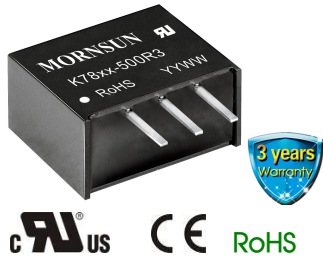


Wide input voltage Non-isolated and Regulated Single Output



FEATURES

- High efficiency up to 95%
- No-load input current as low as 0.2mA
- Operating ambient temperature range -40°C to +85°C
- Support the negative output
- Output short-circuit protection
- Pin-out compatible with LM78XX linear regulators
- UL60950, EN60950 Approval

K78xx-500R3 series are high efficiency switching regulators and ideal substitutes for LM78xx series three-terminal linear 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)*	Output		Full Load Efficiency (%) Vin Min. / Vin Max.	Max. Capacitive Load (µF)
		Nominal (Range)	Voltage (VDC)	Output Current (mA)		
UL/CE	K7803-500R3	24 (4.75-36)	3.3	500	86/80	680
	K7805-500R3	24 (6.5-36)	5.0	500	90/84	680
		12 (7-31)	-5.0	-300	80/81	330
	K7809-500R3	24 (12-36)	9	500	93/90	680
	K7812-500R3	24 (15-36)	12	500	94/91	680
		12 (8-24)	-12	-150	84/85	330
	K7815-500R3	24 (19-36)	15	500	95/93	680
		12 (8-21)	-15	-150	85/87	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	Positive output	--	0.2	1.5	mA
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	--	±2	±4	%
		Others	--	±2	±3	
Linear Regulation	Full load, input voltage range	--	±0.2	±0.4		
Load Regulation	Nominal input voltage, 10% -100% load	3.3/5 VDC output	--	±0.6	--	
		Others	--	±0.3	--	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, 10% -100% load	--	20	75	mVp-p	

Temperature Coefficient	Operating ambient temperature -40°C to +85°C	--	--	±0.03	%/°C
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			
*Note: 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 10%, Ripple & Noise for 3.3V/5V output parts increases to 150mVp-p max, and for 9V/12V/15V output parts to 2%Vo max.					

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1	-40	--	+85	°C
Storage Temperature		-55	--	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	+260	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency	Full load, nominal input voltage	550	--	850	KHz
MTBF	MIL-HDBK-217F@25°C	2000	--	--	K hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	11.60 x 7.55 x 10.16 mm
Weight	1.8g (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

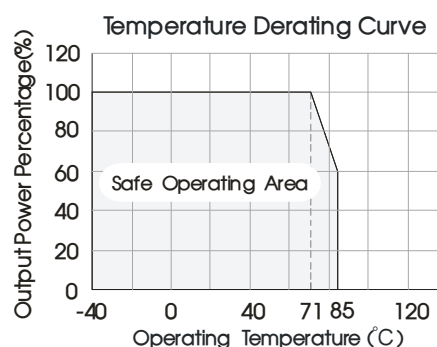
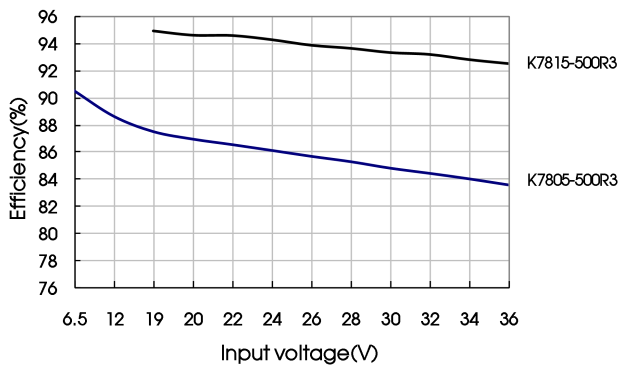
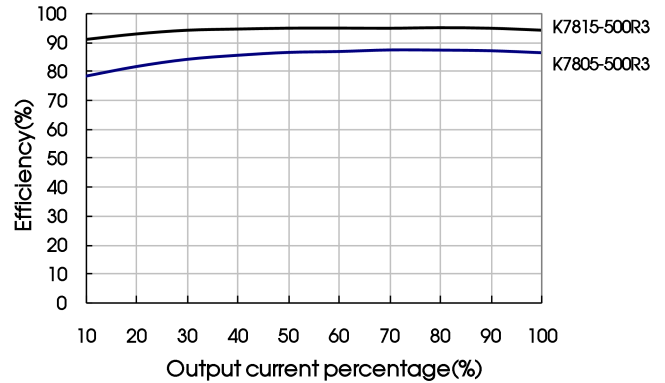


