Switching Regulator

香亭科技 SHINETING

- High efficiency up to 96%
- No-load input current as low as 0.1mA
- Operating ambient temperature range: -40℃ to +85℃
- Support the negative output
- Output short-circuit protection

STK78XX-1.0

RoHS *3-Year Warranty*

Description

STK78XX-1.0 feature high efficiency, low loss, short circuit protection, positive or negative output voltage, and there is no need for a heat sink. These product are widely used in applications such as industrial control, instrumentation and electric power.

Selection Guide

Certification	Part No.	Input Voltage (Vdc) Nominal (Range)	Output Voltage (VDC)	Output Current (mA) Max.	Full Load Efficiency (%) Typ. Vin Min./Vin Max.	Capacitive Load(μF) Max.
/	STK7803-1.0	24 (6-36)	3.3	1000	90/81	680
	STK7805-1.0	24 (8-36)	5	1000	93/86	680
		12 (8-27)	-5	-500	86/82	330
	STK78X6-1.0	24 (10-36)	6.5	1000	93/87	680
	STK7809-1.0	24 (13-36)	9	1000	95/90	680
	STK7812-1.0	24 (16-36)	12	1000	96/93	680
		12 (8-20)	-12	-300	89/88	330
	STK7815-1.0	24 (20-36)	15	1000	96/94	680
		12 (8-18)	-15	-300	89/89	330

Note:①For input voltage exceeding 30 VDC, an input capacitor of 22uF/50V is required;
② L-suffix: Add L-suffix for horizontal mount with 90 degree angled pins (STKxxyy-1.0).

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
No-load Input Current	Positive output	--	0.1	1	mA
Reverse Polarity Input		Forbidden			
Input Filter		Capacitance filter			

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy	Full load, input voltage range	STK7803-1.0	--	±2	±4	%
		Other output	--	±2	±3	
Linear Regulation	Full load, input voltage range		--	±0.2	±0.4	
Load Regulation	Nominal input,10% -100% load		--	±0.4	±0.6	
Ripple & Noise*	20MHz bandwidth, nominal input, 20% -100% load		--	20	75	mVp-p
Temperature Coefficient	Operating ambient temperature -40℃ to +85℃		--	--	±0.03	%/℃
Transient Response Deviation	Nominal input voltage, 25% load step change		--	50	300	mV
Transient Recovery Time			--	0.1	1	ms
Short-circuit Protection	Nominal input		Continuous, self-recovery			

*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 3.3/5V output parts increases to 100mVp-p max, and for 9V/12V/15V output parts to 2%Vo max.

General Specifications

Item	Operating Condition		Min.	Typ.	Max.	Unit
Operating Temperature	Derating if the temperature ≥71℃ (see Fig. 1)		-40	--	85	℃
Storage Temperature			-55	--	125	
Pin Soldering Resistance Temperature	Soldering time: 10 seconds		--	--	260	
Storage Humidity	Non-condensing		5	--	95	%RH
Switching Frequency	100% load, input voltage range	STK7803-1.0/STK7805-1.0/STK78X6-1.0	420	520	620	kHz
		Other output	580	680	780	
MTBF	MIL-HDBK-217F@25℃		2000	--	--	k hours

Mechanical Specifications

Case Material		Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	STK78XX-1.0	11.50 x 9.00 x 17.50 mm
Weight		3.8g (Typ.)
Cooling Method		Free air convection

