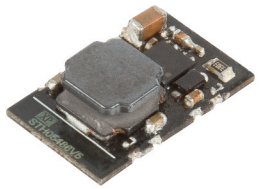
STH05 Series

Switching Regulator

XP Power

0.5 Amp

- Regulated single outputs from 3.3 to 15VDC
- Wide input range
- SMD-10 package
- Non-isolated
- Output voltage trim ±10%
- High efficiency up to 92%
- Class B conducted & radiated emissions with external components
- Short-circuit protection
- No heatsink required
- Remote On/Off
- Tape & reel package available
- -40°C to +100°C operation
- Full load to +60°C
- 3 year warranty



Dimensions:

STH05:
0.77 x 0.47 x 0.39″ (19.5 x 11.8 x 5.0 mm)

The STH05 is a new series of innovative low cost DC-DC buck regulators. Based on SMD technology and high levels of automation the series offers many features including voltage trimming, remote on/off, continuous short circuit protection, regulation and high efficiency.

Models & Ratings

Nominal Input Voltage (VDC)	Output voltage (VDC)	Output Current (A)	Input Current (mA)			Maximum Capacitive Load	Efficiency at Full Load %		Model Number[1]
			No Load (max.)	Full Load					
				Vin (min.)	Vin (max.)		Vin (min.)	Vin (max.)	
48 V (9-72 V)	3.3 V	0.5 A	3.0 mA	232 mA	33 mA	100 µF	79.0%	70.0%	STH0548S3V3
48 V (9-72 V)	5.0 V			323 mA	47 mA		86.0%	74.0%	STH0548S05
48 V (9-72 V)	6.5 V			406 mA	58 mA		89.0%	78.0%	STH0548S6V5
48 V (14-72 V)	7.2 V			289 mA	62 mA		89.0%	81.0%	STH0548S7V2
48 V (14-72 V)	9.0 V			357 mA	74 mA		90.0%	84.0%	STH0548S09
48 V (17-72 V)	12.0 V			384 mA	97 mA		92.0%	86.0%	STH0548S12
48 V (21-72 V)	15.0 V	0.4 A		311 mA	99 mA		92.0%	84.0%	STH0548S15

Notes

1. For tape & reel add "-TR", e.g. STH0548S05-TR. 500 pcs per reel.

Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	9	48	72	VDC	See Models and Ratings
Input Surge			75	VDC for 100 ms	
Input Current			3	mA	No load. See Models and Ratings
Inhibit Mode Input Current			1	mA	When module is in standby mode
Remote On/Off	Pin 10 open circuit, logic high, module is on. Connect pin 10 to ground, logic low, module is off.				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	3.3		15	VDC	See Models and Ratings table
Trim Range		±10		%	See Application Notes
Initial Set Accuracy			±2.0	%	
Minimum Load				A	No minimum load required
Line Regulation			±1.0	%	
Load Regulation			±1.0	%	To 100% load from 10%
Transient Response			±3	%	Maximum deviation recovery within 250 µs at normal Vin for 25% step load change from 25% to 100% load
Ripple & Noise		75		mV pk-pk	20 MHz bandwidth, measured with 0.1 µF ceramic and 10 µF electrolytic capacitors
Short Circuit Protection					Continuous, with auto recovery
Temperature Coefficient			±0.02	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			92	%	See Models and Ratings table
Isolation: Input to Output					No isolation
Switching Frequency	150		550	KHz	See application notes
Mean Time Between Failure	4.8			MHrs	MIL-HDBK-217F, +25 °C GB
Weight		0.0039 (1.8)		lb (g)	
Moisture Sensitivity Level	Level 1				IPC/JEDEC J-STD-020D.1
PCB Pad Material	Copper				
PCB Pad Solder Coating	Lead-free HASL				
Lead-Free Reflow Solder Process	245 °C max, 1.5 mm from case, 10 s max. IPC/JEDEC J-STD-020D.1				

Environmental

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Operating Temperature	-40		+105	°C	See Derating Curve.
Storage Temperature	-55		+125	°C	
Humidity			95	%RH	Non-condensing
Cooling					Natural convection (>30 LFM)

EMC: Emissions

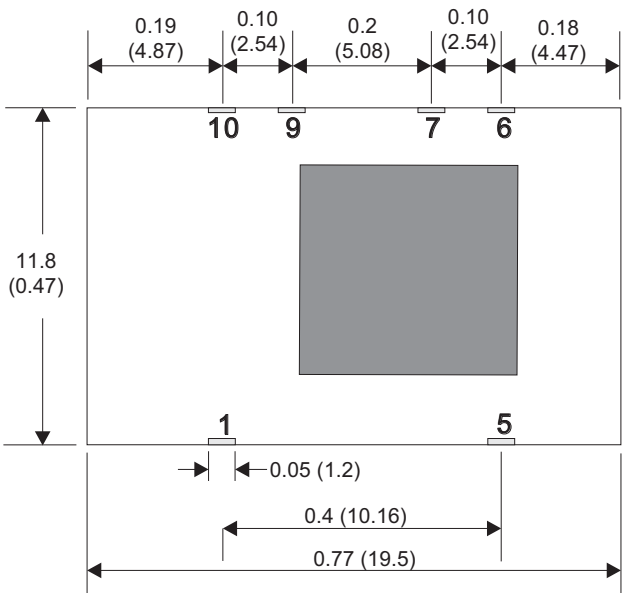
Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class B	With external components, see application note
Radiated	EN55032	Class B	With external components, see application note

