Typical Features

- Wide input voltage range (4:1), Output Power 20W
- Efficiency up to 90% (Typ.)
- Stand-by Power Consumption 0.10W (Typ.)
- Output fast start up
- Continuous Short Circuit protection, Self-recovery
- Input under voltage, output over voltage, short circuit, over current protections
- Isolation Voltage 3000VDC
- Operating Temperature from -40°C to +105°C
- Good EMI performance
- International standard pin-out

Application Field

PFD20-XXDXXA3(C)3 series ---- *DIP mounting standard 2"X1" package DC-DC modular converters with wide input voltage range 4:1, low standby power consumption，isolated & regulated dual outputs 20W. This series of products can be widely used in the fields of industrial control, instrument, communication, electricity power and IoT, etc. The additional circuit for EMC is recommended in this data sheet for the application with high EMC requirement.*

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 (%) @ full load	
		Nom.	Range	Vo (VDC)	Io(mA) Max/Min	Full Load	No Load	uF	Typ.	Max	Min	Typ.
-	PFD20-18D05A3(C)3	24	9-36	±5	2000/0	957	33	5000	100	200	85	87
	PFD20-18D12A3(C)3	24	9-36	±12	833/0	926	5	1000	100	200	88	90
	PFD20-18D15A3(C)3	24	9-36	±15	667/0	926	5	800	100	200	88	90
	PFD20-18D24A3(C)3	24	9-36	±24	416/0	947	5	500	100	200	86	88
	PFD20-36D05A3(C)3	48	18-75	±5	2000/0	484	17	5000	100	200	84	86
	PFD20-36D12A3(C)3	48	18-75	±12	833/0	468	5	1000	100	200	87	89
	PFD20-36D15A3(C)3	48	18-75	±15	667/0	468	5	800	100	200	87	89
	PFD20-36D24A3(C)3	48	18-75	±24	416/0	463	5	500	100	200	88	90

Note 1 - In the part numbers C indicates the part with remote control function, N indicates without Control.

Note 2 - The suffix -H indicates the part with Heat sink, -T (H) indicates a kind of chassis package (with heat sink), -TS (H) indicates a kind of package of DIN Rail (with heat sink) which rail width is 35mm.

Note 3 - The maximum capacitive load is the capacitance allowed to be used when the power supply operates at full load. The converter may not start if the capacitor exceeds this value.

Note 4 - Please contact Aipu sales for other output voltages requirement in this series but not listed in this table.

Input Specifications

Items	Test Conditions	Min.	Typ.	Max.	Unit
Stand-by Power Consumption	Full input voltage range	/	0.1	/	W
Under-Voltage Protection	24V input series	5	7	9	VDC
	48V input series	11	13	18	
Hot Plug	/	N/A			
Input Filter	/	Pi filter			
Remote Control (*Ctrl)	Turn-on the converter	No connection or connect to high level (3.3V-12VDC)			
	Turn-off the converter	Connect to -Vin or connect to low level (0-1.2VDC)			
	Current value to turn off the converter	2mA (Typ.)			

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

Output Specifications

Items	Test Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full input voltage range	+Vo	/	±1	±2	%
		-Vo	/	±1	±3	%
Cross regulation	+Vo: 50% load; -Vo: 10~100% load		/	±3	±5	%
Voltage Regulation	Full voltage range, rated load		/	±0.2	±0.5	%
Load Regulation	10%-100% load		/	±0.5	±1	%
Ripple & Noise	5%-100% load, 20MHz bandwidth		/	100	200	mVp-p
Transient Recovery Time	25% rated load step, nominal input voltage	/	/	250	500	uS
Transient Response Deviation		3.3V/5V output	/	±5	±8	%
		Others	/	±3	±5	%
Turn on Delay Time	Nominal input voltage		/	10	/	mS
Over voltage protection	Full input voltage range		120	160	200	%Vo
Over current protection			110	150	220	%Io
Start-up overshoot voltage			/	/	10	%Vo
Short Circuit Protection			Hiccup, continuous, self-recovery			

Note: Ripple & Noise ≤5%Vo @0%-5% load. The Ripple & Noise are tested by the twisted pair test method, please refer to the following test instruction in this data sheet.

