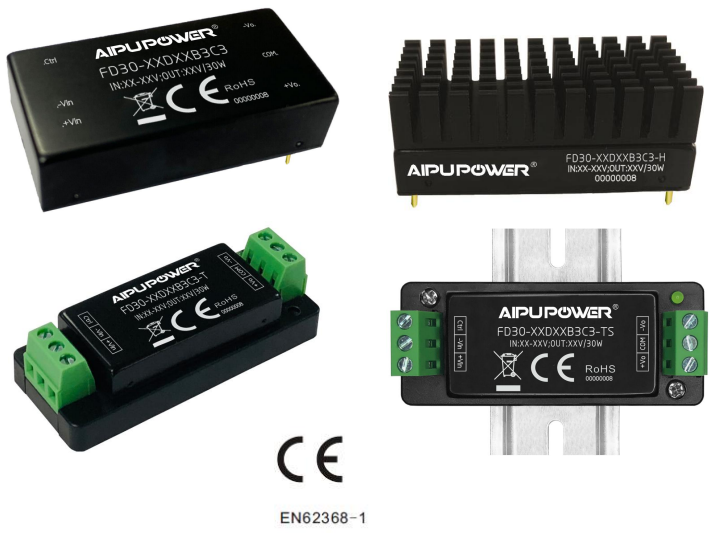
Typical Features

- ◆ Wide input voltage range (4:1), output power 30W
- ◆ Efficiency up to 90% (Typ.)
- ◆ Standby power consumption 0.1W (Typ.)
- ◆ Continuous short circuit protection, self-recovery
- ◆ Input under voltage protection, output over voltage, short circuit & over current protections
- ◆ Isolation voltage 3000VDC
- ◆ Operating temperature from -40°C to +85°C
- ◆ Good EMC performance
- ◆ Standard pin-out alignment



Application Field

FD30-XXDXXB3C3 Series --- DIP standard size 2″x1″ DC-DC modular converters with wide input voltage range (4:1), low standby power consumption, isolated & regulated dual outputs 30W. This series of products can be widely used in the fields of Industrial control, Instrument, Communication, Electric power and IoT, etc. Additional EMC circuit diagram is recommended for the application with higher EMC requirement.

Typical Product List

Certificate	Part No.	Input Voltage Range (VDC)		Output Voltage/Current (Vo/Io)		Input Current (mA) Typ. @Nominal volt.		Max. Capacitive Load	Efficiency (%) @Full load, nominal volt.	
		Nominal	Range	Vo (VDC)	Io(mA) Max/Min	Full Load	No Load	(uF)	Min	Typ.
CE	FD30-18D05B3C3	24	9-36	±5	3000/0	1388	40	2000	87	89
	FD30-18D09B3C3			±9	1667/0	1388	40	1250	87	89
	FD30-18D12B3C3			±12	1250/0	1388	3	1250	87	89
	FD30-18D15B3C3			±15	1000/0	1388	3	680	87	89
	FD30-18D24B3C3			±24	625/0	1410	3	470	86	88
-	FD30-36D05B3C3	48	18-75	±5	3000/0	700	40	2000	87	89
-	FD30-36D09B3C3			±9	1667/0	695	40	1250	88	90
-	FD30-36D12B3C3			±12	1250/0	700	3	1250	87	89
-	FD30-36D15B3C3			±15	1000/0	700	3	680	87	89
-	FD30-36D24B3C3			±24	625/0	704	3	470	87	89

Note 1: The part number letter C indicates the part with ON/OFF Control function, Suffix "-H" indicates the part with heatsink; "-T(H)" indicates the chassis package (with heatsink); "-TS(H)" indicates the DIN-rail mount package (with heatsink), the rail width 35mm.

Note 2: The maximum capacitive load is the capacitance allowed to be used when the power supply starts at full load. The converter may not start if the capacitor exceeds this value.

