



Proadlizer®
Outline
Features
Applications

As symbolized by the initiation of digital TV broadcasting and the appearance of keywords such as "ubiquitous," more and more digital devices are entering our living environment. For this reason, anti-noise measures for electronic equipment are becoming more and more important. Of noises from digital devices mounted on electronic equipment, 90% is said to be ascribable to a timing error in the power supply to a circuit.

For example, a CPU internally switches 0 and 1 at high speed. This means that a circuit at zero volts needs to reach a necessary voltage in a split second. If the power supply to the circuit does not achieve this timing, the semiconductor device cannot operate normally and generates severe noise.

To prevent this noise, a decoupling capacitor or bypass function has been helpful. Use of these has become so important as to occupy 90% of the capacitor market. However, with the growing speed of digital elements, a great problem has surfaced.

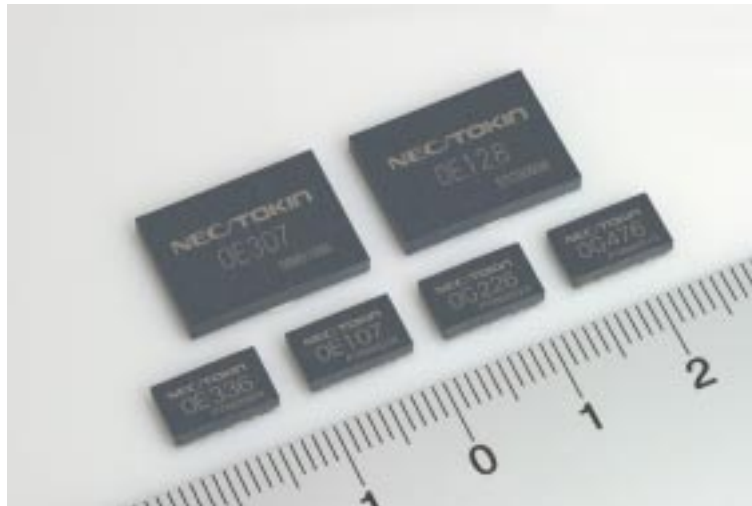
The operating frequency of recent CPUs is over 3 GHz and the switching timing is below three billionths of a second, and becoming shorter. A small number of capacitors are not enough to deal with this ultrahigh speed. A combination of close to 100 capacitors - from small-capacity, high-speed to large-capacity, low-speed - is needed.

Under moves toward compactness and flexibility, semiconductor chips have become more integrated to reduce the numbers of parts. In inverse proportion to this, the number of capacitors in decoupling circuits continues to grow.

Proadlizer[®] is NEC TOKIN's unique answer to noise countermeasures.

What is Proadlizer[®]?

