DCWI 20-xxSxx

Product Feature

- Ultra-Wide 4:1 Input voltage range
- Operating ambient temperature range: -40℃ - +85℃
- Isolation voltage: 6000VDC
- High efficiency: 88%（Typ.）
- Output short-circuit protection, over-current protection, and over-voltage protection mechanisms.
- Application areas:Industry,Power,Instrumentation,Communication,Rail transit.

Selection Guide

Part No.	Input Voltage (VDC)		Output		Full Load Efficiency②% (Typ.)	Capacitive Load(μF) Max.
	Nominal (Range)	Max.①	Voltage (VDC)	Current (mA) Max.		
DCWI 20-24S03	24 (9-36)	40	3.3	5000	84	10000
DCWI 20-24S05			5	4000	86	10000
DCWI 20-24S06			6	3333	86	8200
DCWI 20-24S09			9	2222	86	4700
DCWI 20-24S12			12	1667	87	1600
DCWI 20-24S15			15	1333	87	1000
DCWI 20-24S18			18	1111	88	820
DCWI 20-24S24			24	833	88	500
DCWI 20-48503	48 (18-75)	80	3.3	5000	84	10000
DCWI 20-48S05			5	4000	86	10000
DCWI 20-48S06			6	3333	86	8200
DCWI 20-48S09			9	2222	86	4700
DCWI 20-48S12			12	1667	87	1600
DCWI 20-48S15			15	1333	87	1000
DCWI 20-48S18			18	1111	86	820
DCWI 20-48S24			24	833	86	500

Note:

①. Absolute maximum stress rating without damage (not recommended);

②. Efficiency is measured at nominal input voltage and rated output load.

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Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (Full Load/No-Load)	24VDC Nominal input series, nominal input series	3.3VDC Output	--	819/40	839/45	mA
		5/6/9VDC Output	--	969/40	992/80	
		Others Output	--	958/6	980/10	
	48VDC Nominal input series, nominal input series	3.3VDC Output	--	409/20	419/25	
		5/6/9VDC Output	--	485/20	496/60	
		Others Output	--	485/5	496/9	
Reflected Ripple Current	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
Ctrl①	Turn on module		Ctrl pin open or pulled high (TTL2.7-12VDC)			
	Turn off module		Ctrl pin pulled low to GND (0-1.2VDC)			
Input Filter			PI filter			
Hot Plug			Unavailable			

Note:
①. The Ctrl pin voltage is referenced to input GND.

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 Regulation①	5%-100% load		--	±0.5	±1.0	%
Ripple & Noise	20MHz bandwidth,parallel cable method	5%-100%load	--	80	120	mVp-p
		0%-100%load	--	--	±5.0	%
Transient Recovery Time	25% Load step change,nominal input voltage		--	300	500	μs
Transient Response Deviation		3.3/5VDC Output	--	±3.0	±5.0	%
		Others Output	--	±5.0	±8.0	
Temperature Coefficient	Full load		--	--	±0.03	%/℃
Trim	Input voltage range		90	--	110	%Vo
Over-Voltage Protection			110	--	160	
Over-Current Protection			110	140	--	%Io
Short-Circuit Protection			Continuous,Self-Recovery			

Note:
①. Load regulation for 0%-100% load is ±5.0%.

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General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Isolation Voltage	Input-output, test time 1 minute, leakage current less than 1mA	6000	--	--	VDC
	Input-output,continuous working isolation, leakage current	--	--	3000	VDC
Insulation Resistance	Input-output, resistance at 500VDC	1000	--	--	MΩ
Isolation Capacitance	Input-output, 100KHz/0.1V	--	1000	--	pF
Operating Temperature	See Fig.1	-40	--	+85	℃
Storage Temperature		-55	--	+125	℃
Storage Humidity	Non-condensing	5	--	95	%RH
Soldering Profile	Wave-soldering	260±5℃; time:5 - 10s			
	Manual-welding	360±10℃;time:3 - 5s			
Switching Frequency	PWM	--	300	--	kHz
Vibration	IEC/EN 61373 -Category 1,Grade B				
MTBF	MIL-HDBK-217F@25℃	1000	--	--	K Hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant（UL 94V-0 rated）
Package Dimensions	50.80×25.40×18.30mm
Weight	39.20g (Typ.)
Cooling Method	Free air convection

EMC Specifications

EMI	CE	CISPR32/EN55032 CLASS A (without extra components)/CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032 CLASS A (without extra 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. 3-① for recommended circuit)	Perf.Criteria B
	CS	IEC/EN61000-4-6 3Vr.m.s	Perf.Criteria A

