
Contents

I F_S-1WC2 Series (Fixed Input,3000V isolated and unregulated single output)	1
II F_S-2WC2 Series (Fixed Input,3000V isolated and unregulated single output)	6
III E_S-1WC2 Series (Fixed Input,3000V isolated and unregulated dual output)	11
IV E_S-2WC2 Series (Fixed Input ,3000V isolated and unregulated dual output)	16

I F_S-1WC2 Series 3KV isolated & unregulated single output

1W DC/DC Converters

Features



- ◆ SIP International Standard Pin
- ◆ Low-Quiescent Current and High Conversion Efficiency
- ◆ Low Ripple Coefficient and Low Noise
- ◆ Built-in Soft-Start Technology
- ◆ 3000Vdc Isolation Voltage
- ◆ Operation Temperature:-40°C to 85°C
- ◆ 100% burn-in and screening
- ◆ Special specifications of products can be designed according to customers' requirements

Applications

The F_S-1WC2 series products are specially designed for applications where a power source is isolated from the input power supply in a distributed power system. The products are applicable to:

- 1)The fluctuation range of input power supply voltage is within $\pm 10\%$;
- 2)Isolation is required between input and output(3000Vdc isolation voltage);
- 3)Occasions with low requirements for the output voltage stability and output ripple –noise.

Product Naming Convention

FXXXXS-1WC2

① ② ③ ④ ⑤ ⑥

- ①Product Series
(3000Vdc Isolation Voltage,Single Output)
- ②Input Voltage (Nominal Value)
- ③Output Voltage (Nominal Value)
- ④Package(Single Inline Package)
- ⑤Rated Output Power
- ⑥Identification Code

Specifications

Unless otherwise specified, all values are given at room temperature and standard atmosphere pressure, standard input voltage.

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF)②	Efficiency (% ,Min/Typ) @ Full Load
F0303S-1WC2	2.97~3.63 (3.3V)	3.3	303/30.3	200	68/72
F0305S-1WC2		5	200/20	200	74/78
F0309S-1WC2		9	112/11.2	200	74/78
F0312S-1WC2		12	84/8.4	200	74/78
F0315S-1WC2		15	67/6.7	200	74/78
F0324S-1WC2		24	42/4.2	200	74/78
F0503S-1WC2	4.5~5.5 (5V)	3.3	303/30.3	200	70/74
F0505S-1WC2		5	200/20	200	76/80
F0509S-1WC2		9	112/11.2	200	76/80
F0512S-1WC2		12	84/8.4	200	76/80
F0515S-1WC2		15	67/6.7	200	76/80
F0524S-1WC2		24	42/4.2	200	76/80

Continue

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage^① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF)^②	Efficiency (%Min/Typ) @ Full Load
F0903S-1WC2	8.1~9.9 (9V)	3.3	303/30.3	200	72/76
F0905S-1WC2		5	200/20	200	76/80
F0909S-1WC2		9	112/11.2	200	76/80
F0912S-1WC2		12	84/8.4	200	76/80
F0915S-1WC2		15	67/6.7	200	76/80
F0924S-1WC2		24	42/4.2	200	76/80
F1203S-1WC2	10.8~13.2 (12V)	3.3	303/30.3	200	72/76
F1205S-1WC2		5	200/20	200	76/80
F1209S-1WC2		9	112/11.2	200	76/80
F1212S-1WC2		12	84/8.4	200	76/80
F1215S-1WC2		15	67/6.7	200	76/80
F1224S-1WC2		24	42/4.2	200	76/80
F1503S-1WC2	13.5~16.5 (15V)	3.3	303/30.3	200	72/76
F1505S-1WC2		5	200/20	200	76/80
F1509S-1WC2		9	112/11.2	200	76/80
F1512S-1WC2		12	84/8.4	200	76/80
F1515S-1WC2		15	67/6.7	200	76/80
F1524S-1WC2		24	42/4.2	200	76/80
F2403S-1WC2	21.6~26.4 (24V)	3.3	303/30.3	200	70/74
F2405S-1WC2		5	200/20	200	76/80
F2409S-1WC2		9	112/11.2	200	76/80
F2412S-1WC2		12	84/8.4	200	76/80
F2415S-1WC2		15	67/6.7	200	76/80
F2424S-1WC2		24	42/4.2	200	76/80
FXXXXS-1WC2	Special specifications of products can be designed according to customers' requirements, and 0.1 ~ 1W products can be provided.				
The no-load power consumption of the power modules is about 10% of the rated output power.					
①Nominal output voltage refers to the input voltage in the nominal value and output current under full load conditions.					
②The maximum capacitive load is the maximum capacity of the module power supply to output the capacitive load. Generally, the external output capacitance can not exceed the maximum capacitive load of the module power supply, otherwise, it will result in bad module startup and affect the reliability of the module's long-term work.					

Input Specifications					
Input	Conditions	Min^③	Typ	Max	Unit
Input Voltage	3.3V Input	-0.7	3.3	5	Vdc
	5V Input	-0.7	5	9	
	9V Input	-0.7	9	15	
	12V Input	-0.7	12	18	
	15V Input	-0.7	15	21	
	24V Input	-0.7	24	30	
③The series of modules have no anti-reverse input protection, the input is strictly prohibited positive and negative reverse, otherwise it will cause irreversible damage to the module.					

Output Specifications						
Output	Conditions	Min	Typ	Max	Unit	
Maximum Output Power	—	—	—	1	W	
Output Voltage Accuracy	—	See the error envelope diagram				
Linear Voltage Regulation	±1% Changes of input voltage	3.3V Output	—	—	±1.5	%
		Other Outputs	—	—	±1.2	
Load Regulation	10%~100% load	3.3V Output	—	18	—	
		5V Output	—	12	—	
		9V Output	—	8	—	
		12V Output	—	7	—	
		15V Output	—	6	—	
24V Output	—	5	—			
Ripple and Noise④	20MHz bandwidth	—	60	—	mV	
Output Short-circuit Protection	—	—	—	1	s	

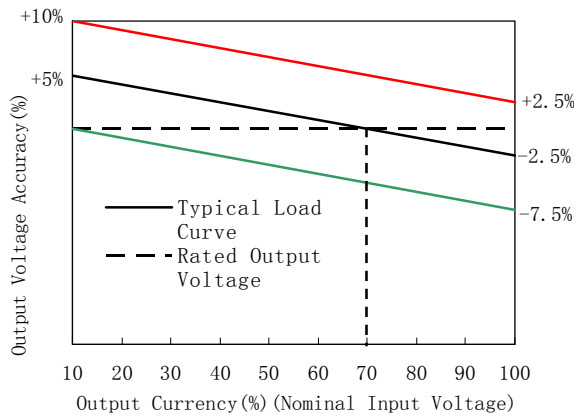
④Ripple and Noise is measured by connecting the oscilloscope probe without ground wire.

