

Product Features

- ◇ Packaging form: DIP plastic plug-in
- ◇ Temperature range: -40°C to +105°C
- ◇ Conversion efficiency: up to 91%
- ◇ Isolation withstand voltage: 1500VDC
- ◇ Input range: 2:1 wide input voltage
- ◇ Output protection: output over-current, output short-circuit protection
- ◇ Application fields: industry, electric power, instrumentation, communications, rail transit

2:1 wide voltage 20W isolated regulated output series



Selection table

Product number	Input nominal voltage (VDC)		output		Full load efficiency (% ,Typ)	Maximum Capacitive Load (μF)
	nominal value (range value)	maximum value	The output voltage (VDC)	Output current (mA) Max./Min.		
HWQ20-12S03 V3	12 (9-18)	20	3.3	5000/0	84/86	10000
HWQ20-12S05V3			5	4000/0	87/89	10000
HWQ20-12S12V3			12	1667/0	87/89	1600
HWQ20-12S15V3			15	1333/0	88/89	1000
HWQ20-12S48V3			48	417/0	88/89	100
HWQ20-24S03V3	24 (18-36)	40	3.3	5000/0	86/88	10000
HWQ20-24S05V3			5	4000/0	88/90	10000
HWQ20-24S12V3			12	1667/0	88/90	1600
HWQ20-24S15V3			15	1333/0	89/91	1000
HWQ20-24S24V3			24	833/0	89/91	500
HWQ20-24D12V3			±12	±833/0	88/90	800#
HWQ20-24D15V3			±15	±667/0	88/90	600#
HWQ20-24D24V3	±24	±417/0	88/90	300#		
HWQ20-48S03V3	48 (36-75)	80	3.3	5000/0	86/88	4700
HWQ20-48S05V3			5	4000/0	88/90	2200
HWQ20-48S12V3			12	1667/0	89/91	330
HWQ20-48S15V3			15	1333/0	89/91	220
HWQ20-48S24V3			twenty four	833/0	89/91	500

*Remarks: “ # ” represents dual outputs for each channel

Input properties

item	working conditions	Min.	Typ.	Max.	unit	
Input current (full load / no load)	12 VDC nominal input series, nominal input voltage	3.3V output	--	1599/40	1916/70	mA
		5V output	--	1873/45	1916/70	
		12V output	--	1873/7	1916/20	
		15V output	--	1852/7	1894/20	
		24V output	--	1852/12	1894/20	
	24 VDC nominal input series, nominal input voltage	3.3V output	--	782/30	800/50	
		5V output	--	926/35	947/55	
		12V output	--	926/6	947/15	
		15V output	--	916/6	937/15	
		24V output	--	916/10	937/20	
	48 VDC nominal input series, nominal input voltage	3.3V output	--	391/15	400/30	
		5V output	--	463/20	474/30	
		12V output	--	458/3	469/15	
		15V output	--	458/3	469/15	
		24V output	--	458/4	469/15	
Reflected ripple current	Nominal input voltage	--	30	--		
Input surge voltage	12 VDC nominal input series	-0.7	--	25	VDC	
	24VDC nominal input series	-0.7	--	50		
	48 VDC nominal input series	-0.7	--	100		
Starting voltage	12 VDC nominal input series	--	--	9		
	24VDC nominal input series	--	--	18		
	48 VDC nominal input series	--	--	36		
Input undervoltage protection	12 VDC nominal input series	5.5	6.5	--		
	24VDC nominal input series	12	15.5	--		
	48 VDC nominal input series	26	30	--		
Start Time	Nominal input and constant resistance load	--	10	--	ms	
Remote control foot (CTRL)	module on	C TRL is left floating or connected to TTL high level (3.5-12VDC)				
	Module shutdown	C TRL connected to GND or low level (0-1.2VDC)				
	Input current during shutdown	--	2	7	mA	
Input filter type		PI type				
hot plug		not support				

