

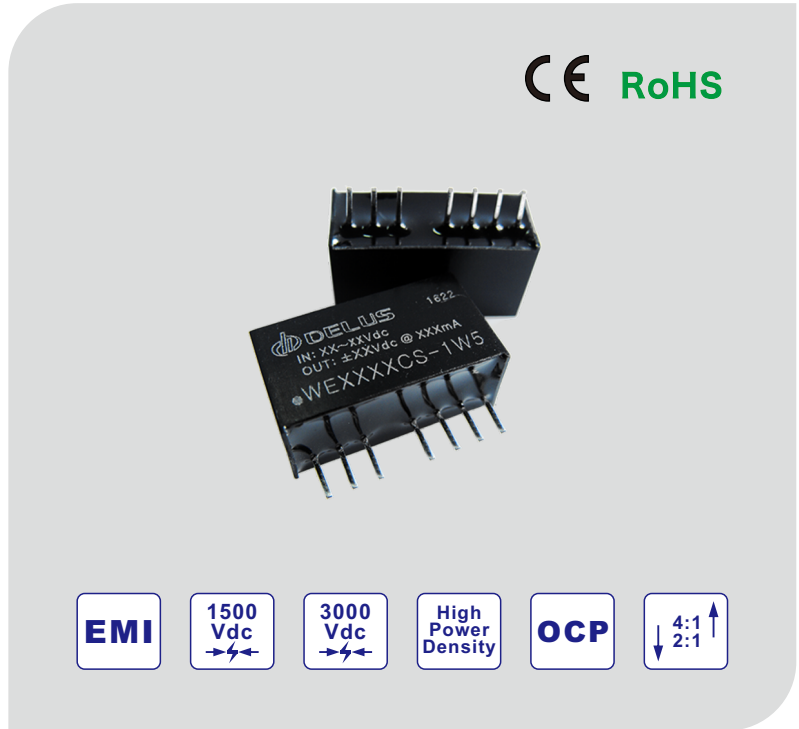
Features

- ◆ Operating temperature: -40 to +85°C
- ◆ 4.5-9/9-18/18-36/36-75/9-36/18-75Vdc input
- ◆ 5V/9V/12V/15V/24V/±5V/±9V/±12V/±15V output
- ◆ Efficiency up to 86%
- ◆ 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

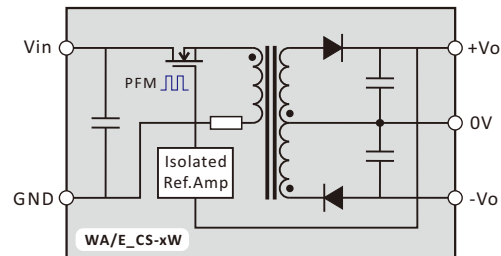
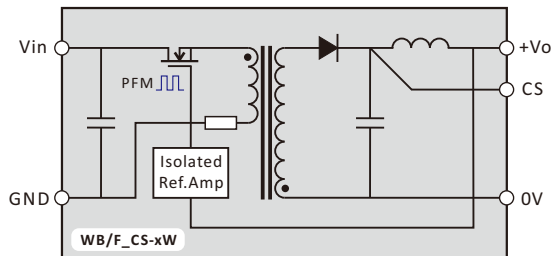
General Description

W_CS series dc/dc converter is wide voltage range. It has a relatively compact SIP package and high power density can help user to save board space. The series has advantages of wide input voltage range, small start current, good load characteristic, and low ripple. Ceramic chip capacitors and SMT used in the series. The product has characteristics of long lifetime, good performance and high reliability.

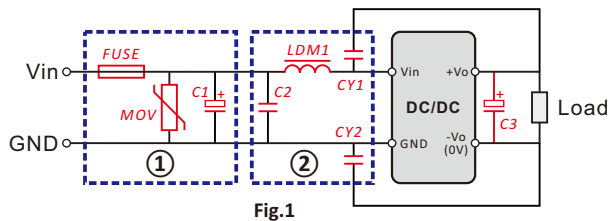
The series product makes an ideal solution in industrial control system, communication system power supply, etc. It is especially suitable for the application where input range is wide and isolation between input and output is necessary.



