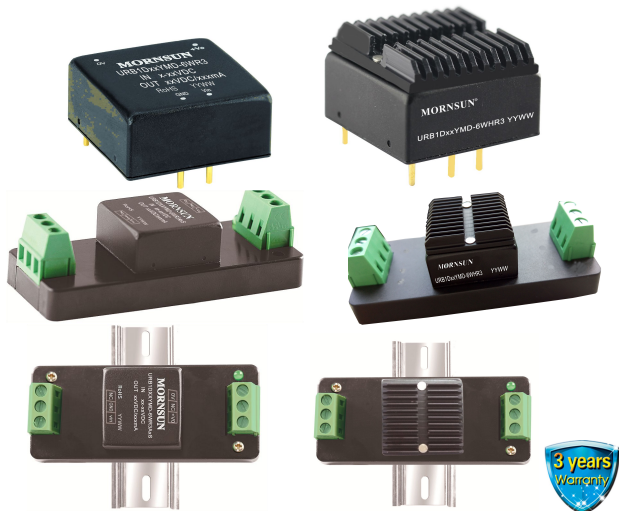


6W, ultra wide input isolated & regulated single output DC-DC converter



RoHS Patent Protection

URB1D_YMD-6WR3 series are isolated 6W DC-DC products with 40-160VDC input voltage. They feature efficiency up to 86%, 2250VDC isolation, operating temperature of -40 °C to +85 °C, Input Under-voltage Protection, Output short circuit, over-current, over-voltage protection. Railway vehicle electronic equipment widely used in 72V, 96V and 110V.

FEATURES

- Ultra wide input voltage range (4:1)
- High efficiency up to 86%
- Isolation voltage :2250 VDC
- Operating temperature range: -40°C to +85°C
- Input Under-voltage Protection, Output short circuit, over-current, over-voltage protection
- Low ripple & noise
- Reverse voltage protection available with A2S(Chassis mounting) or A4S(35mm DIN-Rail mounting)
- Meets requirements of railway standard EN50155
- International standard pin-out

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.)		
-	URB1D05YMD-6WR3	110 (40-160)	170	5	1200/0	78/80	1000
	URB1D12YMD-6WR3			12	500/0	82/84	470
	URB1D15YMD-6WR3			15	400/0	83/85	220
	URB1D24YMD-6WR3			24	250/0	84/86	100

Note:

- ① Series with suffix "H" are heat sink mounting; series with suffix "A2S" are chassis mounting, with suffix "A4S" are DIN-Rail mounting, for example URB1D05YMD-6WHR3A2S is chassis mounting of with heat sink, URB1D05YMD-6WR3A4S is DIN-Rail mounting of without heat sink; If the application has a higher requirement for heat dissipation, you can choose modules with heat sink;
- ② Absolute maximum rating without damage on the converter, but it isn't recommended;
- ③ Efficiency is measured in nominal input voltage and rated output load; A2S (wiring) and A4S (rail) Model due to input reverse polarity protection, minimum efficiency greater than Min.-2 is qualified.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	Nominal input voltage	--	67/3	70/8	mA
Reflected Ripple Current	Nominal input voltage	--	25	--	
Surge Voltage (1sec. max.)		-0.7	--	180	VDC
Starting Voltage		--	--	40	
Shutdown Voltage		28	33	--	
Starting Time	Nominal input voltage & constant resistance load	--	10	--	ms
Input Filter		PI filter			
Hot Plug		Unavailable			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Output Voltage Accuracy		--	±1	±3	%	
Line Regulation	Full load, the input voltage is from low voltage to high voltage	--	±0.2	±0.5		
Load Regulation	0%-100% load	--	±0.5	±1		
Transient Recovery Time		--	300	500	μs	
Transient Response Deviation	25% load step change, nominal input voltage	5V output	--	±3	±8	%
		Others	--	±3	±5	

Temperature Coefficient	Full load	--	±0.02	±0.03	%/°C
Ripple & Noise ^①	20MHz bandwidth , 5%-100% load	--	50	100	mV p-p
Over-voltage Protection	Input voltage range	110	--	160	%Vo
Over-current Protection		120	--	210	%Io
Short circuit Protection		Continuous, self-recovery			

Note: ① Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods. 0%-5% load ripple&Noise is no more than 5%Vo.

