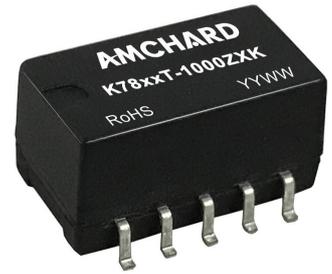


### FEATURES

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		Full Load Efficiency (%) Typ. Vin Min. / Vin Max.	Capacitive Load (µF) Max.
	Nominal (Range)	Voltage (VDC)	Current (mA) Max.		
K7801T-1000Z XK	12 (4.75-32)	1.5	1000	76/66	680
K78X2T-1000Z XK	12 (4.75-32)	1.8	1000	79/69	680
K7802T-1000Z XK	12 (4.75-32)	2.5	1000	86/74	680
K7803T-1000Z XK	24 (6.5-36)	3.3	1000	90/80	680
K7805T-1000Z XK	24 (8-36)	5	1000	93/85	680
K78X6T-1000Z XK	24 (10-36)	6.5	1000	93/86	680
K7809T-1000Z XK	24 (13-36)	9	1000	94/89	680
K7812T-1000Z XK	24 (16-36)	12	800	95/92	680

Note: \*For input voltage exceeding 30 VDC, an input capacitor of 22µF/50V is required.

### Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current		-	0.2	1	mA
Reverse Polarity at Input		Avoid / Not protected			
Input Filter		Capacitance filter			
Ctrl	Module on	Open or pulled high (TTL level 3.2-5.5VDC)			
	Module off	Pulled low to GND level (0-0.8VDC)			
	Input current when off	-	0.2	1	mA

### Output Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit	
Voltage Accuracy	Full load, input voltage range	1.5/1.8/2.5/3.3VDC output	-	±2	±4	%
		Other output	-	±2	±3	
Linear Regulation	Full load, input voltage range	1.5/1.8/2.5VDC output	-	±0.3	±0.6	
		Other output	-	±0.2	±0.4	
Load Regulation	Nominal input voltage, 10% -100% load	1.5/1.8/2.5VDC output	-	0.8	±1.5	
		Other output	-	0.3	±0.6	

Ripple & Noise*	20MHz bandwidth	-	30	75	mVp-p
Temperature Coefficient	Operating temperature range -40°C to +85°C	-	-	±0.03	%/°C
Transient Response Deviation	Nominal input voltage, 25% load step change	-	50	150	mV
Transient Recovery Time		-	0.2	1	ms
Short-circuit Protection	Nominal input	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 increases 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	1.5/1.8/2.5VDC output	-	370	-	kHz
		3.3/5/6.5VDC output	-	520	-	
		9/12VDC 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

<b>Case Material</b>	Black plastic; flame-retardant and heat-resistant (UL94V-0)
<b>Dimensions</b>	15.24 x 11.40 x 8.25 mm
<b>Weight</b>	1.7g (Typ.)
<b>Cooling Method</b>	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 ±4kV perf. Criteria B
	RS	IEC/EN 61000-4-3 10V/m perf. Criteria A
	EFT	IEC/EN 61000-4-4 ±1kV (see Fig. 4-① for recommended circuit) perf. Criteria B
	Surge	IEC/EN 61000-4-5 line to line ±1kV (see Fig. 4-① for recommended circuit) perf. Criteria B
	CS	IEC/EN 61000-4-6 3Vr.m.s perf. Criteria A

