Typical Features

- Wide input voltage range (4:1), Output Power 20W
- Transfer Efficiency up to 90%
- Stand-by Power Consumption as low as 0.10W
- Output super-fast start up
- Continuous Short Circuit protection, Self-recovery
- Input under voltage, output over voltage, short circuit, over current protection
- Isolation Voltage 1500VDC
- Operating Temperature: -40°C~+85°C
- Good EMI performance
- International standard pin-out

Application Field

PFD20-XXDXXA3(C)2 *is a newly designed DIP 1X1 packed，20W output power, ultra wide input range 4:1, low stand-by power consumption, isolated regulated output DC-DC converter, could be widely used for industrial control, instrument, communication, power electricity, internet of things field. For harsh EMC environment, the application circuit in the datasheet is strongly recommended.*

Typical Product List

Certificate	Part No.	Input Voltage Range (VDC)		Output Voltage/ Current(Vo/Io)		Input Current(mA) @Nominal Voltage		Max Capacitive Load	Ripple & Noise (mVp-p)		Efficiency @ output full load(%)	
		Nominal	Range	Voltage (VDC)	Current(mA) Max./Min.	Full Load Typ.	No Load Typ.	uF	Typ.	Max.	Min.	Typ.
---	PFD20-18D05A3(C)2	24	9-36	±5	2000/0	957	33	5000	100	200	85	87
---	PFD20-18D09A3(C)2	24	9-36	±9	1111/0	946	6	2000	100	200	85	87
---	PFD20-18D12A3(C)2	24	9-36	±12	833/0	926	5	1000	100	200	88	90
---	PFD20-18D15A3(C)2	24	9-36	±15	667/0	926	5	800	100	200	88	90
---	PFD20-18D24A3(C)2	24	9-36	±24	416/0	947	5	500	100	200	86	88
---	PFD20-36D05A3(C)2	48	18-75	±5	2000/0	484	17	5000	100	200	84	86
---	PFD20-36D09A3(C)2	48	18-75	±9	1111/0	472	5	2000	100	200	85	87
---	PFD20-36D12A3(C)2	48	18-75	±12	833/0	468	5	1000	100	200	87	89
---	PFD20-36D15A3(C)2	48	18-75	±15	667/0	468	5	800	100	200	87	89
---	PFD20-36D24A3(C)2	48	18-75	±24	416/0	463	5	500	100	200	88	90

Note 1: C means with control pin, N means without control pin;

Note 2: -H means with heat sink, -T (H) means wiring type (with heat sink) package, -TS (H) means guide rail type (with heat sink) package, guide rail width is 35mm;

Note 3: Maximum capacitive load refers to the capacitance capacity that the output allows to be connected when the power supply is fully loaded and started. If the capacity exceeds this, the power supply may not start;

Note 4: Due to limited space, the above is only a partial product list. If you need products outside the list, please contact our sales department.

Input Specification

Items	Test Conditions	Min.	Typ.	Max.	Unit
Stand-by Consumption	Input voltage range	/	0.1	/	W
Input Under-Voltage Protection	24V nominal input	5	/	9	VDC
	48V nominal input	11	/	18	
Input Surge Voltage (1Sec.max.)	24V nominal input	-0.7	/	50	
	48V nominal input	-0.7	/	100	
Hot Plug	/	N/A			
Input Filter	/	Π filter			
Control Pin(Ctrl)	The power module turn on	Suspend or connect to high level (3.3V-12VDC)			
	The power module turn off	Connect to -Vin or low level (0-1.2VDC)			
	Turn off input current	2mA(Typ)			

*Note: The voltage of *CTRL pin is relative to -Vin pin.

Output Specification

Items	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Input voltage range	Vo1	/	±1	±2	%
		Vo2	/	±1.5	±3	%
Cross-regulation rate	Vo1：50% load; Vo2：10~100% load		/	±3	±5	%
Voltage Regulation	Full voltage range, full load		/	±0.2	±0.5	%
Load Regulation	5%-100% load		/	±0.5	±1	%
Ripple & Noise	5%-100% load, 20MHz bandwidth		/	100	200	mVp-p
Transient Recovery Time	25% nominal load step, nominal input voltage	/	/	300	500	us
Transient Response Deviation		5V output	/	±5	±8	%
		Other output	/	±3	±5	%
Turn on Delay Time	Nominal input voltage		/	10	/	ms
O/P voltage adjustable (Trim)	Input voltage range		Unavailable			
O/P Over voltage protection			120	160	200	%Vo
O/P Over current protection			110	160	220	%Io
O/P start-up overshoot voltage			/	/	10	%Vo
Short Circuit Protection			Hiccup, continuous, self-recovery			

Note: 0% - 5% load ripple & noise is less than or equal to 5%Vo; the ripple & noise test adopts the twisted pair test method, see the ripple & noise test instructions for details.

