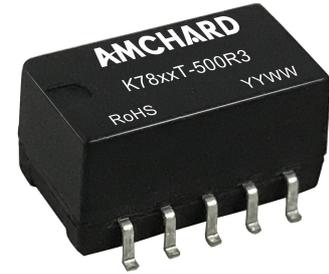


FEATURES

1. High efficiency up to 95%
2. No-load input current as low as 0.2mA
3. Operating ambient temperature range: -40°C to +85°C
4. Output short-circuit protection
5. SMD package



3 years
Warranty

Selection Guide

Part No.	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)(Max./Min.)	Efficiency (%Min./Typ.) @ Full Load	Max. Capacitive Load (μF)
K7801T-500R3	12(4.75-28)	1.5	500	76/67	680
K78X2T-500R3	12(4.75-28)	1.8	500	76/69	680
K7802T-500R3	12(4.75-32)	2.5	500	81/74	680
K7803T-500R3	24(4.75-36)	3.3	500	86/80	680
K7805T-500R3	24(6.5-36)	5	500	90/84	680
K78X6T-500R3	24(8-36)	6.5	500	92/87	680
K7809T-500R3	24(12-36)	9	500	93/90	680
K7812T-500R3	24(15-36)	12	500	94/91	680
K7815T-500R3	24(19-36)	15	500	95/93	680

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current		--	0.2	0.5	mA
Reverse Polarity at Input		Avoid / Not protected			
Input Filter		Capacitance filter			
Ctrl*	Module on	Ctrl pin open or pulled high (TTL 3.2-8VDC)			
	Module off	Ctrl pin pulled low to GND (0-0.8VDC)			
	Input current when off	--	30	100	μA

Note: *The Ctrl pin voltage is referenced to input GND.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Output Voltage Accuracy	Full load, input voltage range	1.5/1.8/2.5/3.3 VDC output	--	±2	±4	%
		Other output	--	±2	±3	
Linear Regulation	Full load, input voltage range		--	±02	±0.4	
Load Regulation	Nominal input voltage, 10% -100% load	1.5/1.8/2.5/3.3/5 VDC output	--	±06	--	
		Other output	--	±03	--	
Ripple & Noise*	20MHz bandwidth, nominal input voltage	1.5/1.8/2.5/3.3 VDC output, 20% -100% load	--	20	50	mVp-p
		Other output, 10% -100% load	--	20	50	
Temperature Coefficient	Operating temperature -40°C to +85°C		--	--	±0.03	%/°C
Transient Response Deviation	Nominal input voltage, 25% load step change		--	50	200	mV
Transient Recovery Time			--	0.2	1	ms
Short-circuit Protection	Nominal input voltage		Continuous, self-recovery			
Vadj	input voltage range		-10	--	+10	%Vo
Note: * 1. The "parallel cable" method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information; 2. With light loads at or below 20%, Ripple & Noise for 1.5/1.8/2.5/3.3V output parts increases to 100mVp-p max. and a load below 10% for 5V/6.5V/9V/12V/15V output parts levels increase to 150mVp-p max.						

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Operating Temperature	See Fig. 1		-40	--	+85	°C
Storage Temperature			-55	--	+125	
Storage Humidity	Non-condensing		5	--	95	%RH
Reflow Soldering Temperature			Peak temperature ≤245°C, duration ≤60s max. over 217°C. Also refer to IPC/JEDEC J-STD-020D.1.			
Switching Frequency	Full load, nominal input	K7801T-500R3	--	370	--	kHz
		Other output	--	700	--	
MTBF	MIL-HDBK-217F@25°C		2000	--	--	k hours
Moisture Sensitivity Level (MSL)*	IPC/JEDEC J-STD-020D.1		Level 1			
Note: * For actual application, please refer to IPC/JEDEC J-STD-020D.1.						

