

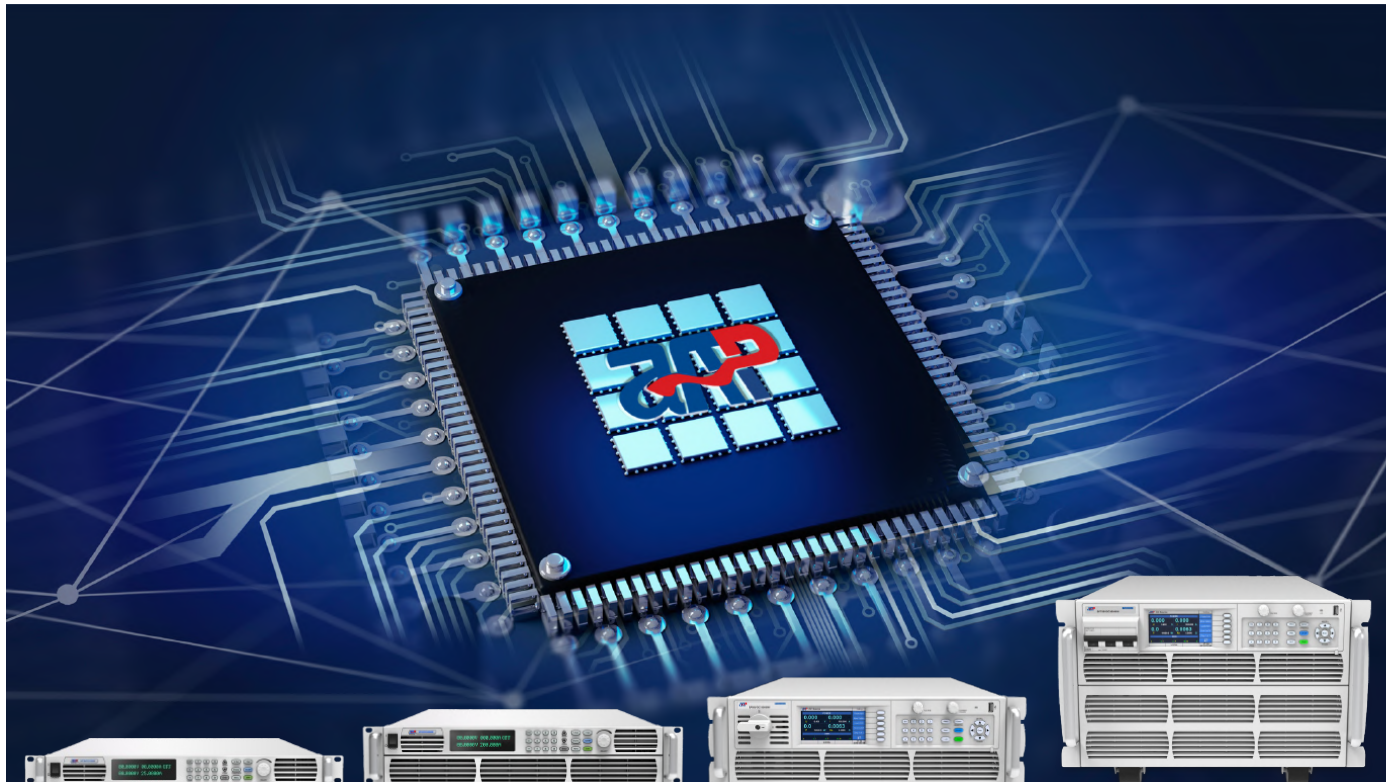
SEMICONDUCTOR/IC TEST SOLUTIONS

- LASER SEMICONDUCTOR CHARACTERISTICS TEST
- LED MODULE TEST
- ULTRACAPACITOR TEST
- LED DIMMING FUNCTION TEST
- THIRD-GENERATION SEMICONDUCTORS IN THE FIELD OF RAIL TRANSIT/NEW ENERGY VEHICLES TEST



HIGH EFFICIENCY & HIGH PRECISION & HIGH STABILITY

Semiconductor/IC Test Solutions



Benefited from the rise and development of new energy vehicle industry, the demand for rail chips and charging piles is increasing day by day as well as the demand for third-generation semiconductor material with the rapid development of 5G technology. The third-generation semiconductor materials have the characteristics of high voltage resistance and high temperature resistance, which can play an important role in power electronics, new energy vehicles, data centers, charging piles, 5G technology and other fields to provide assistance for the future-oriented high-performance applications. At present, in high-voltage and high-power applications, silicon carbide (SiC) devices have begun to accelerate the commercialization process. APM provides professional test solutions for the development trends of semiconductors, and provides higher power and voltage testing power supplies.

