

FEATURES

1. Input voltage range up to 10:1
2. High efficiency up to 93%
3. No-load input current as low as 1.5 mA
4. Operating ambient temperature range: -40°C to 85°C
5. Output short-circuit protection
6. Pin compatible with K78XX series
7. International standard pin package



3 years
Warranty

Selection Guide

Part No.	Input Voltage (VDC)*	Output		Full Load Efficiency (%) Typ. Vin Min./Vin Max.	Capacitive Load (μF) Max.
	Nominal (Range)	Voltage (VDC)	Current (mA) Max.		
K78U03-500R3	48 (9-90)	3.3	500	82/69	100
K78U05-500R3	48 (9-90)	5	500	87/75	
K78U06-500R3	48 (9-90)	6.5	500	91/78	
K78U09-500R3	48 (14-90)	9	500	91/80	
K78U12-500R3	48 (18-90)	12	500	91/83	
K78U15-500R3	48 (20-90)	15	500	93/84	
K78U24-500R3	48 (36-90)	24	300	93/85	

Note: * For input voltage exceeding 80 VDC, an input capacitor of 22μF/100V is required.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Nominal input voltage	–	--	1.5	mA
Reverse Polarity at Input		Avoid / Not protected			
Input Filter		Capacitance filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	10%-100%, input voltage range	3.3V output	–	±3.5	±4.5	%
		Others	–	±2	±3	
Linear Regulation	Full load, input voltage range	K78U03/05/X6-500R3	–	±0.6	±1.5	
		K78U09/12/15-500R3	–	±0.6	±2.0	
		K78U24-300R3	–	±1.2	±2.5	
Load Regulation	Nominal input voltage, 10% -100% load		–	±1.0	±2.0	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, full load		–	40	80	mVp-p
Temperature Coefficient	Operating temperature -40°C to +85°C		–	–	±0.03	%/°C

Transient Response Deviation	Nominal input voltage, 25% load step change	—	±0.4	±1.5	%
Transient Recovery Time	Nominal input voltage, 25% load step change	—	0.2	1	ms
Short-circuit Protection	Nominal input voltage	Continuous, self-recovery			
Note: * The “parallel cable” method is used for ripple and noise test, please refer to DC-DC Converter Application Notes for specific information;					

General Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Operating Temperature	See Fig.1, Fig.2.	-40	–	+85	°C
Storage Temperature		-55	–	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	–	–	+300	
Storage Humidity	Non-condensing	5	–	95	%RH
Switching Frequency*	Full load, nominal input voltage	–	300	–	kHz
MTBF	MIL-HDBK-217F@25°C	2000	–	–	k hours
Note: *Different output voltage with different switching frequency.					

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94 V-0)	
Dimensions	K78U-500R3 / K78U24-300R3	11.50 x 9.00 x 17.50 mm
	K78U-500R3L / K78U24-300R3L	19.00 x 11.50 x 9.00 mm
Weight	3.8g(typ.)	
Cooling Method	Free air convection	

EMC Specifications

Emissions	CE	CISPR32/EN55032	CLASS B (see Fig. 6-② for recommended circuit)		
	RE	CISPR32/EN55032	CLASS B (see Fig. 6-② 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 B
	EFT	IEC/EN 61000-4-4	100kHz ±1kV	(see Fig. 6-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5	line to line ±1kV	(see Fig. 6-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN 61000-4-6	3Vr.m.s		perf. Criteria B

Typical Characteristic Curves

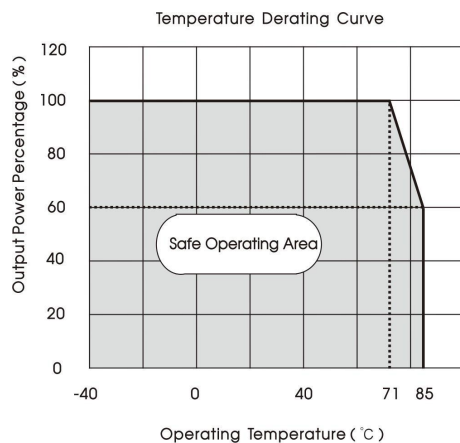


Fig.1 K78UXX-500R3 K78U24-300R3 (Vin=36V~60V)

