



# POWERSTAX F351 Series DC-DC Converter

## 350W Single Output Full Brick 12V input

### Provisional Product Specification

#### FEATURES

- ❑ High efficiency of typ. 87%
- ❑ Output voltages: 12, 24, 28, 42, & 48VDC
- ❑ Standard "full brick" package  
116.8 x 61 x 12.7mm (4.6 x 2.40 x 0.5 in)
- ❑ Low input & output ripple currents
- ❑ Input transient voltage protection
- ❑ Thermal monitoring voltage to provide early warning of system fault
- ❑ Single connection for parallel operation to provide true N+1 redundancy capability
- ❑ No need for master/slave operation
- ❑ External synchronisation facility
- ❑ Hot plug in capability
- ❑ Remote sensing provided
- ❑ Remote shutdown
- ❑ Input voltage range 11-18VDC
- ❑ Output current monitor voltage
- ❑ Thermal protection & Current limit protection

*The Powerstax F351 high power, high-density DC-DC converter module provides 350Watts of power in the industry standard "full brick" size case.*

*Developed from the market leading Powerstax F501 range, this high efficiency converter is now also available with the rare STEP-UP conversion. This allows lower voltage input of 12V to be boosted up to higher output voltages of 24, 28, 48 and 42.*

*Coupled with automated production and test to ensure high reliability, this makes the F351 ideally suited for use in transportation, industrial controls and with 12, 24 & the new 42V output ideal for automotive applications.*

*The comprehensive list of in-built protection functions such as over voltage protection, under-voltage protection and short circuit protection are complemented by unique features such as the thermal monitoring voltage to provide early warning of system fault. Automated production and test ensure high reliability.*

**2 Year Warranty**





### Absolute Maximum Ratings

| Parameter                       | Conditions  | Max       |    |     | Unit |
|---------------------------------|---|-----------|----|-----|------|
| +Vin to -Vin voltage            |   | -0.5      | to | 30  | V    |
| SYNC to -Vin                    |   | -1.2      | to | 7   | V    |
| ON/OFF to -Vin                  |   | -0.3      | to | 7   | V    |
| +Vout to -Vout                  | depend upon output voltage of model selected      | see chart |    |     | V    |
| +S to -Vout                     |   | -0.5      | to | 50  | V    |
| -S to -Vout                     |   | -0.3      | to | 5   | V    |
| TRIM to -Vout                   | from nom output.                                  | 90        | to | 110 | %    |
| Isolation voltage (in to out)   | Complies with reinforced insulation requirements  | 2000      |    |     | Vrms |
| Isolation voltage (in to base)  | Complies with basic insulation requirements       | 1000      |    |     | Vrms |
| Isolation voltage (out to base) | Complies with operational insulation requirements | 500       |    |     | Vrms |
| Storage temperature             |   | -40       | to | 125 | °C   |
| Operating temperature           |   | -20       | to | 100 | °C   |
| Pin soldering temperature       | < 5 sec wave solder                               | 260       |    |     | °C   |
| Pin soldering temperature       | < 7 sec hand solder                               | 390       |    |     | °C   |

### Electrical Characteristics

Electrical characteristics apply over the full input voltage range, output load and base temperature at the centre, unless otherwise specified.

| Input Parameters                          | Notes   | Min | Typ  | Max | Unit  |
|---|---|-----|------|-----|-------|
| Operating input voltage                   |   | 11  | 12   | 18  | V     |
| Input surge withstand                     |   |     |      | 50  | V     |
| Operating input current                   | Input 11V, maximum output power                             |     |      | 40  | A     |
| Output Parameters                         |   |     |      |     |       |
| Voltage Set point                         | dependant upon module                                       |     | TBD  |     | V     |
| Output power                              | At 100C baseplate temperature                               |     |      | 350 | W     |
| Line regulation                           | Low to high input voltage, full load                        |     | ±10  |     | mV    |
| Load regulation                           | No load to full load, typical inut                          |     | ±10  |     | mV    |
| Temperature regulation                    | Deviation of output voltage from 25C                        |     | -0.7 |     | mV/°C |
| Ripple                                    |   |     | 80   |     | mVp-p |
| Transient response, peak deviation        | 50% to 100% and 100% to 50% step load change                |     | 450  |     | mV    |
| Transient response, settling time         | Start of load change return to within 10% of peak deviation |     | 500  |     | us    |
| Trim adjustment range                     |   | 60  |      | 110 | %     |
| ON/OFF over temperature (OT) shutdown     | Increasing baseplate temperature, center                    | 100 | 105  | 110 | °C    |
| ON/OFF input overvoltage (OV) turn-off/on | +Vin to -Vin  | 0   | 0    | 0   | V     |
| Output power                              | At 100C baseplate temperature                               |     |      | 350 | W     |
| Efficiency                                | dependant upon module                                       |     | 87   |     |       |



