Product Feature

RoHS CE 3 years Warranty

1. Package Type：2"X 1"
2. Wide 4：1 input voltage range
3. Operating ambient temperature range: -40℃ - +85℃
4. I/O isolation voltage：1500VDC
5. High efficiency：90%（Typ.）
6. Output short-circuit protection, over-current protection, and over-voltage protection mechanisms.
7. Application areas: Industry, Power, Instrumentation, Communication, Rail transit.

Selection Guide

Part No.	Input Voltage (VDC)		Output		Full Load Efficiency% (Typ.)	Capacitive Load(μF) Max.
	Nominal (Range)	Max.	Voltage (VDC)	Current (mA)		
ATB2403LD-15WR3	24（9-36）	40	3.3	4000/0	86	4700
ATB2405LD-15WR3	24（9-36）	40	5	3000/0	88	4700
ATB2409LD-15WR3	24（9-36）	40	9	1667/0	89	2200
ATB2412LD-15WR3	24（9-36）	40	12	1250/0	89	1000
ATB2415LD-15WR3	24（9-36）	40	15	1000/0	90	820
ATB2424LD-15WR3	24（9-36）	40	24	625/0	90	270
ATA2405LD-15WR3	24（9-36）	40	±5	±1500/0	86	#2200
ATA2409LD-15WR3	24（9-36）	40	±9	±834/0	88	#1000
ATA2412LD-15WR3	24（9-36）	40	±12	±/6250	88	#470
ATA2415LD-15WR3	24（9-36）	40	±15	±500/0	88	#330
ATB4803LD-15WR3	48（18-75）	80	3.3	4000/0	86	4700
ATB4805LD-15WR3	48（18-75）	80	5	3000/0	86	4700
ATB4809LD-15WR3	48（18-75）	80	9	1667/0	89	2200
ATB4812LD-15WR3	48（18-75）	80	12	1250/0	87	1000
ATB4815LD-15WR3	48（18-75）	80	15	1000/0	90	820
ATB4824LD-15WR3	48（18-75）	80	24	625/0	88	270
ATA4805LD-15WR3	48（18-75）	80	±5	±1500/0	86	#2200
ATA4812LD-15WR3	48（18-75）	80	±12	±/6250	88	#470
ATA4815LD-15WR3	48（18-75）	80	±15	±500/0	89	#330

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	
		Others	--	687/10	703/20	
		3.3VDC	--	313/15	320/30	

	48VDC nominal input series	5VDC	--	348/15	356/30	
		Others	--	344/4	352/11	
Reflected Ripple Current	24VDC nominal input series		--	30	--	mA
	48VDC nominal input series		--	30	--	
Surge Voltage (1sec. max.)	24VDC nominal input series		-0.7	--	50	VDC
	48VDC nominal input series		-0.7	--	100	
Start-up Voltage	24VDC nominal input series		--	--	9	
	48VDC nominal input series		--	--	18	
Input under-voltage protection	24VDC nominal input series		5.5	6.5	--	
	48VDC nominal input series		12	15.5	--	
Start time	Nominal input and constant resistance load		--	10	--	ms
Ctrl	Turn off module		Connect to GND or low level (0-1.2VDC)			
	Turn on module		No connected or (3.5-12V)			
	Input current when off		--	2	7	mA
Input Filter			PI filter			

Output Specification

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	us
Transient Response Deviation	25% Load Step Change, nominal input voltage	3.3V、5V output	--	±3.0	±7.0	%
		Others	--	±3.0	±5.0	
Temperature Drift Coefficient			--	--	±0.02	%/℃
Trim	input voltage range		--	±10	--	%Vo
Over-Voltage Protection			110	--	160	%Vo
Over-Current Protection			110	150	--	%Io
Short-Circuit Protection			Continuous, Self-Recovery			

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation	Input-output Electric strength Test for 1 minute with a Leakage current of 1mA max.	1500	--	--	VDC
Insulation Resistance	Input-output, resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitors	Input-Output, 100KHz/0.1V	--	2050	--	pF
Operating Temperature	See Fig 1	-40	--	+85	℃
Storage Temperature		-55	--	+125	℃
Storage Humidity	Non-condensing	5	--	95	%RH

Pin welding Resistance Temperature	Soldering spot is 1.5mm away from case for 10seconds	--	--	300	℃
Switching Frequency		--	300	--	kHz
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K Hours

Mechanical Specifications

Case Material	Aluminum alloy
Package Dimensions	50.80 x 25.40 x 11.80mm
Weight	28.00g(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±4KV	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. 3-①for recommended circuit)	perf. Criteria B
	CS	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A

Typical Characteristic Curves

Temperature Derating Curve （Fig.1）

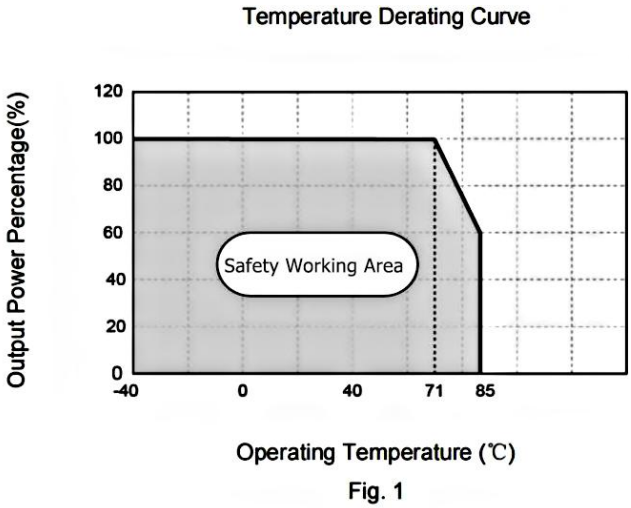
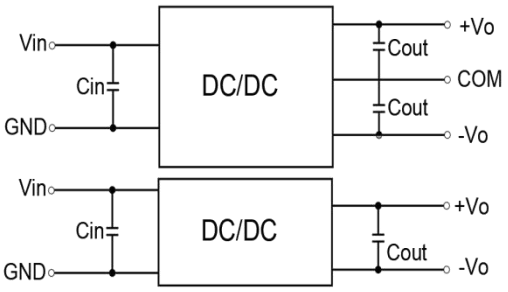


