STH01-XXXXXT

- Continuous short-circuit protection
- No-load input current as low as 8mA
- Operating ambient temperature range: -40℃ to +105℃
- High efficiency up to 85%
- Compact SMD package
- I/O isolation test voltage: 3k VDC
- Industry standard pin-out

RoHS

3-Year Warranty

Description

STH01-XXXXXT series are specially designed for applications where an isolated voltage is required in a distributed power supply system. They are suitable for: pure digital circuits, low frequency analog circuits, relay-driven circuits and data switching circuits.

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.
/	STH01-0303XT	3.3 (2.97-3.63)	3.3	303/30	73/77	2400
	STH01-0305XT		5	200/20	78/82	2400
	STH01-0309XT		9	111/11	80/84	1000
	STH01-0312XT		12	83/8	80/84	560
	STH01-0315XT		15	67/7	80/84	560
	STH01-0324XT		24	42/4	80/84	220

Selection Guide

Certification	Part No.	Input Voltage (Vdc) Nominal (Range)	Output Voltage (Vdc)	Output Current (mA)	Full Load Efficiency (%) Min./Typ.	Capacitive Load(μF) Max.
/	STH01-0503XT	5 (4.5-5.5)	3.3	303/30	70/74	2400
	STH01-0505XT		5	200/20	78/82	2400
	STH01-0509XT		9	111/12	79/83	1000
	STH01-0512XT		12	84/9	79/83	560
	STH01-0515XT		15	67/7	79/83	560
	STH01-0524XT		24	42/4	81/85	220
	STH01-1203XT	12 (10.8-13.2)	3.3	303/30	72/76	2400
	STH01-1205XT		5	200/20	78/82	2400
	STH01-1209XT		9	111/12	79/83	1000
	STH01-1212XT		12	84/9	79/83	560
	STH01-1215XT		15	67/7	79/83	560
	STH01-1224XT		24	42/4	81/85	220
	STH01-1505XT	15 (13.5-16.5)	5	200/20	78/82	2400
	STH01-1509XT		9	111/12	78/82	1000
	STH01-1515XT		15	67/7	79/83	560
	STH01-2403XT	24 (21.6-26.4)	3.3	303/30	72/76	2400
	STH01-2405XT		5	200/20	74/80	2400
	STH01-2409XT		9	111/12	74/80	1000
	STH01-2412XT		12	84/9	74/80	560
	STH01-2415XT		15	67/7	74/80	560
	STH01-2424XT		24	42/4	74/80	220

Input Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Input Current (full load / no-load)	3.3VDC input	3.3VDC output	--	394/12	416/--	mA
		5VDC output	--	370/12	389/--	
		9VDC/12VDC/15VDC/24VDC output	--	361/12	379/--	
	5VDC input	3.3VDC/5VDC output	--	270/8	286/--	
		9VDC/12VDC output	--	241/12	254/--	
		15VDC/24VDC output	--	241/18	254/--	
	12VDC input	3.3VDC	--	110/8	116/--	
		5VDC output	--	102/8	107/--	
		9VDC/12VDC/15VDC output	--	101/8	106/--	
		24VDC output	--	99/8	103/--	
	15VDC input	5VDC/9VDC output	--	82/8	86/--	
		15VDC output	--	81/8	85/--	
	24VDC input	3.3VDC output	--	55/8	58/--	
		5VDC output	--	53/8	57/--	
		9VDC/12VDC/15VDC output	--	51/8	55/--	
		24VDC output	--	53/8	57/--	

Input Specifications

Item	Operating Conditions	Min.	Typ.	Max.	Unit
Reflected Ripple Current*	3.3VDC input	--	30	--	mA
	Other input	--	15	--	
Surge Voltage(1sec. max.)	3.3VDC input	-0.7	--	5	VDC
	5VDC input	-0.7	--	9	
	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.