### Typical Characteristic Curves

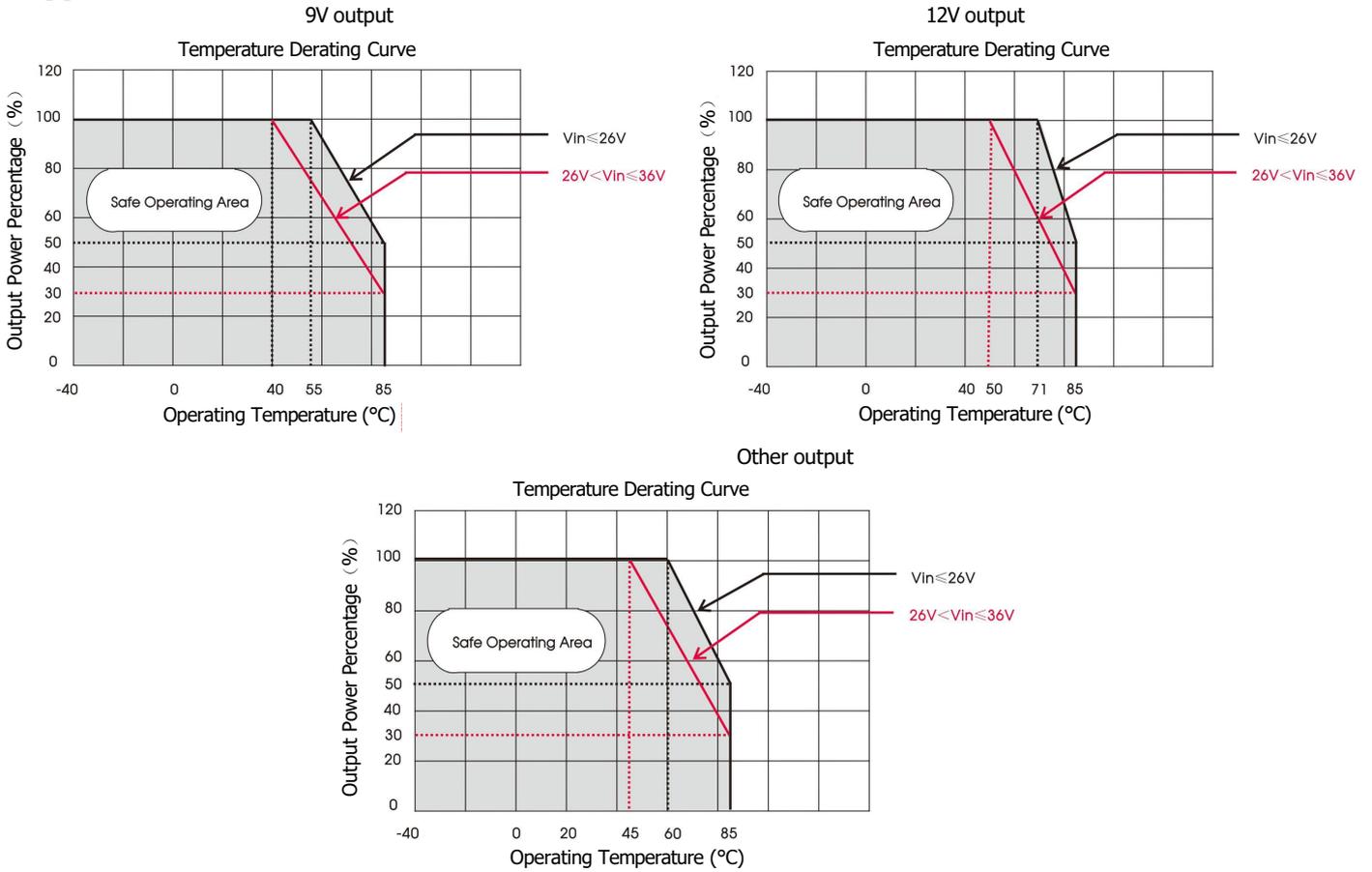
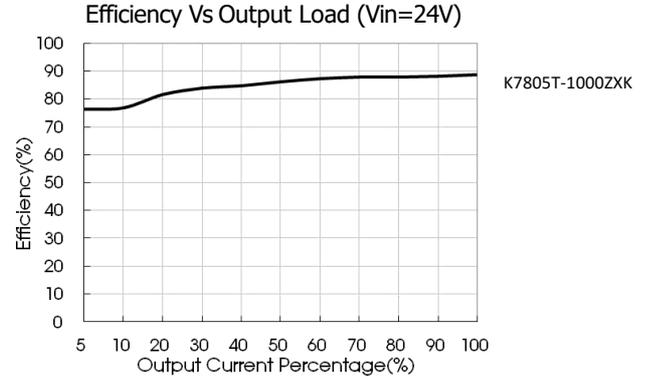
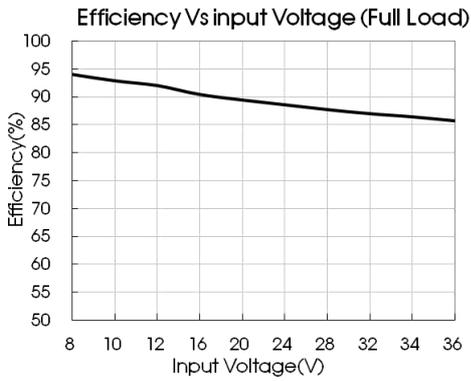


