2：1 Wide voltage input, isolated, regulated dual-output SIP package

FEATURES

- Small SIP package
- Isolation voltage: 1500 VDC
- Continuous short-circuit protection, self-recovery
- Output can be turned off
- High conversion efficiency
- Operating temperature range: -40 to +85°C
- Complies with EN62368 certification standard

W01-A_S series is an international standard through-hole SIP package, Mainly applied to: industrial communication equipment, instruments and meters, power electronics, industrial electronic circuits, etc.

SELECTION TABLE

Part No	Input voltage(VDC)		Output voltage (VDC)	Output current		Efficiency (%)	Capacitive load (uF)
	Typ	Range		Min (mA)	Max(mA)		
W01-A0505S	5	4.5~9	±5	±5	±100	73	1100
W01-A0509S			±9	±3	±56	75	680
W01-A0512S			±12	±2	±42	75	470
W01-A0515S			±15	±2	±33	75	330
W01-A1205S	12	9~18	±5	±5	±100	77	1100
W01-A1209S			±9	±3	±56	78	680
W01-A1212S			±12	±2	±42	81	470
W01-A1215S			±15	±2	±33	78	330
W01-A2405S	24	18~36	±5	±5	±100	79	1100
W01-A2409S			±9	±3	±56	79	680
W01-A2412S			±12	±2	±42	78	470
W01-A2415S			±15	±2	±33	78	330
W01-A4805S	48	36~75	±5	±5	±100	76	1100
W01-A4809S			±9	±3	±56	77	680
W01-A4812S			±12	±2	±42	78	470
W01-A4815S			±15	±2	±33	80	330

INPUT

Item	Conditions/Description		Min	Typ	Max	Units
Input Current	Full Load/No Load	5VDC input	/	281/40	290/60	mA
		12VDC input	/	278/15	114/30	
		24VDC input	/	55/6	57/10	
		48VDC input	/	27/4	28/6	
Refracted ripple current			30	/	45	
Surge voltage	Maximum 1 second	5VDC input	-0.7	/	12	VDC
		12VDC input	-0.7	/	25	
		24VDC input	-0.7	/	50	
		48VDC input	-0.7	/	100	
Starting voltage		5VDC input	/	/	4.5	
		12VDC input	/	/	9	
		24VDC input	/	/	18	
		48VDC input	/	/	36	
Input filter type	Capacitance filter					
Hot Plug	Not supported					
Control foot (Ctrl)	Models ON	The Ctrl port is floating or at a high impedance				
	Models OFF	Connect a high level (relative to the input ground) to make the current flowing into the Ctrl terminal 5 - 10 mA				

OUTPUT

Item	Conditions/Description	Min	Typ	Max	Units
Output voltage accuracy	Load change from 5% to 100%	/	±1.5	±5	%
Line regulation	Full load, input voltage variation ±1%	/	±0.2	±0.5	
Load regulation	Load change from 5% to 100%	/	±0.4	±0.8	
Transient recovery time	25% load step change	/	0.5	2	ms
Transient response deviation		/	±2.5	±5	%
Rippleand noise[1]	20MHz bandwidth (peak to peak)	/	120	/	mVp-p
Temperature coeffecient	100% load	/	±0.02	/	%/°C
Short circuit protection	Continuous, self-recovery				

Notes: 1. ripple and noise are measured at 20 MHz BW by "parallel cable" method with 1 μF ceramic and 10 μF electrolytic capacitors on the output.

COMPREHENSIVE

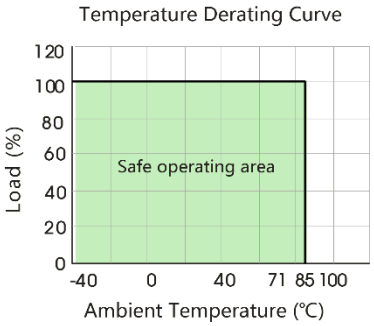
Item	Conditions/Description	Min	Typ	Max	Units
Isolation voltage	input to output for 1 minute at 1 mA max.	1500	/	/	VDC
Isolation resistance	Input to output, insulation voltage 500 VDC	1000	/	/	MΩ
Isolation capacitor	Input-Output, 100kHz/0.1V	/	120	/	pF
Operating temperature	See Figure 1	-40	/	85	℃
Storage temperature		-40	/	125	
Welding Temperature	Manual-welding, Operation time 3-5 seconds	/	/	300	
	Wave soldering, Operation time 5-10 seconds	/	/	260	
Storage humidity	non-condensing	/	/	95	%
Switching frequency	Full load, input nominal voltage	/	250	/	KHz
MTBF	MIL-HDBK-217F @ 25°C	/	1000	/	Khours
Cooling method	Natural air cooling				
Dimensions	22.00 x 9.50 x 12.00mm (0.866 x 0.374 x 0.472 inch)				
Weight	4.6g (Typ.)				
Case material	Black plastic; flame-retardant and heat-resistant plastic (UL94-V0)				

