Key Features

- Deployment flexibility with 800G (dual 400G), 400G, 100G, 50G, 40G, 25G, 10G or 1G modules.
- Hot swappable to maximize uptime and simplify serviceability
- Data rates from 1GbE to 25GbE supported using the SFP form factor, for the smallest, and lowest power solutions
- SFP+ Optical interoperability with 10GbE XFP, X2 and XENPAK pluggable form factors
- QSFP+ Universal transceiver for 40G operations over duplex multi-mode and single-mode fiber. Interoperable with IEEE 40GbE LR4 and LRL4 for easier migrations from 10G to 40G and to single mode fiber
- 100G QSFP pluggable transceivers and cables for high density 100G deployments. Optical interoperability with 100GbE CFP, CFP2 and CPAK
- Parallel QSFP transceivers for both multi-mode and single-mode enable flexible 4x25G and 4x10G options for gradual migration from 10G to 40G and 25G to 100G connectivity
- 100G SFP-DD and DSFP cables for cost effective NIC connectivity
- 200G QSFP optics, AOCs and cables for simple upgrade from 100G
- A Broad range of 400GE optics, AOCs and cables, in both OSFP and QSFP-DD form-factors
- 400G-ZR optics, with pluggable line-system for simple, cost effective DCI
- Flexibility of media and interface choice on a port-by-port basis
- Support for tunable 10G and 400G DWDM for DCI and long-haul optical fiber networks

Overview

Arista's Optical Modules and Cable portfolio offer a wide variety of high-density and low-power 800G (dual 400G), 400G, 200G, 100G, 50G, 40G, 25G, 10G, 1G, and 100M Ethernet connectivity options over fiber or copper.

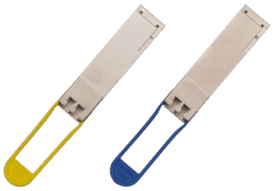
To accommodate an increasing spectrum of applications, Arista offers a wide choice of OSFP, QSFP-DD, QSFP, SFP, SFP-DD and DSFP transceivers and cables that comply with industry standards, offering a broad range of connectivity options. Each module is optimized for different media and reach (ranging from 0.5 meters to 80 kilometers).

All interface speeds, from 1G to 400GE have connectivity options that include Direct Attach copper Cables (DACs), Active Optical Cables (AOCs), multi-mode fiber and single-mode fiber transceivers.

800G OSFP
(Dual 400G-FR4, Dual 400G-XDR4)

