

Wide input voltage non-isolated and regulated single output

FEATURES



Patent Protection **RoHS**

- Input voltage range up to 10:1
- High efficiency up to 93%
- Operating ambient temperature range: -40°C to 85°C
- Output short-circuit protection
- Pin compatible with K78XX series
- International standard pin package

K78Uxx-500R3G series are high efficiency switching regulators. The converters feature high efficiency, low loss and short-circuit protection in a compact DFN package. These products are widely used in applications such as industrial control, instrumentation and electric power.

Selection Guide

Certification	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.		
--	K78U03-500R3G	48 (9-90)	3.3	500	82/69	100
	K78U05-500R3G	48 (9-90)	5.0	500	87/75	
	K78UX6-500R3G	48 (9-90)	6.5	500	91/78	
	K78U09-500R3G	48 (14-90)	9.0	500	91/80	
	K78U12-500R3G	48 (18-90)	12	500	93/84	
	K78U15-500R3G	48 (20-90)	15	500	93/84	
	K78U24-300R3G	48 (36-90)	24	300	93/85	

Note: * For input voltage exceeding 80 VDC, an input capacitor of 47µF/100V is required.

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Nominal input voltage	--	0.5	--	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	--	±2	±3	%
Linear Regulation	Full load, input voltage range	--	±1	--	
Load Regulation	Nominal input voltage, 10% -100% load	--	±1	--	
Ripple & Noise*	20MHz bandwidth, nominal input voltage, full load	--	100	250	mVp-p
Temperature Coefficient	Operating temperature -40°C to +85°C	--	--	±0.05	%/°C
Transient Response Deviation	Nominal input voltage, 50%-75%-50% load step change	--	1.5	--	%

Transient Recovery Time	Nominal input voltage, 50%-75%-50% load step change	--	0.2	--	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	-40	--	+85	°C
Storage Temperature		-55	--	+125	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds	--	--	300	
	Wave-soldering, max. 10 seconds	255	260	265	
Storage Humidity	Non-condensing	5	--	95	%RH
Switching Frequency*	Full load, nominal input voltage	--	210	--	kHz
MTBF	MIL-HDBK-217F@25°C	2000	--	--	k hours

Mechanical Specifications

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

Electromagnetic Compatibility (EMC)