General Specifications

Items	Test Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Operating Mode (PWM)	/	280	/	KHz
Operating Temperature	Refer to the Temperature Derating Graph	-40	/	+105	℃
Storage Temperature	/	-55	/	+125	℃

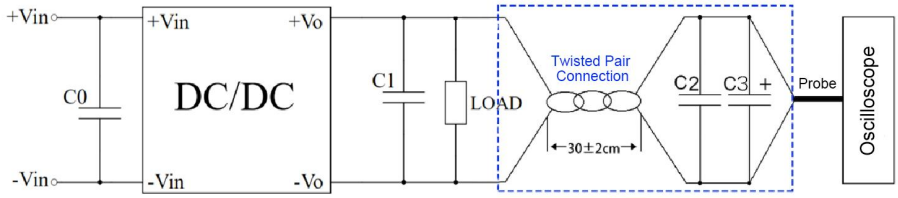
Case Temperature	Within the operating temperature range	/	/	+105	℃
Pin Soldering Temp.	1.5mm from the case, 10S	/	/	300	℃
Relative Humidity	No condensing	5	/	95	%RH
Isolation Voltage	I/P-O/P, test 1min, leakage Current <0.5mA	3000	/	/	VDC
	I/P&O/P-Case, test 1min, leakage Current <0.5mA	1000	/	/	VDC
Insulation Resistance	I/P-O/P, @ 500VDC	1000	/	/	MΩ
Isolation Capacitance	I/P-O/P, 100KHz/0.1V	/	1000	/	pF
MTBF	MIL-HDBK-217F@25℃	1000	/	/	K hours
Cooling Method	Nature air				
Case Material	Aluminum				

Weight/ Dimension	Part No.	Weight (Typ.)	Dimensions L x W x H	
	PFD20-XXDXXA3(C)3	15g	25.4 X 25.4 X 12.5 mm	2.00 X 1.00 X 0.492 inch
	PFD20-XXDXXA3(C)3-H	19g	25.4 X 25.4 X 18.0 mm	2.00 X 1.00 X 0.708 inch
	PFD20-XXDXXA3(C)3-T	37g	76.0 X 31.5 X 21.3 mm	2.99 X 1.24 X 0.838 inch
	PFD20-XXDXXA3(C)3-TH	40g	76.0 X 31.5 X 26.0 mm	2.99 X 1.24 X 1.023 inch
	PFD20-XXDXXA3(C)3-TS	57g	76.0 X 31.5 X 26.0 mm	2.99 X 1.24 X 1.023 inch
	PFD20-XXDXXA3(C)3-TSH	60g	76.0 X 31.5 X 30.8 mm	2.99 X 1.24 X 1.212 inch

EMC Performance

Total Item		Sub Item	Test Standard	Performance/Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B (with the EMC Recommended Circuit)
		RE	CISPR32/EN55032	CLASS B (with the EMC Recommended Circuit)
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B (With the EMC Recommended Circuit)
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B (With the EMC Recommended Circuit)
		ESD	IEC/EN61000-4-2	Contact ±6KV/ Air ±8KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B (With the EMC Recommended Circuit)
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B (With the EMC Recommended Circuit)

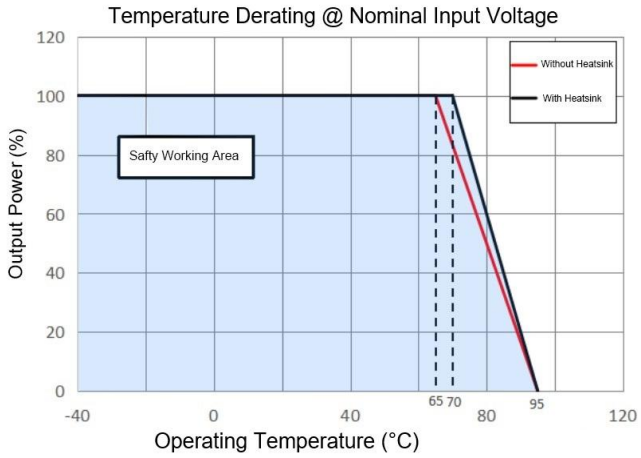
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHZ bandwidth)