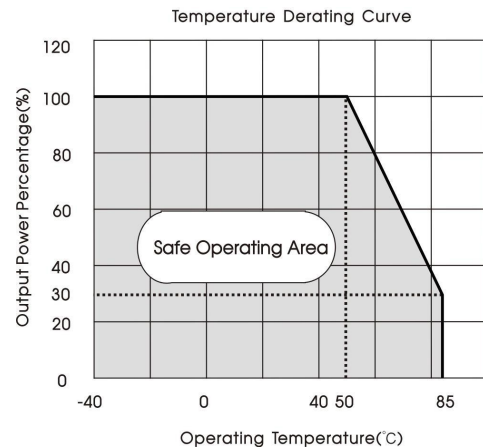


Fig.2 K78U24-300R3 (Vin≥60V)

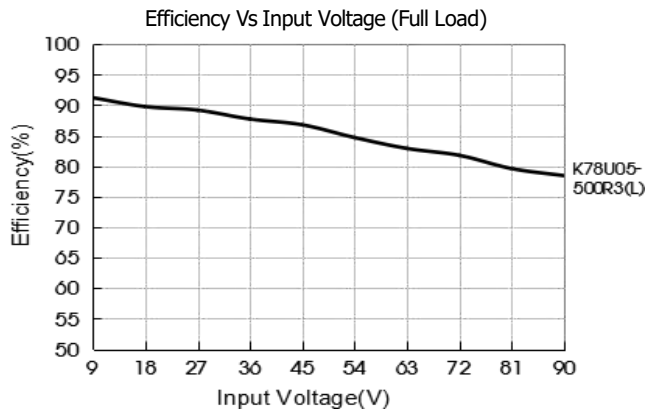


Fig.3

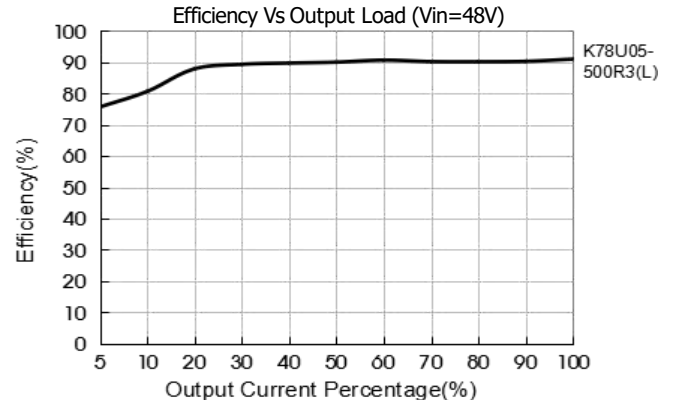


Fig.4

Design Reference

1. Typical application

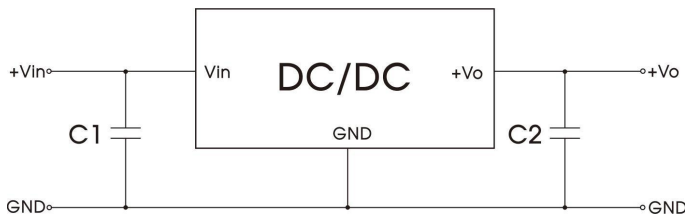


Fig. 5

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
K78U03-500R3	10μF/100V	22μF/10V
K78U05-500R3		22μF/10V
K78UX6-500R3		22μF/10V
K78U09-500R3		22μF/16V
K78U12-500R3		22μF/25V
K78U15-500R3		22μF/25V
K78U24-300R3		10μF/50V

Table 1

- Notes:
1. The required C1 and C2 capacitors 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 values and/or tantalum or low ESR electrolytic capacitors may also be used instead;
 3. Converter cannot be used for hot swap and with output in parallel.

