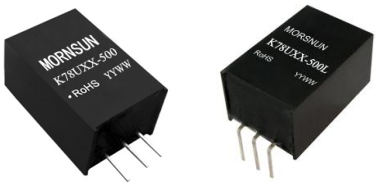
MORNSUN®



K78UXX-500(L) Series

WIDE INPUT NON-ISOLATED & REGULATED SINGLE POSITIVE /NEGATIVE OUTPUT

RoHS

FEATURES

- Efficiency up to 95%
- Ultra wide input voltage range can up to 8:1
- Operating temperature: -40°C ~ +85°C
- Pin-out compatible with LM78XX Linear
- Short circuit protection, thermal shutdown
- Low ripple and noise
- Micro miniature SIP package, meet UL94-V0 requirement
- No heatsink required
- Industry standard pinout
- MTBE>2,000,000Hours

PRODUCT PROGRAM

Part Number	Input Voltage(VDC)		Output			Efficiency(%)(typ.)	
	Nominal	Range	Voltage (VDC)	Current(mA) Min.	Current(mA) Max.	Vin (Min.)	Vin (Max.)
K78U03-500(L)	48	9.0~72.0	3.3	10	500	82	75
K78U05-500(L)		9.0~72.0	5.0	10	500	87	81
*K78UX6-500(L)		9.0~72.0	6.5	10	500	91	84
*K78U09-500(L)		14.0~72.0	9.0	10	500	92	86
*K78U12-500(L)		17.0~72.0	12.0	10	500	93	89
*K78U15-500(L)		20.0~72.0	15.0	10	500	94	90
K78U24-300(L)		36.0~72.0	24.0	6	300	95	91

Note: Add suffix "L" for 90° bend pins, for example: K78U05-500L. "*"Designing.

OUTPUT SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Output voltage accuracy	100% full load		±2	±3	%
Line regulation	Vin=min. to max. at full load		±0.4	±1.0	
Load regulation*	From 10% to 100% Load		±0.3	±0.6	
Ripple& Noise	20MHz bandwidth ,from 10% to 100% Load, without any external capacitor (refer to figure 2)		20	60	mVp-p
Short circuit input power	Vin=Nominal		0.72	1.2	W
Short circuit protection		Continuous, automatic			
Thermal shutdown			160		°C
Switching frequency	100% full load	120		800	kHz
Output current limit	Vin=Nominal		700	1200	mA
Quiescent current	Vin=Nominal , Min. Load		1	5	
Temperature coefficient	-40°C ~ +85°C ambient			±0.015	%/°C
Tendencies load	From 10% to 100% Load			±100	mV
			1.0	1.5	ms
Max capacitance load				100	μF

Note: "GND" Pin can not vacant, or it will damage the module.

COMMON SPECIFICATIONS

Item	Test conditions	Min.	Typ.	Max.	Units
Storage humidity				95	%
Operating temperature		-40		85	°C
Operating case temp.			65	100	
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds			300	
Cooling		Free Air Convection			
Case material		Plastic (UL94-V0)			
MTBF	25℃（MIL-HDBK-217F）	3500			k hours
	71℃（MIL-HDBK-217F）	1500			
Hop swap		Not supported			
Thermal resistance				60	°C/W
EMI conducted	Refer to figure 5	EN55022, CLASS B			
RFI conducted					
Electrostatic discharge		IEC/EN 61000-4-2 level 4			
Safety approvals		EN-60950-1 standards			
Weight			4		g

APPLICATIONS

The K78UXX-500(L) series high efficiency switching regulators are ideally suited to replace LM78xx linear regulators and are pin compatible. It has ultra wide input voltage range ,the efficiency of up to 95% means that very little energy is wasted as heat so there is no need for any heatsinks with their additional space and mounting costs.

MODEL SELECTION

K78U05-500

- Output Current
- Output Voltage
- Ultra Wide Input Voltage
- Product Series

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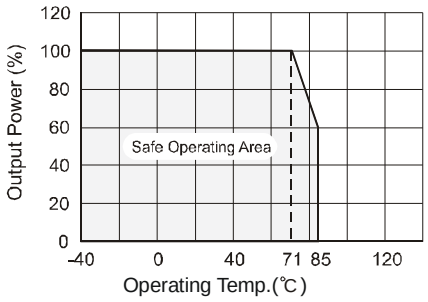
Specifications subject to change without notice.

