

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range:
-40°C to +105°C
- High efficiency up to 86%
- High power density
- I/O isolation test voltage 3k VDC
- Industry standard pin-out

STH02-0512S



RoHS 3-Year Warranty

Description

STH02-XXXXS series are specially designed for applications where an (two) isolated voltage is required in a distributed power supply system. They are suitable for occasions of:

- 1.The voltage of the input power supply is relatively stable with a variation of $\pm 10\%V_{in}$ or less;
- 2.A high input to output isolation voltage of $\leq 3000VDC$ is necessary;
- 3.The requirement for a tight output regulation and low ripple & noise is not as strict.

Selection Guide

Certification	Part No.	Input Voltage (Vdc) Nominal (Range)	Output Voltage (Vdc)	Output Current (mA) Max./Min.	Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
/	STH02-0503S	5 (4.5-5.5)	3.3	400/40	74/78	2400
	STH02-0505S		5	400/40	80/84	2400
	STH02-0507S		7.2	278/28	80/84	1000
	STH02-0509S		9	222/22	81/85	1000
	STH02-0512S		12	167/17	81/85	560
	STH02-0515S		15	133/13	82/86	560
	STH02-0524S		24	83/8	82/86	220

Selection Guide

Certification	Part No.	Input Voltage (Vdc) Nominal (Range)	Output Voltage (Vdc)	Output Current (mA) Max./Min.	Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
/	STH02-1205S	12 (10.8-13.2)	5	400/40	78/82	2400
	STH02-12X6S		6.4	312/31	78/82	1000
	STH02-1209S		9	222/22	78/82	1000
	STH02-1212S		12	167/17	80/84	560
	STH02-1215S		15	133/13	81/85	560
	STH02-1224S		24	83/8	82/86	220
	STH02-1505S	15 (13.5-16.5)	5	400/40	76/80	2400
	STH02-1509S		9	222/22	76/80	1000
	STH02-1512S		12	167/17	77/81	560
	STH02-1515S		15	133/13	77/81	560
	STH02-1524S		24	83/8	77/81	220
	STH02-2403S	24 (21.6-26.4)	3.3	400/40	70/76	2400
	STH02-2405S		5	400/40	74/80	2400
	STH02-2407S		7.2	278/27	74/80	1000
	STH02-2409S		9	222/22	75/81	1000
	STH02-2412S		12	167/17	78/84	560
	STH02-2415S		15	133/13	80/86	560
	STH02-2418S		18	111/11	80/86	220
	STH02-2424S		24	83/8	80/86	220

Note: * The specified maximum capacitive load for positive and negative output is identical.

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	5VDC input	3.3VDC output	--	534/8	564/--	mA
		5VDC/7.2VDC output	--	477/8	500/--	
		9VDC/12VDC output	--	471/8	494/--	
		15VDC/24VDC output	--	466/8	488/--	
	12VDC input	3.3VDC output	--	222/8	235/--	
		5VDC/7.2VDC output	--	208/8	219/--	
		9VDC output	--	203/8	214/--	
		12VDC/15VDC/24VDC output	--	201/8	211/--	
	15VDC input	5VDC/9VDC output	--	167/8	176/--	
		12VDC/15VDC/24VDC output	--	165/8	173/--	
	24VDC input	3.3VDC output	--	110/8	119/--	
		5VDC/7.2VDC output	--	104/8	112/--	
		9VDC output	--	103/8	111/--	
		12VDC output	--	99/8	107/--	
		15VDC/18VDC/24VDC output	--	97/8	104/--	
Reflected Ripple Current*			--	15	--	
Surge Voltage (1sec. max.)	5VDC input		-0.7	--	9	VDC
	12VDC input		-0.7	--	18	
	15VDC input		-0.7	--	21	
	24VDC input		-0.7	--	30	
Input Filter			Capacitance filter			
Hot Plug			Unavailable			

Note: * Refer to DC-DC Converter Application Notes for detailed description of reflected ripple current test method.

Out Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curve (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	±1.5	--
		Others	--	--	±1.2	
Load Regulation	10%-100% load	5VDC input	3.3VDC output	--	10	%
			5/7.2VDC output	--	8	
			9/12/15 output	--	7	
			24VDC output	--	5	
		12/15/24VDC input	3.3VDC output	--	15	
			5VDC output	--	7	
			6.4VDC output	--	10	
			7.2VDC output	--	6	
			9/12VDC output	--	5	
			15VDC output	--	4	
Ripple & Noise*	20MHz bandwidth	5V input	--	75	200	mVp-p
		12/15/24V input	--	75	180	
Temperature Coefficient	Full load		--	±0.02	--	%/°C
Short-circuit Protection			Continuous, self-recovery			

Note: * The “parallel cable” method is used for Ripple and Noise test, please refer to DC-DC Converter Application Notes for specific information.

General Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Isolation	Input-output electric strength test for 1 minute with a leakage current of 1mA max.		3000	--	--	VDC
Insulation Resistance	Input-output resistance at 500VDC		1000	--	--	MΩ
Isolation Capacitance	Input-output capacitance at 100kHz/0.1V		--	20	--	pF
Operating Temperature	Derating when operating temperature≥85℃ (see Fig. 2)		-40	--	105	℃
Storage Temperature			-55	--	125	
Case Temperature Rise	Ta=25℃		--	25	--	
Pin Soldering Resistance Temperature	Soldering spot is 1.5mm away from case for 10 seconds		--	--	300	
Storage Humidity	Non-condensing		5	--	95	%RH
Vibration			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	Full load, nominal input voltage	5V input	--	220	--	kHz
		12/15/24V input	--	260	--	
MTBF	MIL-HDBK-217F @ 25℃		3500	--	--	k hours

Mechanical Specifications

Case Material	Black plastic; flame-retardant and heat-resistant (UL94V-0)
Dimensions	19.65 x 7.05 x 10.16 mm
Weight	2.4g(Typ.)
Cooling Method	Free air convection

Mechanical Specifications

Emissions	CE	CISPR32/EN55032 CLASS B
	RE	CISPR32/EN55032 CLASS B
Immunity	ESD	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV perf. Criteria B

