DC-DC Converter
K78XXJT-500R3 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

Test Conditions: Unless otherwise specified, all parameters are measured at nominal input voltage, pure resistive rated load, and 25°C ambient temperature.

Applications

The K78XXJT-500R3 series is widely utilized in instrumentation, telecommunications, pure digital circuits, general low-frequency analog circuits, relay drive circuits, and data switching systems etc.

Selection Guide

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)	(μF)	Vin (Min.)	Vin (MAX.)
-	K783V3JT -500R3	24	4.75-34	3.3	500	680	93	82
	K7805JT -500R3	24	6.5-34	5	500	680	93	85
	K7809JT -500R3	24	12-34	9	500	680	95	92
	K7812JT -500R3	24	15-34	12	500	680	95	93
	K7815JT -500R3	24	19-34	15	500	680	96	94

Note 1: When input voltage exceeds 30VDC, connect an external 22μF/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.

Note 3: This list is non-exhaustive. For models not listed, please contact our sales department.

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				
ON/OFF Control (Ctrl*)	Turn ON the Converter	No connection or connected to the high level (3.2-8VDC)			
	Turn OFF the Converter	Connected to GND or low level (0-0.8VDC)			
	Current value for switching OFF	-	30	100	μA
*Note: The voltage of Ctrl is relative to the input GND.					
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 output	-	±2	±3	%
Line voltage regulation	Full 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.						

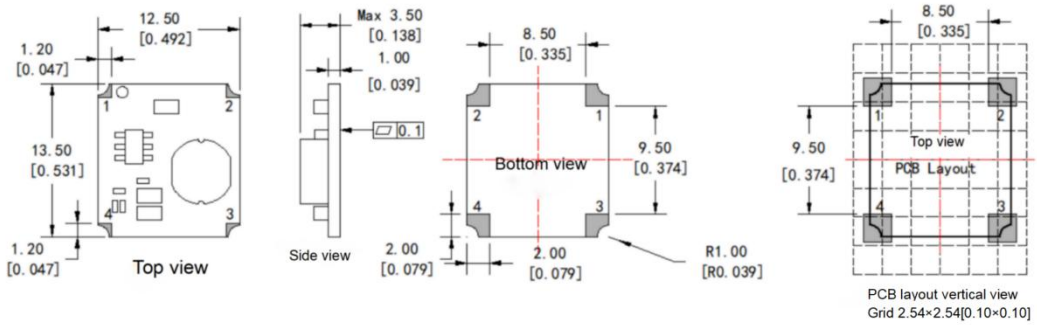
General Specifications

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 Max	Within the operating derating range	-	30°	-	
Pin soldering temperature	1.5mm from the case, soldering time 10S	-	-	300	
Reflow Soldering		Peak temperature T_c≤250℃; time above 217℃ must not exceed 60 seconds.			
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	12.5×13.5×3.5mm		0.492×0.531×0.138inch	

EMC Specifications

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/EN61000R3-4-2	Contact ±4kV perf.Criteria B
		RS	IEC/EN61000R3-4-3	10V/m perf. Criteria A
		EFT	IEC/EN61000R3-4-4	±1kV perf. Criteria B
		Surge	IEC/EN61000R3-4-5	line to line ±1kV perf. Criteria B
		CS	IEC/EN61000R3-4-6	3 Vr.m.s perf. Criteria A

Mechanical Dimensions



Unit: mm [inch]

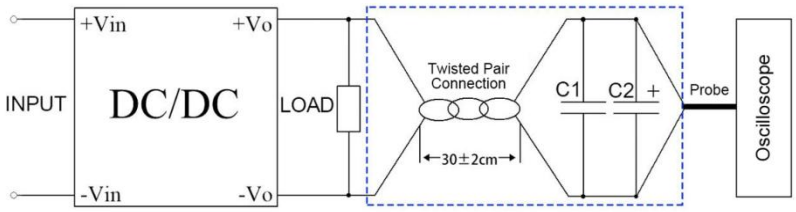
General tolerance: ±0.25 [±0.010]

Soldering Pad Function Description

Pad No.	1	2	3	4
Function	+Vin	GND(Common)	+Vo	ON/OFF control

Note: If the pin definitions of the power module differ from this manual, the labeling on the physical product shall prevail.

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(0.1μF) polypropylene capacitor and C2(10μF) 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.

Application Note:

1.Maximum capacitive load is tested under purely resistive full load conditions.

2. A minimum 10% load or a high-frequency low-ESR electrolytic capacitor (>=100μF) is recommended at the output; otherwise, output voltage ripple and noise may increase.

3.We provide integrated power solutions and customized products. Due to space constraints, please contact our technical support for further inquiries.

Temperature Derating Curves

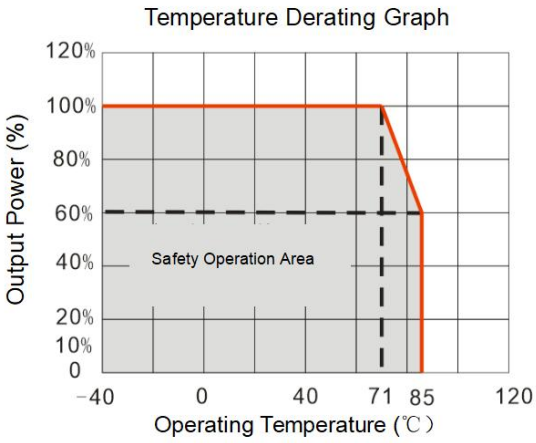


Figure 1

Recommended Circuits for Application

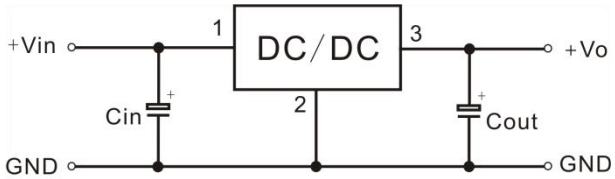
Output Load Requirements

a. Minimum Load: A minimum load of 10% is required for reliable operation. If the actual load is lower, parallel an external resistor to meet the 10% threshold.

b. Capacitive Load: Do not exceed the maximum capacitive load specified in the datasheet. Exceeding this limit may result in start-up failure or permanent damage.

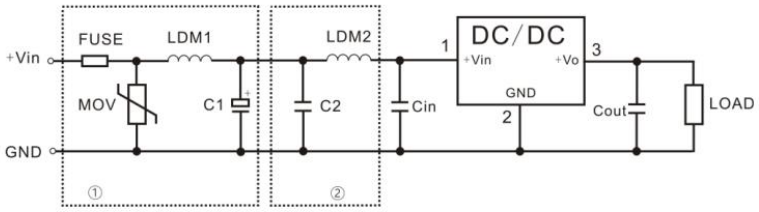
Recommended Circuit

To minimize ripple and noise, an external filter capacitor network is recommended (see diagram below). Ensure capacitors are appropriately sized; excessive capacitance may hinder start-up. Refer to Table 1 for recommended maximum values.Capacitor Selection: Use Low ESR tantalum or electrolytic capacitors.Optimization: Values for Cin and Cout can be adjusted based on specific application requirements, provided they remain within the safe operating range.



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

2. 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	680μF/50V
C2	4.7μF/50V
Cin/Cout	Refer to table 1
LDM1	82μH
LDM2	12μH

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. Specifications apply to standard models only. For non-standard or customized products, please contact our technical team for details.
8. AIPUPOWER offers customized power solutions upon request.

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