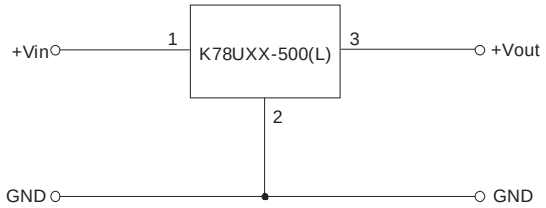
TYPICAL CHARECTERISTICS

Temperature Derating Graph



（figure 1）

TYPICAL APPLICATION CIRCUIT

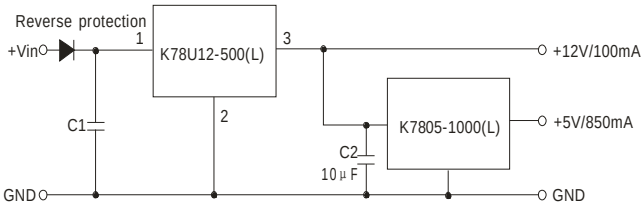


（figure 2）

The regulator proposed to establish the input voltage by soft-start, no plug and play, if the input voltage changes from low voltage to high voltage abruptly, the regulator might be damaged.

APPLICATION EXAMPLE

High voltage input, Multiple Outputs, with greater load

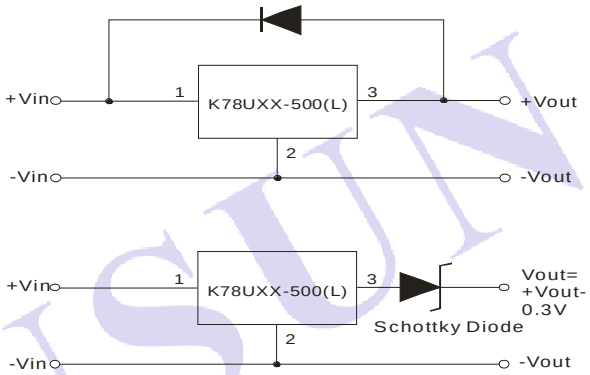


(figure 3)

Note: 1. the input current amount of the back-grade regulator and the pre-class load should be less than or equal the max load current of the pre-class regulator.

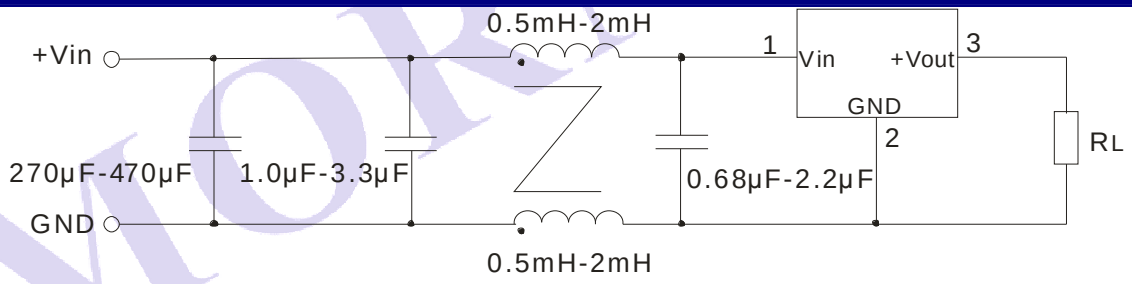
2. If further filtering is required, please add components as per the above circuit. We recommend not to add components, if request, please make sure the capacitors C1 ≤2.2uF，C2≤10uF more close to the back-grade regulator.

MODULES PROTECT RECOMMENDED CIRCUIT



(figure4)

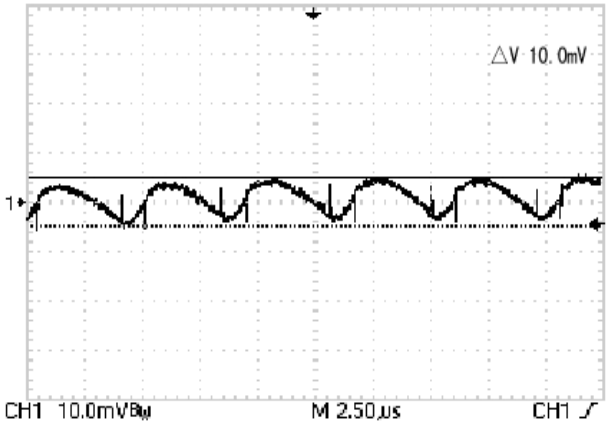
EMC RECOMMENDED CIRCUIT



(figure 5)