EMC

Item		Conditions/Description	
EMI	CE	CISPR32/EN55032 CLASS B (For recommended circuits, see Figure 3-②)	
	RE	CISPR32/EN55032 CLASS B (For recommended circuits, see Figure 3-②)	
EMS	Electrostatic Discharge	IEC/EN61000-4-2 Contact ±4kV	perf. Criteria B
	Radiated Immunity	IEC/EN61000-4-3 10V/m	perf. Criteria A
	Pulse group Immunity	IEC/EN61000-4-4 ±2kV(For recommended circuits, see Figure 3-①)	perf. Criteria B
	Surge Immunity	IEC/EN61000-4-5 line to line ±2kV (For recommended circuits, see Figure 3-①)	perf. Criteria B
	Conducted disturbance immunity	IEC/EN61000-4-6 3 Vr.m.s	perf. Criteria A
	Voltage dips, and short-term interruptions immunity	IEC/EN61000-4-29 0%-70%	perf. Criteria B

Product characteristic curve

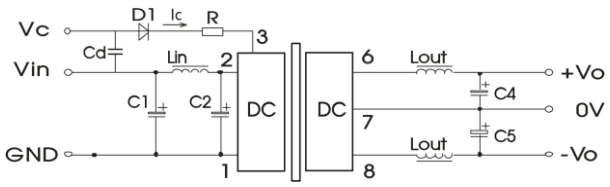
(Figure 1) Temperature curve



Design reference

1. General application circuits

All DC/DC converters in this series are tested according to the generally recommended circuit (as shown in Figure 2) before leaving the factory. If further reduction of input and output ripple is required, the filter capacitors C1, C2, C3, and C4 connected externally to the input and output terminals can be appropriately increased in value. However, the capacitance value should not exceed the maximum capacitive load of the product; otherwise, it may cause startup problems. Under the condition of ensuring safe and reliable operation, the recommended capacitance values are as follows (Table 1). For applications where the actual output power is less than 0.5W, it is recommended not to connect external capacitors.

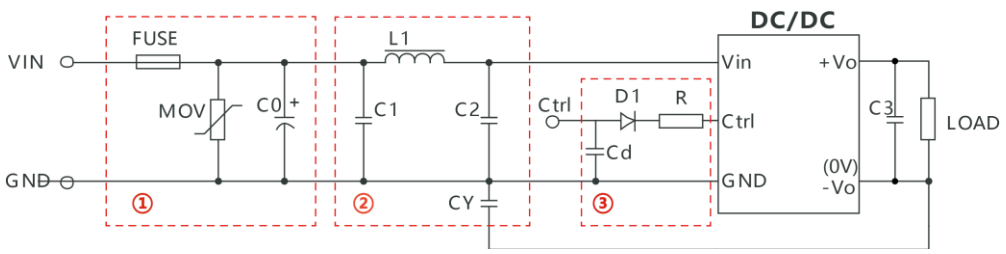


(Figure 2)

Input voltag(Vdc)	5 / 12	24 / 48
C1	100uF/35V	10uF/100V
C2	47uF/35V	1uF/100V
C4,C5	Vo(±3/±5/±9V)100uF/16V	
	Vo(±12/±15V)100uF/25V	
Cd	47nF/100V	
Lin	4.7uH – 12uH	

(Table 1)

2、EMC Recommended Application Circuits (Parameters are shown in Table 2)



(Figure 3)EMC Recommended Circuit

Vin(VDC)	5	12	24	48
FUSE	Slow-blow fuse, selected based on the user's actual input current			
MOV	/	14D330K	14D470K	14D101K
C0	1000μF/25V	1000μF/35V	330μF/50V	330μF/100V
C1	4.7μF/50V			4.7μF/100V
C2	4.7μF/50V			4.7μF/100V
C3	100uF /50V			
L1	12μH			
CY	1nF/2kV			
D1	60V/1A			
R	See Ctrl Port Formula			
Cd	47nF /100V			

(Table 2) Recommended Application Circuit Parameters of EMC

Note:

1. Part ① in Figure 3 is used for EMS testing; part ② is used for EMI filtering, which can be selected according to requirements;
2. If the component in the diagram is not accompanied by parameter descriptions, this component is not required for the model's peripherals.

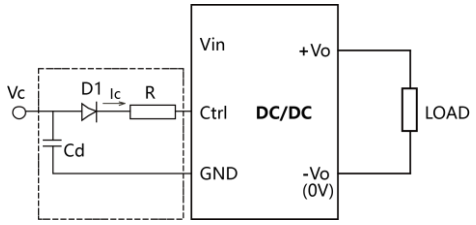
3、Ctrl port

The converter will be turned on when the port is open-circuited or a high impedance is applied. It will turn off when it is pulled high. VC is the voltage of the Ctrl terminal relative to the input ground GND, VD is the forward conduction voltage drop of D1, and IC is the current flowing into the Ctrl terminal, generally taken as 5-10mA. Exceeding the maximum of 20mA can cause permanent damage to the converter. The peripheral circuit of the Ctrl terminal is shown in Figure 3-③; the value of R can be derived as follows:

$$R = \frac{V_C - V_D - 1.0}{I_C} - 300$$

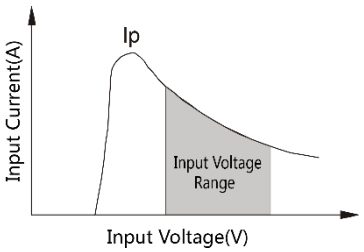
V_C: Control pin input voltage
V_D: Forward voltage drop of diode D1
I_C : Input current of control pins
R : Resistance of the control circuit

