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Cisco QSFP-100G-ZR4-S Pluggable Transceiver

Extended reach links for 100Gb

Whether it's a new build or an upgrade of an existing network, the Cisco QSFP-100G-ZR4-S transceiver provides 100G connectivity for platforms located up to 80 km apart on SMF (Single-Mode Fiber).

As network traffic continues to grow driven by increases in wireless and wireline usage, the demand for 100Gb transceivers is needed at a variety of reaches. While Cisco has an existing portfolio of QSFP-100G transceivers for SMF for 500 m, 2 km, 10 km, 25 km, 30 km, and 40 km reaches, the QSFP-100G-ZR4-S transceiver now adds 80 km reach, as shown in figure 2.

The QSFP-100G-ZR4-S enables 100Gb at distances reaching 80km to connecting: wireless access locations to core networks, distant enterprise locations to each other, widely separated regional data centers together, or remote service provider buildings to central offices.
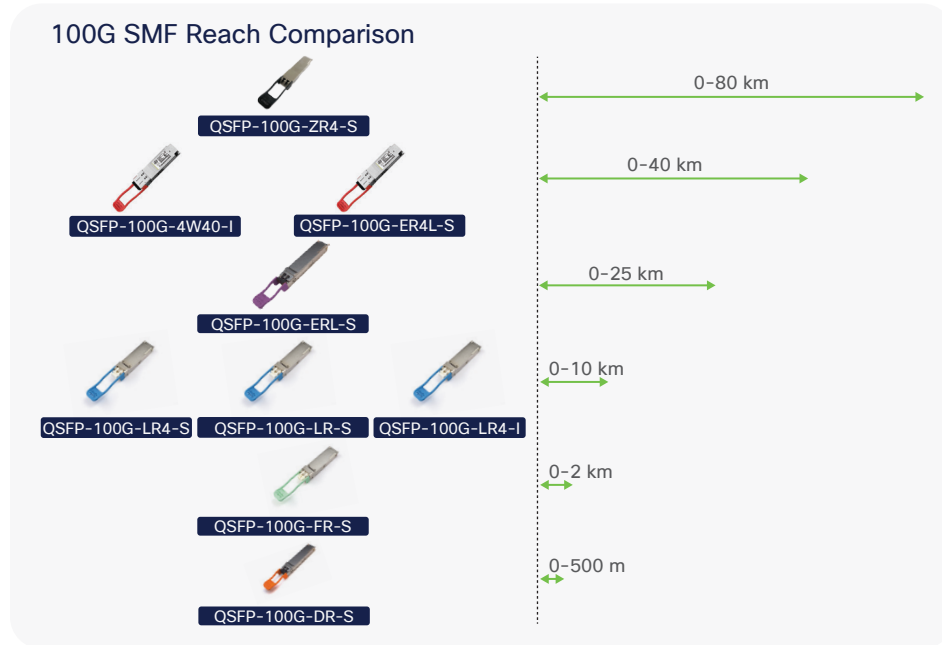
Figure 1.   QSFP-100G-ZR4

Features

- Connect sites up to 80km apart with 100G links

- Leverages the QSFP 28 ports in existing platforms

- Integrated SOA enables up to 80km reach without requiring an external amplifier

- Cost-effective solution for space and power constrained locations

- Supported across multiple Cisco routing and switching platforms

- Use cases include Service Provider, Data Center and Enterprise needing long reach connectivity

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Figure 2.   Reach comparison of Cisco QSFP-100G SMF transceivers

100G SMF Reach Comparison

QSFP-100G-ZR4-S — 0-80 km

QSFP-100G-4W40-I   QSFP-100G-ER4L-S — 0-40 km

QSFP-100G-ERL-S — 0-25 km

QSFP-100G-LR4-S   QSFP-100G-LR-S   QSFP-100G-LR4-I — 0-10 km

QSFP-100G-FR-S — 0-2 km

QSFP-100G-DR-S — 0-500 m

Applications today requiring QSFP-100G-ZR4-S include:

- Wireless: aggregating 4G and 5G fronthaul and midhaul routers
- Service provider: reaching rural and remote COs
- Data center: connecting regional centers
- Enterprise: linking metro offices

A typical installation involving QSFP-100G-ZR4-S might include switches or routers as shown in Figure 3.