## General Specifications

| Module General Specifications   | Notes  | Min  | Typ | Max | Unit |
|---------------------------------|--|------|-----|-----|------|
| Isolation voltage (in to out)   | Complies with reinforced insulation requirements           | 2000 |     |     | Vrms |
| Isolation voltage (in to base)  | Complies with basic insulation requirements                | 1000 |     |     | Vrms |
| Isolation voltage (out to base) | Complies with functional insulation requirements           | 500  |     |     | Vrms |
| Isolation capacitance           | Input to output  |      | 470 |     | pF   |
| Isolation resistance            | Input to output  |      | 10M |     | Ohms |
| Agency approvals                | CE Marked, others Safety agencies per customer requirement |      |     |     |      |

| Module Control Specifications             | Notes   | Min                   | Typ | Max   | Unit |
|---|---|-----------------------|-----|-------|------|
| <b>Primary side</b>                       |   |                       |     |       |      |
| ON/OFF disable                            | External open collector or equivalent drive circuit                         | 0                     | 2.4 |       | V    |
| ON/OFF enable                             | External open collector or equivalent drive circuit                         |                       | 2.7 | 5     | V    |
| ON/OFF driven voltage                     | External drive source voltage   |                       |     | 7     | V    |
| ON/OFF enable delay                       | Delay to 50% output voltage, +Vout to -Vout                                 |                       | 2   | 5     | ms   |
| ON/OFF pull up resistance                 | Internal pull-up resistance to 5V   |                       | 18k |       | Ohms |
| ON/OFF series resistance                  | Internal pull-down resistance to -Vin when overtemp and O.V. & U.V. tripped |                       | 220 |       | Ohms |
| ON/OFF over temperature (OT) shutdown     | Increasing baseplate temperature, center                                    | 100                   | 105 | 110   | °C   |
| ON/OFF restart temperature                | Decreasing baseplate temperature, center                                    |                       | 90  |       | °C   |
| ON/OFF temperature sense voltage          | Advance temperature trip warning voltage limits                             |                       | 2.7 | 4.5   | V    |
| ON/OFF temperature sense voltage at 90°C  | Advance temperature trip warning @90°C, see applications note for graph     | 3.25                  | 3.5 | 3.75  | V    |
| ON/OFF temperature sense voltage          | Temperature sense voltage prior threshold                                   | 2.4                   |     | 2.7   | V    |
| ON/OFF temperature sense voltage          | Temperature sense voltage post threshold                                    | 2.0                   |     | 2.4   | V    |
| ON/OFF temperature sense voltage          | Temperature sense voltage after restart                                     |                       | 3.5 |       |      |
| ON/OFF input undervoltage (UV) turn-on    | Increasing input voltage, +Vin to -Vin                                      |                       | TBD |       | V    |
| ON/OFF input undervoltage (UV) turn-off   | Decreasing input voltage, +Vin to -Vin                                      |                       | TBD |       | V    |
| ON/OFF input overvoltage (OV) turn-off/on | +Vin to -Vin  | 19.4                  | 20  | 20.7  | V    |
| ON/OFF alarm                              | UV and OV fault alarm, sink 1.5mA   |                       |     | 0.8   | V    |
| ON/OFF alarm                              | OT trip voltage   | 2.1                   |     | 2.4   | V    |
| SYNC amplitude                            | External drive source voltage   | 3                     | 4   | 30    | V    |
| SYNC width                                | Maximum tr and tf is to be nominally 10% of pulse width                     | 50                    | 100 | 200   | ns   |
| SYNC control range                        | Single module and multiple modules  | 320                   | 330 | 360   | kHz  |
| SYNC resistance                           | Resistance to -Vin  |                       | 90  |       | Ohms |
| <b>Secondary side</b>                     |   |                       |     |       |      |
| SHARE output voltage                      | Referenced to -S @ maximum output current                                   | Dependant upon module |     |       | V    |
| SHARE current monitor                     | Referenced to -S  | Dependant upon module |     |       | mV/A |
| SHARE resistance                          | Output resistance   |                       | 330 |       | Ohms |
| TRIM voltage                              | Referenced to -S  | 2.487                 | 2.5 | 2.513 | V    |
| TRIM resistance                           | Internal series resistance  |                       | 10k |       | Ohms |