(Figure 4)



4、Input current

When using an unstable power supply, please ensure that the output voltage fluctuation range and ripple voltage do not exceed the module's own specifications. The output current of the input power supply must be sufficient to handle the instantaneous start-up average current Ip of the DC/DC module (see Figure 5 and Table 3).



(Figure 5)

Vin (VDC)	Ip (mA)
5	450
12	210
24	105
48	55

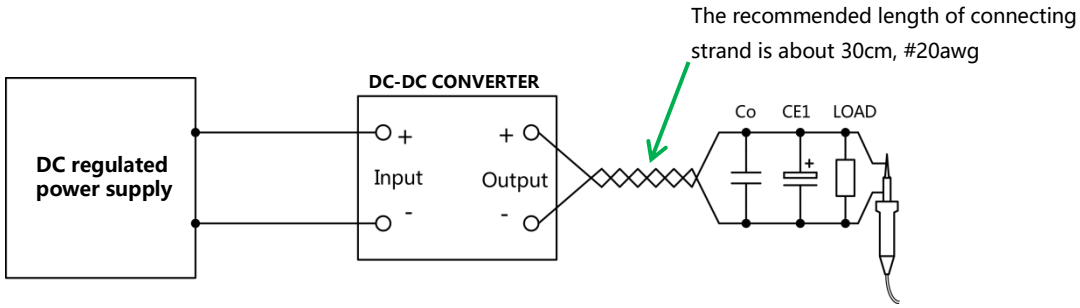
(Table 3)

4、Output load requirements

To ensure the efficient and reliable operation of this module, its minimum output load should not be less than 5% of the rated load; otherwise, the output ripple may increase rapidly.

Ripple and Noise Testing Reference

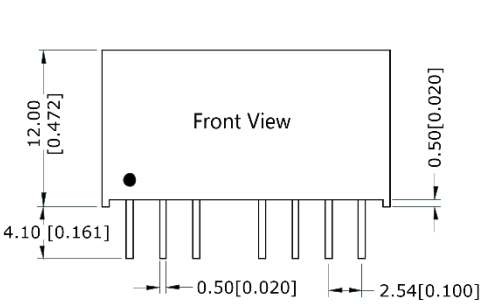
Refer to the following circuit to test ripple and noise

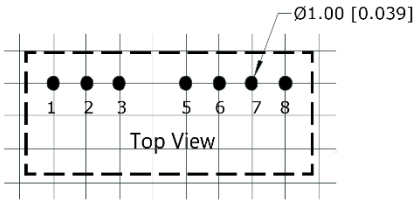


Co	0.1uF ceramic capacitor, the voltage level is 3 times of the output voltage of DC / DC converter.
CE1	10uF electrolytic capacitor, the rated voltage is 1.5 times of the output voltage of DC / DC converter.
LOAD	Resistive load to DC / DC converter shall be connected through stranded wire.

Note: since the ground clamp of the oscilloscope will absorb various high-frequency noise interference measurement results, in order to shield the interference, the proximity test method can be used for measurement. The actual test ripple and noise will vary due to different circuits, external components and instruments.

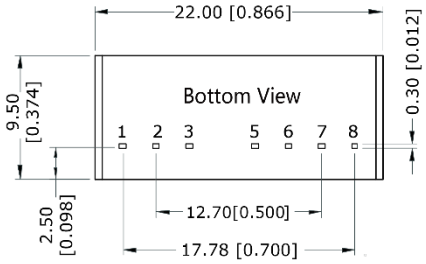
MECHANICAL DRAWING





Grid distance: 2.54×2.54 mm

Recommended PCB footprint (top view)



Dimension unit: mm [inch]
Pin tolerance: ±0.10[±0.004]
Other tolerances: ±0.50[±0.020]

PIN CONNECTIONS	
1	GND
2	Vin
3	Ctrl
5	NC
6	+Vo
7	0V
8	-Vo

NC: Cannot be connected to any circuit

Note:

1. Qituo technology reserves the right to change the product at any time without notice;
2. The product shall be provided with a 3-year warranty period;
3. Unless otherwise specified, the products in this manual are not authorized to be used for key components of equipment requiring high reliability, so as not to affect the safety or effectiveness of the device;
4. All parameters in this manual are measured under indoor ta=25 ℃, humidity <75%, nominal input voltage and output rated load;

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