

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

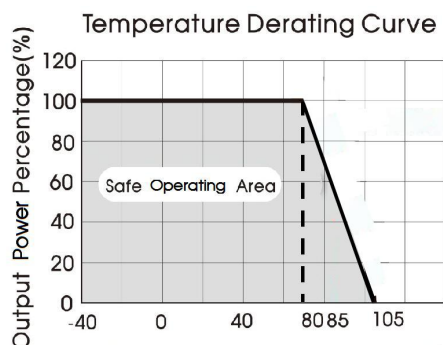
Case Material	Aluminum alloy
Package Dimensions	25.4 X 25.40 X 11.70 mm
Weight	21.00g(Typ.)
Cooling Method	Free air convection

EMC Specifications

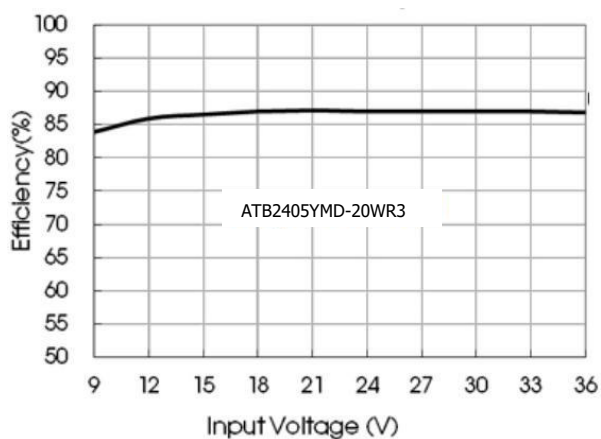
EMI	CE	CISPR32/EN55032	CLASS A
	RE	CISPR32/EN55032	CLASS A
EMS	ESD	IEC/EN61000-4-2 Contact±6KV,Air ±8KV	perf. CriteriaB
	RS	IEC/EN61000-4-3 10V/m	perf. CriteriaA
	EFT	IEC/EN61000-4-4 ±2KV (Recommended circuit diagram 3-①)	perf. CriteriaA
	Surge	IEC/EN61000-4-5 line to line±2KV (Recommended circuit diagram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

Typical Characteristic Curves

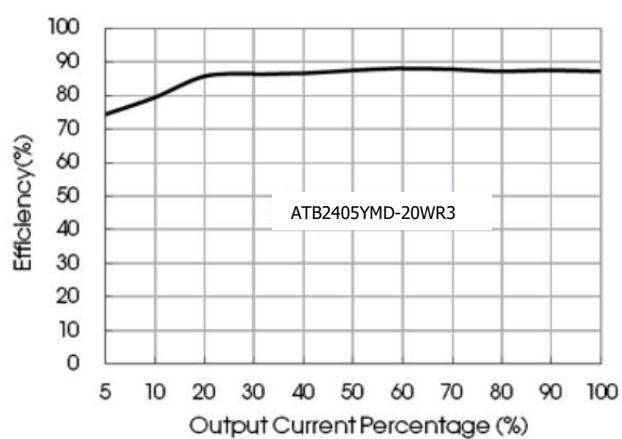
Temperature Derating Curve (Figure 1)



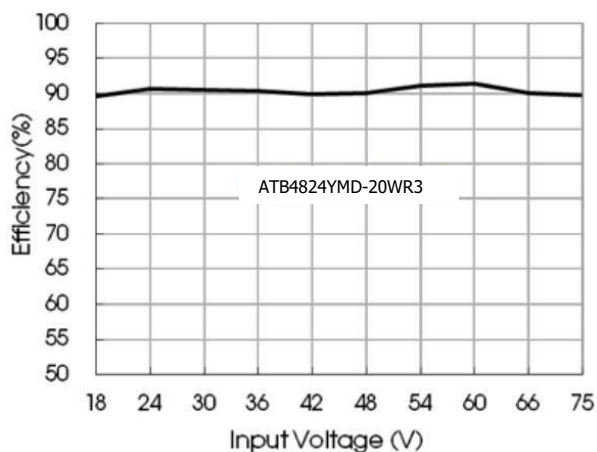
Efficiency Vs Input Voltage (Full Load)



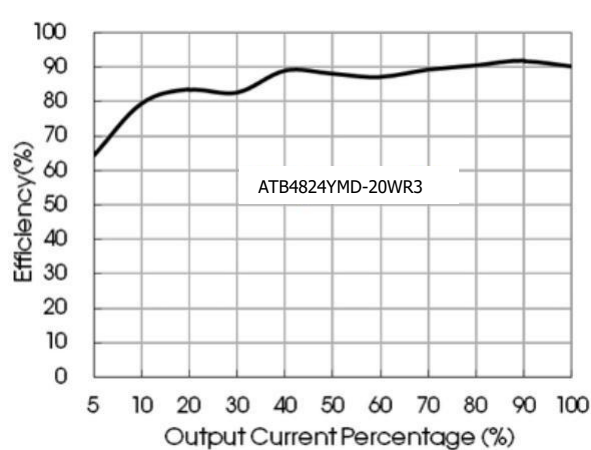
Efficiency Vs Output Voltage (Vin=24V)