400GBASE-DR4, SR8, 2FR4 OSFP

400GBASE-AOC



100GBASE-LRL4 and LR4 QSFP

100GBASE-CR4 Copper Cable

40GBASE-CR4 to 4x 10GBASE-CR Copper Cable

40GBASE-LRL4, UNIV, LR4 and XSR4 QSFP+

25GBASE-CR, AOC, SR and LR

10GBASE-SR and LR SFP+ 1000BASE-T SFP

10GBASE-CR Copper Cable

100 Gigabit Ethernet QSFP Options

PHY Type	Reach
100GBASE-CR4	Twin-ax copper cables with link lengths of 0.5m, 1m, 1.5m, 2m, 2.5m, 3m and 5m
100GBASE-AOC	Active Optical Cable with link lengths of 1m to 30m pre-terminated
100GBASE-SR4	Up to 70m over parallel OM3 multi-mode fiber or 100m over parallel OM4 multi-mode fiber
100GBASE-SR4-E	Up to 30m/50m over OM3/OM4 parallel MMF without FEC (for low latency) or 70m/100m over OM3/OM4 parallel MMF with FEC.
100GBASE-XSR4	Up to 150m over parallel OM3 multi-mode fiber or 300m over parallel OM4 multi-mode fiber
100GBASE-SWDM4	Up to 70m over duplex OM3 multi-mode fiber or 100m over duplex OM4 multi-mode fiber
100GBASE-BIDI	Up to 70m over duplex OM3 multi-mode fiber or 100m over duplex OM4 multi-mode fiber
100GBASE-PSM4	Up to 500m over parallel single-mode fiber, 100G/40G Dual rate
100GBASE-PLRL4	Up to 2km over parallel single-mode fiber, 100G/40G Dual rate
100GBASE-LR4	Up to 10km over single-mode fiber (optical interoperability with 100GBASE-LRL4 up to 2km)
100GBASE-LRL4	Up to 2km over single-mode fiber (optical interoperability with 100GBASE-LR4 up to 2km)
100GBASE-CWDM4	Up to 2km over single-mode fiber, 100G/40G Dual rate
100GBASE-XCWDM4	Up to 10km over single-mode fiber, 100G/40G Dual rate
100GBASE-ERL4	Up to 40km over single-mode fiber (optical interoperability with IEEE 100GBASE-ER4 up to 30km)
100GBASE-ZR4[1]	Up to 80km over single-mode fiber
100GBASE-DR	Up to 500m over single-mode fiber (optical interoperability with 400GBASE-DR4 / XDR4 / PLR4 up to 500m)
100GBASE-FR	Up to 2km over single-mode fiber (optical interoperability with 400GBASE-DR4 / XDR4 & PLR4 up to 500m / 2km)
100GBASE-LR	Up to 10km over single-mode fiber (optical interoperability with 400GBASE- DR4 / XDR4 / PLR4 up to 500m / 2km / 100km)
100GBASE-ER	Up to 40km over single-mode fiber

100G SFP-DD and DSFP Options

PHY Type	Reach
100GBASE-CR2	Twin-ax copper cables with link lengths of 1m, 2m, 3m.

1. QSFP-100G-ZR4 supported on specific platforms. Refer to Arista's Transceiver and Cable Guide for supported platforms.

100 Gigabit Ethernet QSFP Optical Specifications

100GBASE-LR4 QSFP

100GBASE-PSM4 QSFP

PHY Type	Connector Type	Wave-length (nm)	Cable Type	Core Size (um)	Modal Bandwidth (MHz*Km)	Tx power (dBm)	Rx power (dBm)	Max Reach
100GBASE-SR4	MPO-12 UPC	850	OM3 OM4	50.0 50.0	2000 (OM3) 4700 (OM4)	-8.4 to +2.4 / lane	-10.3 to +2.4 /lane	70m 100m
100GBASE-SR4-E	MPO-12 UPC	850	OM3 OM4	50.0 50.0	2000 (OM3) 4700 (OM4)	-4.5 to 2.4 / lane	-5.9 to +2.4 w/o FEC, or -10.3 to	30m/50m w/o FEC, or 70m/100m w FEC
100GBASE-XSR4	MPO-12 UPC	850	OM3 OM4	50.0 50.0	2000 (OM3) 4700 (OM4)	-8.3 to +2.4 / lane	-10.3 to +2.4 /lane	150m 300m
100GBASE-SWDM4	LC	850 880	OM3 OM4	50.0 50.0	2000 (OM3) 4700(OM4)	-7.5 to +3.4 / lane	-9.3 to +3.4 / lane	70m 100m
100GBASE-BIDI	LC	855 908	OM3 OM4	50.0 50.0	2000 (OM3) 4700 (OM4)	-6 to + 4 / lane	-7.9 to +4 /lane	70m 100m
100GBASE-CWDM4	LC	1271 1291 1311 1331	SMF	G.652	–	-6.5 to +2.5 / lane	-11.5 to +2.5 / lane	2km
100GBASE-XCWDM4	LC		SMF	G.652	–	-6.5 to +2.5 / lane	-13 to +2.5 / lane	10km
100GBASE-PSM4	MPO-12 APC	1310	SMF	G.652	–	-9.4 to +2.0 / lane	-12.6 to +2.0 / lane	500m
100GBASE-PLRL4	MPO-12 APC	1310	SMF	G.652	–	-5.5 to +1.5 / lane	-12.6 to +2.0 / lane	2km
100GBASE-LR4	LC	1295.56 1300.05 1304.58 1309.14	SMF	G.652	–	-4.3 to +4.5 /lane	-10.6 to +4.5 /lane	10km
100GBASE-LRL4	LC		SMF	G.652	–	-6.0 to +4.5 / lane	-10.0 to +4.5 / lane	2km
100GBASE-ERL4*	LC		SMF	G.652	–	-2.9 to +4.5 / lane	-16.9 to -4.9 / lane	30km without FEC
							-20.9 to -4.9 / lane	40km with FEC
100GBASE-ZR4*	LC		SMF	G.652	–	+2 to +7 / lane	-5.0 to -28.0 / lane	80km
100GBASE-DR	LC	1310	SMF	G.652	–	-2.9 to +4.0	-5.9 to +4.0	500m
100GBASE-FR	LC	1310	SMF	G.652	–	-2.4 to +4.0	-6.4 to +4.5	2km
100GBASE-LR	LC	1310	SMF	G.652	–	-1.4 to +4.0	-7.7 to +4.5	10km
100GBASE-ER*	LC	1310	SMF	G.652	–	+1.7 to + 7.1	-16 to -3.4	40km

