DC/DC Converter

K78xxM-1000R3 Series

MORNSUN®

Wide input voltage , non-isolated & regulated single output

CE RoHS

FEATURES

- High efficiency up to 96%
- No-load input current as low as 0.3mA
- Operating temperature range: -40℃ to +85℃
- Support the negative output
- Output short circuit protection
- Pin-out compatible with LM78XX linear regulators
- Meets EN62368 approval

K78xxM-1000R3 series are high efficiency switching regulators and ideal substitutes of LM78xx series three-terminal linear regulators. The product is featured with high efficiency, low loss and no heat sink requirement. They are widely used in industrial control, instrumentation, and electric power applications.

Selection Guide

Certification	Part Number	Input Voltage (VDC)	Output		Efficiency (%/Typ.) (Min. Vin)/ (Max. Vin) @Full Load	Max. Capacitive Load(μF)
		Nominal (Range)	Output Voltage (VDC)	Max. Output Current (mA)		
CE	K7803M-1000R3	24 (6-36)	3.3	1000	90/80	680
	K7805M-1000R3	24 (8-36)	5	1000	93/85	680
		12 (8-27)	-5	-500	85/81	330
	K7809M-1000R3	24 (13-36)	9	1000	94/89	680
	K7812M-1000R3	24 (16-36)	12	1000	95/92	680
		12 (8-20)	-12	-300	88/87	330
	K7815M-1000R3	24 (20-36)	15	1000	96/93	680
		12 (8-18)	-15	-300	87/88	330

Note:1. For input voltage higher than 30 VDC, a 22μF/50V input capacitor is required.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Positive output	--	0.3	1	mA
	Negative output	--	1	4	
Reverse Polarity Input		Forbidden			
Input Filter		Capacitor filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load, input voltage range	K7803M-1000R3	--	±2	±4	%
		Others	--	±1.5	±3	
Line Regulation	Full load, input voltage range		--	±0.2	±0.4	
Load Regulation	Nominal input, 10% -100% load	Positive output	--	±0.4	±0.6	
		Negative output	--	±0.4	±0.8	
Ripple & Noise*	20MHz bandwidth, nominal input, 20% -100% load		--	25	75	mVp-p
Temperature Drift Coefficient	100% load		--	--	±0.03	%/℃

Transient response deviation	Nominal input, 25%-50%-25%, 50%-75%-50% load step change	--	±60	±200	mV
Transient recovery time		--	--	1	ms
Output short circuit protection	Nominal input	Continuous, self-recovery			

Note: *1. Ripple and noise tested with "parallel cable" method, please refer to *DC-DC Converter Application Notes* for specific operation methods;
*2.With the load lower than 20%, the maximum ripple and noise of 3.3V/5V output products will be 100mVp-p, 9V/12V/15V output products will be 2%Vo.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature*	see Fig.1	-40	--	85	℃
Storage Temperature		-55	--	125	
Pin Welding Resistance Temperature	Welding time: 10s (Max.)	--	--	260	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	Full load, nominal input	--	520	--	KHz
MTBF	MIL-HDBK-217F@25℃	2000	--	--	K hours

Note: *When Vin >30V, Positive output of 9V/12V/15V output, derating if the temperature ⩾ 55℃, derating to 40%Io if the temperature is 85℃.

Physical Specifications

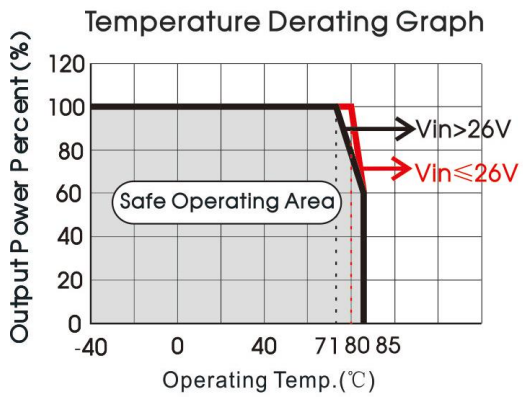
Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Package Dimensions	11.60*8.00*10.40 mm
Weight	1.9g (Typ.)
Cooling Method	Free air convection

EMC Specifications

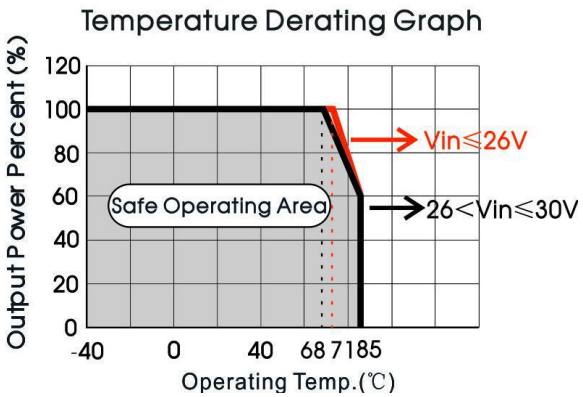
EMI	CE	CISPR32/EN55032	CLASS B (see Fig. 4-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 4-② for recommended circuit)	
EMS	ESD	IEC/EN 61000-4-2	Contact ±4KV	perf. Criteria B
	RS	IEC/EN 61000-4-3	10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4	±1KV (see Fig. 4-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ±1KV(see Fig. 4-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN 61000-4-6	3Vr.m.s	perf. Criteria A

