## Product Feature

1. Package Type：1″X 1″
2. Operating temperature range: -40℃ - +105℃
3. Isolation voltage：1500VDC
4. High efficiency up to 91%
5. The mechanism has input undervoltage protection, output short circuit protection and over current protection
6. 4:1 Ultra-wide input voltage range
7. Fields of application：Power, industrial control, communications, Internet of Things, automotive, etc


RoHS CE 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) | | |
| ATB2403YMD-15WR3 | 24 (9-36) | 40 | 3.3 | 4000/0 | 88 | 4700 |
| ATB2405YMD-15WR3 | | | 5 | 3000/0 | 90 | 4700 |
| ATB2412YMD-15WR3 | | | 12 | 1250/0 | 90 | 1000 |
| ATB2415YMD-15WR3 | | | 15 | 1000/0 | 91 | 820 |
| ATB2418YMD-15WR3 | | | 18 | 833/0 | 90 | 470 |
| ATB2424YMD-15WR3 | | | 24 | 625/0 | 91 | 270 |
| ATA2405YMD-15WR3 | | | ±5 | ±1500/0 | 87 | #1500 |
| ATA2410YMD-15WR3 | | | ±10 | ±750/0 | 87 | #1000 |
| ATA2412YMD-15WR3 | | | ±12 | ±625/0 | 90 | #470 |
| ATA2415YMD-15WR3 | | | ±15 | ±500/0 | 90 | #330 |
| ATA2424YMD-15WR3 | | | ±24 | ±312/0 | 89 | #200 |
| ATB4803YMD-15WR3 | 48 (18-75) | 80 | 3.3 | 4000/0 | 86/88 | 4700 |
| ATB4805YMD-15WR3 | | | 5 | 3000/0 | 88/90 | 4700 |
| ATB4812YMD-15WR3 | | | 12 | 1250/0 | 89/91 | 1000 |
| ATB4815YMD-15WR3 | | | 15 | 1000/0 | 89/91 | 820 |
| ATB4824YMD-15WR3 | | | 24 | 625/0 | 89/91 | 270 |
| ATA4805YMD-15WR3 | | | ±5 | ±1500/0 | 84/86 | #1500 |
| ATA4812YMD-15WR3 | | | ±12 | ±625/0 | 87/89 | #470 |
| ATA4815YMD-15WR3 | | | ±15 | ±500/0 | 87/89 | #330 |
| ATA4824YMD-15WR3 | | | ±24 | ±312/0 | 88/90 | #200 |

#each output

## Input Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Input Current (full load/no-load) | 24VDC nominal input series | 3.3VDC | -- | 625/30 | 640/50 | mA |
| | | 5VDC | -- | 694/30 | 710/50 | |
| | | 12VDC | -- | 694/6 | 710/15 | |
| | | 15VDC | -- | 687/6 | 703/15 | |
| | | 24VDC | -- | 687/10 | 703/20 | |
| | 48VDC nominal input series | 3.3VDC | -- | 313/15 | 320/30 | |
| | | 5VDC | -- | 348/15 | 356/30 | |
| | | 12VDC | -- | 344/3 | 352/11 | |
| | | 15VDC | -- | 344/3 | 352/11 | |
| | | 24VDC | -- | 344/4 | 352/11 | |
| Reflected Ripple Current | nominal input series | | -- | 30 | -- | |
| 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 | |
| Input undervoltage protection | 24VDC nominal input series | | 5.5 | 6.5 | -- | |
| | 48VDC nominal input series | | 12.0 | 15.5 | -- | |
| Ctrl | turn off module | | connected GND or (0-1.2V) | | | |
| | turn on module | | No connected or (3.5-12V) | | | |
| | Input current when off | | -- | 2 | 7 | mA |
| Input Filter | | | PI filter | | | |

## Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|
| Output Voltage Accuracy | 0%-100% load | -- | ±1.0 | ±3.0 | % |
| Linear Regulation | Vin=Min. to Max. @Full Load | -- | ±0.2 | ±0.5 | |
| Load Regulation | 5%-100% load | -- | ±0.5 | ±1.0 | |
| Ripple & Noise | 20MHz bandwidth,100% load | -- | 50 | 100 | mVp-p |
| Transient Recovery Time | 25% Load Step Change,nominal input voltage | -- | 300 | 500 | μs |
| Transient Response | | -- | ±3 | ±8 | % |
| Temperature Coefficient | Full Load | -- | ±0.01 | ±0.02 | %/℃ |
| Trim | input voltage range | 90 | -- | 110 | % |
| Over Voltage Protection | | 110 | -- | 160 | % |
| Over Current Protection | | 110 | 150 | 190 | % |
| Short-Circuit Protection | | Continuous, Self-Recovery | | | |

## General Specifications

| Item | Operating Conditions | | Min. | Typ. | Max. | Unit |
|---|---|---|---|---|---|---|
| Isolation Voltage | Input-output, test time 1 minute, leakage current less than 1mA | | 1500 | -- | -- | VDC |
| Insulation Resistance | Input-output, insulated voltage 500VDC | | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output, 100KHz/0.1V | | -- | 2000 | -- | pF |
| Operating Temperature | See Fig 1 | 3.3V、5VDC | -40 | -- | +95 | ℃ |
| | | Others | -40 | -- | +105 | |
| Storage Temperature | | | -50 | -- | +125 | |
| Storage Humidity | Non-condensing | | -- | -- | 95 | %RH |
| Soldering Profile | 1.5mm from case for 10 sec | | -- | -- | 300 | ℃ |
| Switching Frequency | Full load, nominal input voltage | | -- | 300 | -- | kHz |
| MTBF | MIL-HDBK-217F@25℃ | | 1000 | | | K Hours |

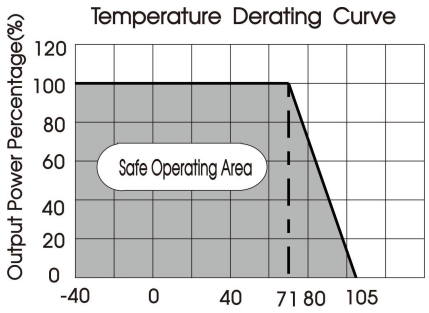
## Mechanical Specifications

| | |
|---|---|
| **Case Material** | Aluminum alloy |
| **Package Dimensions** | 25.4mm * 25.40mm * 11.70 mm |
| **Weight** | 15.65g(Typ.) |
| **Cooling Method** | Free air convection |

## EMC Specifications

| | | | |
|---|---|---|---|
| **EMI** | CE | CISPR32/EN55032 CLASS A (without external components)/CLASS B (see Fig.3-② for recommended circuit) | |
| | RE | CISPR32/EN55032 CLASS A (without external components)/CLASS B (see Fig.3-② for recommended circuit) | |
| **EMS** | ESD | IEC/EN61000-4-2 Contact±6KV/Air ±8KV | perf. Criteria B |
| | RS | IEC/EN61000-4-3 10V/m | perf. Criteria A |
| | EFT | IEC/EN61000-4-4 ±2KV(see Fig.3-① for recommended circuit) | perf. Criteria B |
| | Surge | IEC/EN61000-4-5 line to line±2KV(see Fig.3-① for recommended circuit) | perf. Criteria B |
| | CS | IEC/EN61000-4-6 3 Vr.m.s | perf. Criteria A |