A new device developed for CPU decoupling circuits

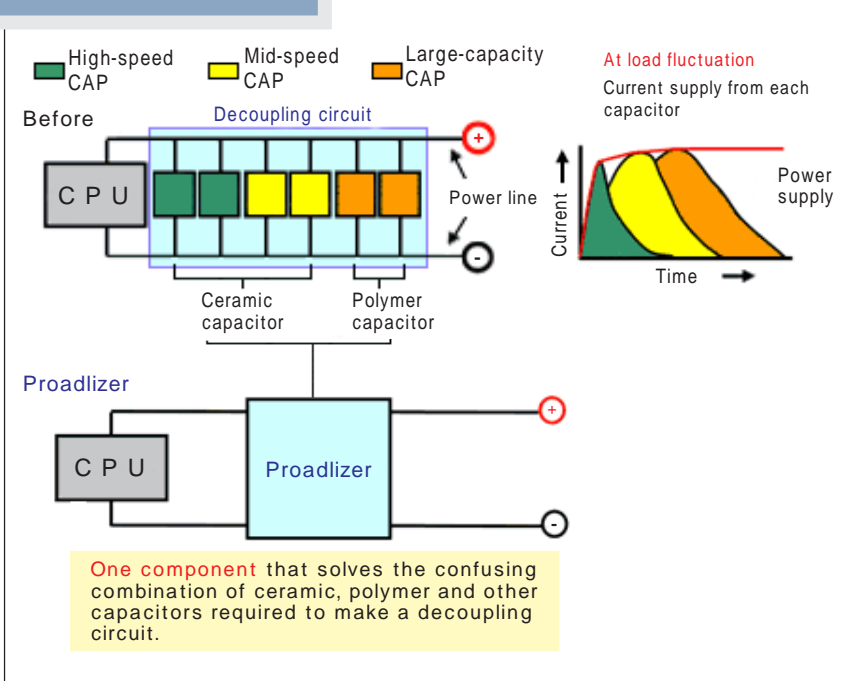


Dozens of decoupling capacitors in combinations that included aluminum electrolytic capacitors used at 100 kHz or less, tantalum capacitors in the 100 kHz to 10 MHz band, and ceramic capacitors corresponding to 100 MHz to 1 GHz or more were finally used to suppress noise. In contrast, one type of Proadlizer can cover a frequency area of dozens of KHz to 1 GHz that used to be covered by several types of decoupling capacitors. As well as featuring a lower impedance of the total frequency area than the conventional synthesized capacitor, it has a very flat characteristic. Due to these superior features, the Proadlizer is able to provide an even more stable power line. This allows several Proadlizers to replace dozens of capacitors. In other words, the Proadlizer not only realizes compactness and flexibility but also reduces the board mounting load and contributes to enhanced reliability.

The Proadlizer is composed of the same material as the conductive polymer tantalum capacitor "NeoCapacitor," which reduces internal resistance using a polymer. However, the Proadlizer has a unique shape that is similar to the structure of a filter to which three or four terminals are attached to a sheet-type electrode. This structure is the secret to the superior characteristic, producing an effect equivalent to that of many fine capacitors being arranged along a power line. In other words, electric charges stored close to the CPU are used for high-speed power supply and those stored gradually farther away are used when low-speed, large-volume power supply is required. The concept of this device structure previously existed for ceramic-based, anti-noise components of 1 GHz or higher, but not for large-capacity electrolytic capacitors of from 100 to 200 μ F. This was due to the common belief that large-capacity capacitors were slow and applicable only in specific fields.

The use of this structure marked a drastic change, one that only NEC TOKIN, with its long-term experience in anti-noise measures and solid electrolytic capacitor technologies, could make.

Using Proadlizer



Proof of Effectiveness

CPU Decoupling Circuit for Laptop PCs

Configuration with Conventional Capacitors



Capacitor (39 pieces)

Configuration with Proadlizer



Proadlizer (1 pieces)

Development of the Proadlizer proceeded with the intention that it would be used for CPU decoupling in high-end computers such as servers. The reason for this was that despite the overwhelmingly superior characteristics, the Proadlizer could not simply replace existing capacitors mounted on a board because it was a very unique device. As the board design had to be reviewed first for the best use of the Proadlizer, it was initially introduced for implementation in devices requiring high custom designing. Since the announcement of the product, however, many inquiries have been received regarding its applications in fields other than server.

Digital TV sets and liquid crystal display units use many semiconductor devices for high-grade processing. However, noise from frequencies of over 10 MHz emanating from these semiconductor devices is radiated into the air as electric waves. This would never be permitted in TV sets or audio equipment, but conventional measures using decoupling capacitors could not suppress the noise completely as the synthesized impedance is not flat. Utilizing the flat and lower impedance of the Proadlizer is believed to be the ideal solution.

In the mid- to long-term, the Proadlizer has the potential of exhibiting excellent anti-noise performance in almost all equipment from audiovisual digital home appliances to communications equipment. In the future, this device will replace decoupling capacitors in many fields.

Proadlizer Frequency Characteristics

Much lower impedance than that of the conventional combined capacitors in a wide frequency band of up to a gigahertz

