DC/DC Converter

K78xx-2000R3 Series

MORNSUN®

Wide input voltage , non-isolated & regulated single output

RoHS

FEATURES

- High efficiency up to 95%
- No-load input current as low as 0.1mA
- Operating temperature range: -40℃ to +85℃
- Output short circuit protection
- Pin-out compatible with LM78XX linear regulators
- Meets EN62368 standards（Pending）

K78xx-2000R3 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 （Pending）	K7803-2000R3	24 (6-36)	3.3	2000	87/83	1800
	K7805-2000R3	24 (8-36)	5	2000	90/87	1000
	K7809-2000R3	24 (13-36)	9	2000	93/90	680
	K7812-2000R3	24 (16-36)	12	2000	94/92	470
	K7815-2000R3	24 (18-36)	15	2000	95/93	470

Note: 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	--	0.1	1	mA
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	K7803-2000R3	--	±2	±4	%
		Others	--	±2	±3	
Line Regulation	Full load, input voltage range		--	±0.4	±0.8	
Load Regulation	Nominal input voltage,10% -100% load		--	±0.5	±1.5	
Ripple & Noise*	20MHz bandwidth, Nominal input voltage, 100% load		--	30	75	mVp-p
Temperature Drift Coefficient	Operating temperature -40℃ to +85℃		--	--	±0.03	%/℃
Transient response deviation	Nominal input voltage, 25%-50%-25%, 50%-75%-50% load step change		--	50	150	mV
Transient recovery time			--	0.2	1	ms
Output short circuit protection	Nominal input voltage		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.Input voltage range, 20%-100% load ripple&Noise is no more than 100mVp-p, 0%-20% load ripple&Noise is no more than 180mVp-p.

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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	5	--	95	%RH
Switching Frequency	Full load, nominal input	--	400	--	KHz
MTBF	MIL-HDBK-217F@25℃	2000	--	--	K hours

Physical Specifications

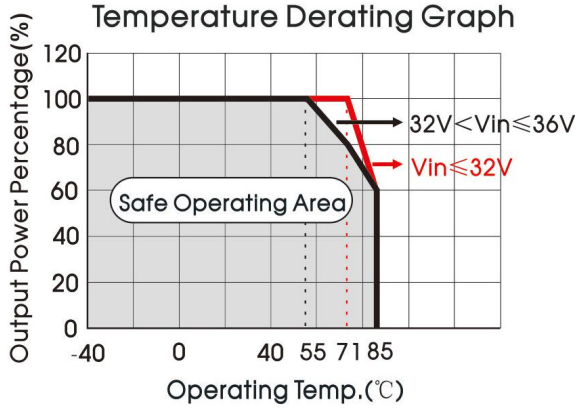
Casing Material	Black flame-retardant and heat-resistant plastic (UL94 V-0)
Package Dimensions	11.50*9.00*17.50 mm
Weight	3.8g (Typ.)
Cooling Method	Free air convection

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 ±6KV	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

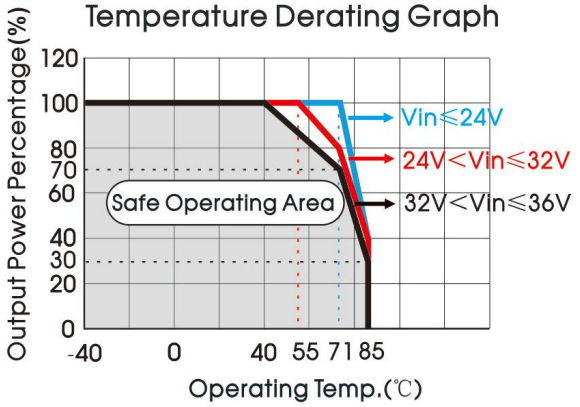
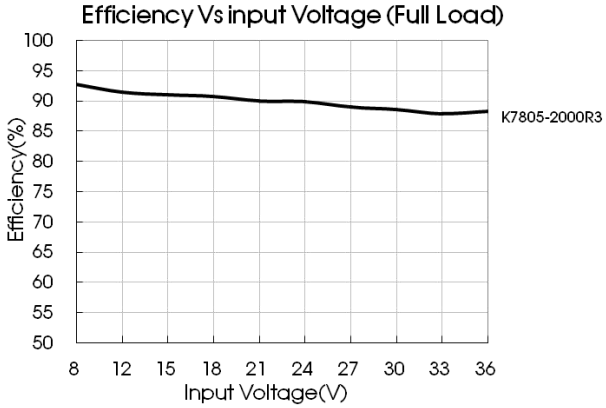
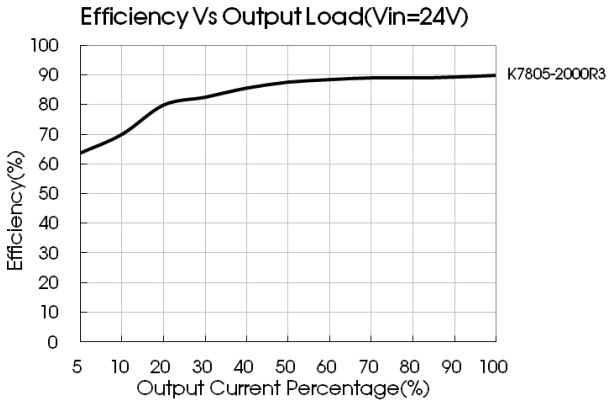