Note 3: The chip could operate at jitter frequency at no load or light load to decrease no-load power consumption, so no load is not available, at least 15% load is recommended for the application.

Note 4: The converters could not go self-recovery after short circuit for FD30-18DXXB3C3 parts working at 30-36VDC &

FD30-36DXXB3C3 parts working at 67-75VDC. The performances can be resumed normally after a restart.

Note 5: Please contact Aipu sales for other output voltages requirements of this series but not listed in this table.

Input Specifications

Item	Test conditions	Min	Typ.	Max	Unit
Standby power consumption	Full input voltage range	/	0.1	/	W
Maximum input current	Full input voltage range	/	/	3.9	A
Startup voltage	24V nominal input series	/	/	9	VDC
	48V nominal input series	/	/	18	
Under voltage protection	24V nominal input series	7	8	/	
	48V nominal input series	15	16	/	
Input inrush voltage(1sec.max)	24V nominal input series	-0.7	/	50	
	48V nominal input series	-0.7	/	100	
Input filter	/	Pi type filter			
Hot-plug	/	Unavailable			
ON/OFF Control (Ctrl*)	Turn ON the converter	No connection or connected to High level (2.5V-12VDC)			
	Turn OFF the converter	Connected to -Vin or Low level (0-1.2VDC)			
	Current value for switching off	/	5	/	mA

*Note: The voltage of Ctrl is relative to the input -Vin.

Output Specifications

Item	Test conditions		Min	Typ.	Max	Unit
Output voltage accuracy	0%~100% load	+Vo	/	±1	±2	%
		-Vo	/	±1	±3	%
Voltage regulation	Full input voltage range, full load	+Vo	/	±0.3	±0.5	%
		-Vo	/	±0.5	±1	%
Load regulation	10%~100% load	+Vo	/	±0.5	±1	%
		-Vo	/	±0.5	±1.5	%
Ripple & Noise	0%-100% load, 20MHz bandwidth		/	50	100	mVp-p
Dynamic recovery time	25% rated load step, full input voltage range		/	300	500	uS
Dynamic response deviation	25% rated load step, nominal input voltage	±5V output	/	±5	±8	%
		Others	/	±3	±5	%
Temperature drift coefficient	/		/	/	±0.03	%/℃
Turn-on delay time	Nominal input voltage		/	150	/	mS
Output start-up overshoot	Full input voltage range		/	/	10	%Vo
Over voltage protection			120	140	160	%Vo
Over current protection			105	160	240	%Io
Short circuit protection			Continuous, self-recovery			

Notes: The Ripple & Noise is tested by the parallel-line method, for details, refer to the following test instructions.

General Specifications

Item	Test conditions		Min	Typ.	Max	Unit
Switching frequency	Operating mode（PWM）		/	350	/	KHz
Operating temperature	Refer to the temperature derating graphs		-40	/	+85	℃
Storage temperature	/		-55	/	+125	
Case temperature Max	Within the operating derating range		/	/	+105	℃
Pin soldering temperature	1.5mm from the case, soldering time 10S		/	/	300	
Relative humidity	No condensation		5	/	95	%RH
Isolation voltage	I/P-O/P	Test 1min, leakage current <1mA	3000	/	/	VDC
	I/P&O/P-Case	Test 1min, leakage current <1mA	1000	/	/	
Isolation capacitance	I/P-O/P	100KHz@0.1V	/	1000	/	pF
Insulation resistance	I/P-O/P	Voltage 500VDC	1000	/	/	MΩ
MTBF	MIL-HDBK-217F@25℃		1000	/	/	K hours
Cooling method	Nature air					
Vibration	IEC/EN 61373 Category 1/Body Mounted Class B					
Case material	Aluminum					

