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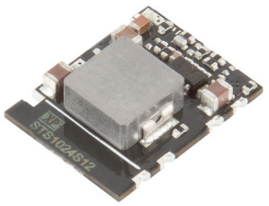
STS10 Series

Switching Regulator

XP Power

1.0 Amp

- 1A Switching Regulator
- Regulated Single Outputs from 1.2 to 15VDC
- Wide Input Range
- SMD-10 Package
- Non-Isolated
- Output Voltage Trim ±10%
- High Efficiency up to 96%
- Class B Conducted & Radiated Emissions with External Components
- Short-Circuit Protection
- No Heatsink Required
- Remote On/Off
- Tape & Reel Package Available
- -40°C to +105°C Operation
- Full load to +65°C
- 3 Year Warranty



Dimensions:

STS10:
0.60 x 0.47 x 0.15" (15.20 x 11.80 x 3.6 mm)

The STS10 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)	Input Voltage (VDC)	Output voltage (VDC)	Output Current (A)	Maximum Capacitive Load	Efficiency at minimum input %	Efficency at maximum input %	Model[1]
5 V	3.0-5.5 V	1.2 V	1.0 A	330 µF	90.5%	90.5%	STS1005S1V2
5 V	3.0-5.5 V	1.5 V	1.0 A	330 µF	92.0%	92.0%	STS1005S1V5
5 V	3.0-5.5 V	1.8 V	1.0 A	330 µF	92.5%	92.5%	STS1005S1V8
5 V	3.8-5.5 V	2.5 V	1.0 A	330 µF	94.5%	94.0%	STS1005S2V5
24 V	4.6-36.0 V	1.2 V	1.0 A	330 µF	87.0%	72.0%	STS1024S1V2
24 V	4.6-36.0 V	1.5 V	1.0 A	330 µF	89.0%	76.0%	STS1024S1V5
24 V	4.6-36.0 V	1.8 V	1.0 A	330 µF	90.5%	79.0%	STS1024S1V8
24 V	4.6-36.0 V	2.5 V	1.0 A	330 µF	92.5%	83.0%	STS1024S2V5
24 V	4.75-36.0 V	3.3 V	1.0 A	330 µF	94.0%	86.5%	STS1024S3V3
24 V	6.5-36.0 V	5.0 V	1.0 A	330 µF	95.5%	89.5%	STS1024S05
24 V	9.0-36.0 V	6.5 V	1.0 A	330 µF	94.5%	90.0%	STS1024S6V5
24 V	12.0-36.0 V	9.0 V	1.0 A	330 µF	95.5%	92.0%	STS1024S09
24 V	15.0-36.0 V	12.0 V	1.0 A	330 µF	95.0%	93.0%	STS1024S12
24 V	18.0-36.0 V	15.0 V	1.0 A	330 µF	96.0%	94.0%	STS1024S15

Notes

1. For tape & reel add "-TR", e.g. STS1005S1V5-TR. 500 pcs per reel.

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Input

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Input Voltage Range	3	5	5.5	VDC	
	4.6	24	36		
Input Surge			6	VDC for 100 ms	5 V input
			40		24 V input
Input Current - No Load		0.4/1.5		mA	5 V/24 V input
- Full Load		700/900			5 V/24 V input
Input Current - Remote On/Off			0.3/0.8	mA	5 V/24 V input, idle current
Remote On/Off	ON: Connect pin 10 to voltage of 2-4 V, Logic high OFF: Short pin 10 to pin 9 (0-0.4 V), Logic low				

Output

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Output Voltage	1.2		15	VDC	See Models and Ratings table
Initial Set Accuracy			±2.0	%	
Minimum Load				A	No minimum load required
Line Regulation			±0.2	%	
Load Regulation			±0.6	%	To 100% load from 10%
Transient Response <4V			±5	%	Maximum deviation recovery within 250 µs at normal Vin for 50% step load change from 50% to 100% load
>4V			±3		
Ripple & Noise		50		mV pk-pk	5 V: 20 MHz bandwidth
		75			24 V: 20 MHz bandwidth
Short Circuit Protection					Continuous, with auto recovery
Temperature Coefficient			0.02	%/°C	