Output characteristics

item	working conditions		Min.	Typ.	Max.	unit
Output voltage accuracy	0% -100% load		--	±1	±3	%
Linear regulation rate	Full load , input voltage from low voltage to high voltage		--	±0.2	±0.5	
Load regulation	5% -100% load		--	±0.5	±1	
ripple noise	20MHz bandwidth, 5%-100% load		--	50	100	mVp-p
transient recovery time	25% load step change, nominal input voltage		--	300	500	μs
Transient response deviation		3.3V, 5V output	--	±5	±8	%
		Other outputs	--	±3	±5	
Temperature drift coefficient	Fully loaded		--	--	±0.03	%/ °C
Output voltage regulation Trim	Input voltage range		90	--	110	% Vo
Output overvoltage protection			110	--	160	
Output overcurrent protection			110	150	190	%
Short circuit protection			Burp-like, sustainable, self-restoring			

General features

item	working conditions		Min.	Typ.	Max.	unit
Insulation voltage	Input - output, test time 1 minute, leakage current less than 1mA		1500	--	--	VDC
Insulation resistance	Input - output, insulation voltage 500VDC/1 minute, normal temperature, 75%RH		1000	--	--	MΩ
isolation capacitor	Input - output, 100KHz , 0.1V		--	2000	--	pF
Operating temperature	See Figure 1	3.3V , 5V output	-40	--	+95 _	C°
		Other outputs	-40	--	+105 _	
Storage temperature			-50	--	+125	
Storage humidity	No condensation		--	--	95	%RH
Pin resistance to soldering temperature	1.5mm away from the shell , 10 seconds		--	--	260	°C
On-off level	PWM mode		--	300	--	kHz
mean time between failures	MIL-HDBK-217F@25 °C		1000			kHours

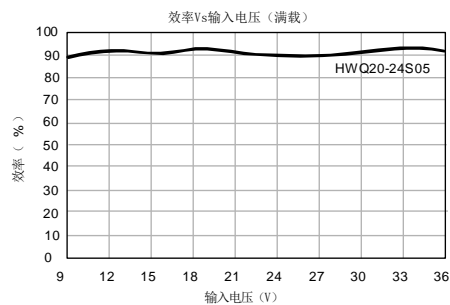
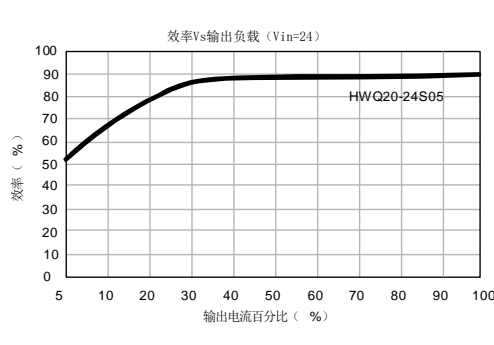
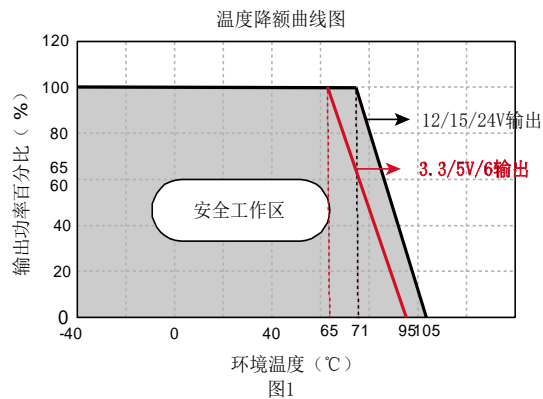
physical properties