General Specification

Items	Test Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Operating Mode(PWM)	/	280	/	KHz
Operating Temperature	Refer to Temperature Derating Curve	-40	/	+85	℃
Storage Temperature	/	-55	/	+125	
Max Shell Temperature	Within the operating curve	/	/	+105	
Pin Withstand Soldering Temperature	Distance to shell is 1.5mm,10seconds	/	/	300	
Relative Humidity	No condensing	5	/	95	%RH

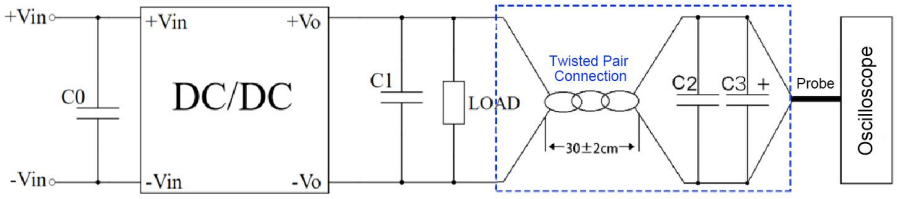
Isolation Voltage	Input to output, test 1min, leakage current<0.5mA	1500	/	/	VDC
Insulation Resistance	Input to output , voltage 500VDC	1000	/	/	MΩ
Isolation Capacitance	Typical value	/	1000	/	pF
MTBF	MIL-HDBK-217F@25℃	1000	/	/	K hours
Cooling Method	Free air convection				
Case Material	Metal Aluminum				

Weight/ Dimension	Model	Weight (Typ.)	L x W x H	
	PFD20-XXDXXA3(C)2	18g	25.4 X 25.4 X 12.5 mm	2.00 X 1.00 X 0.492 inch
	PFD20-XXDXXA3(C)2-H	21g	25.4 X 25.4 X 18.0 mm	2.00 X 1.00 X 0.708 inch
	PFD20-XXDXXA3(C)2-T	39g	76.0 X 31.5 X 21.3 mm	2.99 X 1.24 X 0.838 inch
	PFD20-XXDXXA3(C)2-TH	42g	76.0 X 31.5 X 26.0 mm	2.99 X 1.24 X 1.023 inch
	PFD20-XXDXXA3(C)2-TS	59g	76.0 X 31.5 X 26.0 mm	2.99 X 1.24 X 1.023 inch
	PFD20-XXDXXA3(C)2-TSH	62g	76.0 X 31.5 X 30.8 mm	2.99 X 1.24 X 1.212 inch

EMC Compatible Characteristics

Total Item		Sub Item	Test Standard	Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (EMC Recommended Circuit)
		RE	CISPR32/EN55032	CLASS B (EMC Recommended Circuit)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria A (EMC Recommended Circuit)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria A (EMC Recommended Circuit)
		ESD	IEC/EN61000-4-2	Contact ±4KV/ Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B (EMC Recommended Circuit)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B (EMC Recommended Circuit)
		Voltage dips and interruptions	IEC/EN61000-4-11	0%~70% Perf.Criteria B

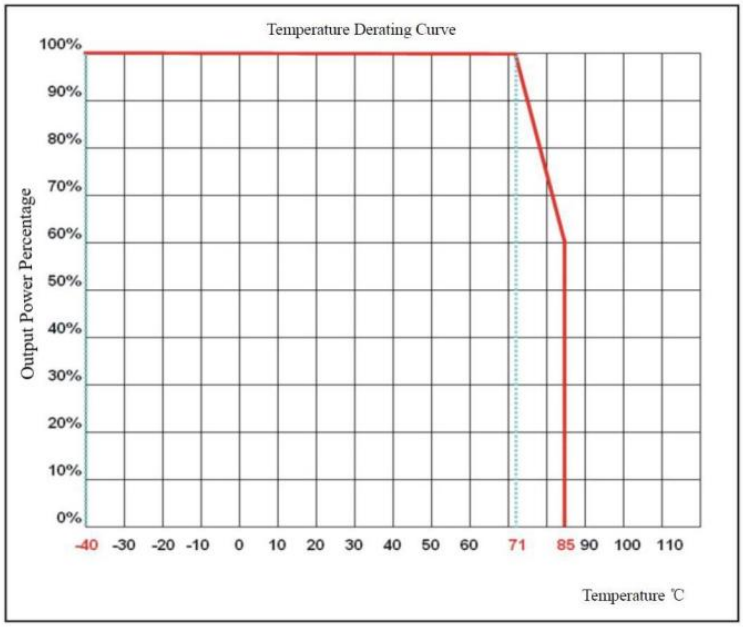
Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)



