RHENXV
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DC-DC CONVERTERS

15 WATTS

DCWB_YD-15W Series

CE Report RoHS 3 YEARS WARRANTY

FEATURES

- Wide voltage range input (4:1)
- Wide operating temperature range：-40°C To +105 °C
- Up to 91% efficiency
- Standby power consumption: 0.3W
- Output short circuit, overcurrent, overload protection
- 3 Years Warranty

APPLICATIONS

- Industrial Control Systems
- Electric Power & Smart Grid
- Automated Instrumentation
- Medical Equipment
- IndustrCommunications & Telecommunicationsial Robotics

DESCRIPTION

DC-DC Module Power Supply, Wide Voltage Input, Power 15W, Isolated, Regulated, Single Output, DIP Packaging

MODEL NUMBERING

DCWBxxxxYD-15W

- Series
- Input Voltage
- Output Voltage
- Output Power
- Packaging Form

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-15W	24VDC (9-36)	3.3	4000/0	86/88	4700
DCWB2405YD-15W		5	3000/0	88/90	4700
DCWB2409YD-15W		9	1667/0	88/90	1000
DCWB2412YD-15W		12	1250/0	88/91	1000
DCWB2415YD-15W		15	1000/0	89/91	820
DCWB2424YD-15W		24	625/0	89/91	270

Product Model	Input Voltage Standard Value(range)	Output Voltage (Vdc)	Output Current (mA) (Max./Min.)	Efficiency % (Min./Typ.)	Maximum capacitive load (μF)
DCWB4803YD-15W	48VDC (18-75)	3.3	4000/0	86/88	4700
DCWB4805YD-15W		5	3000/0	88/90	4700
DCWB4809YD-15W		9	1667/0	88/90	1000
DCWB4812YD-15W		12	1250/0	88/90	1000
DCWB4815YD-15W		15	1000/0	89/91	820
DCWB4824YD-15W		24	625/0	89/91	270

INPUT CHARACTERISTICS

Parameter	Operating Conditions	Min.	Typ.	Max.	Units
Input Current (full load)	Nominal voltage input@24VDC	--	625	710	mA
	Nominal voltage input@48VDC	--	310	360	mA
Input current (No-load)	Nominal voltage input@24VDC	--	10	15	mA
	Nominal voltage input@48VDC	--	06	09	mA
Reflected Ripple Current		30	40	50	mA
Input impulse voltage	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	--	VDC
Start Time		--	10	--	ms

Parameter	Conditions	Min.	Typ.	Max.	Units
Remote control foot (Some models are applicable)	Module On	Ctrl pin open or pulled high (3.5-12VDC)			
	Module shutdown	Ctrl pin pulled low to GND(0-1.2VDC)			
	Input current during shutdown	- -	06	10	mA
Input filter	PI type				

Remarks: This product does not support hot plug

OUTPUT CHARACTERISTICS

Parameter	Conditions	Min.	Typ.	Max.	Units
Output voltage accuracy	0% -100% Load	--	±1	±3	%
Linear regulation rate	Input voltage variation+/- 1%	--	±0.2	±0.5	%
Load regulation rate	10% to 100% load	--	±0.5	±1.5	%
Ripple & Noise	20MHz bandwidth	--	50	100	mVp p
Dynamic response step deviation		--	±3	±7	%
Dynamic response recovery time		--	300	500	us
Temperature drift coefficient	100% load	--	±0.03	--	%/°C
Output over voltage protection	Full voltage range input	110	--	160	%Vo
Output over current protection	Full voltage range input	110	140	190	%Io
Short circuit protection	Sustainable, Self healing				

Note: The Testing Method For Ripple And Noise Is The Parallel Line Testing Method.

GENERAL CHARACTERISTIC

Parameter	Conditions	Min.	Typ.	Max.	Units
Isolation voltage	Input output, test time 1 minute, Leakage current less than 1 mA	1500	--	--	VDC
Insulation resistance	Input output, Insulation voltage 500VDC	1000	--	--	MΩ
Isolation capacitance	Input output, 100KHz/0.1V	--	2000	--	pF
Working temperature	Temperature ≥ 80 °C for derating (See Figure4)	-40	--	+105	°C
Storage temperature		-55	--	+125	°C
Storage humidity	Non condensing	--	--	95	%RH
Housing temperature rise during operation	Ta=25°C,Nominal input, Full output	--	--	100	°C
Soldering temperature resistance of pins	The distance from the welding spot to the shell is 1.5mm, 10 seconds	--	--	300	°C
Switching frequency	Full load, Nominal input voltage	--	270	--	kHz
Vibrate		10-55Hz,10G,30Min.alongX,YandZ			
Mean time between faliures【MTBF】	MIL HDBK-217F@25°C	2000	--	--	kHours