Product Characteristic Curve

3.3V/5V output



9V/12V/15V output



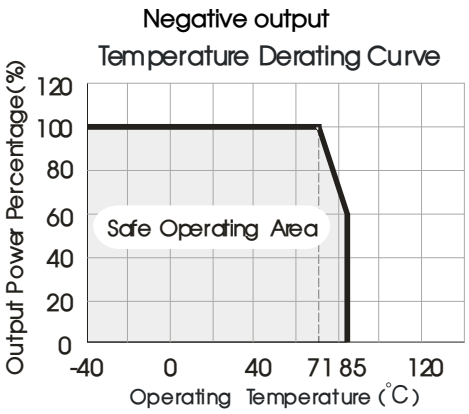
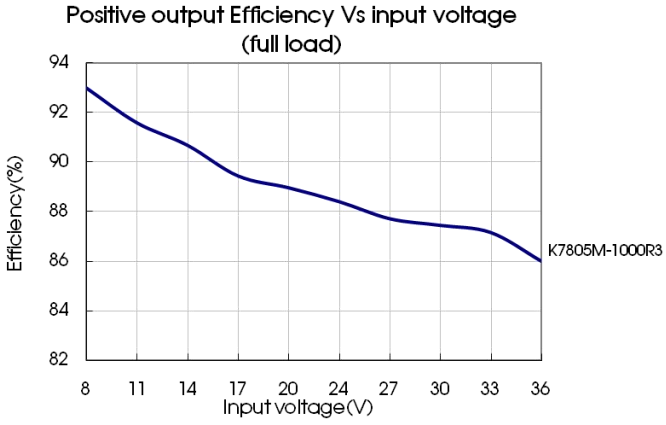
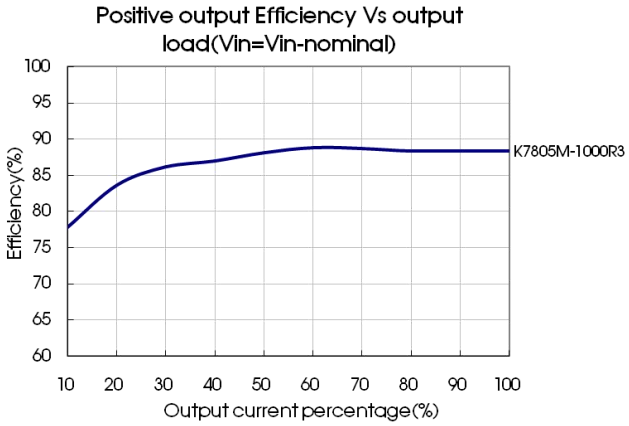


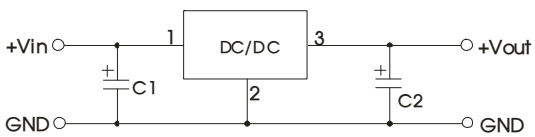
Fig. 1



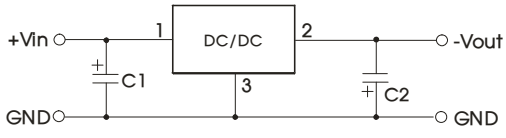


Design Reference

1. Typical application circuit



Positive output application circuit



Negative output application circuit

Fig. 2 Typical application circuit

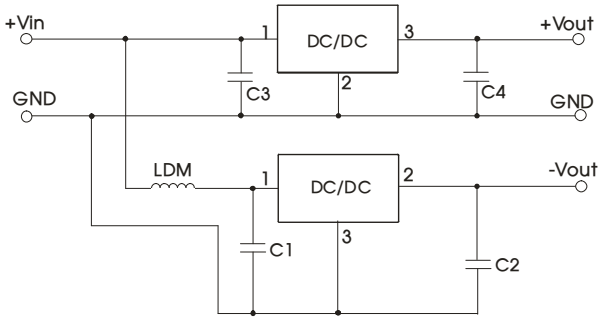


Fig. 3 Positive and Negative output parallelling application circuit

Sheet 1

Part No.	C1/C3 (ceramic capacitor)	C2/C4 (ceramic capacitor)
K7803M-1000R3	10μF/50V	22μF/10V
K7805M-1000R3		22μF/10V
K7809M-1000R3		22μF/16V
K7812M-1000R3		22μF/25V
K7815M-1000R3		22μF/25V

Note:
1. C1 and C2 (C3 and C4) are required and should be connected close to the pin terminal of the module.
2. The capacitance of C1 and C2 (C3 and C4) refer to Sheet 1.
3. To reduce the output ripple furtherly, C2 and C4 can be increased properly if required, tantalum capacitor and aluminum electrolytic capacitor of low ESR may also suffice.
4. When the products used as the circuit like figure 3, an inductor named as LDM up to 10μH is recommended in the circuit to reduce the mutual interference.
5. Cannot be used in parallel to enlarge the power for output and hot swap.