General Specifications					
General	Conditions	Min	Typ	Max	Unit
Isolation Voltage	t=60s, leak current≤1mA	3000	—	—	Vdc
Isolation Resistance	Input to Output,500Vdc	1000	—	—	MΩ
Isolation Capacitance	Input to Output 100kHz/0.1V	—	40	—	pF
Operating Temperature	Full-load states of the output voltage	-40	—	+85	°C
Storage Temperature	—	-55	—	+105	°C
Storage Humidity	non condensing	—	—	95	%RH
Temperature Coefficient	100% load	—	—	±0.03	%/°C
Soldering Temperature	1.5 mm distance between solder joint and case, 10s	—	—	300	°C
Switching Frequency	100% load, nominal input voltage	—	100	300	kHz
MTBF	—	3.5×10 ⁶ h Refer to MIL-HDFK-217F@25°C			

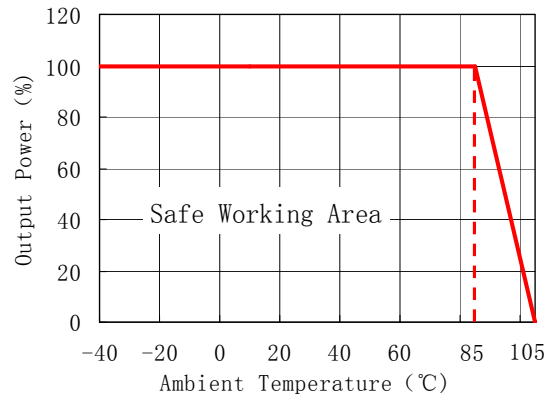
Physical Specifications	
Case material	Black flame retardant and heat-resistant epoxy (UL94-V0)
Package Size	19.50×10.00×6.00mm
Weight	2.4g typ.
Cooling mode	natural air cooling

Characteristic Curves

The Error Envelope Diagram



Temperature vs Power

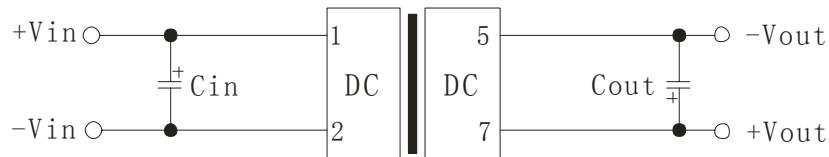


Design Considerations

◆ **Peripheral Recommended Circuit**

Recommended Circuit 1:

A filter capacitor can be connected in parallel at the input and output terminals respectively on the occasions of low requirements for ripple and noise. An external circuit is shown in the figure 1 below. The recommended values of the filter capacitors are shown in the table 1.



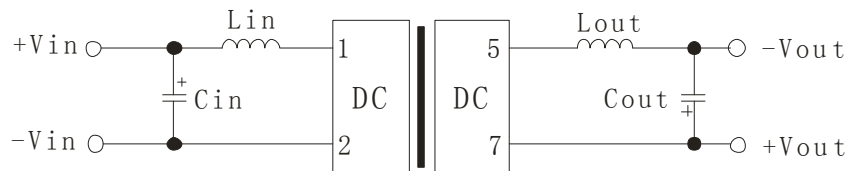
The figure 1

The table 1

Vin(Vdc)	Cin	Vout(Vdc)	Cout
3.3/5	10uF/16V	3.3/5	10uF/16V
9/12	4.7uF/25V	9/12	4.7uF/25V
15/24	2.2uF/50V	15/24	1uF/50V

Recommended Circuit 2:

The external circuit can be referred to the figure 2 on the occasions of strict requirements for ripple and noise. The recommended values of the filter capacitance and inductance are shown in the table 2.



The figure 2

The table 2

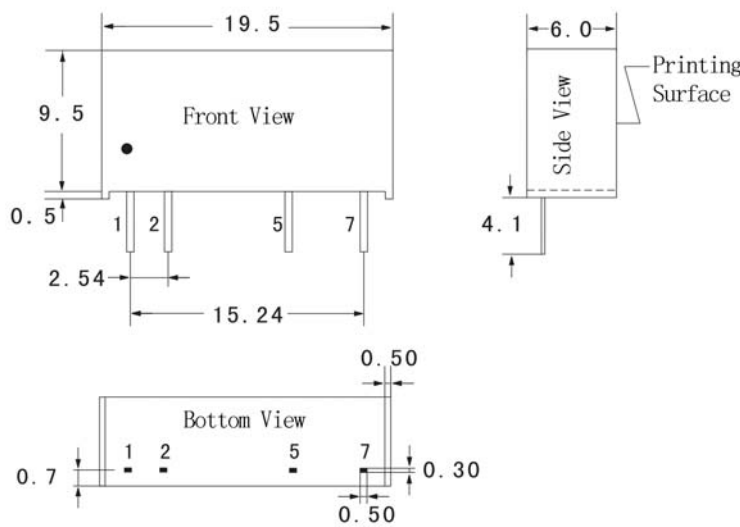
Vin(Vdc)	Cin	Lin	Cout (Vdc)	Lout
3.3/5/9/12/15/24	See the table 1	4.7uH	See the table 1	4.7uH

◆ **Precautions for product use**

- Input requirement: Ensure that the output voltage fluctuations of the power supply do not exceed the input voltage range of the DC/DC module. And the output power of the power supply must be greater than the input power of the DC/DC module.
- Output load requirement: Try to avoid no-load use. When the actual power consumption of the load is less than 10% of the rated power of the module or there is no load, pseudo loads are recommended to be connected at the output terminals. The pseudo load can be calculated from 5 ~ 10% of the rated power of the module, resistance = $V_{out}^2 / (1W * 10\%)$.
- Overload protection: Under the normal working conditions, the product has no output overload protection. The simplest approach is to connect a self-recovery fuse in series at the input, or to add a circuit breaker to the circuit.
- The external capacitance of the output terminals should not be too large, otherwise it is easy to cause over-current even failure during starting up of the converter.

Outline Diagram and recommended layout

1) Outline Diagram

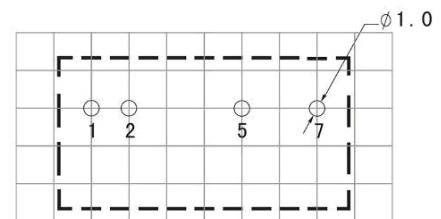


Unites:mm Tolerances:XX±0.25

2) Pin Definition

1	+Vin	Positive Input
2	-Vin	Negative Input
3	No Pin	No Pin
4	No Pin	No Pin
5	-Vout	Negative Output
6	No Pin	No Pin
7	+Vout	Positive Output

3) Recommended Layout



Note:grid distance:2.54mm*2.54mm

Application Data

Quality Statement

The converters are manufactured in accordance with ISO 9001 system requirements, and are monitored 100% by auto-testing system, 100% burn in. The warranty for the converters is 2-year.

