

DCWB_YD-20W Series



FEATURES

- Wide input voltage range (4:1)
- High efficiency up to 91%
- No-load power consumption as low as 0.12W
- Isolation voltage :1.5K VDC
- Input under-voltage protection, output short circuit, over-current protection
- Operating temperature range: -40°C to+105°C
- 3 Years Warranty

APPLICATIONS

- Industrial Control
- Instrumentation
- Railway
- Home Appliances
- Communication

DESCRIPTION

DC-DC Module Power Supply, Wide Voltage Input, Power 20W, Isolated, Regulated, Single Output, DIP Packaging.

MODEL NUMBERING

DCWBxxxxYD-20W



SELECTION GUIDE

Product Model	Input Voltage Standard Value(range)	Output Voltage (Vdc)	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum capacitive load (μF)
DCWB2403YD-20W	24VDC (9-36)	3.3	5000/0	86/88	10000
DCWB2405YD-20W		5	4000/0	88/90	10000
DCWB2412YD-20W		12	1667/0	88/90	1600
DCWB2415YD-20W		15	1333/0	87/89	1000
DCWB2424YD-20W		24	833/0	89/91	500

DC-DC CONVERTERS

20 WATTS

Product Model	Input Voltage Standard Value(range)	Output Voltage (Vdc)	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum capacitive load (μ F)
DCWB4803YD-20W	48VDC (18-75)	3.3	5000/0	86/88	10000
DCWB4805YD-20W		5	4000/0	88/90	10000
DCWB4812YD-20W		12	1667/0	89/91	1600
DCWB4815YD-20W		15	1333/0	89/91	1000
DCWB4824YD-20W		24	833/0	89/91	500

INPUT CHARACTERISTICS

Parameter	Conditions		Min.	Typ.	Max.	Units
Input Current (full load /no load)	24VDC nominal input series nominal input voltage	3.3V Output	--	782/30	800/50	mA
		5V Output	--	926/35	947/55	mA
		12V Output	--	926/6	947/15	mA
		15V Output	--	916/6	937/15	mA
		24V Output	--	391/15	937/20	mA
	48VDC nominal input series nominal input voltage	3.3V Output	--	463/20	400/30	mA
		5V Output	--	458/3	474/30	mA
		12V Output	--	458/3	469/15	mA
		15V Output	--	458/4	469/15	mA
		24V Output	--	458/4	469/15	mA
Reflected Ripple Current	Nominal input series		--	30	--	mA
Input impulse voltage (1sec. max.)	Nominal voltage input@24VDC		-0.7	--	50	VDC
	Nominal voltage input@48VDC		-0.7	--	100	VDC
Starting voltage	Nominal voltage input@24VDC		--	--	9	VDC
	Nominal voltage input@48VDC		--	--	18	VDC
Under voltage protect	Nominal voltage input@24VDC		5.5	6.5	--	VDC
	Nominal voltage input@48VDC		12	15.5	100	VDC

Parameter	Conditions	Min.	Typ.	Max.	Units
Start Time	Nominal Input Voltage & Constant Resistance Load	--	10	--	ms
Remote control foot (Some models are applicable)	Module On	Ctrl hovering or connected to TTL high level (3.5 12VDC)			
	Module shutdown	Ctrl connected to GND or low level (0 1.2VDC)			
	Input current during shutdown	--	2	7	mA
Input filter	PI type				

OUTPUT CHARACTERISTICS

Parameter	Operating Conditions		Min.	Typ.	Max.	Units
Output Voltage Accuracy	5%-100% load		--	±1	±3	%
Linear Regulation	Input voltage variation from low to high at full load		--	±0.2	±0.5	%
Load Regulation	5%-100% load		--	±0.5	±1	%
Transient Recovery Time	25% load step change, nominal input voltage		--	300	500	μs
Transient Response Deviation	25% load step change, input voltage range	3.3V, 5V,output	--	±5	±8	%
		Others	--	±3	±5	%
Temperature Coefficient	Full load		--	--	±0.03	%/°C
Ripple & Noise *	20MHz bandwidth, nominal input voltage, 5%-100% load		--	50	100	mVp-p
Trim	Input voltage range		90	--	110	%Vo
Over-voltage Protection			110	--	160	%Vo
Over-current Protection			110	150	190	%Io
Short circuit Protection			Continuous, self-recovery			

Note: *Ripple & Noise at < 5% load is 300mV max. The "parallel cable" method is used for Ripple and Noise test.