Weights/Dimensions	Part No.	Weight (Typ)	Dimensions L x W x H	
	FD30-XXDXXB3C3	18g	50.80x25.40x13.30 mm	2.000x1.000x0.523 inch
	FD30-XXDXXB3C3-H	30g	50.80x25.40x23.40 mm	2.000x1.000x0.921 inch
	FD30-XXDXXB3C3-T	39g	76.00x31.50x22.40 mm	2.992x1.240x0.881 inch
	FD30-XXDXXB3C3-TH	51g	76.00x31.50x32.60 mm	2.992x1.240x1.283 inch
	FD30-XXDXXB3C3-TS	59g	76.00x31.50x27.00 mm	2.992x1.240x1.063 inch
	FD30-XXDXXB3C3-TSH	71g	76.00x31.50x36.50 mm	2.992x1.240x1.437 inch

EMC Performance

Items			Test standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the Recommended EMC Circuit)
		RE	CISPR32/EN55032	CLASS B (with the Recommended EMC Circuit)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf. Criteria B (with the Recommended EMC Circuit)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf. Criteria B (with the Recommended EMC Circuit)
		ESD	IEC/EN61000-4-2	Contact ±4KV Perf. Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf. Criteria B (with the Recommended EMC Circuit)
		EFT	IEC/EN61000-4-4	±2KV Perf. Criteria B (with the Recommended EMC Circuit)

Temperature Derating Graphs

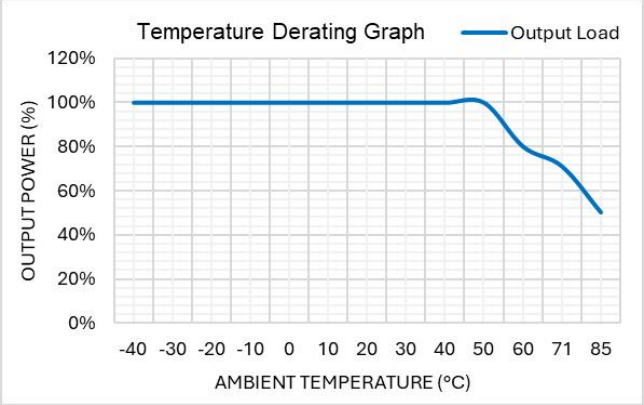


Figure 1

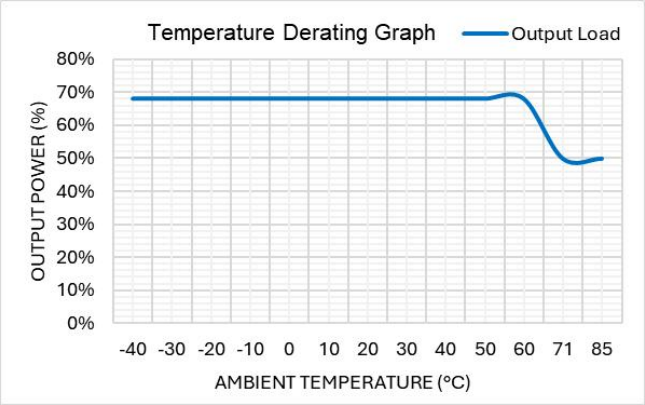
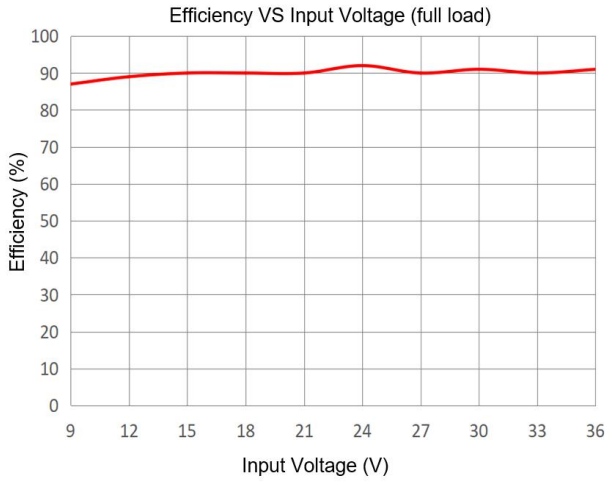


