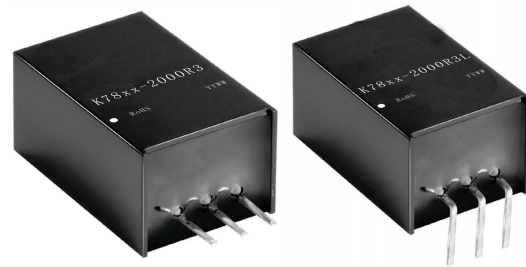


Typical Performance

Wide input voltage, non-isolated regulated single output DC-DC module power supply

- Features: Wide input voltage, non-isolated regulated single-channel output
- Efficiency: Up to 96%
- Operating temperature: -40°C~+85°C
- No-load input current as low as 0.1mA
- Output short circuit protection
- Pin compatibility with LM78xx series
- Small SIP package, plastic housing



The K78xx-2000R3 series are high-efficiency switching regulators, an ideal replacement for the LM78xx series three-terminal linear regulators. They feature high efficiency, low no-load power consumption, and short-circuit protection, and require no external heatsink, supporting negative output. These products are widely used in industrial control, power, and instrumentation industries.

Product Selection Table

Product Model	Input voltage range (Vdc)	Output voltage/current		Ripple and noise	Full load efficiency
	Nominal value (range value)	Output voltage (Vdc)	Output current (mA) (Max.Min.)	Full load (mVp-p) Typ/Max.	% Typ./Min.(Vin)
K78X2-2000R3	24 (4.5-28)	1.8	2000	30/75	83/79
K7802-2000R3	24 (4.5-36)	2.5	2000	30/75	89/83
	12 (8-32)	-2.5	1000	30/100	86/80
K7803-2000R3(L)	24 (6-36)	3.3	2000	30/75	89/85
	12 (8-31)	-3.3	1000	30/100	85/83
K7805-2000R3(L)	24 (8-36)	5	2000	30/75	89/87
	12 (8-30)	-5	1000	30/100	86/84
K78X6-2000R3(L)	24 (10-36)	6.5	2000	30/75	92/89
	12 (8-29)	-6.5	1000	30/100	85/83
K7809-2000R3(L)	24 (13-36)	9	2000	30/75	92/90
	12 (8-26)	-9	800	30/100	86/81
K7812-2000R3(L)	24 (16-36)	12	2000	30/75	93/91
	12 (8-23)	-12	600	30/100	87/85

K7815-2000R3	24 (18-36)	15	2000	30/75	95/93
	12 (8-20)	-15	600	30/100	87/87

- Note: 1. Due to space limitations, the above is only a typical product list. For products not listed, please contact our sales department.
2. When the input voltage exceeds 30VDC, an external 22uF/50V electrolytic capacitor is required at the input terminal to prevent voltage spikes from damaging the module.
3. K78xx-1000R3L indicates a horizontal angled product.

Test conditions: Unless otherwise specified, all parameters were measured at nominal input voltage, purely resistive rated load and 25°C room temperature.

Input Characteristics

Items	Working conditions	Min.	Typ.	Max.	Unit.
No-load input current (full load/no load)	Positive output	--	0.1	1.0	mA
Reverse input		Prohibit			mA
Input filter type (Isec.max)		Capacitor filtering			VDC
Hot-swap		No support			