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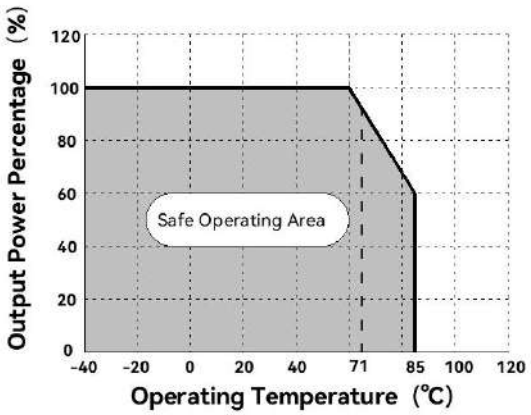
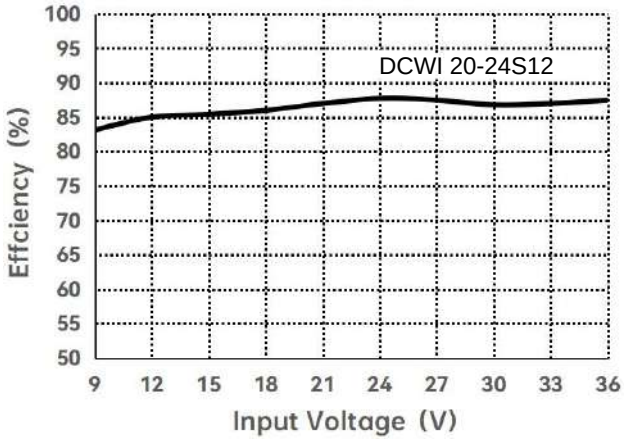
Typical Characteristic Curves

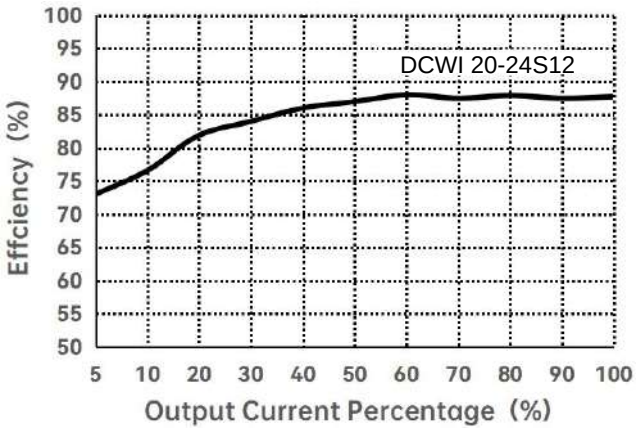
Temperature Derating Curve （Fig.1）



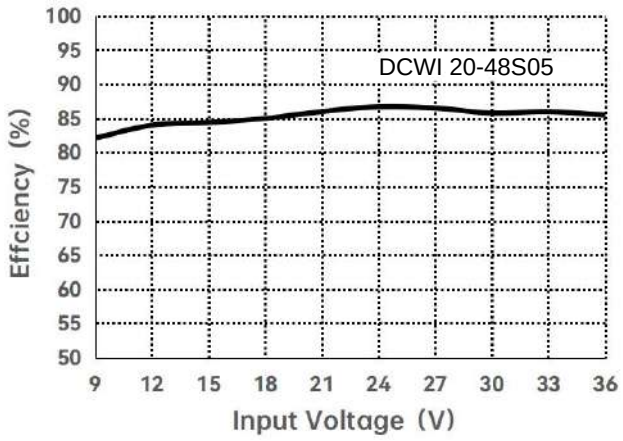
Efficiency VS Input Voltage (Full load)



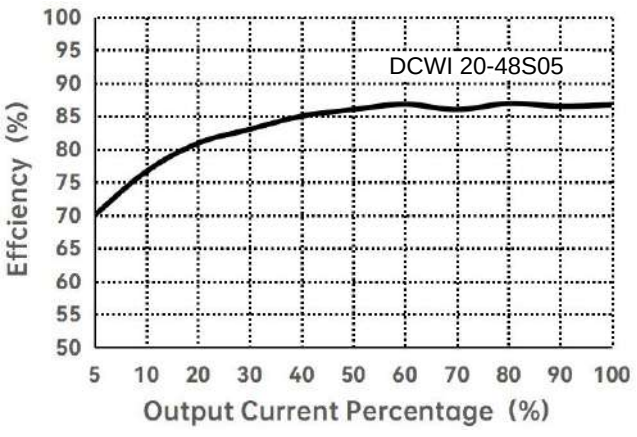
Efficiency VS Output Load（Vin=24V）



Efficiency VS Input Voltage (Full load)



Efficiency VS Output Load（Vin=48V）



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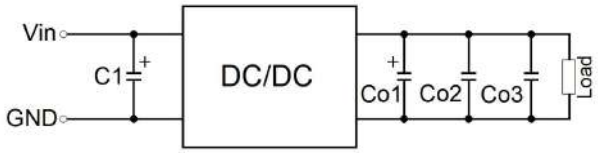
Typical Circuit Design And Application

Recommended Circuit (Fig.2)