EMC: Immunity

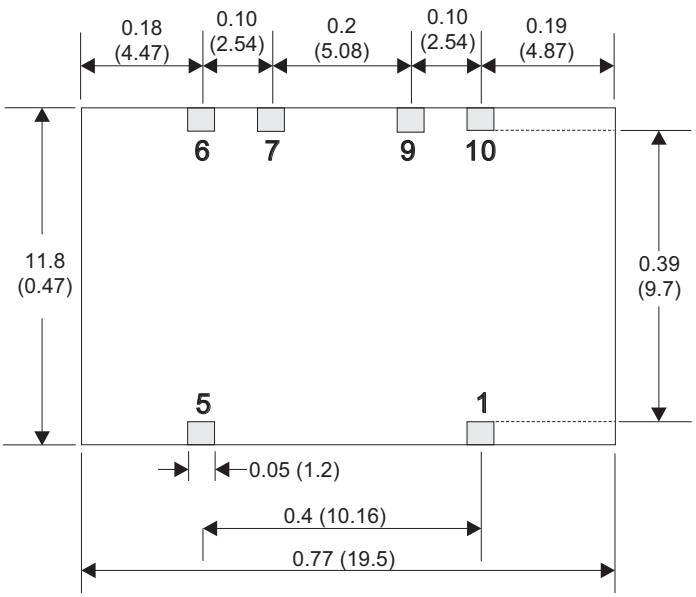
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	±8 kV air discharge	A	
Radiated	EN61000-4-3	3 V/m	A	
EFT/Burst	EN61000-4-4	±0.5 kV	A	See application note
Surge	EN61000-4-5	±1 kV	A	See application note
Conducted	EN61000-4-6	3 V rms	A	
Magnetic Fields	EN61000-4-8	3 A/m	A	

Mechanical Details

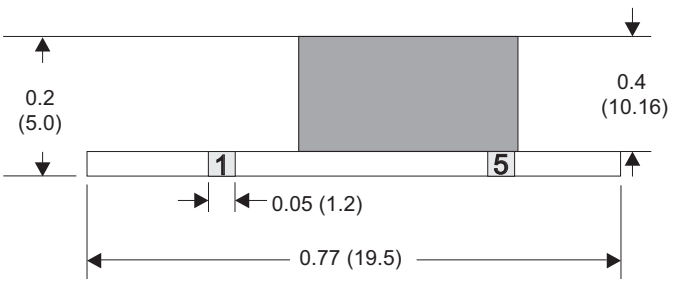
Top View



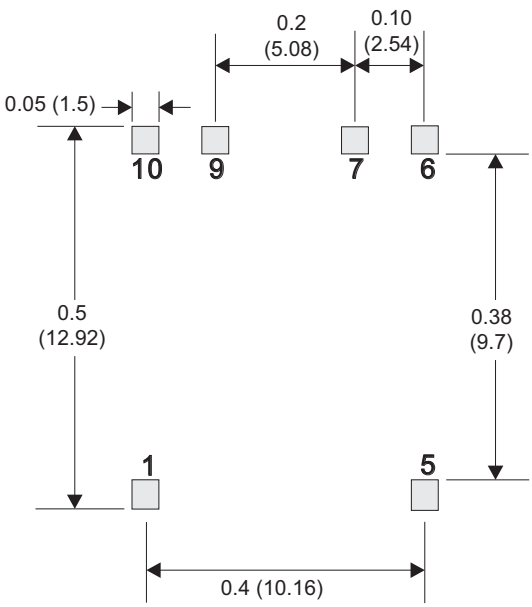
Bottom View



Side View



Solder Pad Dimension



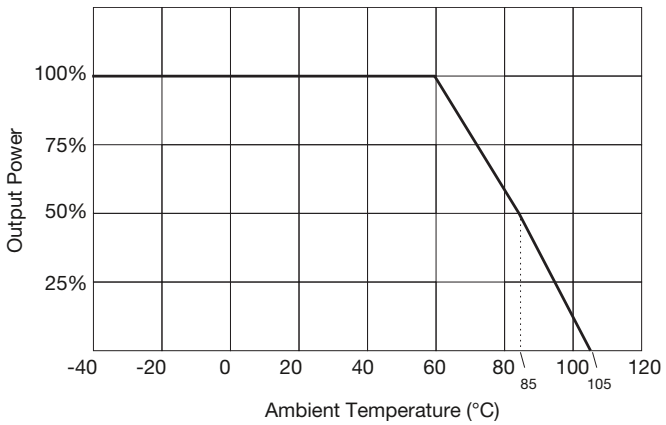
Pin Connections	
Pin	Function
1	+Vin
5	+Vout
6	Trim
7	Ground
9	Ground
10	Remote On/Off