Test conditions:

1. Ripple noise is connected using 12# twisted pair cable, oscilloscope sampling uses sampling mode, oscilloscope bandwidth is set to 20MHz, 100M bandwidth probe is used, probe cap and ground clip are removed; and C2 (0.1uF) polypropylene capacitor and C3 (10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel at the probe end of the twisted pair cable, and the capacitance values of C0 and C1 refer to the design application circuit data;
2. Ripple noise test: The module input end (INPUT) is connected to the input power supply, and the power output is connected to the electronic load (LOAD) through the power line. The test is sampled from the power output port with a 30±2 cm twisted pair cable alone, and connected to the oscilloscope probe according to polarity.
3. It is recommended to output a minimum 5% load or connect an electrolytic capacitor with a high-frequency resistance of more than 470uF, otherwise the output voltage ripple will increase;
4. It is recommended that the load imbalance of dual-channel output products is less than ±5%.

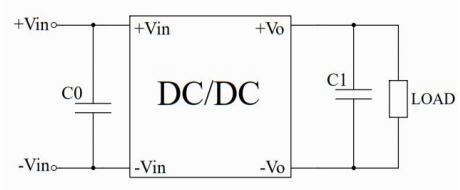
Product Characteristic Curve



Design Application Circuit

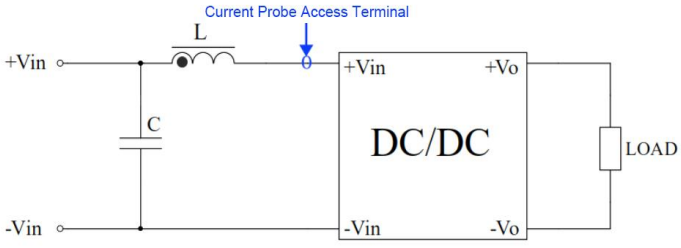
Recommended circuit

1. This series of module power supplies are tested according to this peripheral circuit before leaving the factory. Increasing the capacity of C0 or C1 can reduce the output ripple, but the output capacity must be less than the maximum capacitive load;