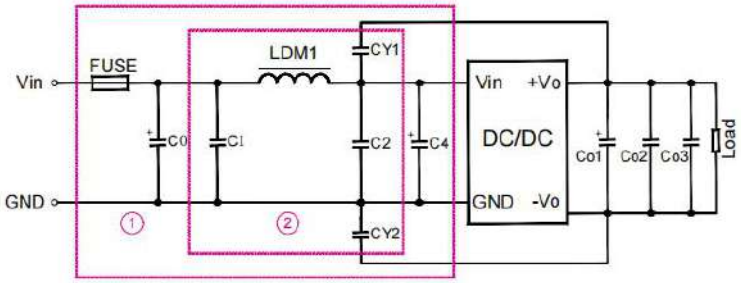


Recommended Capacitive Load Value Table

Vout	C1	Co1	Co2	Co3
3.3/5/6VDC	100μF/100V	100μF/16V	10μF/50V	0.1μF/16V
9/12/15VDC	100μF/100V	100μF/25V	10μF/50V	0.1μF/25V
18/24VDC	100μF/100V	47μF/50V	10μF/50V	0.1μF/50V

All the 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 C1 and Co1/Co2/Co3 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.

EMC Recommended Circuit (Fig.3)

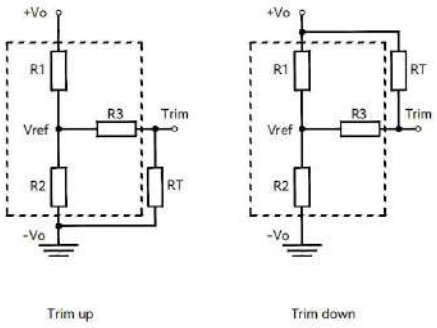


Notes: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

EMC Recommended Parameter Table

Model	Vin:24V	Vin:48V
FUSE	Select according to the actual input current of the customer	
C0,C4	330μF/50V	330μF/100V
C1,C2	4.7μF/50V	4.7μF/100V
LDM1	10μH/4A	10μH/2A
Co1,Co2,Co3	Refer Figure 2 Capacitive load value table	
CY1,CY2	1nF/2KVDC	

Trim Recommended Circuit Fig.4



Trim resistor connections (dashed line shows internal resistor network)

Trim Recommended Component Parameters

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
6	10	6.982	13.622	2.5
9	12	4.602	17.346	2.5
12	8.2	2.153	17.346	2.5
15	12	2.388	21.016	2.5
18	24	3.868	33.275	2.5
24	10	1.158	10.714	2.5

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

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

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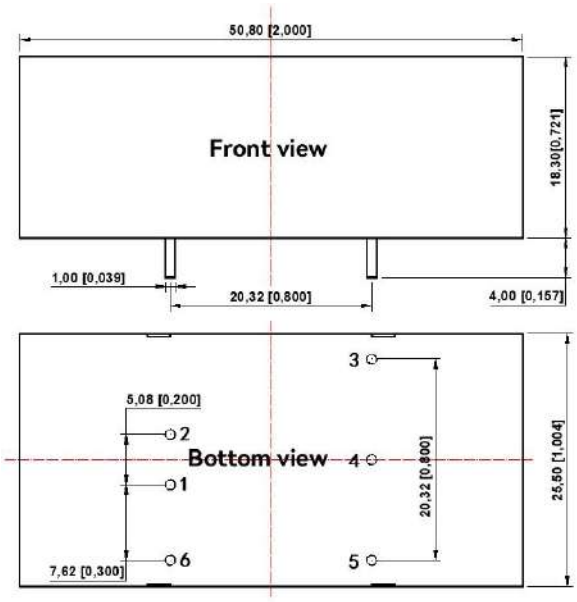
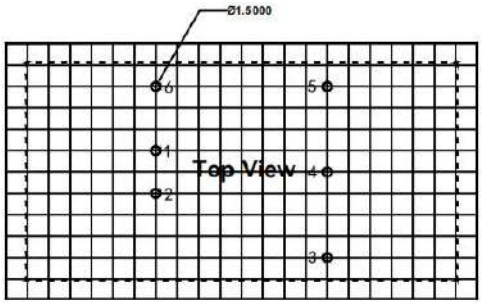
Dimensions and Recommended Layout

Dimensions	PCB Printing Layout



Note:

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



The grid distance is 2.54mm x2.54mm

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

Note:

- The input voltage should not exceed the specified range value, otherwise it may cause permanent and irreparable damage;
- 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;
- The maximum capacitive load is tested within the input voltage range and under full load conditions;
- Unless otherwise specified, all indicators in this manual are measured at Ta=25 ℃, humidity<75% RH, nominal input voltage, and output rated load;
- All indicator testing methods in this manual are based on our company's corporate standards;
- Our company can provide product customization, and specific requirements can be directly contacted by our technical personnel;
- Product specifications are subject to change without prior notice.