

## Features

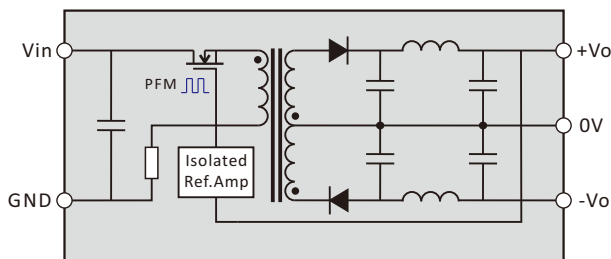
- ◆ Operating temperature: -40 to +85°C
- ◆ 9-18/18-36/36-75/9-36/18-75Vdc input
- ◆ 5V/9V/12V/15V/24V/±5V/±9V/±12V/±15V output
- ◆ Efficiency up to 89%
- ◆ Ultra-low noise & ripple
- ◆ Bare module meet CISPR22/EN55022 Class B
- ◆ 100% burn-In
- ◆ No external heat sink
- ◆ Continuous short circuit protection
- ◆ RoHS/CE multiple compliance
- ◆ With 3 years warranty
- ◆ Case size 31.8×20.3×11.5mm 25.4×25.4×11.5mm

## General Description

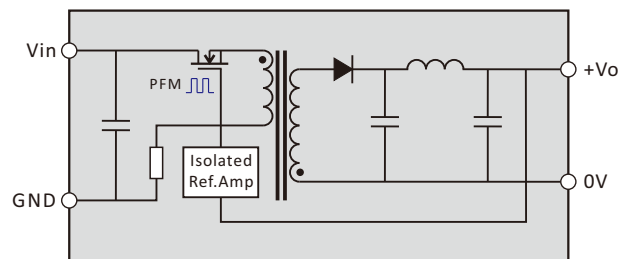
WA/B/E/F\_P(D)-6W series power converter compact, high power density, can save valuable board space to reduce product volume. It has the characteristics of wide input voltage range, low starting current, good load characteristics and minimum noise characteristics. The chip ceramic capacitors and SMT are used in all series. These converters have characteristics of long life, excellent performance, stability and reliability.



## Functional Diagram



Dual Series



Single Series

## EMC Solution-Recommended Circuit

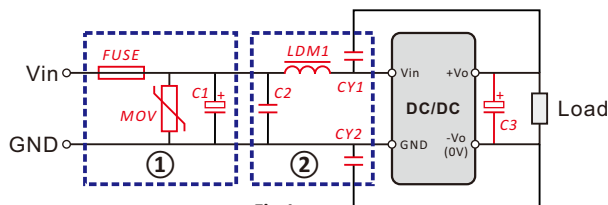


Fig.1

### Notes:

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

Parameter Description			
Model	Vin:12V	Vin:24V	Vin:48V
FUSE	Choose according to actual input current		
MOV	S14K35	S14K35	S14K60
C1	330uF/50V	330uF/50V	330uF/100V
C2	1uF/50V	1uF/50V	1uF/100V
C3	Refer to the Cout in Fig.3		
LDM1	4.7uH		
CY1/CY2	1nF/2kV or 4.5kV		

# WA/B/E/F\_P/D-6W Series

6w, wide input, isolated & regulated dual/single output dc-dc converter



Input Specifications					
Item		Min	Typ	Max	Units
Input Impulse Voltage (1 sec max)	12V input models	-0.7		20	Vdc
	24V input models	-0.7		40	
	48V input models	-0.7		80	
Startup Voltage	12V input models			9	Vdc
	24V input models			18	
	48V input models			36	
Startup Current @ 100% load, nominal input		<1.6 lin-max.			
Input Filter		"LC" filter			
Input Polarity Protection		Unavailable			

Output Specifications					
Item	Test Conditions	Min	Typ	Max	Units
Output Power	Ta=-40-+70°C			6	W
Line Regulation	100% load, input low to high		±0.1	±0.3	%
Load Regulation	10-100% load, nominal input		±0.3	±0.5	
Output Voltage Accuracy	100% load, nominal input	Master	±1	±3	
		Slave	±3	±5	
Balance of Vout	Dual output, balance load		±0.5	±1.5	
Ripple & Noise	DC-20MHz bandwidth		30	60	mVp-p
Temperature Drift	100% load, nominal input			±0.03	%/°C
Short Circuit Protection		Continuous, Self-Recovery			
Output Filter		"Π" filter			

