Cisco QDD-400G-ZR-S Datasheet

Cisco QDD-400G-ZR-S QSFP-DD transceiver module, coherent DCO, 400G-ZR

QDD-400G-ZR-S

Cisco offers a comprehensive range of pluggable optical modules in the Cisco pluggables portfolio. The wide variety of modules gives you flexible and cost-effective options for all types of interfaces. Cisco offers a range of GBIC, SFP, XFP, SFP+, CXP, CFP, Cisco CPAK, and QSFP+ pluggable modules. These small, modular optical interface transceivers offer a convenient and cost-effective solution for an array of applications in the data center, campus, metropolitan-area access and ring network, storage area network, and long-haul network. In recent times, with longer strides of innovation, Cisco has introduced analog DWDM CFP2 interfaces to the market. The latest addition to the Cisco portfolio pushes this boundary further with the introduction of the 400G DIGITAL COHERENT QSFP-DD PLUGGABLE OPTICAL MODULE.

Product overview

Cisco now offers a range of all new 400G Digital Coherent QSFP-DD transceivers. Cisco already offers a range of Digital Coherent CFP2 transceivers capable of supporting up to a 200-Gbps wavelength. Thanks to the miniaturization of the technology with a 7-nm manufacturing procedure and innovation in silicon photonic technology, it is now possible to squeeze a 400G-capable Digital Coherent WDM interface within a QSFP-DD form factor.

Two product variants are available:

1. ZR variant
2. ZR Plus variant

QDD ZR QDD-400G-ZR-S overview

The QSFP-DD ZR variant complies with OIF MSA, allowing to provide compatibility with the equivalent component compliant with the same MSA standard. The key application for the ZR standard is allowing the transmission of a 400G wavelength in point-to-point topology up to a distance of 120 km with the Mux/Demux and Amplifier as depicted the below.

Features and benefits

As line card ports become universal, it is possible to design new line cards optimized for 400G, knowing that by simply replacing the pluggable, the port can support bitrates down to 100G to guarantee backward compatibility with previous-generation routers. In addition, the IPoDWDM options, available by simply using the 400G ZR/ZR+ optics, provides, for the first time, the same density of grey line cards, eventually solving the usual dilemma of having to choose between the benefits of integration and maximizing the throughput of router line cards.

Some network operators chose to take a different approach at 400G upon recognizing the lessons learned from the efforts at 100G. In late 2016, these network operators and a few vendors identified 400G as an intersection point for

the industry to support coherent optics in the same form factors as emerging high-volume client optics, such as QSFP-DD. In less than one year, the OIF defined most of the 400ZR interface technical details, which helped motivate increased industry investment in pluggable, interoperable coherent interfaces.

A key requirement was to accommodate hyperscale DCI links beyond 120 km, while maintaining the same QSFP-DD/OSFP form factors. A survey of 400G standardization efforts pointed to elements of OpenROADM that could provide a standard-based, high-performance addition to the 400ZR standard. Thus, the industry began looking at the next logical step, which would be to combine these vetted specifications and achieve the goal of addressing 400G Ethernet-centric solutions beyond 120 km. This would enable the extension of hyperscale DCIs beyond the edge to regional distances, and expand the addressable market for module suppliers, providing greater economies of scale that benefit the entire distribution chain. This combination of the 400ZR standard with elements of OpenROADM became known as OpenZR+.

OpenZR+ is the logical combination of two industry standardization efforts that enables high-performance DCI pluggable modules supporting multivendor interoperability.

OpenZR+ is a combination of two industry standardization efforts created to maintain the simple Ethernet-only host interface of 400ZR while adding support for features such as: (1) higher coding gain using oFEC from the OpenROADM standard, which extends the reach capability; (2) multirate Ethernet, which enables the multiplexing of 100GbE and 200GbE clients over the line-side link, providing optimization options for the switch/router equipment to channelize the traffic over the transport link; (3) adjustable 100G, 200G, 300G, or 400G line-side transport links (using QPSK, 8QAM, or 16QAM modulation), which enables reach/capacity optimization over various fiber links; and (4) higher dispersion tolerance. All of these enhanced capabilities would exist in a QSFP-DD designed to utilize OpenZR+, supporting reaches well beyond the 120 km supported by 400ZR.

Multivendor interoperability

Extensive system-level testing and unmatched technical expertise enable Cisco optics to be successfully used across Cisco as well as multivendor platforms. The strategic supply chain diversity and service capabilities provide the high network availability and peace of mind.

Flexible modulation

As in the case of QSFP+, QSFP56-DD will provide the capability to support lower bitrates, via 4x 100G pluggables. In addition, this pluggable supports the downsize to the port to 200G (or 2x 100G). This one pluggable fit's all type of approach provides great benefits to both vendors and customers, as it enables a simplification in the IP router portfolio and, as a consequence, a simplification in network planning and spare parts.

Specifications

- Product ID: QDD-400G-ZR-S
- Product Description: QSFP-DD transceiver module, coherent DCO, 400G-ZR
- Transmit Power：Without TX Shaping: -8.5 (Typ)， -10 (Worst case)
- Symbol Rate (+/- 20ppm): 59,843,750,000
- Modulation (Payload): 16-QAM (400G)
- FEC: C-FEC
- Modulation (Payload): 16-QAM (400G)
- OSNR Sensitivity (dB): 26
- RX Sensitivity Optimal: -12dBm

- Extended Range RX Sensitivity (1dB OSNR Penalty): -15dBm

- RX Power Sensitivity (No ASE Noise): -20dBm

- CD Robustness (ps/nm): 2400

- DGD Robustness (ps): 33

- MTBF: 442,477 hrs

- Roundtrip Latency: 400GE: 7.9 microsec, 4x100GE: 8.2 microsec

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