Ultracapacitor test



Recommendation

SP-1U /2U Series High Performance Programmable DC Power Supply

Voltage Range: 20V-800V

Current Range: 7.5A-200A

Power Range : 600W-4000W

Application Advantages:

- SP-1U/2U series high performance programmable DC power supply, as for the limitation of charging time when charging ultracapacitors, we can manually control the power on/off, or set the charging process to automatically shut down. When the set time is up, the power output will be automatically turned off.

Laser Semiconductor Characteristics test

Semiconductor lasers are lasers with semiconductor materials as the working substance, also known as semiconductor laser diodes. It has the advantages of small size, light weight and selectable wavelength. It is widely used in medical treatment, processing and manufacturing, military, automobile, scientific research, information technology and other fields.

To ensure the reliable use of semiconductor laser, it is necessary to carry out a series of performance index test. Due to the characteristics of semiconductor lasers, when using a DC power supply to test, there are mainly the following requirements:

- power supply needs to work in CC mode with voltage adaptive;
- current overshoot is not allowed;
- Once the operation mode of the power supply changes from CC to CV, the power supply must shut down the output to protect its DUT.



Recommendation

SP-3U /6U Series Wide-range High-power Programmable DC Power Supply

Voltage Range: 0-2250V

Voltage Range: 0-1200A

Power Range : 0-36kW

Application Range:

Semiconductor laser module loop closure test; Comprehensive test of laser system

Application Advantages:

- CC & CV priority is optional: can choose whether the output is voltage high speed mode or current no overshoot mode.
- Fold back: After a breakdown of a laser melting, the test circuit is disconnected and will soon be switched on. Due to the characteristics of the switching power supply, the external test circuit is switched on at the moment and will generate overshoot current. To prevent more lasers are damaged, the power supply needs to shut down the output immediately while the test circuit is disconnected. The fold back protection of APM power supply can solve this problem. The power supply works in CC mode during normal testing and automatically switches to CV mode when the circuit is disconnected. The CC to CV protection of fold back means that once the operation mode of the power supply changes, this protection is triggered, an alarm prompts, and the power supply output is shut down. After the alarm is cleared, the power supply can resume output.
- Electric adaptive: when working in CC mode, voltage can be automatically pulled down to achieve self-adaptive.

LED Module Test



Recommendation

SP-3U /6U Series Wide-range High-power Programmable DC Power Supply

Voltage Range: 0-2250V

Voltage Range: 0-1200A

Power Range : 0-36kW

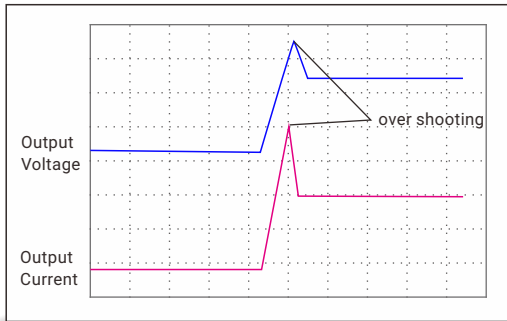
Application Range:

LED Load

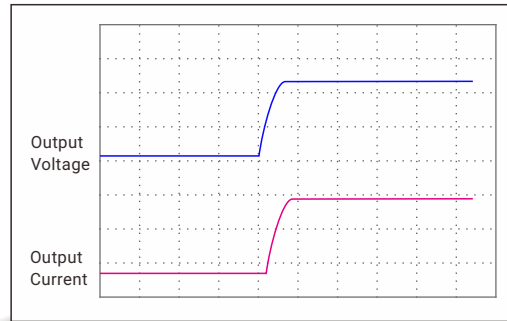
Application Advantages:

Application of LED Load

APM high power DC sources support CC&CV priority selection function, which determines whether the output is in voltage high speed mode or current no overshoot mode. When testing LED loads, CC priority mode can be selected to avoid output current overshoot.



