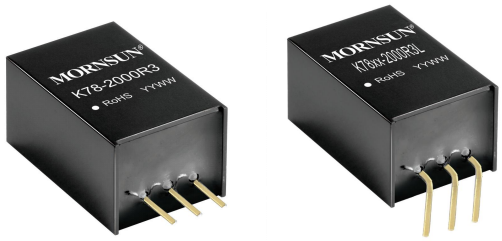
DC/DC Converter

K78xx-2000R3 Series

MORNSUN®

Wide input voltage, non-isolated and regulated single output



CE Patent Protection RoHS

3 years Warranty

FEATURES

- High efficiency up to 96%
- No-load input current as low as 0.1mA
- Operating ambient temperature range: -40℃ to +85℃
- Output short-circuit protection
- Pin compatible with LM78XX series linear regulators
- EN62368 approved

K78xx-2000R3 series are high efficiency switching regulators and ideal substitutes of LM78xx series three-terminal linear regulators. The converters feature high efficiency, low loss, and there is no need for a heat sink. These products are widely used in applications such as industrial control, instrumentation and electric power.

Selection Guide

Certification	Part Number	Input Voltage (VDC)*	Output		Full Load Efficiency(%) typ. Vin Min. / Vin Max.	Capacitive Load(μF) Max.
		Nominal (Range)	Voltage (VDC)	Current (mA) Max.		
CE	K7802-2000R3	24 (4.5-36)	2.5	2000	89/83	2000
	K7803-2000R3(L)	24 (6-36)	3.3	2000	89/85	1800
	K7805-2000R3(L)	24 (8-36)	5	2000	92/89	1000
	K7809-2000R3	24 (13-36)	9	2000	95/92	680
	K7812-2000R3(L)	24 (16-36)	12	2000	96/94	470
	K7815-2000R3	24 (18-36)	15	2000	96/94	470

Note: For input voltage exceeding 30 VDC, an input electrolytic capacitor of 22uF/50V is required to prevent the module from being damaged by voltage spikes.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current(Positive output)	Nominal input voltage, 2.5V output	--	0.2	0.5	mA
	Others	--	0.1	1	
Reverse Polarity at Input		Avoid / Not protected			
Input Filter		Capacitance filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, input voltage range	2.5V, 3.3V output	--	±2	±4	%
		Others	--	±2	±3	
Linear Regulation	Full load, input voltage range		--	±0.4	±0.8	%
Load Regulation	10% -100% load step; nominal input voltage		--	±0.5	±1.5	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, 100% load		--	30	75	mVp-p
Temperature Coefficient	Operating temperature -40℃ to +85℃		--	--	±0.03	%/℃

Transient Response Deviation	Nominal input, 25% load step (25%-50%-25%, 50%-75%-50% step)	2.5V output	--	±80	±150	mV
		Others	--	±50	±150	
Transient Recovery Time			--	0.2	1	ms
Short-circuit Protection	Nominal input		Continuous, self-recovery			

Notes: *1.The "parallel cable" method is used for ripple and noise test, please refer to Non-isolated DC-DC Converter Application Notes for specific information;
*2.Input voltage range, 20%-100% load ripple & noise is less than 100mVp-p, 0%-20% load ripple & noise is less than 180mVp-p.

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	85	℃
Storage Temperature		-55	--	125	
Pin Soldering Resistance Temperature	Soldering 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

Mechanical Specifications

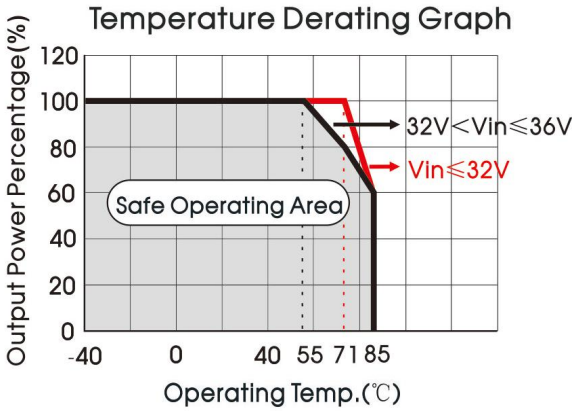
Case Material	Black plastic; flame-retardant and heat-resistant (UL94-V0)
Dimensions	11.50 x 9.00 x 17.50 mm
Weight	3.8g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 3-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 3-② for recommended circuit)	
Immunity	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. 3-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ±1KV(see Fig. 3-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN 61000-4-6	3Vr.m.s	perf. Criteria A