Contact Information

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II F_S-2WC2 Series 3KV isolated & unregulated single output

2W DC/DC Converters

Features



- ◆ SIP International Standard Pin
- ◆ Low-Quiescent Current and High Conversion Efficiency
- ◆ Low Ripple Coefficient and Low Noise
- ◆ Built-in Soft-Start Technology
- ◆ 3000Vdc Isolation Voltage
- ◆ Operation Temperature:-40℃ to 85℃
- ◆ 100% burn-in and screening
- ◆ Special specifications of products can be designed according to customers' requirements

Applications

The F_S-2WC2 series products are specially designed for applications where a power source is isolated from the input power supply in a distributed power system. The products are applicable to:

- 1)The fluctuation range of input power supply voltage is within $\pm 10\%$;
- 2)Isolation is required between input and output(3000Vdc isolation voltage);
- 3)Occasions with low requirements for the output voltage stability and output ripple –noise.

Product Naming Convention

FXXXS-2WC2

① ② ③ ④ ⑤ ⑥

- ①Product Series
(3000Vdc Isolation Voltage,Single Output)
- ②Input Voltage (Nominal Value)
- ③Output Voltage (Nominal Value)
- ④Package(Single Inline Package)
- ⑤Rated Output Power
- ⑥Identification Code

Specifications

Unless otherwise specified, all values are given at room temperature and standard atmosphere pressure, standard input voltage.

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF)②	Efficiency (%Min/Typ) @ Full Load
F0303S-2WC2	2.97~3.63 (3.3V)	3.3	606/61	200	80/84
F0305S-2WC2		5	400/40	200	82/86
F0309S-2WC2		9	224/23	200	82/86
F0312S-2WC2		12	167/17	200	82/86
F0315S-2WC2		15	133/13	200	82/86
F0324S-2WC2		24	83/8	200	82/86
F0503S-2WC2	4.5~5.5 (5V)	3.3	606/61	200	82/86
F0505S-2WC2		5	400/40	200	86/90
F0509S-2WC2		9	224/23	200	82/86
F0512S-2WC2		12	167/17	200	82/86
F0515S-2WC2		15	133/13	200	82/86
F0524S-2WC2		24	83/8	200	82/86

Continue

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage ^① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF) ^②	Efficiency (%Min/Typ) @ Full Load
F0903S-2WC2	8.1~9.9 (9V)	3.3	606/61	200	82/86
F0905S-2WC2		5	400/40	200	82/86
F0909S-2WC2		9	224/23	200	82/86
F0912S-2WC2		12	167/17	200	82/86
F0915S-2WC2		15	133/13	200	82/86
F0924S-2WC2		24	83/8	200	82/86
F1203S-2WC2	10.8~13.2 (12V)	3.3	606/61	200	80/84
F1205S-2WC2		5	400/40	200	82/86
F1209S-2WC2		9	224/23	200	82/86
F1212S-2WC2		12	167/17	200	82/86
F1215S-2WC2		15	133/13	200	82/86
F1224S-2WC2		24	83/8	200	82/86
F1503S-2WC2	13.5~16.5 (15V)	3.3	606/61	200	82/86
F1505S-2WC2		5	400/40	200	86/90
F1509S-2WC2		9	224/23	200	82/86
F1512S-2WC2		12	167/17	200	82/86
F1515S-2WC2		15	133/13	200	82/86
F1524S-2WC2		24	83/8	200	82/86
F2403S-2WC2	21.6~26.4 (24V)	3.3	606/61	200	82/86
F2405S-2WC2		5	400 /40	200	82/86
F2409S-2WC2		9	224/23	200	82/86
F2412S-2WC2		12	167/17	200	82/86
F2415S-2WC2		15	133/13	200	82/86
F2424S-2WC2		24	83/8	200	83/87
FXXXXS-2WC2	Special specifications of products can be designed according to customers' requirements, and 1 ~ 2W products can be provided.				
The no-load power consumption of the power modules is about 10% of the rated output power.					
①Nominal output voltage refers to the input voltage in the nominal value and output current under full load conditions.					
②The maximum capacitive load is the maximum capacity of the module power supply to output the capacitive load. Generally, the external output capacitance can not exceed the maximum capacitive load of the module power supply, otherwise, it will result in bad module startup and affect the reliability of the module's long-term work.					

Input Specifications					
Input	Conditions	Min ^③	Typ	Max	Unit
Input Voltage	3.3V Input	-0.7	3.3	5	Vdc
	5V Input	-0.7	5	9	
	9V Input	-0.7	9	15	
	12V Input	-0.7	12	18	
	15V Input	-0.7	15	21	
	24V Input	-0.7	24	30	
③The series of modules have no anti-reverse input protection, the input is strictly prohibited positive and negative reverse, otherwise it will cause irreversible damage to the module.					

Output Specifications						
Output	Conditions	Min	Typ	Max	Unit	
Maximum Output Power	—	—	—	2	W	
Output Voltage Accuracy	—	See the error envelope diagram				
Linear Voltage Regulation	±1% Changes of input voltage	3.3V Output	—	—	±1.5	%
		Other Outputs	—	—	±1.2	
Load Regulation	10%~100% load	3.3V Output	—	18	—	
		5V Output	—	12	—	
		9V Output	—	8	—	
		12V Output	—	7	—	
		15V Output	—	6	—	
24V Output	—	5	—			
Ripple and Noise④	20MHz bandwidth	—	60	—	mV	
Output Short-circuit Protection	—	—	—	1	s	

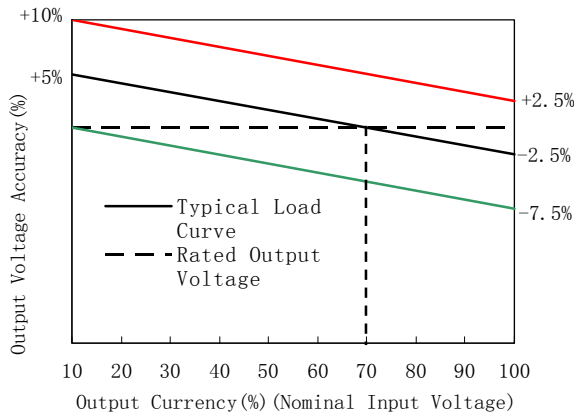
④Ripple and Noise is measured by connecting the oscilloscope probe without ground wire.