GENERAL CHARACTERISTIC

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
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 Capacitance	Input-output capacitance at 100KHz/0.1V	1000	--	--	pF

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Operating Temperature	3.3V , 5V	-40	--	+95	°C
	12V, 15V, 24V	-40		+105	°C
Storage Humidity	Without condensation	5	--	+95	%RH
Storage Temperature		-55	--	+125	°C
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+300	°C
Vibration		10-150Hz,5G, 0.75mm. along X, Y & Z			
Switching Frequency *	PWM mode	--	300	--	KHz
MTBF	MIL-HDBK-217F@25°C	1000	--	--	Khours

Note: *Switching frequency is measured at full load. The module reduces the switching frequency for light load (below 50%) efficiency improvement.

PHYSICAL CHARACTERISTICS

Parameter	Conditions
Case Material	Aluminum alloy
Overall dimensions	25.40 × 25.40 × 11.70 mm
Weight	18.4g
Cooling Method	Free air convection

EMC CHARACTERISTICS

Parameter	Category	Content
EMI	CE	CISPR32/EN55032 CLASS B (see Fig.2-② for recommended circuit)
	RE	CISPR32/EN55032 CLASS B (see Fig.2-② for recommended circuit)
EMS	ESD	IEC/EN61000-4-2 Contact ±4KV perf. CriteriaB
	RS	IEC/EN61000-4-3 10V/m perf. CriteriaA
	EFT	IEC/EN61000-4-4 ±2KV (see Fig.2-① for recommended circuit) perf. CriteriaB
	Surge	IEC/EN61000-4-5 line to line ±2KV (see Fig.2-① for recommended circuit) perf. CriteriaB
	CS	IEC/EN61000-4-6 3 Vr.m.s perf. CriteriaA

CIRCUIT DESIGN AND APPLICATION

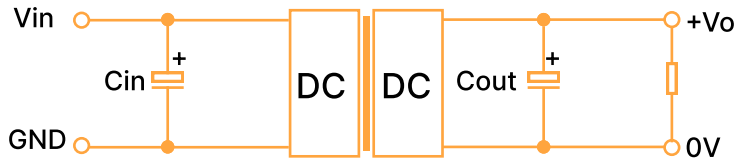
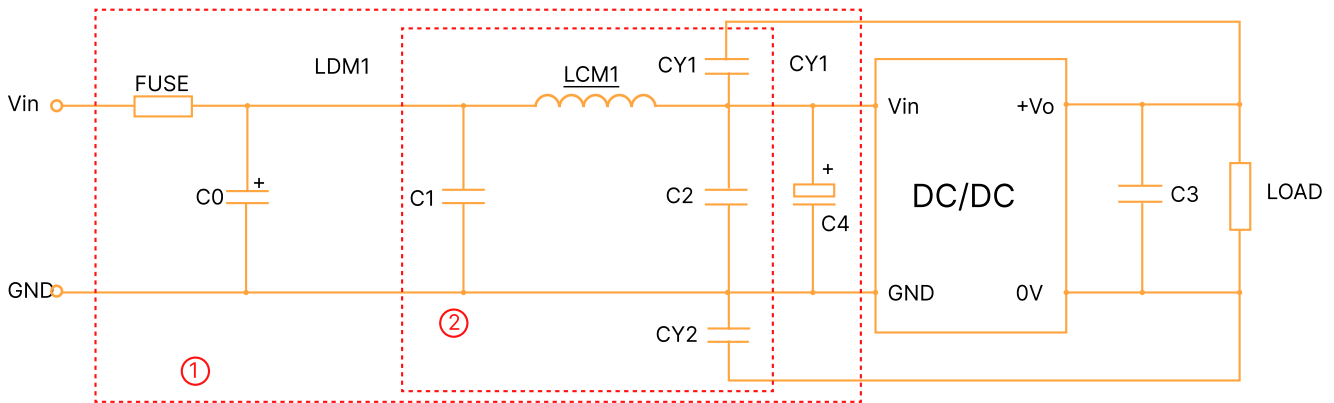


Figure 1: Application circuit

Vin (VDC)	Vout (VDC)	Cin	Cout
24	3.3/5	100 μ F/50V	100 μ F/16V
	12/15		100 μ F/25V
	24		47 μ F/50V
48	3.3/5	100 μ F/100V	100 μ F/16V
	12/15		100 μ F/25V
	24		47 μ F/50V

Table 1: Recommended Capacitive Load Values

2. EMC compliance circuit

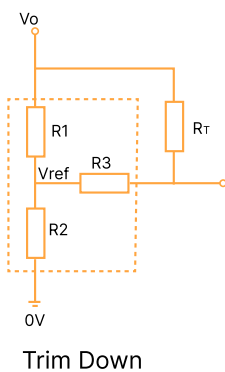
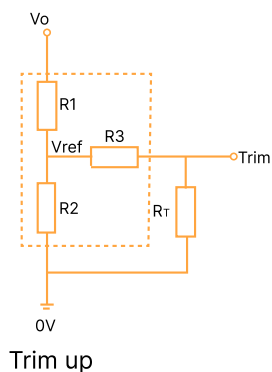


Notes: Part ① in the Fig. 2 is used for EMC test and part ② for EMI filtering; selected based on needs.

