SK78UXX-500(L) Series

WIDE INPUT NON-ISOLATED & REGULATED SINGLE OUTPUT

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

APPLICATIONS

The SK78UXX-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

SK78U05-500

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

PRODUCT PROGRAM

Part Number	Input Voltage(VDC)		Output			Efficiency(%)(typ.)	
	Nominal	Range	Voltage (VDC)	Current(mA) Min.	Current(mA) Max.	Vin (Min.)	Vin (Max.)
SK78U03-500(L)	48	9.0~72.0	3.3	10	500	82	75
SK78U05-500(L)		9.0~72.0	5.0	10	500	87	81
SK78UX6-500(L)		9.0~72.0	6.5	10	500	91	84
SK78U09-500(L)		14.0~72.0	9.0	10	500	92	86
SK78U12-500(L)		17.0~72.0	12.0	10	500	93	89
SK78U15-500(L)		20.0~72.0	15.0	10	500	94	90
SK78U24-300(L)		36.0~72.0	24.0	6	300	95	91

Note: Add suffix “L” for 90° bend pins, for example: SK78U05-500L.

OUTPUT SPECIFICATIONS

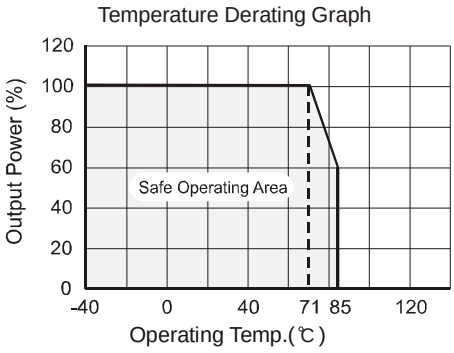
Item	Test conditions	Min.	Typ.	Max.	Units
Output voltage accuracy	100% full load		±2	±3	%
Line regulation	Vin=min. to max. at full load		±0.4	±1.0	
Load regulation*	From 10% to 100% Load		±0.3	±0.6	
Ripple& Noise	20MHz bandwidth ,from 10% to 100% Load (refer to figure 2)		20	60	mVp-p
Short circuit input 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

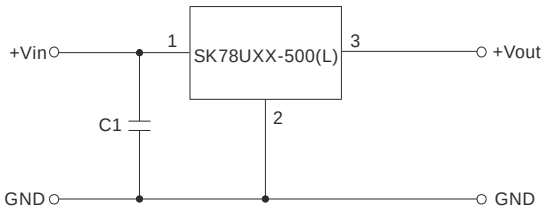
Item	Test conditions	Min.	Typ.	Max.	Units
Storage humidity				95	%
Operating temperature	Power derating (above 71°C)	-40		85	°C
Operating case temp.			65	100	
Storage temperature		-55		125	
Lead temperature	1.5mm from case for 10 seconds			300	
Cooling		Free Air Convection			
Case material		Plastic (UL94-V0)			
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

TYPICAL CHARECTERISTICS



（figure 1）

TYPICAL APPLICATION CIRCUIT

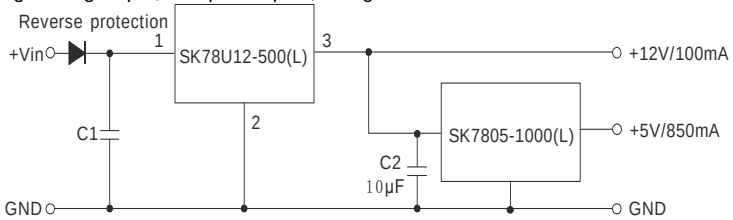


（figure 2）

Note:
1. 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.
2. If the applications is high-voltage input, the regulator must add an external capacitor C1(≤47μF/100V),to prevent voltage spikes caused by damage to the module.
3. No parallel connection.