General Specifications					
General	Conditions	Min	Typ	Max	Unit
Isolation Voltage	t=60s, leak current≤1mA	3000	—	—	Vdc
Isolation Resistance	Input to Output, 500Vdc	1000	—	—	MΩ
Isolation Capacitance	Input to Output 100kHz/0.1V	—	40	—	pF
Operating Temperature	Full-load states of the output voltage	-40	—	+85	°C
Storage Temperature	—	-55	—	+105	°C
Storage Humidity	non condensing	—	—	95	%
Temperature Coefficient	100% load	—	—	±0.03	%/°C
Soldering Temperature	1.5 mm distance between solder joint and case, 10s	—	—	300	°C
Switching Frequency	100% load, nominal input voltage	—	100	300	kHz
MTBF	—	3.5×10 ⁶ h Refer to MIL-HDFK-217F@25°C			

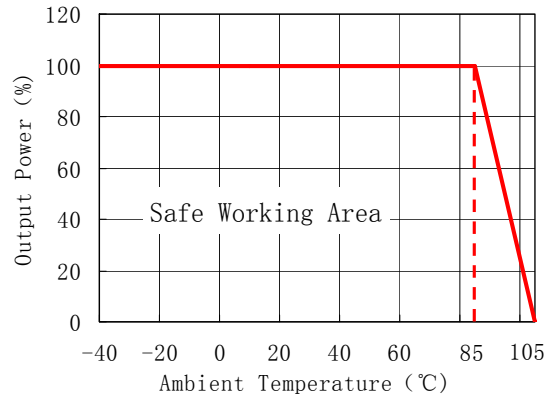
Physical Specifications	
Case material	Black flame retardant and heat-resistant epoxy (UL94-V0)
Package Size	19.50×10.00×7.00mm
Weight	2.4g typ.
Cooling mode	natural air cooling

Characteristic Curves

The Error Envelope Diagram



Temperature vs Power

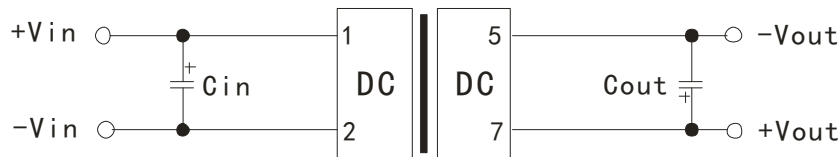


Design Considerations

◆ **Peripheral Recommended Circuit**

Recommended Circuit 1:

A filter capacitor can be connected in parallel at the input and output terminals respectively on the occasions of low requirements for ripple and noise. An external circuit is shown in the figure 1 below. The recommended values of the filter capacitors are shown in the table 1.



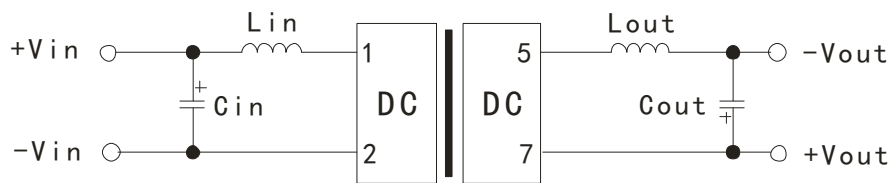
The figure 1

The table 1

Vin(Vdc)	Cin	Vout(Vdc)	Cout
3.3/5	10uF/16V	3.3/5	10uF/16V
9/12	4.7uF/25V	9/12	4.7uF/25V
15/24	2.2μF/50V	15/24	1uF/50V

Recommended Circuit 2:

The external circuit can be referred to the figure 2 on the occasions of strict requirements for ripple and noise. The recommended values of the filter capacitance and inductance are shown in the table 2.



The figure 2

The table 2

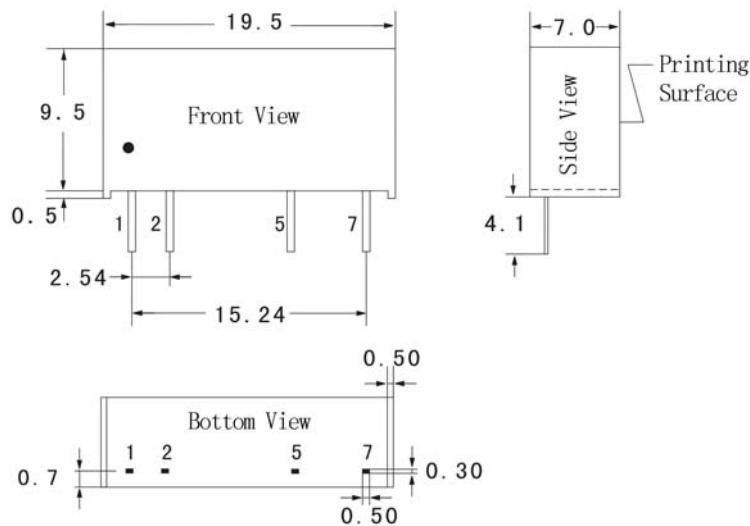
Vin(Vdc)	Cin	Lin	Cout (Vdc)	Lout
3.3/5/9/12/15/24	See the table 1	4.7μH	See the table 1	4.7μH

◆ **Precautions for product use**

- Input requirement: Ensure that the output voltage fluctuations of the power supply do not exceed the input voltage range of the DC/DC module. And the output power of the power supply must be greater than the input power of the DC/DC module.
- Output load requirement: Try to avoid no-load use. When the actual power consumption of the load is less than 10% of the rated power of the module or there is no load, pseudo loads are recommended to be connected at the output terminals. The pseudo load can be calculated from 5 ~ 10% of the rated power of the module, resistance = $V_{out}^2 / (2W * 10\%)$.
- Overload protection: Under the normal working conditions, the product has no output overload protection. The simplest approach is to connect a self-recovery fuse in series at the input, or to add a circuit breaker to the circuit.
- The external capacitance of the output terminals should not be too large, otherwise it is easy to cause over-current even failure during starting up of the converter.

Outline Diagram and recommended layout

1) Outline Diagram

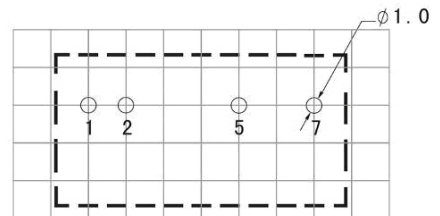


Unites:mm Tolerances:XX±0.25

2) Pin Definition

1	+Vin	Positive Input
2	-Vin	Negative Input
3	No Pin	No Pin
4	No Pin	No Pin
5	-Vout	Negative Output
6	No Pin	No Pin
7	+Vout	Positive Output

3) Recommended Layout



Note: grid distance: 2.54mm*2.54mm

Application Data

Quality Statement

The converters are manufactured in accordance with ISO 9001 system requirements, and are monitored 100% by auto-testing system, 100% burn in. The warranty for the converters is 2-year.