Fig. 1



### Design Reference

#### 1. Typical application

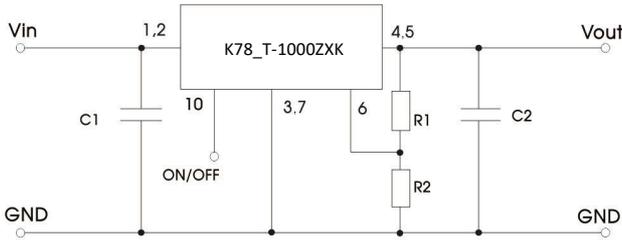


Fig. 2 Typical application circuit

Part No.	C1 (ceramic capacitor)	C2 (ceramic capacitor)	R1/R2 (Vadj resistance)
K7801T-1000Z XK	10µF/50V	22µF/10V	Refer to Vadj resistance calculation
K78X2T-1000Z XK		22µF/10V	
K7802T-1000Z XK		22µF/10V	
K7803T-1000Z XK		22µF/10V	
K7805T-1000Z XK		22µF/16V	
K78X6T-1000Z XK		22µF/16V	
K7809T-1000Z XK		22µF/16V	
K7812T-1000Z XK		22µF/25V	

table 1

- Note:
- The required C1 and C2 capacitors must be connected as close as possible to the terminals of the module.
  - 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.
  - Converter cannot be used for hot swap and with output in parallel.
  - 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.

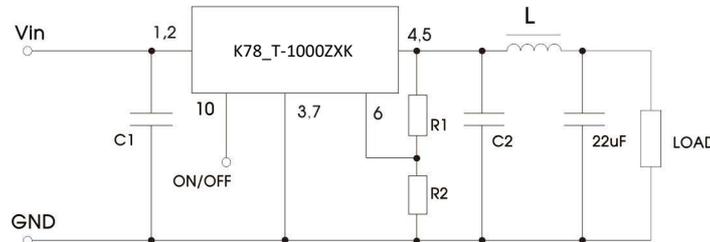


Fig. 3 External "LC" output filter circuit diagram

#### 2. EMC compliance circuit

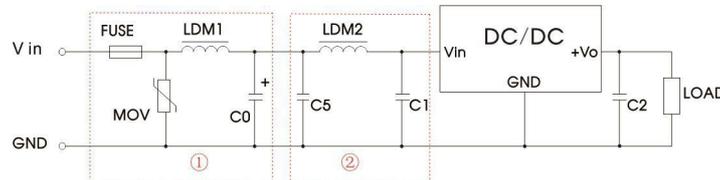
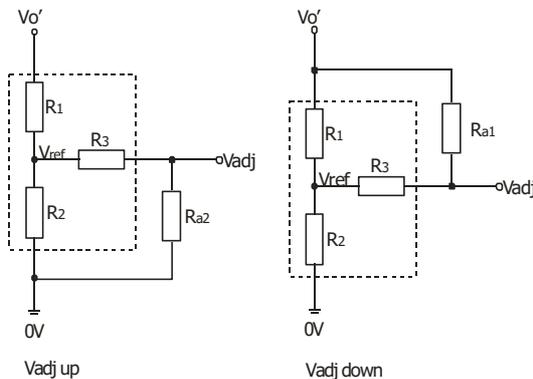


