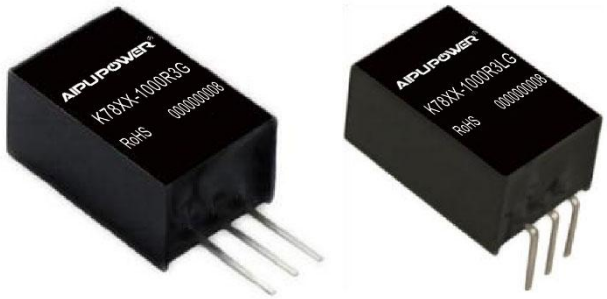
DC/DC Converter
K78XX-1000R3(L)G Series

Typical Features

- Wide input voltage range, non-isolated & regulated output
- Efficiency up to 95% (Typ.)
- Low standby power consumption
- Mini SIP package
- Short circuit protection
- Available for negative output
- Operating temperature from -40℃ to +85℃
- Plastic Case, flame class UL94-V0



Test Condition: Unless otherwise specified, all parameter values had been tested at nominal input voltage, pure resistive rated load, and at room temperature 25°C.

Application Field

This series of products can be widely used in the fields of instrument, communication, pure digital circuit, general low frequency analog circuit, relay drive circuit, data exchange circuit, etc.

Typical Product List

Certificate	Part No.	Input Voltage Range (VDC)		Output Voltage/ Current (Vo/Io)		Max Capacitive Load	Ripple & Noise (20MHz) Max/Typ.	Efficiency (%) @full load (Typ.)	
		Nom.	Range	Vo (VDC)	Io (mA)	uF	mVp-p	Vin (Min)	Vin (Max)
-	K783V3-1000R3(L)G	24	6-34	3.3	1000	680	75/40	90	81
-	K7805-1000R3(L)G	24	8-34	5	1000	680	75/40	92	86
		12	8-27	-5	-500	330	75/40	85	81
-	K7806-1000R3(L)G	24	10-34	6.5	1000	680	75/40	92	86
-	K7809-1000R3(L)G	24	13-34	9	1000	680	75/40	93	90
-	K7812-1000R3(L)G	24	15-34	12	1000	680	75/40	95	91
		12	8-20	-12	-300	330	75/40	88	87
-	K7815-1000R3(L)G	24	20-34	15	1000	680	75/40	95	91
		12	8-18	-15	-300	330	75/40	87	88

Note 1: It is recommended to connect an electrolytic capacitor (22uF/50V) to the input to protect the unit against the peak voltage when the input voltage is more than 30VDC.

Note 2: The Ripple & Noise is tested by the twisted pair method.

Note 3: The letter **L** indicates the package with Pins bent.

Input Specifications

Item	Operation Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Positive output	--	0.2	1.5	mA
	Negative output	--	1	4	

Input Reversed	Not allowed
Input Filter	Capacitor filter
Hot Plug	Unavailable

Output Specifications

Item	Operation Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full input voltage range, full load	Output 3.3V	--	±2	±4	%
		Others	--	±2	±3	
Load Regulation	10% ~ 100% load	V+ output	--	±0.4	±0.6	%
		V- output	--	±0.4	±0.8	
Line Regulation	Full input voltage range, full load		--	±0.2	±0.4	
Temp. Drift Coefficient	100% Load		--	--	±0.03	%/°C
Transient Response Deviation	Nominal input voltage, 25%-50%-25% & 50%-75%-50% load step change		--	50	300	mV
Transient Recovery Time			--	0.1	1	mS
Short Circuit Protection			Continuous, Self-recovery			