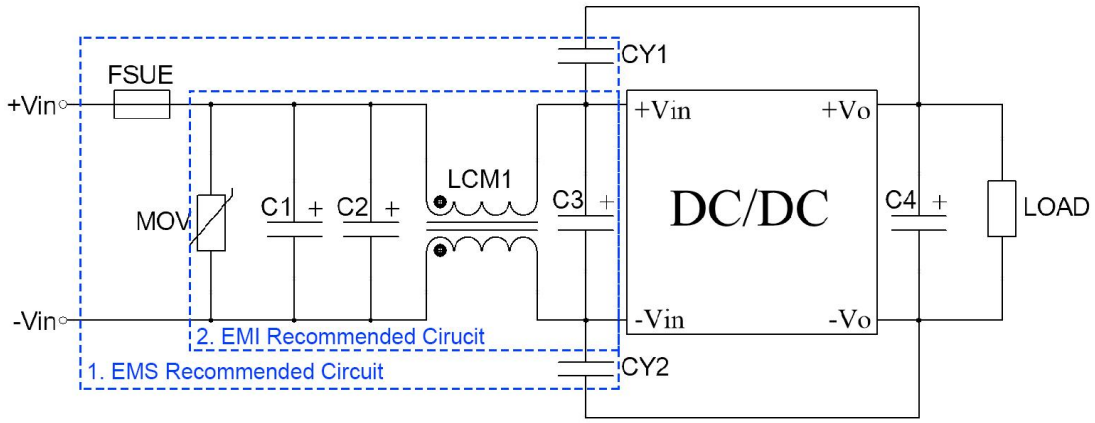


Component	Parameter
C0	47-100uF/100V
C1	100uF/100V

2. Input reflected ripple current test peripheral circuit:



Component	Parameter
C	220uF/100V
L	4.7uH/15A

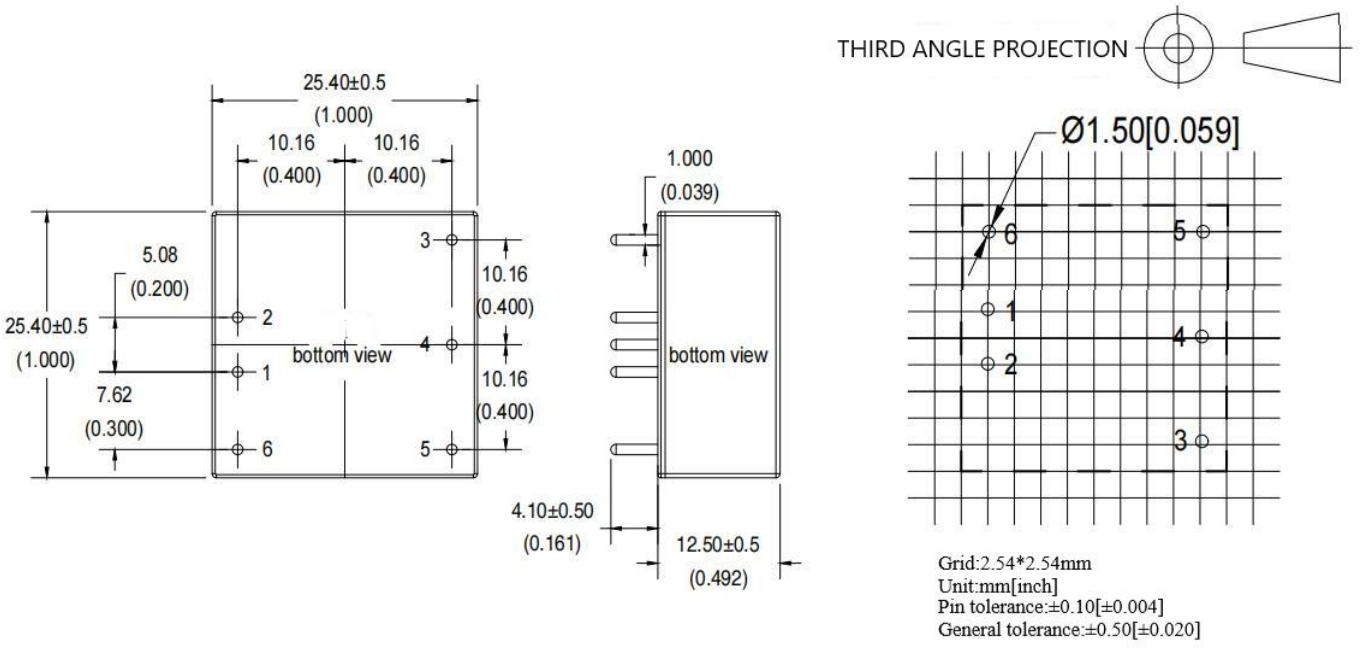


Note: Part 1 in the figure is for EMS testing, and part 2 in the figure is for EMI filtering, which can be adjusted according to the situation.

Specs:

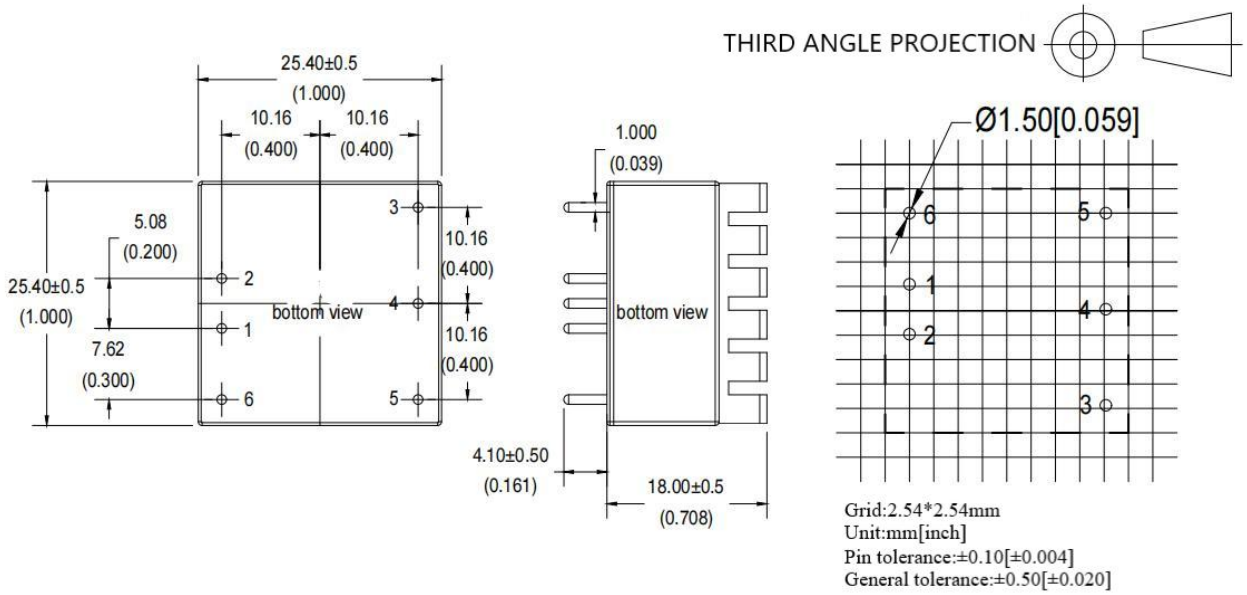
Components	Vin:24VDC	Vin:48VDC
FUSE	Connect the corresponding fuse according to customer needs	
MOV1	14D560K	14D101K
C1,C2,C3	330uF/50V	330uF/100V
C4	47uF/50V	47uF/50V
LCM1	5mH	5mH
CY1,CY2	2.2nF/2KV	

A3 (without heat sink)



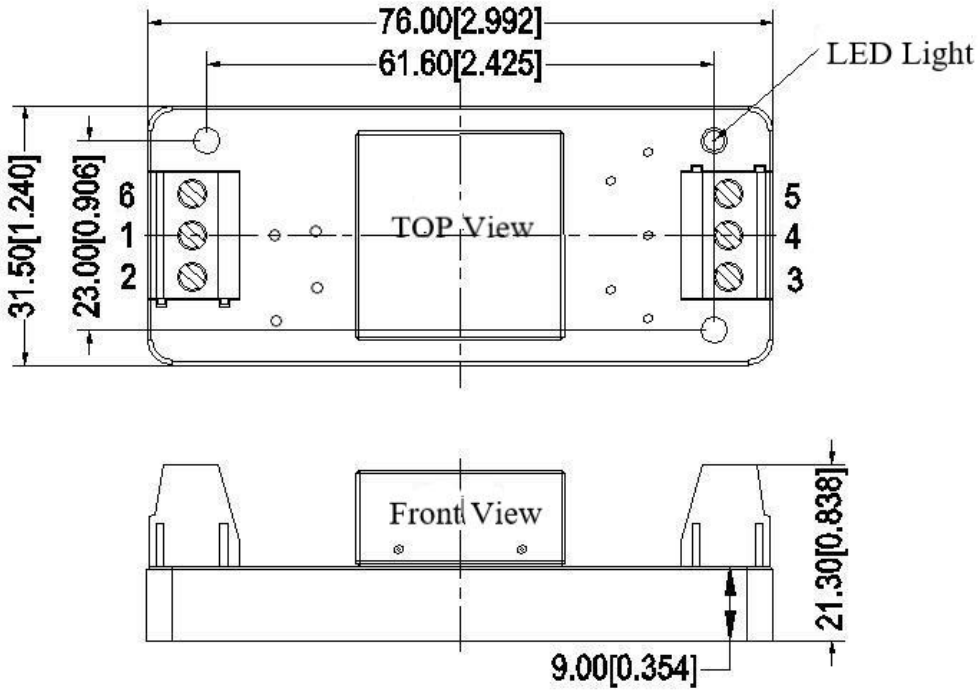
Pin	1	2	3	4	5	6
PFD20-XXDXXA3C	-Vin	+Vin	+Vo	COM	-Vo	Ctrl

A3-H (with heat sink)



