DC/DC Converter

K78xx-1500(L) Series

MORNSUN®

Wide input voltage , non-isolated & regulated single output

Patent Protection RoHS

FEATURES

- Efficiency up to 95%
- Low ripple & noise
- Short circuit protection and overheat protection
- Pin-out compatible with LM78XX series
- Operating temperature range: -40℃ to +85℃
- Subminiature SIP package, meeting requirements of UL94-V0

K78xx-1500(L) series are high efficiency switching regulators and ideal substitutes of 78 series three-terminal linear regulators. Efficiency of product is up to 95%, it is featured with low loss, low radiation and no heat sink requirement. They are widely used in industrial control, instrumentation, and electric power applications.

Selection Guide

Part No.	Input Voltage (VDC)	Output		Efficiency (%/Typ.) (Min. Vin)/ (Max. Vin)	Max. Capacitive Load(μF)
	Nominal (Range)	Output Voltage (VDC)	Output Current (mA)		
K7803-1500(L)	12 (4.75-18)	3.3	1500	91/88	1000
K7805-1500(L)	12 (6.5-18)	5	1500	93/91	
K78X6-1500(L)	12 (8-18)	6.5	1500	95/93	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Power Consumption	Input voltage range	--	0.09	0.18	W
Input Filter		Capacitor filter			

Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Output Voltage Accuracy	100% load, input voltage range	--	±2	±3	%
Line Regulation	Input voltage range	--	±0.5	±0.75	
Load Regulation	10%-100% load	--	±0.5	±1.0	
Ripple & Noise*	20MHz bandwidth (refer to Fig. 2)	--	25	45	mVp-p
Temperature Drift Coefficient	-40℃ to +85℃	--	--	±0.03	%/℃
Over temperature Protection	IC built-in	--	160	--	℃
Output short circuit protection		Continuous, self-recovery			
Transient response deviation	Nominal input, 25% load step change	--	100	250	mV
Transient recovery time		--	0.5	3	ms
Thermal impedance		--	60	--	℃/ W

Note: * Ripple and noise tested with "parallel cable" method, please see *DC-DC Converter Application Notes* for specific operation methods.

General Specifications

Item	Operating Condition	Min.	Typ.	Max.	Unit
Operating Temperature*	Derating if the temperature ≥71℃ (see Fig. 1)	-40	--	85	℃
Storage Temperature		-55	--	125	
Pin Welding Resistance Temperature	Welding spot is 1.5mm away from the casing, 10 seconds	--	--	300	
Storage Humidity	Non-condensing	--	--	95	%RH
Switching Frequency	100% load, input voltage range	300	340	380	KHz

MTBF	MIL-HDBK-217F@25℃	2000	--	--	K hours
Note: *When K7803-1500 (L) work at -40℃, the product requires input voltage ⩾ 5V.					

Physical Specifications

Casing Material		Black flame-retardant and heat-resistant plastic (UL94-V0)
Package Dimensions	K78xx-1500	11.50*9.00*17.50mm
	K78xx-1500L	11.50*9.00*19.00mm
Weight		4.0g(Typ.)
Cooling Method		Free air convection

EMC Specifications

EMI	Conducted Disturbance	CISPR22/EN55022	CLASS B (see Fig. 4-② for recommended circuit)	
	Radiated Emission	CISPR22/EN55022	CLASS B (see Fig. 4-② for recommended circuit)	
EMS	Electrostatic Discharge	IEC/EN 61000-4-2	Contact ±4KV	perf. Criteria B
	Radiation Immunity	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 Immunity	IEC/EN 61000-4-5	±1KV (see Fig. 4-① for recommended circuit)	perf. Criteria B
	Conducted Disturbance Immunity	IEC/EN 61000-4-6	3Vr.ms	perf. Criteria A
	Voltage dip, drop and short interruption	IEC/EN 61000-4-29	0%-70%	perf. Criteria B