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Voltage Accuracy			See output regulation curves (Fig. 1)			
Linear Regulation	Input voltage change: ±1%	3.3VDC output	--	--	1.5	--
		Other output	--	--	1.2	
Load Regulation	3.3VDC input 10%-100% load	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC/12VDC/15VDC output	--	8	15	
		24VDC output	--	6	15	

Output Specifications

Item	Operating Conditions		Min.	Typ.	Max.	Unit
Load Regulation	5VDC input 10%-100% load	3.3VDC output	--	15	20	%
		5VDC output	--	10	15	
		9VDC output	--	8	10	
		12VDC output	--	7	10	
		15VDC output	--	6	10	
		24VDC output	--	5	10	
	12VDC/15VDC/ 24VDC input 10%-100% load	3.3VDC output	--	8	20	
		5VDC output	--	5	15	
		9VDC output	--	3	10	
		12VDC output	--	3	10	
		15VDC output	--	3	10	
		24VDC output	--	2	10	
Ripple & Noise*	20MHz bandwidth	3.3VDC input	--	50	100	mVp-p
		5VDC/12VDC/15 VDC/24VDC input Other output	--	30	75	
		5VDC/12VDC/15 VDC/24VDC input 24VDC output	--	50	100	
Temperature Coefficient	Full load		--	±0.02	--	%/℃
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	3.3VDC input	Derating when operating temperature≥85℃, (see Fig. 2)		-40	--	105	℃
	Other output	Derating when operating temperature≥100℃, (see Fig. 2)					
Storage Temperature				-55	--	125	
Case Temperature Rise	Ta=25℃	5VDC input	3.3VDC output	--	25	--	
			Other output		15		
		Other input			25		
Storage Humidity	Non-condensing	5VDC input		--	--	95	%RH
		Other input		5	--	95	
Reflow Soldering Temperature*				Peak temp.≤245℃, maximum duration time≤ 60s over 217℃			
Vibration	3.3VDC/12VDC/15VDC/24VDC input			10-150Hz, 5G, 0.75mm. along X, Y and Z			
Switching Frequency	3.3VDC input, full load, nominal input voltage			--	220	--	kHz
	5VDC input, full load, nominal input voltage			--	270	--	
	12VDC/15VDC/24VDC input, full load, nominal input voltage			--	260	--	
MTBF	MIL-HDBK-217F@ 25℃			3500	--	--	k hours
Moisture Sensitivity Level (MSL)	IPC/JEDEC J-STD-020D.1			Level 1			
Note: *Please refer to IPC/JEDEC J-STD-020D.1.							

Mechanical Specifications

Case Material	Black plastic, flame-retardant and heat-resistant(UL94V-0)
Dimensions	13.20x11.40x7.25mm
Weight	1.4g(Typ.)
Cooling Method	Free air convection

Electromagnetic Compatibility

Emissions	CE		CISPR32/EN55032 CLASS B	
	RE		CISPR32/EN55032 CLASS B	
Immunity	ESD	5VDC input	IEC/EN61000-4-2 Air ±8kV, Contact ±4kV	perf. Criteria B
		5VDC input	IEC/EN61000-4-2 Air ±8kV, Contact ±6kV	perf. Criteria B
Note: Refer to Fig.4 for recommended circuit test.				