Fig. 1

Typical Circuit Design And Application

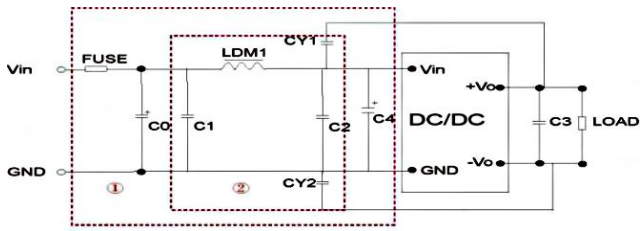
Fig.2



Recommended component parameters

Vout(VDC)	Cout (μF)	Cin(uF)
3.3/5/12/15	100	100
24	47	

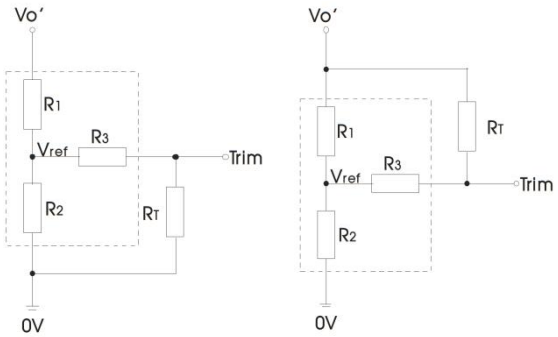
Fig. 3



EMI Recommended component parameters

Vin(VDC)	24VDC	48VDC
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	2.2μH/3.1A	
CY1、CY2	1nF/2KV	

Figure 4



Trim up Trim down

Trim resistor connections
(dashed line shows internal resistor network)

Trim Recommended component parameters

Vout	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	10	6.06	13.62	1.24
5	2.4	2.34	13.62	2.5
9	12	4.6	17.4	2.5
12	8.2	2.15	17.4	2.5
15	12	2.39	21.02	2.5
24	10	1.16	10.71	2.5

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

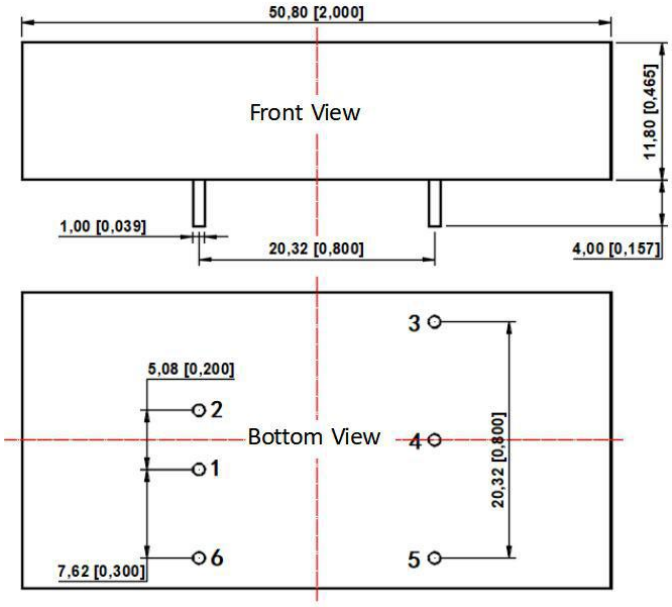
$$Down: \text{Rt} = \frac{nR1}{R1-n} - R3 \qquad \text{n} = \frac{Vo-Vref}{Vref} * R2$$

Note:

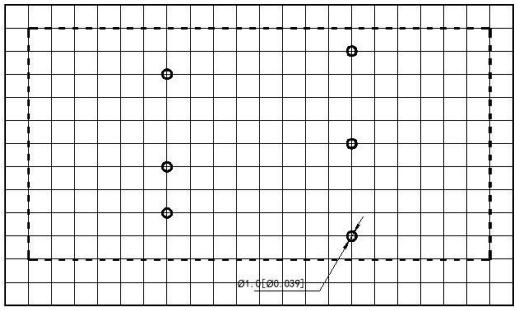
1. All DC-DC converters of this series are tested before delivery using the recommended circuit shown in Fig. 2.
2. Input and/or output ripple can be further reduced by appropriately increasing the input & output capacitor values Cin and Cout and/or by selecting capacitors with a low ESR (equivalent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

Dimensions and Recommended Layout

Dimensions	PCB Printing Layout



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



Note: The grid distance is 2.54mm*2.54mm

Pin Definition Table		
Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	+Vo	+Vo
4	Trim	Com
5	-Vo	-Vo
6	CTRL	CTRL

Note:

1. The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparabledamage;
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: ≤ ± 5%. If it exceeds ± 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 Ta=25 ℃, 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.