FEATURES

1. Ultra-wide 4:1 input voltage range
2. High efficiency up to 85%
3. Reinforced I/O isolation test voltage 2.25k VDC
4. Operating ambient temperature range -40℃ to +85℃
5. Input under-voltage protection, output short circuit, over-current, over–voltage protection
6. Low output ripple & noise
7. EN50121-3-2 & CISPR32/EN55032 CLASS A EMI compliant without external components
8. Designed to meet UL62368/IEC62368 standard
9. Input Reverse Polarity Protection available with Chassis (A2S) or DIN-Rail mounting (A4S) version
10. Industry standard pin-out

RoHS CE 3 years Warranty

Selection Guide

Part No. ①	Input Voltage (VDC)		Output		Full Load Efficiency ③(%) Min./Typ.	Max. Capacitive Load(μF)
	Nominal (Range)	Max.②	Voltage (VDC)	Current (mA) Max./Min.		
ATB1D03LMD-10WR3	110 (40-160)	170	3.3	2400/0	76	5400
ATB1D05LMD-10WR3			5	2000/0	80	5400
ATB1D12LMD-10WR3			12	833/0	84	470
ATB1D15LMD-10WR3			15	667/0	84	330
ATB1D24LMD-10WR3			24	417/0	85	100
ATA1D12LMD-10WR3			±12	±417/0	82/84	470

Note:
①Use "H" suffix for heat sink mounting, "A2S" suffix for chassis mounting and "A4S" suffix for DIN-Rail mounting. We recommend to choose modules with a heat sink for enhanced heat dissipation and applications with extreme temperature requirements;
②Absolute maximum stress rating without damage (not recommended);
③Efficiency is measured at nominal input voltage and rated output load; efficiencies for A2S and A4S Model's is decreased by 2% due to the input reverse polarity protection circuit.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	Nominal input voltage	3.3V output	–	95/3	98/8	mA
		Others	–	110/3	117/8	
Reflected Ripple Current	Nominal input voltage		–	25	–	
Surge Voltage (1sec. max.)			-0.7	–	180	VDC
Start-up Voltage	100% load		–	–	40	
Shut-down Voltage			28	33	–	
Start-up 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
Voltage Accuracy	0%-100% load		–	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load		–	±0.2	±0.5	
Load Regulation	0%-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	–	±3	±8	%
		Others	–	±3	±5	
Temperature Coefficient	Full load		–	±0.02	±0.03	%/°C
Ripple & Noise①	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: ①Ripple & Noise at ＜ 5% load is 5%Vo max. 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 1mA max.	2250	–	–	VDC
	Input/output-case Electric Strength Test for 1 minute with a leakage current of 1mA max.	1600	–	–	
Insulation Resistance	Input-output resistance at 500VDC	1000	–	–	MΩ
Isolation Capacitance	Input-output capacitance at 100KHz/0.1V	–	2200	–	pF
Operating Temperature	See Fig.1	-40	–	+85	°C
Storage Temperature		-55	–	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	–	–	300	
Storage Humidity	Non-condensing	5	–	95	%RH
Vibration		IEC61373 - Category 1, Grade B			
Switching Frequency①	PWM Mode	–	300	–	KHz
MTBF	MIL-HDBK-217F@25℃	1000	–	–	K hours

Note:① 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	Horizontal package (without heat sink)		50.80 ×25.40 ×12.00 mm
	Horizontal package (with heat sink)		51.40 ×26.20 ×16.50 mm
	A2S chassis mounting (without heat sink)		76.00 ×31.50 ×21.20 mm
	A2S chassis mounting (with heat sink)		76.00 ×31.50 ×25.30 mm
	A4S Din-rail mounting (without heat sink)		76.00 ×31.50 ×25.80 mm
	A4S Din-rail mounting (with heat sink)		76.00 ×31.50 ×29.90 mm
Weight	without heat sink	Horizontal package/A2S chassis mounting/A4S Din-rail mounting	26.0g/48.0g/68.0g(Typ.)
	with heat sink	Horizontal package/A2S chassis mounting/A4S Din-rail mounting	34.0g/56.0g/76.0g(Typ.)
Cooling Methods	Free air convection		

