DC-DC Converter
K78XXJT-500R3-LB Series

Typical Features

- ◆ Wide input voltage range, non-isolated regulated single output
- ◆ Efficiency up to 96% (Typ.)
- ◆ No load input current: 0.2mA
- ◆ Mini size low cost open-frame power supply
- ◆ Short circuit protection
- ◆ Operating temperature from -40°C to +85°C

Application Field

This series of products can be widely used in the fields of Instrument, communication, pure digital circuits, general low-frequency analog circuit, relay drive circuits, data exchange circuits and other fields.

Typical product List

Certificate	Part No.	Input Voltage Range		Output Voltage/Current (Vo/Io)		Max. Capacitive Load	Efficiency (%) @Full load,	
		Nominal (VDC)	Range (VDC)	Vo (VDC)	Io (mA)	(uF)	Vin (Min.)	Vin (MAX)
-	K783V3JT -500R3-LB	24	4.75-34	3.3	500	680	93	82
	K7805JT -500R3-LB	24	6.5-34	5	500	680	93	85
	K7809JT -500R3-LB	24	12-34	9	500	680	95	92
	K7812JT -500R3-LB	24	15-34	12	500	680	95	93
	K7815JT -500R3-LB	24	19-34	15	500	680	96	94

Note 1: When input voltage exceeds 30VDC, connect an external 22uF/50V electrolytic capacitor to the input terminal to prevent module damage from voltage spikes.

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

Input Specifications

Items	Test Condition	Min	Typ.	Max	Unit
No load input current	Positive output	-	0.2	1.5	mA
Input reversed	Not allowed				
Input filter	Capacitor Filter				
Hot-plug	Unavailable				

Output Specifications

Items	Test Condition		Min	Typ.	Max	Unit
Output voltage accuracy	Full input voltage range, 0%-100% load	3.3V output	-	±2	±4	%
		Others	-	±2	±3	%
Line voltage regulation	100% load		-	±0.2	±0.4	%
Load regulation	10%-100% load		-	±0.4	±0.6	%

Transient response deviation	25% rated load step, nominal input voltage	-	50	300	mV
Transient recovery time		--	0.1	1	mS
Temperature drift coefficient		-	-	±0.03	%/°C
Ripple & Noise	0%-100% load, 20MHz bandwidth	-	50	100	mVp-p
Over current protection	Full input voltage range	-	-	300	%Io
Short circuit protection	Continuous, self-recovery				
Note: Ripple & Noise is tested by the Twisted Pair Method, please refer to the following test instruction.					

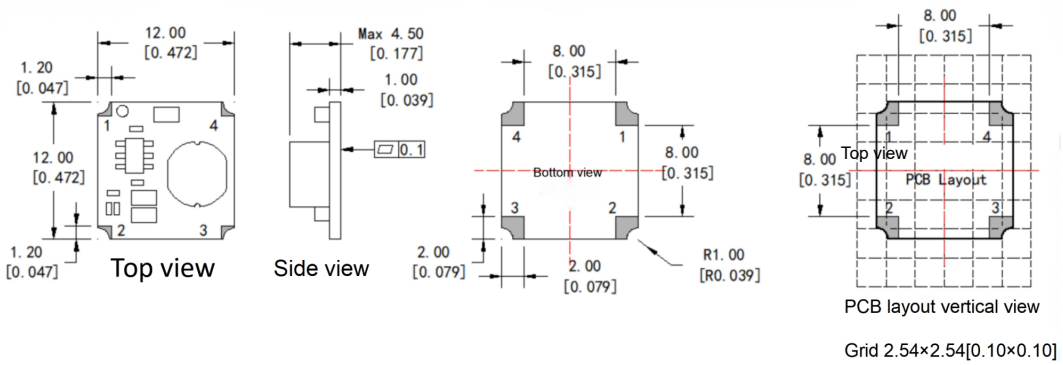
General Specifications

Items	Test Condition	Min	Typ.	Max	Unit
Switching frequency	Nominal input voltage, full load	-	800	-	KHz
Operating temperature	Refer to the Temperature Derating Graph(figure 1)	-40	-	+85	°C
Storage temperature	/	-55	-	+125	
Case temperature rise	Within the operating derating range	-	30°	-	
Pin soldering temperature	1.5mm from the case, soldering time 10S	-	-	300	
Relative humidity	No condensing	5	-	95	%RH
Vibration	10-150Hz, 5G, 30 Min. along X, Y and Z				
MTBF	MIL-HDBK-217F@25℃	3500	-	-	K hours
Unit weight	0.75g(Typ.)				
Cooling method	Nature Air				
Unit dimensions	L × W × H	12×12×4.5mm		0.472×0.472×0.177inch	

EMC Performance

Items			Test Standard	Performance/Class
EMC	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
		Surge	IEC/EN61000-4-5	line to line ±1kV perf. Criteria B
		CS	IEC/EN61000-4-6	3 Vr.m.s perf. Criteria A

Mechanical Dimensions



Grid 2.54×2.54[0.10×0.10]