Contact Information

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III E_S-1WC2 Series 3KV isolated & unregulated dual output

1W DC/DC Converters

Features



- ◆ SIP International Standard Pin
- ◆ Low-Quiescent Current and High Conversion Efficiency
- ◆ Low Ripple Coefficient and Low Noise
- ◆ Built-in Soft-Start Technology
- ◆ 3000Vdc Isolation Voltage
- ◆ Operation Temperature:-40°C to 85°C
- ◆ 100% burn-in and screening
- ◆ Special specifications of products can be designed according to customers' requirements

Applications

The E_S-1WC2 series products are specially designed for applications where two sources are isolated from the input power supply in a distributed power system.

The products are applicable to:

- 1)The fluctuation range of input power supply voltage is within $\pm 10\%$;
- 2)Isolation is required between input and output(3000Vdc isolation voltage);
- 3)Occasions with low requirements for the output voltage stability and output ripple –noise.

Product Naming Convention

E XXXX S - 1 WC 2

① ② ③ ④ ⑤ ⑥

- ①Product Series
(3000Vdc Isolation Voltage,Dual Output)
- ②Input Voltage (Nominal Value)
- ③Output Voltage (Nominal Value)
- ④Package(Single Inline Package)
- ⑤Rated Output Power
- ⑥Identification Code

Specifications

Unless otherwise specified, all values are given at room temperature and standard atmosphere pressure, standard input voltage.

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage ① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF)②	Efficiency (% ,Min/Typ) @ Full Load
E0303S-1WC2	2.97~3.63 (3.3V)	±3.3	±152/±15	100	70/74
E0305S-1WC2		±5	±100/±10	100	74/78
E0309S-1WC2		±9	±56/±6	100	74/78
E0312S-1WC2		±12	±42/±5	100	74/78
E0315S-1WC2		±15	±34/±4	100	74/78
E0324S-1WC2		±24	±21/±3	100	74/78
E0503S-1WC2	4.5~5.5 (5V)	±3.3	±152/±15	100	72/76
E0505S-1WC2		±5	±100/±10	100	76/80
E0509S-1WC2		±9	±56/±6	100	76/80
E0512S-1WC2		±12	±42/±5	100	76/80
E0515S-1WC2		±15	±34/±4	100	76/80
E0524S-1WC2		±24	±21/±3	100	76/80

Continue

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage ① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF)②	Efficiency (%Min/Typ) @ Full Load
E0903S-1WC2	8.1~9.9 (9V)	±3.3	±152/±15	100	72/76
E0905S-1WC2		±5	±100/±10	100	76/80
E0909S-1WC2		±9	±56/±6	100	76/80
E0912S-1WC2		±12	±42/±5	100	76/80
E0915S-1WC2		±15	±34/±4	100	76/80
E0924S-1WC2		±24	±21/±3	100	76/80
E1203S-1WC2	10.8~13.2 (12V)	±3.3	±152/±15	100	72/76
E1205S-1WC2		±5	±100/±10	100	76/80
E1209S-1WC2		±9	±56/±6	100	76/80
E1212S-1WC2		±12	±42/±5	100	76/80
E1215S-1WC2		±15	±34/±4	100	76/80
E1224S-1WC2		±24	±21/±3	100	76/80
E1503S-1WC2	13.5~16.5 (15V)	±3.3	±152/±15	100	76/80
E1505S-1WC2		±5	±100/±10	100	76/80
E1509S-1WC2		±9	±56/±6	100	76/80
E1512S-1WC2		±12	±42/±5	100	76/80
E1515S-1WC2		±15	±34/±4	100	76/80
E1524S-1WC2		±24	±21/±3	100	76/80
E2403S-1WC2	21.6~26.4 (24V)	±3.3	±152/±15	100	76/80
E2405S-1WC2		±5	±100/±10	100	76/80
E2409S-1WC2		±9	±56/±6	100	76/80
E2412S-1WC2		±12	±42/±5	100	76/80
E2415S-1WC2		±15	±34/±4	100	76/80
E2424S-1WC2		±24	±21/±3	100	76/80
EXXXXX-1WC2	Special specifications of products can be designed according to customers' requirements, and 0.1 ~ 1W products can be provided.				

The no-load power consumption of the power modules is about 10% of the rated output power.
 ①Nominal output voltage refers to the input voltage in the nominal value and output current under full load conditions.
 ②The maximum capacitive load is the maximum capacity of the module power supply to output the capacitive load. Generally, the external output capacitance can not exceed the maximum capacitive load of the module power supply, otherwise, it will result in bad module startup and affect the reliability of the module's long-term work.

Input Specifications					
Input	Conditions	Min③	Typ	Max	Unit
Input Voltage	3.3V Input	-0.7	3.3	5	Vdc
	5V Input	-0.7	5	9	
	9V Input	-0.7	9	15	
	12V Input	-0.7	12	18	
	15V Input	-0.7	15	21	
	24V Input	-0.7	24	30	

③The series of modules have no anti-reverse input protection, the input is strictly prohibited positive and negative reverse, otherwise it will cause irreversible damage to the module.

Output Specifications						
Output	Conditions		Min	Typ	Max	Unit
Maximum Output Power	—		—	—	1	W
Output Voltage Accuracy	—		See the error envelope diagram			
Linear Voltage Regulation	±1% Changes of input voltage	3.3V Output	—	—	±1.5	%
		Other Outputs	—	—	±1.2	
Load Regulation	10%~100% load	3.3V Output	—	18	—	
		5V Output	—	12	—	
		9V Output	—	8	—	
		12V Output	—	7	—	
		15V Output	—	6	—	
		24V Output	—	5	—	
Ripple and Noise④	20MHz bandwidth		—	60	—	mV
Output Short-circuit Protection	—		—	—	1	s

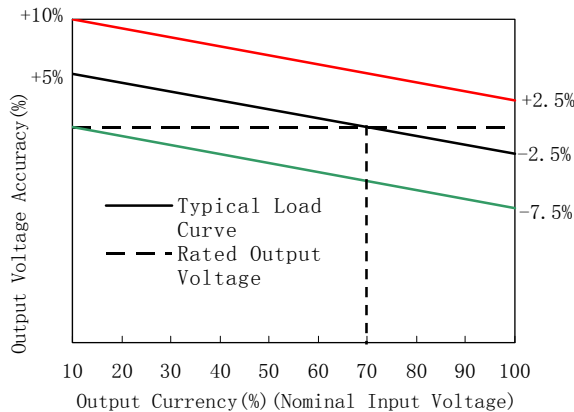
④Ripple and Noise is measured by connecting the oscilloscope probe without ground wire.