EMCSpecifications

Emissions	CE	CISPR32/EN55032	CLASS A (without external components)/ CLASS B (see Fig.3 or Fig.4 for recommended circuit)	
	RE	CISPR32/EN55032	CLASS A (without external components)/ CLASS B (see Fig.3 or Fig.4 for recommended circuit)	
Immunity	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	perf. Criteria B
	RS	IEC/EN61000-4-3	20V/m	perf. Criteria A
	EFT	EN50121-3-2	±2kV 5/50ns 5kHz	perf. Criteria B
	Surge	IEC/EN61000-4-5	line to line ±2KV (2Ω 18uF see Fig.3 for recommended circuit) line to ground ±4KV (12Ω 9uF see Fig.3 for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6	10 Vr.m.s	perf. Criteria A

Typical Characteristic Curves

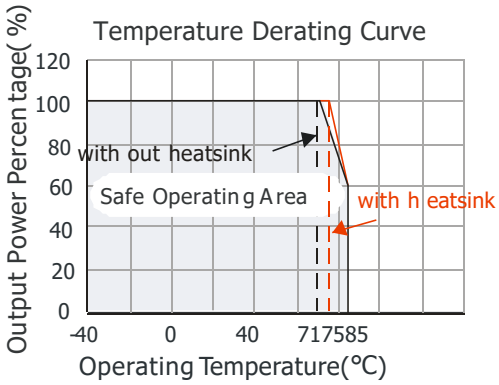
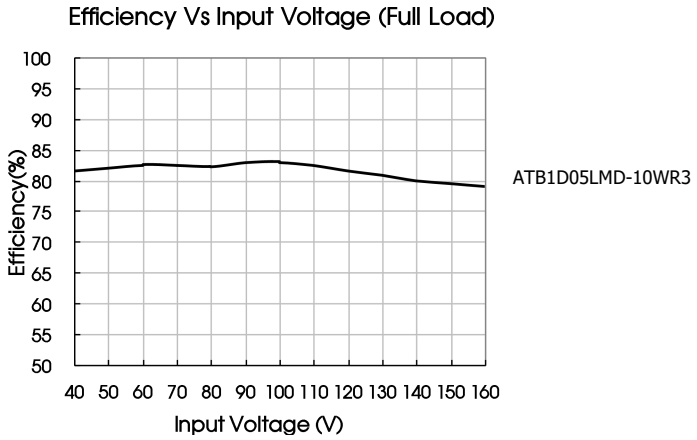
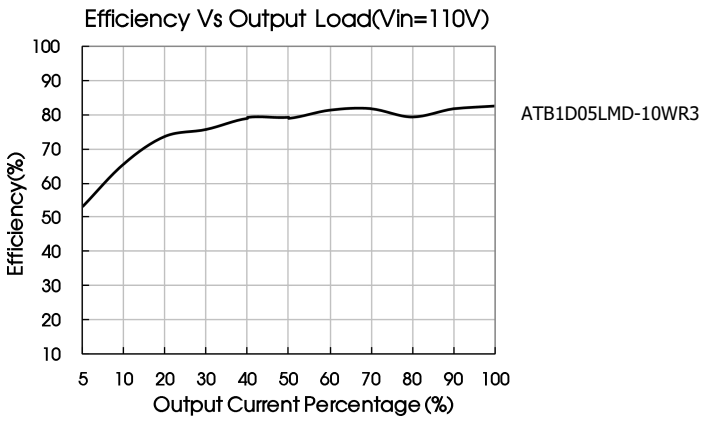
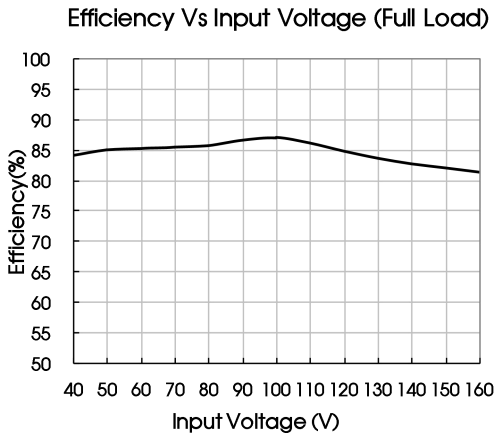
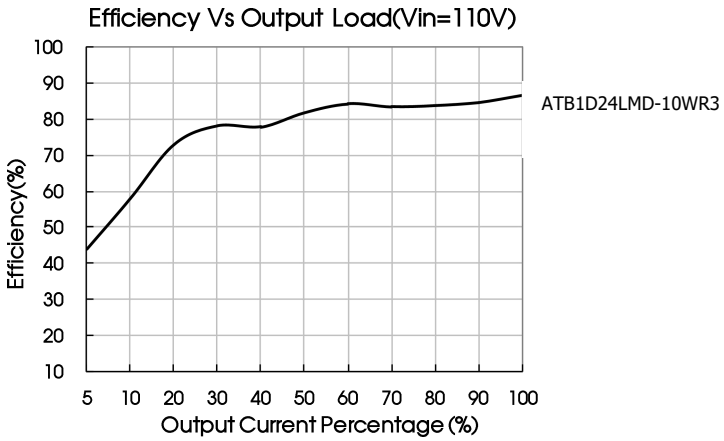