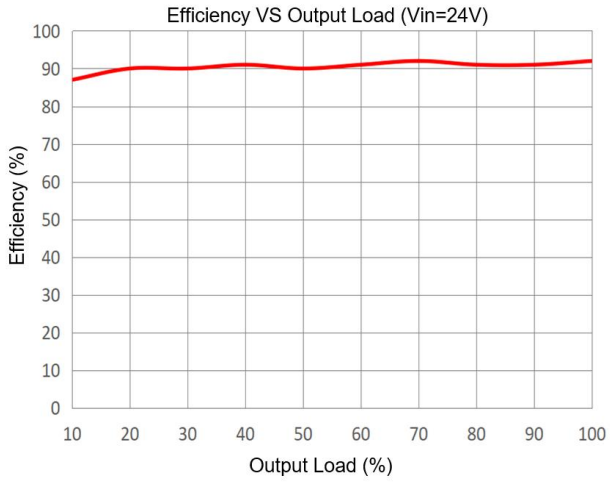
Figure 2

The temperature derating graph (Figure 1) is for FD30-18DXXB3C3 (at the input voltage range 12-36V) and FD30-36DXXB3C3(at full input voltage rang) working under the condition of forced-air cooling by minimum wind speed 20LFM @65℃-85℃.

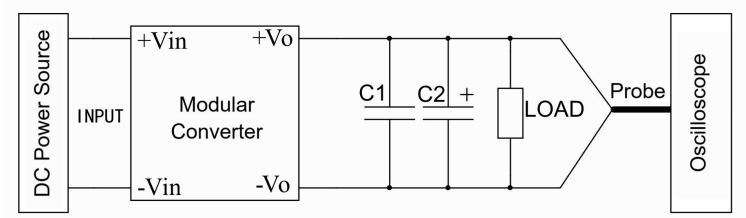
The temperature derating graph (Figure 2) is for FD30-18DXXB3C3 (at the input voltage range 9-12V) working under the condition of forced-air cooling by the minimum wind speed 20LFM @50℃-85℃.

Efficiency Graphs





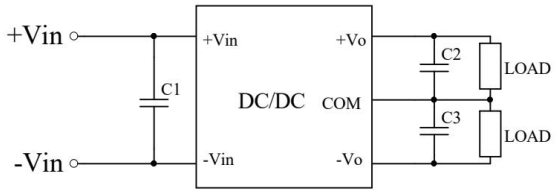
Ripple & Noise Test Instruction (Parallel-line Method, 20MHz Bandwidth)



1. The Ripple & Noise test needs the cables in parallel, an oscilloscope that should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. One polypropylene capacitor C1(0.1uF) and one high frequency low impedance electrolytic capacitor C2(10uF) are connected in parallel with the probe.
2. Refer to the test diagram, the converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The test can start at the converter output terminals after the input power on.
3. It is recommended that the dual output loads imbalance should be less than ±5%.

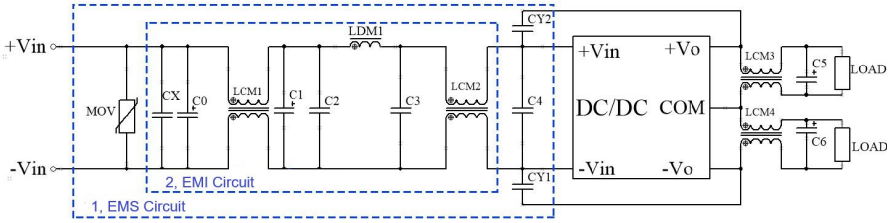
Recommended Circuits for Application

1. All this series of converters will be tested according to this circuit diagram below before shipping. The output ripple could be decreased with C2, C3 capacitance increased, the output capacitance must be less than the maximum capacitive load.



