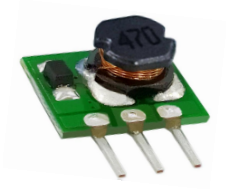
DC/DC Converter

K78xx-500R3-LB Series

MORNSUN®

Wide input voltage non-isolated and regulated single output



Patent Protection RoHS

FEATURES

- Economical open frame power supply
- High efficiency up to 95%
- Operating ambient temperature range: -40℃ to +85℃
- No-load input current as low as 0.2mA
- Support the negative output
- Output short-circuit protection
- EN62368 approval

K78xx-500R3-LB series are high efficiency switching regulators. The converters feature high efficiency, low loss, short circuit protection, positive or negative output voltage, 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 No.	Input Voltage (VDC)* Nominal (Range)	Output Voltage (VDC)	Output Current (mA)	Full Load Efficiency (%) Typ. Vin Min. / Vin Max.	Capacitive Load (μF) Max.
CE	K7803-500R3-LB	24 (4.75-36)	3.3	500	85/76	680
		12 (7-32)	-3.3	-300	73/72	330
	K7805-500R3-LB	24 (6.5-36)	5	500	90/81	680
		12 (7-31)	-5	-300	76/78	330
	K78X6-500R3-LB	24 (8-36)	6.5	500	91/83	680
		12 (7-29)	-6.5	-300	76/77	330
	K7809-500R3-LB	24 (12-36)	9	500	93/87	680
		12 (8-27)	-9	-150	83/77	330
	K7812-500R3-LB	24 (15-36)	12	500	94/88	680
		12 (8-24)	-12	-150	85/82	330
	K7815-500R3-LB	24 (19-36)	15	500	95/90	680
		12 (8-21)	-15	-150	80/79	330

Note: * For input voltages exceeding 30 VDC, an input capacitor of 22μF/50V is required.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
No-load Input Current	Nominal input voltage	Positive output	--	0.2	1.5	mA
		Negative output	--	1	10	
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	K7803-500R3-LB	--	±2	±4	%

Voltage Accuracy	Full load, input voltage range	Others	--	±2	±3	%
Linear Regulation	Full load, input voltage range		--	±0.2	±0.5	
Load Regulation	Nominal input voltage, 0% -100% load		--	±0.3	±1	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, 20% -100% load		--	50	100	mVp-p
Temperature Coefficient	Operating ambient temperature -40℃ to +85℃		--	±0.02	--	%/℃
Transient Response Deviation	Nominal input voltage, 25% load step change		--	±50	±250	mV
Transient Recovery Time			--	0.2	1	ms
Short-circuit Protection	Nominal input voltage		Continuous, self-recovery			

Notes: * 1.The "parallel cable" method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information;
2.With light loads at or below 20%, Ripple & Noise increases to 300mVp-p max.,

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: 10 seconds	--	--	+260	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	Full load, nominal input voltage	--	700	--	kHz
MTBF	MIL-HDBK-217F@25℃	2000	--	--	k hours

Mechanical Specifications

Dimensions	10.27 x 6.00 x 8.61 mm
Weight	0.6g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