Notes

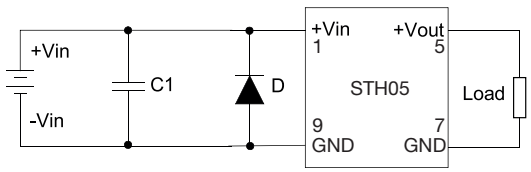
1. All dimensions are in inches (mm)
2. Weight: 0.0039 lbs (1.4 g) approx.
3. Pin Profile Tolerance: ±0.004 (±0.1)
4. Pin Pitch Tolerance: ±0.01 (±0.25)
5. Other Tolerances: ±0.02 (±0.5)
6. PCB tracks should not run under the STH05 to avoid interference and the risk of short circuit.

Application Notes

Derating Curve



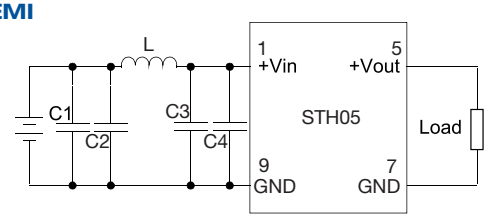
EFT & Surge



Suggested Filter : 5Vin models : Nippon - chemi - con KY series, 2200 µF/50 V and a TVS, 3 KW

C1	D1
330 µF, 100 V	SMDJ 7.0 A

EMI



Input filter components (Cin, C1, L1) are used to help meet EMI requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

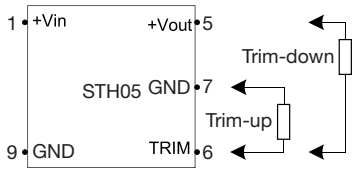
C1, C2	L1	C3, C4
1206, 2.2 µF, 100V	56 µH	1206, 2.2 µF, 100 V

Switching Frequency

		Notes
15 V	540 KHz	Typical values at 20% load. Typically 50 KHz at 10% load for all variants.
12 V	480 KHz	
9 V	390 KHz	
7.2 V	300 KHz	
6.5 V	290 KHz	
5.0 V	220 KHz	
3V3	180 KHz	

Application Notes

Output Voltage Adjustment

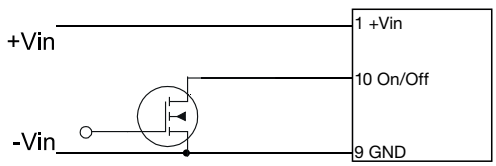


Pin 6 via a resistor to Pin 5 (+Vout), Vo trim down (Rd)
Pin 6 via a resistor to Pin 7(GND),Vo trim up (Ru)

STH0548S3V3 (3V3)		STH0548S05 (5)		STH0548S6V5 (6V5)		STH0548S7V2 (7V2)		STH0548S09 (9)		STH0548S12 (12)		STH0548S15 (15)	
Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru
50.85	43.59	35.9	112.4	7.637	206.567	14.781	53.792	69.411	88.789	51.633	106.567	18.967	89.733
13.089	26.956	17.15	56.15	4.619	38.65	7.133	26.37	33.856	44.344	24.967	53.233	8.883	44.817
7.148	19.496	10.9	37.4	3.202	21.279	4.525	17.443	22.004	29.53	16.078	35.456	5.5522	29.844
4.730	15.26	7.775	28.025	2.38	14.622	3.21	13.019	16.078	22.122	11.633	26.567	3.842	22.358
3.417	12.53	5.9	22.4	1.843	11.173	2.417	10.377	12.522	17.678	8.967	21.233	2.833	17.867
2.593	10.624	4.65	18.65	1.464	9.018	1.887	8.621	10.15	14.715	7.189	17.678	2.161	14.872
2.028	9.218	3.757	15.971	1.183	7.554	1.508	7.369	8.459	12.598	5.919	15.138	1.681	12.733
1.616	8.138	3.088	13.963	0.966	6.496	1.223	6.431	7.189	11.011	4.967	13.233	1.321	11.129
1.302	7.282	2.567	12.4	0.793	5.694	1.001	5.702	6.201	9.777	4.226	11.752	1.041	9.881
1.056	6.588	2.15	11.15	0.653	5.067	0.824	5.12	5.411	8.789	3.633	10.567	0.817	8.883

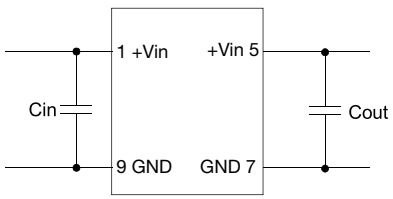
Note: Rd: Trim down. Ru: Trim up. Resistor values in kΩ
* 1V2 model only trim up

Remote On/Off



2-5 VDC or Open DC-DC ON
0-0.4 VDC or Short DC-DC OFF

Standard Application Circuit



Cin 10 µF must be fitted near DC-DC pins.
Optional Cout 10 µF

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