Note: Refer to Fig. 4 for recommended circuit test

Typical Characteristic Curves

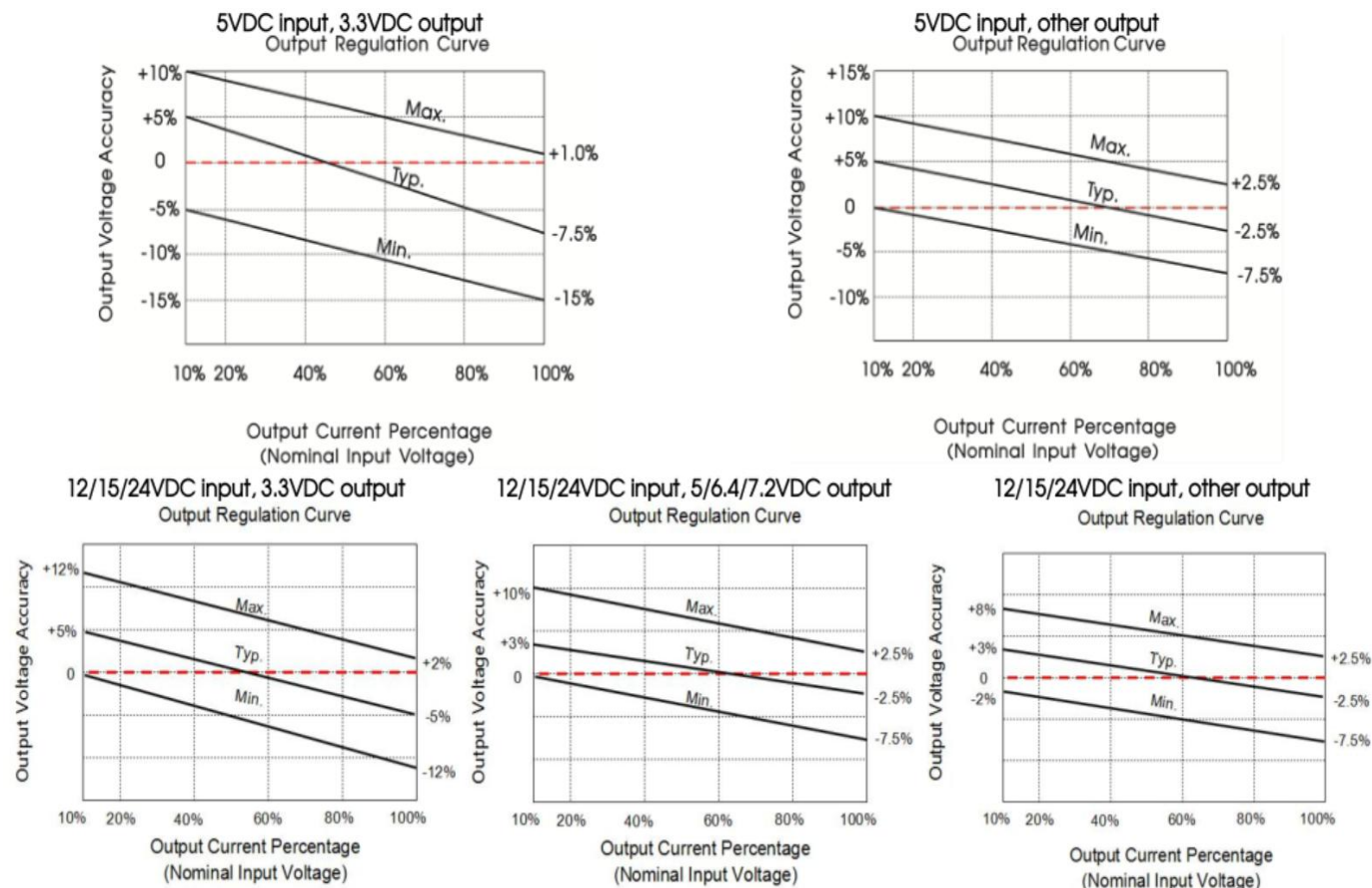


Fig. 1

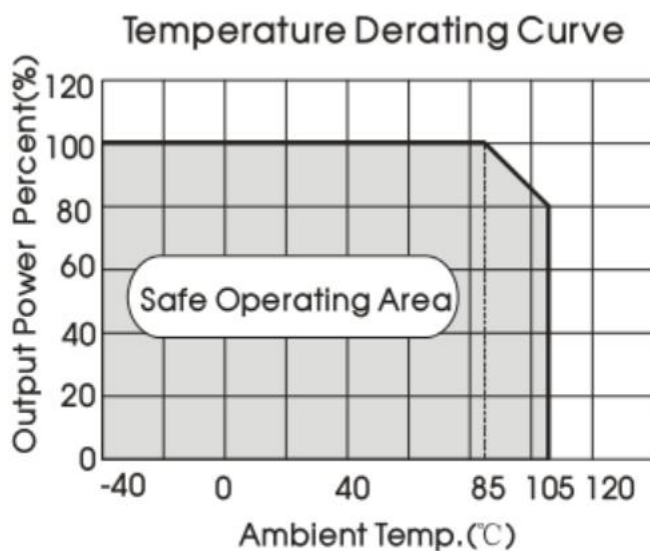
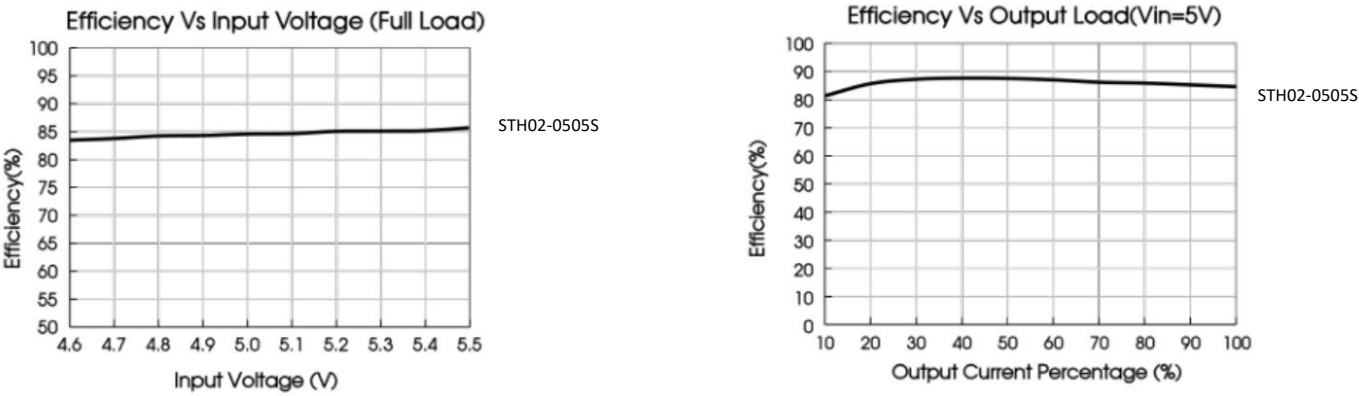


Fig. 2

Typical Characteristic Curves



Design Reference

1. Typical application

Input and/or output ripple can be further reduced, by connecting a filter capacitor from the input and/or output terminals to ground as shown in Fig. 3.

Choosing suitable filter capacitor values is very important for a smooth operation of the modules, particularly to avoid start-up problems caused by capacitor values that are too high. For recommended input and output capacitor values refer to Table 1.