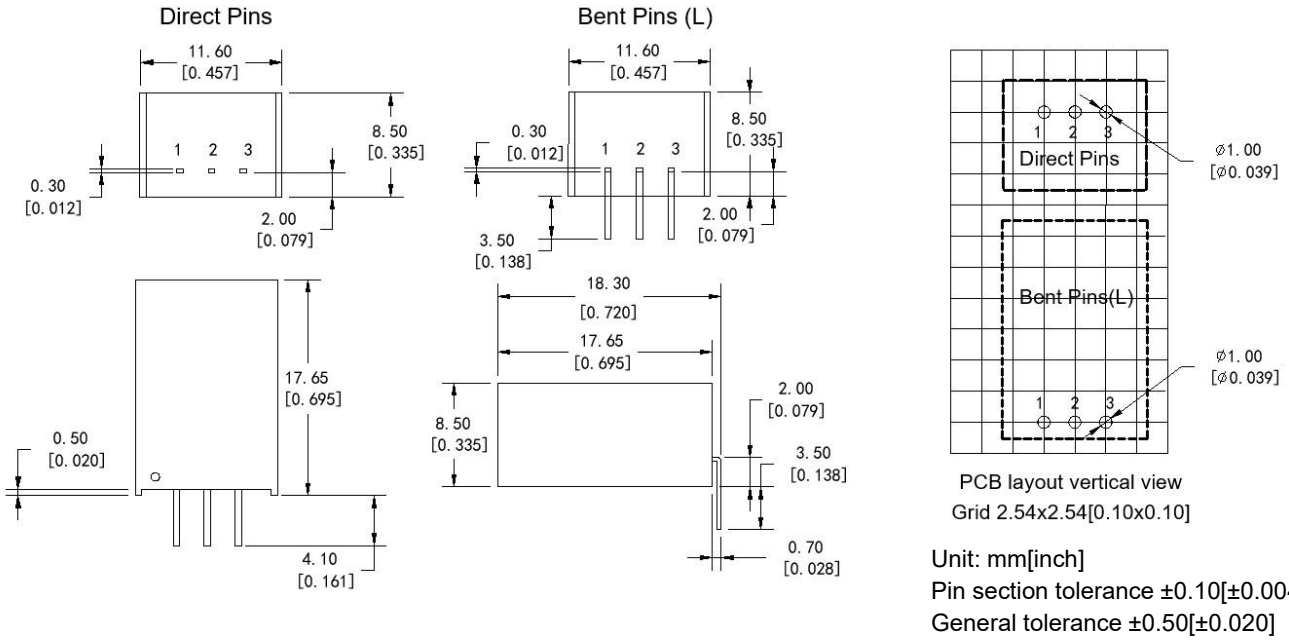
General Specifications

Item	Operation Conditions		Min.	Typ.	Max.	Unit
Switching Frequency	Nominal input voltage, full load	Output 3.3V & 5V	--	520	--	KHz
		Others	--	800	--	
Operating Temperature	Refer to the Temperature Derating Graph		-40	--	+85	°C
Storage Temperature			-55	--	+125	
Case temperature rise	Operating at Ta =25℃		--	30°	--	
Pin Soldering Temperature	1.5mm from the case, 10S		--	--	300	
Relative humidity	No condensation		5	--	95	%RH
Vibration			10-150Hz, 5G, 30 Min. along X, Y and Z			
MTBF	MIL-HDBK-217F@25℃		3500	--	--	K hours
Case Material	Plastic in Black, flame class UL94-V0					
Unit Weight	3.8g (Typ.)					
Cooling Method	Natural air					
Packing (Direct Pins)	Tube size (525x12.5x26.7mm)		17PCS/Tube			
	Carton size (542x110x155mm)		1360PCS/Carton (total 80 tubes)			
Unit Dimensions	L x W x H	11.60× 8.50 × 17.65 mm	0.457 × 0.335 × 0.695 inch			

EMC Performances

EMI	CE	CISPR32/EN55032, CLASS B (with the Recommended EMC Circuit)
	RE	CISPR32/EN55032, CLASS B (with the Recommended EMC Circuit)
EMS	ESD	IEC/EN61000-4-2, Contact ±4kV perf.Criteria B
	RS	IEC/EN61000-4-3, 10V/m perf. Criteria A
	EFT	IEC/EN61000-4-4, ±1kV perf. Criteria B (with the Recommended EMC Circuit)
	Surge	IEC/EN61000-4-5, Line to line ±1kV perf. Criteria B (with the Recommended EMC Circuit)
	CS	IEC/EN61000-4-6, 3Vr.m.s perf. Criteria A (with the Recommended EMC Circuit)

