	±0.03	%/℃
Ripple*	20MHz bandwidth	--	15	30	mV p-p
Noise*		--	60	100	
Output Over-voltage Protection	Input voltage range	110	120	140	%Vo
Output Short circuit Protection		Continuous, self-recovery			

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	%
Max. Operating Temperature for Casing	Within the operating temperature curve	--	--	105	℃
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
Package 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	Conducted disturbance	CISPR22/EN55022	CLASS B (see Fig.3 for recommended circuit)	
	Radiated emission	CISPR22/EN55022	CLASS B (see Fig.3 for recommended circuit)	
EMS	Electrostatic discharge	IEC/EN61000-4-2	Contact ±6KV	perf. Criteria B
	Radiation immunity	IEC/EN61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV	perf. Criteria B
	Surge immunity	IEC/EN61000-4-5	±2KV/±4KV (see Fig.3 for recommended circuit)	perf. Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6	3 Vr.m.s	perf. Criteria A
	Immunities of voltage dip, drop and short interruption	IEC/EN61000-4-29	0-70%	perf. Criteria B

Product Characteristic Curve

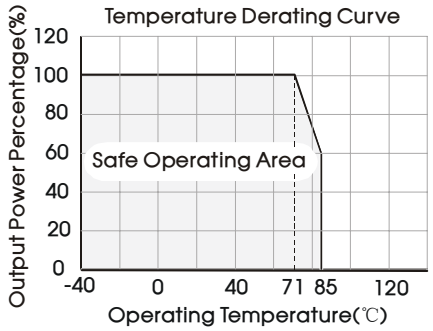
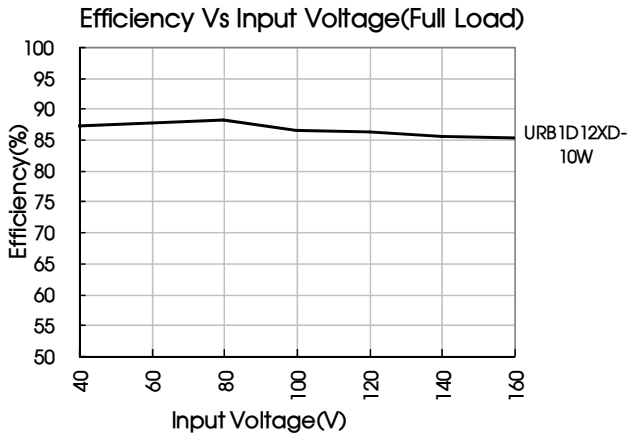
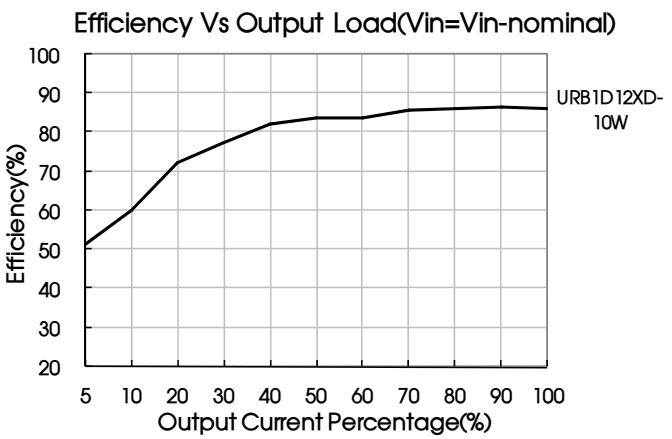


Fig. 1





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 it is required to further reduce input and output ripple, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance provided that the capacitance is no larger than the max. capacitive load of the product.

Fig. 2

Cin	Cout
10μF -47μF	10μF

2. EMC solution-recommended circuit

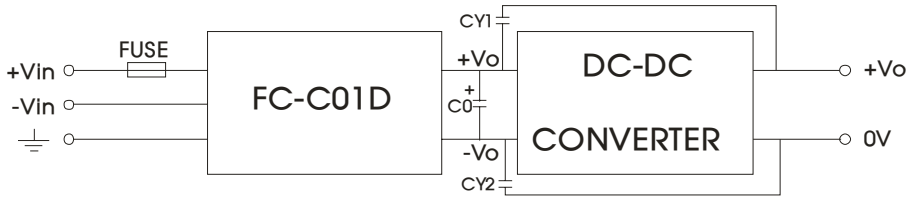


Fig. 3

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; It is used to suppress voltage dips, is not designed without requirement of the application;
CY1\CY2:1nF /2KV.

