

Product Manual

TP-P6



1. Overview

1.1 Application

This high-voltage DC power supply is a customized special-purpose power module featuring compact size, light weight, and high efficiency. It comes with built-in fan cooling and achieves a maximum efficiency of $\geq 96\%$. The power module adopts an aluminum alloy enclosure, providing both aesthetics and waterproof performance. It serves as an ideal alternative to imported high-voltage DC modules.

1.2 Product Features

- DC-DC isolated converter: Converts 750V DC input to 50V DC output, with rated power of 6kW.
- High power density, compact size, and lightweight design.
- Complies with power supply reliability requirements: input over/undervoltage protection, output overvoltage protection, current limiting, short-circuit, and over-temperature protection.

1.4 Main Specifications

Input Voltage Range	Rated Output Voltage	Rated Output Power	Efficiency	Voltage Regulation	Ripple & Noise
600–750V DC	50 $\pm$ 0.5V DC	6kW	$\geq 96\%$	$\leq \pm 1\%$	$\leq \pm 2\%V_o$

2. Environmental Conditions

No.	Item	Technical Specification	Unit	Remarks
1	Operating Temperature	-20°C ~ +40°C	°C	Continuous 6kW operation
2	Storage Temperature	-40°C ~ +80°C	°C	/
3	Relative Humidity	≤ 95	%	No condensation (40°C $\pm$ 2°C)
4	Altitude	0–3000	m	

5	Atmospheric Pressure	76-106	kPa	/
6	Cooling Method	Self-contained fan cooling	/	/

3. Electrical Characteristics

Includes input, output, and protection characteristics as follows:

3.1 Input Characteristics

No.	Item	Specification	Remarks
1.1	Rated Input Voltage	720V DC	
1.2	Input Voltage Range	600-750V DC	
1.3	Max Input Current	10A	Vin=650Vdc, Po=6kW

3.2 Output Characteristics

No.	Item	Specification	Remarks
2.1	Rated Output Voltage	50V DC	/
2.2	Output Voltage Range	45-50.5V DC	
2.3	Rated Output Current	120A	/
2.4	Rated Output Power	6000W	/
2.5	Peak Output Power	7000W	
2.6	Efficiency	≥96%	Vin=720Vdc, > 50% load
2.7	Voltage Regulation	±1%	/
2.10	Ripple & Noise	≤700mVp-p	20MHz BW, rated load

3.3 Protection Characteristics

No.	Protection Type	Specification	Remarks
3.1	Input Undervoltage	580–600V DC	Hysteresis >10V
3.3	Input Overvoltage	770–790V DC	Hysteresis >15V
3.5	Output Overvoltage	54–56V DC	Auto recovery
3.6	Output Overcurrent	140–160A	Auto recovery
3.7	Short Circuit	Long-term short-circuit resistant	Auto recovery
3.8	Over Temperature	Protection at 75°C, recovery at 65°C	Enclosure temp

4. Safety Features

Dielectric Strength and Insulation Resistance:

Test Item	Condition	Requirement	Remarks
Input-Output	3000Vdc /10mA/1min	No breakdown or flashover	
Input-Enclosure	2000Vdc /10mA/1min		
Output-Enclosure	1000Vdc /10mA/1min		
Insulation Resistance	≥10MΩ @500Vdc	RH 90%, normal pressure	

5. Other Features

- Flammability: PCB shall meet V-0 per GB4943.1-2011; insulation cables per GB/T18380.12-2008; other insulation materials ≥V-1.
- System Noise: ≤60dB(A).
- Reliability: MTBF ≥100K hours at 25°C, rated input/output (per MIL-HDBK-217F Notice2).
- Protection Grade: IP65; no water accumulation on top.

- Anti-moisture, Anti-mildew, and Anti-salt-fog per GB/T 4797.6 Table 9.

6. Product Label

Customized or printed according to customer requirements.

7. Mechanical Dimensions and Connector Definitions

Maximum Dimensions: 248mm × 107mm × 75±1mm

Weight (Net): ≤1.4kg

Connector Definition:

Function	Definition	Description
DC Input	VIN+	High-voltage positive input
	VIN-	High-voltage negative input
DC Output	OUT+	50V output positive
	OUT-	50V output negative

8. Packaging, Transportation, and Storage

Packaging: The box shall include product name, model, manufacturer label, inspection certificate, and manufacturing date.

Transportation: Packages must be firm with handling symbols. Protect from rain, snow, and mechanical shock.

Storage: Store in original packaging at -10~40°C, RH ≤80%, away from harmful gases, flammables, or strong magnetic fields. Shelf life: 2 years; reinspection required after.

9. Safety Precautions

- Stop operation immediately if safety protection is damaged.
- Avoid condensation after temperature change; ensure proper grounding.
- Only qualified personnel should connect to power supply.
- Wait at least 5 minutes after power-off before maintenance to allow capacitor discharge.

- Observe high-voltage warning symbols and avoid direct contact to prevent electric shock or burns.