Integrated power supply casing material



Overview

Understanding Power Supply Casing: Design and SafetyExplore the essential functions of a power supply casing, including thermal management, EMI shielding.

Key Takeaways

Integrated power supply casings are typically made from plastics like ABS, polycarbonate, or metals such as aluminum, chosen for durability, heat resistance, and mechanical strength. Common MaterialsPlasticsABS (Acrylonitrile Butadiene Styrene): Offers good dimensional stability, impact resistance, and low shrinkage, making it suitable for injection-molded casings that house sensitive electronics. Polycarbonate (PC): Provides high heat resistance, excellent impact strength, and transparency options for visual inspection or display integration.

Polypropylene (PP): Lightweight and chemically resistant, often used where cost and corrosion resistance are priorities.

Metals

Aluminum: Commonly used for die-cast enclosures, aluminum provides high mechanical strength, corrosion resistance, and effective heat dissipation, making it ideal for high-power or industrial applications. Steel: Sheet steel enclosures, often spray-finished, offer robust protection and can support IP-rated designs for dust and water resistance.

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Reinforced Composites

Glass fiber-reinforced polyester: Combines high mechanical strength with chemical and thermal resistance, suitable for outdoor or harsh environments.

Material Selection Considerations

Thermal Management: Materials must handle heat generated by power components. Plastics like polycarbonate can withstand higher temperatures, while metals like aluminum provide superior heat dissipation. Mechanical Strength: Casings must resist impact, vibration, and deformation.

Metals and reinforced plastics excel in high-stress environments. Dimensional Stability: Precise internal dimensions are critical for fitting components and ensuring electrical safety. Injection-molded plastics like ABS and PC are preferred for tight tolerances.

Environmental Protection: For outdoor or industrial use, materials must support IP ratings (e.g., IP65) to protect against dust and water ingress.

Manufacturing Methods

Injection Molding: Common for plastic casings, allowing precise control of wall thickness, ventilation, and structural integrity. Die Casting: Used for aluminum enclosures, providing high strength and consistent dimensions for industrial-grade power supplies. In summary, the choice of casing material for integrated power supplies depends on the balance between thermal performance, mechanical protection, dimensional accuracy, and environmental resistance, with plastics like ABS and polycarbonate favored for consumer electronics and metals like aluminum preferred for industrial or high-power applications.

Article Content

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Explore the essential functions of a power supply casing, including thermal management, EMI shielding, and material durability for safe operations.

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Computer case

An opened ATX case, front towards right. Components pictured include a microATX motherboard (top), a CPU (beneath the Cooler Master fan), a GPU (middle), and an SSD (right). The power supply is

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