Fig. 1





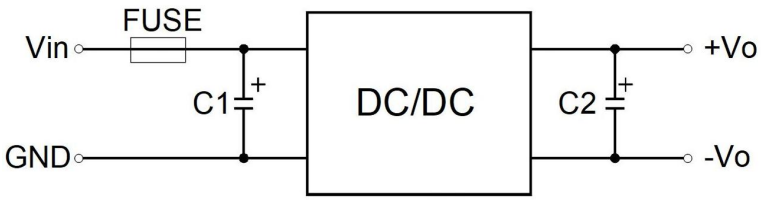




Design Reference

1. Typical application

All the 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 max. capacitive load value of the product.



Vout(VDC)	Fuse	Cin	Cout
3.3/5	2A，slow blow	10μF - 47μF	470μF
12/15			220μF
24/48			100μF

2. EMC compliance circuit

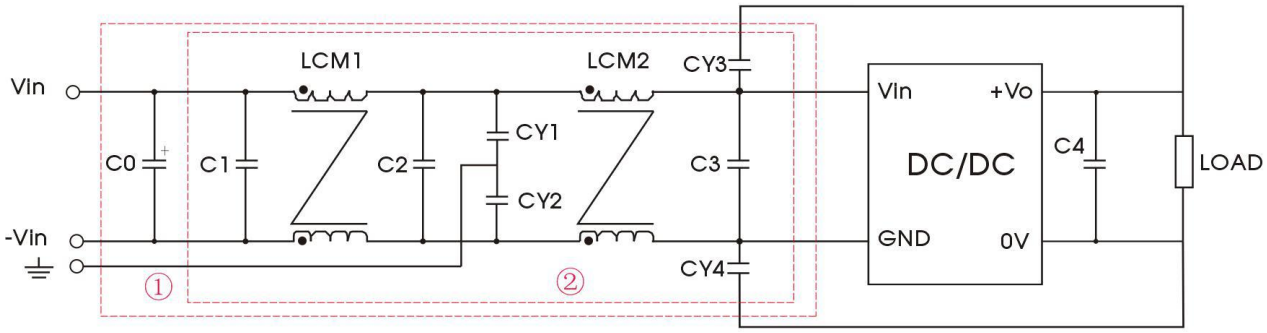


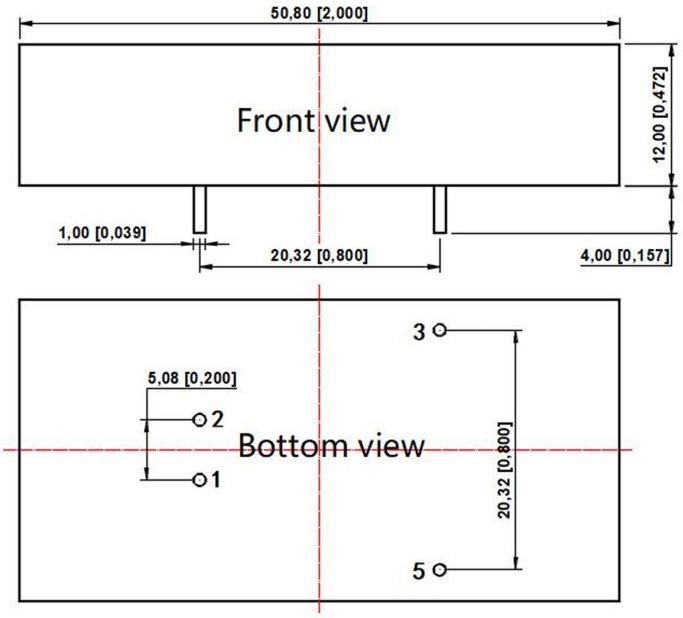
Fig. 3

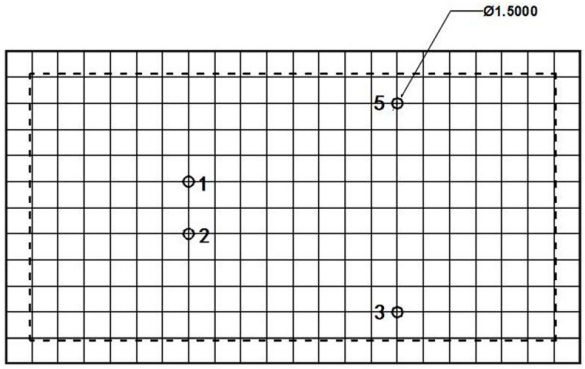
Fig. 3 List of components:

EMI Recommended component parameters	
CO	100μF/200V
C1、C2	0.22μF/250V
C3	Refer to the Cin in Fig.2
LCM1	2.2mH
LCM2	1.1mH
CY1、CY2、CY3、CY4	1000pF/400VAC
C4	Refer to the Cout in Fig.2