General

Characteristic	Minimum	Typical	Maximum	Units	Notes & Conditions
Efficiency			96	%	See Models and Ratings table
Isolation: Input to Output					No isolation
Switching Frequency		1.2/0.41		MHz	5 V/24 V input
Mean Time Between Failure	4.7			MHrs	MIL-HDBK-217F, +25 °C GB
Weight		0.022 (1.4)		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	260 °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)

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Safety Approvals

Agency	Standard	Test Level	Notes & Conditions
CE	Meets all applicable directives		
UKCA	Meets all applicable legislation		

EMC: Emissions

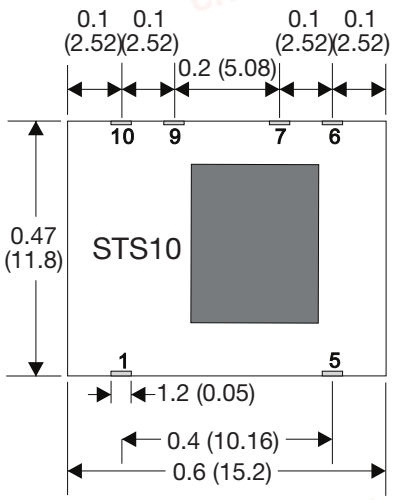
Phenomenon	Standard	Test Level	Notes & Conditions
Conducted	EN55032	Class B	With external components, see application note
Radiated	EN55032	Class B	

EMC: Immunity

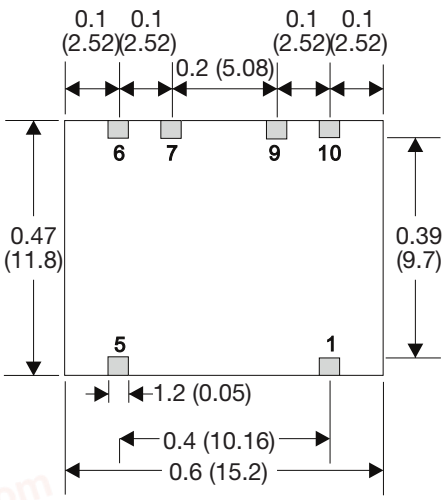
Phenomenon	Standard	Test Level	Criteria	Notes & Conditions
ESD	EN61000-4-2	±8 kV air discharge	A	
Radiated	EN61000-4-3	3 V/m	A	
EFT/Burst	EN61000-4-4	±0.5 kV	A	See application note
Surge	EN61000-4-5	±1 kV	A	See application note
Conducted	EN61000-4-6	3 V rms	A	
Magnetic Fields	EN61000-4-8	3 A/m	A	

Mechanical Details

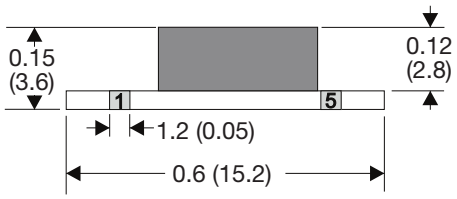
Top View



Bottom View



Side View



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

Notes

1. All dimensions are in inches (mm)
2. Weight: 0.0022 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 STS10 to avoid interference and the risk of short circuit.