Output Characteristics

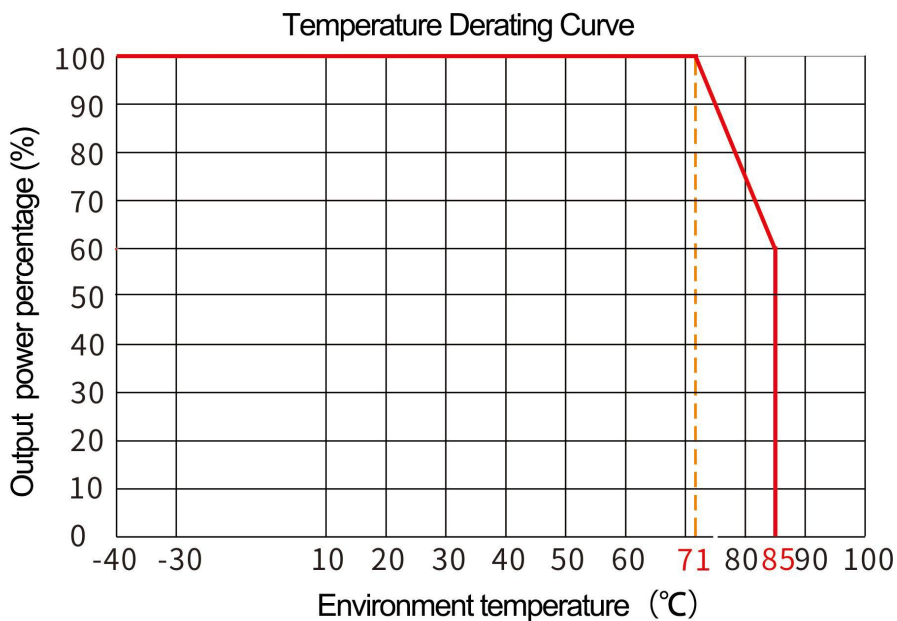
Items	Working and testing conditions	Min.	Typ.	Max.	Unit.	
Output voltage accuracy	Full load, input voltage range	3.3V output	--	±2	±4	%
		Other models	--	±2	±3	%
Linear adjustment rate	Full load, input voltage range	--	±0.4	±0.8	%	
Load regulation	10%~100% load	--	±0.5	±2	%	
Ripple & Noise	Positive output, 20MHz bandwidth, peak-to-peak, 100% load	--	30	75	mVp-p	
	Negative output, 20MHz bandwidth, peak-to-peak, 100% load	--	30	100		
Temperature drift coefficient	Operating temperature -40°C to +85°C	--	--	±0.03	%/°C	
Transient response deviation	Nominal input voltage, 25% load step change	--	±50	±150	mVp-p	
Transient recovery		--	0.2	1	ms	
Output short circuit protection		Long-term short circuit, automatic recovery			-	

- Note: ① The test method for ripple and noise is the twisted-pair test method.
② At a load below 10%, the maximum ripple and noise value for the 3.3V/5V output is 150mVp-p, and the maximum ripple and noise value for the 9V/12V/15V output is 2%Vo.

General Characteristics

Items	Working condition	Min.	Typ.	Max.	Unit.
Operating temperature	Using the reference temperature derating curve	-40	--	+85	°C
Storage temperature		-55	--	+125	
Temperature rise of the outer casing during operation		--	25	--	
Storage humidity	No condensation	5	--	95	%RH
Pin soldering temperature resistance	Solder joint distance from casing: 1.5mm, 10 seconds (Max.)	--	--	+260	°C
Switching frequency	Full load, nominal voltage input	--	400	--	KHz
Shock		10-55Hz, 10G, 30 Min. along X, Y and			
Shell material		Black flame-retardant and heat-resistant plastic (UL94 V-0)			
Package size	K78xx-2000R3	11.60x9.0x17.50mm			
	K78xx-2000R3L	19.0x11.6x9.0mm			
Weight	3.8g (Typ.)				
Cooling method	Natural cooling				
Minimum time between failures	MIL-HDBK-217F@25°C	2000	--	--	KHrs

Product Characteristic Curves



Typical Application Reference Circuit (Recommended Parameters)

1. Common Applications:

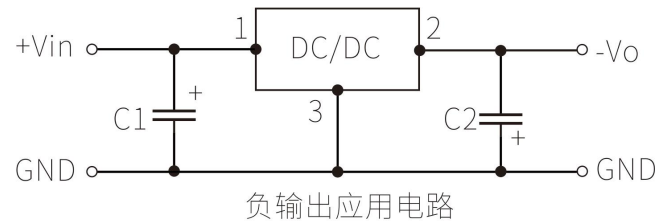
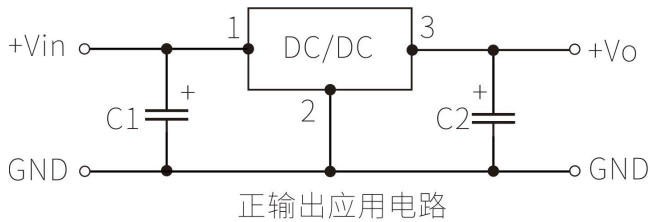