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

Horizontal Package (without heat sink) Dimensions and Recommended Layout

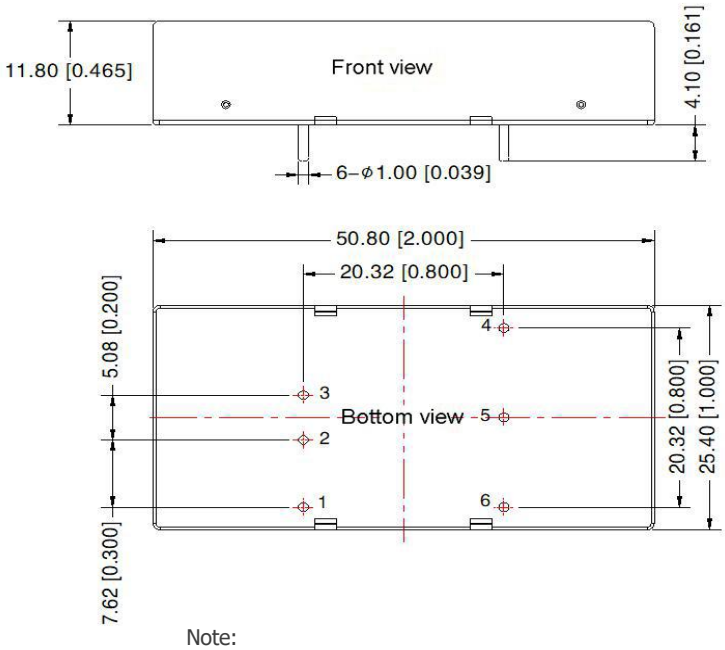




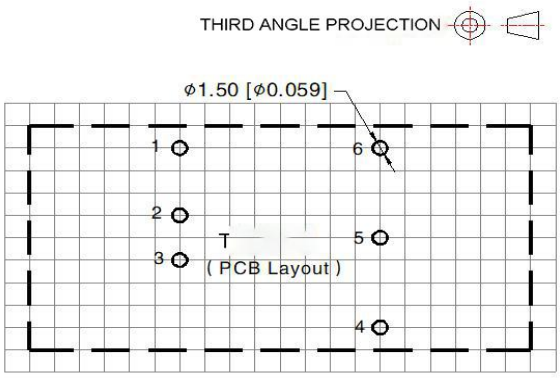
The grid distance is 2.54 x 2.54mm

Pin	Function
1	GND
2	Vin
3	-Vo
5	+Vo

ATA1D12LMD-10WR3 Horizontal Package Dimensions and Recommended Layout



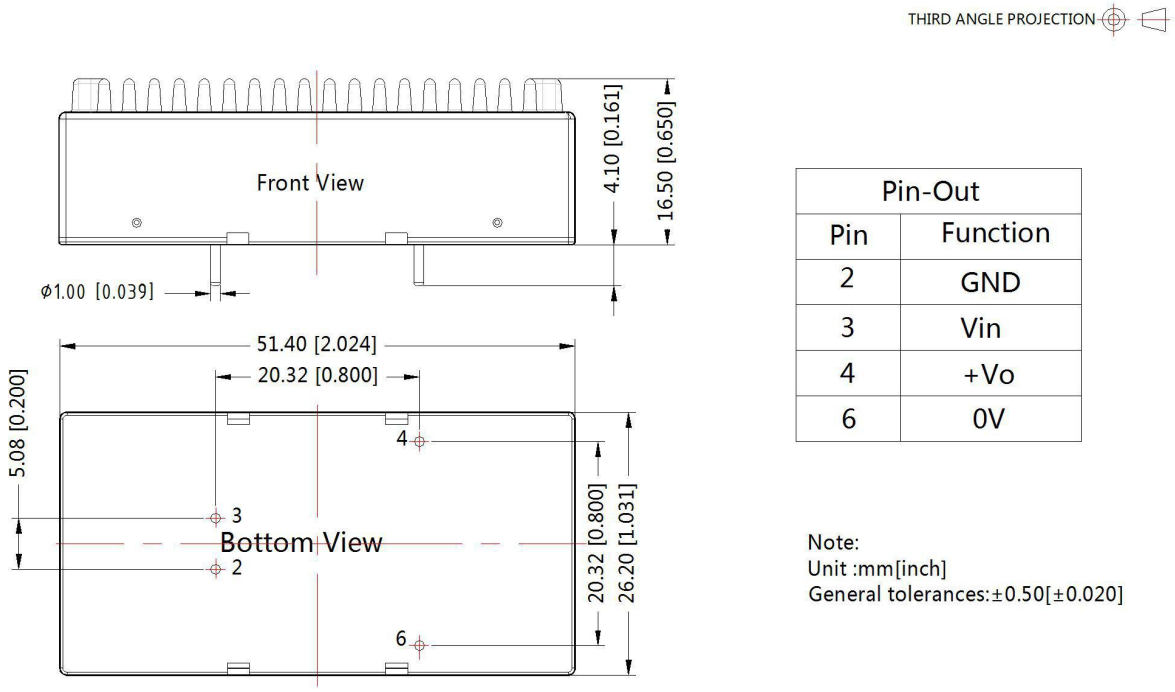
Note:
Unit: mm[inch]
Pin1/2/3/4/5/6: Ø1.0mm
Pin section tolerances:±0.10[±0.004]
General tolerances:±0.50[±0.020]