LED load, CV priority mode



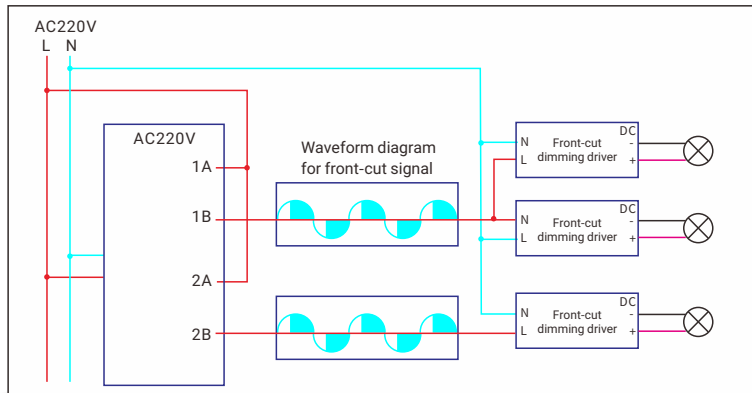
LED load, CC priority mode

LED Dimming Function Test

The price of LED lighting has been declining rapidly year by year, making LED lighting gradually popular. Although LED lighting has been the most energy-saving lighting equipment, which has more energy saving effect than incandescent lamp and fluorescent lamp, there is still an important function of LED lighting that is not fully utilized at present, which is the dimming function. Dimming can not only save energy, but also significantly improve the comfort of lighting, conform to the sensitive dimming curve of the human eye, and significantly improve the environmental experience.

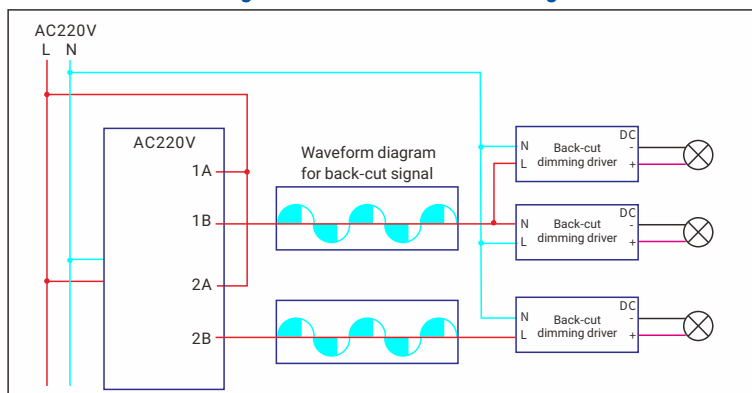
There are five control modes for LED lighting devices on the market: front-cut SCR dimming, back-cut MOS dimming, 1-10VDC, DALI and DMX512.

Diagram for Front-cut SCR Dimming



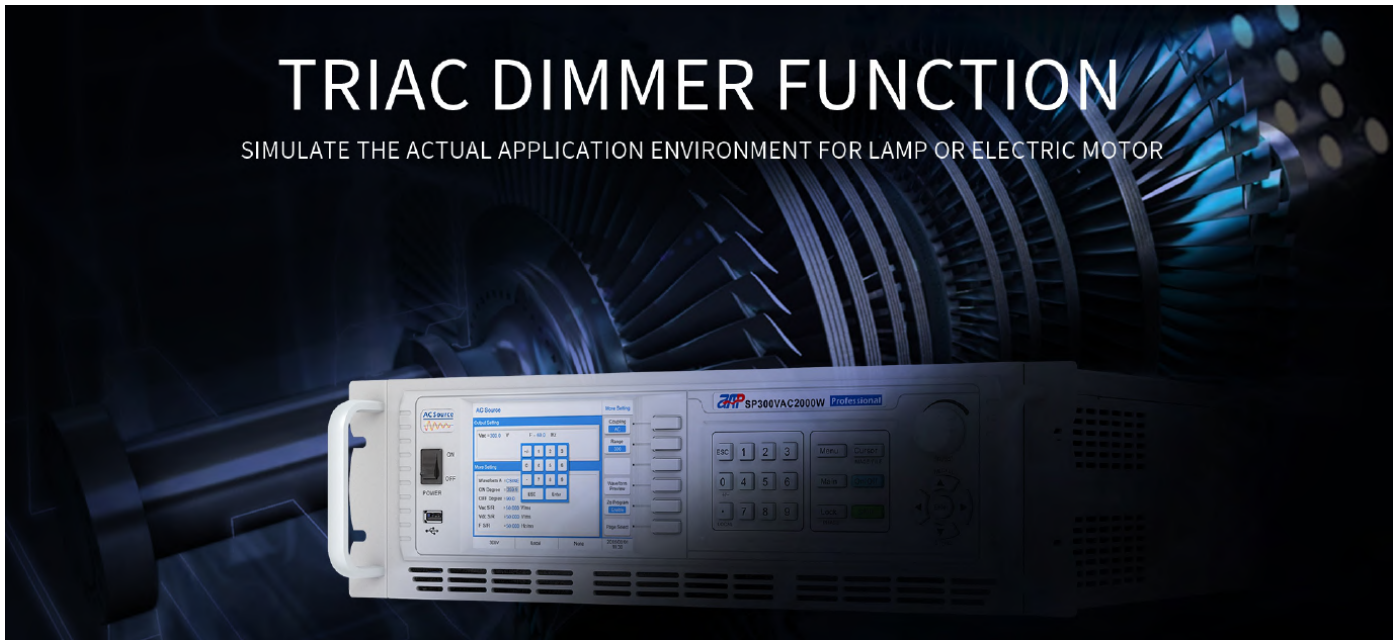
Front dimming is to use SCR circuit, starting from AC phase 0, Input voltage chopper, and there is no voltage input until the SCR is turned on. Its principle is to adjust the conduction angle of each half-wave of the alternating current to change the sinusoidal waveform, thereby changing the effective value of the alternating current, so as to achieve the purpose of dimming, which plays a dominant position in the market, most manufacturers offer this type of dimmer.

