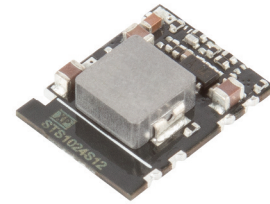


### 1.0 Amp

- 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
- $-40^{\circ}\text{C}$  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 <sup>(1)</sup> |
|-------------------|--------------------|------------------|-------------------------|-------------------------------|-------------------------------|----------------------|
| 5 V (3-5.5)       | 1.2                | 1.0 A            | 330 $\mu\text{F}$       | 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<br>- 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<br>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 |         |         |       |                              |

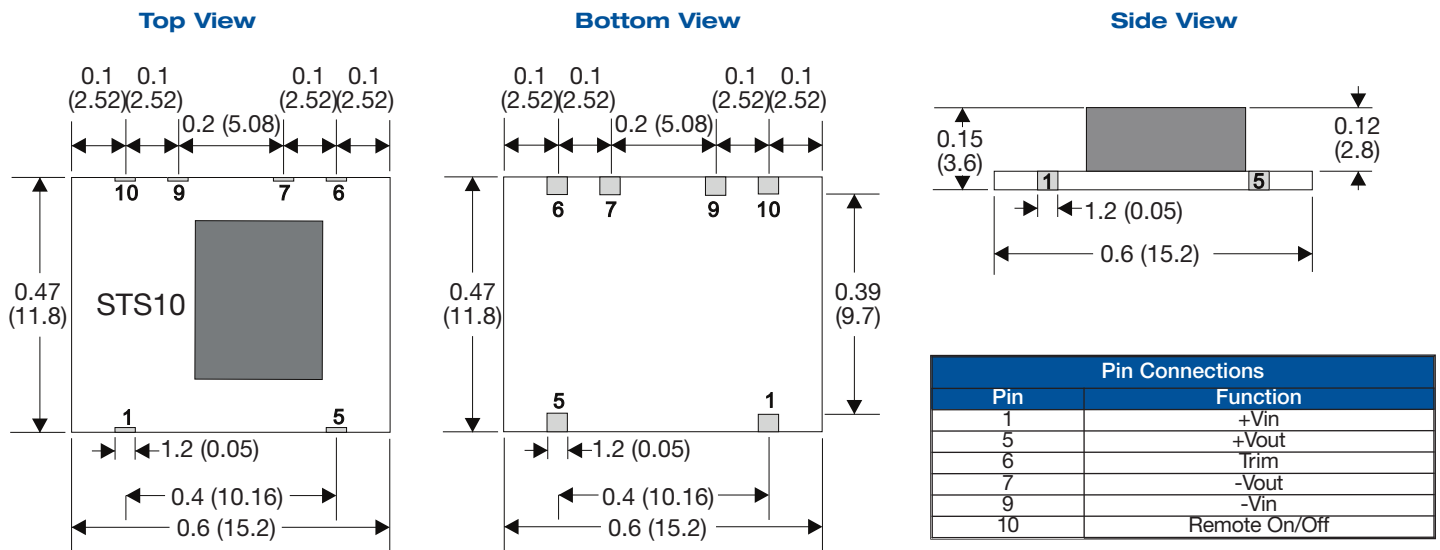
### EMC: Emissions

| 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  $\mu$ F/50 V and a TVS, 3 KW , 6.0 V 24 Vin models : Nippon - chemi - con KY series , 330  $\mu$ F/100V and a TVS, 3KW/36V

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

#### EMI

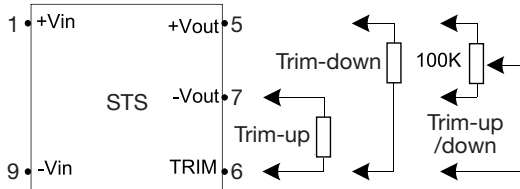


Input filter components (Cin, C1, L1) are used to help meet EMI requirement for the module. These components should be mounted as close as possible to the module; and all leads should be minimized to decrease radiated noise.

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

### Application Notes

#### Output Voltage Adjustment



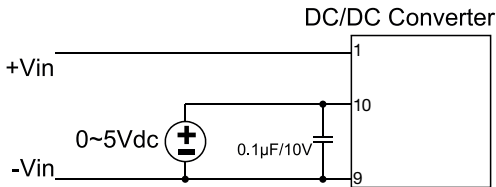
Pin 6 via a resistor to Pin 5 (+Vout), Vo trim down (Rd)  
 Pin 6 via a resistor to Pin 7(-Vout),Vo trim up (Ru)

| 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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