2. EMC compliance circuit

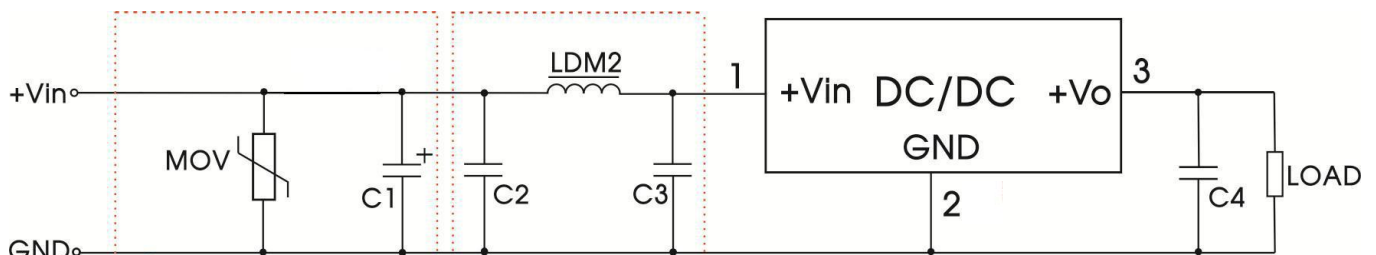
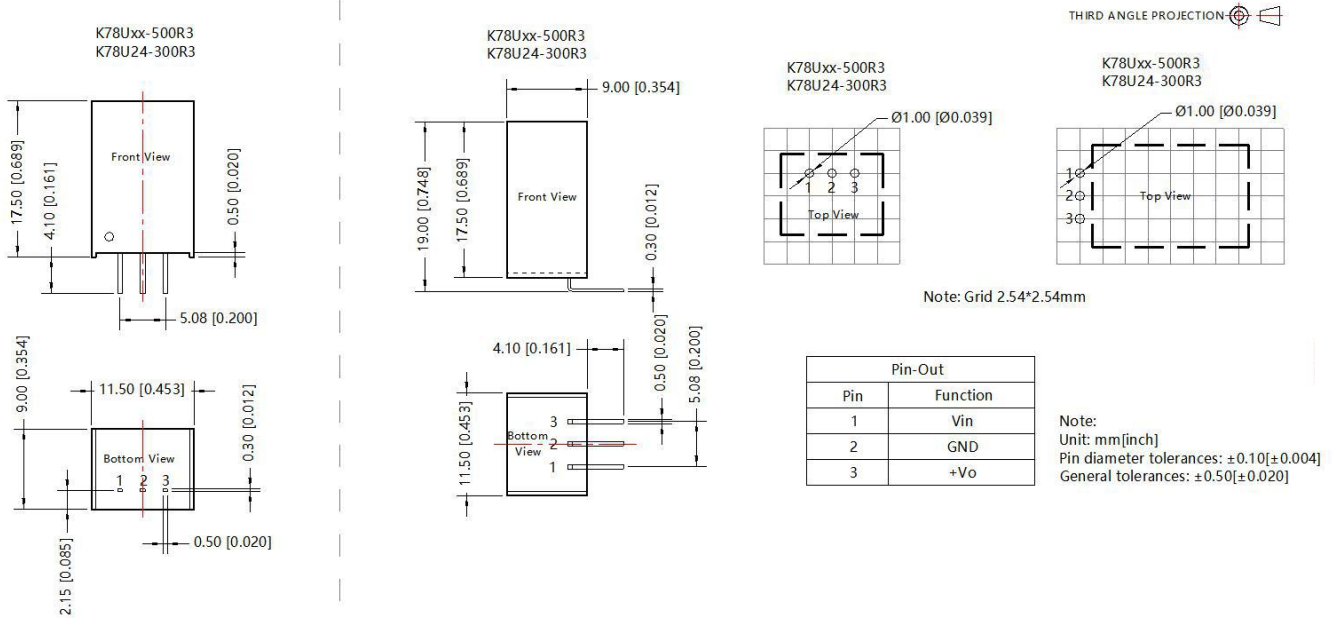


Fig.6

Part No.	MOV	C1	C2	LDM2	C3	C4
K78UXX-500R3	S10K75	680μF /100V	4.7μF/100V	120μH	4.7μF/100V	10μF/50V

Table.2

Dimensions and Recommended Layout



Note:

1. If the product works under the minimum required load, it cannot guarantee that the performance of the product complies with all the performance indicators in this manual;
2. The maximum capacitive load is tested under the input voltage range and full load condition;
3. Unless otherwise stated, all indexes in this manual are measured at $T_a=25^\circ\text{C}$, humidity $<75\%\text{RH}$, nominal input voltage and rated output load;
4. All index testing methods in this manual are based on the enterprise standards of the company;
5. Our company can provide product customization, specific needs can directly contact our technical staff;