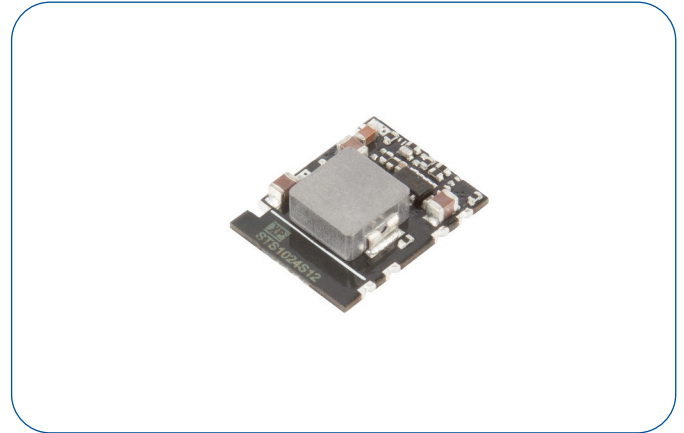


1.0 Amp

- Regulated single outputs from 1.2 to 15VDC
- Wide input range
- SMD-10 package
- Non-isolated
- Output voltage trim $\pm 10\%$
- 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 $+105^{\circ}\text{C}$ operation
- Full load to $+65^{\circ}\text{C}$
- 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

| Input voltage VDC | Output voltage VDC | Output Current A | Maximum Capacitive Load | Efficiency at minimum input % | Efficiency at maximum input % | Model ⁽¹⁾ |
|-------------------|--------------------|------------------|-------------------------|-------------------------------|-------------------------------|----------------------|
| 5 V (3-5.5) | 1.2 | 1.0 A | 330 μF | 90.5% | 90.5% | STS1005S1V2 |
| 5 V (3-5.5V) | 1.5 | | | 92.0% | 92.0% | STS1005S1V5 |
| 5 V (3-5.5V) | 1.8 | | | 92.5% | 92.5% | STS1005S1V8 |
| 5 V (3.8-5.5V) | 2.5 | | | 94.5% | 94.0% | STS1005S2V5 |
| 24 V (4.6-36 V) | 1.2 | | | 87.0% | 72.0% | STS1024S1V2 |
| 24 V (4.6-36 V) | 1.5 | | | 89.0% | 76.0% | STS1024S1V5 |
| 24 V (4.6-36 V) | 1.8 | | | 90.5% | 79.0% | STS1024S1V8 |
| 24 V (4.6-36 V) | 2.5 | | | 92.5% | 83.0% | STS1024S2V5 |
| 24 V (4.75-36 V) | 3.3 | | | 94.0% | 86.5% | STS1024S3V3 |
| 24 V (6.5-36 V) | 5.0 | | | 95.5% | 89.5% | STS1024S05 |
| 24 V (9-36 V) | 6.5 | | | 94.5% | 90.0% | STS1024S6V5 |
| 24 V (12-36 V) | 9.0 | | | 95.5% | 92.0% | STS1024S09 |
| 24 V (15-36 V) | 12.0 | | | 95.0% | 93.0% | STS1024S12 |
| 24 V (18-36 V) | 15.0 | | | 96.0% | 94.0% | STS1024S15 |

Notes

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

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 - Full Load | | 0.4/1.5 | | mA | 5 V/24 V input |
| | | 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 | 3.5 | | | 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 |

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) |
| Lead-Free Reflow Solder Process | 260 °C max, 1.5 mm from case, 10 s max. IPC/JEDEC J-STD-020D.1 | | | | |

