Typical Features

- ◆ Wide input voltage (4:1), output power 20W
- ◆ Transfer efficiency up to 89%
- ◆ Output quick start
- ◆ Continuous short circuit protection, Self-recovery
- ◆ Input under-voltage, output over-voltage, short circuit, over-current protection
- ◆ Isolation voltage 3000VDC
- ◆ Operating Temperature range：-40℃～+85℃
- ◆ Good EMI performance
- ◆ International standard pin

Application Filed

DD20-XXSXXB3R3 Series ----- *is our newly developed DIP standard 2X1 package, 20W output power, ultra-wide voltage 4:1 input range, ultra-low standby power consumption, isolated and regulated single output, DC-DC module power supply, which can be widely used in industrial control, instrumentation, communication, power, Internet of Things and other fields.*

Typical Product List

Part no.	Input voltage Range (VDC)		Output voltage /Current (Vo/ Io)		Input Current (mA) @nominal voltage		Max. Capacitive Load	Ripple & Noise (mVp-p)		Efficiency@ output full load (%)	
	Nominal	Range	Voltage (VDC)	Current (mA) Max./Min.	Full load Typ.	No load Typ.	uF	Typ.	Max.	Min.	Typ
*DD20-18S3V3B3R3	24	9-36	3.3	4000/0	650	50	8000	50	100	82	84
*DD20-18S05B3R3	24	9-36	5	4000/0	934	57	6000	50	100	85	87
*DD20-18S09B3R3	24	9-36	9	2222/0	936	30	2000	50	100	87	89
DD20-18S12B3R3	24	9-36	12	1667/0	930	10	1000	50	100	88	90
*DD20-18S15B3R3	24	9-36	15	1333/0	928	7	1000	50	100	87	89
DD20-18S18B3R3	24	9-36	18	1111/0	940	25	500	50	100	87	89
DD20-18S24B3R3	24	9-36	24	833/0	926	20	500	50	100	87	89
*DD20-18S28B3R3	24	9-36	28	714/0	950	8	500	50	100	87	89
*DD20-36S3V3B3R3	48	18-75	3.3	4000/0	320	25	8000	50	100	84	86
*DD20-36S05B3R3	48	18-75	5	4000/0	473	30	5000	50	100	85	87
*DD20-36S09B3R3	48	18-75	9	2222/0	468	15	2000	50	100	87	89

Note：

1: "*" indicates a model under development;

2: The above efficiency is measured by the nominal input voltage and the output rated load;

3: The maximum capacitive load refers to the maximum capacity allowed by the external output capacitor when the power supply is started at the rated load. If the capacity is exceeded, the power supply may not start;

4: In order to reduce no-load power consumption and improve light-load efficiency, the IC works in a frequency-jittering state when no-load and light-load. The output cannot be no-loaded and must be at least 15% loaded or an electrolytic capacitor with a high-frequency resistance of more than 470uF, otherwise the output voltage ripple will increase;

5: Due to limited space, the above is only a partial product list. If you need products other than the list, please contact our sales department.

Input Specifications

Item	Test Conditions	Min.	Typ.	Max.	Unit
Standby power consumption	Input Voltage Range	/	0.5	/	W
Input under-voltage	24V nominal input	5	7	9	VDC
	48V nominal input	11	14	18	
Input surge voltage (1sec.max)	24V nominal input	-0.7	/	50	
	48V nominal input	-0.7	/	100	
Start-up voltage	24V nominal input	/	/	9	
	48V nominal input	/	/	18	
Hot plug	/	Unavailable			
Input Filter	/	Π filter			
CTRL*					

Turn on

CTRL is left floating or connected to TTL high level（2.5VDC-12VDC）

Turn off

CTRL connected to -Vin or low level（0-1.2VDC）

Input current at shutdown

5mA (TYP)

Note: *The voltage of the CTRL control pin is relative to the input pin -Vin.

Output Specification

Item	Test Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Input voltage range, nominal load	/	±1	±5	%
Voltage Regulation	Nominal load, full voltage range	/	±0.2	±0.5	%
Load Regulation	10% ~ 100% rated load	/	±0.2	±0.5	%

Ripple & Noise	15% ~ 100% load, 20MHz bandwidth		/	50	100	mVp-p
Dynamic recovery time	25% of nominal load step, nominal input voltage	/	/	300	500	us
Dynamic response deviation		3.3V、5V output	/	±5	±8	%
		Other output	/	±3	±5	%
Start-up delay time	Input nominal voltage		/	100	/	ms
Output voltage Regulation (Trim)	Input voltage range		90	/	110	%Vo
Output Over-voltage Protection			120	160	200	%Vo
Output Over-current Protection			110	150	220	%Io
Output Short Circuit Protection			Continuous, self-recovery			