Mechanical Dimensions



Unit: mm[inch]
Pin section tolerance ±0.10[±0.004]
General tolerance ±0.50[±0.020]

Pin-out Function Description

Pin No.	1	2	3
Positive output	+Vin	GND(Common)	+Vo
Negative output	+Vin	-Vo	GND(Common)

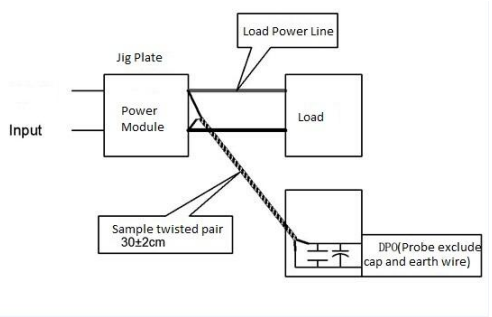
Note 1: Please take the pin definition on the product marking as the right one if there is any difference than the description on the data sheet.

Note 2: The part with bent pins will be packed by the foam.

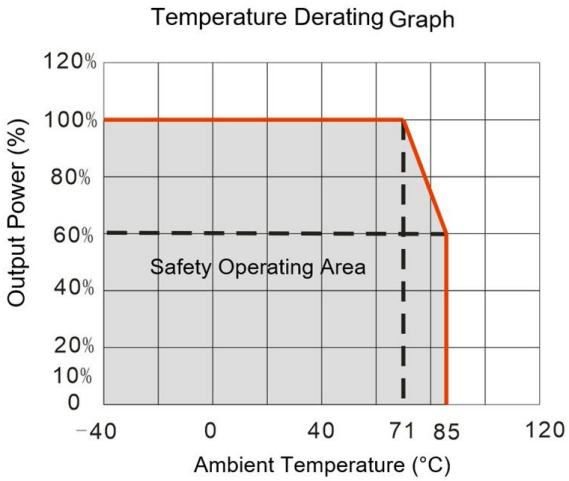
Ripple & Noise Test Instruction (Twisted Pair Method, 20MHz bandwidth)

1) The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which bandwidth should be set to 20MHz, 0.1uF polypropylene capacitor and 10uF high-frequency low-resistance electrolytic capacitor are connected in parallel with the probes (100M bandwidth). The oscilloscope should be set at the Sample Mode.

2) The test diagram is shown on the right. The converter output connects to the electronic load by the jig with cables which size should be defined according to the output current value. The twisted pair (length 30cm±2 cm) should be connected in parallel with the load, the location is as close as possible to the output pins or terminals. The test can be start after input power on.



Product Characteristics Graph



Recommended Circuits for Application

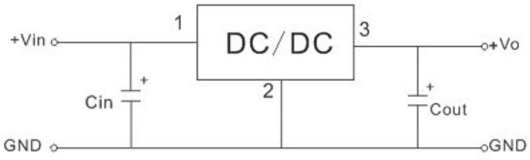
1. Requirements for output load

a. To ensure the converter operating efficiently and reliably, its minimum load should not be less than 10% of the rated load. It is recommended to connect a resistor in parallel to the output when the real load is less than 10% (the sum of the power consumed should be bigger than or equal to 10% of the rated power).

b. The maximum capacitive load is tested at nominal input voltage and full load. The converter may not start or be damaged at the capacitive over-load.

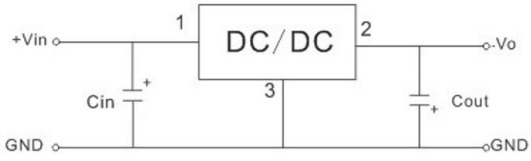
2. Typical application circuits

To effectively decrease the input and output ripple and noise, a capacitor filter can be connected to the input and output as below circuit diagrams (Figure 1 for the Positive output application, Figure 2 for the Negative output application and Figure 3 for Positive & Negative outputs connected in parallel application, 10uH is recommended for LDM). The suitable filtering capacitors should be chosen as the recommended capacitive load values in Table 1. The converter could not start if the capacitance is too big.