2. EMC solution-recommended circuit

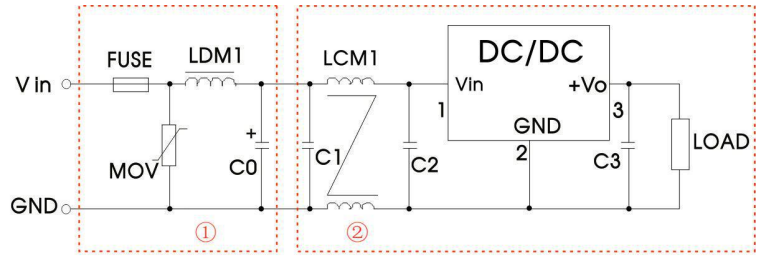
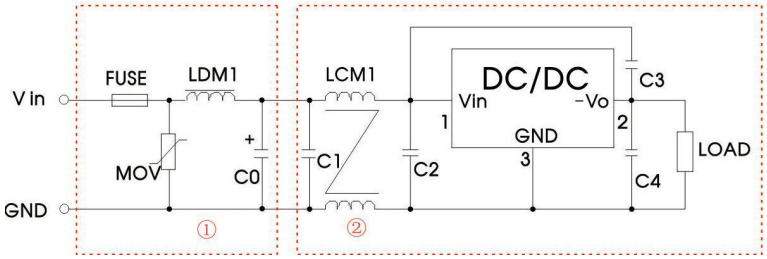
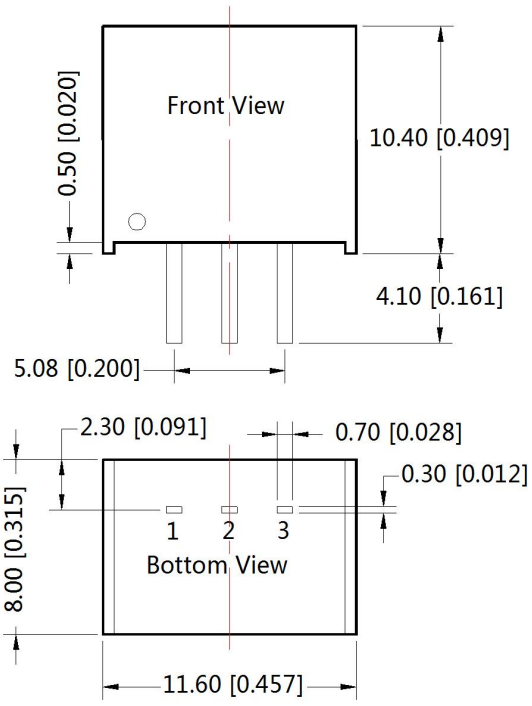
	EMC recommended circuit	Parameter description
positive Output		FUSE: According to the customer actual input current choice MOV: 20D470K LDM1: 82μH C0: 680μF /50V LCM1: 4.7mH C1/C2: 4.7μF /50V C3: Refer to the Cout in Sheet 1
negative Output		FUSE: According to the customer actual input current choice MOV: 20D470K LDM1: 82μH C0: 680μF /50V LCM1: 4.7mH C1/C3/C4: 4.7μF /50V C2: 10μF /50V

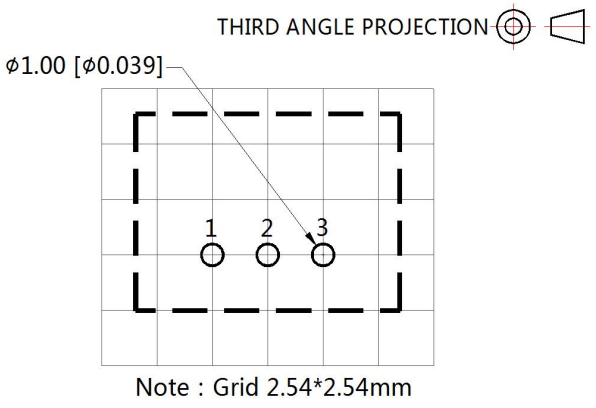
Fig. 4 EMC recommended circuit

Note: Part ① in the Fig. 4 is for EMS test, part ② is for EMI filtering; parts ① and ② can be added based on actual requirement.

3. For more information please find the application notes on www.mornsun-power.com

Dimensions and Recommended Layout





Note : Grid 2.54*2.54mm

Pin-Out		
Pin	Positive Output	Nagetive Output
1	Vin	Vin
2	GND	-Vo
3	+Vo	GND

Note:
Unit: mm[inch]
Pin section tolerances: ±0.10[±0.004]
General tolerances: ±0.50[±0.020]

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58200003;
2. The maximum capacitive load offered were tested at input voltage range and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our Company's corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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