2：1 Wide voltage input, isolated, regulated single-output, DIP package

FEATURES

- Wide voltage input of 2:1
- Isolation voltage: 1500 VDC
- Sustainable short-circuit protection
- High conversion efficiency
- Operating temperature range: -40 to +85°C
- Complies with EN62368 certification standard

V20-B_Y series is an international standard through-hole DIP package, mainly used for: Industrial control circuits, power electronics, instrumentation, communication circuits, etc.

SELECTION TABLE

Part No	Input voltage(VDC)		Output voltage (VDC)	Output current		Efficiency (%)	Capacitive load (uF)
	Typ	Range		Min (mA)	Max(mA)		
V20-B1203Y	12	9~18	3.3	0	5000	86	10000
V20-B1205Y			5	0	4000	88	10000
V20-B1212Y			12	0	1667	89	1600
V20-B1215Y			15	0	1333	90	1000
V20-B1224Y			24	0	833	90	500
V20-B2403Y	24	18~36	3.3	0	5000	88	10000
V20-B2405Y			5	0	4000	89	10000
V20-B2412Y			12	0	1667	89	1600
V20-B2415Y			15	0	1333	91	1000
V20-B2424Y			24	0	833	90	500
V20-B4803Y	48	36~75	3.3	0	5000	88	10000
V20-B4805Y			5	0	4000	89	10000
V20-B4812Y			12	0	1667	89	1600
V20-B4815Y			15	0	1333	91	1000
V20-B4824Y			24	0	833	90	500

INPUT

Item	Conditions/Description		Min	Typ	Max	Units
Input Current	Full Load/No Load	12VDC input	/	1600/8	1920/70	mA
		24VDC input	/	780/6	950/55	
		48VDC input	/	390/4	475/30	
Refracted ripple current			/	30	/	
Surge voltage	Maximum 1 second	12VDC input	-0.7	/	25	VDC
		24VDC input	-0.7	/	50	
		48VDC input	-0.7	/	100	
Input filter type	Pi Filter					
Hot Plug	Not supported					
Control foot (Ctrl)	Models ON	The Ctrl key is left hovering or connected to a high level (3.5 - 12 VDC)				
	Models OFF	When Ctrl is connected to GND (voltage relative to input ground) or low level (0 - 1.2VDC), the current flowing into the Ctrl terminal is 5 - 10mA				

OUTPUT

Item	Conditions/Description	Min	Typ	Max	Units
Output voltage accuracy	Load change from 5% to 100%	/	±1	±3	%
Line regulation	Full load, input voltage variation ±1%	/	±0.2	±0.5	
Load regulation	Load change from 5% to 100%	/	±0.5	±1	
Transient recovery time	25% load step change	/	0.3	0.5	ms
Transient response deviation		/	±3	±8	%
Rippleand noise[1]	20MHz bandwidth (peak to peak)	/	80	/	mVp-p
Temperature coeffecient	100% load	/	±0.03	/	%/°C
Output overvoltage protection	Input voltage range	110	/	160	%Vo
Output overcurrent protection		110	140	190	%Io
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

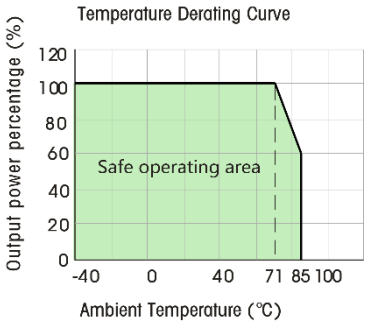
Item	Conditions/Description	Min	Typ	Max	Units
Isolation voltage	input to output for 1 minute at 1 mA max.	1500	/	/	VDC
Isolation resistance	Input to output, insulation voltage 500 VDC	1000	/	/	MΩ
Isolation capacitor	Input-Output, 100kHz/0.1V	/	2000	/	pF
Operating temperature	Use with derating when temperature is ≥71°C, see derating curve chart 1	-40	/	85	℃
Storage temperature		-40	/	125	
Working shell temperature rise	at full load, Ta=25°C	/	25	/	
Welding Temperature	Manual-welding, Operation time 3-5 seconds	/	/	300	
	Wave soldering, Operation time 5-10 seconds	/	/	260	
Storage humidity	non-condensing	5	/	95	%
Switching frequency	Full load, input nominal voltage	/	300	/	KHz
MTBF	MIL-HDBK-217F @ 25°C	/	1000	/	Khours
Cooling method	Natural air cooling				
Dimensions	25.40 x 25.40 x 11.70mm (1.000 x 1.000 x 0.461 inch)				
Weight	12.5g (Typ.)				
Case material	Aluminum alloy				

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

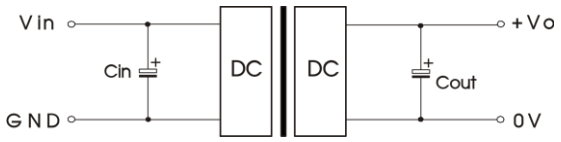


Design reference

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 external filter capacitors Cin and Cout connected to the input and output terminals can be appropriately increased in capacitance, but the capacitance value should not exceed the maximum capacitive load of the product, otherwise it may cause startup issues. Under the condition of ensuring safe and reliable operation, the recommended capacitance values are as follows (Table 1). For applications with actual output power less than 0.5W, it is recommended not to connect external capacitors.

