

0.5 Amp

- Regulated single outputs from 3.3 to 15VDC
- Wide input range
- SMD-10 package
- Non-isolated
- Output voltage trim $\pm 10\%$
- 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 $+100^{\circ}\text{C}$ operation
- Full load to $+60^{\circ}\text{C}$
- 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

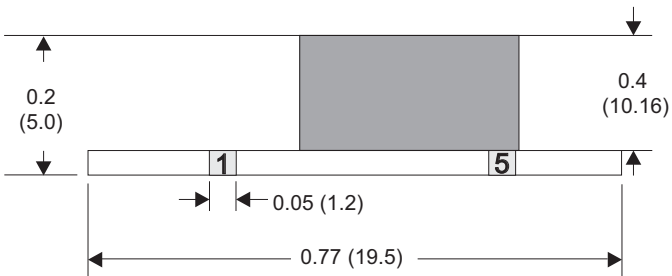
Top View



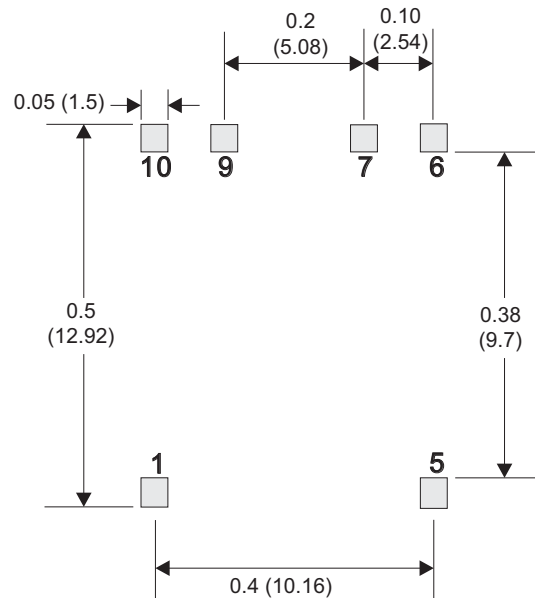
Bottom View



Side View



Solder Pad Dimension



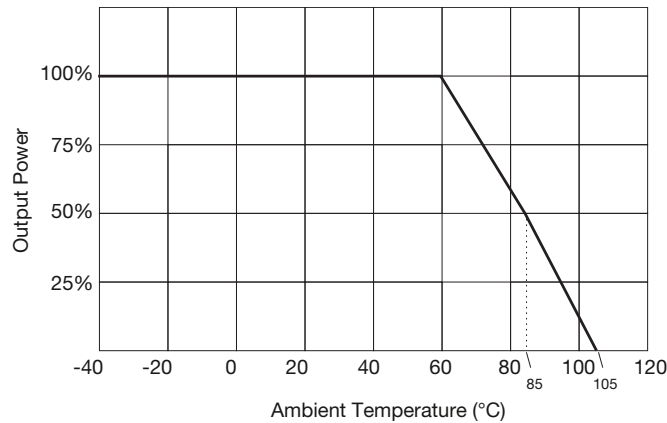
Pin Connections	
Pin	Function
1	+Vin
5	+Vout
6	Trim
7	Ground
9	Ground
10	Remote On/Off

Notes

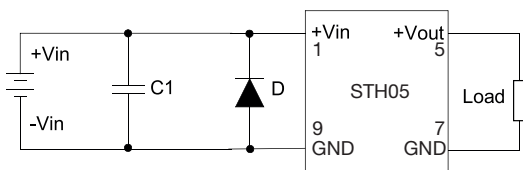
- All dimensions are in inches (mm)
- Weight: 0.0039 lbs (1.4 g) approx.
- Pin Profile Tolerance: ± 0.004 (± 0.1)
- Pin Pitch Tolerance: ± 0.01 (± 0.25)
- Other Tolerances: ± 0.02 (± 0.5)
- PCB tracks should not run under the STH05 to avoid interference and the risk of short circuit.

Application Notes

Derating Curve



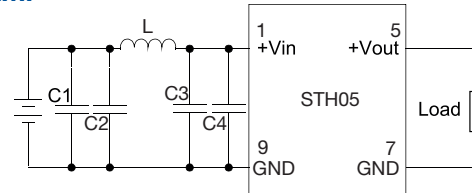
EFT & Surge



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

C1	D1
330 μ F, 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.

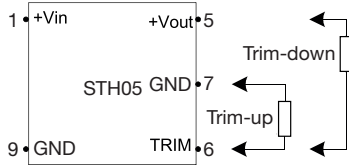
C1, C2	L1	C3, C4
1206, 2.2 μ F, 100V	56 μ H	1206, 2.2 μ F, 100 V

Switching Frequency

Input Voltage	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

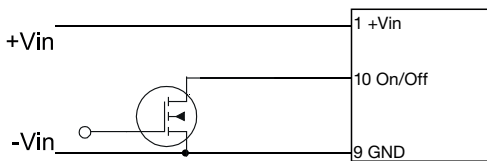


Pin 6 via a resistor to Pin 5 (+Vout), Vo trim down (Rd)
 Pin 6 via a resistor to Pin 7(GND),Vo trim up (Ru)

% Trim	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
1	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
2	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
3	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	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
5	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
6	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
7	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
8	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
9	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
10	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