Functional Diagram



EMC Solution-Recommended Circuit



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:5V	Vin:12V	Vin:24V	Vin:48V
FUSE	Choose according to actual input current			
MOV	S14K11	S14K17	S14K35	S14K60
C1	1000uF/16V	680uF/25V	330uF/50V	330uF/100V
C2	1uF/25V	1uF/25V	1uF/50V	1uF/100V
CY1/CY2	1nF/2kV or 4.5kV			
LDM1	4.7uH			
C3	Refer to the Cout in Fig.2			

W_CS-1W5 & W_CS-3W Series

1.5w/3w, wide input, isolated & regulated dual/single output dc-dc converter



Input Specifications					
Item		Min	Typ	Max	Units
Input Impulse Voltage (1 sec max)	5V input models	-0.7		10	Vdc
	12V input models	-0.7		20	
	24V input models	-0.7		40	
	48V input models	-0.7		80	
Startup Voltage	5V input models			4.5	Vdc
	12V input models			9	
	24V input models			18	
	48V input models			36	
Input Filter	"C" filter				
Input Polarity Protection	unavailable				
Input control (CTRL)	ON	open or high impedance			
	OFF	high level (sink<10mA)			

Output Specifications						
Item		Test Conditions	Min	Typ	Max	Units
Output Power	CS-1W5	Ta=-40~+85°C	0.15		1.5	W
	CS-3W		0.3		3	
Line Regulation		100% load, input low to high		±0.05	±0.15	%
Load Regulation		10-100% load, nominal input		±0.1	±0.3	
Output Voltage Accuracy		100% load, nominal input		±1	±3	%
Balance of Vout		Dual output, balance load		±0.8	±2	
Ripple & Noise		DC-20MHz bandwidth		40	100	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/B	Tested for 60S and 1mA max	1500			Vdc
	WE/F		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		35		
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		Black Plastic (UL94V-0)				

EMC Specification			
EMI			
CE	RE	EN55022:2010	Class B (Bare component)
	RS	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

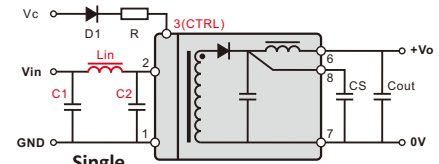
Application Note

1. The power requirements

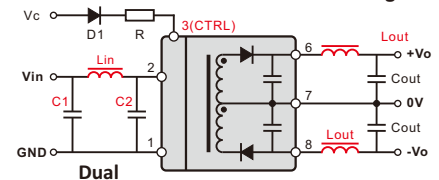
As the power module start, a impulse current will formed, so please ensure that the power supply is sufficient to cope with the current. In general, the impulse current will be 1.6 times typical input current in consideration.

2. Typical application

All DC/DC converters of this series are tested according to the recommended circuit before delivery (see Fig.2, but without external capacitor Cin & Cout).



Single



Dual

Fig.2

C1, C2	Vout	CS	Cout	Lin, Lout
C1: 10-100uF	3.3V	47uF	47uF	Lin: 4.7-12uF
	5V	22uF	22uF	
	9V	22uF	22uF	
C2: 2.2-47uF	12V	10uF	10uF	Lout: 2.2-10uH
	15V	10uF	10uF	
	24V	4.7uF	4.7uF	
If dual output, Cout value reduce half				

3. CS Pin

CS pin is a terminal of the connective point of main filter capacitor in DC/DC converter (connect to capacitor cathode). Connecting a low ESR capacitor between the terminal and pin7 can improve the output ripple.

4. CTRL Pin

CTRL pin provides an external control. The module is normal operation when this pin is not connected. If the pin is connected to high level the module will be close. Please refer to Recommended Circuit. Sink current on resistor R is no more than 10mA, value of R can be calculated from (sink-current: 5~10mA):

$$R \geq \frac{V_C - V_{D1} - 0.7}{10} \text{ (k}\Omega\text{)}$$

4. On derating

Environmental temperature exceeds 70°C the module must be derating used (see Fig.3).