Product Characteristic Curve

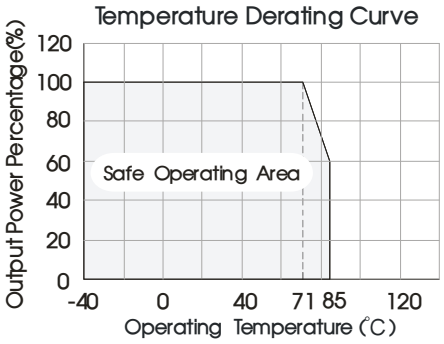
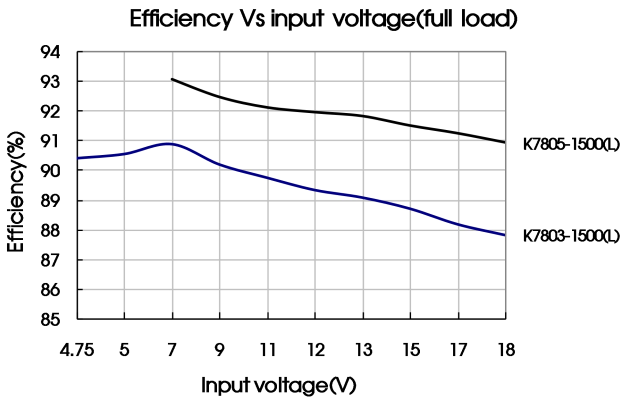
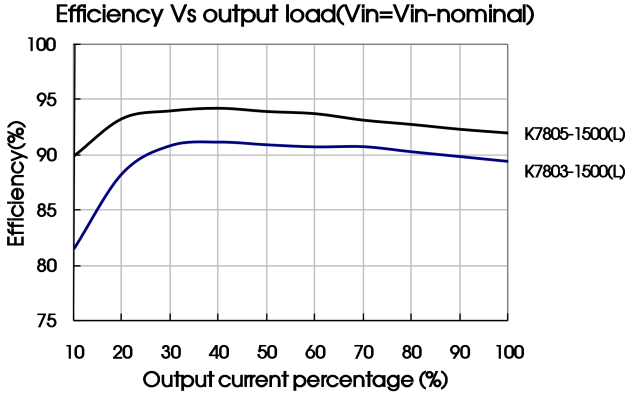
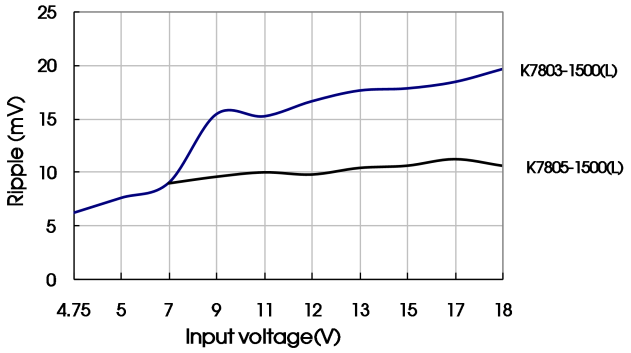


Fig. 1

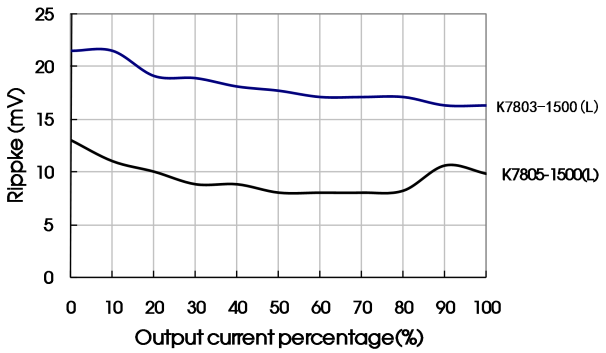




Ripple Vs input voltage(full load)



Ripple Vs output load(Vin=Vin-nominal)



Design Reference

1. Typical application circuit

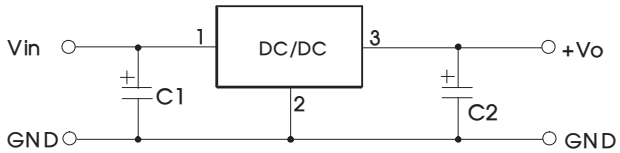


Fig. 2 Typical application circuit

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
K7803-1500(L)	10uF/25V	22μF/6.3V
K7805-1500(L)		22μF/16V
K78X6-1500(L)		22μF/16V

Notes:
① C1 and C2 are required and should be connected close to the pin terminal of the module.
② Capacitance of C1 and C2 refers to the table, which may be increased appropriately based on actual requirement, and a tantalum capacitor or a low ESR electrolytic capacitor may also be used.
③ No parallel connection and plug and play.

To reduce the output ripple furtherly, it is suggested to connect a "LC" filter at the output terminal, and recommended value of L is 10μH-47μH.