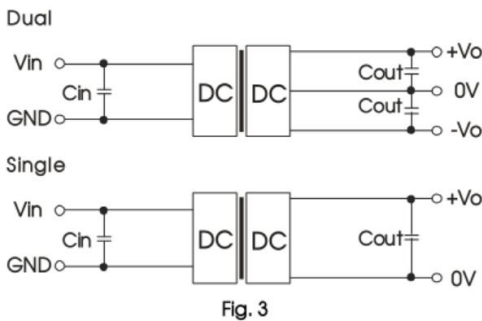
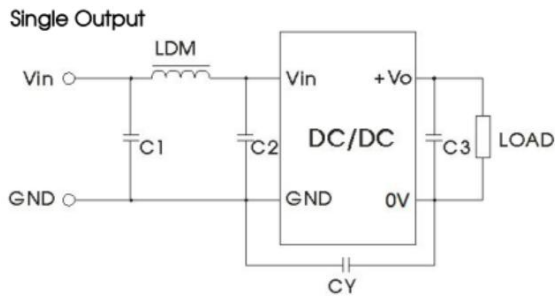


Table 1: Recommended input and output capacitor values					
Vin	Cin	Single Vout	Cout	Dual Vout	Cout*
5VDC	10μF/16V	3.3VDC	10μF/16V	±3.3VDC	4.7μF/16V
12VDC	2.2μF/25V	5VDC	10μF/16V	±5VDC	4.7μF/16V
15VDC	2.2μF/25V	6.4VDC	4.7μF/16V	±7.2VDC	2.2μF/25V
24VDC	1μF/50V	7.2VDC	2.2μF/25V	±9VDC	2.2μF/25V
--	--	9VDC	2.2μF/25V	±12VDC	1μF/25V
--	--	12VDC	2.2μF/25V	±15VDC	1μF/25V
--	--	15VDC	1μF/25V	±24VDC	0.47μF/50V
--	--	18VDC	1μF/50V	--	--
--	--	24VDC	1μF/50V	--	--

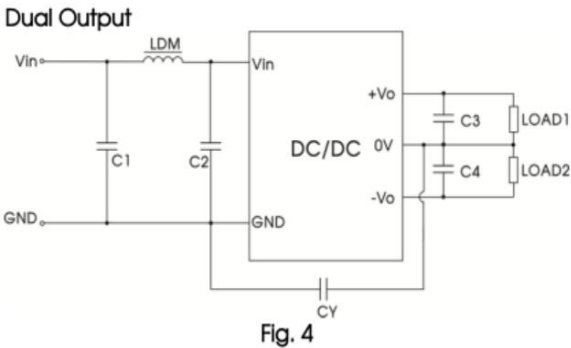
Note: The capacitor value of the positive and the negative output is identical.

2. EMC compliance circuit



Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/4kV	
	C3	Refer to Cout in Fig. 3	
	LDM	6.8μH	

Design Reference

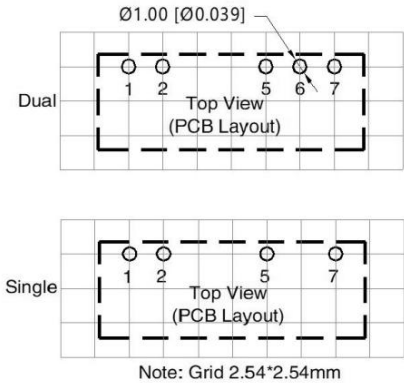
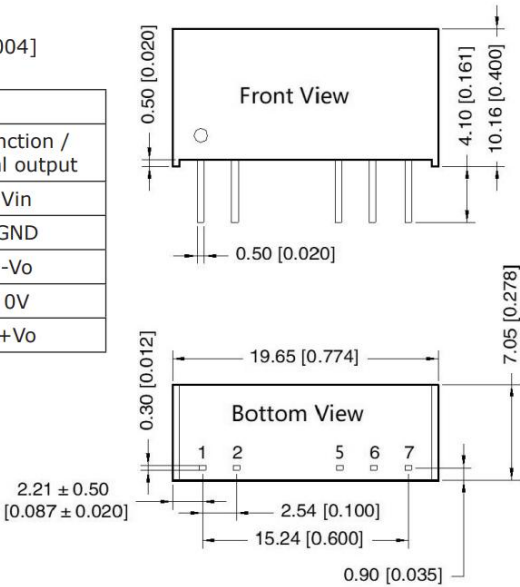


Input voltage		5VDC	12/15/24VDC
Emissions	C1/C2	4.7μF /16V	4.7μF /50V
	CY	270pF/4kV	
	C3/C4	Refer to Cout in Fig. 3	
	LDM	6.8μH	

Dimensions and Recommended Layout

units: mm [inch]
tolerance: $\pm 0.25[\pm 0.010]$
pin section tolerance: $\pm 0.10[\pm 0.004]$

PIN CONNECTIONS		
PIN	Function / Single output	Function / Dual output
1	Vin	Vin
2	GND	GND
5	0V	-Vo
6	No pin	0V
7	+Vo	+Vo



- 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 Ta=25°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 corporate standards;
 5. We can provide product customization service, please contact our technicians directly for specific information;
 6. Products are related to laws and regulations: see "Features" and "EMC";