

# Low-Cost T0-Can Header for Coaxial Laser Modules in 25-Gbit/s Transmission Applications

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## Abstract

A new transistor outline-Can (T0-Can) header for a low-cost coaxial laser module for 25-Gbit/s transmission is proposed and demonstrated using a 3-D full-wave electromagnetic simulation. The simulation result is compared with the measured results of a conventional T0-56 header to verify its applicability. A two-section feedthrough hole is employed, and a wire-overground feed lead is introduced to overcome the impedance matching problems. The simulation results show that the proposed T0-Can header provides a transmission bandwidth in excess of 40 GHz and reflection loss less than 10 dB below 26 GHz, with an ideal 50- terminal. Taking the bonding wires into account, the transmission bandwidth still reaches 28 GHz. The electrical characteristics of this T0-Can package were extracted and combined with a small-signal equivalent circuit model of a 24.5-GHz laser diode to simulate the electrical characteristics of a full coaxial laser module. The 3-dB bandwidth is 20.5 GHz, which allows the laser module to operate at 25 Gbit/s. This superior T0Can header provides a low-cost coaxial laser package solution and can be applied in the emerging 21-Gbit/s fiber channel (20 GFC) and 100-gigabit ( $4 \times 25$  Gbit/s) Ethernet (100 GbE) networks.

Keyword : 100-Gigabits Ethernet, 100GbE, 20GFC, coaxial laser package, fiber channel, T0-Can, transmitter optical subassembly.