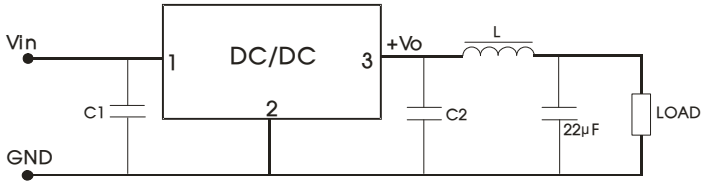


Fig. 3

2. EMC solution-recommended circuit

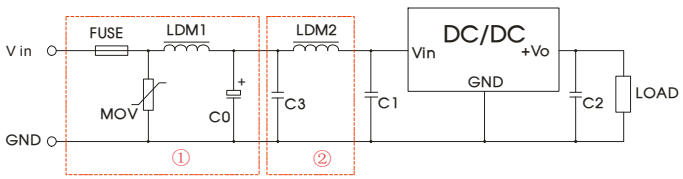


Fig. 4 Recommended EMC circuit

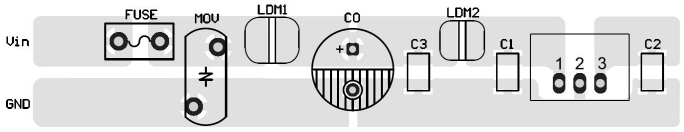


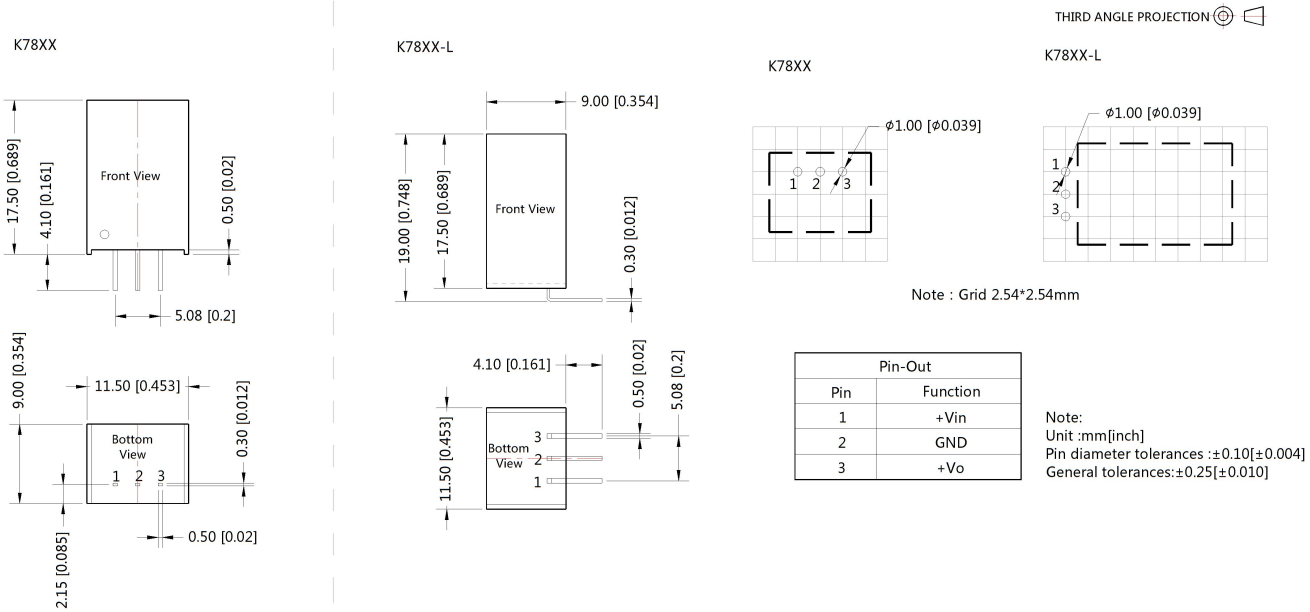
Fig.5 Recommended EMC circuit-PCB layout

FUSE	MOV	LDM1	C0	C3	C1/C2	LDM2
Selected based on the actual input current from the customer	S14K35	82μH	680μF /50V	4.7μF /50V	Refer to Fig.2	12μH

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



Pin-Out	
Pin	Function
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'. Packing bag number: 58210021(K78xx-1500), 58210027 (K78xx-1500L);
2. The max. capacitive load should be tested within the input voltage range and under full load conditions;
3. Unless otherwise specified, data in this datasheet should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;
4. All index testing methods in this datasheet 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. We can provide product customization service;
7. Specifications of this product are subject to changes without prior notice.

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