Fig. 1





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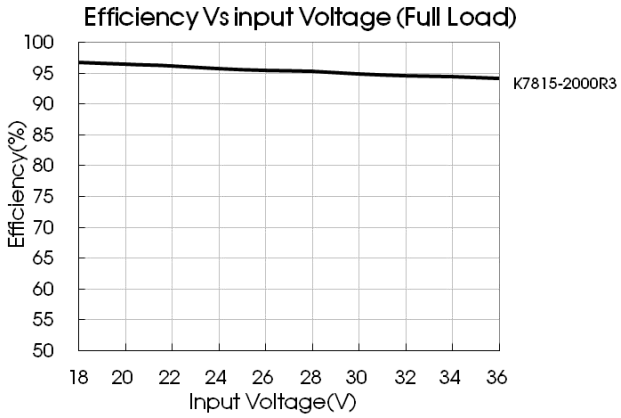

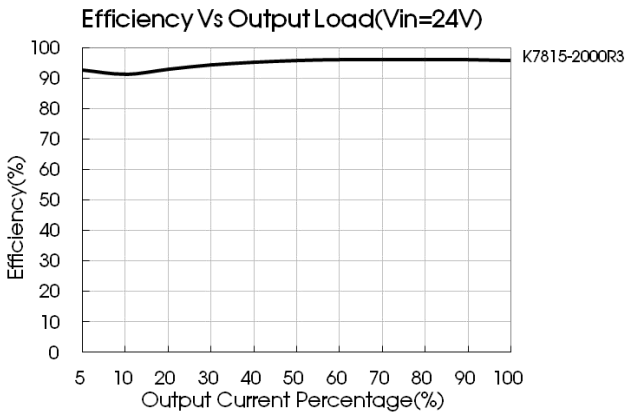

Design Reference

1. Typical application circuit

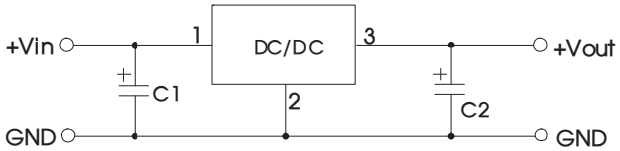

Fig. 2 Typical application circuit

Sheet 1

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
K7803-2000R3	22μF/50V	22μF/10V
K7805-2000R3		22μF/10V
K7809-2000R3		22μF/16V
K7812-2000R3		22μF/25V
K7815-2000R3		22μF/25V

Note:
1. C1 and C2 are required and should be connected close to the pin terminal of the module.
2. The capacitance of C1 and C2 refer to Sheet 1.
3. To reduce the output ripple furtherly, C2 can be increased properly if required, tantalum capacitor and aluminum electrolytic capacitor of low ESR may also suffice.
4. Cannot be used in parallel to enlarge the power for output and hot swap.

2. EMC solution-recommended circuit

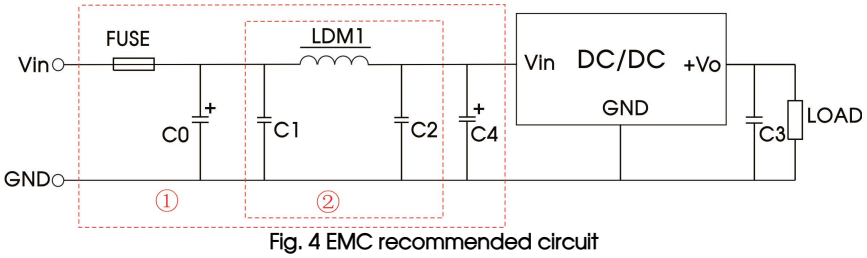

Fig. 4 EMC recommended circuit

FUSE	C0	LDM1	C4	C1/C2	C3
Selected based on the actual input current from the customer	100μF /100V	22μH	680μF /50V	10μF /50V	22μF /25V

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

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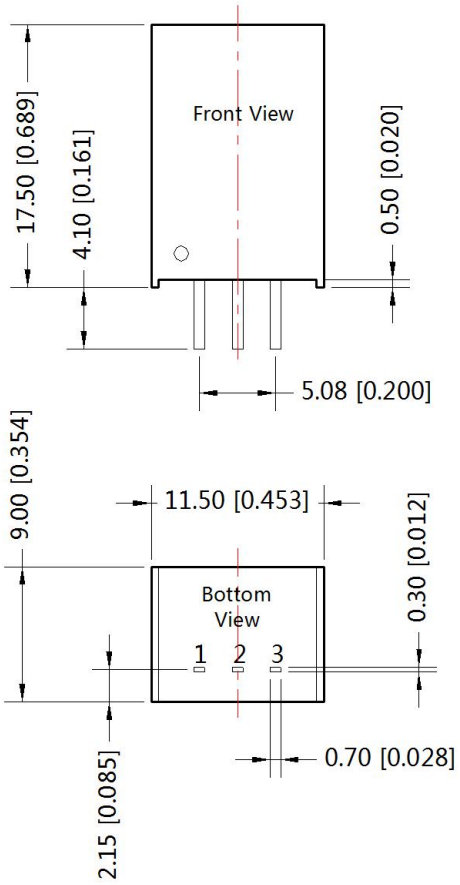
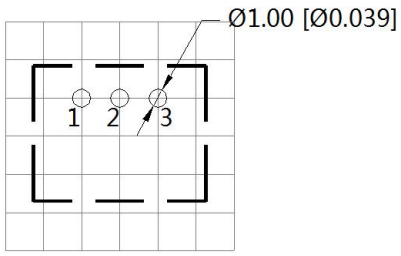
Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note : Grid 2.54*2.54mm

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

Note:
Unit :mm[inch]
Pin diameter tolerances :±0.10[±0.004]
General tolerances:±0.25[±0.010]

Notes:

1. Packing information please refer to Product Packing Information which can be downloaded from www.mornsun-power.com. Packing bag number: 58210021;
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% 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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