图1典型应用电路

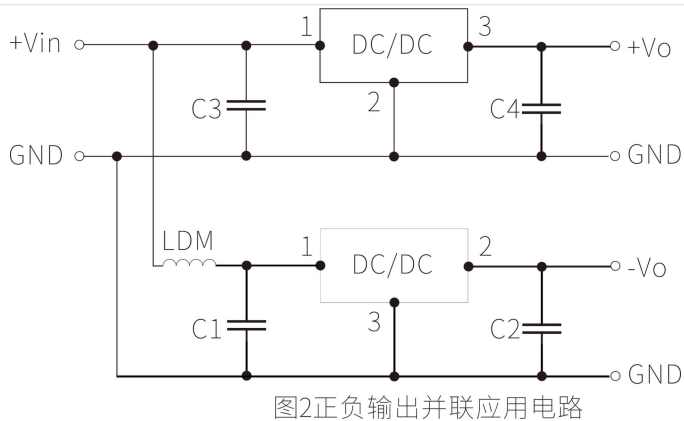


Table 1

Model	C1/C3 (Ceramic capacitor)	C2/C4 (Ceramic capacitor)
K78X3-2000R3	22uF/50V	22uF/10V
K7802-2000R3		22uF/10V
K7803-2000R3(L)		22uF/10V
K7805-2000R3(L)		22uF/10V
K78X6-2000R3(L)		22uF/10V
K7809-2000R3(L)		22uF/16V
K7812-2000R3(L)		22uF/25V
K7815-2000R3		22uF/25V

- Note:
- Under normal circumstances, external capacitors C1 and C2 (C3 and C4) can be added depending on the product's operating environment, and the capacitors should be positioned close to the product's pins.
 - The capacitance values of C1 and C2 (C3 and C4) are referenced in Table 1. They can be increased appropriately as needed, or low-ESR tantalum capacitors and electrolytic capacitors can be used.
 - When the product is used in the application circuit shown in Figure 2, it is recommended to add an inductor LDM to reduce mutual interference between products. The recommended value for LDM is 10 μ H.
 - This product does not support hot-swapping, and the output terminals cannot be used in parallel.
 - If further reduction of output ripple is required, an external "LC" filter network can be connected to the output terminal. The recommended value for L is 10 μ H-47 μ H, and the recommended value for C5 is 22uF, as shown in Figure 3.



图3 ‘LC’ 滤波应用电路

2. Recommended EMC Circuit

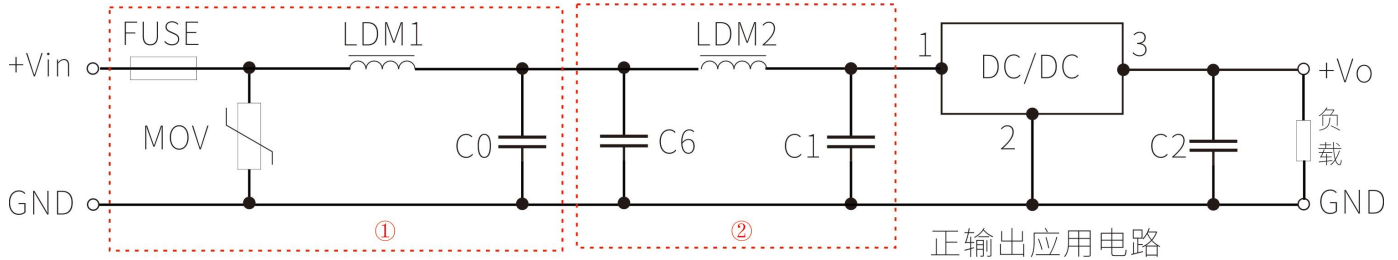


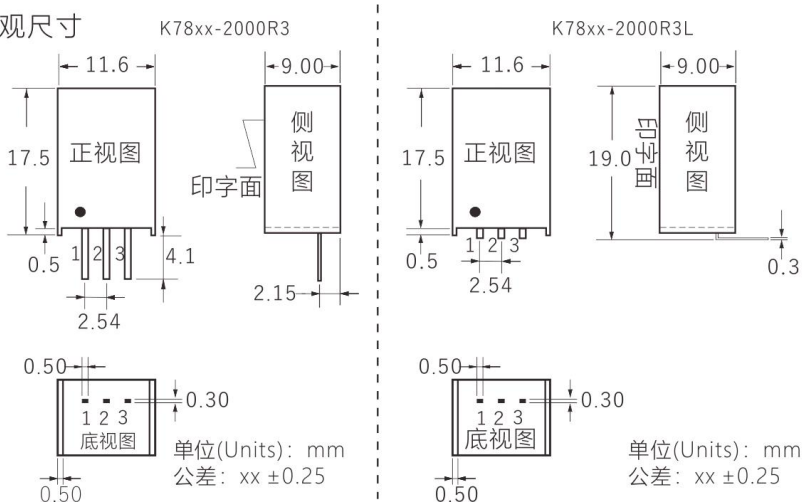
图4 EMC推荐应用电路

FUSE	MOV	LDM1	Co	C1/C2	C6	LDM2
Select according to the customer's actual input current	20D470K	82uH	680uF/50V	Refer to Table 1	4.7Uf/50V	12uH