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	15.24 x11.40 x 8.25mm
Weight	1.5g (Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility (EMC)

Emissions	CE	CISPR32/EN55032 CLASS B (see Fig. 4-② for recommended circuit)	
	RE	CISPR32/EN55032 CLASS B (see Fig. 4-② for recommended circuit)	
Immunity	ESD	IEC/EN 61000-4-2 Contact $\pm 4\text{kV}$	perf. Criteria B
	RS	IEC/EN 61000-4-3 10V/m	perf. Criteria A
	EFT	IEC/EN 61000-4-4 $\pm 1\text{kV}$ (see Fig. 4-① for recommended circuit)	perf. Criteria B
	Surge	IEC/EN 61000-4-5 line to line $\pm 1\text{kV}$ (see Fig. 4-① for recommended circuit)	perf. Criteria B
	CS	IEC/EN 61000-4-6 3Vr.m.s	perf. Criteria A

Typical Performance Curves

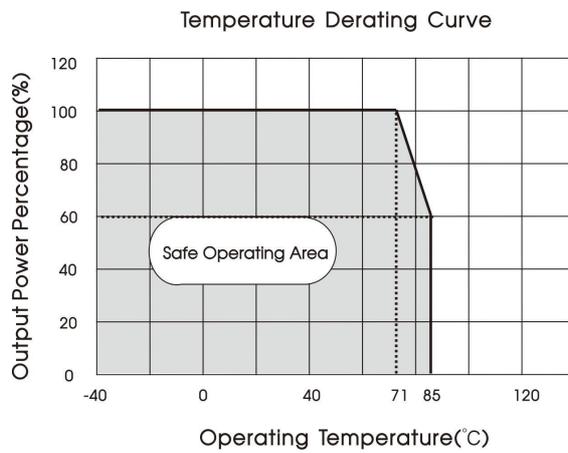
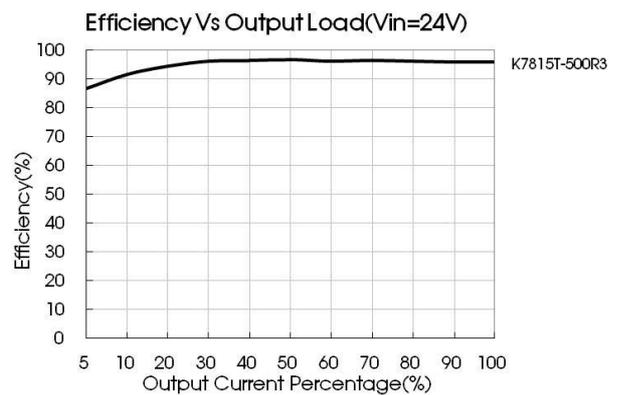
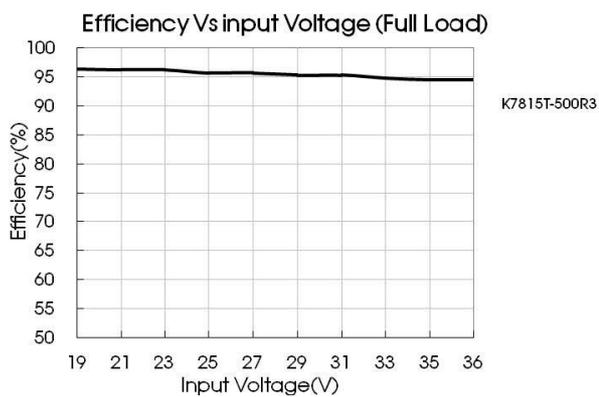
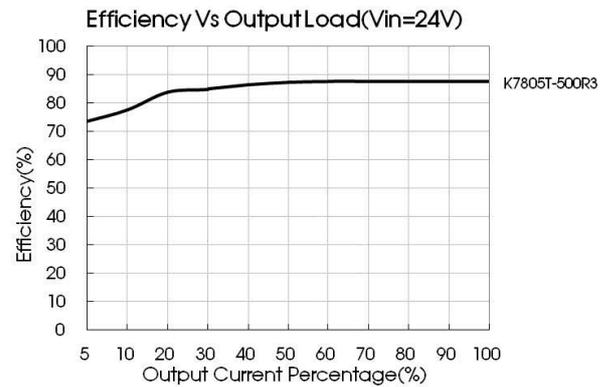
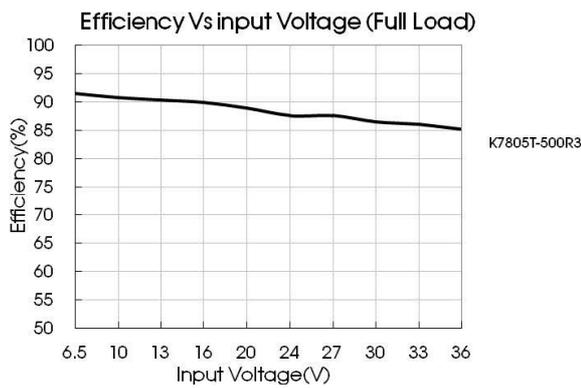