EMC Specifications

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

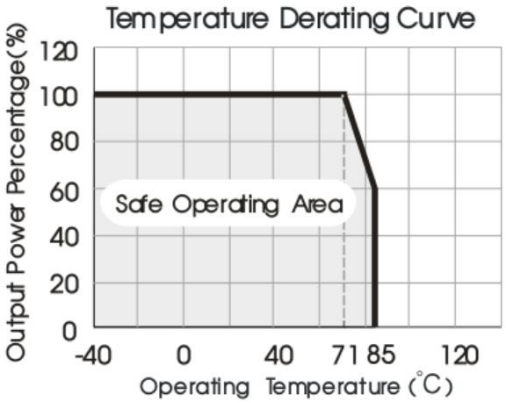
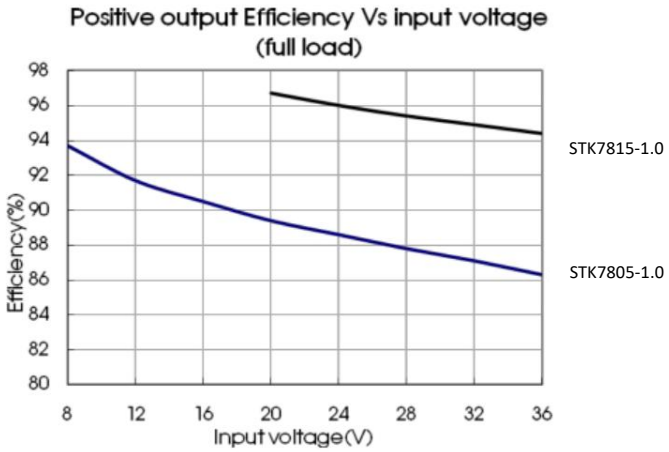
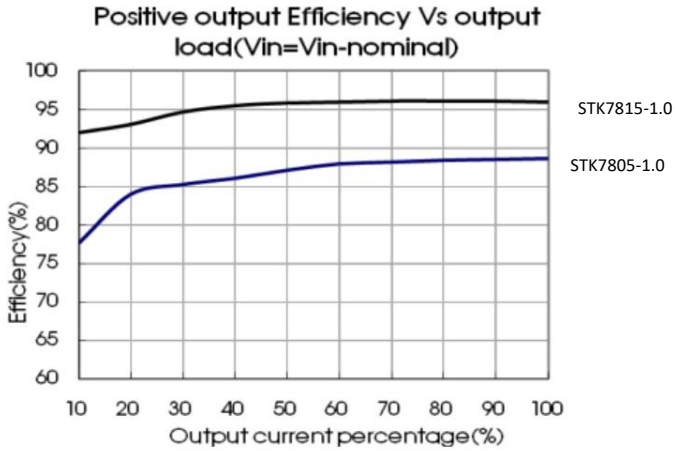
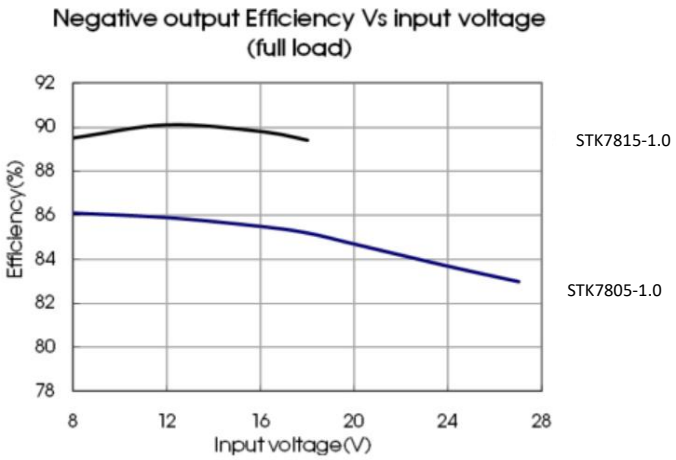
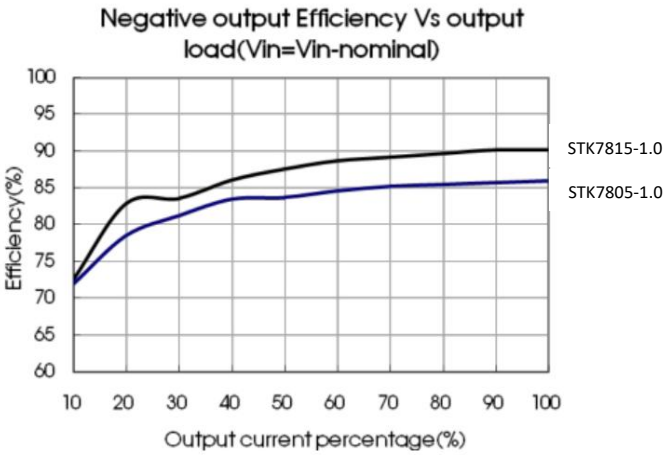