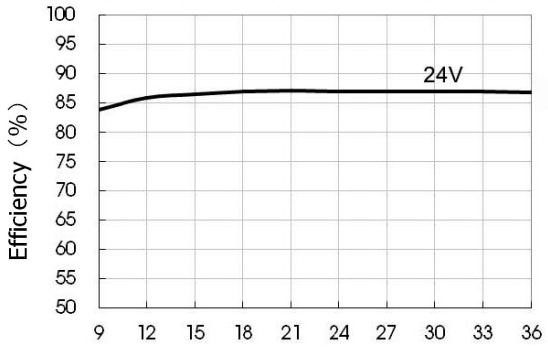
## Typical Characteristic Curves




Operating Temperature（℃）

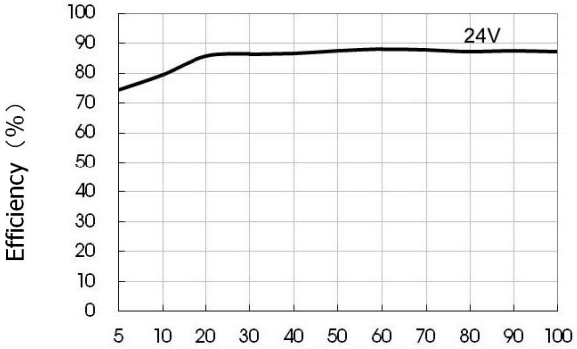
Fig 1

Efficiency Vs Input Voltage (Full Load)



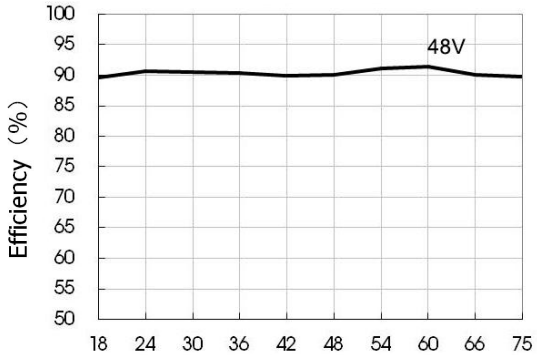

Input Voltage（V）

Efficiency Vs Output Voltage (Vin=24V)



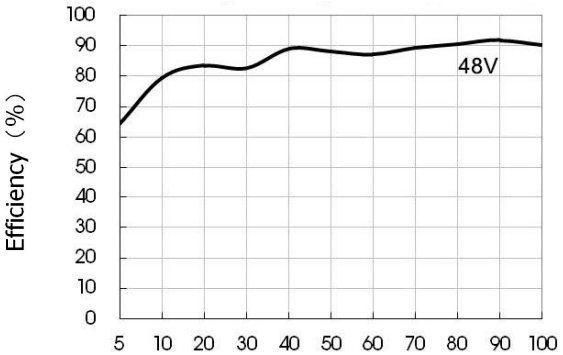

Output Voltage Percentage（%）

Efficiency Vs Input Voltage (Full Load)




Input Voltage（V）

Efficiency Vs Output Voltage (Vin=48V)




Output Voltage Percentage（%）

## Typical Circuit Design And Application

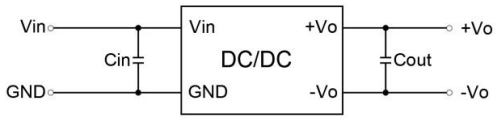



Fig 2

| recommended component parameters | | |
|---|---|---|
| Vout(VDC) | Cin(uF) | Cout(uF) |
| 3.3/5/12/15 | 100uF | 100uF |
| 24 | | 47uF |

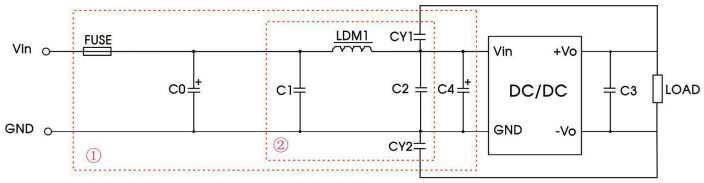
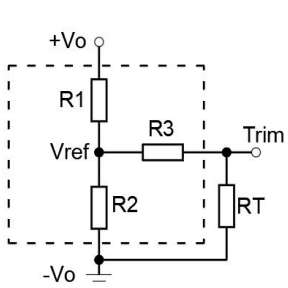
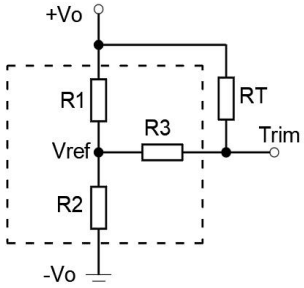