Isolation Specifications					
Item	Test Conditions	Min	Typ	Max	Units
Isolation Voltage	WA/WB	1500			Vdc
	WE/WF	3000			
Insulation Resistance	Test at 500Vdc	1000			MΩ
Isolation Capacitance	IN-OUT, 100kHz @ 0.1Vdc		1000		pF

Common Specification					
Item	Test Conditions	Min	Typ	Max	Units
Switching Frequency	100% load, input low to high	180		550	kHz
Operating Temperature	Ta>70°C derating	-45		+85	°C
Case Temp Rise	100% load, nominal input		40		
Lead Temperature	1.5mm from case for 10 seconds			+300	
Storage Temperature		-50		+130	
Storage Humidity				95	
MTBF	Using MIL-HDBK 217 @ 25°C	1000			k hours
Hot Plug		Unavailable			
Case Material		Aluminium Alloy			

EMC Specification			
EMI	CE	EN55022:2010	Class B ( Bare component )
	RE	EN55022:2010	Class B ( Bare component )
EMS	ESD	EN55024:2010/EN61000-4-2	perf. Criterion B
	RS	EN55024:2010/EN61000-4-3	perf. Criterion A

## Application Note

### 1. The power requirements

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 Fig.2 ).

General:  $I_p < 1.6 I_{in-max}$ .

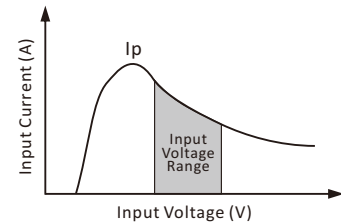


Fig.2

### 2. Typical application

All DC/DC converters of this series are tested according to the recommended circuit before delivery (see Fig.3, but without external capacitor Cin & Cout).

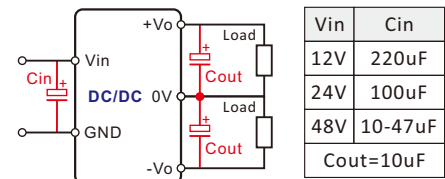


Fig.3

General applications, the **output** does not require any external filter components. If the required to further reduce input and output ripple, properly increase the input and output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance. Provided that the capacitance is not larger than the max capacitive load of the product, **avoid affect the product startup performance.**

### 3. EMC solution-recommended circuit

The WA and WB series products have a very good ripple and noise performance so that bare module meet the EN55022 Class B.

The WE and WF series products, recommend Fig.1 for the EMC solution that meet the EN55022 Class B ( see Fig.1 ).

### 4. On derating

When the environmental temperature exceeds 70°C the module must be derating used, please refer to derating curve ( see Fig.4 ).

#### Temperature Derating Curve

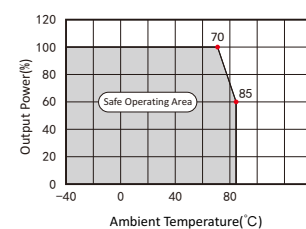


Fig.4

# WA\_D-6W & WB\_D-6W Series

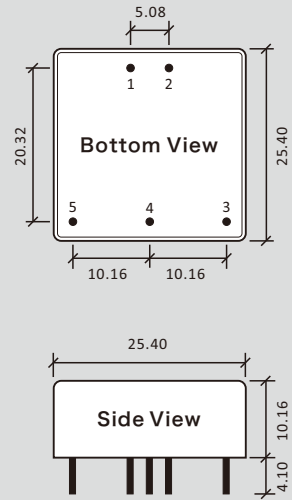
6w, wide input, isolated & regulated dual/single output dc-dc converter