Note: When the load is ≤15%, the ripple is 5%Vo mVp-p typ; the twisted pair test method is adopted, and the bandwidth is 20MHz;

General Characteristics

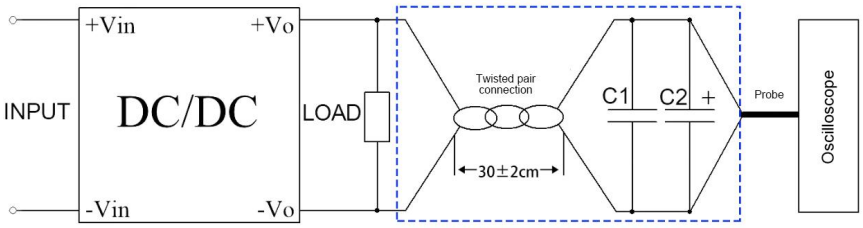
Item	Test Conditions	Min.	Typ.	Max.	Unit
Switching Frequency	Working mode (PWM)	/	230	/	KHz
Operating Temperature	Refer to temperature	-40	/	+85	℃
Storage Temperature	/	-55	/	+125	
Pin resistance soldering	The distance between the soldering point and	/	/	300	
Relative Humidity	No condensing	5	/	95	%RH
Isolation Voltage	I/P-O/P, test for 1min, leakage current is less than 0.5 mA	3000	/	/	VDC
Mean Time Between Failures	MIL-HDBK-217F@25℃	1000	/	/	K hours
Cooling Method	Natural cooling				
Case Material	Aluminum metal casing				

Weight/ Dimension	Part No.	Weight(Typ.)	L x W x H	
	DD20-XXSXXB3R3	30g	50.8X25.4X11.8 mm	2.0X1.0X0.464inch

EMC Characteristics

Total Items		Sub Items	Test Standard	Class
EMC	EMI	CE	CISPR32/EN55032	CLASS B （see EMC Recommended Circuit）
		RE	CISPR32/EN55032	CLASS B （see EMC Recommended Circuit）
	EMS	RS	IEC/EN61000-4-3	10V/m Perf.Criteria B
		CS	IEC/EN61000-4-6	3Vr.m.s Perf.Criteria B
		ESD	IEC/EN61000-4-2	Contact ±4KV Perf.Criteria B
		Surge	IEC/EN61000-4-5	±2KV Perf.Criteria B （see EMC Recommended Circuit）
		EFT	IEC/EN61000-4-4	±2KV Perf.Criteria B （see EMC Recommended Circuit）
		Voltage dips, short interruptions and voltage variations immunity	IEC/EN61000-4-11	0%~70% Perf.Criteria B

Ripple& Noise Test: (Twisted Pair Method 20MHZ bandwidth)



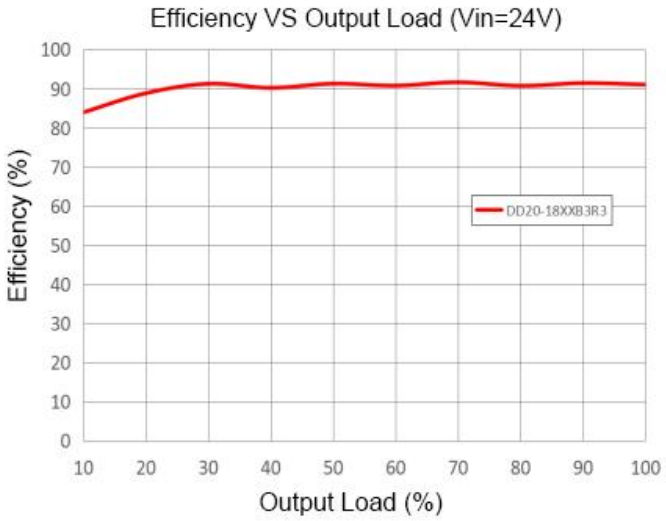
Test conditions:

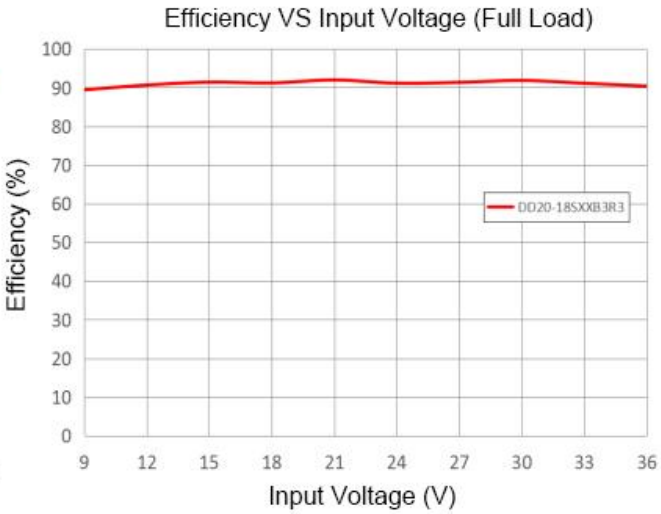
1. Ripple noise is connected using 12# twisted pair cable, oscilloscope sampling uses sampling mode, oscilloscope bandwidth is set to 20MHz, 100M bandwidth probe is used, probe cap and ground clip are removed; and C1 (0.1uF) polypropylene capacitor and C2 (10uF) high-frequency low-resistance electrolytic capacitor are connected in parallel at the probe end of the twisted pair cable;