PHYSICAL CHARACTERISTICS

Parameter	Conditions
Housing material	Aluminum alloy
Overall dimensions	25.40 × 25.40 × 13.64mm
Weight	15g(Typ.)
Cooling mode	Natural air cooling

EMC CHARACTERISTICS

Parameter	Category	Content	
EMI	Conductive disturbance	CISPR32/EN55032 CLASS A (Bare machine) CLASS B (Recommended circuit)	
	Radiation disturbance	CISPR32/EN55032 CLASS A (Bare machine) CLASS B (Recommended circuit)	
EMS	Electrostatic discharge	IEC/EN61000-4-2 Contact ±4kV	perf. Criteria B
	Radiated Immunity	IEC/EN61000-4-3 10V/m	perf. CriteriaA
	Pulse group Immunity	IEC/EN61000-4-4 ±2kV Recommended circuit	perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5 line to line ±2kV Recommended circuit	perf. Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6 3 Vr.m.s	perf. CriteriaA
	Voltage dips, and short-term interruptions immunity	IEC/EN61000-4-29 0%, 70%	perf. Criteria B

CIRCUIT DESIGN AND APPLICATION

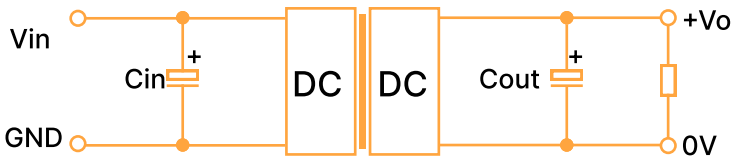


Figure 1: Application circuit

Table 1:
Recommended Capacitive Load Values

Vin(VDC)	Cin(μF)	Vo(VDC)	Cout(μF)
Nominal voltage	100	Nominal voltage	100

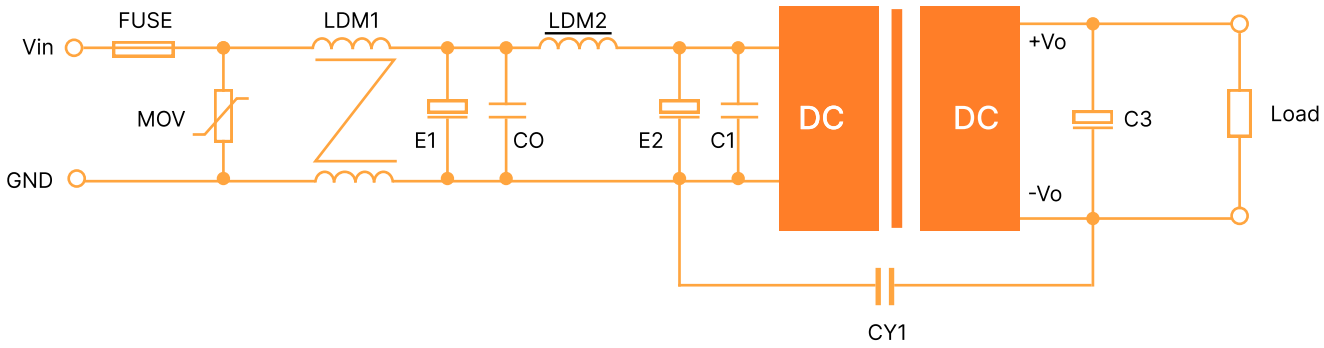


Figure 2: EMC Typical Recommended Circuits

Table 2: Recommended Circuit Parameter Values

Category	Component	Value
EMI	MOV	14D560K
	E1/E2	100μF
	C0/C1	1μF
	CY1	1nF/2KV
	LDM1	10mH
	LDM2	10μH

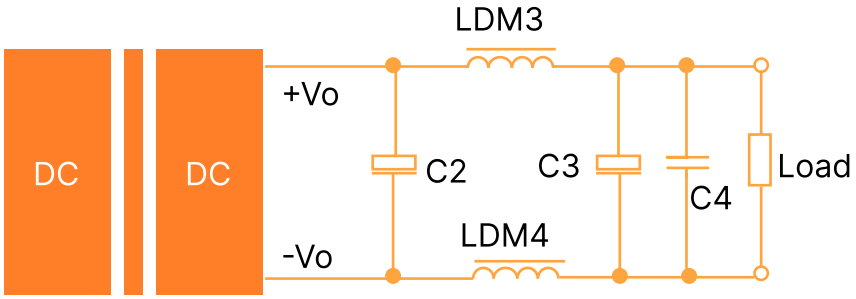
1. Typical application: If further reduction of input and output ripple is required, a capacitor Filter network can be connected at the input and output ends. The application circuit is shown in Figure 1. However, suitable Filter capacitors should be selected. If the capacitance is too large, it may cause overcurrent or poor startup of the power supply. For each output, while ensuring safe and reliable operation, the recommended capacitance load values are shown in Table 1.

