Datasheet
RS Pro K78xx-1000R3L DC-DC Converter

Wide input voltage non-isolated and regulated single output.

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
- IEC60950, UL60950, EN60950 Approval
- 3 Year Warranty

c**UL**us C€ CB **Patent Protection** RoHS

K78xx-1000R3L series switching regulators are drop in replacements for LM78xx series three-terminal linear regulators. The high efficiency of these converters allows operation at full load without the need for a heat sink. With low ripple and standby power consumption these regulated converters are widely used in instrumentation, IoT and battery powered applications.

Selection Guide

Certification	RS Stock no. (Standard Pack)	RS Stock no. (Tube Pack 44pcs)	Part No.	Input Voltage (VDC)① Nominal (Range)	Output		Full Load Efficiency (%) Vin Min. / Vin Max.	Max. Capacitive Load (µF)
					Voltage (VDC)	Current (mA) Max.		
UL/CE/CB	1934013	1934012	K7803-1000R3	24 (6-36)	3.3	1000	90/81	680
	1934023	1934022	K7803-1000R3L	24 (6-36)	3.3	1000	90/81	680
	1934015	1934014	K7805-1000R3	24 (8-36)	5	1000	93/86	680
	1934025	1934024	K7805-1000R3L	24 (8-36)	5	1000	93/86	680
	1934017	1934016	K7809-1000R3	24 (13-36)	9	1000	95/90	680
	1934019	1934018	K7812-1000R3	24 (16-36)	12	1000	96/93	680
	1934028	1934026	K7812-1000R3L	24 (16-36)	12	1000	96/93	680
	1934021	1934020	K7815-1000R3	24 (18-36)	15	1000	96/94	680

Note:
①For input voltage exceeding 30 VDC, an input capacitor of 22uF/50V is required;
② **L-suffix: Add L-suffix for horizontal mount with 90 degree angled pins (K78xx-1000R3L).**

DC/DC Converter

K78xx-1000R3(L) Series

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Positive output	--	0.1	1	mA
Input Filter		Capacitance filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, input voltage range	K7803-1000R3(L)	--	±2	±4	%
		Others	--	±2	±3	
Linear Regulation	Full load, input voltage range		--	±0.2	±0.4	
Load Regulation	Nominal input,10% -100% load		--	±0.4	±0.6	
Ripple & Noise*	20MHz bandwidth, nominal input, 20% -100% load		--	20	75	mVp-p
Temperature Coefficient	Operating ambient temperature -40℃ to +85℃		--	--	±0.03	%/℃
Transient Response Deviation	Nominal input voltage, 25% load step change		--	50	300	mV
Transient Recovery Time			--	0.1	1	ms
Short-circuit Protection	Nominal input		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 20%, Ripple & Noise for 3.3/5V output parts increases to 100mVp-p max, and for 9V/12V/15V output parts to 2%Vo max.

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 Soldering Resistance Temperature	Soldering time: 10 seconds		--	--	260	
Storage Humidity	Non-condensing		5	--	95	%RH
Switching Frequency	100% load, input voltage range	K7803-1000R3(L)/K7805 -1000R3(L)	420	520	620	KHz
		Other output	580	680	780	
MTBF	MIL-HDBK-217F@25℃		2000	--	--	K hours

Note: *The K7803-2000 (L) part requires an input voltage ≥5V for operation at -40℃.

Mechanical Specifications

Case Material		Black plastic; flame-retardant and heat-resistant (UL94 V-0)
Dimensions	K78xx-1000R3	11.50 x 9.00 x 17.50 mm
	K78xx-1000R3L	19.00 x 11.50 x 9.00 mm
Weight		3.8g (Typ.)
Cooling Method		Free air convection

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Electromagnetic Compatibility (EMC)

|				
Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 4-② for recommended circuit)	
	RE	CISPR32/EN55032	CLASS B (see Fig. 4-② 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. 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

Typical Characteristic Curves
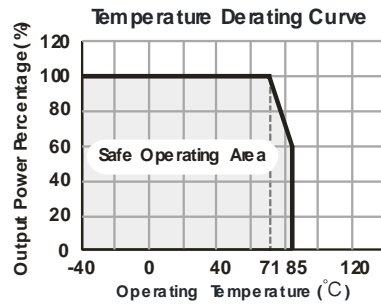
Fig. 1

DC/DC Converter

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1. Typical application
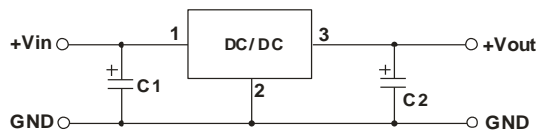
Positive output application circuit

Fig. 2 Typical application circuit

table 1

Part No.	C1 (ceramic	C2 (ceramic capacitor)
K7803-1000R3(L)		22µF/10V
K7805-1000R3(L)		22µF/10V
K7809-1000R3(L)	10µF/50V	22µF/16V
K7812-1000R3(L)		22µF/25V
K7815-1000R3(L)		22µF/25V