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

Typical Characteristic Curves

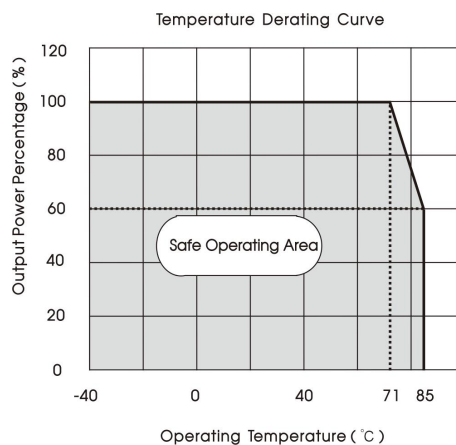


Fig.1

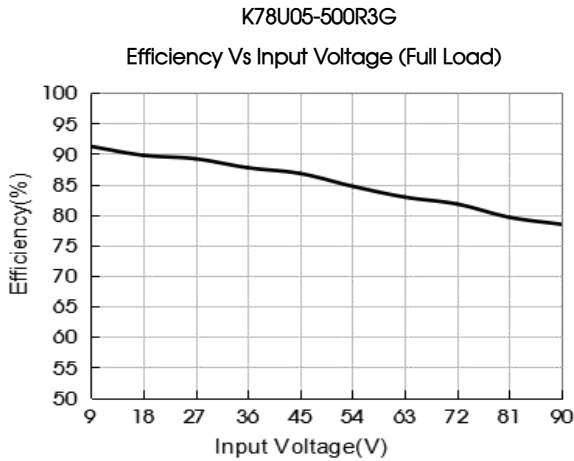


Fig.2

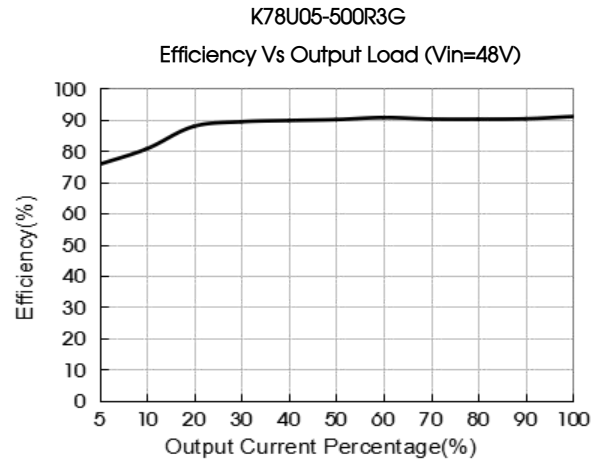


Fig.3

Design Reference

1. Typical application

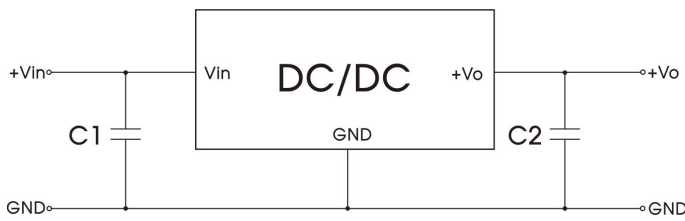


Fig.4

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)
K78U03-500R3G	10μF/100V	22uF/25V x 1
K78U05-500R3G		22uF/25V x 1
K78UX6-500R3G		22uF/25V x 1
K78U09-500R3G		22uF/25V x 1
K78U12-500R3G		10uF/50V x 2
K78U15-500R3G		10uF/50V x 2
K78U24-300R3G		10uF/50V x 2

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

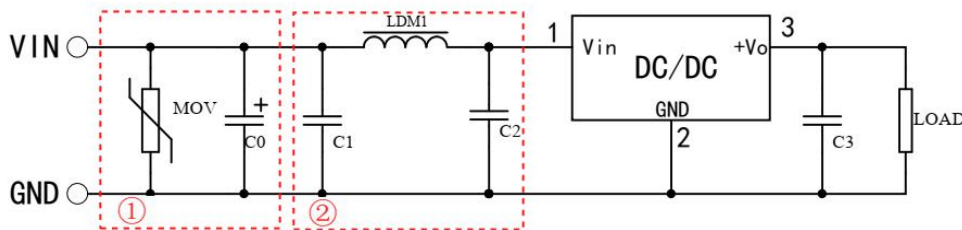



Fig.5

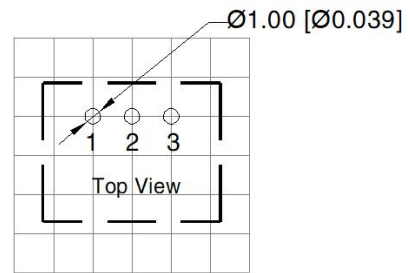
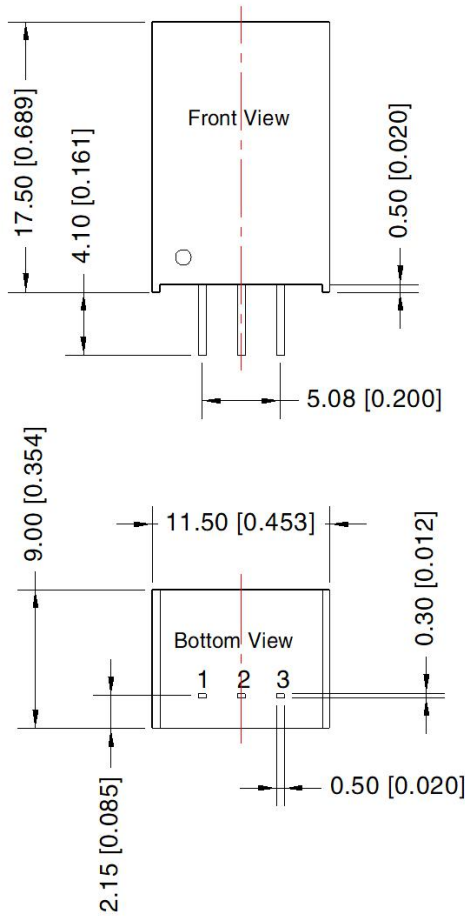
Part No.	MOV	C0	C1/C2	LDM1	C3
K78U03-500R3G	NC	1000uF/100V	4.7uF/100V x 1	150uH	22uF/25V x 1
K78U05-500R3G			4.7uF/100V x 2		22uF/25V x 1
K78UX6-500R3G			4.7uF/100V x 2		22uF/25V x 1
K78U09-500R3G			4.7uF/100V x 3		22uF/25V x 1
K78U12-500R3G			4.7uF/100V x 3		10uF/50V x 2
K78U15-500R3G			4.7uF/100V x 4		10uF/50V x 2
K78U24-300R3G			4.7uF/100V x 4		10uF/50V x 2

Table.2

3. For additional information please refer to DC-DC converter application notes on www.mornsun-power.com

Dimensions and Recommended Layout

THIRD ANGLE PROJECTION 



Note: Grid 2.54*2.54mm

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

Note:
Unit: mm[inch]
Pin diameter tolerances: ± 0.10 [± 0.004]
General tolerances: ± 0.50 [± 0.020]

Notes:

1. For additional information on Product Packaging please refer to www.mornsun-power.com. Tape/Reel packaging bag number: 58210021;
2. The maximum capacitive load offered were tested at nominal input voltage and full load;
3. Unless otherwise specified, parameters in this datasheet were measured under the conditions of $T_a=25^\circ\text{C}$, humidity<75%RH with nominal input voltage and rated output load;
4. All index testing methods in this datasheet are based on our company corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Products are related to laws and regulations: see "Features" and "EMC";
7. Our products shall be classified according to ISO14001 and related environmental laws and regulations, and shall be handled by qualified units.

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