Fig.4 Recommended compliance circuit

FUSE	MOV	LDM1	C0	C2	C1/C5	LDM2
Select fuse value according to actual input current	S20K30	82µH	680µF /50V	Refer to table 1	4.7µF /50V	68µH

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:

$$\begin{aligned} \text{up: } R_{a2} &= \frac{aR_2}{R_2 - a} - R_3 & a &= \frac{V_{ref}}{V_o' - V_{ref}} R_1 \\ \text{down: } R_{a1} &= \frac{aR_1}{R_1 - a} - R_3 & a &= \frac{V_o' - V_{ref}}{V_{ref}} \cdot R_2 \end{aligned}$$

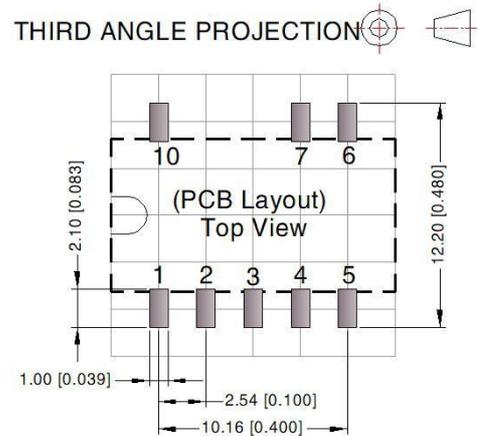
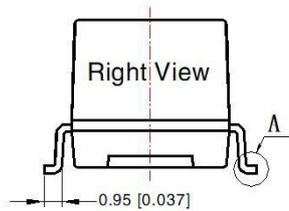
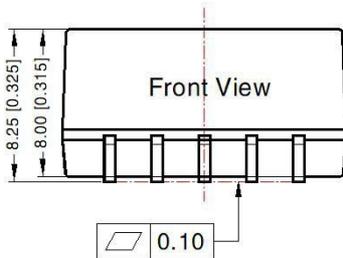
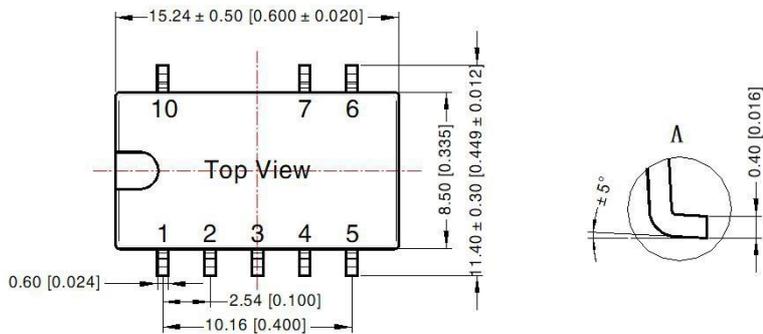
Ra1、Ra2 = Trim Resistor value;  
Vo' = desired output voltage; a = self-defined parameter.

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	4.7	3.3	6.8	0.75
2.5	9.1	3.9	8.2	0.75
3.3	75	22	75	0.75
5	43	7.5	33	0.75
6.5	43	5.6	22	0.75
9	43	3.9	22	0.75
12	36	2.4	10	0.75

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).

### Dimensions and Recommended Layout



Note: Grid 2.54\*2.54mm

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

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

NC: Pin to be isolated from circuitry

**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  $<75\%RH$ , 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;