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.	2250	--	--	VDC
	Input and output respectively on the shell, with the test time of 1 minute and the leak current lower than 1mA.	1600	--	--	
Insulation Resistance	Input-output, isolation voltage 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	see Fig.1	-40	--	+85	°C
Storage Temperature		-55	--	+125	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds.	--	--	+300	
Storage Humidity	Non-condensing	5	--	95	%RH
Vibration		IEC61373 car body 1 B mold			
Switching Frequency *	PWM Mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K hours

* This series of products using reduced frequency technology, the switching frequency is test value of full load. When the load is reduced to below 50%, the switching frequency decreases with decreasing load.

Physical Specifications

Casing Material	Aluminum alloy				
Dimensions	Horizontal package(without heat sink)			25.40*25.40*11.70 mm	
	Horizontal package(with heat sink)			25.40*25.40*16.20 mm	
	A2S wiring package (without heat sink)			76.00*31.50*21.20 mm	
	A2S wiring package(with heat sink)			76.00*31.50*25.20 mm	
	A4S rail package(without heat sink)			76.00*31.50*25.80 mm	
	A4S rail package(with heat sink)			76.00*31.50*29.80 mm	
Weight	without heat sink	Horizontal package/A2S wiring package/A4S rail		15g/35g/54g(Typ.)	
	with heat sink	Horizontal package/A2S wiring package/A4S rail		20g/40g/59g(Typ.)	
Cooling Methods	Free air convection				

EMC Specifications

EMI	CE	CISPR22/EN55022	CLASS B (see Fig.3 or Fig.4 for recommended circuit)		
	RE	CISPR22/EN55022	CLASS B (see Fig.3 or Fig.4 for recommended circuit)		
EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV		perf. Criteria B
	RS	IEC/EN61000-4-3	10V/m		perf. Criteria A
	EFT	IEC/EN61000-4-4	±4KV(see Fig.3 or Fig.4 for recommended circuit)		perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (2Ω 0.5uF see Fig.3 for recommended circuit)		perf. Criteria B
			line to ground ±4KV (12Ω 0.5uF see Fig.3 for recommended circuit)		
		EN50121-3-2	line to line ±1KV (42Ω 0.5uF see Fig.4 for recommended circuit)		perf. Criteria B
CS	IEC/EN61000-4-6	10 Vr.m.s		perf. Criteria A	

Product Characteristic Curve

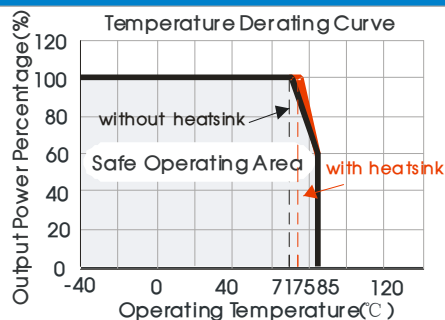
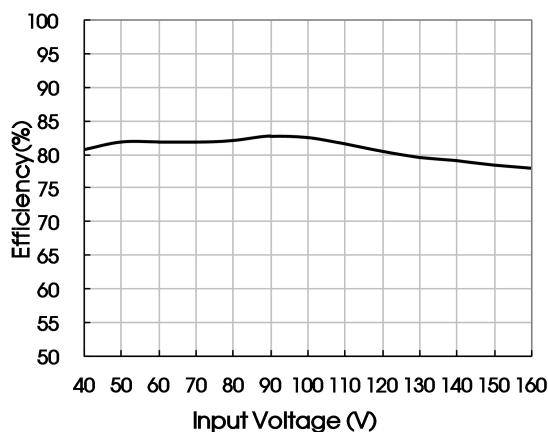


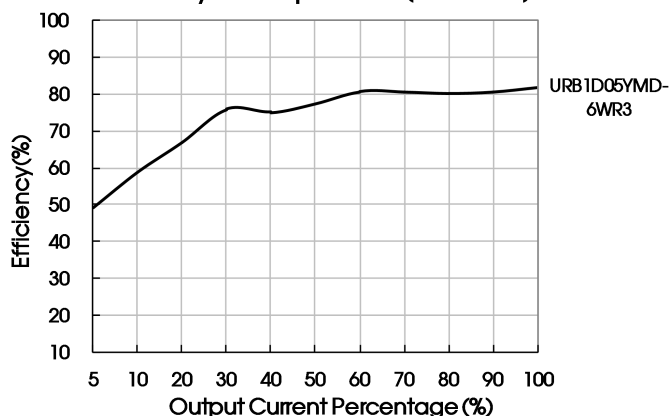
Fig. 1

Efficiency Vs Input Voltage (Full Load)



