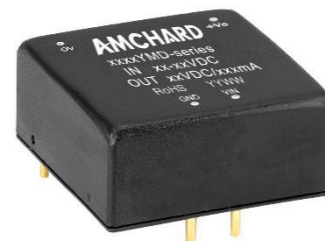


Product Feature

1. Package Type: 1"X 1"
2. Input voltage range: 4:1
3. Operating temperature range: -40°C - +105°C
4. Isolation voltage: 1500VDC
5. High efficiency: 91% (Typ.)
6. The mechanism has input undervoltage protection,
7. Output short circuit protection and over current protection
8. Fields of application: Power, industrial control, communications, Internet of Things, automotive


**3 years
Warranty**

Selection Guide

| Part No. | Input Voltage (VDC) | | Output | | Full Load Efficiency% (Typ.) | Capacitive Load (μF) Max. |
|------------------|---------------------|------|----------------------|--------------------------|------------------------------|---------------------------|
| | Nominal (Range) | Max. | Output Voltage (VDC) | Output Current (mA) Max. | | |
| ATB2403YMD-20WR3 | 24 (9-36) | 40 | 3.3 | 5000 | 88 | 10000 |
| ATB2405YMD-20WR3 | 24 (9-36) | 40 | 5 | 4000 | 90 | 10000 |
| ATB2406YMD-20WR3 | 24 (9-36) | 40 | 6 | 3333 | 89 | 10000 |
| ATB2412YMD-20WR3 | 24 (9-36) | 40 | 12 | 1667 | 90 | 1600 |
| ATB2415YMD-20WR3 | 24 (9-36) | 40 | 15 | 1333 | 91 | 1000 |
| ATB2424YMD-20WR3 | 24 (9-36) | 40 | 24 | 833 | 91 | 500 |
| ATA2405YMD-20WR3 | 24 (9-36) | 40 | ±5 | ±2000 | 87 | #2000 |
| ATA2412YMD-20WR3 | 24 (9-36) | 40 | ±12 | ±833 | 90 | #800 |
| ATA2415YMD-20WR3 | 24 (9-36) | 40 | ±15 | ±667 | 90 | #600 |
| ATA2424YMD-20WR3 | 24 (9-36) | 40 | ±24 | ±417 | 89 | #300 |
| ATB4803YMD-20WR3 | 48 (18-75) | 80 | 3.3 | 5000 | 88 | 10000 |
| ATB4805YMD-20WR3 | 48 (18-75) | 80 | 5 | 4000 | 90 | 10000 |
| ATB4812YMD-20WR3 | 48 (18-75) | 80 | 12 | 1667 | 91 | 1600 |
| ATB4815YMD-20WR3 | 48 (18-75) | 80 | 15 | 1333 | 91 | 1000 |
| ATB4824YMD-20WR3 | 48 (18-75) | 80 | 24 | 833 | 91 | 500 |
| ATA4805YMD-20WR3 | 48 (18-75) | 80 | ±5 | ±2000 | 86 | #2000 |
| ATA4812YMD-20WR3 | 48 (18-75) | 80 | ±12 | ±833 | 90 | #800 |
| ATA4815YMD-20WR3 | 48 (18-75) | 80 | ±15 | ±667 | 90 | #600 |
| ATA4824YMD-20WR3 | 48 (18-75) | 80 | ±24 | ±417 | 90 | #300 |