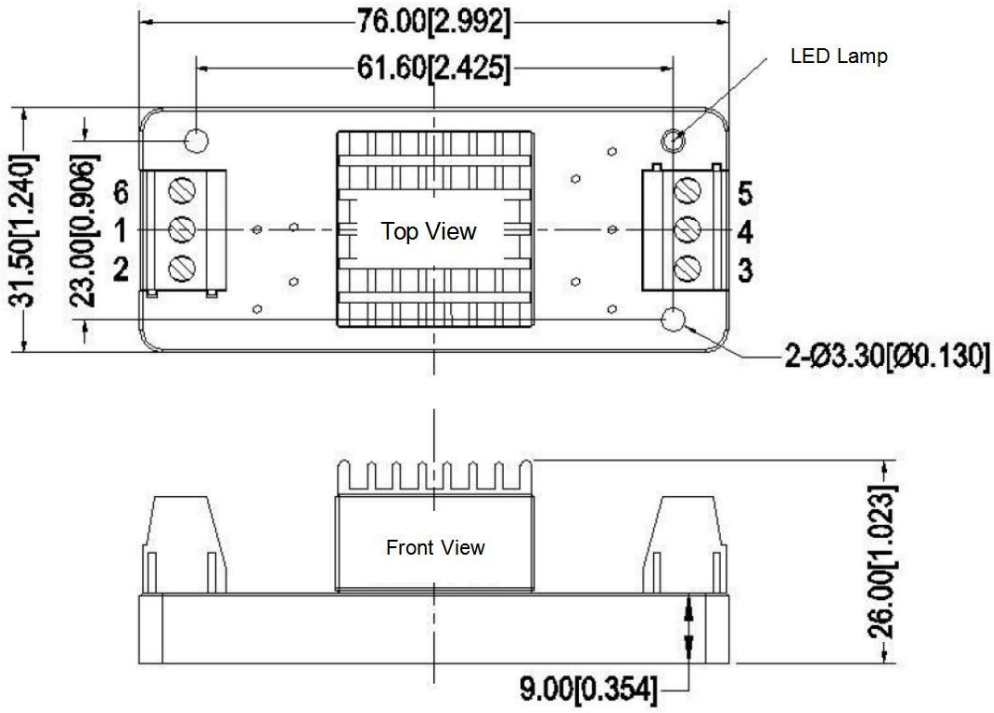
Pin	1	2	3	4	5	6
PFD20-XXDXXA3C2	-Vin	+Vin	+Vo	COM	-Vo	Ctrl

A3-T (without heat sink)



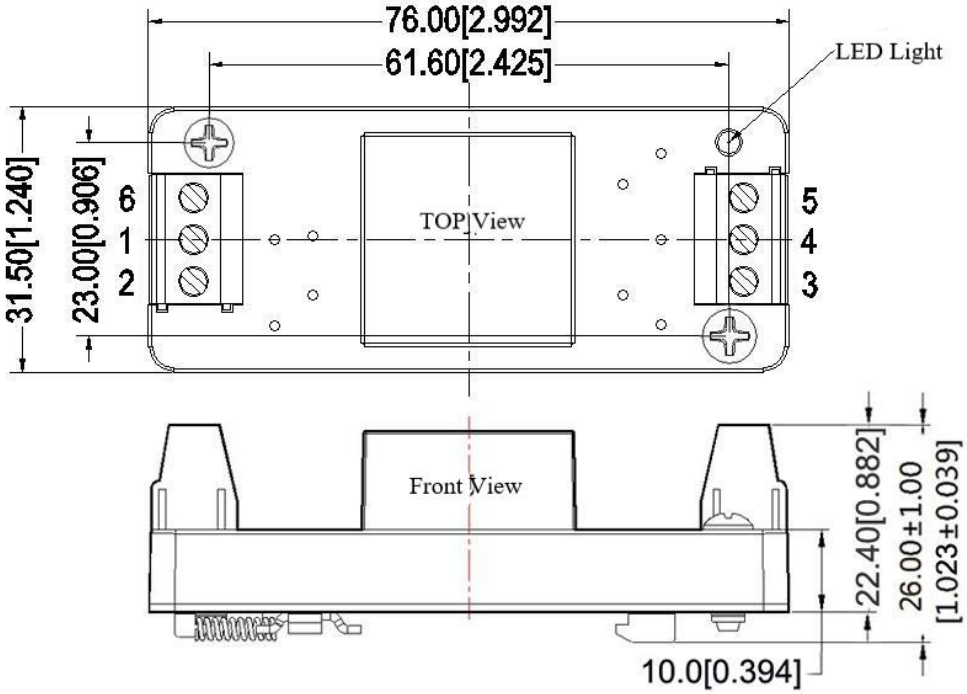
Pin	1	2	3	4	5	6
PFD20-XXDXXA3C2	-Vin	+Vin	+Vo	COM	-Vo	Ctrl