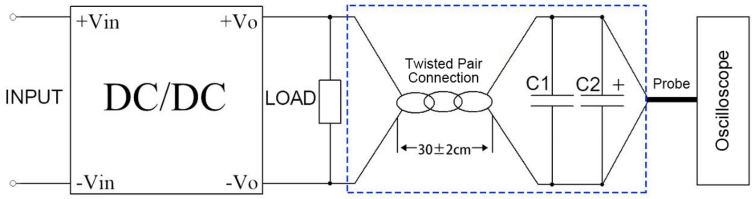
Unit: mm[inch]

General tolerance: ±0.25mm[±0.010]

Soldering Pad Function Description

Pad No.	1	2	3	4
Function	+Vin	NC	+Vo	GND(Common)

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



1. The Ripple & noise test needs 12# twisted pair cables, an oscilloscope which should be set at the Sample Mode, bandwidth 20MHz. 100M bandwidth probe with cap and ground removed. C1(0.1uF) polypropylene capacitor and C2(10uF) high-frequency low-impedance electrolytic capacitor are connected in parallel with the probes and one side of the twisted pair.
2. Refer to the test diagram, 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 other side of the twisted pair (length 30cm±2 cm) should be connected in parallel with the load. The test can start after the input power on.
3. It is recommended to use a ≥10% load or a high-frequency low impedance electrolytic capacitor (≥100uF) load at the output to avoid the output ripple increasing.

Temperature Derating Graph

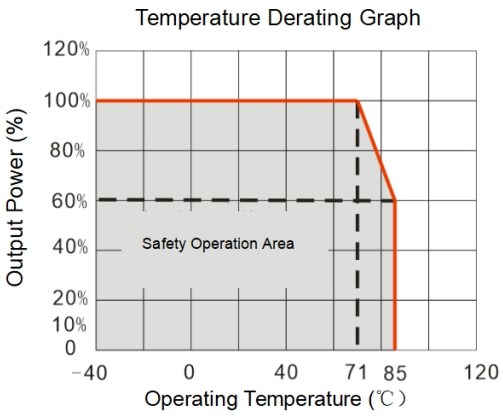


Figure 1

Recommended Circuits for Application

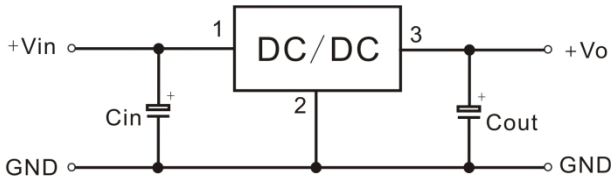
1. Output load requirements

a. In order to ensure the converter can work reliably with high efficiency, the minimum load should not less than 10% rated load when it is used. If the needed power is indeed small, please parallel a resistor at the output side, the resistance equal to 10% nominal load.

b. The maximum capacitive load is tested under nominal input full load, and cannot exceed the maximum capacitive load of output terminal under operation, otherwise it will cause it difficult to start up and damage the product.

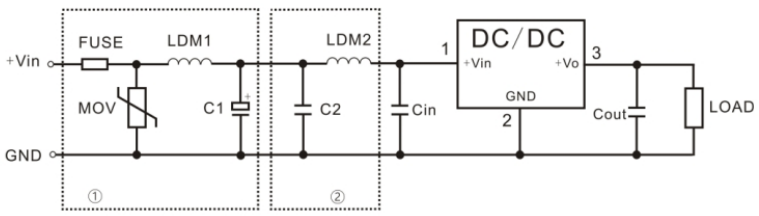
2. Recommended circuit

To reduce input and output ripple and noise, add a capacitor filter to the input and output ports (see the circuit diagram). Do not use too large a capacitor, or the product may fail to start. The recommended capacitive load for each output is in Table 1. Cin and Cout values can be checked in the external capacitor table, and can be increased if needed. Low-ESR tantalum or electrolytic capacitors are also an option.



Recommended Capacitive Load Values (Table 1)		
Part No.	Cin (Ceramic Capacitor)	Cout (Ceramic Capacitor)
K783V3JT-500R3-LB	10uF/50V	22uF/10V
K7805JT -500R3-LB		22uF/10V
K7809JT -500R3-LB		22uF/16V
K7812JT -500R3-LB		22uF/25V
K7815JT -500R3-LB		22uF/25V

3. Recommended EMC circuit diagram



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

FUSE	Select based on actual need
MOV	20D470K
C1	680uF/50V
C2	4.7uF/50V
Cin/Cout	Refer to table 1
LDM1	82uH
LDM2	12uH

Application Notice

1. This series of products cannot be used in parallel, and hot plug is not available.
2. The product should be used according to the specifications, otherwise it could be permanently damaged.
3. The product performance cannot be guaranteed if it works at a lower load than the minimum load defined.
4. The product performance cannot be guaranteed if it works under over-load condition.
5. Unless otherwise specified, all values or indicators are tested at Ta=25℃, humidity<75%RH, nominal input voltage and rated load (pure resistance load).
6. All values or indicators on this datasheet have been tested based on Aipupower test specifications.
7. The specifications are specially for the parts listed on this datasheet, any other non-standard model performances could be out of the specifications. Please contact our technician for specific requirements.
8. Aipupower can provide customization service.

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