Diagram for Back-cut MOS Dimming



The trailing edge phase-cut control dimmer is made of Field Effect Transistor (FET) or Insulated Gate Bipolar Transistor (IGBT) devices. The trailing edge phase-cut dimmer generally uses MOSFET as the switching device, so it is also called MOSFET dimmer, commonly known as "MOS tube".

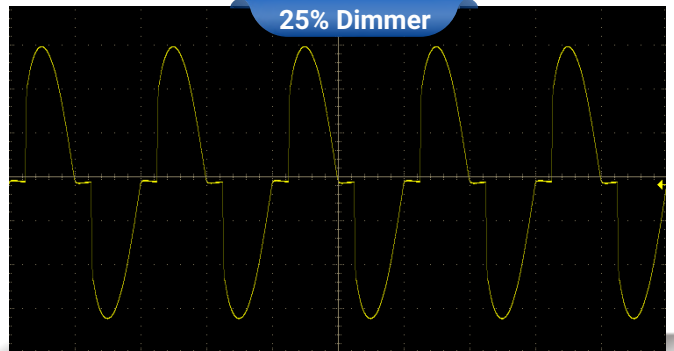
The Triac Dimmer function of APM SP-300 series programmable AC power supply can realize the accurate simulation of the dimmer function.



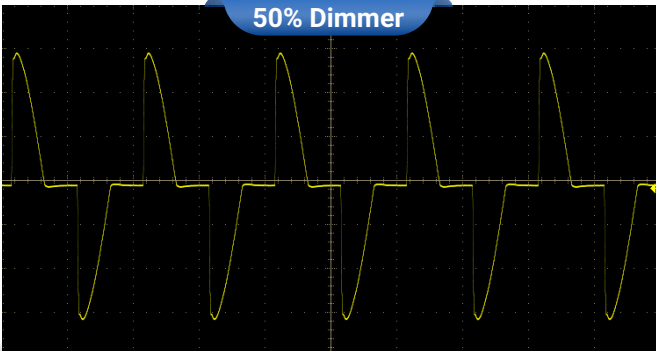
Fully Bright



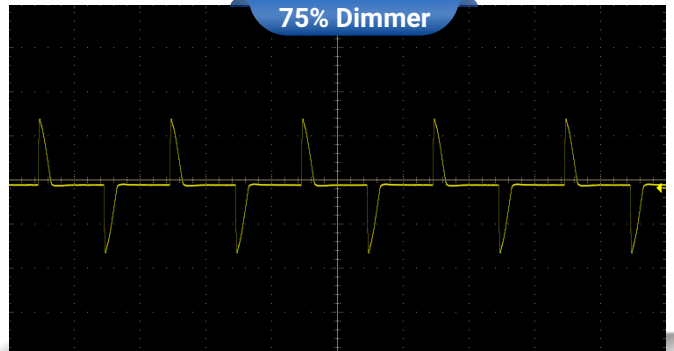
25% Dimmer



50% Dimmer



75% Dimmer



Third-generation Semiconductors in the Field of Rail Transit/New Energy Vehicles Test

With the development of microelectronics technology, the typical representative of the third generation of semiconductor materials: silicon carbide (SiC) has achieved breakthroughs in applications. Global semiconductor suppliers have launched semiconductor products with high voltage resistance, high frequency and high thermal conductivity. The 3300V high-voltage wide-band gap device developed based on new materials has been applied in the development of domestic subways.

In recent years, under the background of the irreversible trend of automobile electrification, the silicon carbide industry will also usher in a development trend. New energy vehicle suppliers headed by Tesla Model 3, BYD Han EV and Porsche Taycan have successively expanded their distribution. The silicon carbide (SiC) market for electric vehicles is expected to grow rapidly to \$2.4 billion by 2022.