Figure 2 Parameter description

Model	Vin:12V	Vin:24V
FUSE	Choose according to actual input current	
C0, C4	330 μ F/50V	330 μ F/100V
C1	4.7 μ F/50V	4.7 μ F/100V
LDM1	2.2 μ H/4A	2.2 μ H/2A
C2	4.7 μ F/50V	4.7 μ F/100V
C3	Refer To The Cout In Fig.2	
CY1, CY2	1nF/2kV	

TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT (OPEN IF UNUSED)



The Calculation formula for trip resistance

$$\text{Trim up: } R_T = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_o' - V_{ref}} R_1$$

$$\text{Trim down: } R_T = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_o' - V_{ref}}{V_{ref}} R_2$$

R_T = Trim resistance

a = is a self-defined parameter,

V_o' = desired output voltage

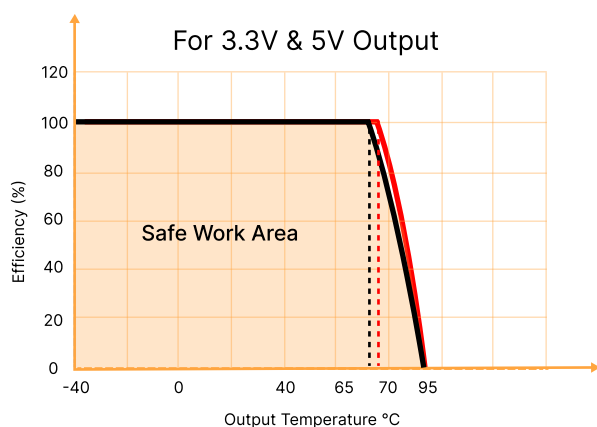
Fig. 3

Fig. 4

TRIM resistor connection (dashed line shows internal resistor network)

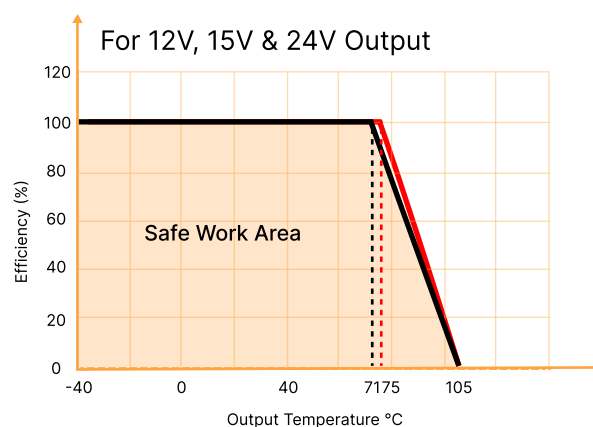
Vout(V)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	4.772	2.87	15	1.25
5	2.894	2.87	10	2.5
12	11.000	2.87	17.4	2.5
15	14.494	2.87	17.4	2.5
24	24.872	2.87	20	2.5

PRODUCT CHARACTERISTIC CURVE



Temperature Derating Curve

Fig. 5



Temperature Derating Curve

Fig. 6

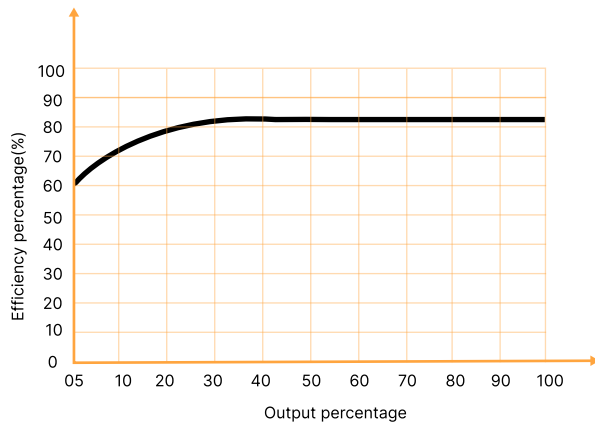


Figure 7: Efficiency Vs Output Load
(Nominal Voltage Input)