#Each output

Input Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit | |
|----------------------------------|---------------------------|---------------------------|-------|--------|------|----|
| Input Current(full load/no-load) | 24VDCnominal input series | 3.3VDC Output | -- | 782/30 | -- | mA |
| | | 5VDC Output | -- | 926/35 | -- | |
| | | 9VDC Output | -- | 936/50 | -- | |
| | | 12VDC Output | -- | 926/6 | -- | |
| | | 15VDC Output | -- | 916/6 | -- | |
| | | 24VDC Output | -- | 916/10 | -- | |
| | 48VDCnominal input series | 3.3VDC Output | -- | 391/15 | -- | mA |
| | | 5VDC Output | -- | 463/20 | -- | |
| | | 12VDC Output | -- | 458/3 | -- | |
| | | 15VDC Output | -- | 458/3 | -- | |
| 24VDC Output | | -- | 458/4 | -- | | |
| Reflected Ripple Current | Rated input voltage | -- | 30 | -- | mA | |
| Impulse Voltage | 24VDCnominal input series | -0.7 | -- | 50 | VDC | |
| | 48VDCnominal input series | -0.7 | -- | 100 | | |
| Starting Voltage | 24VDCnominal input series | -- | -- | 9 | VDC | |
| | 48VDCnominal input series | -- | -- | 18 | | |
| Input undervoltage protection | 24VDCnominal input series | 5.5 | 6.5 | -- | VDC | |
| | 48VDCnominal input series | 12 | 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 | -- | 5 | 8 | mA | |
| Input Filter | PI filter | | | | | |

Output Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|------------------------------|---|---------------------------|-------|-------|-------|
| Output Voltage Accuracy | 5%-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,5%-100% load | -- | 100 | 200 | mVp-p |
| Transient Recovery Time | 25% Load Step Change, nominal input voltage | -- | 250 | 500 | µs |
| Transient Response Deviation | 25% Load Step Change, nominal input voltage | -- | ±3 | ±8 | % |
| Temperature Coefficient | Full Load | -- | ±0.01 | ±0.02 | %/°C |
| Trim | Rated input voltage | -- | ±10.0 | -- | % |
| Over Voltage Protection | Rated input voltage | 110 | 150 | -- | % |
| Over Current Protection | Rated input voltage | 110 | 150 | -- | % |
| Short-Circuit Protection | Rated input voltage | Continuous, Self-Recovery | | | |

General Specifications

| Item | Operating Conditions | Min. | Typ. | Max. | Unit |
|-----------------------|--|------|------|------|---------|
| Isolation Voltage | I-O, test time 1 minute, leakage current less than 1mA | 1500 | -- | -- | VDC |
| | I-H, test time 1 minute, leakage current less than 1mA | 500 | -- | -- | |
| Insulation Resistance | Input-output, insulated voltage 500VDC | 1000 | -- | -- | MΩ |
| Isolation Capacitance | Input-output, 100KHz/0.1V | -- | 2000 | -- | pF |
| Operating Temperature | See Fig 1 | -40 | -- | +105 | °C |
| Storage Temperature | | -55 | -- | +125 | °C |
| Storage Humidity | Non-condensing | -- | -- | 95 | %RH |
| Soldering Profile | 1.5mm from case for 10 sec | -- | -- | 300 | °C |
| Switching Frequency | Full load, nominal input voltage | -- | 330 | -- | kHz |
| MTBF | MIL-HDBK-217F@25°C | 1000 | -- | -- | K Hours |

Mechanical Specifications

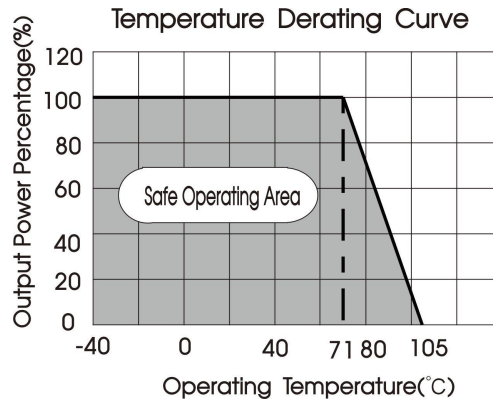
| | |
|---------------------------|-------------------------|
| Case Material | Aluminum alloy |
| Package Dimensions | 25.4 X 25.40 X 11.70 mm |
| Weight | 21.00g(Typ.) |
| Cooling Method | Free air convection |