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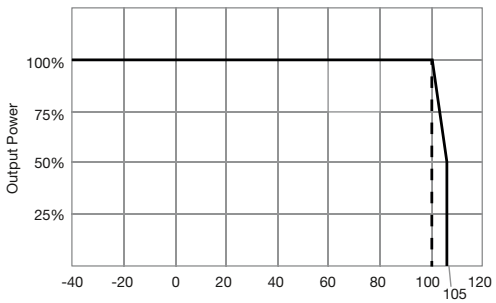
Application Notes

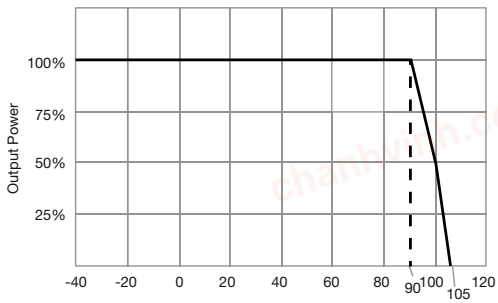
Derating Curve

STS1005



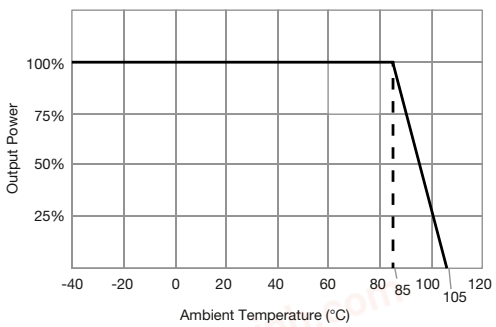
STS1024

Vo= 1.2 V and 1.5 V



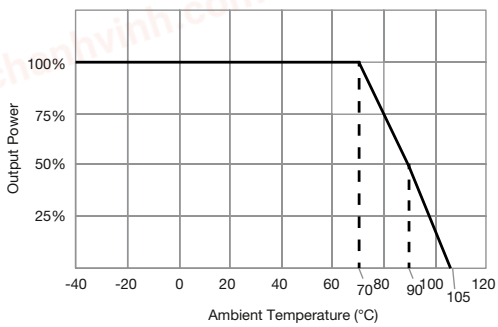
STS1024

Vo= 1.8 V, 2.5 V, 3.3 V and 5 V



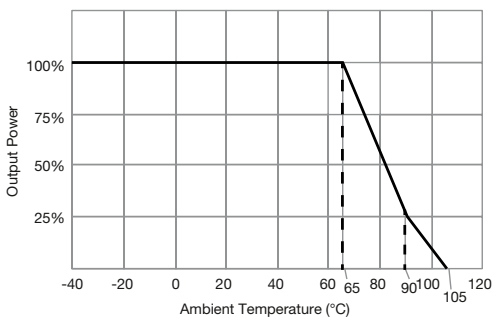
STS1024

Vo= 6.5 V and 9 V

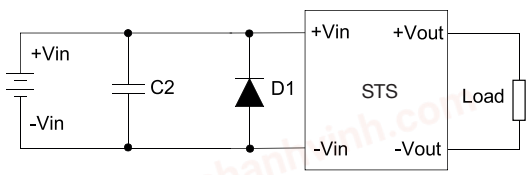


STS1024

Vo= 12 V and 15 V



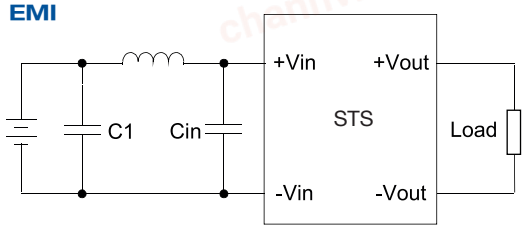
EFT & Surge



Suggested Filter : 5Vin models : Nippon - chemi - con KY series, 2200 µF/50 V and a TVS, 3 KW , 6.0 V 24 Vin models : Nippon - chemi - con KY series , 330 µF/100V and a TVS, 3KW/36V

	C2	D1
5 V	2200 µF, 50 V	SMDJ 6.0 A
24 V	330 µF, 100 V	SMDF 36.0 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	L1	Cin
5 V	1206, 10 µF, 50 V	6.8 µH	1206, 10 µF, 50 V
24 V	1206, 4.7 µF, 50 V	33 µH	1206, 10 µF, 50 V

