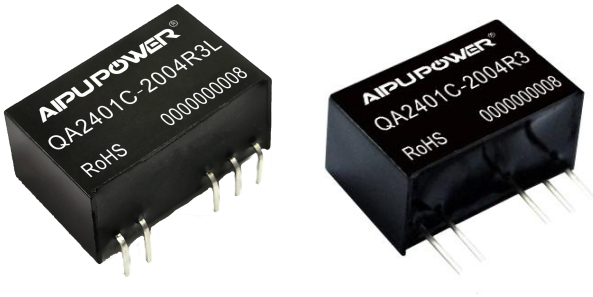
Typical Features

- ◆ Fixed voltage input, isolated & unregulated output
- ◆ Efficiency up to 83% (Typ.)
- ◆ Continuous short-circuit protection
- ◆ Reinforced insulated
- ◆ Mini SIP Package
- ◆ Isolation voltage 4200Vac/6000Vdc
- ◆ Operating temperature from -40℃ to +105℃
- ◆ Plastic case, flame class UL94-V0



Test conditions: Unless otherwise specified, all parameter values had been tested at the nominal input voltage, pure resistive rated load, and at room temperature 25 ℃.

Application Field

QA2401C-2004R3(L) is a DC-DC modular converter specially designed for SIC driver. It has asymmetric voltage output to decrease the SIC drive loss, output short-circuit protection and self-recovery.

Product List

Certificate	Part No.	Input Voltage (VDC)		Output Voltage/ Current (Vo/Io)		Input Current (mA) Typ. @nominal voltage		Max Capacitive load	Ripple & Noise (20MHz) Max/Typ	Efficiency @full load, Nominal voltage	
		Nom.	Range	Vo (VDC)	Io(mA) Max/Min	Full Load	No load	uF	mVp-p	Min (%)	Typ (%)
-	QA2401C-2004R3(L)	24	21.6 - 26.4	+20/-4.0	+100/-100	120	10	1000	150/100	79	83

Note 1: The Ripple & Noise tested by the twisted pair method.

Note 2: To ensure the converter operates efficiently and reliably, the minimum load should not be less than 10% of the rated load. It is recommended to connect a resistor in parallel to the output when the real load is less than 10% (the sum of the power consumed should be bigger than or equal to 10% of the rated power).

Note 3: The part number letter L indicates the part with pins bent by 90°.

Input Specifications

Item	Operating conditions	Min.	Typ.	Max.	Unit
Input inrush voltage (1sec. max.)	24Vdc Input	-0.7	--	30	Vdc
Input filter	Capacitor filter				
Hot Plug	Unavailable				

Output Specifications

Item		Operating conditions		Min.	Typ.	Max.	Unit
QA2401C-2004R3(L)	+Vo	Vin=24Vdc, Pin6 & Pin7 +Io= +100mA		18.57	19.55	20.52	VDC
	-Vo	Vin=24Vdc, Pin5 & Pin6 -Io= -100mA		-3.88	-4.09	-4.30	
Output voltage accuracy		Please refer to the output voltage deviation graph (Figure 1)					
Load regulation		10% - 100% load	Positive output	--	8	15	%
			Negative output	--	10	15	
Line regulation		Input voltage change ±1%	Positive output	--	±1.2	±1.5	%
			Positive output	--	±1.2	±1.5	
Temperature drift coefficient		100% Load		--	--	±0.03	%/°C
Short circuit protection		Continuous, self-recovery					

General Specifications

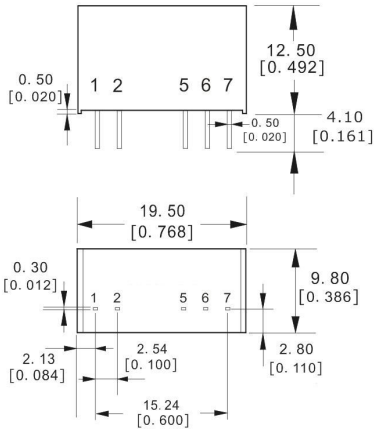
Items	Conditions	Min.	Typ.	Max.	Unit
Switching frequency	Nominal input voltage, full load	--	240	--	KHz
Operating temperature	Refer to the temperature derating graph (Figure 2)	-40	--	+105	℃
Storage temperature		-55	--	+125	
Case temperature rise	Operating at Ta =25℃	--	25°	--	
Pin soldering temperature	1.5mm from the case, soldering time 10S	--	--	300	
Relative humidity	No condensation	5	--	95	%RH
Isolation voltage	Input/Output, test 1min, leakage current <0.5mA	4200	--	--	VAC
		6000	--	--	VDC
Insulation resistance	Input/Output, @ 500VDC	1000			MΩ
Isolation capacitance	Input/Output,100KHz/0.1V	--	6	--	pF
Vibration		10-150Hz, 5G, 30 Min. along X, Y and Z			
MTBF	MIL-HDBK-217F@25℃	3500	--	--	K Hours
Case material	Plastic in Black, flame class UL94 V-0				
Unit weight	3.7g (Typ.)				
Cooling method	Natural air				
Packing	Tube size (525x18x10mm)	25PCS/Tube			
	Carton size (542x110x155mm)	1400PCS (Total 56 Tubes)			
Unit dimensions	L x W x H	19.50x9.80x12.50 mm		0.768x0.386×0.492 inch	