EMC solution-recommended circuit PCB layout

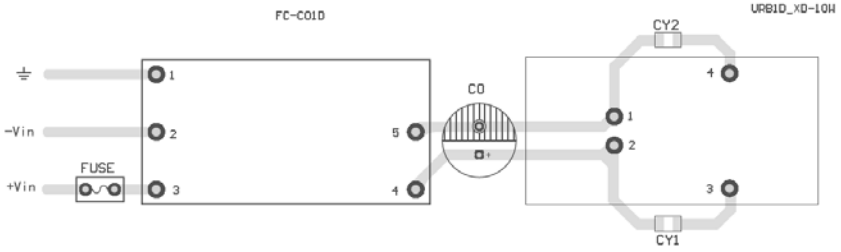


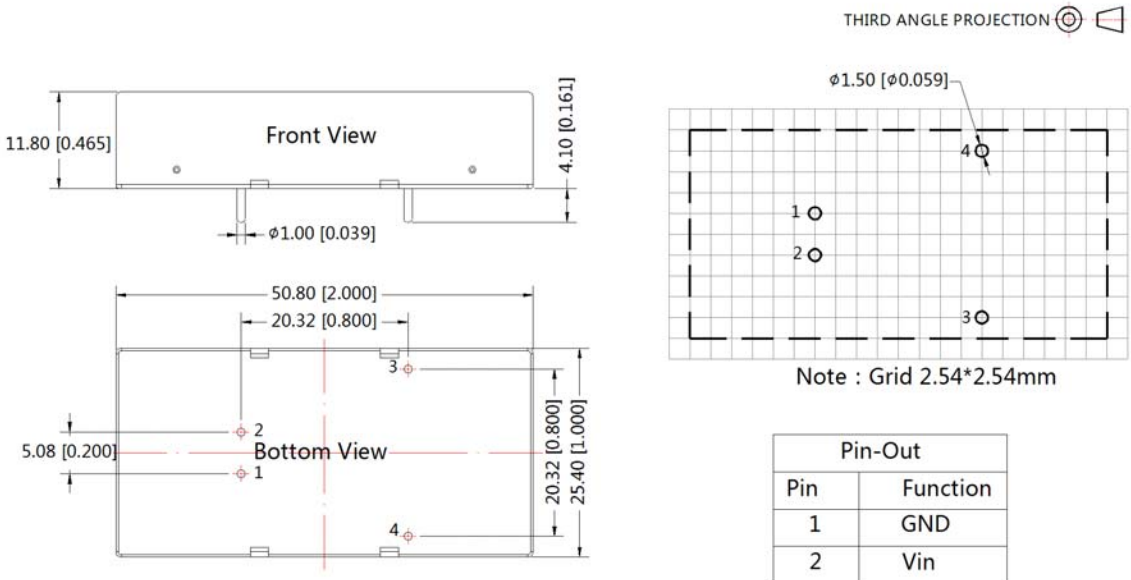
Fig. 4

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

3. The product does not support output in parallel with power per liter or hot-plug use

4. For more information please find the application notes on www.mornsun-power.com

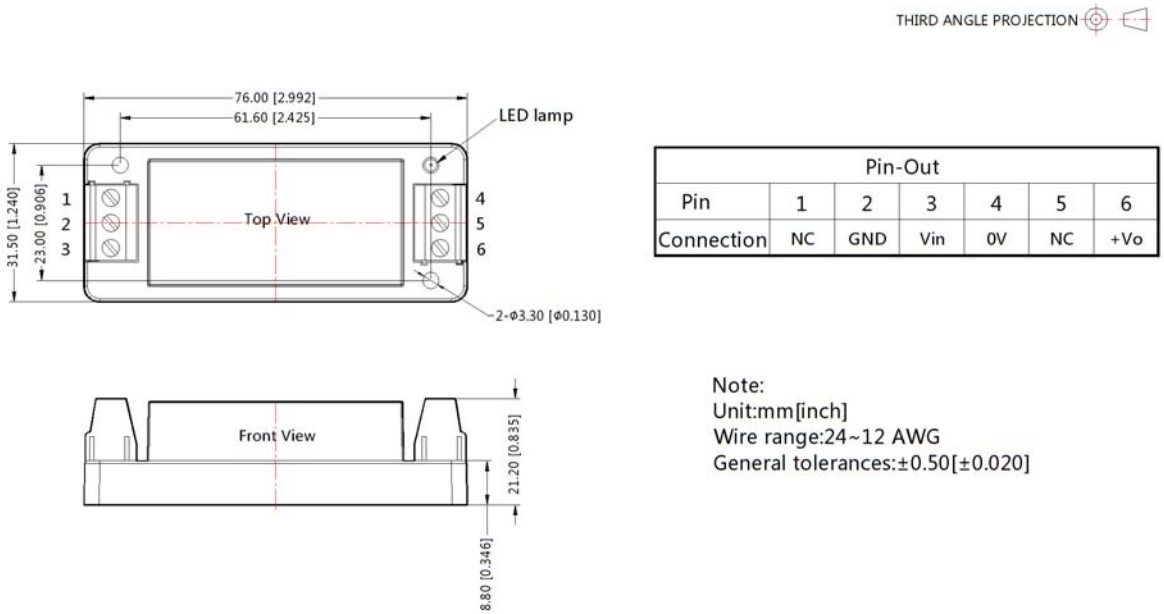
Dimensions and Recommended Layout



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

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
Pin height tolerances :±0.50[±0.020]
General tolerances:±0.30[±0.012]

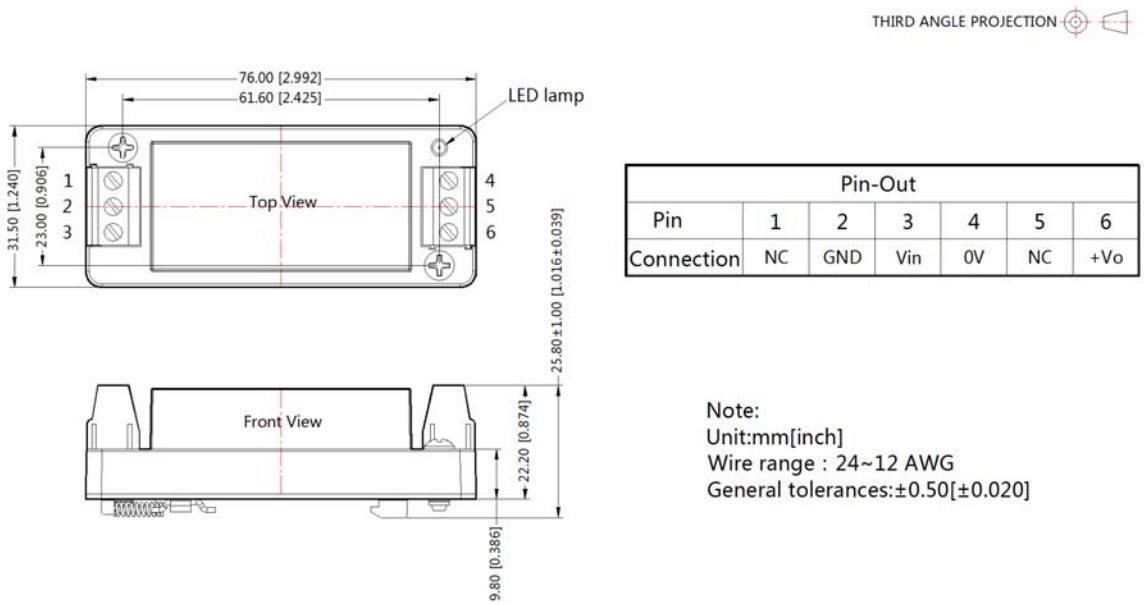
URB1D_XD-10WA2S Wiring Package



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

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

URB1D_XD-10WA4S Rail Package



Pin-Out						
Pin	1	2	3	4	5	6
Connection	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. The min. load shall be no lower than 5%, or the output ripple may increase rapidly; If the product is operated under the min. required load, the product performance cannot be guaranteed to comply with all performance indexes in the Manual, but the reliability of the product will not be influenced;
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.

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