Typical Performance Curves

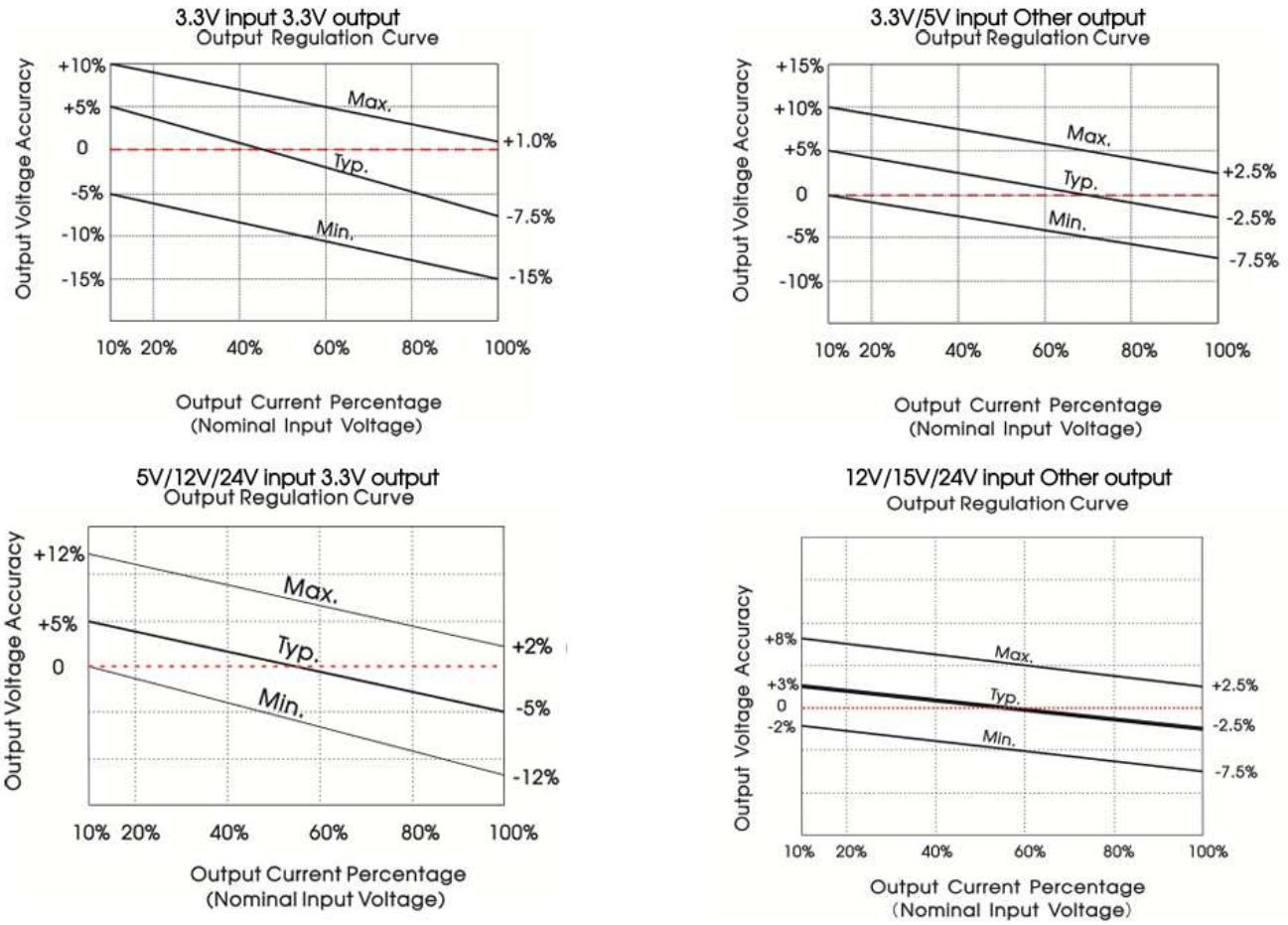
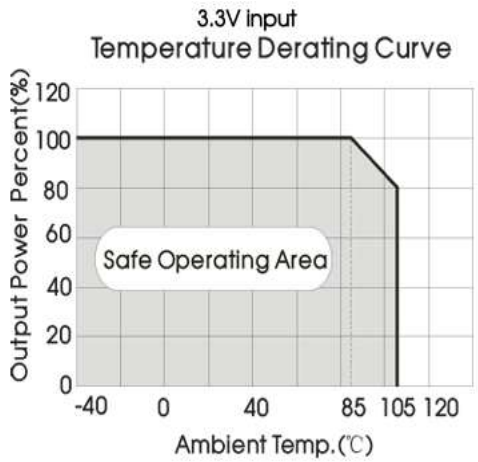


