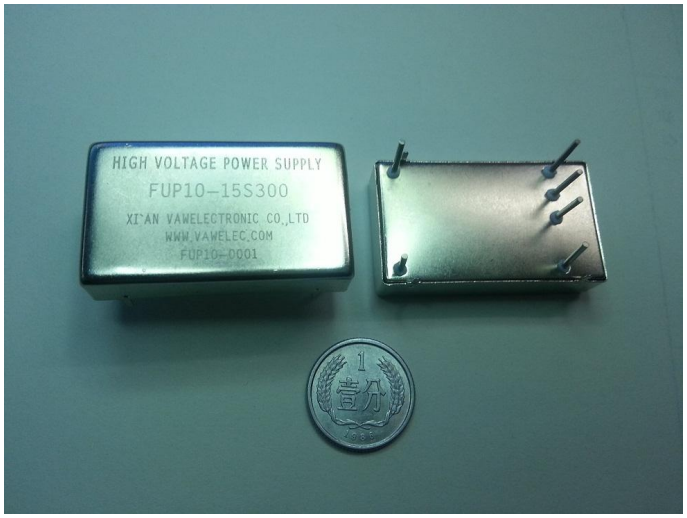
FUP 10 Series High-Voltage Power-Supply Module for Acoustic Logging Tool

Features：



- ： High operating temperature :Ambient temperature:-55℃～+175℃ and max. shell temperature up to +204℃)
- ： Small size: L38.0×W22.0×H8.5mm
- ： Wide input range:10～20V
- ：Input and output separated and adjustable continuously :50V～150V, 100～300V
- ： Low output ripple: less than 100mV_{p-p}
- ： High output power: 10W
- ： High conversion efficiency (typical 80％)
- ： High operating frequency（300KHZ）
- ： Integrated LC EMI filter
- ： Sealed metal casting (impact and moist resistance and electromagnetic radiation protection)
- ： Provide rated power without deduction at 185℃ (shell)
- ： Over-heat protection at 204℃

Description

FUP10 series 10W high-voltage power module, specially designed for oil prospecting acoustic logging tool working in the harsh environment, is only L38.0×W22.0×H8.5mm in size and saves space for acoustic logging tool. Simply designed, the power-supply module's static working current is only 30mA and load conversion efficiency up to 80%. It is resistant to high temperature, shock and moisture when working in harsh environment, thus it is able to normally work at an ambient temperature of 175℃. Shock resistance frequency: 20-50Hz/50Hz-2KHz and amplitude/rate: 0.5mm/10g. Shock resistance reaches three times per amplitude. Spike rate: 100g and duration: 6ms

Considering that transducer of acoustic logging tool has various types of crystals and to simplify design and reduce purchasing types for users, FUP10 series 10W high-voltage power-supply module for acoustic logging tool is specially designed to be isolated between input low voltage and output high voltage with isolation voltage of 1500V. The output high voltage is continuously adjustable. Control voltage GND is connected to input GND. When the control voltage ranges 0-3.3V, output high voltage has linear variation with control voltage. Output high voltage reaches maximum value when control voltage is 0V and minimum value when control voltage is 3.3V. When control voltage is higher than 3.3V, output voltage will not have linear variation with control voltage and output variation becomes gentle and then reaches the minimum value without variation. The amplitude of control voltage is not allowed to exceed -0.5V～+15V.

The working frequency of FPU10 series power-supply module is up to 300KHz which provides good condition for filtering. In the circumstance of adding no filtering, its output voltage ripple is less than 100MV. The temperature stability of frequency within the entire range of temperature is ±1%.

FPU10 series power-supply module is specially designed a high conversion efficiency in the circumstance of light and heavy load. The efficiency is up to 70% when output is 2W and 80% when output is 8W. In order to achieve light load and high efficiency, the input range of circuit not like other series of three times high-low ratio reduces to two times high-low ratio.

To pursue light load and high efficiency, FUP10 series power-supply module sacrifices some protection circuits. If users have been accustomed to our other series module, special attention should be paid to their difference.

(A:No overvoltage shutdown function! B: No overcurrent shutdown function! C: No soft start function)

FUP10 series power-supply module contains an in-built LC network, which can effectively reduce the fluctuations of the input current and the output voltage.