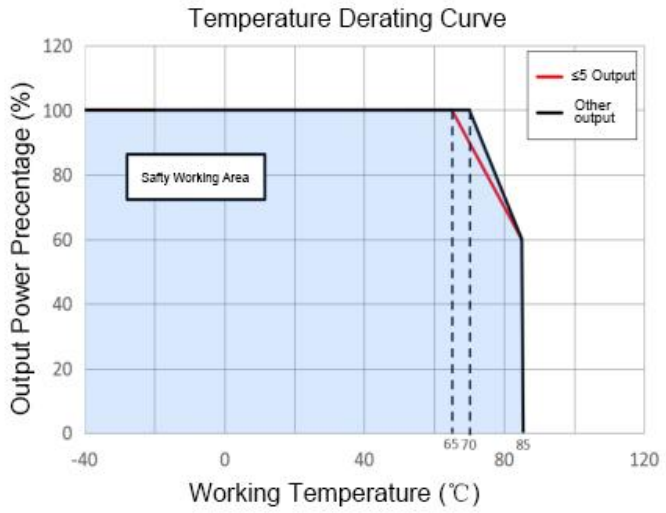
2. Ripple noise test: The module input end (INPUT) is connected to the input power supply, and the power supply output is connected to the electronic load (LOAD) through the power line. The test is sampled from the power supply output port using a 30±2 cm twisted pair cable alone, and connected to the oscilloscope probe according to polarity;

3. The output cannot be unloaded, and must be at least 15% loaded or an electrolytic capacitor with a high-frequency resistance of more than 470uF, otherwise the output voltage ripple will increase;

Product characteristic curve



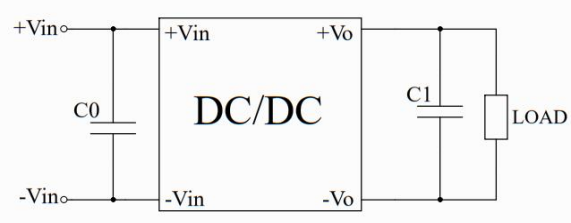




Design and Application Reference

Recommended circuit

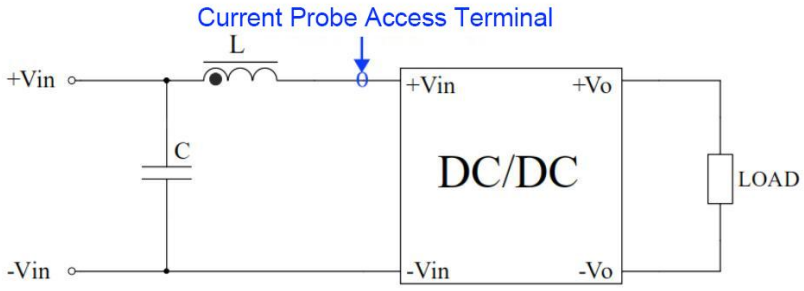
1. This series of module power supplies are tested according to this peripheral circuit before leaving the factory. Increasing the capacity of C1 can reduce the output ripple, but the output capacity must be less than the maximum capacitive load.



Parameter Description:

Components	Parameter
C0	47-100uF/100V
C1	330uF/50V

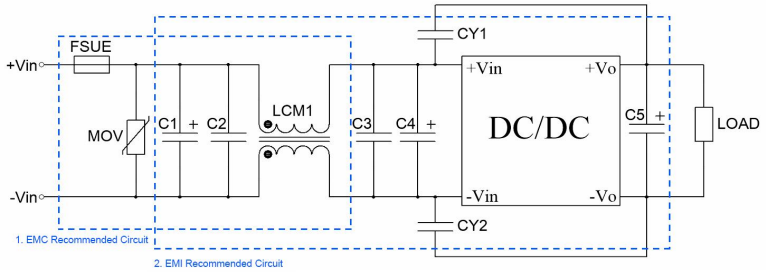
2. Recommended EMC External Circuit:



Parameter Description:

Components	Parameter
C	220uF/100V
L	4.7uH

3. EMC external recommended circuit:

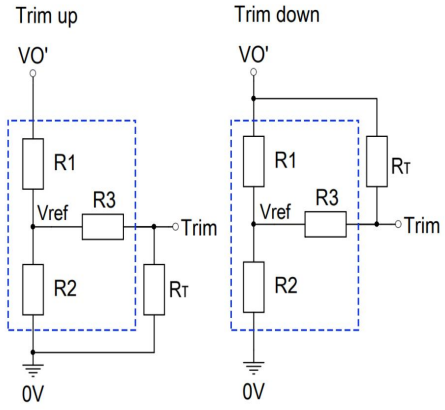


Note: Part 1 in the figure is for EMS testing, and part 2 in the figure is for EMI filtering, which can be adjusted according to the situation.

Parameter Description:

Components	Vin:24VDC	Vin:48VDC
FUSE	Choose according to customer needs	
MOV1	14D470K	14D101K
C1,C4	330uF/50V	330uF/100V
LCM1	5mH	5mH
C2,C3	10uF/50V	10uF/100V
C5	100uF/ 50V	100uF/ 50V
CY1,CY2	2.2nF / 400VAC	

4. Use of Trim and calculation of Trim resistance



Note: Trim uses circuits, and the dotted box area is the interior of the product.

Trim resistance calculation formula:

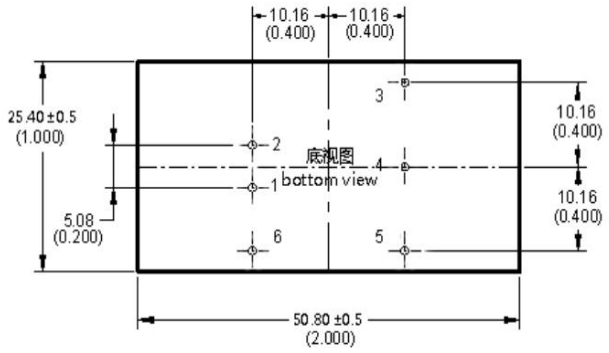
$$up:\ R_T=\frac{aR_2}{R_2-a}-R_3 \qquad a=\frac{Vref}{Vo'-Vref}\cdot R_1$$

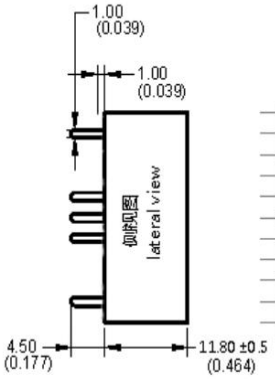
$$down:\ R_T=\frac{aR_1}{R_1-a}-R_3 \qquad a=\frac{Vo'-Vref}{Vref}\cdot R_2$$

RT is the Trim resistor, a is a custom parameter, and Vo' is the actual voltage that needs to be adjusted up or down.

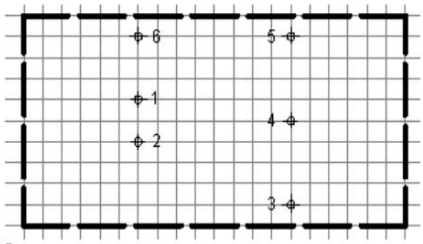
Output Voltage	Trim uses internal circuit parameters			
Vout(VDC)	R1(KΩ)	R2(KΩ)	R3(KΩ)	Vref(V)
3.3	24	14.53	68	1.25
5	18	18	68	2.5
9	25.5	9.79	30	2.5
12	18	4.7	30	2.5
15	25.5	5.1	30	2.5
24	25.5	2.95	18	2.5

B3 Packing Dimension





Unit: mm
Printed board vertical view
Lattic spacing: 2.54mm(0.1inch)
Unmarked dimension tolerance ±0.25mm
Unmarked pin diameter tolerance ±0.50mm



Pin	1	2	3	4	5	6
DD20-XXSXXB3R3	-Vin	+Vin	+Vout	Trim	GND	Ctrl

Note:

1. The product should be used within the specification range, otherwise it will cause permanent damage to the product;
2. If the product works below the minimum required load, it cannot be guaranteed that the product performance meets all the performance indicators in this manual;
3. If the product works beyond the product load range, it cannot be guaranteed that the product performance meets all the performance indicators in this manual;
4. Unless otherwise specified, the above data are measured at Ta=25℃, humidity<75%, input nominal voltage and output rated load (pure resistance load);
5. All the above index test methods are based on our company's standards;
6. The above are the performance indicators of the product models listed in this manual. Some indicators of non-standard model products will exceed the above requirements. For specific circumstances, please contact our technical personnel directly;
7. Our company can provide product customization;
8. The product specification may be changed at any time without prior notice.

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