Temperature Derating Curve

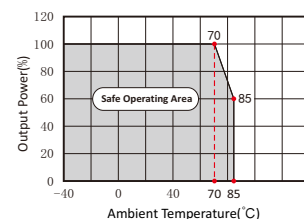


Fig.3

WA_CS-1W5 & WB_CS-1W5 Series

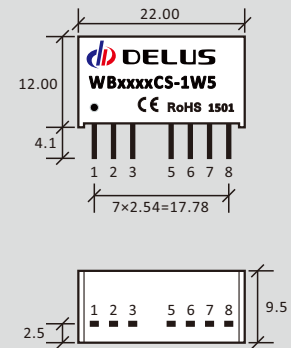
1.5w, wide input, 1500Vdc isolated & regulated output dc-dc converter



Product Program							
Certificate	Model	Eff (%)	Input		Output		
			Voltage(Vdc)		Vdc	mA	Max Capacitive Load (uF)
			Nominal	Range	Nominal	Max	
CE/RoHS	WA1205CS-1W5	79	12	9-18	±5	±150	470
	WA1209CS-1W5	83			±9	±83	220
	WA1212CS-1W5	82			±12	±63	100
	WA1215CS-1W5	82			±15	±50	100
CE/RoHS	WA2405CS-1W5	79	24	18-36	±5	±150	470
	WA2409CS-1W5	80			±9	±83	220
	WA2412CS-1W5	81			±12	±63	100
	WA2415CS-1W5	82			±15	±50	100
CE/RoHS	WA4805CS-1W5	76	48	36-72	±5	±150	470
	WA4809CS-1W5	79			±9	±83	220
	WA4812CS-1W5	82			±12	±63	100
	WA4815CS-1W5	82			±15	±50	100
CE/RoHS	WB0515CS-1W5	77	5	4.5-9	15	100	220
CE/RoHS	WB1203CS-1W5	75	12	9-18	3.3	455	1800
	WB1205CS-1W5	75			5	300	1000
	WB1209CS-1W5	79			9	167	680
	WB1212CS-1W5	83			12	125	470
	WB1215CS-1W5	79			15	100	220
	WB1224CS-1W5	77			24	63	100
CE/RoHS	WB2403CS-1W5	76	24	18-36 (9-36)	3.3	455	1800
	PWB2405CS-1W5	79			5	300	1000
	WB2409CS-1W5	81			9	167	680
	WB2412CS-1W5	82			12	125	470
	WB2415CS-1W5	82			15	100	220
	WB2424CS-1W5	80			24	63	100
CE/RoHS	WB4803CS-1W5	76	48	36-72 (18-72)	3.3	455	1800
	WB4805CS-1W5	79			5	300	1000
	WB4809CS-1W5	80			9	167	680
	WB4812CS-1W5	85			12	125	470
	WB4815CS-1W5	86			15	100	220
	WB4824CS-1W5	84			24	63	100

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

Dimensions First Angle Proj



Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	0V	0V
8	CS	-Vo

Note:

All size units mm,
 Diameter of all terminal 0.5mm;
 Distance between all adjacent terminal 2.54mm;
Isolation: 1500Vdc
Weight: 4.6g

WA_CS-3W & WB_CS-3W Series

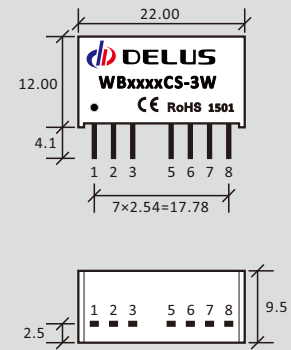
3w, wide input, 1500Vdc isolated & regulated output dc-dc converter



Product Program							
Certificate	Model	Eff (%)	Input		Output		
			Voltage(Vdc)		Vdc	mA	Max Capacitive Load (uF)
			Nominal	Range	Nominal	Max	
CE/RoHS	WA1205CS-3W	77	12	9-18	±5	±300	470
	WA1209CS-3W	79			±9	±167	220
	WA1212CS-3W	80			±12	±125	100
	WA1215CS-3W	80			±15	±100	100
CE/RoHS	WA2405CS-3W	79	24	18-36 (9-36)	±5	±300	470
	PWA2409CS-3W	83			±9	±167	220
	PWA2412CS-3W	84			±12	±125	100
	WA2415CS-3W	85			±15	±100	100
CE/RoHS	WA4805CS-3W	79	48	36-72	±5	±300	470
	WA4809CS-3W	80			±9	±167	220
	WA4812CS-3W	83			±12	±125	100
	WA4815CS-3W	85			±15	±100	100
CE/RoHS	WB1205CS-3W	76	12	9-18	5	600	1000
	WB1209CS-3W	79			9	333	680
	WB1212CS-3W	80			12	250	470
	WB1215CS-3W	83			15	200	220
	WB1224CS-3W	81			24	125	100
CE/RoHS	PWB2405CS-3W	80	24	18-36 (9-36)	5	600	1000
	WB2409CS-3W	80			9	333	680
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	WB4824CS-3W	82			24	125	100