Efficiency Vs Input Voltage (Full Load)

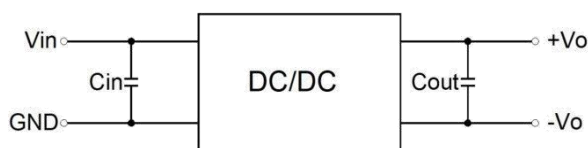


Efficiency Vs Output Voltage (Vin=48V)



Typical Circuit Design And Application

Figure 2

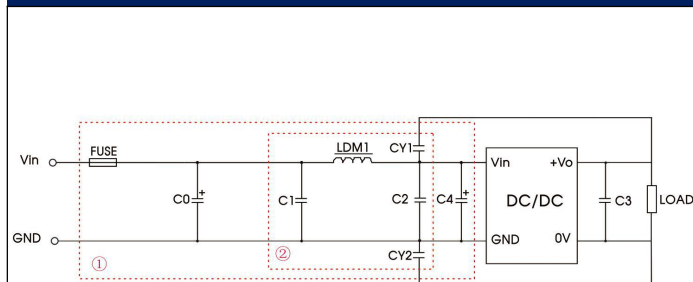


Recommended component parameters

Vin(VDC)	Cin	Cout
24	100uF	10uF
48	10uF-47uF	10uF

Figure 3

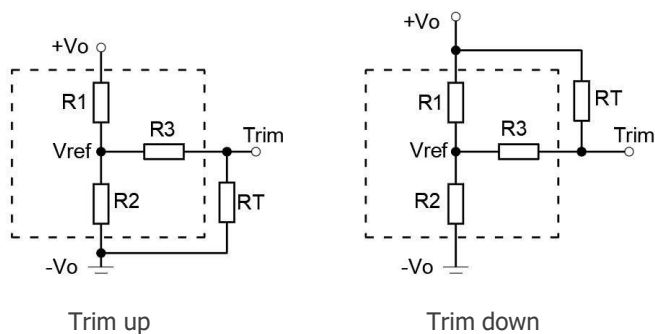
EMI Recommended component parameters



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



Trim resistor connections (dashed line shows internal resistor network)

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

$$\text{Up : } R_t = \frac{nR_2}{R_2 - n} - R_3$$

$$n = \frac{V_{ref}}{V_o - V_{ref}} * R_1$$

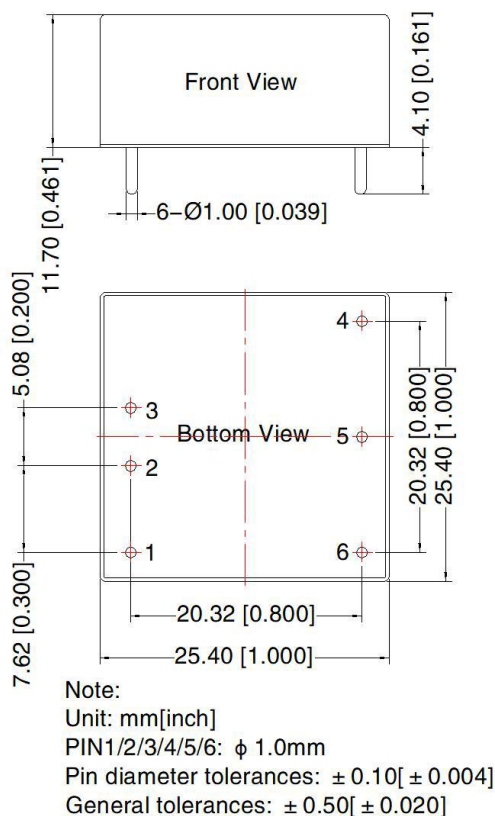
$$\text{Down : } R_t = \frac{nR_1}{R_1 - n} - R_3$$

$$n = \frac{V_o - V_{ref}}{V_{ref}} * R_2$$

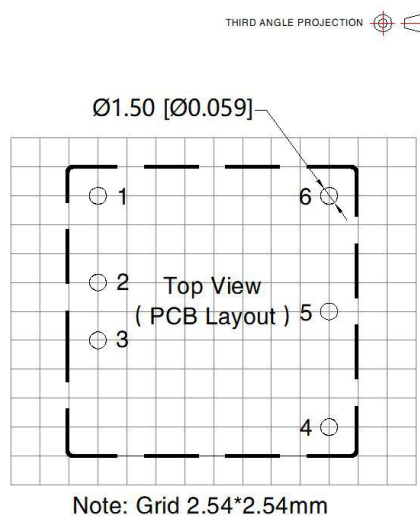
All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent series 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.