General Specifications					
General	Conditions	Min	Typ	Max	Unit
Isolation Voltage	t=60s, leak current≤1mA	3000	—	—	Vdc
Isolation Resistance	Input to Output,500Vdc	1000	—	—	MΩ
Isolation Capacitance	Input to Output 100kHz/0.1V	—	40	—	pF
Operating Temperature	Full-load states of the output voltage	-40	—	+85	°C
Storage Temperature	—	-55	—	+105	°C
Storage Humidity	Non condensing	—	—	95	%RH
Temperature Coefficient	100% Load	—	—	±0.03	%/°C
Soldering Temperature	1.5 mm distance between solder joint and case, 10s	—	—	300	°C
Switching Frequency	100% load, nominal input voltage	—	100	300	kHz
MTBF	—	3.5×10 ⁶ h Refer to MIL-HDFK-217F@25°C			

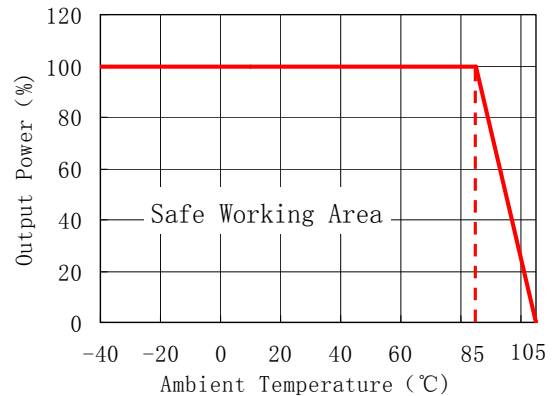
Physical Specifications	
Case material	Black flame retardant and heat-resistant epoxy (UL94-V0)
Package Size	19.50mm×10.00mm×6.00mm
Weight	2.4g typ.
Cooling mode	natural air cooling

Characteristic Curves

The Error Envelope Diagram



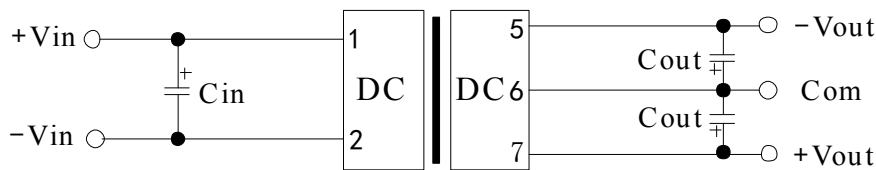
Temperature vs Power



◆ **Peripheral Recommended Circuit**

Recommended Circuit 1:

A filter capacitor can be connected in parallel at the input and output terminals respectively on the occasions of low requirements for ripple and noise. An external circuit is shown in the figure 1 below. The recommended values of the filter capacitors are shown in the table 1.



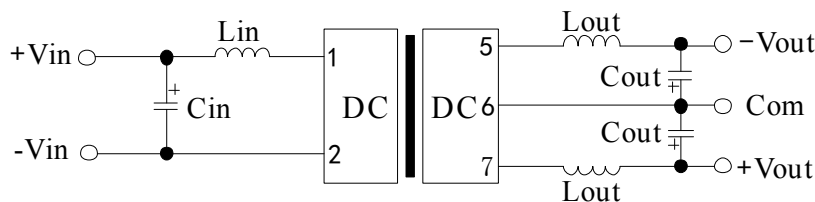
The figure 1

The table 1

Vin(Vdc)	Cin	Vout(Vdc)	Cout
3.3/5	4.7 μ F/16V	\pm 3.3/ \pm 5	4.7 μ F/16V
9/12	2.2 μ F/25V	\pm 9/ \pm 12	1 μ F/25V
15/24	2.2 μ F/50V	\pm 15/ \pm 24	0.47 μ F/50V

Recommended Circuit 2:

The external circuit can be referred to the figure 2 on the occasions of strict requirements for ripple and noise. The recommended values of the filter capacitance and inductance are shown in the table 2.



The figure 2

The table 2

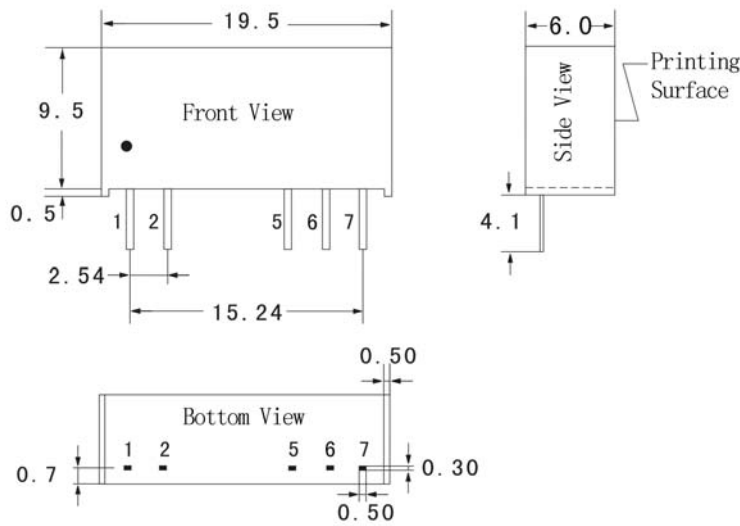
Vin(Vdc)	Cin	Lin	Cout (Vdc)	Lout
3.3/5/9/12/15/24	See the table 1	4.7 μ H	See the table 1	4.7 μ H

◆ **Precautions for product use**

- Input requirement: Ensure that the output voltage fluctuations of the power supply do not exceed the input voltage range of the DC/DC module. And the output power of the power supply must be greater than the input power of the DC/DC module.
- Output load requirement: Try to avoid no-load use. When the actual power consumption of the load is less than 10% of the rated power of the module or there is no load, pseudo loads are recommended to be connected at the two outputs respectively. The pseudo load can be calculated from 5 ~ 10% of the rated power of the module, resistance = $V_{out}^2 / (0.5W * 10\%)$.
- Overload protection: Under the normal working conditions, the product has no output overload protection. The simplest approach is to connect a self-recovery fuse in series at the input, or to add a circuit breaker to the circuit.
- The external capacitance of the output terminals should not be too large, otherwise it is easy to cause over-current even failure during starting up of the converter.

Outline Diagram and recommended layout

1) Outline Diagram

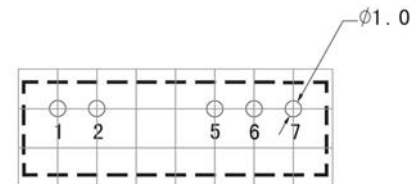


Unites:mm Tolerances:XX±0.25

2) Pin Definition

1	+Vin	Positive Input
2	-Vin	Negative Input
3	No Pin	No Pin
4	No Pin	No Pin
5	-Vout	Negative Output
6	Com	Common Ground
7	+Vout	Positive Output

3) Recommended Layout



Note: grid distance: 2.54mm*2.54mm

Application Data

Quality Statement

The converters are manufactured in accordance with ISO 9001 system requirements, and are monitored 100% by auto-testing system, 100% burn in. The warranty for the converters is 2-year.

