

## PWA\_(M)D-1W5&PWB\_(M)D-1W5 Series

### 1.5W, WIDE INPUT, ISOLATED & REGULATED

### DUAL/SINGLE OUTPUT DIP DC-DC CONVERTER

multi-country patent protection **RoHS**

#### FEATURES

Wide input voltage(4:1)  
 Operating Temperature: -40°C to +85°C  
 1500VDC Input/Output Isolation  
 Short Circuit Protection(automatic recovery)  
 Internal SMD construction  
 No external component required  
 No Heat Sink Required  
 Industry Standard Pinout  
 Five-sided shielding package(PWA/B\_MD)  
 MTBF>1,000,000 hours  
 RoHS Compliance

#### APPLICATIONS

The PWA\_(M)D-1W5&PWB\_(M)D-1W5 Series are specially designed for applications where a wide range input voltage power supplies are isolated from the input power supply in a distributed power supply system on a circuit board.

These products apply to:

- 1) Where the voltage of the input power supply is wide range (voltage ranges  $\leq 4:1$ );
- 2) Where isolation is necessary between input and output (Isolation Voltage  $\leq 1500$ VDC);
- 3) Where the regulation of the output voltage and the output ripple noise are demanded.

#### PRODUCT PROGRAM

Part Number	Input			No-load (mA)(typ)	Output			Efficiency (%) (typ)				
	Voltage (VDC)				Voltage (VDC)	Current (mA)						
	Nominal	Range	Max*			Max	Min					
PWA2405(M)D-1W5	24	9.0-36	40	16	±5	±150	±15	74				
PWA2412(M)D-1W5					±12	±63	±6	78				
PWA2415(M)D-1W5					±15	±50	±5	79				
PWB2403(M)D-1W5					3.3	500	50	72				
PWB2405(M)D-1W5					5	300	30	74				
PWB2409(M)D-1W5					9	167	17	76				
PWB2412(M)D-1W5					12	125	12	78				
PWB2415(M)D-1W5					15	100	10	80				
PWA4805(M)D-1W5					48	18-72	80	8	±5	±150	±15	74
PWA4812(M)D-1W5									±12	±63	±6	78
PWA4815(M)D-1W5	±15	±50	±5	80								
PWB4803(M)D-1W5	3.3	500	50	72								
PWB4805(M)D-1W5	5	300	30	74								
PWB4809(M)D-1W5	9	167	17	76								
PWB4812(M)D-1W5	12	125	12	78								
PWB4815(M)D-1W5	15	100	10	80								

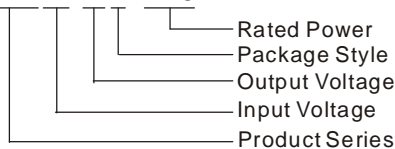
\* Input voltage over it may cause permanent damage to the device.

Note: The load shouldn't be less than 10%, otherwise ripple will increase dramatically.

Operation under 10% load will not damage the converter; However, they may not meet all specification listed

#### MODEL SELECTION

PWA2412D-1W5



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#### OUTPUT SPECIFICATIONS

Item	Test Conditions	Min	Typ	Max	Units
Output Power	See below products program	0.15		1.5	W
Positive Voltage accuracy	Refer to recommended circuit		±1	±3	%
Negative Voltage accuracy	Refer to recommended circuit		±3	±5	
Load Regulation	From 10% to 100% load		±0.5	±2*	
Line Regulation	Input voltage from low to high		±0.2	±0.75	
Temperature Drift	Refer to recommended circuit			±0.03	%/°C
Ripple**	20MHz bandwidth		20	50	mVp-p
Noise**	20MHz bandwidth		50	100	
Switching Frequency	100% load, nominal input voltage		300		KHz

\* Dual output models unbalanced load:  $\pm 5\%$ .

\*\*Test ripple and noise by "parallel cable" method. See detailed operation instructions at Testing of Power Converter section, application notes.

Note:

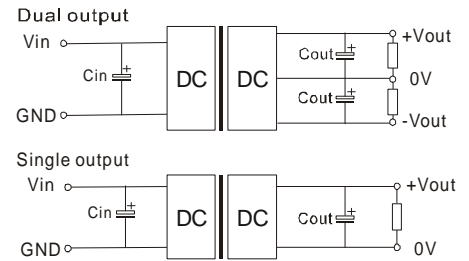
1. All specifications measured at  $T_A=25^\circ\text{C}$ , humidity<75%, nominal input voltage and rated output load unless otherwise specified.
2. See below recommended circuits for more details.