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Dimensions First Angle Proj



Pin	Single	Dual
1	GND	GND
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3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	0V	0V
8	CS	-Vo

Note:

All size units mm,
 Diameter of all terminal 0.5mm;
 Distance between all adjacent terminal 2.54mm;
Isolation: 1500Vdc
Weight: 4.6g

WE_CS-1W5 & WF_CS-1W5 Series

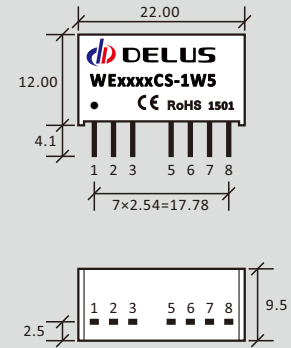
1.5w, wide input, 3000Vdc isolated & regulated output dc-dc converter



Product Program							
Certificate	Model	Eff (%)	Input		Output		
			Voltage(Vdc)		Vdc	mA	Max Capacitive Load (uF)
			Nominal	Range	Nominal	Max	
CE/RoHS	WE1205CS-1W5	79	12	9-18	±5	±150	470
	WE1209CS-1W5	83			±9	±83	220
	WE1212CS-1W5	82			±12	±63	100
	WE1215CS-1W5	82			±15	±50	100
CE/RoHS	WE2405CS-1W5	79	24	18-36	±5	±150	470
	WE2409CS-1W5	80			±9	±83	220
	WE2412CS-1W5	81			±12	±63	100
	WE2415CS-1W5	82			±15	±50	100
CE/RoHS	WE4805CS-1W5	76	48	36-72	±5	±150	470
	WE4809CS-1W5	79			±9	±83	220
	WE4812CS-1W5	82			±12	±63	100
	WE4815CS-1W5	82			±15	±50	100
CE/RoHS	WF0515CS-1W5	77	5	4.5-9	15	100	220
CE/RoHS	WF1203CS-1W5	75	12	9-18	3.3	455	1800
	WF1205CS-1W5	75			5	300	1000
	WF1209CS-1W5	79			9	167	680
	WF1212CS-1W5	83			12	125	470
	WF1215CS-1W5	79			15	100	220
	WF1224CS-1W5	77			24	63	100
CE/RoHS	WF2403CS-1W5	76	24	18-36 (9-36)	3.3	455	1800
	PWF2405CS-1W5	79			5	300	1000
	WF2409CS-1W5	81			9	167	680
	WF2412CS-1W5	82			12	125	470
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	WF4805CS-1W5	79			5	300	1000
	WF4809CS-1W5	80			9	167	680
	WF4812CS-1W5	85			12	125	470
	WF4815CS-1W5	86			15	100	220
	WF4824CS-1W5	84			24	63	100

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

Dimensions First Angle Proj



Pin	Single	Dual
1	GND	GND
2	Vin	Vin
3	CTRL	CTRL
5	NC	NC
6	+Vo	+Vo
7	0V	0V
8	CS	-Vo

Note:

All size units mm,
 Diameter of all terminal 0.5mm;
 Distance between all adjacent terminal 2.54mm;
Isolation: 3000Vdc
Weight: 4.6g

WE_CS-3W & WF_CS-3W Series

3w, wide input, 3000Vdc isolated & regulated output dc-dc converter

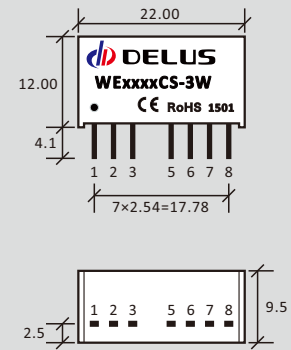


Product Program							
Certificate	Model	Eff (%)	Input		Output		
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			Nominal	Range	Nominal	Max	
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	PWE2409CS-3W	83			±9	±167	220
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8	CS	-Vo

Note:

All size units mm,
 Diameter of all terminal 0.5mm;
 Distance between all adjacent terminal 2.54mm;
Isolation: 3000Vdc
Weight: 4.6g

File Release Notes

DBN-401 Technical Data Sheet Version



No.	Version	Date	Description
1	V0	2011/11/01	First release
2	A/0	2016/07/01	Change datasheet document version
3			
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

Delus Guangzhou Electronic Technology CO.,LTD

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