APPLICATION EXAMPLE

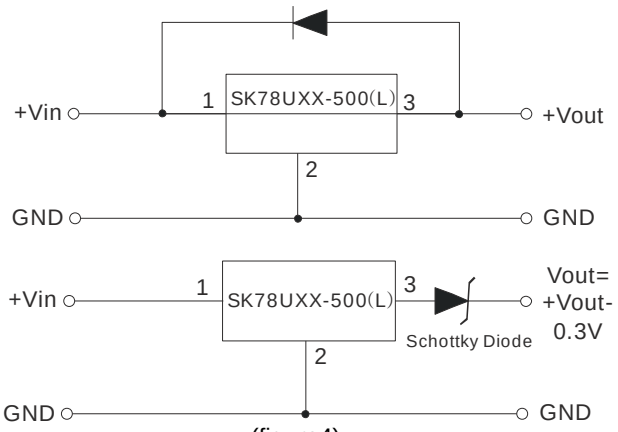
High voltage input, Multiple Outputs, with greater load



(figure 3)

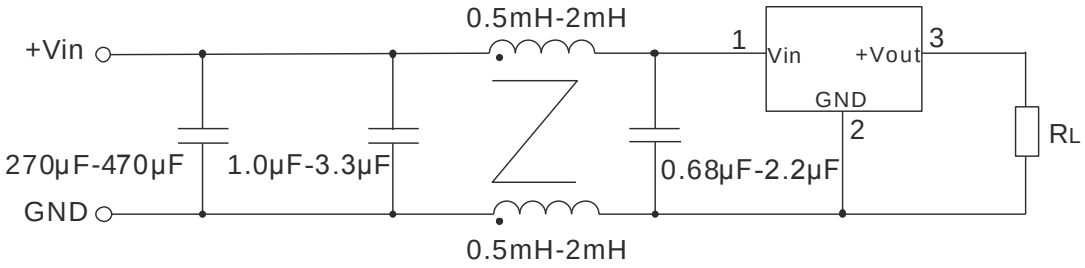
Note:
1. the input current amount of the back-grade regulator and the pre-class load should be less than or equal the max load current of the pre-class regulator.
2. If further filtering is required, please add components as per the above circuit(We recommend not to add components), if request, please make sure the capacitors C1≤47μF,C2≤10μF more close to the back-grade regulator.

MODULES PROTECT RECOMMENDED CIRCUIT



(figure4)

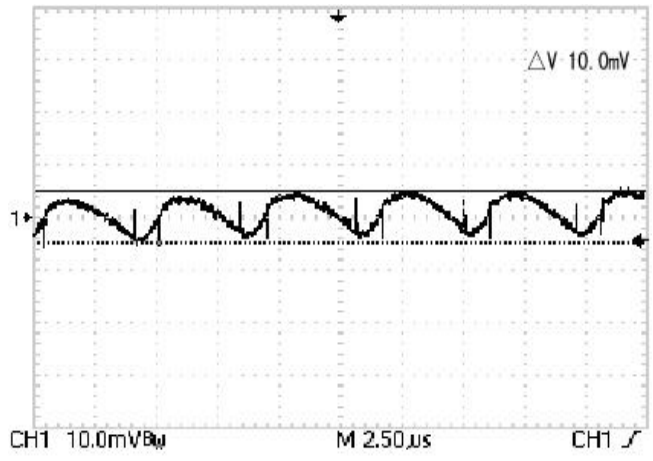
EMC RECOMMENDED CIRCUIT



(figure 5)

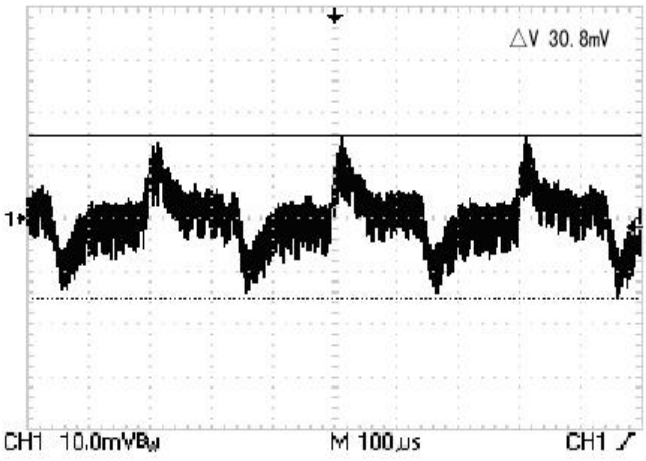
TEST CONFIGURATIONS (TA=25°C)

1、FULL LOAD OUTPUT RIPPLE & NOISE MEASURED GRAPH



(figure 6)