Product Program							
Certificate	Model	Eff (%)	Input		Output		
			Voltage(Vdc)		Vdc	mA	Max Capacitive Load (uF)
			Nominal	Range	Nominal	Max	
CE/RoHS	WA1205D-6W	80	12	9-18	±5	±600	470
	WA1209D-6W	83			±9	±333	220
	WA1212D-6W	85			±12	±250	100
	WA1215D-6W	86			±15	±200	100
CE/RoHS	PWA2405D-6W	82	24	18-36 (9-36)	±5	±600	470
	PWA2409D-6W	88			±9	±333	220
	PWA2412D-6W	86			±12	±250	100
	PWA2415D-6W	88			±15	±200	100
CE/RoHS	PWA4805D-6W	83	48	36-75 (18-75)	±5	±600	470
	PWA4809D-6W	89			±9	±333	220
	PWA4812D-6W	87			±12	±250	100
	PWA4815D-6W	88			±15	±200	100
CE/RoHS	WB1205D-6W	80	12	9-18	5	1200	1000
	WB1209D-6W	82			9	667	680
	WB1212D-6W	84			12	500	470
	WB1215D-6W	86			15	400	220
CE/RoHS	PWB2405D-6W	82	24	18-36 (9-36)	5	1200	1000
	PWB2409D-6W	86			9	667	680
	PWB2412D-6W	86			12	500	470
	PWB2415D-6W	88			15	400	220
CE/RoHS	PWB2424D-6W	87			24	250	100
	PWB4805D-6W	83	48	36-75 (18-75)	5	1200	1000
	PWB4809D-6W	85			9	667	680
	PWB4812D-6W	87			12	500	470
PWB4815D-6W	88	15			400	220	
	PWB4824D-6W	87			24	250	100

Note: The prefix "P" for 4:1 input range

## Dimensions First Angle Proj



Pin	Single	Dual
1	<b>GND</b>	<b>GND</b>
2	<b>Vin</b>	<b>Vin</b>
3	<b>+Vo</b>	<b>+Vo</b>
4	<b>no Pin</b>	<b>0V</b>
5	<b>0V</b>	<b>-Vo</b>

**Note:**

All size units mm,  
 Diameter of all terminal 0.8mm;  
 Distance between all adjacent terminal 2.54mm;  
**Isolation: 1500Vdc**  
**Weight: 11g**

# WA\_P-6W & WB\_P-6W Series

6w, wide input, isolated & regulated dual/single output dc-dc converter

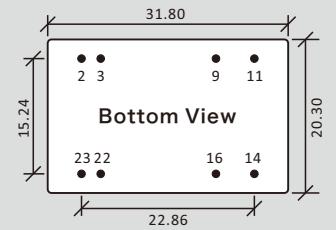


Product Program							
Certificate	Model	Eff (%)	Input		Output		
			Voltage(Vdc)		Vdc	mA	Max Capacitive Load (uF)
			Nominal	Range	Nominal	Max	
CE/RoHS	WA1205P-6W	80	12	9-18	±5	±600	470
	WA1209P-6W	83			±9	±333	220
	WA1212P-6W	85			±12	±250	100
	WA1215P-6W	86			±15	±200	100
	WA1224P-6W	85			±24	±125	100
CE/RoHS	PWA2405P-6W	82	24	18-36 (9-36)	±5	±600	470
	PWA2409P-6W	88			±9	±333	220
	PWA2412P-6W	86			±12	±250	100
	PWA2415P-6W	88			±15	±200	100
	PWA2424P-6W	86			±24	±125	100
CE/RoHS	PWA4805P-6W	83	48	36-75 (18-75)	±5	±600	470
	PWA4809P-6W	89			±9	±333	220
	PWA4812P-6W	87			±12	±250	100
	PWA4815P-6W	88			±15	±200	100
	PWA4824P-6W	87			±24	±125	100

CE/RoHS	WB1205P-6W	80	12	9-18	5	1200	1000
	WB1209P-6W	82			9	667	680
	WB1212P-6W	84			12	500	470
	WB1215P-6W	86			15	400	220
	WB1224P-6W	84			24	250	100
CE/RoHS	PWB2405P-6W	82	24	18-36 (9-36)	5	1200	1000
	PWB2409P-6W	86			9	667	680
	PWB2412P-6W	86			12	500	470
	PWB2415P-6W	88			15	400	220
	PWB2424P-6W	87			24	250	100
CE/RoHS	PWB4805P-6W	83	48	36-75 (18-75)	5	1200	1000
	PWB4809P-6W	85			9	667	680
	PWB4812P-6W	87			12	500	470
	PWB4815P-6W	88			15	400	220
	PWB4824P-6W	87			24	250	100

Note: The prefix "P" for 4:1 input range

## Dimensions First Angle Proj



Pin	Single	Dual
2,3	<b>GND</b>	<b>GND</b>
22,23	<b>Vin</b>	<b>Vin</b>
9	<b>NC</b>	<b>0V</b>
11	<b>NC</b>	<b>-Vo</b>
14	<b>+Vo</b>	<b>+Vo</b>
16	<b>0V</b>	<b>0V</b>