Fig. 1

Typical Performance Curves



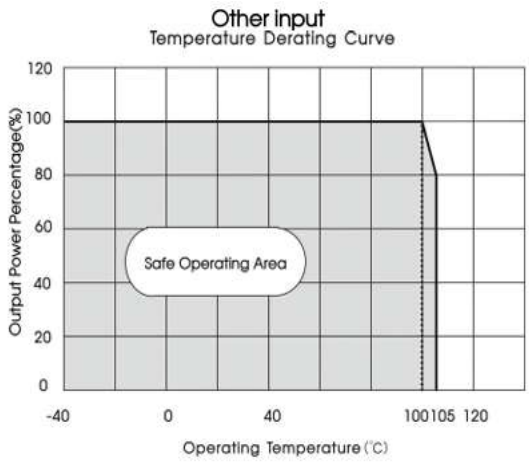
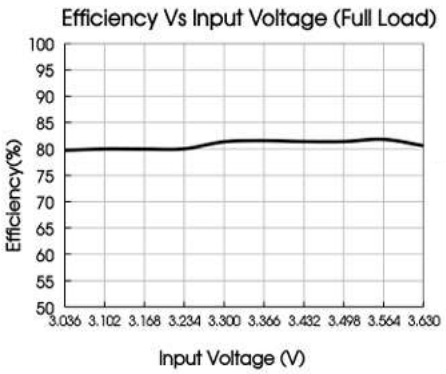
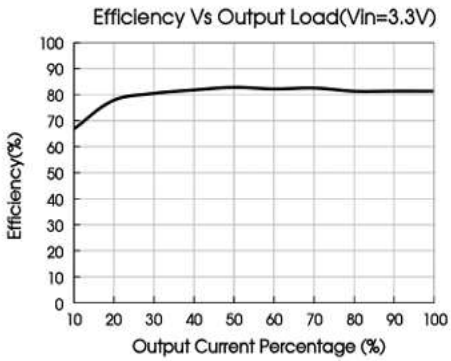


Fig. 2



STH01-0505XT



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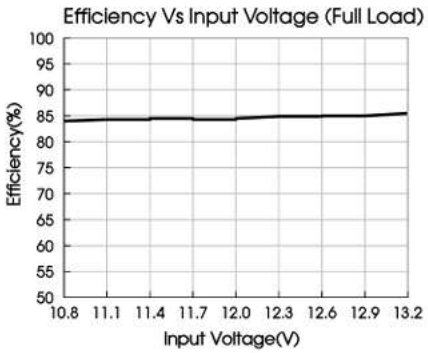

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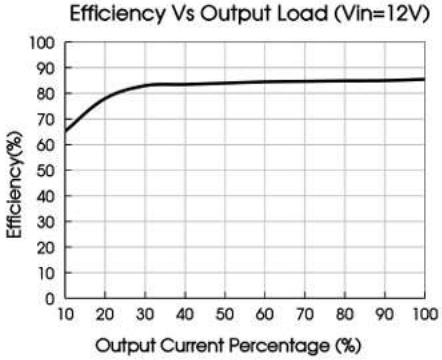
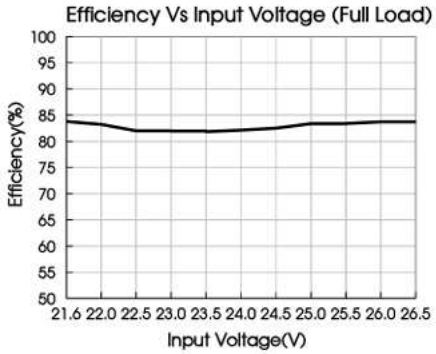
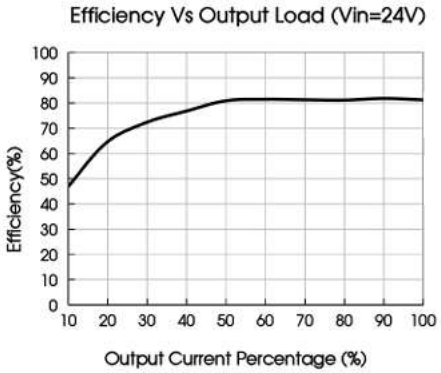


STH01-1205XT

Typical Performance Curves



STH01-2405XT



STH01-2405XT

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.