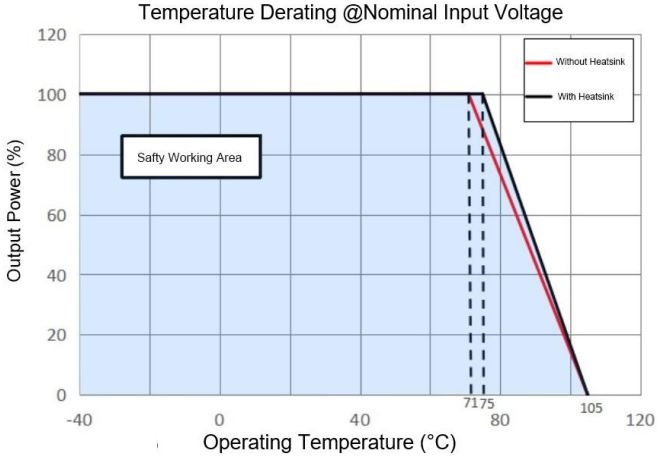
1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C2(0.1uF) polypropylene capacitor and C3(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair. C0 & C1 refer to the application circuit recommended.

2) The power supply output connects to the load by the cables. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the polarity of the output and the oscilloscope probe should not be reversed. The test can be started after input power on.

Product Characteristics Graphs



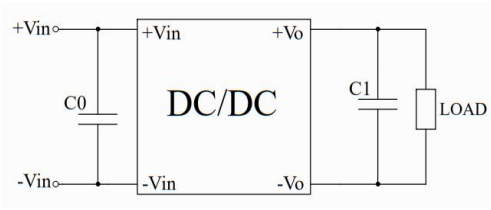
±5V Output



±12V,±15V,±24V Outputs

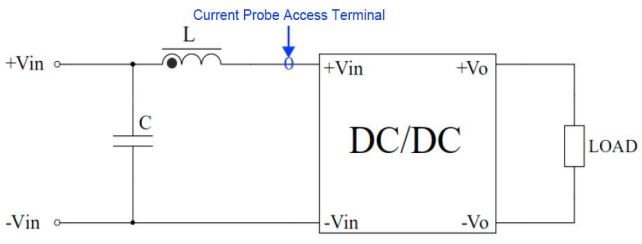
Recommended Circuit Diagrams for Application

1. DC/DC typical test circuit diagram



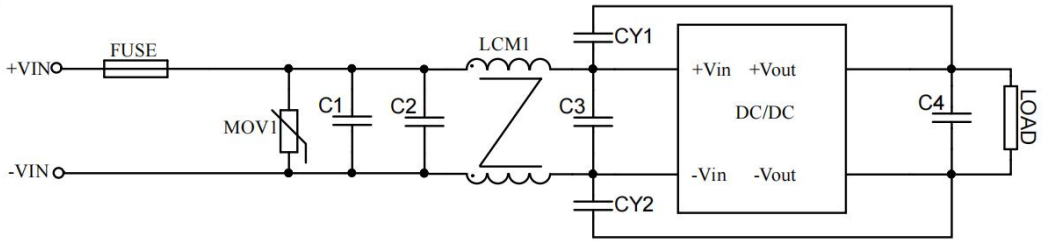
Component	Parameters
C0	47-100uF/100V
C1	10-22uF/100V

2. Input reflected ripple current test circuit diagram



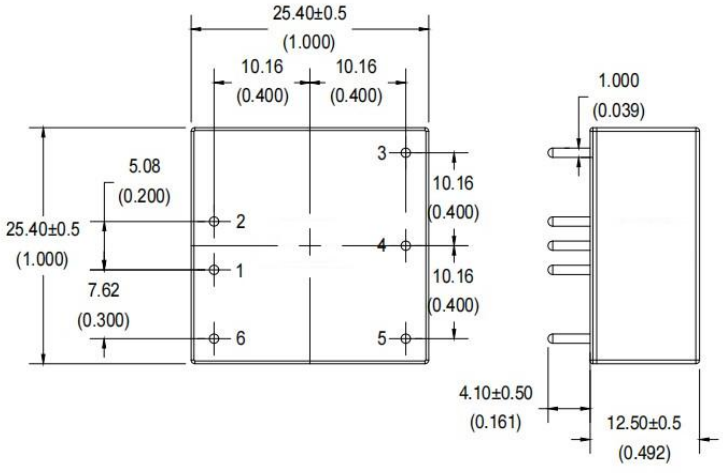
Component	Parameters
C	220uF/100V
L	4.7uH/15A