Figure 3.   Application requiring QSFP-100G-ZR4

Up to 80 km#

100Gbps

QSFP-100G-ZR4-S   QSFP-100G-ZR4-S
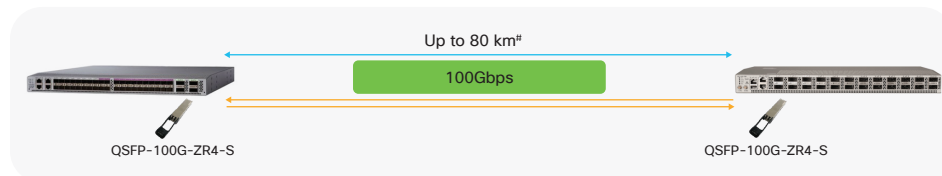
Existing options for 100G connectivity reaching 80km are primarily based on specific chassis, line cards, or large modules. As a result, these solutions tend to require lots of power or take up large amounts of space, resulting in higher costs to deploy and operate. The Cisco QSFP-100G-ZR4-S solution operates with relatively low power and the modules fit into standard QSFP28 ports, resulting in a cost effective solution.

The QSFP-100G-ZR4-S operates in the O-band optical spectrum where fiber optic dispersion is minimal, using traditional direct-detect transceiver technology with NRZ (Nonreturn to Zero) modulation. A SOA (Semiconductor Optical Amplifier) is used to overcome the optical attenuation of the long reach. The lasers in the QSFP-100G-ZR4-S leverage the traditional LAN WDM grid lasers found in other QSFP-100G transceivers. As like many other QSFP28 transceivers, the QSFP-100G-ZR4 has 4 optical and electrical lanes, where each lane is operating at 25Gb. The block diagram in Figure 4, shows the transmit signal of the QSFP-100G-ZR4-S consisting of four lasers each operating at a different wavelength that are muxed into a single optical fiber, and on another fiber in the receive path the optical signal is amplified by an SOA and then demuxed in 4 unique wavelengths and fed into four receivers.

Figure 4.   Block diagram of QSFP-100G-ZR4-S

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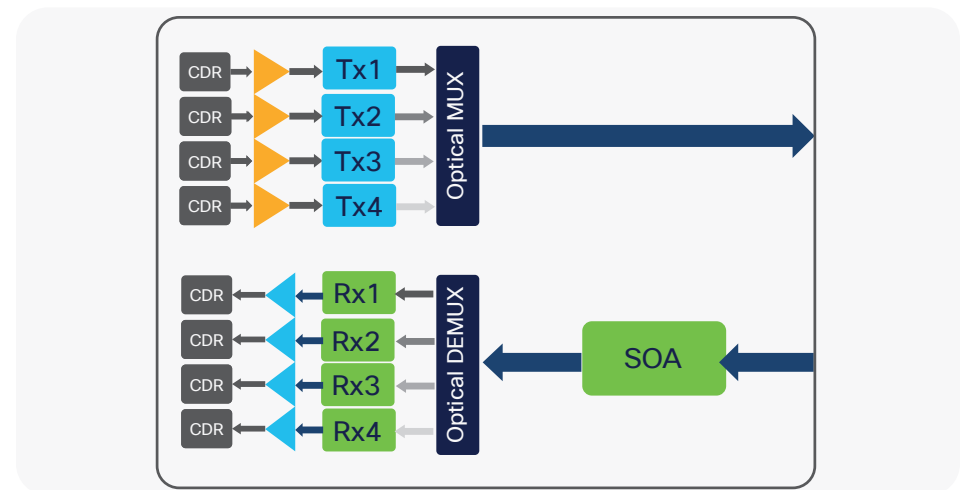
The QSFP-100G-ZR4-S requires Host-Based RS-FEC (Reed Solomon Forward Error Correction) and provides DOM (Digital Optical Monitoring) to provide important optical-level information.

Since the QSFP-100G-ZR4-S requires up to 5.5W over its full commercial temperature range of 0 to 70°C, which is higher powered than many traditional 3.5W QSFP28 transceivers, power supply and cooling/thermal verification is performed on Cisco platforms where it is used.

The configurations and software required to operate in Cisco platforms can be found in Cisco's Optics-to-Device Compatibility Matrix: https://tmgmatrix.cisco.com/

To determine the interoperability of the QSFP-100G-ZR4-S with other Cisco transceivers, please see Cisco's Optics-to-Optics Compatibility Matrix: https://tmgmatrix.cisco.com/iop

Summary of QSFP-100G-ZR4-S specifications

Table 1.   QSFP-100G-ZR4-S specification summary

PID	QSFP-100G-ZR4-S
Data Rate	100G
Reach	0-80 km#
Fiber	SMF
Wavelengths	1296, 1300, 1304, and 1309 nm
Max Power	5.5W
Optical Connector	Duplex-LC
Pull Tab Color	Black
Required Host FEC	RS-FEC
DOM	Yes
Coding	NRZ
Form Factor	QSFP28
Operating Temp	0 to 70°C

Detailed specifications for the QSFP-100G-ZR4-S can be found at Cisco Optics Product Information: https://copi.cisco.com/

Depends upon fiber and connector loss