SMD pulse transformers for Gigabit Ethernet and PoE

- Designed for high transmission rates of up to 10 Gbit/s
- Support Power over Ethernet applications at 1 Gbit/s
- Special core design optimized for fully-automated production processes

TDK Corporation has expanded the ALT4532 series of pulse transformers with new types for Gigabit Ethernet and Power over Ethernet (PoE) applications. The new ALT4532P type is designed for emerging 2.5GBASE-T (2.5 Gbit/s) and 5GBASE-T (5 Gbit/s) LAN applications as well as 1000BASE-T (1 Gbit/s) applications with 600-mA PoE. The new ALT4532H type is compatible with the 10GBASE-T standard (10 Gbit/s). The components feature a compact SMD package with dimensions of 4.5 mm x 3.2 mm x 2.9 mm. Mass production of the new pulse transformers was launched in February 2018.

In recent years, Ethernet standards have been established for higher transmission rates up to 10 Gbit/s. With the new ALT4532 components TDK is responding to the rising demand for compact pulse transformers for these high-speed LAN interfaces, in particular, for the growing number of IoT devices. Thanks to their compact IEC 4532 packages, these SMD components are suitable for circuit board layouts with many pulse transformers.

Unlike conventional products with toroidal shaped cores, the new TDK transformers feature a special core design that is optimized for fully-automated production and winding processes, resulting in extremely stable quality. The discrete ALT4532 types offer designers greater flexibility for circuit board layouts than conventional LAN modules that combine pulse transformer and common-mode filters in a single package, for example, enabling mounting on both sides of the PCB.

Glossary

- Gigabit Ethernet: LAN systems based on IEEE 1000BASE-T, 2.5GBASE-T, 5GBASE-T, and 10GBASE-T standards for transmission rates of 1 Gbit/s, 2.5 Gbit/s, 5 Gbit/s, and 10 Gbit/s, respectively, over twisted-pair copper media.
- Power over Ethernet (PoE): The Ethernet standard defined by IEEE 802.3af and IEEE 802.3at for the simultaneous data transmission and supply power via LAN cables.

Main applications

- LAN interface for network devices, communication equipment, digital appliances, and IoT devices

Main features and benefits

- Designed for high transmission rates of up to 10 Gbit/s
- Support Power over Ethernet (PoE) applications at 1 Gbit/s
- Special core design optimized for fully-automated production processes
- Compact dimensions of 4.5 mm x 3.2 mm x 2.9 mm
Key data

<table>
<thead>
<tr>
<th>Type</th>
<th>Turns ratio</th>
<th>Min. inductance @ 100 kHz [μH]</th>
<th>Max. insertion loss [dB]</th>
<th>Max. inter-winding stray capacitance @ 100 kHz [pF]</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT4532P-181-T05G (2.5- / 5 GBASE-T)</td>
<td>1 : 1</td>
<td>180</td>
<td>0.9 @ 1-100 MHz, 1.4 @ 100-200 MHz</td>
<td>35</td>
</tr>
<tr>
<td>ALT4532H-121-T10G (10GBASE-T)</td>
<td>1 : 1</td>
<td>120</td>
<td>0.5 @ 1-150 MHz, 1.0 @ 150-500 MHz</td>
<td>35</td>
</tr>
</tbody>
</table>

Terminal layout