2. EMC requirements: For situations with high EMC requirements, a typical EMC recommended circuit is shown in Figure 2.

3. Input requirements: Ensure that the Fluctuation range of the input voltage does not exceed the upper and lower limits of the input voltage Specified in this data sheet, and the input power must be greater than the output power Specified in this data sheet. For situations with a 24V input voltage, it is recommended to connect a TVS tube between the positive and negative input pins for protection (recommended parameters for TVS tubes: 30V, bidirectional, SOD-123 packaging).

4. Output load requirements: Try to avoid using it without load as much as possible; When the actual power of the load is less than 10% of the rated output power in this data sheet, or when it needs to be used in no-load situations, it is recommended to connect a load resistor externally at the output end. The load resistor can be calculated according to 5-10% of the rated power in this data sheet. The calculation formula for the load resistor value is $RL=Vout^2/(Pout*10\%)$.

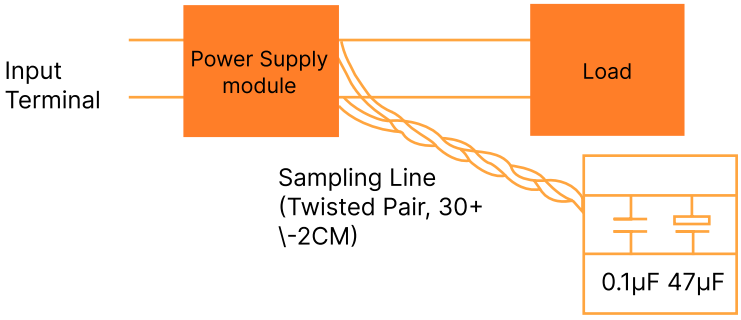
5. Overload protection: Under normal working conditions, the output circuit of this product has no protection function for overload situations. The simplest method is to connect a self recovery fuse in series at the input end, or add a circuit breaker outside the circuit; Or during design and selection, the actual power of the circuit should be around 60-80% of the rated power in this data sheet.



When using in situations with strict requirements for ripple and noise, it is recommended to use the circuit shown in the figure above

Figure 3: Ripple application and testing

The testing method for ripple and noise is to use a 12 # twisted pair connection, with an oscilloscope bandwidth of 20MHZ and a 100M bandwidth oscilloscope probe. The capacitor shown in the above figure is connected in parallel to the oscilloscope probe, and the sampling mode of the oscilloscope is SAMPLE.