Key components used for FUP10 series power-supply module 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℃. All finished products have experienced 8-hour full-load operation under the temperature of +175 ℃ 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

FUP10--15S300

Series code
FUP Series
Output power
10W

Input voltage
15（10～20V）

Output voltage
150（50～150V）
300（100～300V）

Output modes
S 单路 Single

Technical Parameters

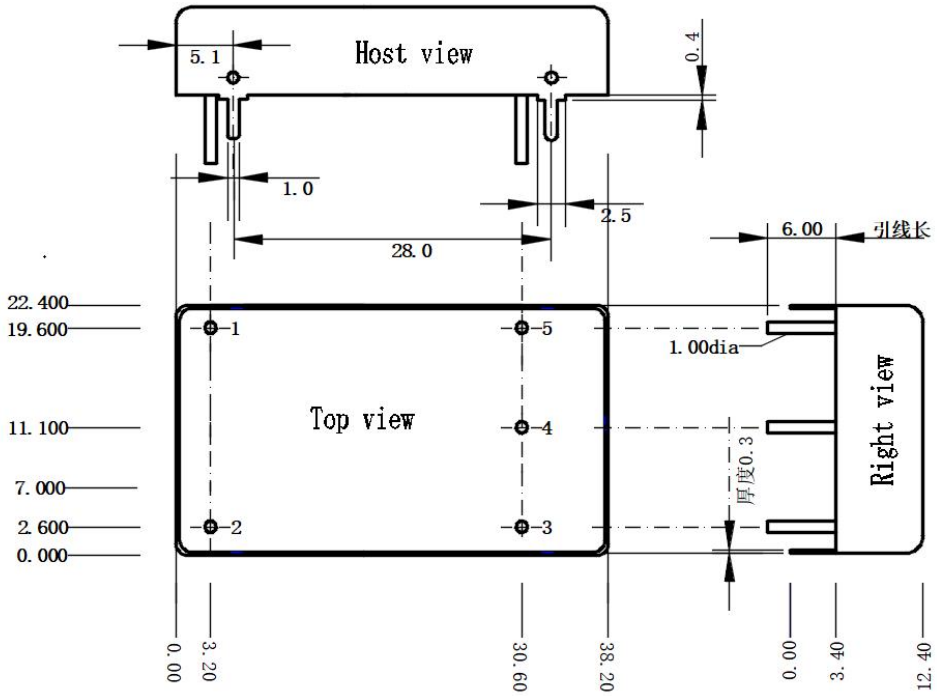
(1) Operating temperature: -55 ℃ ~ +175 ℃ Max. shell temperature: +204 ℃.
(2) Input voltage: 10～20V
(3) Output voltage: 50～150V, 100～300V
(4) Output ripple: 100mVp-p (typical 30mVp-p)
(5) Output power: 10W
(6) Load regulation: less than 5%.
(7) Temperature stability: less than ±2.5% (typical ±1%)
(8) Linear regulation: ±0.1% (10% linear variation)
(9) Earthquake resistance: 25G, 0 ~ 300Hz
(10) Conversion efficiency: 70-80%
(11) Static power consumption: 0.6W Max.
(12) Isolation voltage between input and output: 1500V
(13) Over-heat cutoff at 204℃
(14) Dimension: L38.0×W22.0×H8.5mm

Service Requirement

As the power-supply module has nearly 2W power consumption under the condition of full-load operation and their sizes are small, good medium is necessary to be added between the shell of the power-supply module and the radiator so as to ensure the temperature of the module shell to be less than 145 ℃. The shell of the module is isolated from the input and output. We adopted two 1500V/2000PF capacitors to connect shell with input ground and output ground respectively so as to effectively reduce the switching spikes. In some applications, it requires that input and output have common ground and it must use the shortest and roughest wire to make input and output ground wire short circuit as soon as it comes out the module. The shorter the connection distance is, the less the interference will be.

To strengthen the shock resistant performance, four soldering terminals of shell should be welded on printing circuit when installing the module on printing circuit board. Power-supply module is to be possibly damaged when fixed with only four pins in strong shock condition.

Outline Diagram



Note: 1、The tolerance of needle diameter and between two pins is ±0.1mm;
2、The tolerance of external dimension is ±0.2mm

Definition of Pin

Pin No.	Definition of Pins
1	Input negative (IN-)
2	Input positive (IN+)
3	Output positive (+OUT)
5	Output negative (-OUT)
6	Control end (ADJ)

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

July 16,2022