EMC Specifications

| | | | |
|------------|-------|--|-----------------|
| EMI | CE | CISPR32/EN55032 | CLASS A |
| | RE | CISPR32/EN55032 | CLASS A |
| EMS | ESD | IEC/EN61000-4-2 Contact±6KV,Air ±8KV | perf. CriteriaB |
| | RS | IEC/EN61000-4-3 10V/m | perf. CriteriaA |
| | EFT | IEC/EN61000-4-4 ±2KV (Recommended circuit diagram 3-①) | perf. CriteriaA |
| | Surge | IEC/EN61000-4-5 line to line±2KV (Recommended circuit diagram 3-①) | perf. CriteriaB |
| | CS | IEC/EN61000-4-6 3 Vr.m.s | perf. CriteriaA |

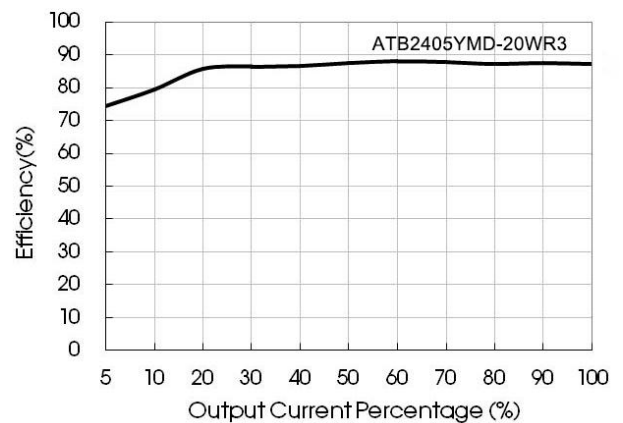
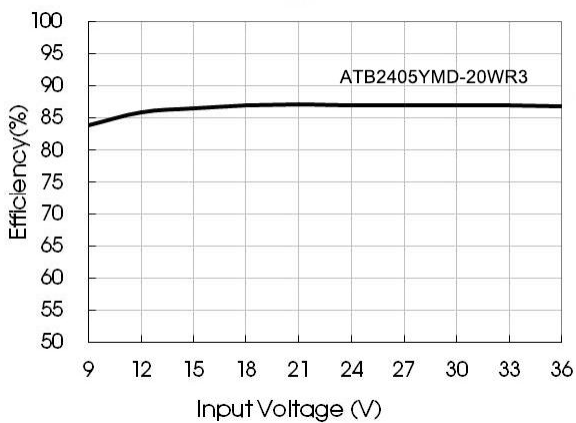
Typical Characteristic Curves

Temperature Derating Curve (Figure 1)



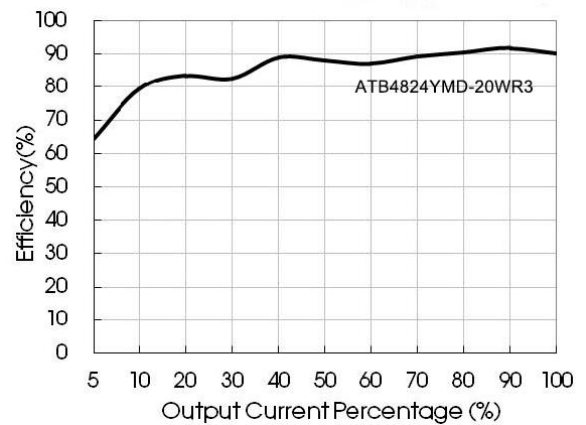
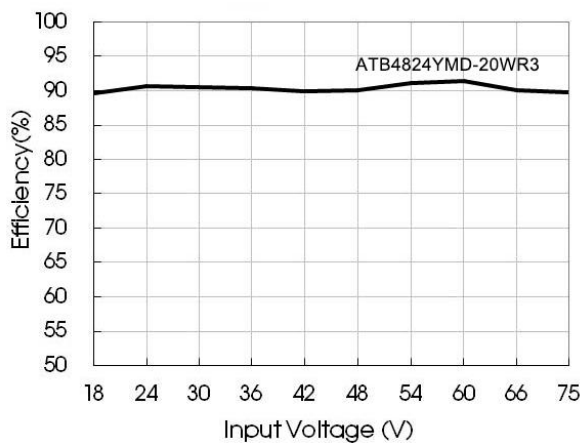
Efficiency Vs Input Voltage (Full Load)