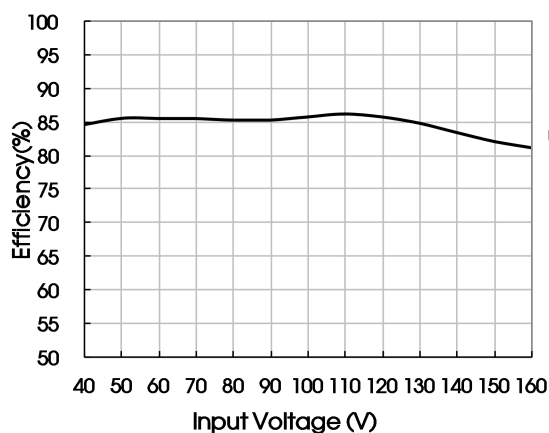
URB1D05YMD-6WR3

Efficiency Vs Output Load (Vin=110V)



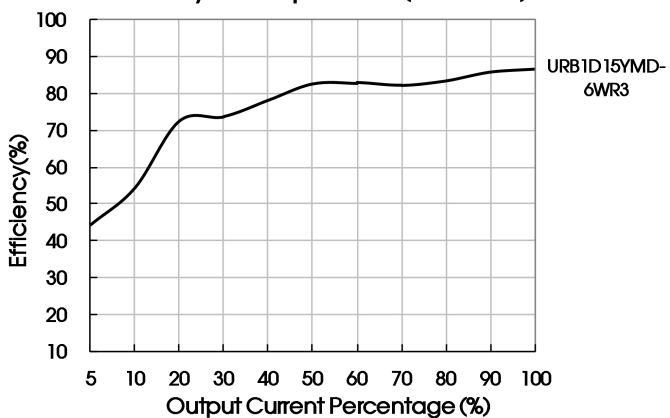
URB1D05YMD-6WR3

Efficiency Vs Input Voltage (Full Load)



URB1D15YMD-6WR3

Efficiency Vs Output Load (Vin=110V)



URB1D15YMD-6WR3

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 C_{in} and C_{out} or select capacitors of low equivalent impedance, and ensure the capacitance should be lower than the max. capacitive load of the product.



Fig. 2

C_{in}	C_{out}
10 μ F -47 μ F	10 μ F

2. EMC solution-recommended circuit

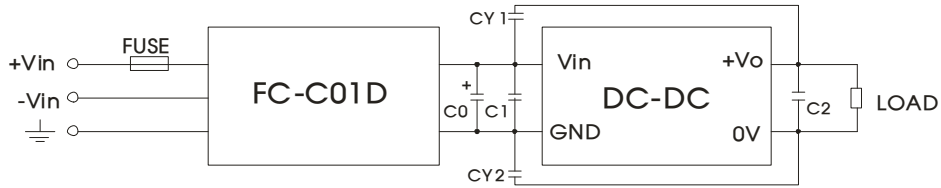


Fig. 3

Fig.3 Parameter description:

FUSE	Choose according to actual input current
FC-CX1D	FC-CX1D is the EMC auxiliary component of our company. Input voltage range: 40V-160V
C0	100μF/200V
C1	Refer to the Cin in Fig.2
C2	Refer to the Cout in Fig.2
CY1、CY2	1nF /3KV

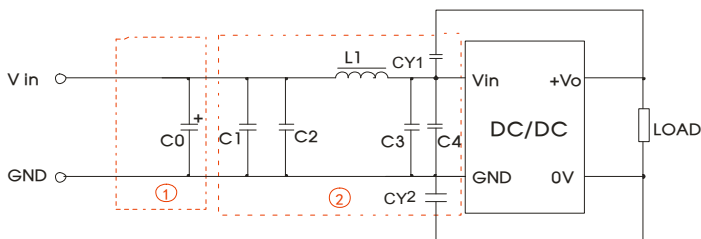


Fig. 4

Fig. 4 Parameter description:

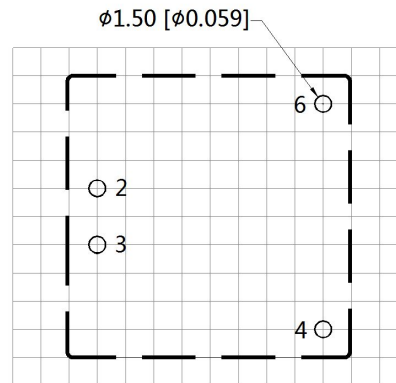
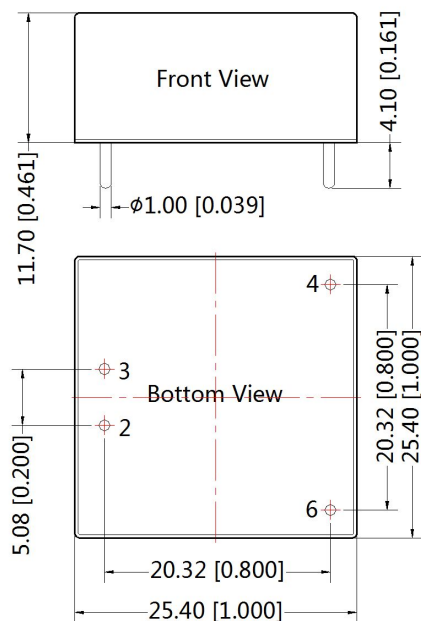
C0	100uF/200V
C1、C2、C3、C4	0.22uF/250V
L1	68 μ H
CY1、CY2	1nF/3KV

Notes: Part ① in the Fig. 4 is used for EMS test and part ② for EMI filtering; selected based on needs.

- It is not allowed to connect modules output in parallel to enlarge the power
- For more information about Mornsun EMC Filter products, please visit www.mornsun-power.com to download the Selection Guide of EMC Filter