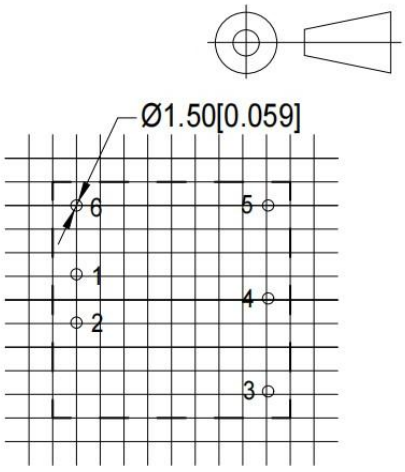
3. The Recommended EMC circuit diagram



Components	Vin=24VDC	Vin=48VDC
FUSE	TBD by the customer	
MOV1	14D560K	14D101K
C1, C2, C3	330uF/50V	330uF/100V
C4	47uF/50V	
LCM1	5mH	
CY1, CY2	2.2nF/3000V	

A3 Mechanical Dimensions (without heat sink)



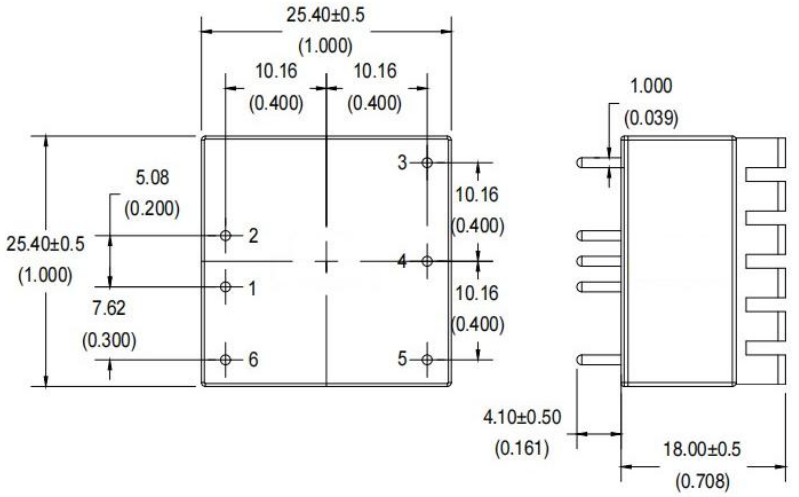


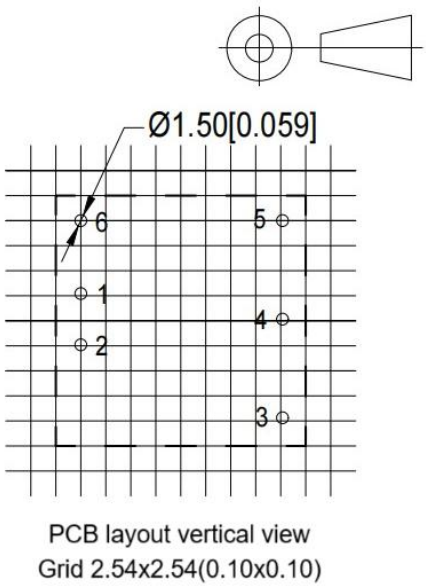
PCB layout vertical view
Grid 2.54x2.54(0.10x0.10)

Unit: mm(inch)
Pin diameter tolerance ±0.10(±0.004)
General tolerance ±0.50(±0.020)

Pin No.	1	2	3	4	5	6
PFD20-XXDXXA3C3	-Vin	+Vin	+Vout	COM	-Vout	CTRL

A3-H Mechanical Dimensions (with heat sink)