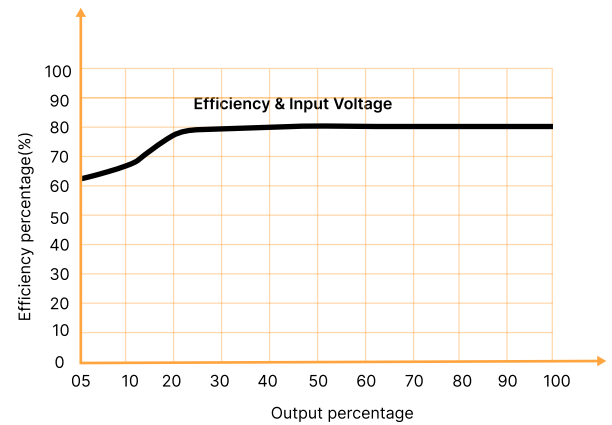


Figure 8: Efficiency Vs Input Voltage
(100% Load)

OVERALL DIMENSIONS AND PIN FUNCTIONS

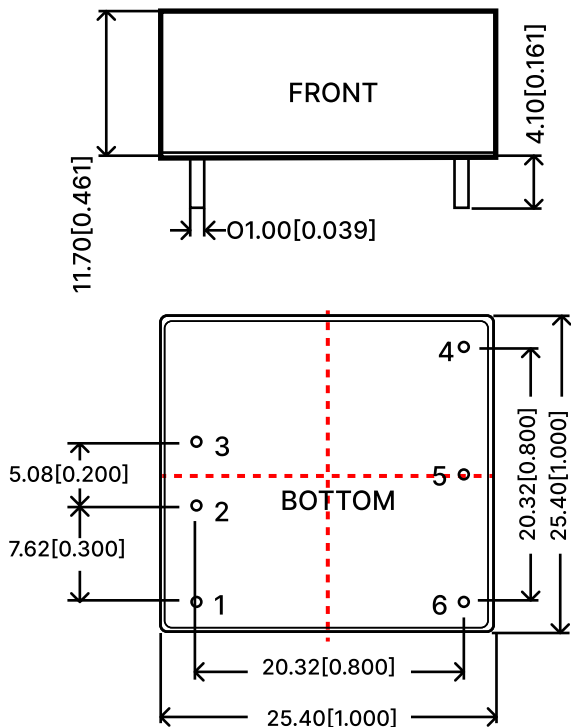
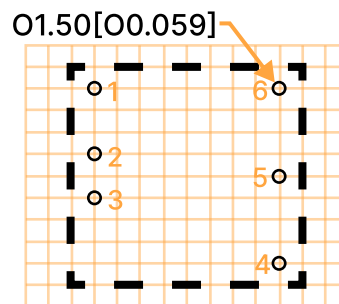


Figure 9: Overall dimensions

THIRD ANGLE PROJECTION



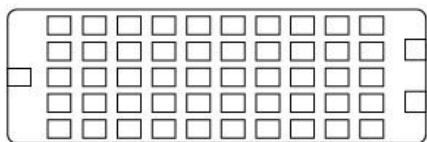
Note: Grid 2.54*2.54

Unit: mm[inch]
Pin diameter tolerances: ± 0.10
General tolerances: ± 0.50

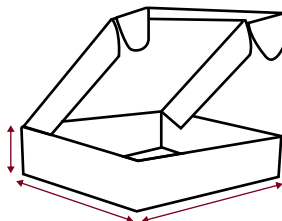
Table 3: Pin Function Table

Pin	Function
1	Ctrl
2	GND
3	Vin
4	+Vo
5	Trim
6	0V

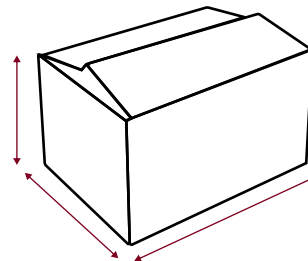
PACKAGING METHOD



50 Pieces/Tube



100 Pieces/Inner box



500 Pieces/Outer box

NOTES & INSTRUCTIONS

- 1.The input voltage shall not exceed the specified range value, otherwise permanent and unrecoverable damage maybe caused;
2. Unless otherwise specified,the parameters in this manual are measured at 25 °C,40%~75% humidity, input nominal voltage and output pure resistance mode under full load;
- 3.All index test methods are based on the company's enterprise standards.
- 4.The copyright and the final interpretation right of the product belong to RHENXV.