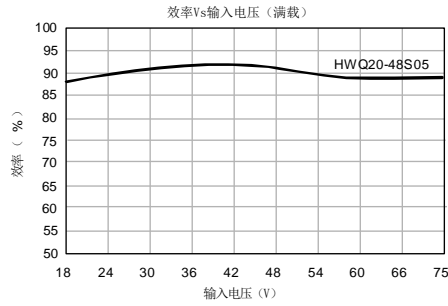
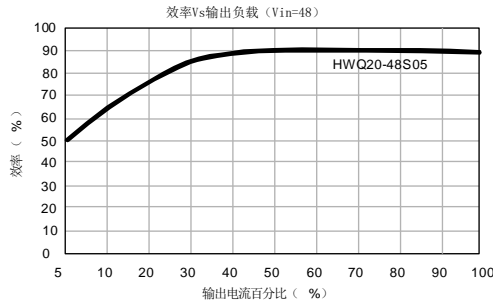
Shell material	Aluminum alloy, black anodized coating
Package size	25.40 × 25.40 × 12.00 mm
weight	15g
cooling method	Natural air cooling

EMC characteristics

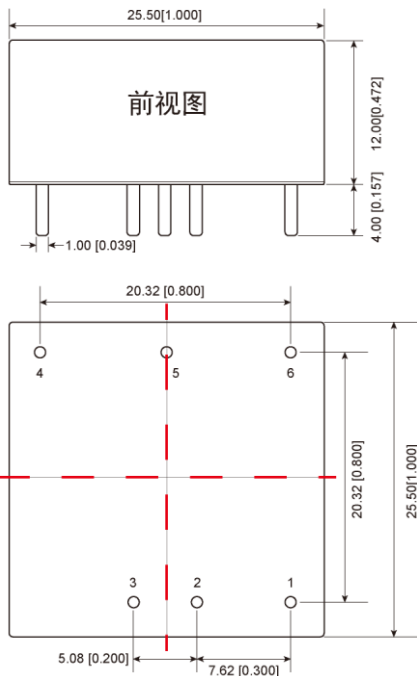
EMI	conduction	EN55032, FCC part 15	CLASS B
	radiation		
EMS	electrostatic discharge	EN61000-4-2 Air ± 8kV, Contact ± 6kV	perf. Criteria B
	Radiated immunity	EN61000-4-3 10V/m	perf. Criteria A
	Burst Immunity	EN61000-4-5 ±2kV	perf. Criteria B
	Surge Immunity	EN61000-4-5 ±1kV	perf. Criteria B
	Conducted disturbance immunity	EN61000-4-6 10Vrms	perf. Criteria A

Product Characteristics Curve





Appearance dimensions/recommended printing layout



Size unit: mm [inch]
Terminal diameter tolerance: ± 0.10 [± 0.004]
Unmarked tolerances: ± 0.50 [± 0.020]

Pin no.	Function (single channel)
1	CTRL
2	GND
3	Vin
4	+Vo
5	Trim
6	-Vo

circuit design

1.Application circuit

All DC/DC converters of this series are tested according to the recommended test circuit (Figure 2) before leaving the factory. If it is required to further reduce the input and output ripple, the input and output external capacitors C_{in} and C_{out} can be increased or a capacitor with a small series equivalent impedance value can be selected, but the capacitance cannot be greater than the maximum capacitive load of the product.