Fig. 1



Design Reference

1, Typical application

If it is required to further reduce input and output ripple, a filter capacitor can be connected to the input and output terminals, see Fig.3. Moreover, choosing suitable filter capacitor is very important, start-up problems may be caused by too large capacitance. To ensure the modules running well, the recommended capacitive load values as shown in Table 1. The simplest device for output voltage regulation, over-voltage and over-current protection is a linear voltage regulator with overheat protection that is connected to the input or output end in series (Fig.4)

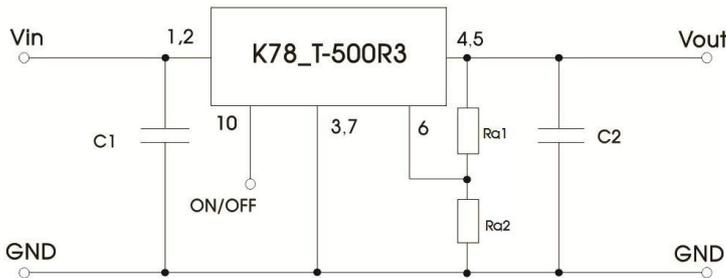


Fig. Typical application circuit

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)	Ra1/Ra2 (Vadj resistance)
K7801T-500R3	10μF/50V	22μF/10V	Refer to Vadj resistance calculation
K78X2T-500R3		22μF/10V	
K7802T-500R3		22μF/10V	
K7803T-500R3		22μF/10V	
K7805T-500R3		22μF/16V	
K78X6T-500R3		22μF/16V	
K7809T-500R3		22μF/25V	
K7812T-500R3		22μF/25V	
K7815T-500R3		22μF/25V	

Table 1

Note:

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;
4. To further reduce the output ripple and noise, we suggested the use of a "LC" filter at the output terminals, with an inductor value (L) of 10μH 47μH.

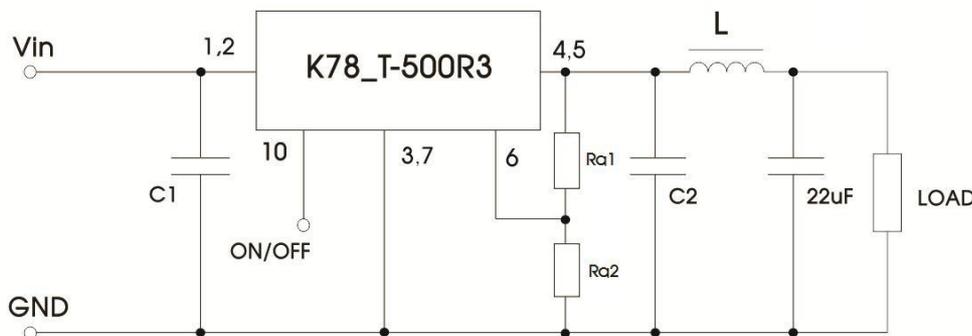


Fig. 3 External "LC" output filter circuit diagram

2, EMC Compliance circuit

To ensure the module work efficiently and reliably, during the operation, the min. output load should be no less than 10% of the full load. If the actual output power is low, please connect a resistor to the output terminal in parallel, with a recommended resistance which is 10% of the rated power, and detailing is required during operation