**Note:**

All size units mm,  
 Diameter of all terminal 0.8mm;  
 Distance between all adjacent terminal 2.54mm;  
**Isolation: 1500Vdc**  
**Weight: 11g**

# WE\_P-6W & WF\_P-6W Series

6w, wide input, isolated & regulated dual/single output dc-dc converter

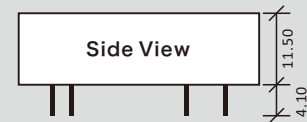
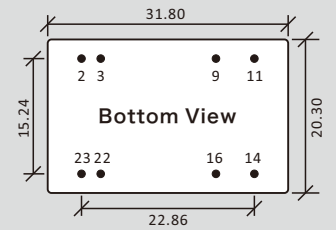


Product Program							
Certificate	Model	Eff (%)	Input		Output		
			Voltage(Vdc)		Vdc	mA	Max Capacitive Load (uF)
			Nominal	Range	Nominal	Max	
CE/RoHS	WE1205P-6W	80	12	9-18	±5	±600	470
	WE1209P-6W	83			±9	±333	220
	WE1212P-6W	85			±12	±250	100
	WE1215P-6W	86			±15	±200	100
	WE1224P-6W	85			±24	±125	100
CE/RoHS	PWE2405P-6W	82	24	18-36 (9-36)	±5	±600	470
	PWE2409P-6W	88			±9	±333	220
	PWE2412P-6W	86			±12	±250	100
	PWE2415P-6W	88			±15	±200	100
	PWE2424P-6W	86			±24	±125	100
CE/RoHS	PWE4805P-6W	83	48	36-75 (18-75)	±5	±600	470
	PWE4809P-6W	89			±9	±333	220
	PWE4812P-6W	87			±12	±250	100
	PWE4815P-6W	88			±15	±200	100
	PWE4824P-6W	87			±24	±125	100

CE/RoHS	WF1205P-6W	80	12	9-18	5	1200	1000
	WF1209P-6W	82			9	667	680
	WF1212P-6W	84			12	500	470
	WF1215P-6W	86			15	400	220
	WF1224P-6W	84			24	250	100
CE/RoHS	PWF2405P-6W	82	24	18-36 (9-36)	5	1200	1000
	PWF2409P-6W	86			9	667	680
	PWF2412P-6W	86			12	500	470
	PWF2415P-6W	88			15	400	220
	PWF2424P-6W	87			24	250	100
CE/RoHS	PWF4805P-6W	83	48	36-75 (18-75)	5	1200	1000
	PWF4809P-6W	85			9	667	680
	PWF4812P-6W	87			12	500	470
	PWF4815P-6W	88			15	400	220
	PWF4824P-6W	87			24	250	100

Note: The prefix "P" for 4:1 input range

## Dimensions First Angle Proj



Pin	Single	Dual
2,3	<b>GND</b>	<b>GND</b>
22,23	<b>Vin</b>	<b>Vin</b>
9	<b>NC</b>	<b>0V</b>
11	<b>NC</b>	<b>-Vo</b>
14	<b>+Vo</b>	<b>+Vo</b>
16	<b>0V</b>	<b>0V</b>

**Note:**

All size units mm,  
 Diameter of all terminal 0.8mm;  
 Distance between all adjacent terminal 2.54mm;  
**Isolation: 3000Vdc**  
**Weight: 11g**

# File Release Notes

DBN-404 Technical Data Sheet Version



No.	Version	Date	Description
1	V0	2011/11/01	First release
2	V1	2013/08/24	The fifth page error correction "-Vo(11) to-Vo(16)"
3	A/0	2016/07/01	Fixed bug
4			
5			

1. All data in addition to particular things, are Ta = 25°C, humidity<75%, nominal input voltage and output measured at rated load;
2. Non-standard models with some of the following indicators may be different from the specific circumstances of the Secretary to direct contact with me;
3. In the use of this manual, if some of them do not quite understand terms please refer to our <<DC/DC Converter Application Guide>>;
4. The Company focused on technological improvements, product specifications and parameter updates without notice, to pay attention to the latest information on website.

All Delus Corporation's products are manufactured, assembled and tested utilizing ISO9001 quality systems.  
For information regarding Delus Corporation and its products please see website: [www.delus-power.com](http://www.delus-power.com)

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