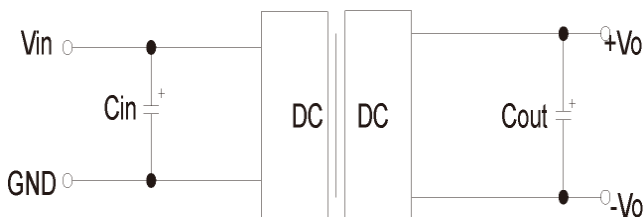


图2

Vout(VDC)	Cin(uF)	Cout(uF)
3.3/5/12/15	100	100
2 4		47

2. EMC Solution – Recommended Circuit

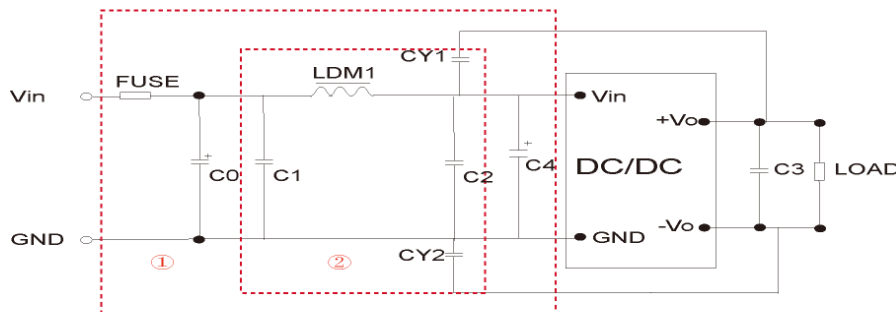
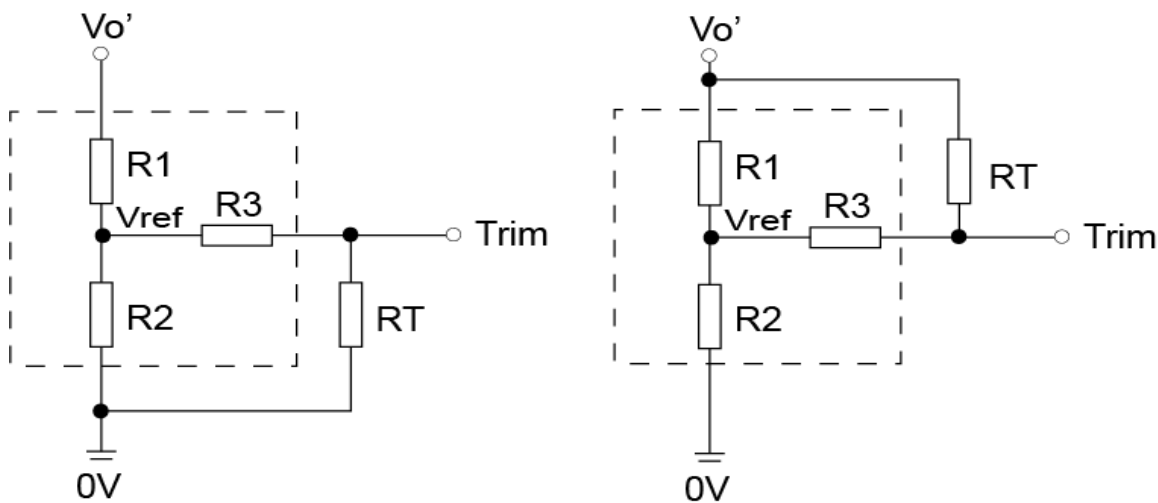


图3

model	Vin:24V	Vin:48V
FUSE	Select according to customer's actual input current	
C0 , C4	330μF/50V	330μF/100V
C1 , C2	4.7μF/50V	4.7μF/100V
C3	Refer to the Cout parameter in Figure 2	
LDM1	2.2uH/4A	2.2uH/2A
CY1 , CY2	1nF/2KV	

3. The use of Trim and the calculation of Trim resistance



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

Note:

1. If the product operates below the minimum required load, there is no guarantee that the product performance will comply with all performance indicators in this manual;
2. The maximum capacitive load is tested under input voltage range and full load conditions;
3. Unless otherwise specified, all indicators in this manual are measured at Ta=25°C, temperature <75%RH, nominal input voltage and output rated load;
4. All index testing methods in this manual are based on the company's corporate standards;
5. Our company can provide product customization, please contact our sales engineer directly for specific needs;

About us

No.6nd floor,building 17# TIAN-CHEN road,high-techdistrict(west),chengdu

Marketing Department : Miss Hu: TEL/WeChat: +86-18782919117

Mailbox: bary_sales01@163.com

Online mall: <https://www.aliexpress.com/store>

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