Fig 3

| EMI recommended component parameters | | |
|---|---|---|
| Model | Vin:24V | Vin:48V |
| FUSE | Choose according to actual input current | |
| C0、C4 | 330μF/50V | 330μF/100V |
| C1、C2 | 4.7μF/50V | 4.7μF/100V |
| C3 | Refer to the Cout in Fig.2 | |
| LDM1 | 2.2uH/4A | 2.2uH/2A |
| CY1、CY2 | 1nF/2KV | |




Trim up




Trim down

Trim resistor connections (dashed line shows internal resistor network)

| Trim | | | | |
|---|---|---|---|---|
| Vout(V) | R1(KΩ) | R2(KΩ) | R3(KΩ) | Vref(V) |
| 3.3 | 10 | 6.064 | 13.622 | 1.24 |
| 5 | 2.4 | 2.344 | 13.622 | 2.5 |
| 12 | 8.2 | 2.153 | 17.346 | 2.5 |
| 15 | 12 | 2.388 | 21.016 | 2.5 |
| 24 | 10 | 1.158 | 10.714 | 2.5 |

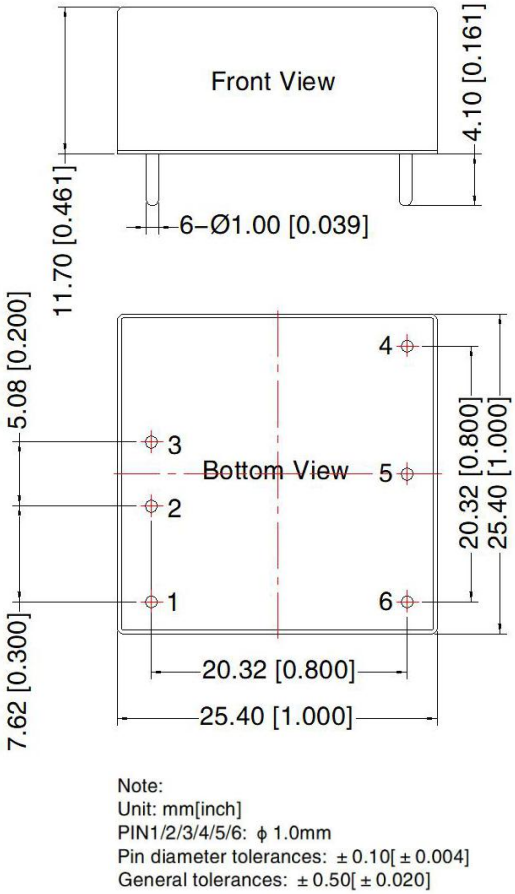
$$Up:\ \mathrm{Rt} = \frac{nR2}{R2-n} - R3 \qquad \mathrm{n} = \frac{Vref}{Vo-Vref} * R1$$

$$Down:\ \mathrm{Rt} = \frac{nR1}{R1-n} - R3 \qquad \mathrm{n} = \frac{Vo-Vref}{Vref} * R2$$

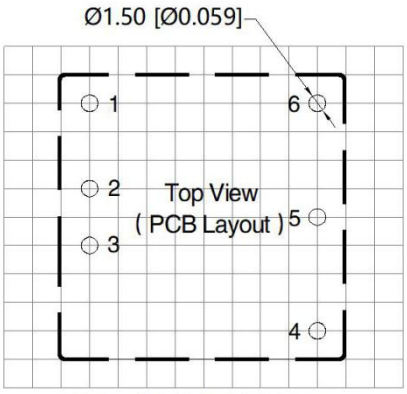
All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series resistance). Also make sure that the capacitance is not exceeding the specified max. capacitive load value of the product.

## Dimensions and Recommended Layout

Horizontal Package Dimensions




Note:
Unit: mm[inch]
PIN1/2/3/4/5/6: ϕ 1.0mm
Pin diameter tolerances: ± 0.10[ ± 0.004]
General tolerances: ± 0.50[ ± 0.020]




Note: Grid 2.54*2.54mm

| Pin-Out | |
|---|---|
| Pin | Mark |
| 1 | Ctrl |
| 2 | GND |
| 3 | Vin |
| 4 | +Vo |
| 5 | 0V |
| 6 | –Vo |

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;