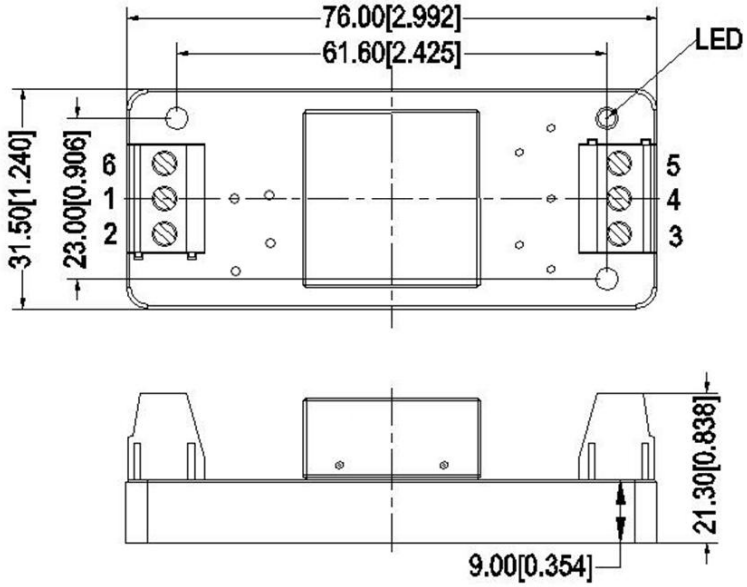


PCB layout vertical view
Grid 2.54x2.54(0.10x0.10)

Unit: mm(inch)
Pin diameter tolerance ±0.10(±0.004)
General tolerance ±0.50(±0.020)

Pin No.	1	2	3	4	5	6
PFD20-XXDXXA3C3	-Vin	+Vin	+Vout	COM	-Vout	CTRL

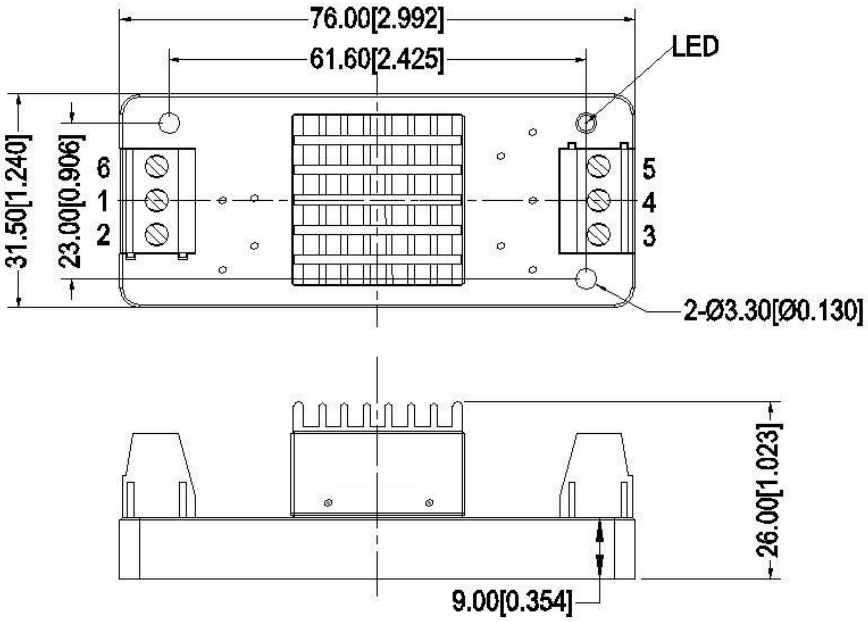
A3-T Mechanical Dimensions (without heat sink)



Unit: mm[inch]
Lead Wires Size: 24-12AWG
Screwing Torque: 0.4N.m Max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
PFD20-XXDXXA3C3	-Vin	+Vin	+Vout	COM	-Vout	CTRL