Components	Parameters
C1	100uF/100V
C2, C3	100uF/50V

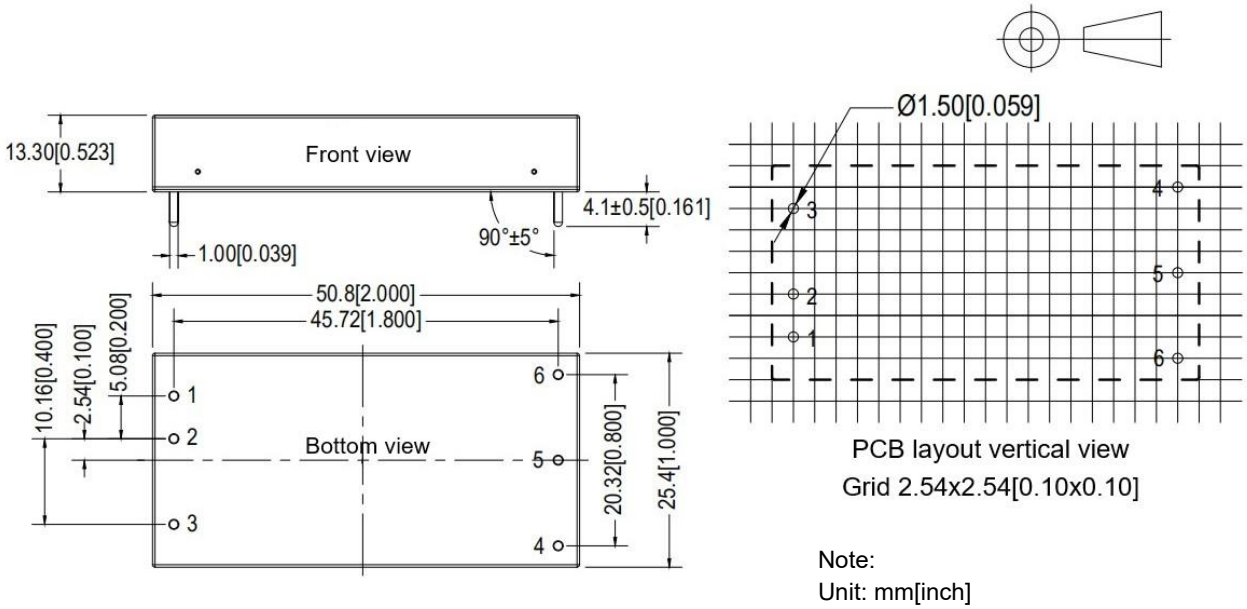
2. Recommended EMC circuit diagram



Note: Part 1 circuit is for EMS test, Part 2 for EMI filtering, both can be adjusted according to the actual situation.

Component	Vin:24VDC	Vin:48VDC
MOV	14D560K	14D101K
CX	0.47uF	0.47uF
LCM1	10~15mH	10~15mH
C0, C1	470uF/50V	470uF/100V
C2, C3, C4	1uF/50V	1uF/100V
LCM2	300uH	300uH
C5, C6	47uF/50V	47uF/50V
CY1, CY2	2.2nF/250V	2.2nF/250V
LDM1	4.7uH	4.7uH
LCM3, LCM4	50~300uH	50~300uH

Mechanical Dimensions (without Heat Sink)