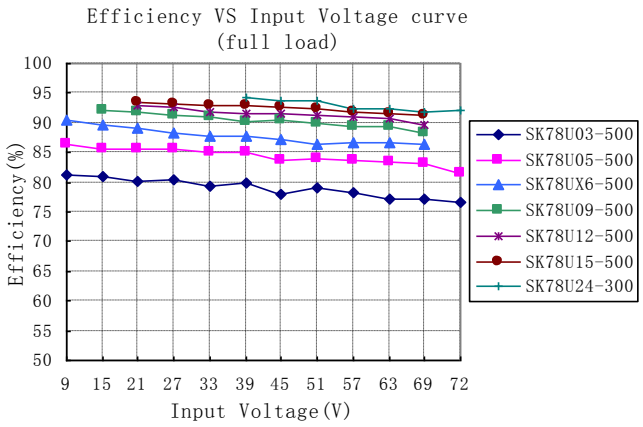
2、LOAD TRANSIENT RESPONSE WAVEFORM

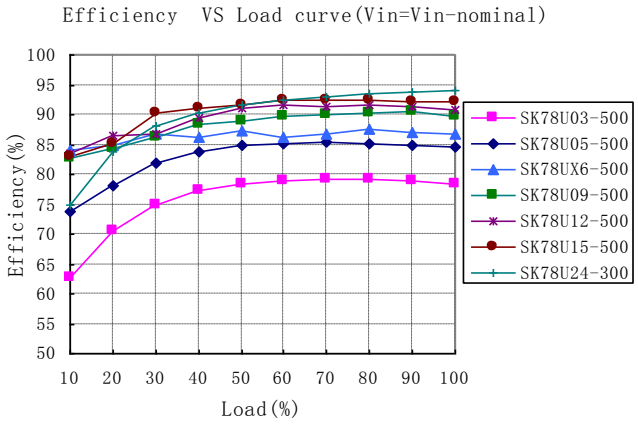


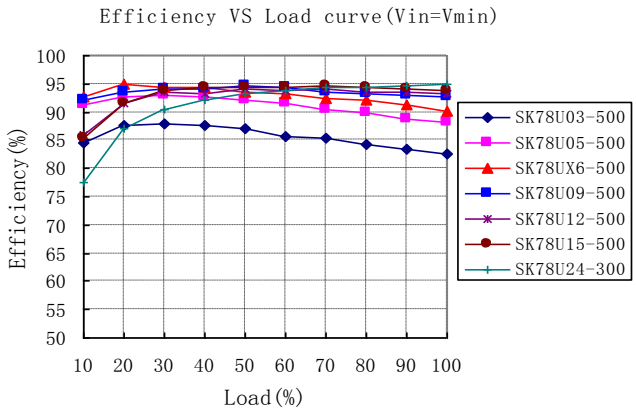
(figure 7)