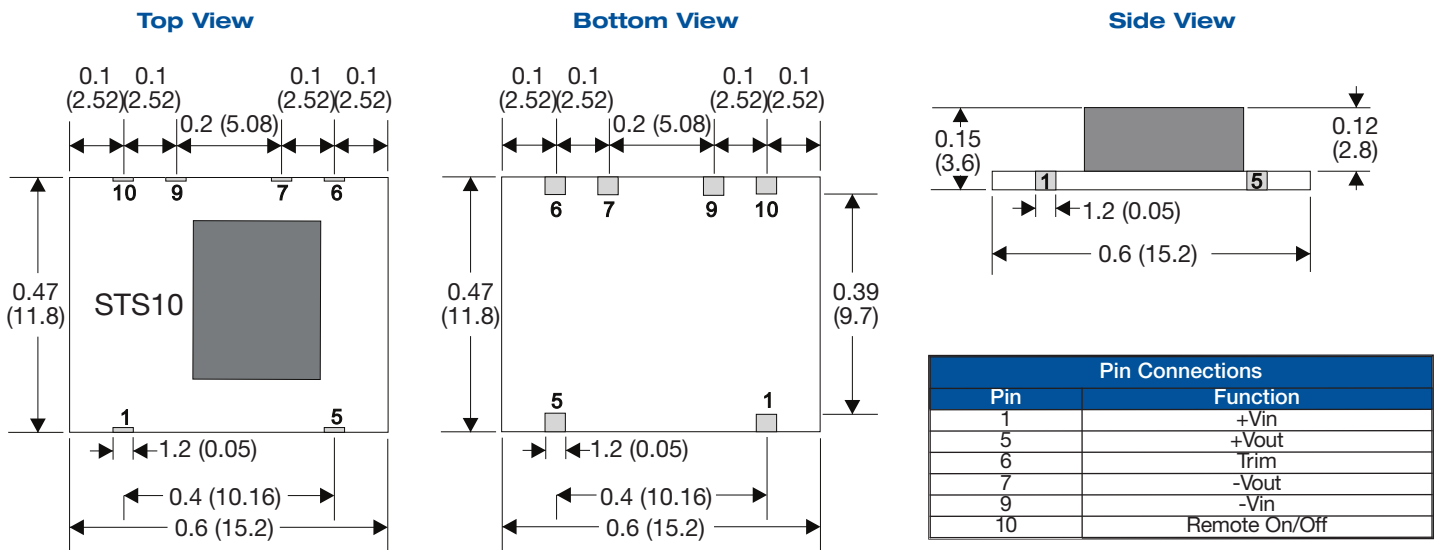
EMC: Emissions

| 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



Notes

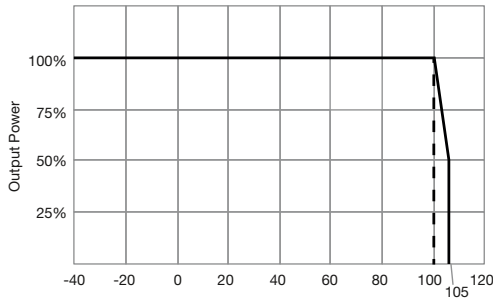
- All dimensions are in inches (mm)
- Weight: 0.0022 lbs (1.4 g) approx.
- Pin Profile Tolerance: ±0.004 (±0.1)

- Pin Pitch Tolerance: ±0.01 (±0.25)
- Other Tolerances: ±0.02 (±0.5)