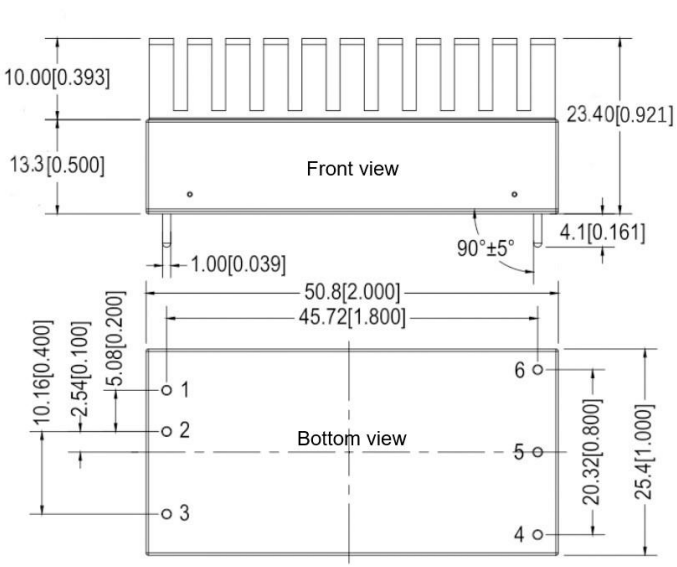


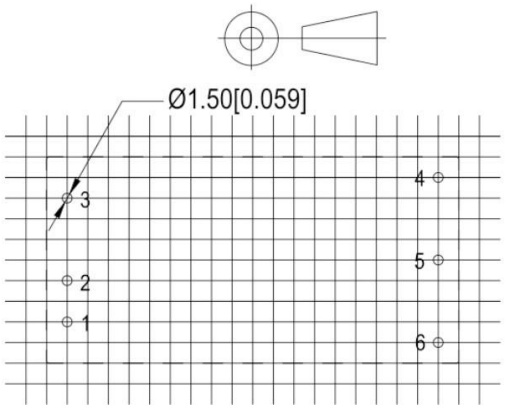
Note:
Unit: mm[inch]
Pin diameter tolerance: ±0.10 [±0.004]
General tolerance: ±0.50 [±0.020]

Pin-out Function Description

Pin No.	1	2	3	4	5	6
FD30-XXDXXB3C3	+Vin	-Vin	Ctrl	-Vo	COM	+Vo

-H Mechanical Dimensions (with Heat Sink)





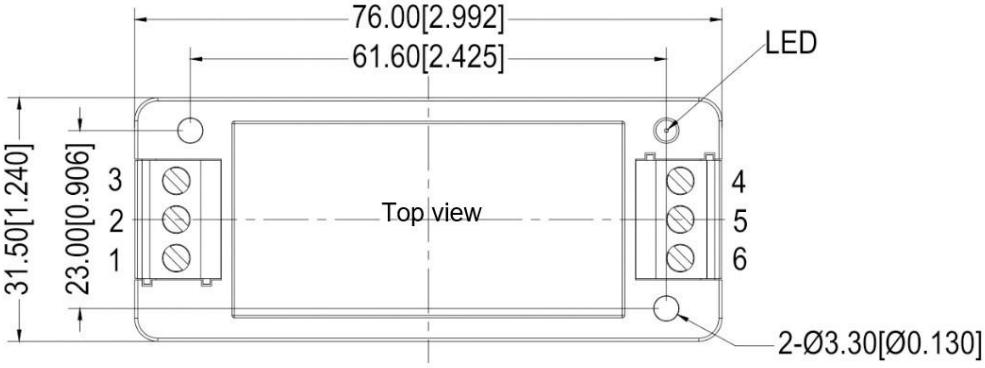
PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

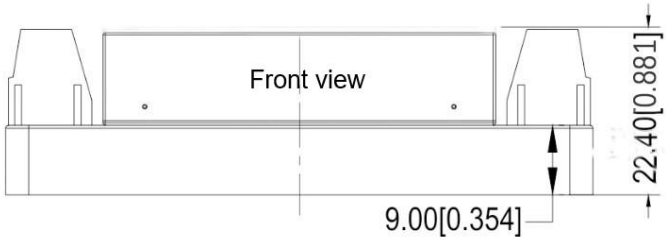
Note:
Unit: mm[inch]
Pin diameter tolerance: ±0.10 [±0.004]
General tolerance: ±0.50 [±0.020]