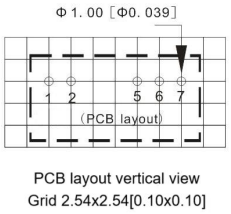
EMC Performance

EMI	CE	CISPR32/EN55032, CLASS B （with the Recommended EMC Circuit）
	RE	CISPR32/EN55032, CLASS B （with the Recommended EMC Circuit）
EMS	ESD	IEC/EN61000-4-2 Contact ± 6kV perf.Criteria B

Mechanical Dimensions

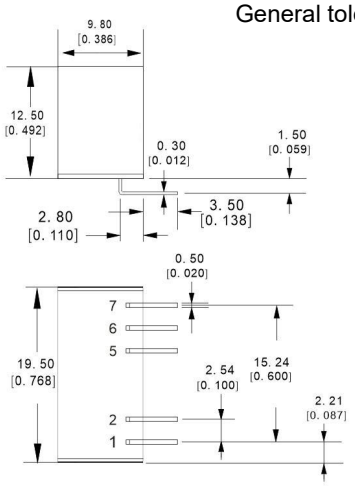
Unit: mm[inch]
Pin section tolerance: ±0.10[±0.004]
General tolerance: ±0.50[±0.020]

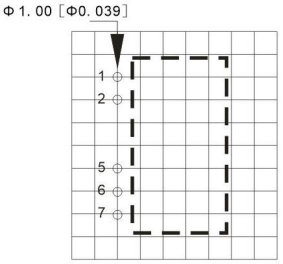




PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

QA2401C-2004R3





PCB layout vertical view
Grid 2.54x2.54[0.10x0.10]

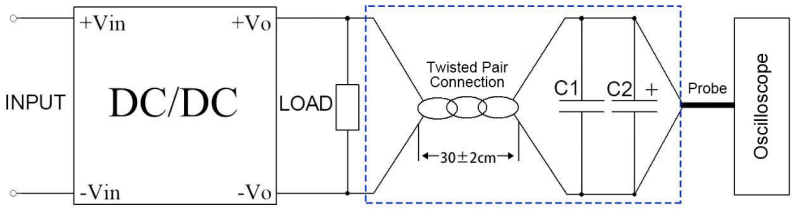
QA2401C-2004R3L

Pin-out Function Description

Pin No.	1	2	3,4	5	6	7
Dual (D)	+Vin	GND	(No pin)	-Vo	0V	+Vo

Note: Please take the pin definition on the product label as the right one if it is different than the data sheet description.

Ripple & Noise Test Instructions (Twisted Pair Method, 20MHz Bandwidth)



1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.
2. The power supply output connects to the load by the cables. The other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the polarity of the output and the oscilloscope probe should not be reversed. The test can be start after input power on.
3. It is recommended to connect a ⩾5% load or a high-frequency low resistance E-cap(⩾100uF) load at output to avoid the output ripple increasing.