Fig. 1

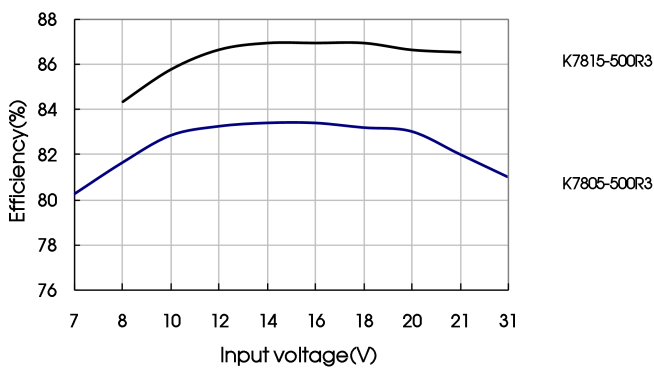
Positive output efficiency Vs input voltage
(full load)



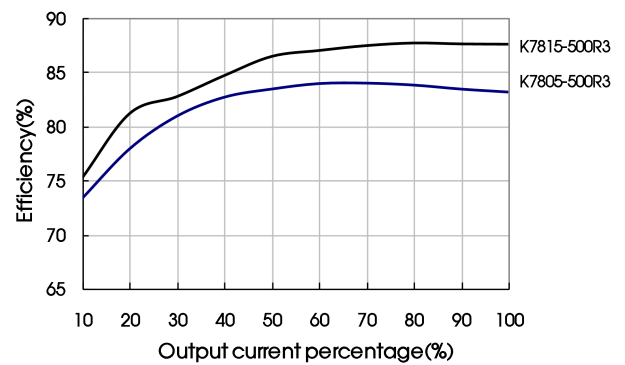
Positive output efficiency Vs output load
($V_{in}=V_{in-nominal}$)



Negative output efficiency Vs input voltage
(full load)



Negative output efficiency Vs output load
($V_{in}=V_{in-nominal}$)



Design Reference

1. Typical application

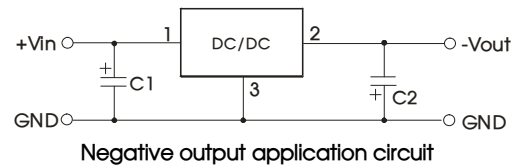
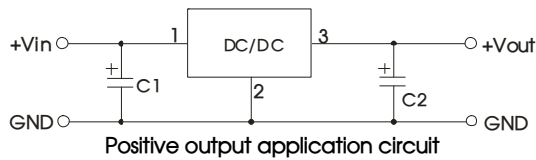
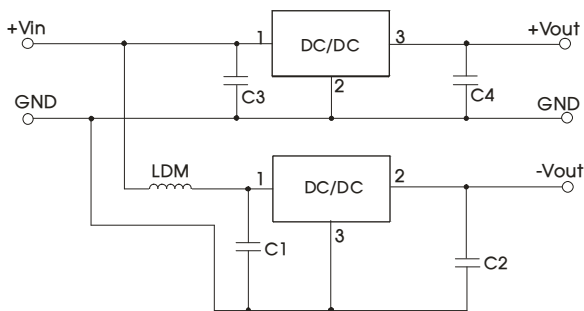


Fig. 2 Typical application circuit



Note:

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 capacitor 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.