Typical Characteristic Curves

2.5V/3.3V/5V output



9V/12V/15V output

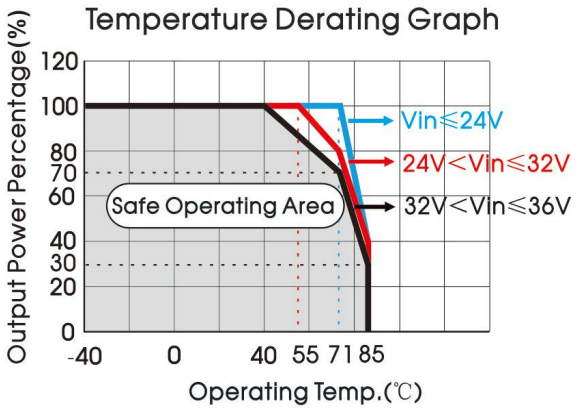
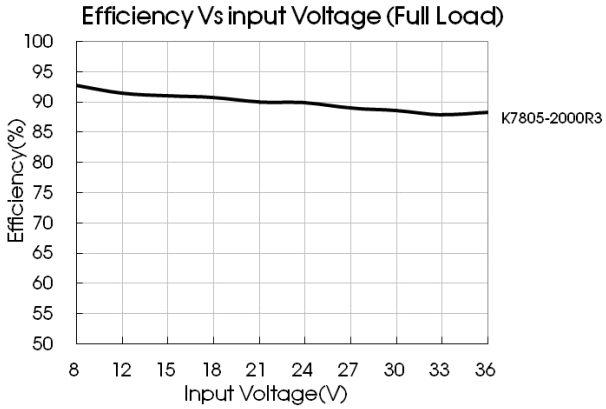
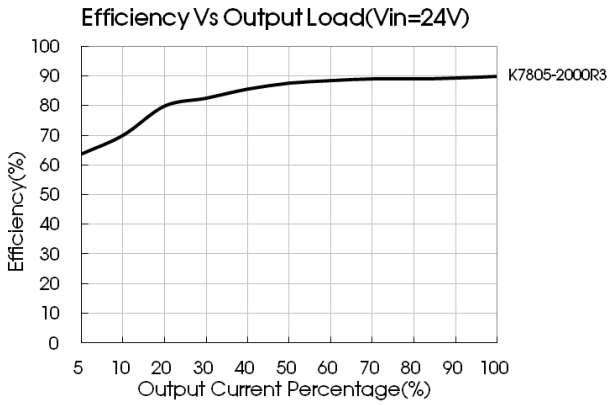
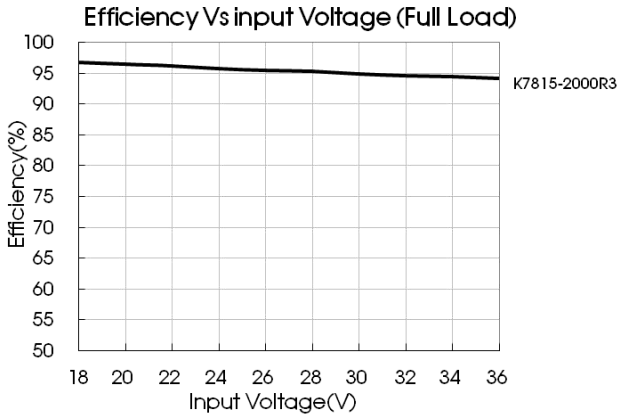
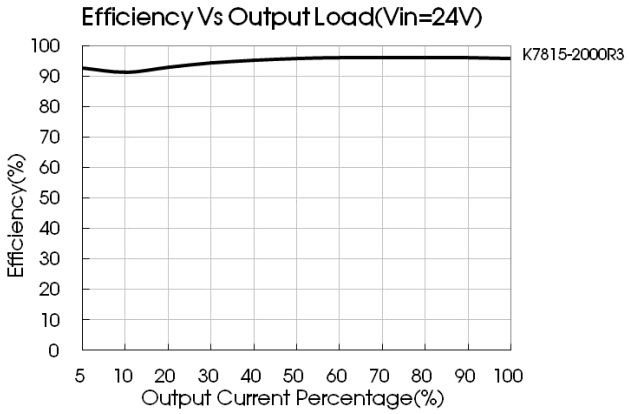