Application Notes

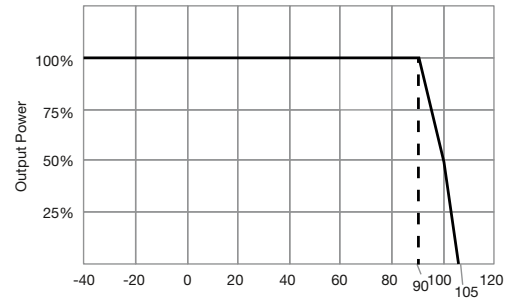
Derating Curve

STS1005



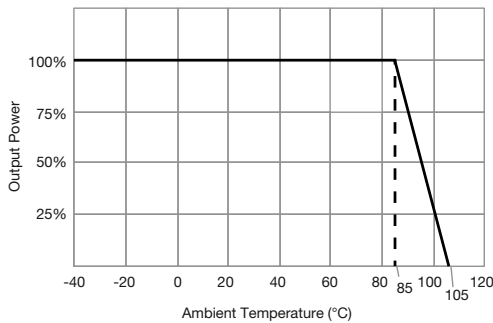
STS1024

Vo= 1.2 V and 1.5 V



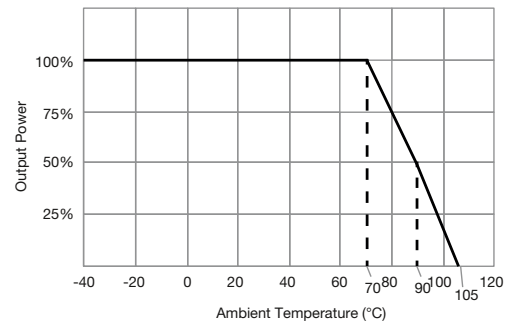
STS1024

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



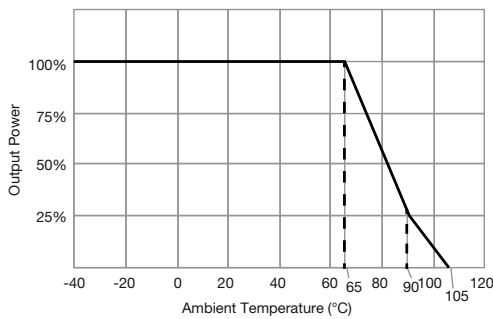
STS1024

Vo= 6.5 V and 9 V

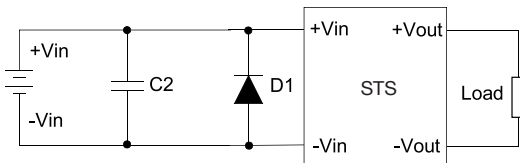


STS1024

Vo= 12 V and 15 V



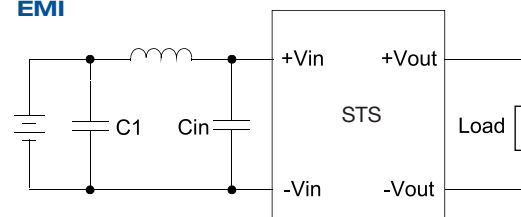
EFT & Surge



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

| | C2 | D1 |
|------|-------------------|-------------|
| 5 V | 2200 μ F, 50V | SMDJ 6.0 A |
| 24 V | 330 μ F, 100V | SMDJ 36.0 A |

EMI

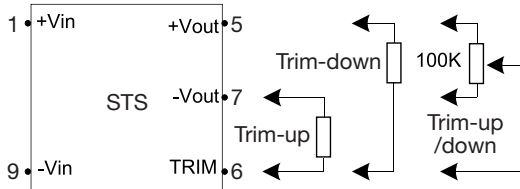


Input filter components (Cin, C1, L1) are used to help meet EMI requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

| | C1 | L1 | Cin |
|------|------------------------|-------------|-----------------------|
| 5 V | 1206, 10 μ F, 50V | 6.8 μ H | 1206, 10 μ F, 50V |
| 24 V | 1206, 4.7 μ F, 50V | 33 μ H | 1206, 10 μ F, 50V |

Application Notes

Output Voltage Adjustment



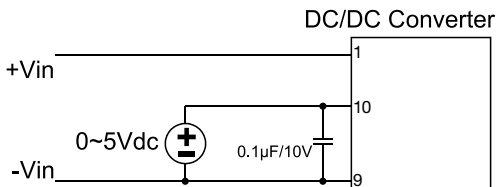
Pin 6 via a resistor to Pin 5 (+Vout), Vo trim down (Rd)
 Pin 6 via a resistor to Pin 7(-Vout),Vo trim up (Ru)

| 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 | | | | | | | | | | |
| 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 |

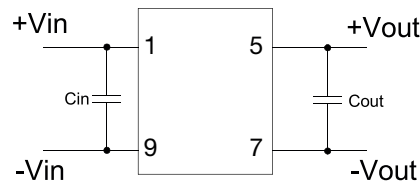
Note: Rd: Trim down. Ru: Trim up. Resistor values in kΩ
 * 1V2 model only trim up

Remote On/Off



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

Standard Application Circuit



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

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