table 1

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

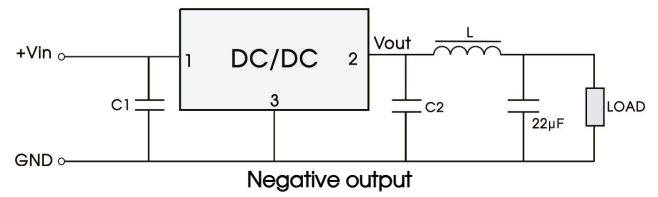
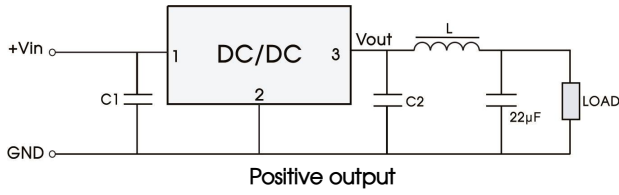


Fig. 4 Using the "LC" output filter application

2. EMC compliance circuit

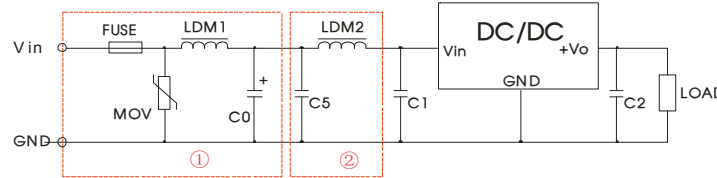


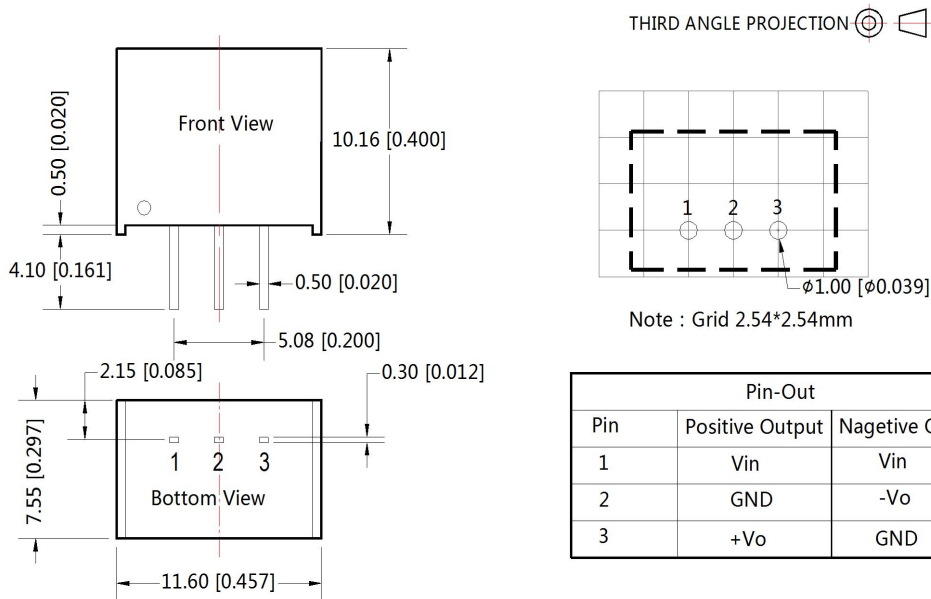
Fig. 5 EMC compliance circuit

FUSE	MOV	LDM1	C0	C1/C2	C5	LDM2
Select fuse value according to actual input current	S20K30	82µH	680µF /50V	Refer to table 1	4.7µF /50V	12µH

Note: Part ① in Fig. 5 shows EMS compliance filter and part ② filter for EMI compliance; depending on requirement both filters ① and ② can be used in series as shown.

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

Dimensions and Recommended Layout



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

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

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tube Packaging bag number:58200003;
2. The specified maximum capacitive load is tested under full load condition and over the input voltage range;
3. All parameters in this datasheet were measured under following conditions: Ta=25°C., relative humidity <75%RH, nominal input voltage and rated output load (unless otherwise specified);
4. All index testing methods in this datatable are based on our Company's corporate standards;
5. The performance indexes of the product models listed in this manual are as above, but some indexes of non-standard model products will exceed the above-mentioned requirements, and please directly contact with our technician 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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