

## Product Feature

1. Package Type: DIP 24
2. Operating temperature range: -40°C - +85°C
3. High efficiency up to 85%
4. Isolation voltage: 6000VDC
5. The mechanism has input undervoltage protection,
6. output short circuit protection and over current protection
7. Ultra-wide input voltage range
8. Fields of application: Power, medical treatment, energy storage system, etc



3 years Warranty

## Selection Guide

Part No.	Input Voltage (VDC)		Output		Full Load Efficiency% (Typ.)	Capacitive Load(μF) Max.
	Nominal (Range)	Maximum	Voltage (VDC)	Current (mA)		
ATH2405P-6WR3	24 (9-36)	40	5	1200/0	78/80	2700
ATH2406P-6WR3			6	1000/0	79/81	2200
ATH2409P-6WR3			9	667/0	81/83	1800
ATH2412P-6WR3			12	500/0	82/84	1000
ATH2415P-6WR3			15	400/0	83/85	680
ATH2418P-6WR3			18	333/0	83/85	1200
ATH2424P-6WR3			24	250/0	82/84	470
ATH4805P-6WR3	48 (18-75)	80	5	1200/0	79/81	2700
ATH4809P-6WR3			9	667/0	81/83	1800
ATH4812P-6WR3			12	500/0	82/84	1000
ATH4815P-6WR3			15	400/0	83/85	680
ATH4824P-6WR3			24	250/0	82/84	470

## Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Input Current(full load/no-load)	24VDC nominal input series	--	309/5	317/8	mA
	48VDC nominal input series	--	154/4	159/7	
Reflected Ripple Current	24VDC nominal input series	--	20	--	
	48VDC nominal input series				
Impulse Voltage	24VDC nominal input series	-0.7	--	50	VDC
	48VDC nominal input series	-0.7	--	100	
Starting Voltage	24VDC nominal input series	--	--	9	
	48VDC nominal input series	--	--	18	
Undervoltage Protection	24VDC Input	5.5	6.5	--	
	48VDC Input	12	15.5	--	
Start time	nominal input voltage	--	10	--	ms
Input Filter		PI filter			
Hot Plug		Unavailable			

## Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy		--	±1	±3	%
Linear Regulation	Full load, Input voltage from low limit to high limit	--	±0.2	±0.5	
Load Regulation	5% - 100% Load	--	±0.5	±1	
Ripple & Noise	20MHZ Bandwidth (0% - 5% Load)	--	100	180	mVp-p
Transient Recovery Time	25% load step change	--	300	500	µs
Transient Response Deviation		--	±3	±5	%
Temperature Coefficient	Full load	--	--	±0.03	%/°C
Over Current Protection	input voltage range	110	150	160	%Io
Over Voltage Protection		110	--	160	%Vo
Short-circuit Protection		Continuous, Self-Recovery			
① 0% -100% load working condition test, the index of load adjustment rate is ± 5;					
② 0% to 5% load ripple & noise less than or equal to 5% Vo.					

## General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	6000	--	--	VDC
Insulation Resistance	Input-output, insulated voltage 500VDC	10000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	13	20	pF
leakage current	240VAC/60Hz	--	3.6	5	uA
Application		CF			
Reinforced insulation	Transformer creepage distance	8.00	--	--	mm
	Transformer electrical clearance	5.00	--	--	
	PCB electrical clearance & creepage distance	8.00	--	--	
	Optical coupling electrical clearance	8.00	--	--	
working temperature	Temperature 71°C drop (see Figure 1)	-40	--	85	°C
Storage Temperature		-55	--	+125	
Storage Humidity	Non-condensing	5	--	95	%RH
Vibration		10-55Hz,2G,30Min.along X,Y and Z			
Soldering Profile	1.5mm from case for 10 sec	--	--	300	°C
Switching Frequency	PWM mode (nominal, full load)	--	300	--	kHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	K Hours
Safety standards		EN60601-1:2006+A1:2013			
Insulation protection grade	240VAC/60Hz	2xMOPP			
When the load decreases below 50%, the switching frequency decreases with decreasing load.					