Contact Information

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IV E_S-2WC2 Series 3KV isolated & unregulated dual output

2W DC/DC Converters

Features



- ◆ SIP International Standard Pin
- ◆ Low-Quiescent Current and High Conversion Efficiency
- ◆ Low Ripple Coefficient and Low Noise
- ◆ Built-in Soft-Start Technology
- ◆ 3000Vdc Isolation Voltage
- ◆ Operation Temperature:-40°C to 85°C
- ◆ 100% burn-in and screening
- ◆ Special specifications of products can be designed according to customers' requirements

Applications

The E_S-2WC2 series products are specially designed for applications where two sources are isolated from the input power supply in a distributed power system.

The products are applicable to:

- 1)The fluctuation range of input power supply voltage is within $\pm 10\%$;
- 2)Isolation is required between input and output(3000Vdc isolation voltage);
- 3)Occasions with low requirements for the output voltage stability and output ripple-noise.

Product Naming Convention

EXXXXS-2WC2

① ② ③ ④ ⑤ ⑥

- ①Product Series
(3000Vdc Isolation Voltage,Dual Output)
- ②Input Voltage (Nominal Value)
- ③Output Voltage (Nominal Value)
- ④Package(Single Inline Package)
- ⑤Rated Output Power
- ⑥Identification Code

Specifications

Unless otherwise specified, all values are given at room temperature and standard atmosphere pressure, standard input voltage.

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage ① (Vdc)	Output Current (mA) Max(Full Load)/ Min(Light Load)	Maximum Capacitive Load (μF)②	Efficiency (% ,Min/Typ) @ Full Load
E0303S-2WC2	2.97~3.63 (3.3V)	±3.3	±303/±30	100	72/76
E0305S-2WC2		±5	±200/±20	100	76/80
E0309S-2WC2		±9	±112/±12	100	82/86
E0312S-2WC2		±12	±83/±8	100	82/86
E0315S-2WC2		±15	±67/±7	100	82/86
E0324S-2WC2		±24	±42/±4	100	82/86
E0503S-2WC2	4.5~5.5 (5V)	±3.3	±303/±30	100	72/76
E0505S-2WC2		±5	±200/±20	100	76/80
E0509S-2WC2		±9	±112/±12	100	82/86
E0512S-2WC2		±12	±83/±8	100	82/86
E0515S-2WC2		±15	±67/±7	100	82/86
E0524S-2WC2		±24	±42/±4	100	82/86

Continue

Selection Table					
Product Model	Input Voltage (Vdc) range (nominal)	Output Voltage ① (Vdc)	Output Current (mA) Max(Full Load) / Min(Light Load)	Maximum Capacitive Load (μF)②	Efficiency (%Min/Typ) @ Full Load
E0903S-2WC2	8.1~9.9 (9V)	±3.3	±303/±30	100	78/82
E0905S-2WC2		±5	±200/±20	100	82/86
E0909S-2WC2		±9	±112/±12	100	82/86
E0912S-2WC2		±12	±83/±8	100	82/86
E0915S-2WC2		±15	±67/±7	100	82/86
E0924S-2WC2		±24	±42/±4	100	82/86
E1203S-2WC2	10.8~13.2 (12V)	±3.3	±303/±30	100	72/82
E1205S-2WC2		±5	±200/±20	100	82/86
E1209S-2WC2		±9	±112/±12	100	82/86
E1212S-2WC2		±12	±83/±8	100	82/86
E1215S-2WC2		±15	±67/±7	100	82/86
E1224S-2WC2		±24	±42/±4	100	82/86
E1503S-2WC2	13.5~16.5 (15V)	±3.3	±303/±30	100	78/82
E1505S-2WC2		±5	±200/±20	100	82/86
E1509S-2WC2		±9	±112/±12	100	82/86
E1512S-2WC2		±12	±83/±8	100	82/86
E1515S-2WC2		±15	±67/±7	100	82/86
E1524S-2WC2		±24	±42/±4	100	82/86
E2403S-2WC2	21.6~26.4 (24V)	±3.3	±303/±30	100	78/82
E2405S-2WC2		±5	±200/±20	100	82/86
E2409S-2WC2		±9	±112/±12	100	82/86
E2412S-2WC2		±12	±83/±8	100	82/86
E2415S-2WC2		±15	±67/±7	100	82/86
E2424S-2WC2		±24	±42/±4	100	83/87
EXXXS-2WC2	Special specifications of products can be designed according to customers' requirements, and 1 ~ 2W products can be provided.				

The no-load power consumption of the power modules is about 10% of the rated output power.
 ①Nominal output voltage refers to the input voltage in the nominal value and output current under full load conditions.
 ②The maximum capacitive load is the maximum capacity of the module power supply to output the capacitive load. Generally, the external output capacitance can not exceed the maximum capacitive load of the module power supply, otherwise, it will result in bad module startup and affect the reliability of the module's long-term work.

Input Specifications					
Input	Conditions	Min③	Typ	Max	Unit
Input Voltage	3.3V Input	-0.7	3.3	5	Vdc
	5V Input	-0.7	5	9	
	9V Input	-0.7	9	15	
	12V Input	-0.7	12	18	
	15V Input	-0.7	15	21	
	24V Input	-0.7	24	30	

③The series of modules have no anti-reverse input protection, the input is strictly prohibited positive and negative reverse, otherwise it will cause irreversible damage to the module.

Output Specifications						
Output	Conditions		Min	Typ	Max	Unit
Maximum Output Power	—		—	—	2	W
Output Voltage Accuracy	—		See the error envelope diagram			
Linear Voltage Regulation	±1% Changes of input voltage	3.3V Output	—	—	±1.5	%
		Other Outputs	—	—	±1.2	
Load Regulation	10%~100% load	3.3V Output	—	18	—	
		5V Output	—	12	—	
		9V Output	—	8	—	
		12V Output	—	7	—	
		15V Output	—	6	—	
		24V Output	—	5	—	
Ripple and Noise④	20MHz bandwidth		—	60	—	mV
Output Short-circuit Protection	—		—	—	1	s

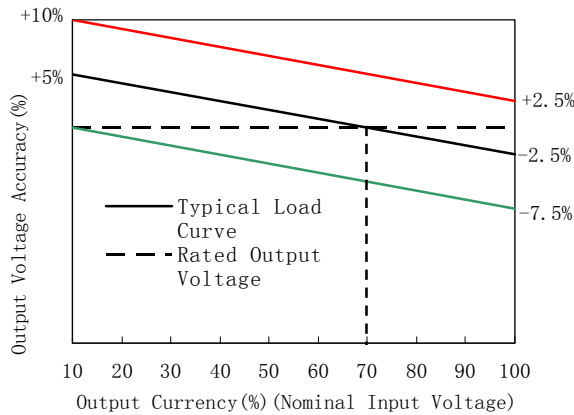
④Ripple and Noise is measured by connecting the oscilloscope probe without ground wire.