Product Characteristics Graphs

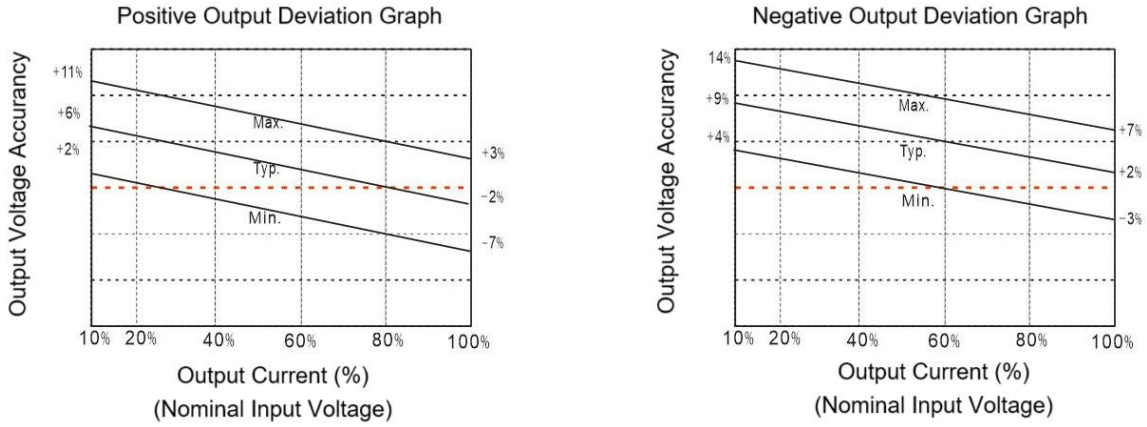


Figure 1

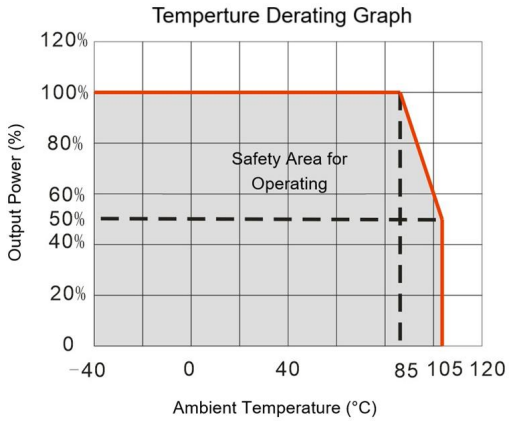
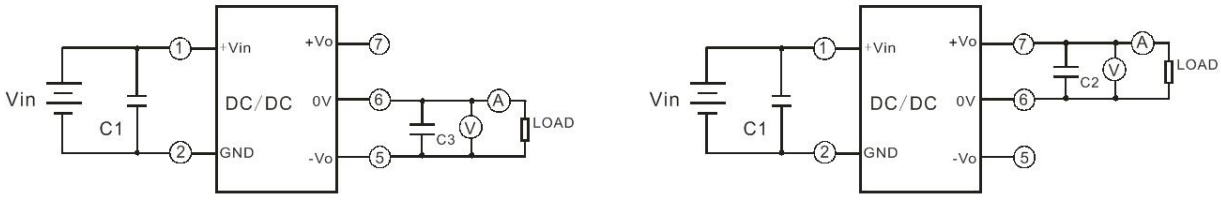


Figure 2

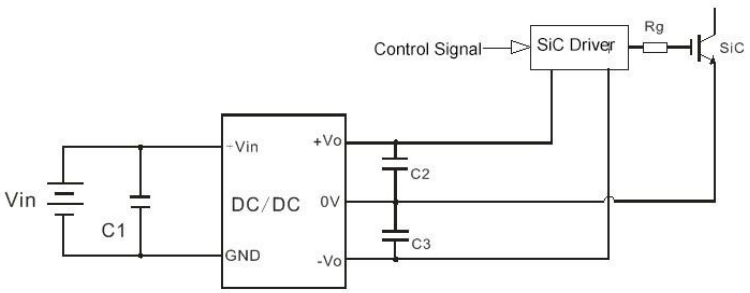
Recommended Circuits for Application

1. Test circuit diagrams



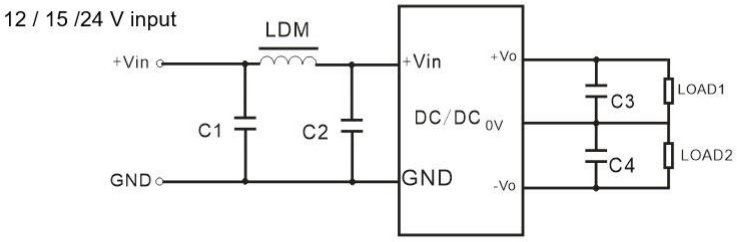
C1/C2/C3 100μF/50V (Low internal resistance capacitor)

2. Typical application circuit diagram

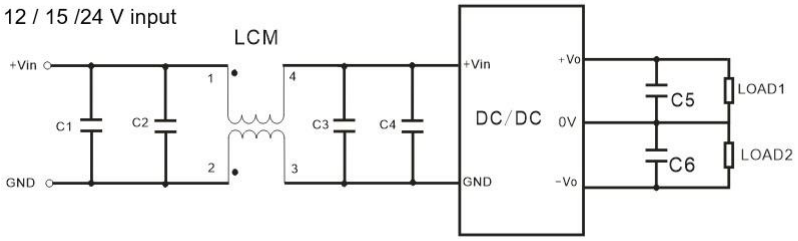


C1/C2/C3
100uF/50V(Low inter-resistance capacitor)

3. Recommended EMC circuit diagram



Input Voltage		12/15/24VDC
EMI	C1/C2	1μF/50V
	C3/C4	100μF/30V
	LDM	33μH



Input Voltage		12/15/24VDC
EMI	C1/C2	4.7μF/50V
	C3/C4	1μF/50V
	C5/C6	100μF/30V
	LCM	22μH CMC

Application Notice

1. This product cannot be used by connecting in parallel, and does not support hot plugging.
2. The connecting lead wire between the converter and the SIC driver should be as short as possible.
3. The output filter (low inter-resistance electrolytic capacitor) should be close to the converter and the SIC driver.
4. The SIC drive average output power must be less than the rated power of the converter.
5. It is recommended to use ceramic capacitors or electrolytic capacitors at the input or output. Tantalum capacitor should not be used to avoid the risk of failure.
6. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.
7. All values or indicators on the datasheet have been tested based on Aipupower test specifications.

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