Fig. 1



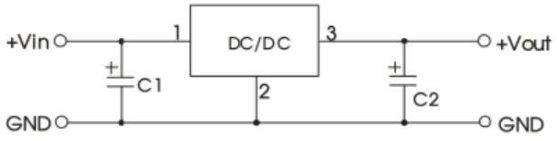




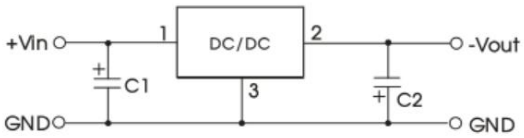


Design Reference

1. Typical application



Positive output application circuit



Negative output application circuit

Fig. 2 Typical application circuit

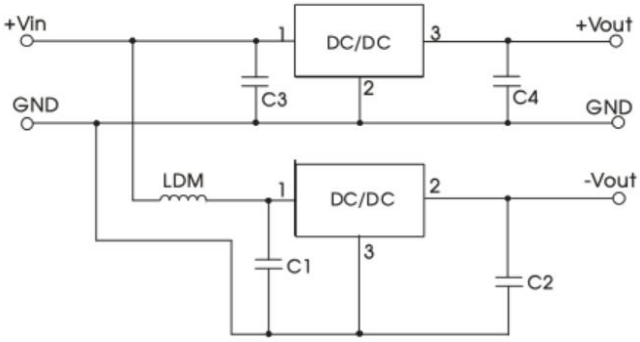


Fig. 3 Positive and Negative output application circuit

Table 1

Part No.	C1/C3 (ceramic capacitor)	C2/C4 (ceramic capacitor)
STK7803-1.0	10μF/50V	22μF/10V
STK7805-1.0		22μF/10V
STK78X6-1.0		22μF/10V
STK7809-1.0		22μF/16V
STK7812-1.0		22μF/25V
STK7815-1.0		22μF/25V

Notes:

1. The required capacitors C1 and C2 (C3 and C4) must be connected as close as possible to the terminals of the module;

2. Refer to Table 1 for C1 and C2 (C3 and C4) capacitor values.

3. For certain applications, increased values for C2 and C4 and/or tantalum or low ESR electrolytic capacitors may also be used instead;

4. When using configurations as shown in figure 3, we recommended to add an inductor (LDM) with a value of up to 10μH which helps reducing mutual interference;

5. Converter cannot be used for hot swap and with output in parallel.

2. EMC compliance circuit

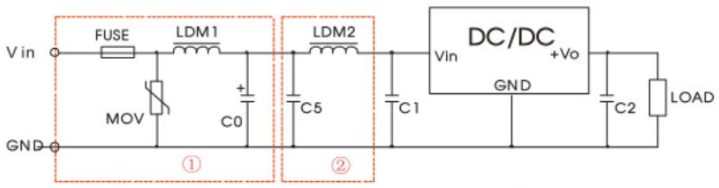


Fig. 4 EMC recommended circuit

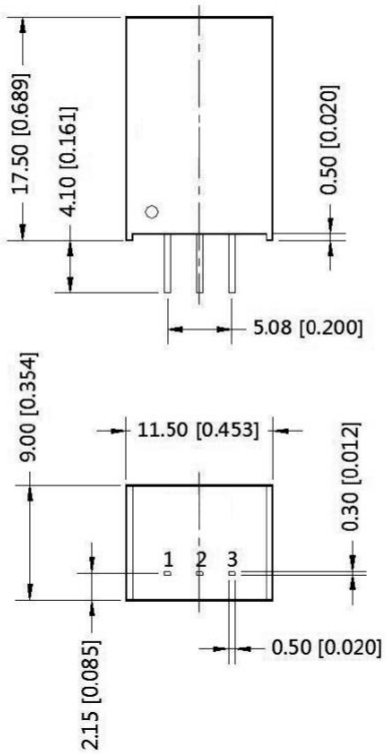
FUSE	MOV	LDM1	C0	C1/C2	C5	LDM2
Select fuse value according to actual input current	S20K30	82μH	680μF /50V	Refer to table 1	4.7μF /50V	12μH

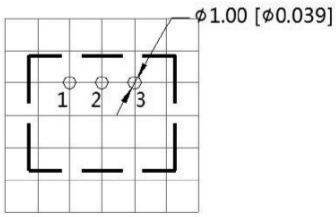
Note: Part ① in Fig. 4 shows EMS compliance filter and part ② filter for EMI compliance; depending on requirement both filters ① and ② can be used in series as shown.

Dimensions and Recommended Layout

units: mm [inch]
tolerance: ±0.25[±0.010]
pin diameter tolerance: ±0.10[±0.004]

PIN CONNECTIONS		
PIN	+OUTPUT	-OUTPUT
1	+VIN	+VIN
2	GND	-VOUT
3	+VOUT	GND





Note : Grid 2.54*2.54mm
Recommended PCB Layout
Top View

Note:

1. The maximum capacitive load offered were tested at nominal input voltage and full load;
2. Unless otherwise specified, parameters in this datasheet were measured under the conditions of Ta=25℃, humidity<75%RH with nominal input voltage and rated output load;
3. All index testing methods in this datasheet are based on our company corporate standards;
4. We can provide product customization service, please contact our technicians directly for specific information;
5. Products are related to laws and regulations: see "Features" and "EMC";