Fig. 1









Design Reference

1. Typical application

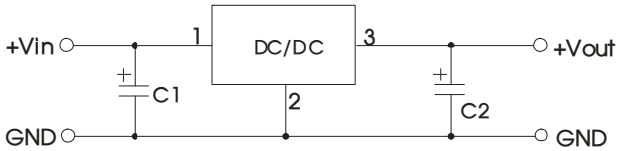


Fig. 2 Typical application

Sheet 1

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
K7802-2000R3	22μF/50V	22μF/10V
K7803-2000R3(L)		22μF/10V
K7805-2000R3(L)		22μF/10V
K7809-2000R3		22μF/16V
K7812-2000R3(L)		22μF/25V
K7815-2000R3		22μF/25V

Note:
1.The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module;
2.Refer to Table 1 for C1 and C2 capacitor values;
3.For certain applications, increased values of C2 and/or tantalum or low ESR electrolytic capacitors may also be used instead;
4.Converter cannot be used for hot swap and with output in parallel.

2. EMC compliance circuit

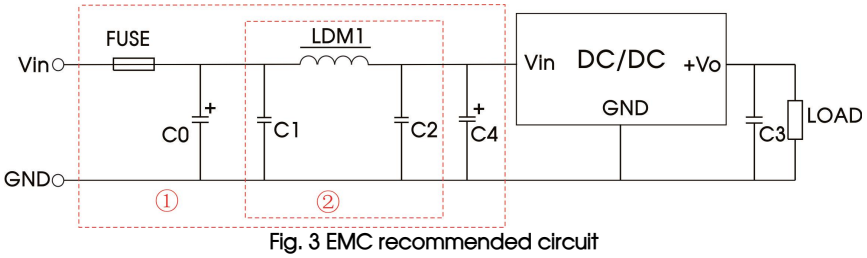


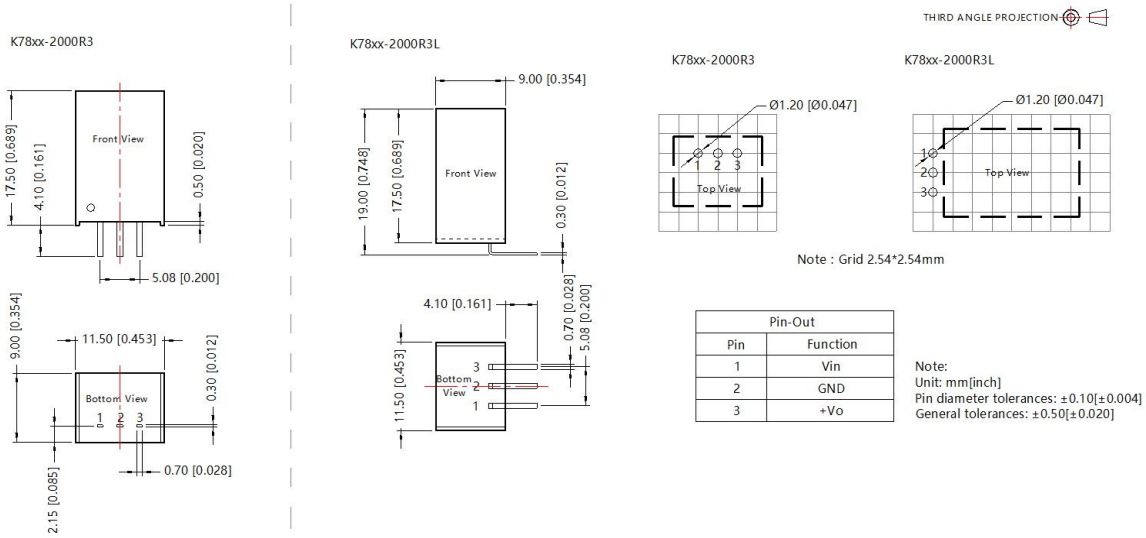
Fig. 3 EMC recommended circuit

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

Note: For EMC tests we use Part ① in Fig. 3 for immunity and part ② for emissions test. Selecting based on needs.

3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout



Pin-Out	
Pin	Function
1	Vin
2	GND
3	+Vo

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

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210021(Straight Legs Series), 58210027(Bend Legs Series);
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 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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