A3-TH (with heat sink)



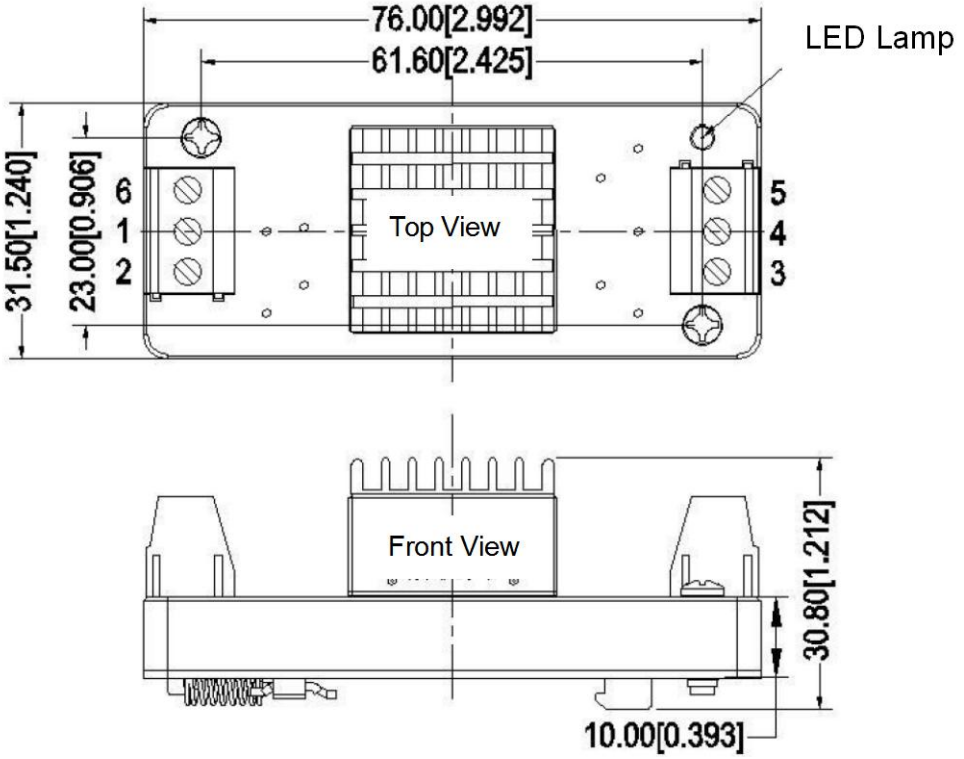
Pin	1	2	3	4	5	6
PFD20-XXDXXA3C2	-Vin	+Vin	+Vo	COM	-Vo	Ctrl

A3-TS (without heat sink)



Pin	1	2	3	4	5	6
PFD20-XXDXXA3C2	-Vin	+Vin	+Vo	COM	-Vo	Ctrl

A3-TSH (with heat sink)



Pin	1	2	3	4	5	6
PFD20-XXDXXA3C2	-Vin	+Vin	+Vo	COM	-Vo	Ctrl

Other Models Pin Definition

Pin	1	2	3	4	5	6
PFD20-XXDXXA3C2	-Vin	+Vin	+Vo	COM	-Vo	NP

Note:

1. The product should be used within the specification range, otherwise it will cause permanent damage to the product;
2. If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all the performance indicators in this manual;
3. If the product works beyond the product load range, it cannot be guaranteed that the product performance meets all the performance indicators in this manual;
4. Unless otherwise specified, the above data are measured at Ta=25℃, humidity<75%, input nominal voltage and output rated load (pure resistance load);
5. All the above index test methods are based on our company's standards;
6. The above are the performance indicators of the product models listed in this manual. Some indicators of non-standard model products will exceed the above requirements. For specific circumstances, please contact our technical personnel directly;
7. Our company can provide product customization;
8. Product specifications are subject to change without prior notice. Please pay attention to the latest manual published on our official website.

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