Note:The grid distance is 2.54 x 2.54mm

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

Horizontal Package (with heat sink) Dimensions

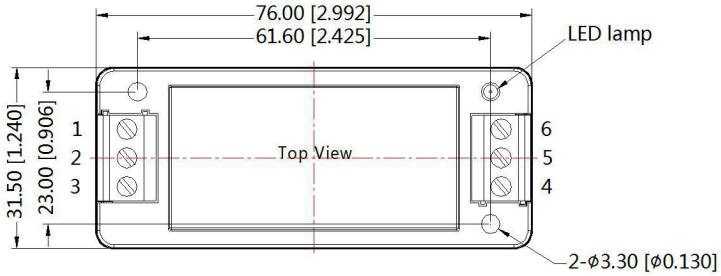


Pin-Out	
Pin	Function
2	GND
3	Vin
4	+Vo
6	0V

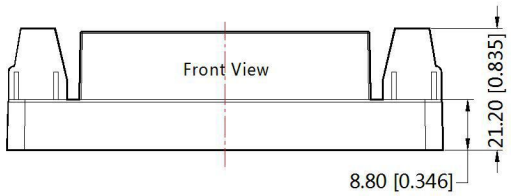
Note:
Unit :mm[inch]
General tolerances:±0.50[±0.020]

ATB_LMD-10WR3A2S (without heat sink) Dimensions

THIRD ANGLE PROJECTION



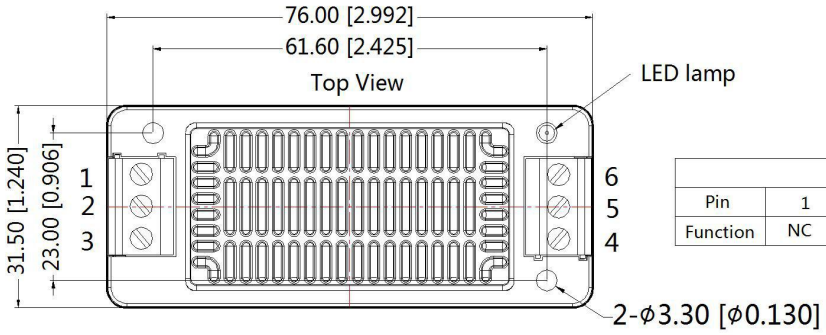
Pin-Out						
Pin	1	2	3	4	5	6
Function	NC	GND	Vin	+Vo	NC	0V