Horizontal Package (without heat sink) Dimensions and Recommended Layout

THIRD ANGLE PROJECTION

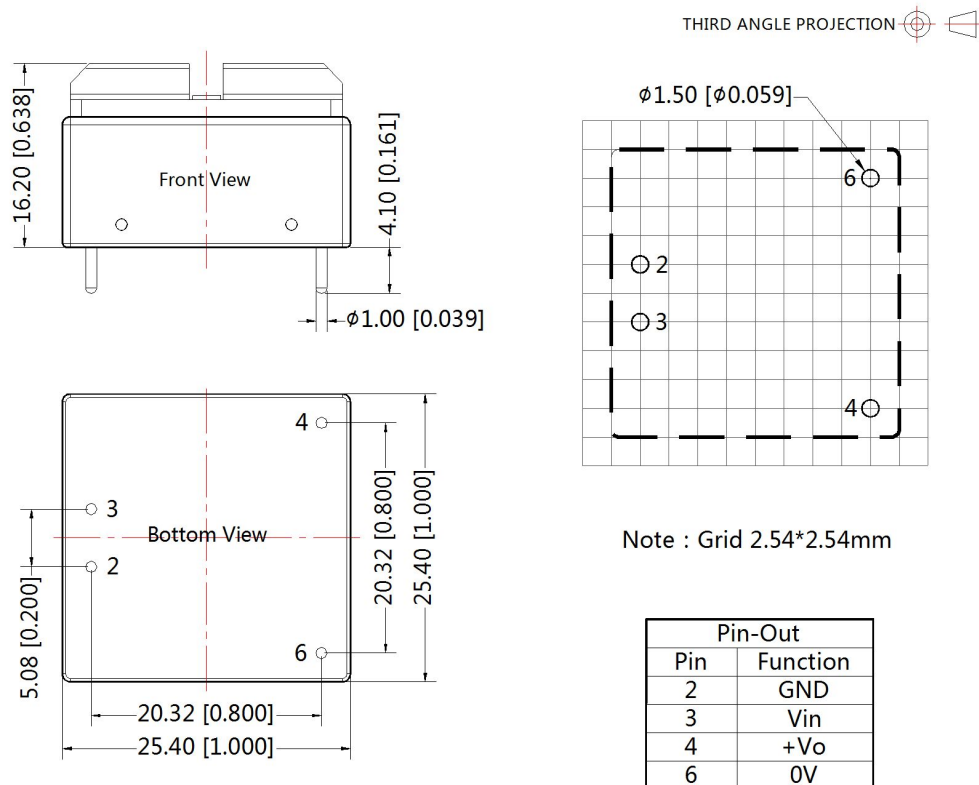


Note: Grid 2.54*2.54mm

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

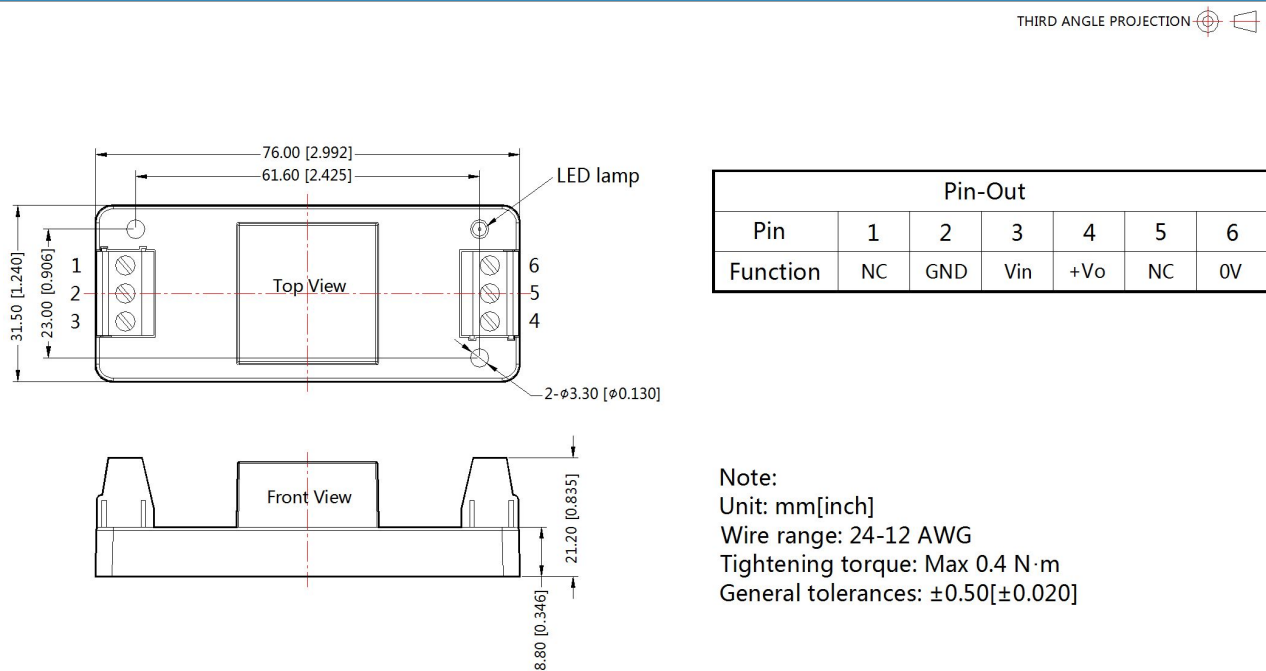
Note:
Unit: mm[inch]
Pin diameter tolerances: $\pm 0.10[\pm 0.004]$
General tolerances: $\pm 0.50[\pm 0.020]$

Horizontal Package (with heat sink) Dimensions



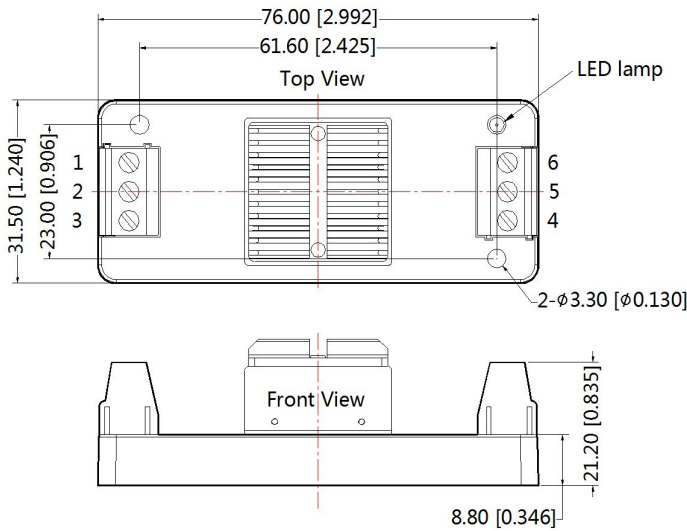
Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances :±0.50[±0.020]