Pin-out Function Description

Pin No.	1	2	3	4	5	6
FD30-XXDXXB3C3	+Vin	-Vin	Ctrl	-Vo	COM	+Vo

-T Mechanical Dimensions (without Heat Sink)



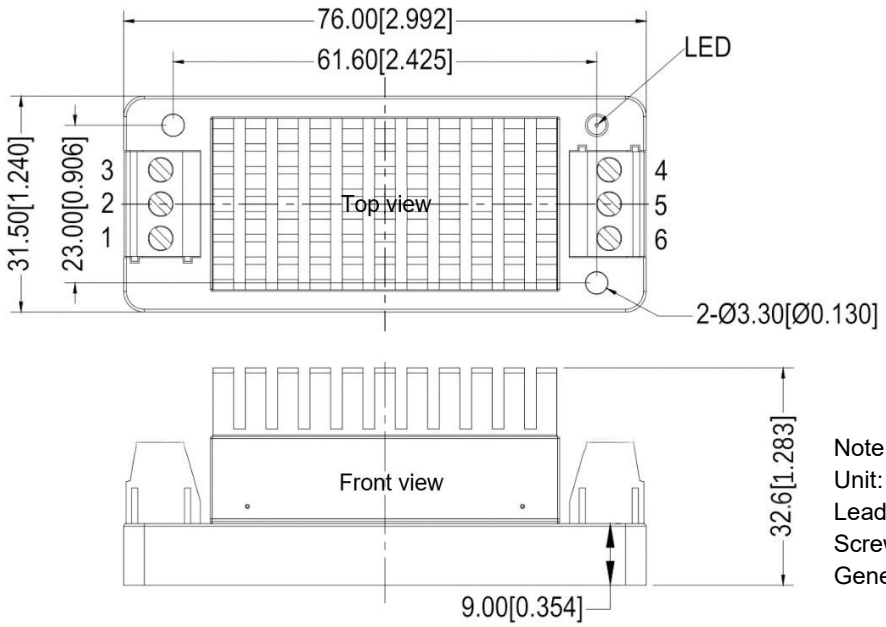


Note:
Unit: mm[inch]
Lead wires gauge: 24-12AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00 [±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6
FD30-XXDXXB3C3	+Vin	-Vin	Ctrl	-Vo	COM	+Vo

-TH Mechanical Dimensions (with Heat Sink)