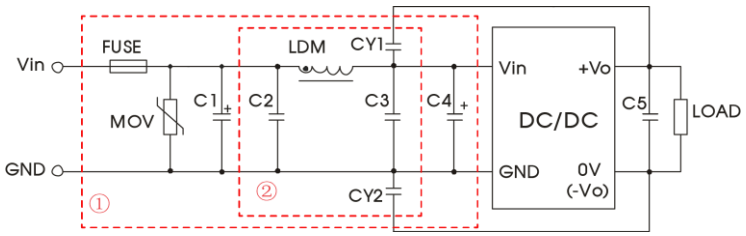


(Figure 2)

Input voltag(Vdc)	Capacitance Cin	Output voltag(Vdc)	Capacitance Cout
12	100uF/35V	3.3/5	100uF/16V
24	100uF/50V	12/15	100uF/25V
48	100uF/100V	24	47uF/50V

(Table 1)

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



(Figure 3)EMC Recommended Circuit

Vin(VDC)	12	24	48
FUSE	Slow-blow fuse, selected based on the user's actual input current		
MOV	14D330K	14D470K	14D101K
C1,C4	330μF/35V	330μF/50V	330μF/100V
C2,C3	4.7μF/35V	4.7μF/50V	4.7μF/100V
C5	Refer to the Cout parameter in Figure 2		
LDM	2.2μH		
CY1,CY2	1nF/400VAC		

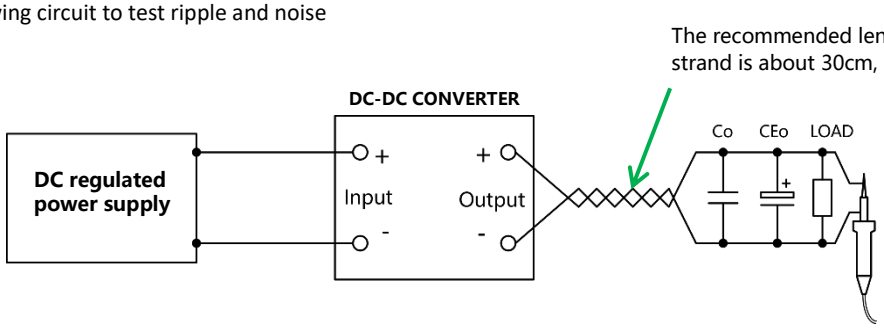
(Table 2) Recommended Application Circuit Parameters of EMC

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 does not have parameter descriptions attached, this component is not required in the peripheral circuit of this model.

Ripple and Noise Testing Reference

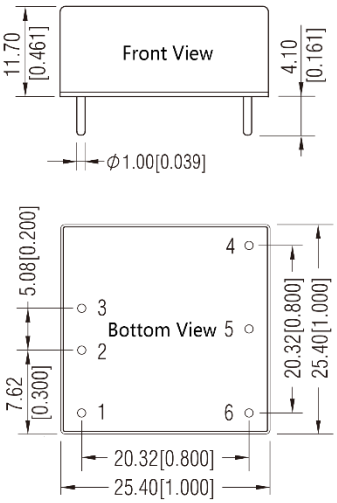
Refer to the following circuit to test ripple and noise



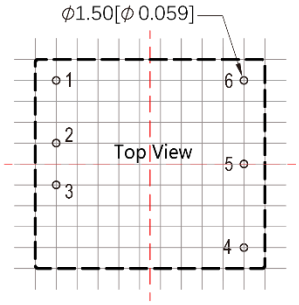
Co	0.1uF ceramic capacitor, the voltage level is 3 times of the output voltage of DC / DC converter.
CEo	10uF electrolytic capacitor, the rated voltage is 1.5 times of the output voltage of DC / DC converter.
LOAD	Resistive load to DC / DC converter shall be connected through stranded wire.

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



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



Grid distance: 2.54×2.54 mm

Recommended PCB footprint (top view)

PIN CONNECTIONS	
1	Ctrl
2	GND
3	Vin
4	+Vo
5	No Pin
6	0V

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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