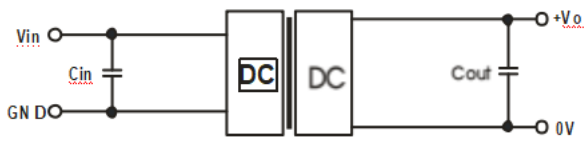


Fig. 3

Table2:Recommended input and output capacitor values

Vin	Cin	Vo	Cout
3.3VDC	4.7μF/16V	3.3VDC/5VDC	10μF/16V
5VDC	4.7μF/16V	9VDC	2.2μF/16V
12VDC	2.2μF/25V	12VDC	2.2μF/25V
15VDC	2.2μF/25V	15VDC	1μF/25V
24VDC	1μF/50V	24VDC	1μF/50V

2. EMC compliance circuit

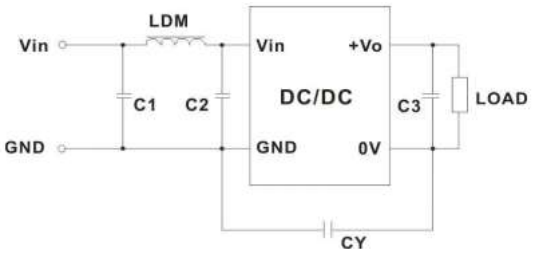


Fig. 4

Table2： EMC recommended circuit value table

Input voltage		3.3VDC Input	5VDC Input		12/15/24VDC Input
Output voltage		--	3.3/5/9VDC	12/15/24VDC	--
EMI	C1, C2	4.7μF/16V	4.7μF/25V		4.7μF/50V
	CY	270pF/4kV	100pF/4kV	1000pF/4kV	270pF/4kV
	C3	Refer to the Cout in table 1			
	LDM	6.8μH			

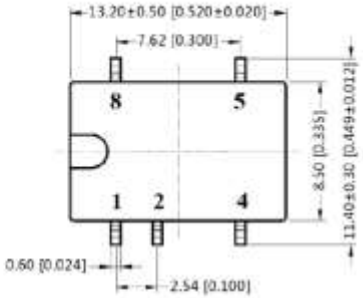
Note: In the case of actual use, the requirements for EMI are high, it is subject to CY.

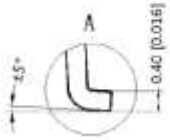
Dimensions and Recommended Layout

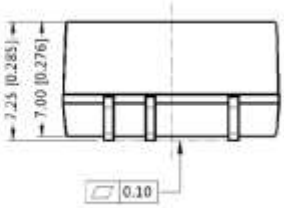
units: mm [inch]
tolerance: ±0.25[±0.010]
pin section tolerance: ±0.10[±0.004]

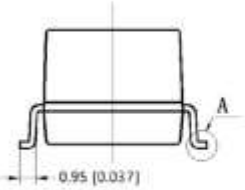
PIN CONNECTIONS	
PIN	Function
1	GND
2	Vin
4	0V
5	+Vout
8	NC

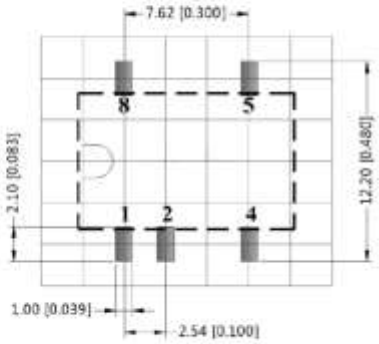
NC = No connect











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

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℃, 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";