### Mechanical Specifications

<b>Case Material</b>	Black flame retardant heat resistant plastic (UL 94V-0 rated)
<b>Package Dimensions</b>	31.60 * 20.30 * 10.20mm
<b>Weight</b>	13.00g (Typ.)
<b>Cooling Method</b>	Free air convection

### EMC Specifications

<b>EMI</b>	CE	CISPR32/EN55032 CLASS A(open board)	
		CISPR32/EN55032 CLASS B (application circuit 3-②)	
<b>EMS</b>	ESD	IEC/EN61000-4-2 Contact±6KV	perf. CriteriaB
	EFT	IEC/EN61000-4-4 ±2KV	perf. CriteriaB
	Surge	IEC/EN61000-4-5 ±6KV	Perf.Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	Perf.Criteria A
	Voltage dips, drops and short interruption immunity	IEC/EN61000-4-29 0-70%	perf. Criteria B

### Typical Characteristic Curves

**Temperature Derating Curve**

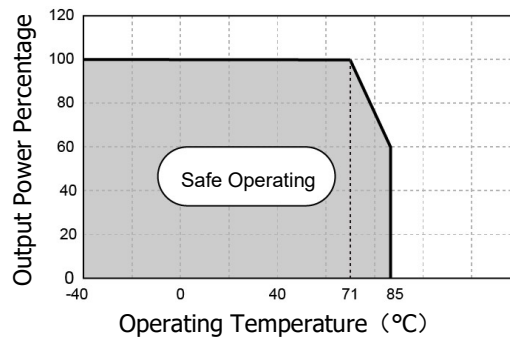
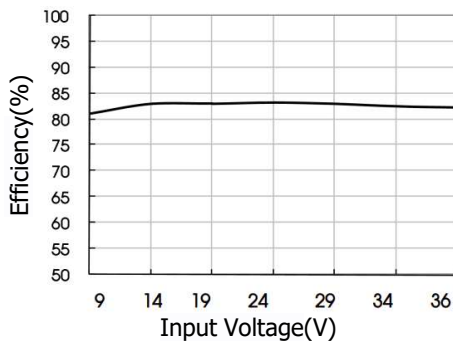
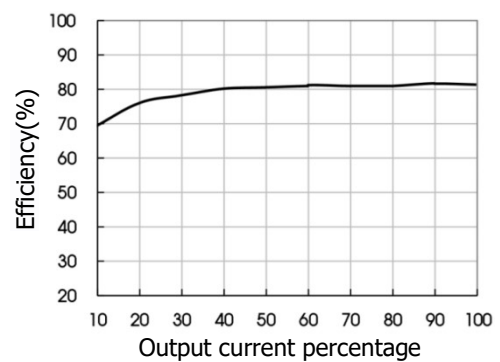


Fig 1

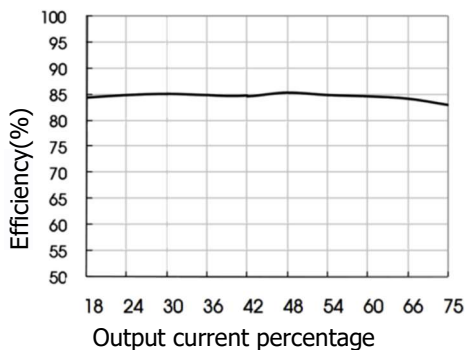
Efficiency VS input voltage (full load) (24V)



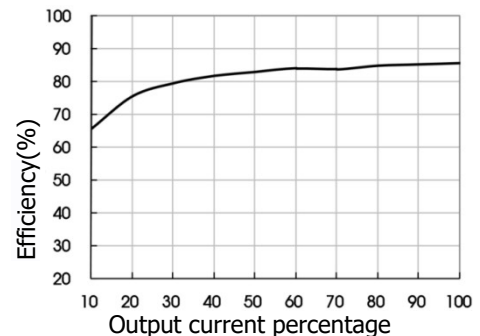
Efficiency VS output load (Vin=24VDC)