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

Typical Characteristic Curves

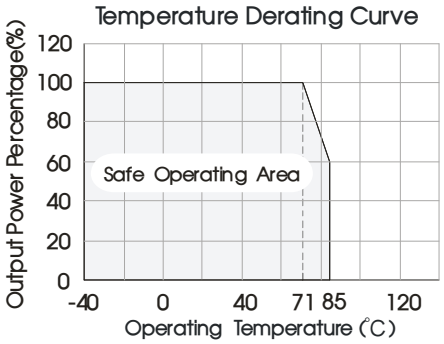
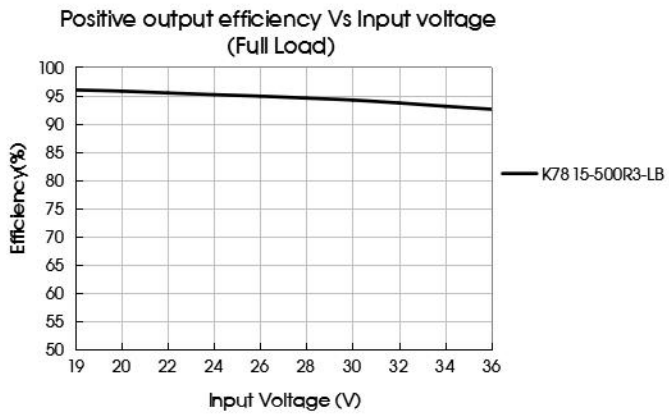
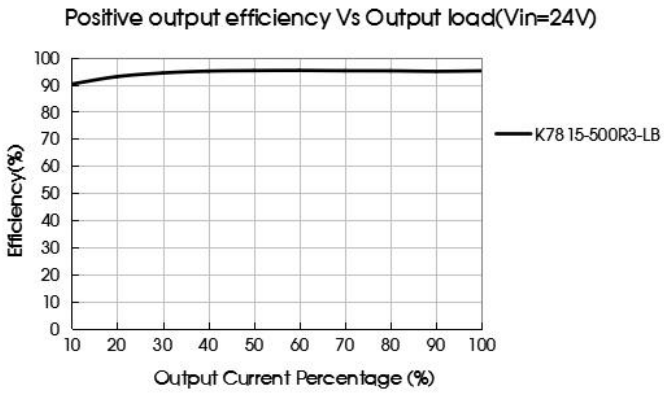
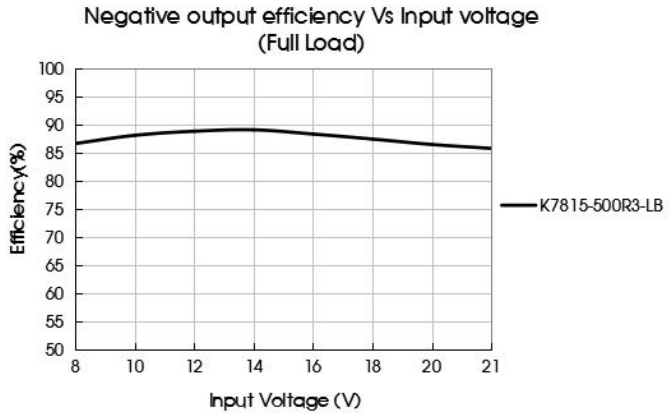
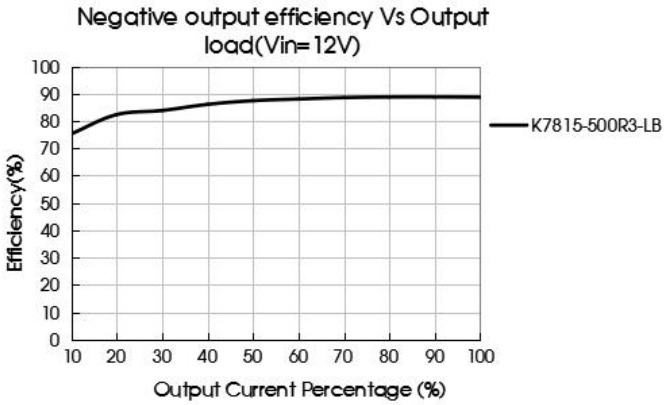


Fig. 1



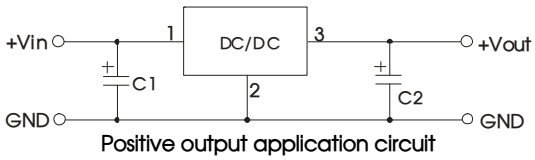




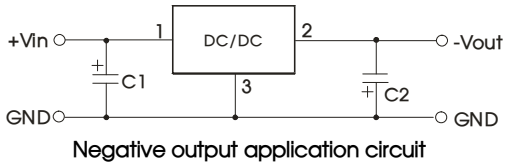


Design Reference

1. Typical application



Positive output application circuit



Negative output application circuit

Fig. 2 Typical application circuit

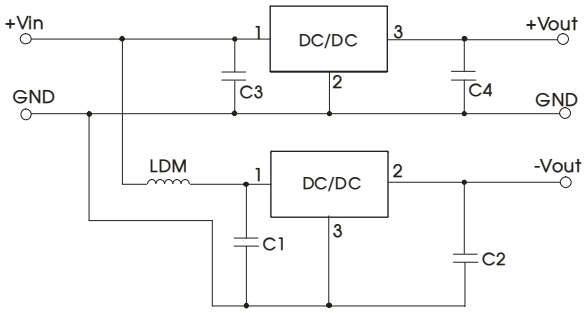


Fig. 3 Positive and negative output application circuit

Table 1

Part No.	C1/C3 (ceramic capacitor)	C2/C4 (ceramic capacitor)
K7803-500R3-LB	10μF/50V	22μF/10V
K7805-500R3-LB		22μF/10V
K78X6-500R3-LB		22μF/16V
K7809-500R3-LB		22μF/16V
K7812-500R3-LB		22μF/25V
K7815-500R3-LB		22μF/25V