URB1D_YMD-6WR3A2S (without heat sink) Dimensions



URB1D_YMD-6WHR3A2S (with heat sink) Dimensions

THIRD ANGLE PROJECTION 

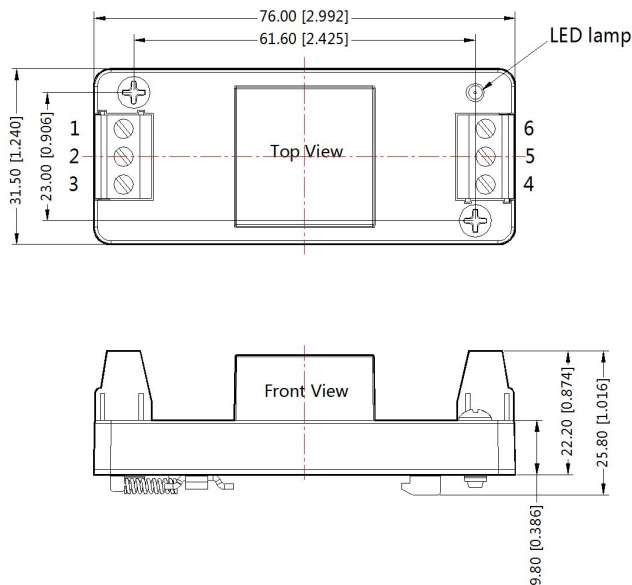


Pin-Out						
Pin	1	2	3	4	5	6
Function	NC	GND	Vin	+Vo	NC	0V

Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

URB1D_YMD-6WR3A4S (without heat sink) Dimensions

THIRD ANGLE PROJECTION 

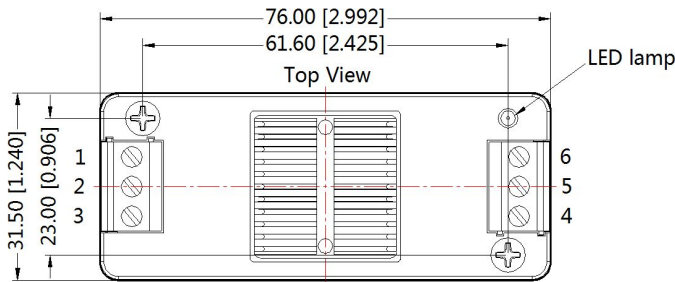


Pin-Out						
Pin	1	2	3	4	5	6
Function	NC	GND	Vin	+Vo	NC	0V

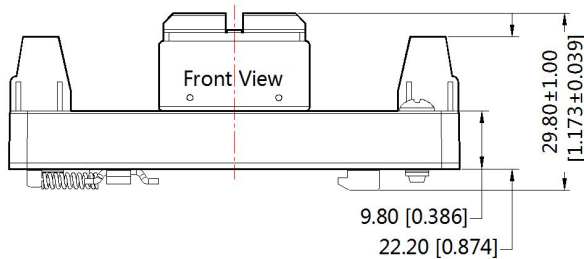
Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

URB1D_YMD-6WHR3A4S(with heat sink) Dimensions

THIRD ANGLE PROJECTION 



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



Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

Note:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com.The Packing bag number of Horizontal package :58210003(without heat sink), 58200048(with heat sink, A2S/ A4S package number: 58220022;
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°C, humidity<75%RH with nominal input voltage and rated output load;
4. Other product application information, please see DC-DC (railway power supply) Converter Application Notes for specific operation methods--2016 Edition.
5. All index testing methods in this datasheet are based on Company's corporate standards;
6. We can provide product customization service, please contact our technicians directly for specific information;
7. Specifications are subject to change without prior notice.

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