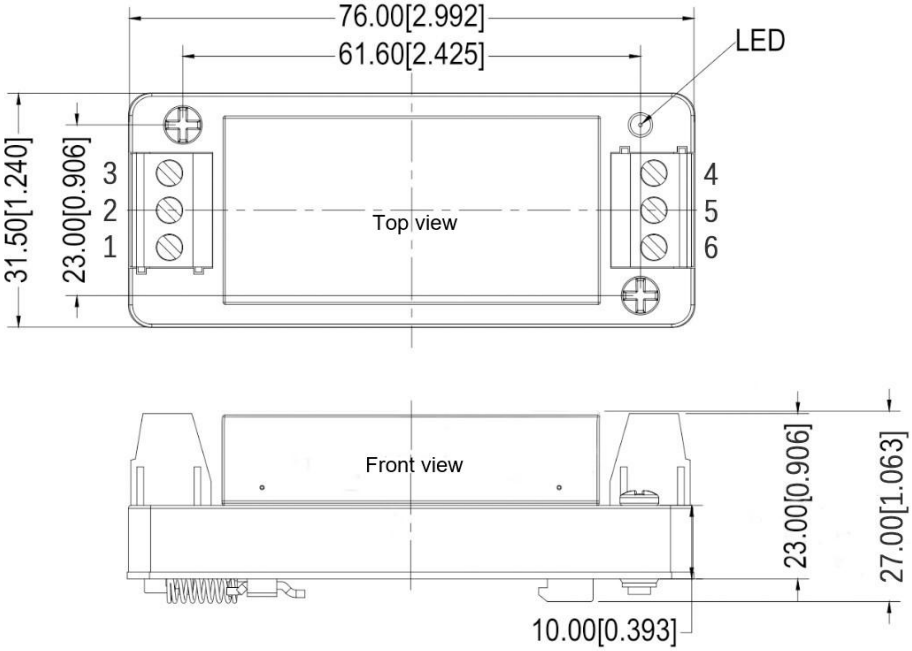


Note:
Unit: mm[inch]
Lead wires gauge: 24-12AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00 [±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6
FD30-XXDXXB3C3	+Vin	-Vin	Ctrl	-Vo	COM	+Vo

-TS Mechanical Dimensions (without Heat Sink)

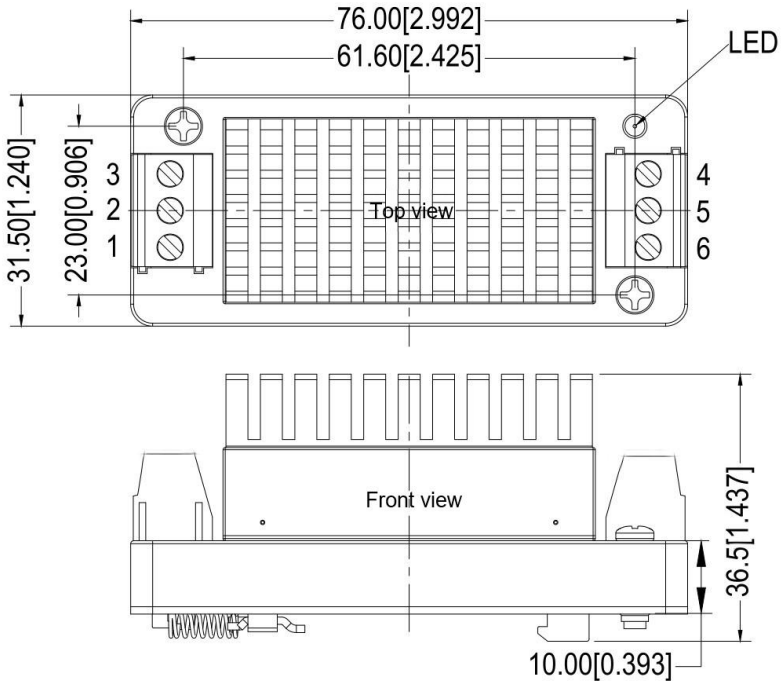


Note:
Unit: mm[inch]
Lead wires gauge: 24-12AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00 [±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6
FD30-XXDXXB3C3	+Vin	-Vin	Ctrl	-Vo	COM	+Vo

-TSH Mechanical Dimensions (with Heat Sink)



Note:
Unit: mm[inch]
Lead wires gauge: 24-12AWG
Screwing torque: 0.4 N.m Max
General tolerance: ±1.00 [±0.039]

Terminal Function Description

Terminal No.	1	2	3	4	5	6
FD30-XXDXXB3C3	+Vin	-Vin	Ctrl	-Vo	COM	+Vo

Application Notice

1.The product should be used according to the specifications, otherwise it could be permanently damaged.

2. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.

3. The product performance cannot be guaranteed if it works under over-load condition.

4. Unless otherwise specified, all values or indicators on this datasheet are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).

5. All values or indicators on this datasheet have been tested based on Aipupower test specifications.

6.The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.

7. Aipupower can provide customization service.

Guangzhou Aipu Electron Technology Co., Ltd
Address: Building 4, HEDY Park, No.63, Punan Road, Huangpu Dist, Guangzhou, China.
Tel: 86-20-84206763 Fax: 86-20-84206762 HOTLINE: 400-889-8821
E-mail: sales@aipu-elec.com Website: https://www.aipupower.com