Notes:

1. The required capacitors C1 and C2 (C3 and C4) must be connected as close as possible to the terminals of the module;
2. Refer to Table 1 for C1 and C2 (C3 and C4) capacitor values. For certain applications, increased values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
3. When using configurations as shown in figure 3, we recommended to add an inductor (LDM) with a value of up to 10μH which helps reducing mutual interference;
4. Converter cannot be used for hot swap and with output in parallel;
5. To further reduce the output ripple and noise, we suggested the use of a "LC" filter at the output terminals, with an inductor value (L) of 10μH-47μH.

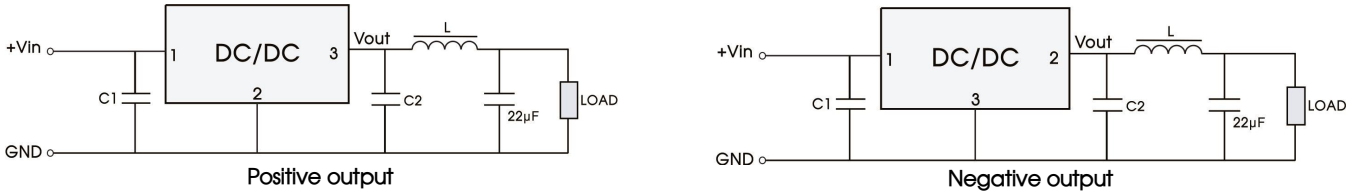


Fig. 4 "LC" output filter application

2. EMC compliance circuit

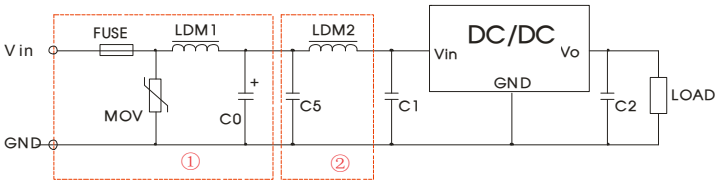


Fig. 5 EMC compliance circuit

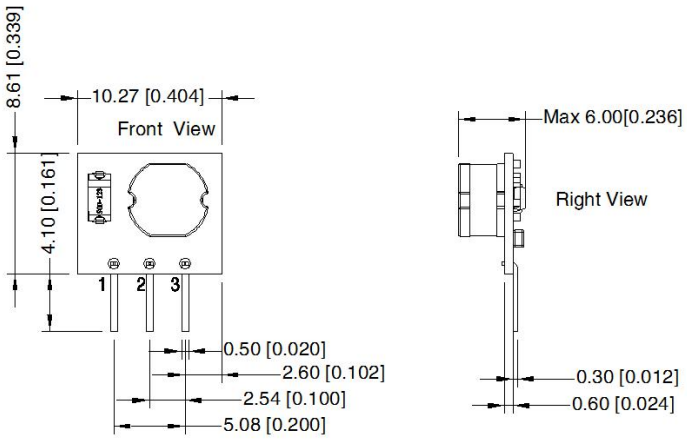
FUSE	MOV	LDM1	C0	C1/C2	C5	LDM2
Select fuse value according to actual input current	S20K30	82μH	680μF /50V	Refer to table 1	10μF /50V	22μH

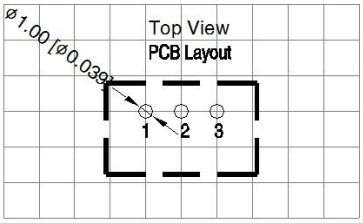
Notes: For EMC tests we use Part ① in Fig. 5 for immunity and part ② for emissions test. Selecting based on needs.

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

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION





Note: Grid 2.54*2.54mm

Pin-Out		
Pin	Positive Output	Negative Output
1	Vin	Vin
2	GND	–Vout
3	Vout	GND

Note:
Unit: mm[inch]
Pin section tolerances: ±0.20[±0.008]
General tolerances: ±0.50[±0.020]
The layout of the device is for reference only, please refer to the actual product

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Packaging bag number: 58210141;
2. The maximum capacitive load offered were tested at nominal input voltage 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 datatable 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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