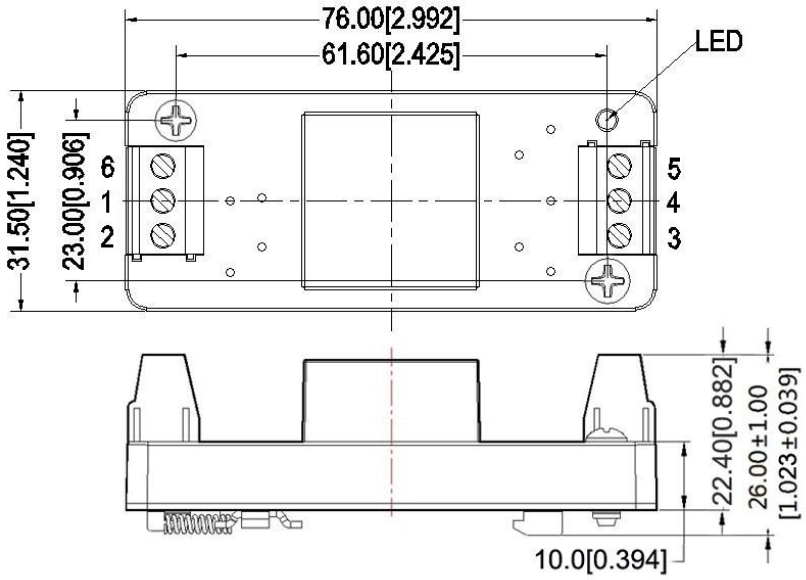
A3-TH Mechanical Dimensions (with heat sink)



Unit: mm[inch]
Lead Wires Size: 24-12AWG
Screwing Torque: 0.4N.m Max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
PFD20-XXDXXA3C3	-Vin	+Vin	+Vout	COM	-Vout	CTRL

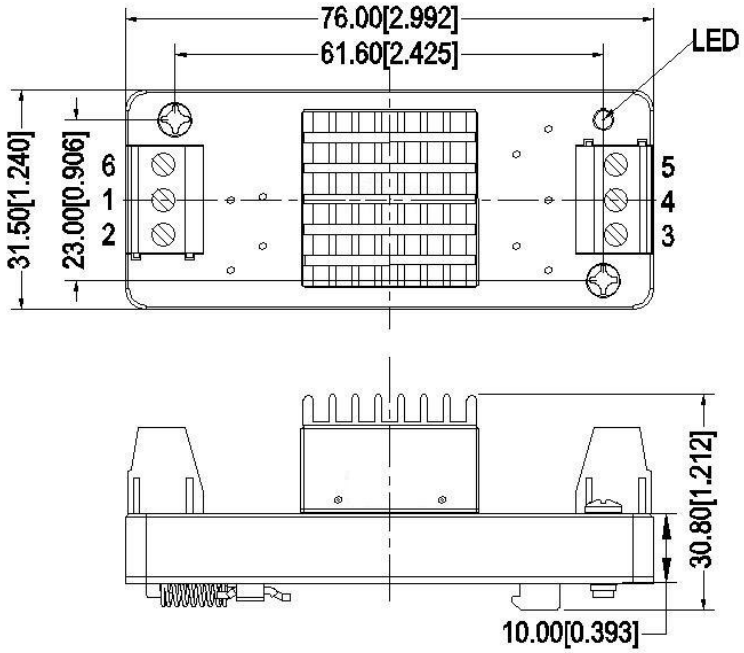
A3-TS Mechanical Dimensions (without heat sink)



Unit: mm[inch]
Lead Wires Size: 24-12AWG
Screwing Torque: 0.4N.m Max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
PFD20-XXDXXA3C3	-Vin	+Vin	+Vout	COM	-Vout	CTRL

A3-TSH Mechanical Dimensions (with heat sink)



Unit: mm[inch]
Lead Wires Size: 24-12AWG
Screwing Torque: 0.4N.m Max
General tolerance ±1.00[±0.039]

Terminal No.	1	2	3	4	5	6
PFD20-XXDXXA3C3	-Vin	+Vin	+Vout	COM	-Vout	CTRL

Others Model Pin Function Definition

Pin No.	1	2	3	4	5	6
PFD20-XXDXXA3N3	-Vin	+Vin	+Vout	COM	-Vout	No Pin

Application Notice

1.The products should be used according to the specifications in this datasheet, otherwise it could be permanently damaged.

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

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

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

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

6.The specifications are specially for the parts listed in 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.

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