Remove the probe cap and the ground clamp from the oscilloscope probe

PRODUCT CHARACTERISTIC CURVE

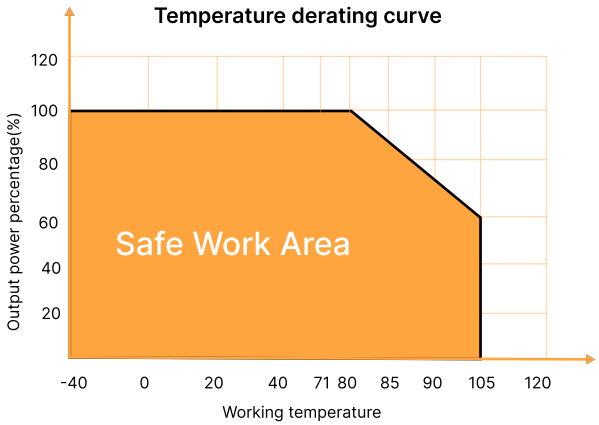


Figure 4: Temperature Derating Curve

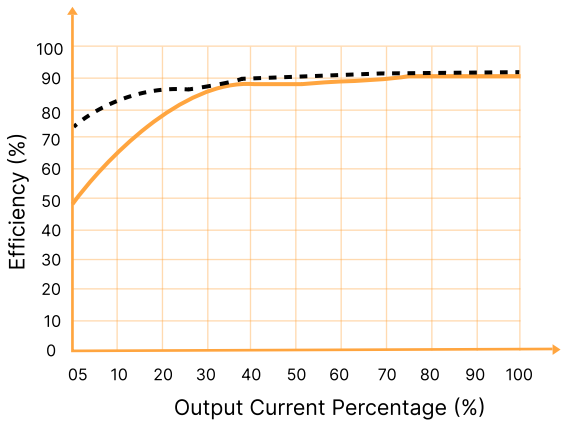


Figure 5: Efficiency Vs Output Load

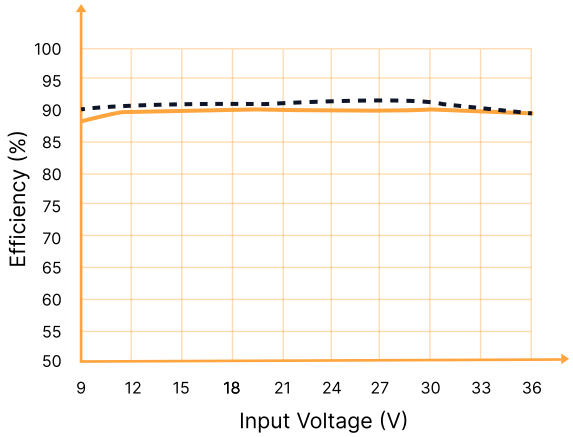
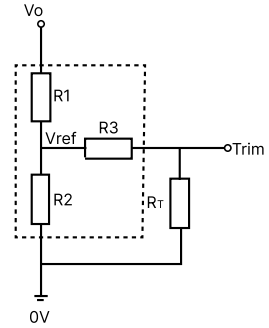
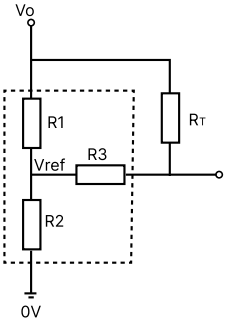


Figure 6: Efficiency Vs Input Voltage (Full Load)

TRIM FUNCTION FOR OUTPUT VOLTAGE ADJUSTMENT



Trim up



Trim Down

The Calculation formula for trip resistance

Trim up: $R_T \frac{aR_2}{R_2-a} - R_3$ $a = \frac{Vref}{Vo'-Vref} R_1$

Trim down: $R_T \frac{aR_1}{R_1-a} - R_3$ $a = \frac{Vo'-Vref}{Vref} R_2$

R_T is Trim resistance
a is a self-defined parameter, with no real meaning.

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	12.4	1.25
5	2.883	2.87	10	2.5
09	7.500	2.87	15	2.5
12	11.000	2.87	15	2.5
15	14.494	2.87	15	2.5
24	24.872	2.87	17.8	2.5

OVERALL DIMENSIONS AND PIN FUNCTIONS

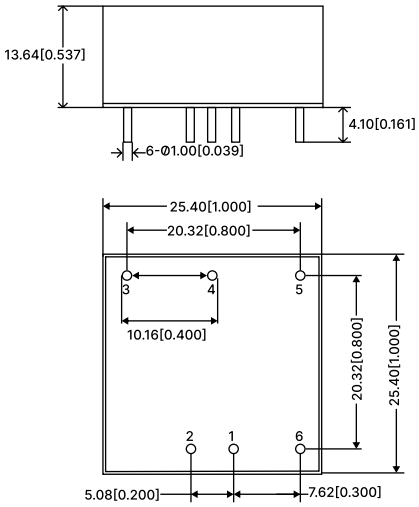
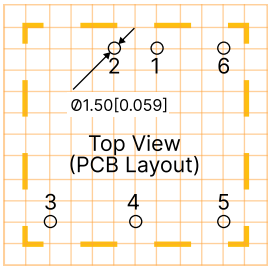


Figure 7: Overall dimensions



Note: 2.54mm*2.54mm

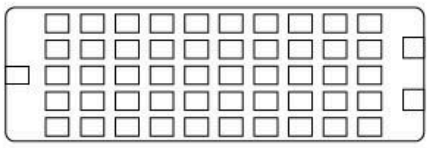
Note:
Dimensions in mm
Terminal diameter tolerance:+/-0.10
Undeclared tolerance:+/-0.50

Table 3: Pin Function Table

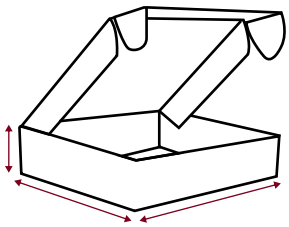
Pin	Function
1	GND
2	Vin
3	+Vo
4	Trim
5	0V
6	Ctrl

*NC cannot be connected to any external circuits

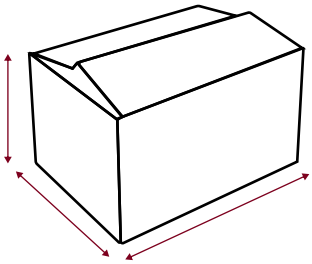
PACKAGING METHOD



50 Pieces/Tube



100 Pieces/Inner box



500Pieces/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.