In the field of new energy vehicles, silicon carbide (SiC) devices are mainly used for inverters that drive and control motors, on-board DC/DC converters, on-board chargers (OBC), etc., which significantly reduces energy consumption and lightweight development trends. APM Technologies provides test solutions for semiconductor development trends and provides higher power/high voltage test power supplies.

Typical Application Fields:

■ New Energy Vehicles:

Car charger; DC/DC converter; drive motor inverter 750Vdc~800Vdc and above 1000Vdc

■ Rail Transit:

Silicon Carbide Traction Inverter 3300Vdc

■ Charging Pile:

Silicon carbide high voltage charging module 650Vdc~1200Vdc

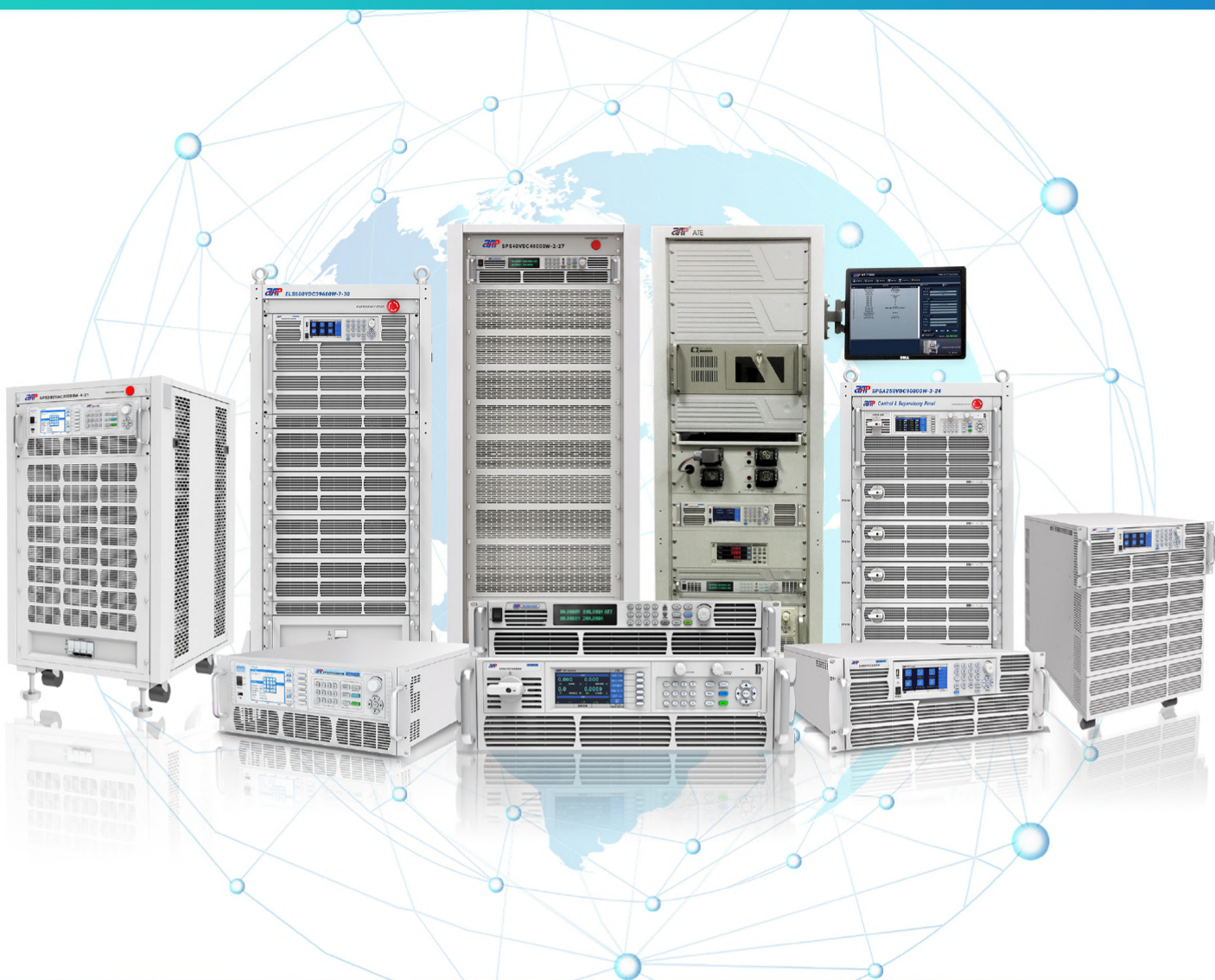


Recommendation

SP-3U/6U Programmable DC Power Supply: 750V~2250V (extendable to 3000V or more)

Features:

Low ripple, continuous 5500Hr uninterrupted high-voltage stable operation



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