Note: Part ① in Figure 4 is for EMS testing; Part ② is for EMI testing. Choose the appropriate recommended circuit based on your needs.

Product Dimensions and Pin Definitions, Recommended PCB Layout

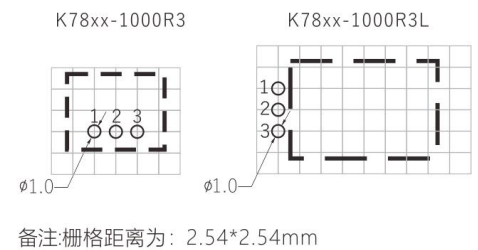
1)外观尺寸



2)引脚定义

引脚	1	2	3
正输出	+Vin	GND	+Vo
负输出	+Vin	-Vo	GND

3)建议印刷版图



*Note: If the pin definitions of the power module do not match those in the selection manual, the markings on the actual product label shall prevail.

Package Description

Model	L x W x H	
K78xx-2000R3	11.60x9.00x17.50mm	0.457 × 0.354 × 0.689inch
K78xx-2000R3L	19.00x11.60x9.00mm	0.748 × 0.457 × 0.354inch

Test Application Reference

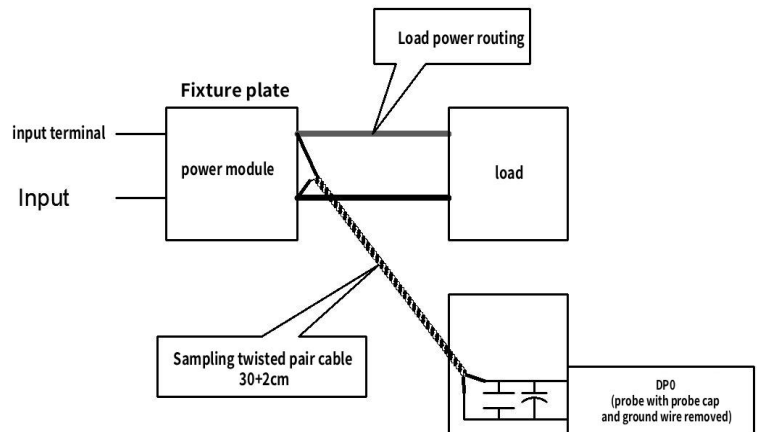
Ripple & Noise Test: (Twisted Pair Method, 20MHz Bandwidth)

Test Method:

1. Ripple and noise are tested using a #12 twisted pair cable. The oscilloscope bandwidth is set to 20MHz, with a 100MHz bandwidth probe. A 0.1uF polypropylene capacitor and a 4.7uF high-frequency low-impedance electrolytic capacitor are connected in parallel at the probe end. The oscilloscope sampling uses Sample mode.

2. Output Ripple and Noise Test Diagram:

Connect the power input to the input power supply. Connect the power output to the electronic load via a fixture board. The test uses a 30cm ± 2cm sampling wire to sample directly from the power output port. The power wire should be an insulated conductor of appropriate diameter based on the output current.



Product Application Precautions

1. Input Requirements: Ensure the output voltage fluctuation range of the power supply does not exceed the input requirements of the DC/DC module itself, and the output power of the input power supply must be greater than the output power of the DC/DC module;
2. The capacitance value of the external capacitor connected to the output terminal should not be too large, otherwise it may easily cause overcurrent or poor startup during module startup;
3. Maximum capacitive loads are tested under full load conditions within the input voltage range;
4. Unless otherwise specified, all specifications in this manual are measured at $T_a=25^{\circ}\text{C}$, humidity<75%RH, nominal input voltage and rated output load;
5. All test methods for specifications in this manual are based on our company's standards;
6. We can provide product customization. For specific details, please contact our technical staff directly; Product specification changes will not be notified separately.

Contact

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