

## FHB1.5A Series High Temperature Step Down Power Converter

### Features:

- : Operating temperature (ambient temperature:  
-55°C ~ +175°C and max. shell temperature up to +204°C)
- : Size: L30.5×W25.5×H9.0mm
- : Input range: 7.0~20.0V
- : Output voltage: 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V, 7.0V, 9.0V,  
12.0V, 15.0V
- : Output current: 1.5A
- : Conversion efficiency: typical 82%, max. 96%
- : Operating frequency: 100KHz
- : High conversion efficiency: typical 82-87%
- : Integrated LC EMI filter
- : Sealed metal casting (impact and moist resistance and electromagnetic radiation protection)
- : Provide rated power without deduction at 175°C (shell); provide 50% rated power at 204°C (shell);
- : Over-voltage and over-current failure cut-off delay restart
- : Input undervoltage cutoff protection



### Description:

FHB1.5A series high-temperature step down power converter with input current of 1.5A is designed for electronic equipment working in the harsh environment. It can work for 1,000 hours at shell temperature 150 °C, for 400 hours at shell temperature 175 °C and for 48 hours at shell temperature 204 °C. With features of being resistant to high temperature, impact and humidity, it is a power supply system especially applicable to petroleum survey logging tool, petroleum drilling instrument, geophysical detecting instrument, vehicles, telecommunication, network infrastructures, enterprise and high-performance calculation. Its input ranges from 7.0V to 20.0V. It provides non-isolated voltage-reduced single fix voltage or adjustable output voltage ranging 1.2V ~ 7.0V/7.0V ~ 18.0V. Within the entire temperature range and conversion between full load and no-load, the output voltage fluctuation is within 0.1V. The working frequency of FHB1.5A series power converter is up to 100KHz which provides good condition for filtering. In the circumstance of adding no filtering, its output voltage ripple is less than 50mV. The temperature stability of frequency within the entire range of temperature is  $\pm 8\%$ .

FHB1.5A is a step down power converter using DC-DC-BUCK circuit. When input voltage is greater than 7V, it starts to work. During operation, if input voltage is less than the preset output voltage, it becomes a series resistance with internal resistance of 0.4Ω. When power converter works steadily, the less the voltage difference of input and output voltage, the higher the conversion efficiency will be. The minimum voltage difference of input and output voltage is  $0.4 \cdot I_{OUT}$  (output current).

FHB1.5A has output control end (ADJ) used to adjust output voltage. When ADJ connects resistance to output GND, the less the resistance is, the more the output will be; when ADJ connects the resistance to output, the less the resistance is, the less the output will be. To adjust the resistance, a 20K potentiometer is enough.

FHB1.5A series power converter contains an in-built LC network, which can effectively reduce the fluctuations of the input current and the output voltage.

FHB1.5A series power converter contains under-voltage cut-off function, which enables the converter to stop working beyond the range of the input voltage to protect the converter.

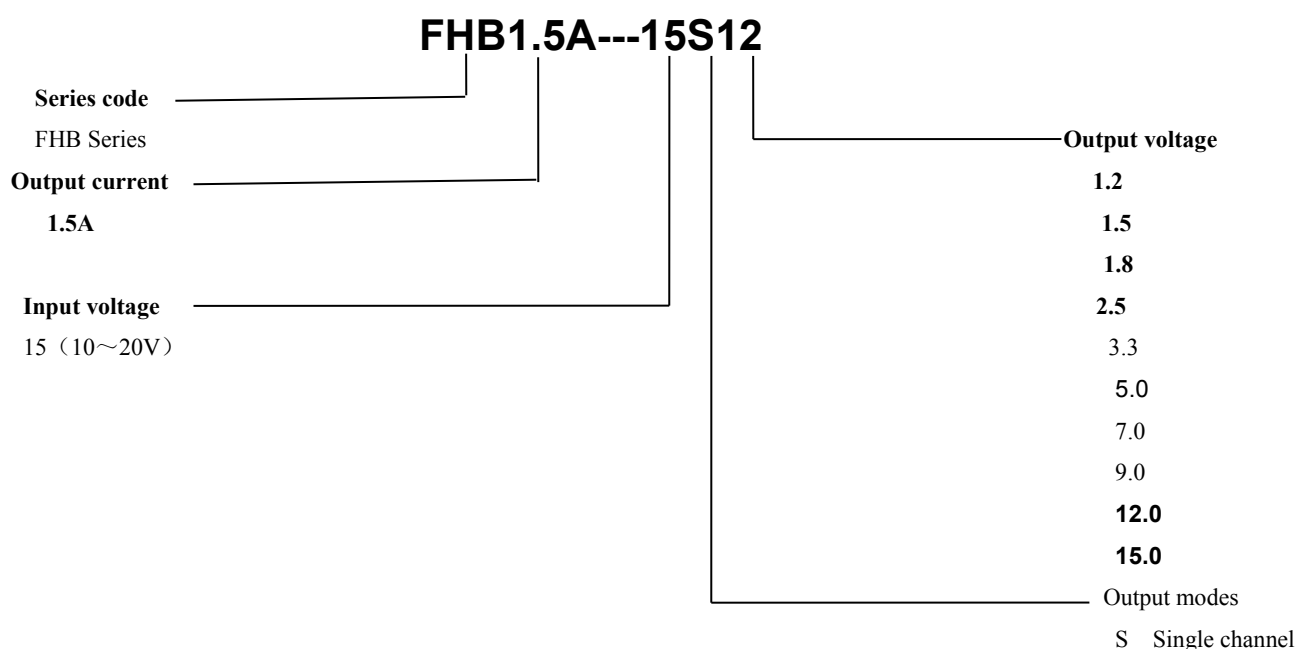
FHB1.5A series power converter contains the output short circuit and overload automatic cut-off circuit. When the output

lasts 0.1s and exceeds 120% of the rated output power, the module cuts off all outputs. After the over-current fault is eliminated, it automatically enters soft-start mode and restores the output voltage. If the overload duration of output is less than 0.1s, the module will not act.