## COMMON SPECIFICATION

Item	Test Conditions	Min	Typ	Max	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Storage Temperature		-55		125	
Temp. rise at full load			15		
Lead temperature	1.5mm from case for 10 seconds			300	
Isolation voltage	Tested for 1 minute and 1mA max	1500			VDC
Isolation resistance	Test at 500VDC	1000			MΩ
Isolation capacitance			100		PF
Cooling	Free air convection				
Case material	D: Plastic(UL94-V0); MD: Steel, nickel plated				
Short circuit protection	Continuous, automatic recovery				
MTBF		100			K hours
Weight			15		g

## Recommended Circuit

All the PWA\_(M)D-1W5 & PWB\_(M)D-1W5 Series have been tested according to the following recommended testing circuit before leaving factory. (See Figure 1).



(Figure 1)

If you want to further decrease the input/output ripple, you can increase capacitance properly or choose capacitors with low ESR. However, the capacitance should not be too high, or may cause start-up problem. For every channel of output, provided the safe and reliable operation is ensured, the greatest capacitance of its filter capacitor sees (Table 1). If you want to use the products in high EMI, please choose our metal packaged products (PWA\_MD-1W5 & PWB\_MD-1W5). General:

Cin: 24V&48V 10μF-47μF

Cout: 10μF/100mA

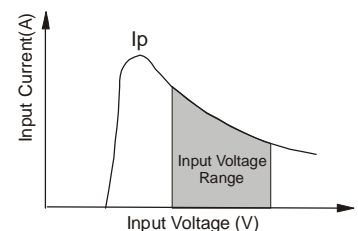
Output External Capacitor Table (Table 1)

Single Vout (VDC)	Cout (μF)	Dual Vout (VDC)	Cout (μF)
3.3	2200	±5	680
5	1000	±12	330
9	680	±15	220
12	470	--	--
15	330	--	--

## Input Current

When it is used in unregulated power supply, be sure that the fluctuating range of the power supply and the rippled voltage do not exceed the module standard. Input current of power supply should afford the startup current of this kind of DC/DC module. (See figure 2)

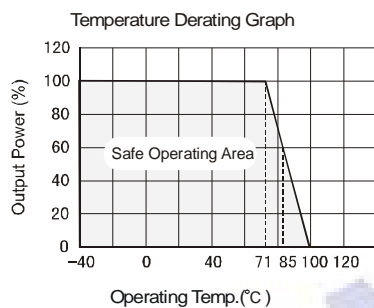
General:  $I_p \leq 1.4 \cdot I_{in-max}$



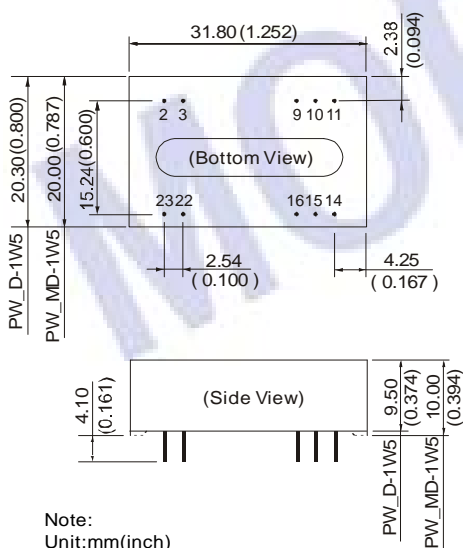
(Figure 2)

**No parallel connection or plug and play.**

## TYPICAL CHARACTERISTICS



## OUTLINE DIMENSIONS & FOOTPRINT DETAILS

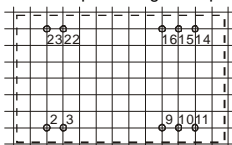


Note:  
Unit: mm (inch)  
Pin diameter: 0.50mm (0.020inch)  
Pin diameter tolerances:  $\pm 0.10\text{mm} (\pm 0.004\text{inch})$   
General tolerances:  $\pm 0.25\text{mm} (\pm 0.010\text{inch})$

First Angle Projection

RECOMMENDED FOOTPRINT  
Top view, grid: 2.54mm (0.1inch)  
diameter: 1.00mm (0.039inch)

Dual Output /Single Output



## FOOTPRINT DETAILS

Pin	Single	Dual
2,3	GND	GND
9	NC	0V
10,15	NC	NC
11	NC	-Vo
14	+Vo	+Vo
16	0V	0V
22,23	Vin	Vin

NC: No Connection

## APPLICATION NOTE

### Requirement On Output Load

In order to ensure the product operate efficiently and reliably, in addition to a max load (namely full load), a minimum load is specified for this kind of DC/DC converter. Make sure the specified range of input voltage is not exceeded, the minimum output load no less than 10% load. If the actual load is less than the specified minimum load, the output ripple may increase sharply while its efficiency and reliability will reduce greatly. If the actual output power is very small, please add an appropriate resistor as extra loading, or contact our company for other lower output power products.