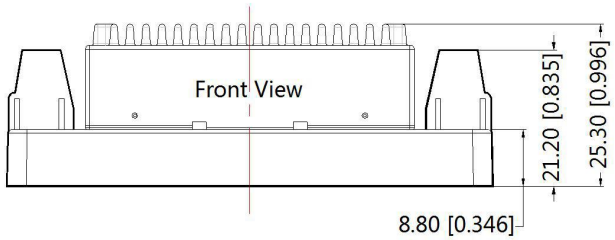
Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±0.50[±0.020]

ATB_LMD-10WHR3A2S (with heat sink) Dimensions

THIRD ANGLE PROJECTION



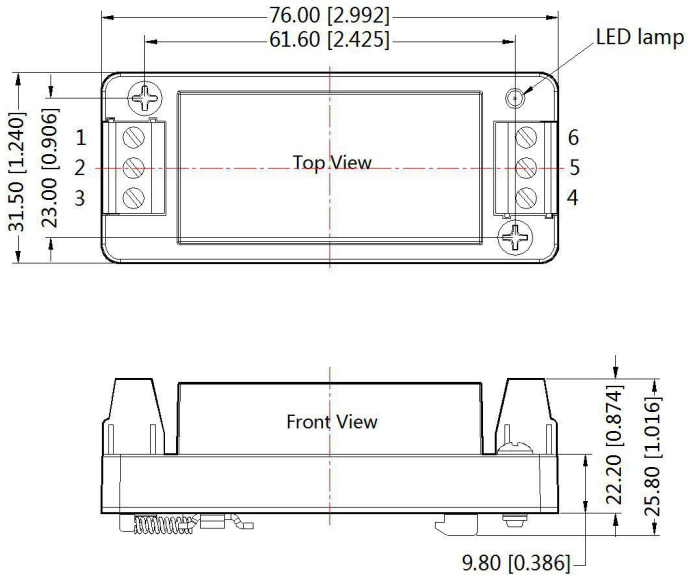
Pin-Out						
Pin	1	2	3	4	5	6
Function	NC	GND	Vin	+Vo	NC	0V



Note:
Unit: mm[inch]
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±0.50[±0.020]

ATB_LMD-10WR3A4S (without heat sink) Dimensions

THIRD ANGLE PROJECTION

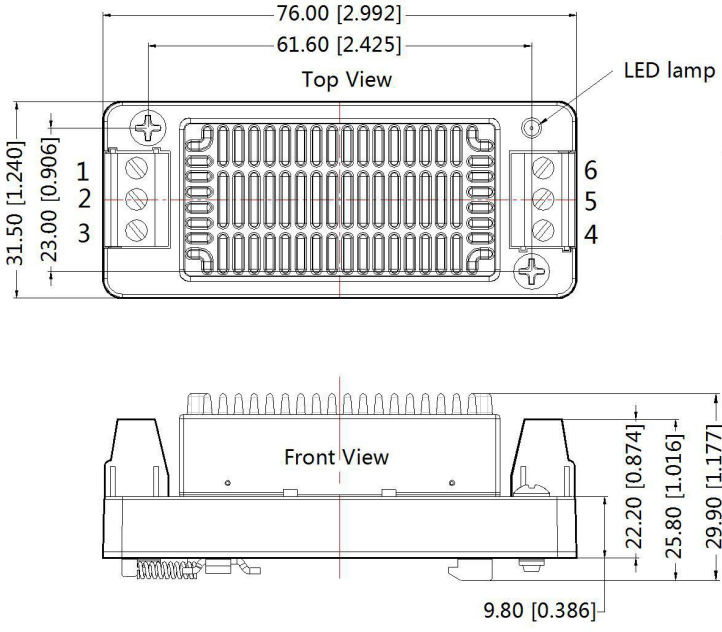


Pin-Out						
Pin	1	2	3	4	5	6
Function	NC	GND	Vin	+Vo	NC	0V

Note:
Unit: mm[inch]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

ATB_LMD-10WHR3A4S(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]
Mounting rail: TS35
Wire range: 24-12 AWG
Tightening torque: Max 0.4 N·m
General tolerances: ±1.00[±0.039]

Note:

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at Ta=25℃, humidity <75%RH, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;