General Specifications					
General	Conditions	Min	Typ	Max	Unit
Isolation Voltage	t=60s, leak current≤1mA	3000	—	—	Vdc
Isolation Resistance	Input to Output,500Vdc	1000	—	—	MΩ
Isolation Capacitance	Input to Output 100kHz/0.1V	—	40	—	pF
Operating Temperature	Full-load states of the output voltage	-40	—	+85	°C
Storage Temperature	—	-55	—	+105	°C
Storage Humidity	non condensing	—	—	95	%RH
Temperature Coefficient	100% load	—	—	±0.03	%/°C
Soldering Temperature	1.5 mm distance between solder joint and case, 10s	—	—	300	°C
Switching Frequency	100% load, nominal input voltage	—	100	300	kHz
MTBF	—	3.5×10 ⁶ h Refer to MIL-HDFK-217F@25°C			

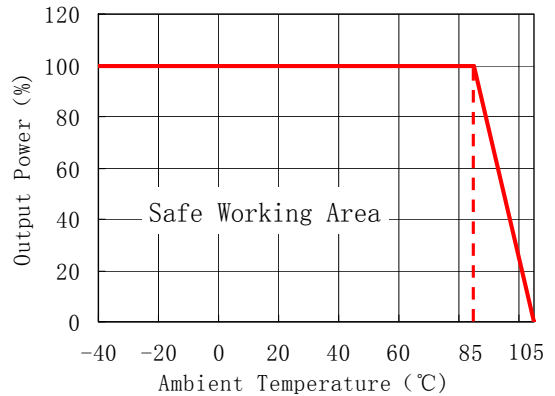
Physical Specifications	
Case material	Black flame retardant and heat-resistant epoxy (UL94-V0)
Package Size	19.50mm×10.00mm×7.00mm
Weight	2.4g typ.
Cooling mode	natural air cooling

Characteristic Curves

The Error Envelope Diagram



Temperature vs Power



Design Considerations

◆ **Peripheral Recommended Circuit**

Recommended Circuit 1:

A filter capacitor can be connected in parallel at the input and output terminals respectively on the occasions of low requirements for ripple and noise. An external circuit is shown in the figure 1 below. The recommended values of the filter capacitors are shown in the table 1.



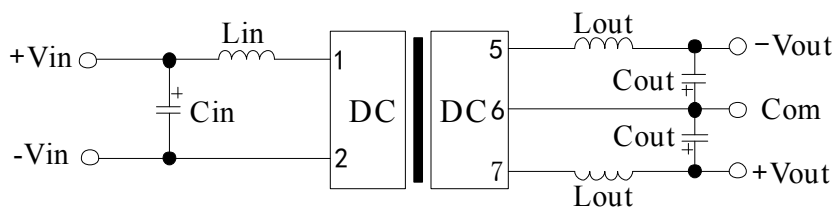
The figure 1

The table 1

Vin(Vdc)	Cin	Vout(Vdc)	Cout
3.3/5	4.7 μ F/16V	\pm 3.3/ \pm 5	4.7 μ F/16V
9/12	2.2 μ F/25V	\pm 9/ \pm 12	1 μ F/25V
15/24	2.2 μ F/50V	\pm 15/ \pm 24	0.47 μ F/50V

Recommended Circuit 2:

The external circuit can be referred to the figure 2 on the occasions of strict requirements for ripple and noise. The recommended values of the filter capacitance and inductance are shown in the table 2.



The figure 2

The table 2

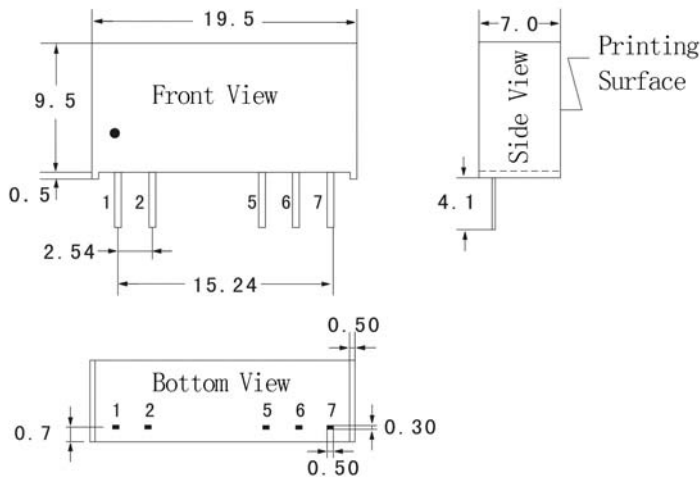
Vin(Vdc)	Cin	Lin	Cout (Vdc)	Lout
3.3/5/9/12/15/24	See the table 1	4.7 μ H	See the table 1	4.7 μ H

◆ **Precautions for product use**

- Input requirement: Ensure that the output voltage fluctuations of the power supply do not exceed the input voltage range of the DC/DC module. And the output power of the power supply must be greater than the input power of the DC/DC module.
- Output load requirement: Try to avoid no-load use. When the actual power consumption of the load is less than 10% of the rated power of the module or there is no load, pseudo loads are recommended to be connected at the two outputs respectively. The pseudo load can be calculated from 5 ~ 10% of the rated power of the module, resistance = $V_{out}^2 / (1W * 10\%)$.
- Overload protection: Under the normal working conditions, the product has no output overload protection. The simplest approach is to connect a self-recovery fuse in series at the input, or to add a circuit breaker to the circuit.
- The external capacitance of the output terminals should not be too large, otherwise it is easy to cause over-current even failure during starting up of the converter.

Outline Diagram and recommended layout

1) Outline Diagram

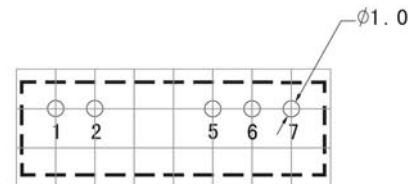


Unites:mm Tolerances:XX±0.25

2) Pin Definition

1	+Vin	Positive Input
2	-Vin	Negative Input
3	No Pin	No Pin
4	No Pin	No Pin
5	-Vout	Negative Output
6	Com	Common Ground
7	+Vout	Positive Output

3) Recommended Layout



Note: grid distance: 2.54mm*2.54mm

Application Data

Quality Statement

The converters are manufactured in accordance with ISO 9001 system requirements, and are monitored 100% by auto-testing system, 100% burn in. The warranty for the converters is 2-year.

Contact Information

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