CHARACTERISTICS CURVE

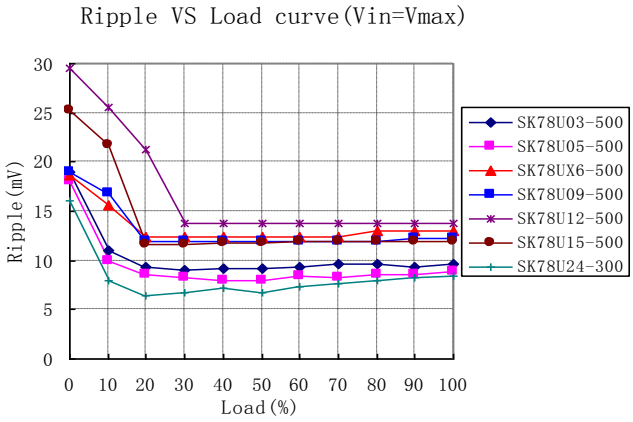
Efficiency

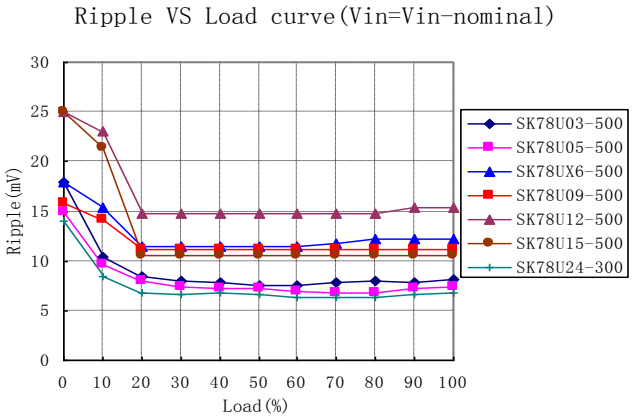


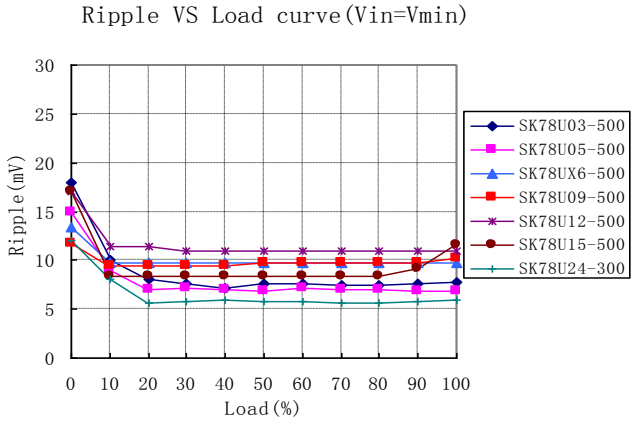




Ripple



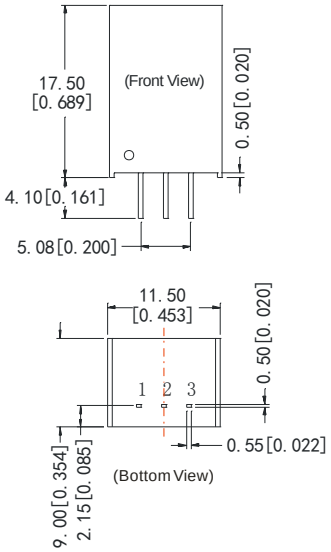




OUTLINE DIMENSIONS & FOOTPRINT DETAILS

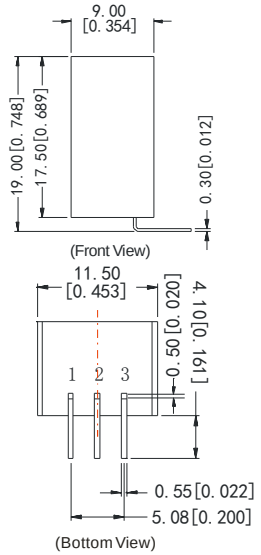
MECHANICAL DIMENSIONS

SK78UXX-500



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

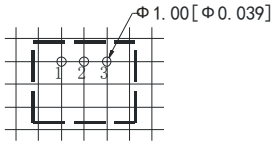
SK78UXX-500L



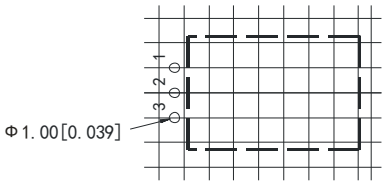
Note:
Unit:mm[inch]
Pin section tolerances:±0.10mm[±0.004inch]
General tolerances:±0.25mm[±0.010inch]

RECOMMENDED FOOTPRINT

SK78UXX-500



SK78UXX-500L

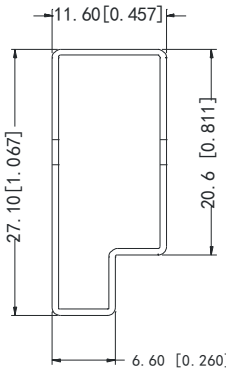


Note:
grid:2.54*2.54mm.

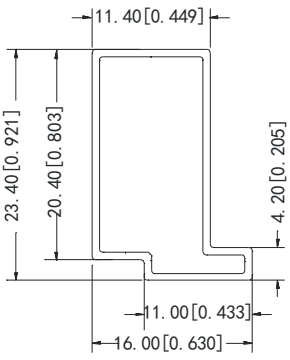
FOOTPRINT DETAILS	
Pin	Function
1	+Vin
2	GND
3	+Vout

TUBE OUTLINE DIMENSIONS

SK78UXX-500



SK78UXX-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(with six inner packaging boxes): 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 three 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.