### Key Parts That Support Power Supply Performance

**Capacitors (electrolytic capacitors, film capacitors, multilayer ceramic chip capacitors)**

- **Multilayer ceramic chip capacitors** are compact and offer high reliability and long life spans. There are also high-capacity types that encroach on the territories of film capacitors and electrolytic capacitors. Multilayer ceramic chip capacitors are important as EMC countermeasure components.

Since the capacity is high, capacitors are used for smoothing. Such capacitors are characterized by their compact size, high reliability, and longer life spans. They also have excellent high-frequency characteristics.

**Examples of choke coil cores (toroidal cores)**

A gap is placed in the core to prevent magnetic saturation. The magnetic flux leakage from the gap can cause noise, so shielding must be used.

### Noise Countermeasures in Switching Power Supplies

One of the weak points of switching power supplies is the generation of electromagnetic noise. TDK provides total EMC solutions that support all aspects of noise control from input to output and include various EMC countermeasure components (noise countermeasure components) and noise measurement in anechoic chambers.

**Examples of EMC countermeasures for switching power supplies (AC input)**

- **Noise generated by transistors and diodes** is also radiated from heat sinks designed to release thermal energy.
- **Magnetic flux leakage from transformers and choke coils** can cause eddy current in metal cases, generating noise.
- **Wires** and components where large currents are turned ON and OFF. The inductor portion of wire leads can also have an impact, so wiring and leads are made as short as possible.

**Other Sources of Noise**

Advanced circuit design and simulation technologies are needed.

**Ferrite Core**

A flexible electromagnetic shield material that absorbs radiated noise, converts it to heat, and eliminates it.

**Clamp Filters**

- Wire loops become antennas and radiate noise, so the area of such loops must be minimized.
- The operation of capacitors and resistors can control the switching noise and spike noise of transistors and diodes.

**Common mode filter on the output line** prevents noise from flowing in and out.

**Advanced circuit filter on the output line** prevents noise from flowing out.