Note:
1. The required capacitors C1 and C2 must be connected as close as possible to the terminals of the module;
2. Refer to Table 1 for C1 and C2 capacitor values. For certain applications, increased value for C2 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.
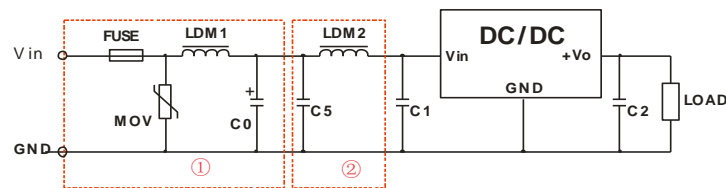
2. EMC compliance circuit
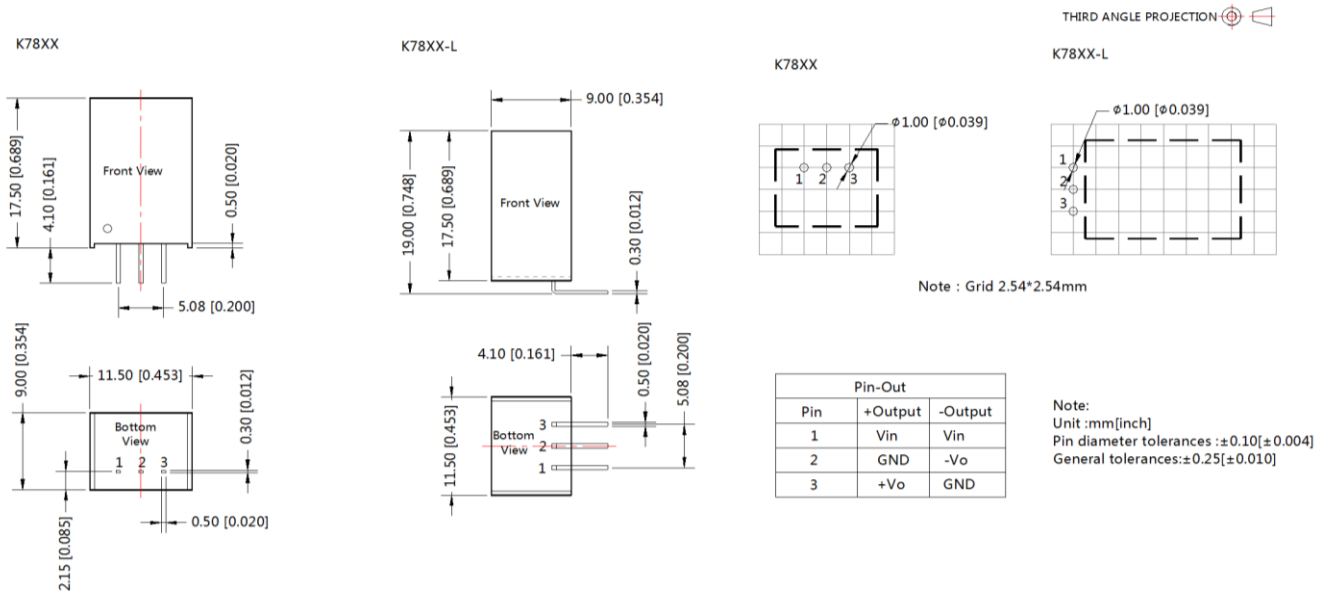

Fig. 4 EMC recommended circuit

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. 4 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.

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THIRD ANGLE PROJECTION

K78XX

Front View

17.50 [0.689]

4.10 [0.161]

0.50 [0.020]

5.08 [0.200]

9.00 [0.354]

11.50 [0.453]

Bottom View

1 2 3

0.30 [0.012]

2.15 [0.085]

0.50 [0.020]

K78XX-L

9.00 [0.354]

19.00 [0.748]

17.50 [0.689]

Front View

0.30 [0.012]

4.10 [0.161]

Bottom View

3
2
1

11.50 [0.453]

0.50 [0.020]

5.08 [0.200]

K78XX

φ1.00 [φ0.039]

1 2 3

K78XX-L

φ1.00 [φ0.039]

1
2
3

Note : Grid 2.54*2.54mm

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

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

Notes:

1. The max. capacitive load should be tested within the input voltage range and under full load conditions;

2. Unless otherwise specified, data in this data table should be tested under the conditions of Ta=25°C, humidity<75% when inputting nominal voltage and outputting rated load;

3. All index testing methods in this data table are based on our Company's corporate standards;

4. We can provide product customization service, please contact our technicians directly for specific information;

5. Products are related to laws and regulations: see "Features" and "EMC";

6. Our products shall be classified according to ISO14001 and related environmental laws and regulations and shall be handled by qualified units.