Efficiency Vs Output Voltage (Vin=24V)



Efficiency Vs Input Voltage (Full Load)

Efficiency Vs Output Voltage (Vin=48V)



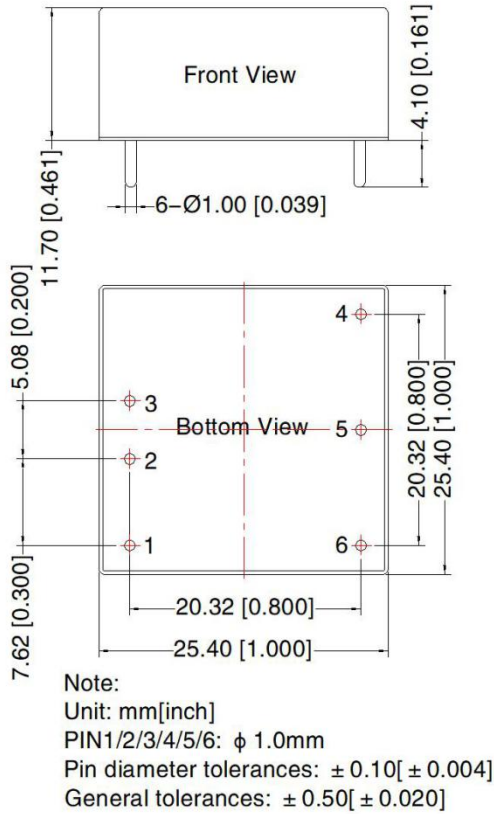
Typical Circuit Design And Application

| Figure 2 | | Recommended component parameters | | | |
|--|----------|---|------------|--------|---------|
| | Vin(VDC) | Cin | Cout | | |
| | 24 | 100uF | 10uF | | |
| | 48 | 10uF-47uF | 10uF | | |
| Figure 3 | | EMI Recommended component parameters | | | |
| | Vin(VDC) | 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 | | | |
| Figure 4 | | Trim Recommended component parameters | | | |
| <p>Trim up</p> <p>Trim down</p> <p>Trim resistor connections (dashed line shows internal resistor network)</p> | 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 |
| $Up : R_t = \frac{nR_2}{R_2 - n} - R_3$ $Down : R_t = \frac{nR_1}{R_1 - n} - R_3$ | | $n = \frac{V_{ref}}{V_o - V_{ref}} * R_1$ $n = \frac{V_o - V_{ref}}{V_{ref}} * R_2$ | | | |

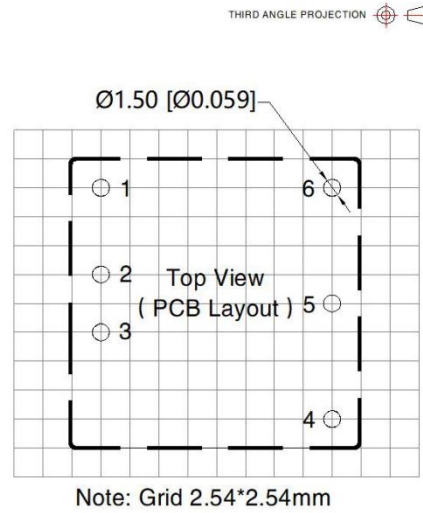
All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series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

Dimensions and Recommended Layout

Dimensions



PCB Printing Layout



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

Note:

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
2. It is recommended to use at a load of over 5%. If the load is below 5%, the ripple index of the product may exceed the specifications, but it does not affect the reliability of the product;
3. Suggested dual output module load imbalance: $\leq \pm 5\%$. If it exceeds $\pm 5\%$, it cannot be guaranteed that the product performance meets all performance indicators in this manual;
4. The maximum capacitive load is tested within the input voltage range and under full load conditions;
5. Unless otherwise specified, all indicators in this manual are measured at $T_a=25^\circ\text{C}$, humidity < 75% RH, nominal input voltage, and output rated load;
6. All indicator testing methods in this manual are based on our company's corporate standards;
7. Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
8. Product specifications are subject to change without prior notice.