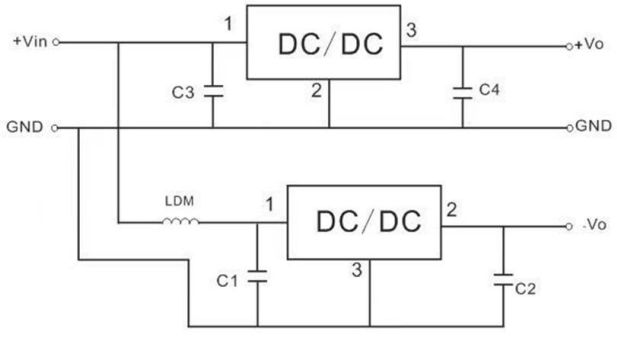
Positive output circuit diagram

Figure 1



Negative output circuit diagram

Figure 2



Positive & Negative outputs connected in parallel application circuit diagram

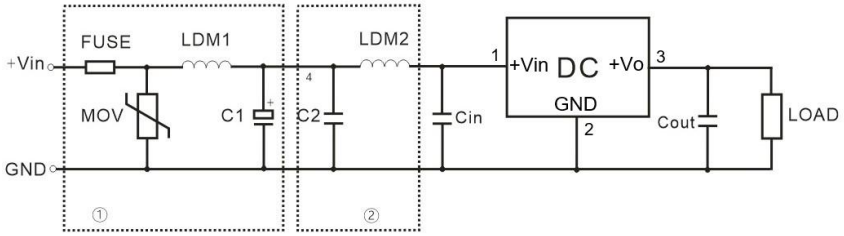
Recommended Capacitive Load Values (Table 1)

Part No.	C1/C3 (Ceramic capacitor)	C2/C4 (Ceramic capacitor)
K783V3-1000R3(L)G	10μF/50V	22μF/10V
K7805-1000R3(L)G		22μF/10V
K7806-1000R3(L)G		22μF/16V
K7809-1000R3(L)G		22μF/16V
K7812-1000R3(L)G		22μF/25V
K7815-1000R3(L)G		22μF/25V

Figure 3

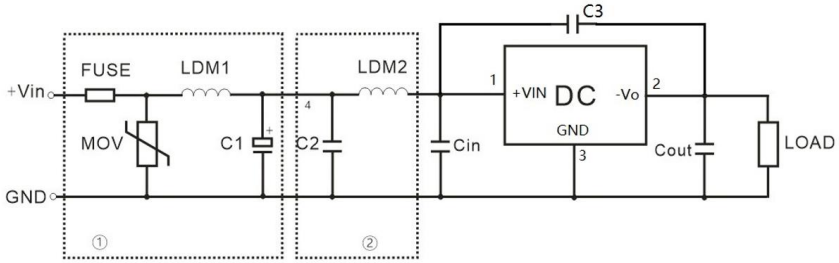
3. Recommended EMC circuit diagrams

Positive output



FUSE	TBD by input current
MOV	20D470K
C1	680μF/50V
C2	4.7μF/50V
Cin/Cout	Refer to table 1
LDM1	82μH
LDM2	12μH

Negative output



FUSE	TBD by input current
MOV	20D470K
C1	680μF/50V
C2/C3	4.7μF/50V
Cin/Cout	Refer to table 1
LDM1	82μH
LDM2	12μH

Note: Part ① circuit is for EMS test, part ② for EMI filtering, both can be adjusted according to the actual situation.

Application Notice

1.The product performance in this manual cannot be guaranteed if it works at a lower load than the minimum load condition.

2. All values or indicators in this manual have been tested based on Aipupower test specifications.

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