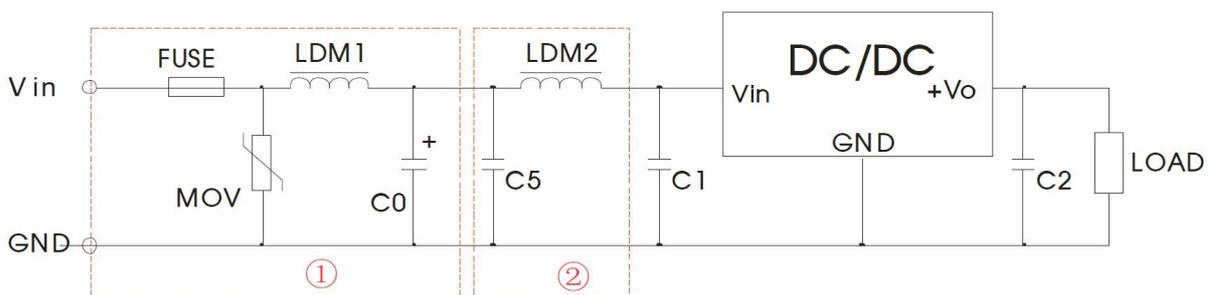
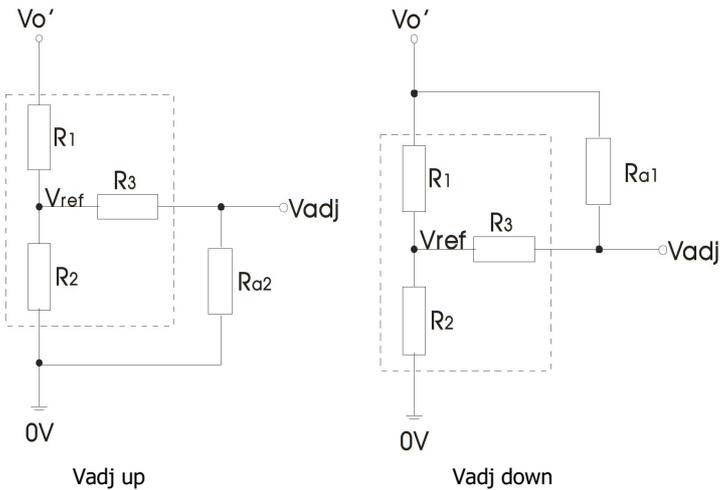


Fig.4 Recommended compliance circuit

FLUS	MOV	LDM1	C0	C1/C2	C5	LDM2
Select fuse value according to actual input current	S20K30	82μH	680μF /50V	Refer to table 1	4.7μF /50V	12μH

Note: Part ① in Fig. 4 shows Immunity compliance filter and part ② filter for Emission compliance; depending on requirement both filters ① and ② can be used in series as shown.

3, Trim Function for Output Voltage Adjustment (open if unused)



Calculating Trim resistor values:

$$\text{Up: } Ra_2 = \frac{aR_2}{R_2 - a} - R_3 \quad a = \frac{V_{ref}}{V_{o'} - V_{ref}} \cdot R_1$$

$$\text{Down: } Ra_1 = \frac{aR_1}{R_1 - a} - R_3 \quad a = \frac{V_{o'} - V_{ref}}{V_{ref}} \cdot R_2$$

Ra1、Ra2= Trim Resistor value;
Vo'= desired output voltage.
a = self-defined parameter;