The operating frequency of FHB1.5A series power-supply converter is 100KHz, which provides a good condition for filtering. Under the circumstance without any filtering, its output voltage ripple is less than 50mV.

Key components used for FHB1.5A series power-supply converter are purchased in military level and completely pass the in-factory test in strict accordance with the national military product quality standard. The factory test includes 24 ~ 72-hour live aging and screening under the temperature of +175°C. All finished products have experienced 8-hour full-load operation under the temperature of +185 °C before delivery so as to fully check the damage to the components during the production process and hence ensure the reliability of products.

### Type Selection:



### Technical Parameters:

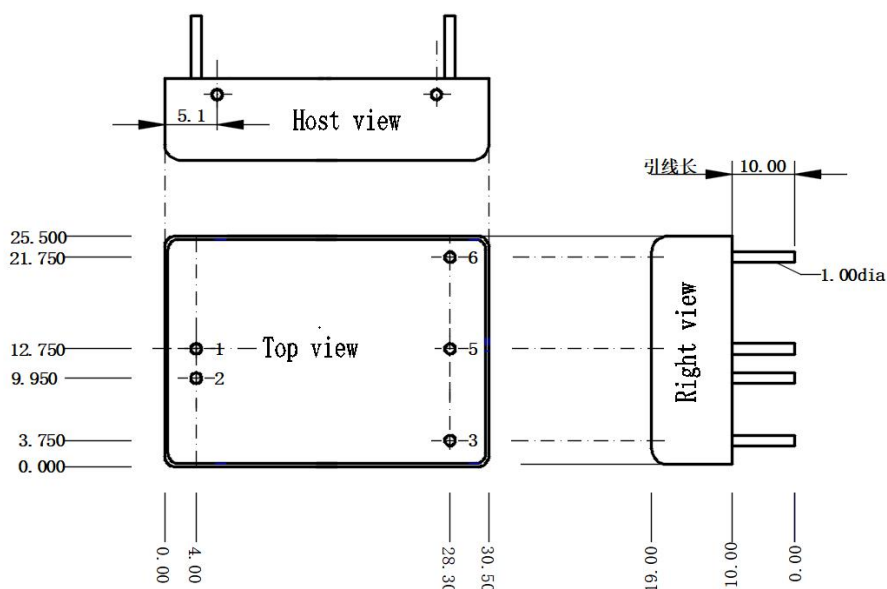
- (1) Operating temperature: -55 °C ~ +175 °C Max. shell temperature: +204 °C.
- (2) Input voltage: 10~20V
- (3) Output voltage: 1.2V, 1.5V, 1.8V, 2.5V, 3.3V, 5.0V, 7.0V, 9.0V, 12.0V, 15.0V
- (4) Output ripple: 50mVp-p, typical 20mVp-p
- (5) Output current: 1.5A
- (6) Output precision: less than 5%
- (7) Load regulation: less than 5%
- (8) Temperature stability: less than ±2.5% (typical ±1%)
- (9) Linear regulation: ±0.1% 10% linear variation
- (10) Shock resistance: 25G, 0 ~ 300Hz
- (11) Conversion efficiency: 92%
- (12) Static power consumption: 0.1W max.
- (13) Dimension: L 30.0 × W25.5 × H9.0mm

### Service Requirement:

The module shell is isolated from input and output. Normally the module is directly installed on printing circuit board in using. The top of converter is connected with radiator. As the converter has nearly 1W power consumption under the full-load operation and its size is small, a good medium needed to be added between the shell of the power supply and the radiator so as to ensure the temperature of the converter shell to be less than 204 °C.

If the ripple cannot be filtered with capacitance or LC network, then this ripple is electro magnetic interference (EMI). Thus, an EMI filtering module is necessary to be added to input and output terminals of FHA65. To function properly, the shell of filtering module should be suspended not to connect with radiator, input GND and output GND. If it is connected to either of them, EMI filtering module will not function properly. As we have added EMI network to input and output terminals inside module, so long as the shell is suspended, it will function. If the ripple is still large, it is needed to externally connect input or output EMI filter outside the shell. To suspend shell, it ordinarily put heat-conducting pad, ceramics backing or silicon rubber pad between the shell and radiator.

### Outline Diagram:



- Note: 1、 The tolerance of needle diameter and between two pins is  $\pm 0.1\text{mm}$ ;  
2、 The tolerance of external dimension is  $\pm 0.2\text{mm}$

### Definition of Pins:

Pin No.	Definition of ouput
1	Input negative
2	Input positive
3	ADJ
5	Output positive
6	Output negative

**Product performance, reliability and information are subject to change without prior notice.**

**June 16,2022**