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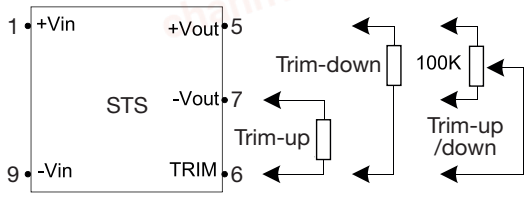
Application Notes

Output Voltage Adjustment



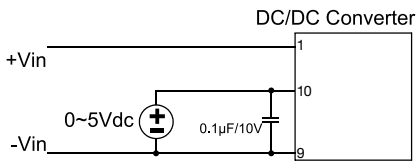
Pin 6 via a resistor to Pin 5 (+Vout), Vo trim down (Rd)
Pin 6 via a resistor to Pin 7(-Vout),Vo trim up (Ru)

Model	STS1005S1V2		STS1005S1V5		STS1005S1V8		STS1005S2V5	
V out nominal	1V2		1V5		1V8		2V5	
Trim %	Rd*	Ru	Rd	Ru	Rd	Ru	Rd	Ru
1%	-	890	223	955	187	1000	372	1600
2%	-	440	103	475	87	499	172	792
3%	-	290	63	315	54	332	106	525
4%	-	215	43	235	37	249	72	393
5%	-	170	31	187	27	199	52	312
6%	-	140	23	155	20	166	40	260
7%	-	118	18	132	15	142	30	221
8%	-	102	13	115	12	124	22	193
9%	-	90	10	102	9	110	17	170
10%	-	80	7.3	91	7	100	12.5	153

Model	STS1024S1V2		STS1024S1V5		STS1024S1V8		STS1024S2V5		STS1024S3V3		STS1024S05		STS1024S6V5		STS1024S09		STS1024S12		STS1024S15	
V out nominal	1V2		1V5		1V8		2V5		3V3		5		6V5		9		12		15	
Trim %	Rd*	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru	Rd	Ru
1%	-	668	152	1020	132	876	143	963	226	853	212	941	193	866	230	750	425	1108	139	714
2%	-	319	69	514	61	432	71	444	105	424	103	440	94	410	105	380	211	520	67	341
3%	-	207	41	343	37	286	45	288	65	281	64	285	58	268	64	253	135	337	42	224
4%	-	152	28	257	25	214	31	213	45	210	44	210	40	198	44	190	96	248	29	166
5%	-	119	19	206	18	171	23	169	33	167	32	165	30	157	32	151	72	195	21	132
6%	-	98	14	171	13	142	18	140	25	138	23	136	22	130	24	125	56	160	16	109
7%	-	82	10	146	10	121	14	119	19	117	17	115	17	110	19	107	45	136	12	93
8%	-	70	7	128	7	106	10	104	15	103	13	100	13	96	15	93	36	117	10	81
9%	-	62	5	114	5	94	8	92	11	91	10	88	10	84	11	82	29	103	7	71
10%	-	54	3.2	103	3.6	85	6.3	83	8.5	81	6.7	78	7.5	75	8.6	73	24	92	5.6	64

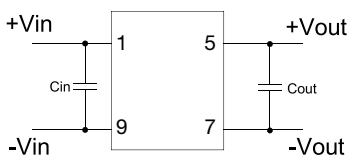
Note: Rd: Trim down. Ru: Trim up. Resistor values in kΩ * 1V2 model only trim up

Remote On/Off



2-5 VDC or Open DC-DC ON
0-0.4 VDC or Short DC-DC OFF
PCB tracks should not run under the STS10 to avoid interference and the risk of short circuit.

Standard Application Circuit



Cin 10 μF must be fitted near DC-DC pins.
Optional Cout 47 μF

Recommended PCB Layout

Units mm (inches)