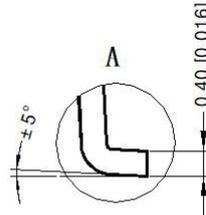
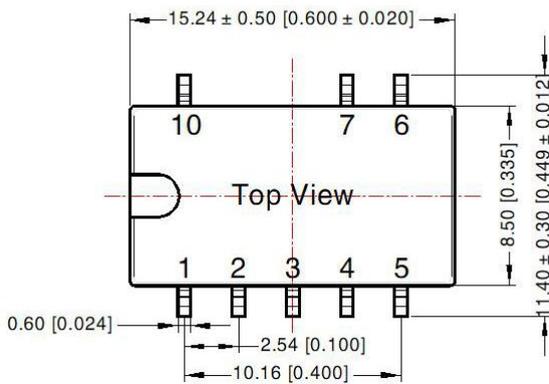
Fig. 5 Circuit diagram of Vadj up and down (dashed line shows internal part of module)

Vout(V)	R1(kΩ)	R2(kΩ)	R3(kΩ)	Vref(V)
1.5	7.5	7.5	15	0.75
1.8	35.7	26.29	100	0.765
2.5	27	11.858	51	0.765
3.3	33	9.9	47	0.765
5	75	13.5	75	0.765
6.5	75	10	51	0.765
9	51	4.7	27	0.765
12	75	5.1	27	0.765
15	82	4.423	27	0.765

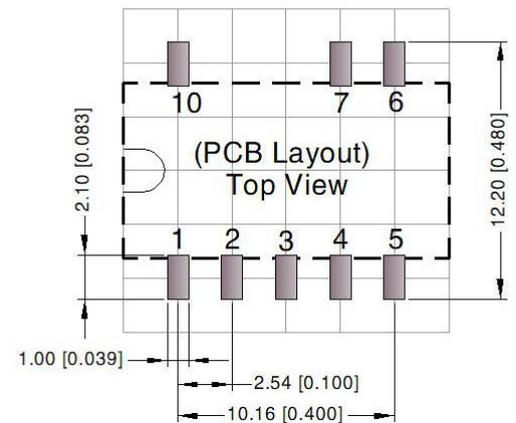
Note: The 1.5V model's output voltage can only be adjusted up (Vadj up) and cannot be adjusted to a lower voltage (Vadj down is not applicable).

4, For additional information please refer to DC-DC converter application notes on

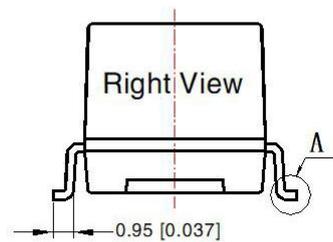
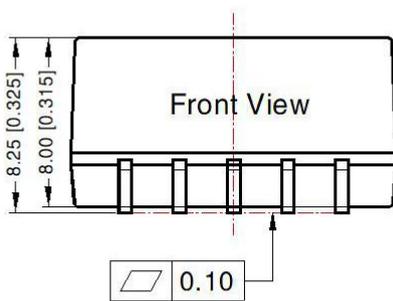
Dimensions and Recommended Layout



THIRD ANGLE PROJECTION



Note: Grid 2.54*2.54mm



Note:

Unit: mm[inch]

Pin section tolerances: ± 0.10 [± 0.004]

General tolerances: ± 0.25 [± 0.010]

Pin-Out	
Pin	Mark
1	+Vin
2	+Vin
3	GND
4	+Vout
5	+Vout
6	V adj
7	GND
10	Remote On/Off

NC: Pin to be isolated from circuitry

Note:

1. If the product is not operated within the required load range, the product performance cannot be guaranteed to comply with all parameters in the datasheet;
2. The maximum capacitive load offered were tested at input voltage range 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's corporate standards;
5. We can provide product customization service, please contact our technicians directly for specific information;
6. Specifications are subject to change without prior notice.