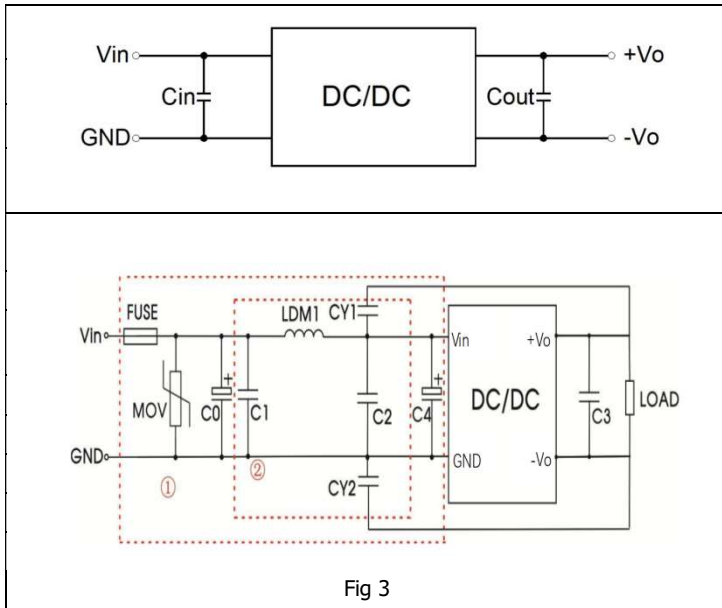
Efficiency VS input voltage (full load) (48V)



Efficiency VS input voltage (full load) (48V)



### Typical Circuit Design And Application



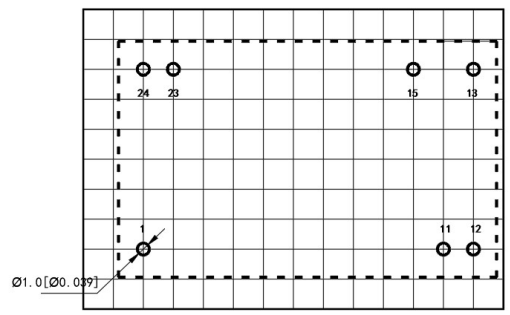
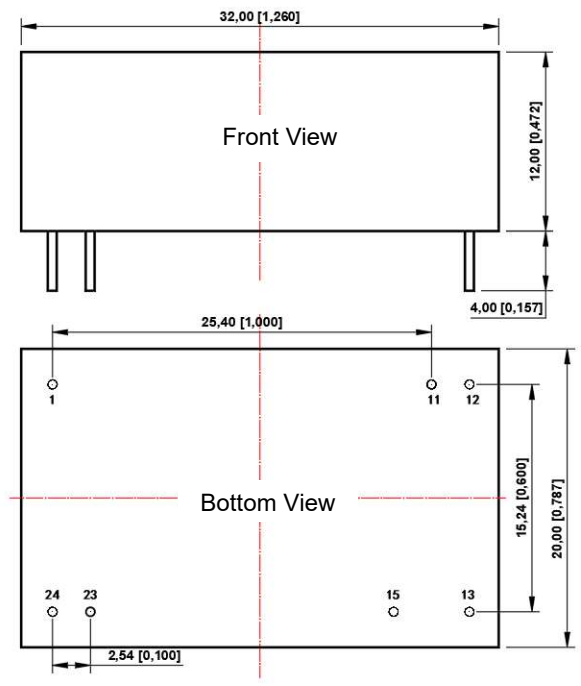
Recommended component parameters		
Vin	Cin	Cout
24VDC	100uF	10uF
48VDC	10uF~47uF	10uF

EMI recommended component parameters		
Model	Vin: 24VDC	Vin: 48VDC
FUSE	Select according to the actual input current of the customer	
MOV	20D470K	14D101K
C0、C4	330uF/50V	330uF/100V
C1、C2	10uF/50V	--
C3	Refer to Figure 2 Cout parameter	
LCM	10uH	
CY1、CY2	1nF/6KV	

### Dimensions and Recommended Layout

Dimensions	PCB Printing Layout & Pin Definition Table
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Note: The grid distance is 2.54\*2.54mm

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

Pin	Function (Single)
1	Vin
11	No Pin
12	-Vo
13	+Vo
15	No Pin
23	GND
24	GND

**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  $T_a=25^{\circ}\text{C}$ , 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;