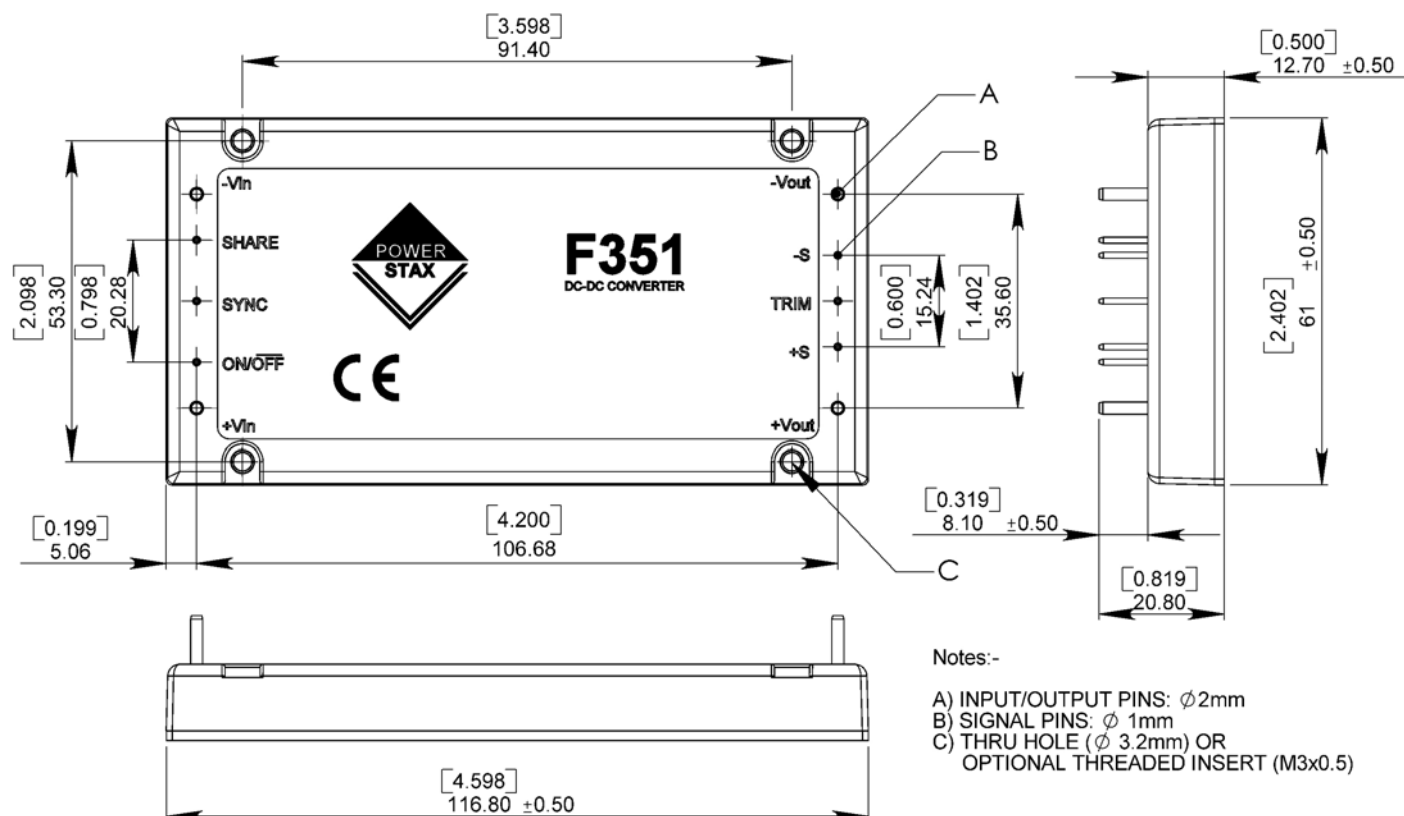
Provisional Specification to be verified against the test data

# POWERSTAX F501 Series DC-DC Converter - 500W Single Output Full Brick

## Outline Product Specification



### Mechanical Outline



### Range

| Model Reference | Input Voltage (V) | Output Voltage (V) | Output Current (A) |
|-----------------|-------------------|--------------------|--------------------|
| F351-012-120    | 12                | 12                 | 30                 |
| F351-012-240    | 12                | 24                 | 15                 |
| F351-012-280    | 12                | 28                 | 12.8               |
| F501-024-420    | 12                | 42                 | 8.5                |
| F351-012-480    | 12                | 48                 | 7.5                |
| F351-012-562    | 12                | 56.2               | 6.4                |

Exceeding absolute maximum ratings may cause permanent damage and may reduce reliability. Information and specifications contained in this data sheet are believed to be correct at the time of publication. However, Powerstax accept no responsibility for consequences arising from printing errors or inaccuracies. Specifications are subject to change without notice.