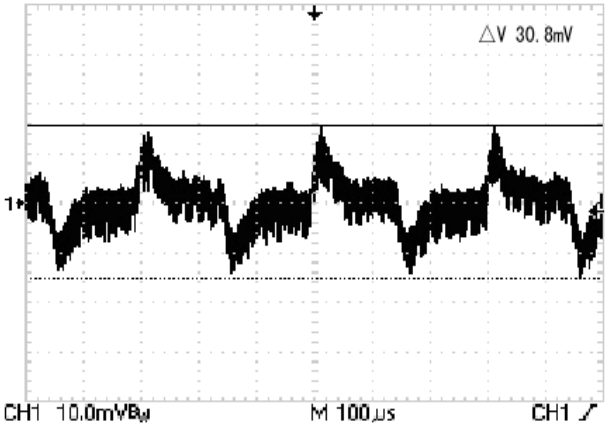
TEST CONFIGURATIONS (TA=25°C)

1、FULL LOAD OUTPUT RIPPLE & NOISE MEASURED GRAPH



(figure 6)

2、LOAD TRANSIENT RESPONSE WAVEFORM



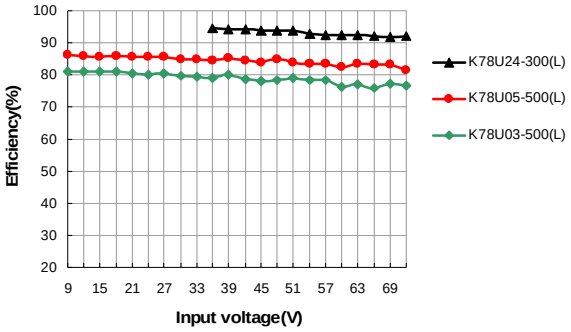
(figure 7)

Specifications subject to change without notice.

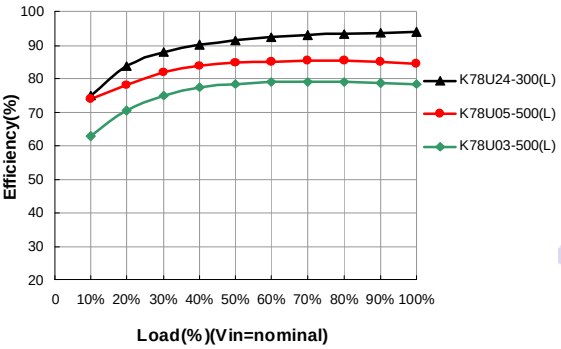
CHARACTERISTICS CURVE

Efficiency

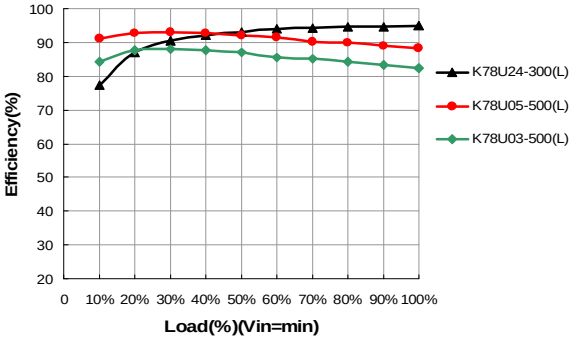
Efficiency VS Input voltage (full load)



Efficiency VS Load

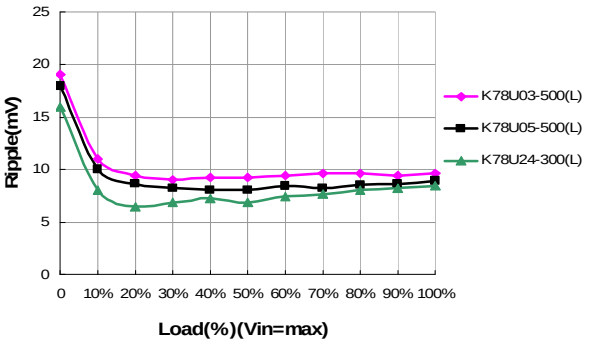


Efficiency VS Load

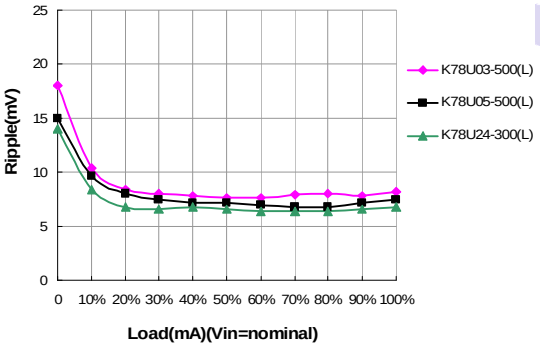


Ripple

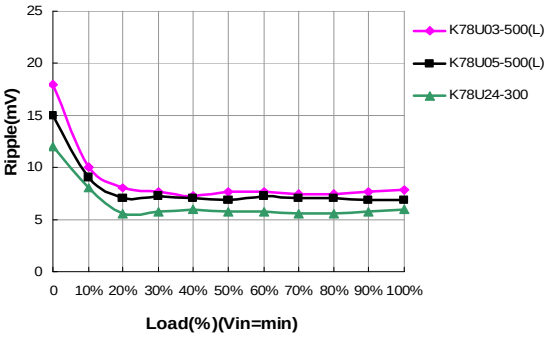
Ripple VS Load



Ripple VS Load



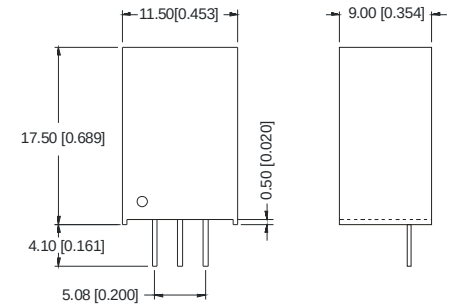
Ripple VS Load



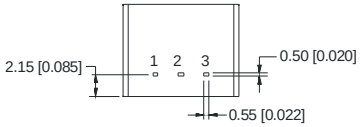
OUTLINE DIMENSIONS & FOOTPRINT DETAILS

MECHANICAL DIMENSIONS

K78UXX-500

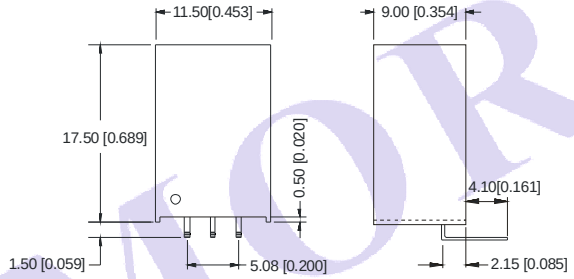


(Bottom View)

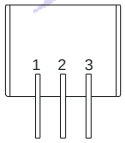


Note:
Unit: mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

K78UXX-500L



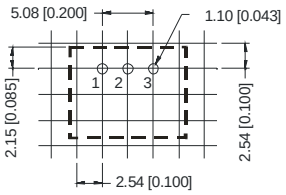
(Bottom View)



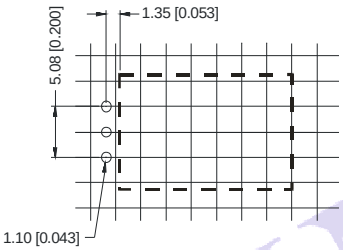
Note:
Unit: mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.50mm[±0.020inch]

RECOMMENDED FOOTPRINT

K78UXX-500



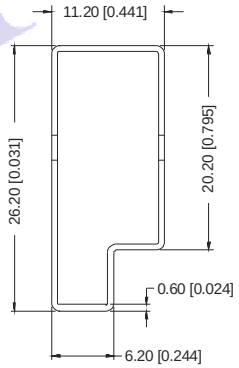
K78UXX-500L



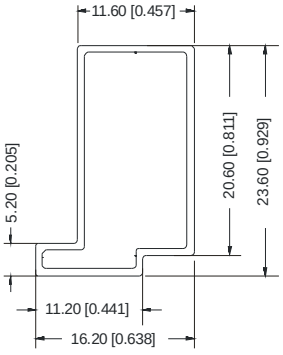
FOOTPRINT DETAILS	
pin	Function
1	+Vin
2	GND
3	+Vout

TUBE OUTLINE DIMENSIONS

K78UXX-500



K78UXX-500L



Note:
Unit: mm[inch]
General tolerances:±0.50mm[±0.020inch]
L=530mm[20.866inch] Devices per tube quantity: 44pcs
L=220mm[8.661inch] Devices per tube quantity: 17pcs
Short tube inner packaging dimensions: L*W*H=255*170*80mm
Short tube outer packaging dimensions: L*W*H=375*280*270mm
Long tube inner packaging dimensions: L*W*H=580*200*100mm
Long tube outer packaging dimensions(with two inner packaging boxes): L*W*H=600*215*220mm
Long tube outer packaging dimensions(with two inner packaging boxes): L*W*H=600*215*325mm

Note:

1. The load shouldn't be less than 10%, and the output external capacitor should not be too large (recommend <10μF), otherwise ripple will increase dramatically.
2. Operation under 10% load will not damage the converter; However, they may not meet all specification listed
3. All specifications measured at Ta=25°C, humidity<75%, nominal input voltage and rated output load unless otherwise specified.
4. In this datasheet, all the test methods of indications are based on corporate standards.