* Optical attenuation is required for shorter links to protect the receiver from permanent damage

100G Gigabit SFP-DD & DSFP Cable Specifications

100GBASE-CR2

SFP-DD to QSFP

PHY Type	Connector Type	Wavelength (nm)	Cable Type	Max Reach
100GBASE-CR2	SFP-DD to SFP-DD	–	Twinax Copper	1m to 3m
	SFP-DD to QSFP			
	DSFP to DSFP			
	DSFP to QSFP			
100GBASE-CR2 to 2x 50GBASE-CR	SFP-DD to 2x SFP	–	Twinax Copper	1m to 3m
	DSFP to 2x SFP			

100 Gigabit Ethernet QSFP Cable Specifications

100GBASE-CR4

PHY Type	Connector Type	Wavelength (nm)	Cable Type	Max Reach
100GBASE-CR4	QSFP to QSFP	–	Twinax Copper	1, 2, 3, 5m
50GBASE-CR2	QSFP to 2x QSFP	–	Twinax Copper	1, 2, 3, 5m
25GBASE-CR	QSFP to 4 x SFP	–	Twinax Copper	1, 2, 3m
100GBASE-AOC	QSFP to QSFP	850	MMF	1m to 30m

Order Number	Product Description
100 Gigabit Ethernet QSFP Twinax Copper cables	
CAB-Q-Q-100G-0.5	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 0.5 meter
CAB-Q-Q-100G-1M	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 1 meter
CAB-Q-Q-100G-1.5	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 1.5 meter
CAB-Q-Q-100G-2M	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 2 meter
CAB-Q-Q-100G-2.5	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 2.5 meter
CAB-Q-Q-100G-3M	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 3 meter
CAB-Q-Q-100G-5M	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable 5 meter
CAB-Q-4S-100G-1M	100GBASE-CR4 QSFP to 4 x 25GBASE-CR SFP Twinax Copper Cable, 1 meter
CAB-Q-4S-100G-2M	100GBASE-CR4 QSFP to 4 x 25GBASE-CR SFP Twinax Copper Cable, 2 meter
CAB-Q-4S-100G-3M	100GBASE-CR4 QSFP to 4 x 25GBASE-CR SFP Twinax Copper Cable, 3 meter
CAB-Q-4S-100G-5M	100GBASE-CR4 QSFP to 4 x 25GBASE-CR SFP Twinax Copper Cable, 5 meter
CAB-Q-2Q-100G-1M	100GBASE-CR4 QSFP to 2 x 50GBASE-CR2 QSFP Twinax Copper Cable, 1M
CAB-Q-2Q-100G-2M	100GBASE-CR4 QSFP to 2 x 50GBASE-CR2 QSFP Twinax Copper Cable, 2M
CAB-Q-2Q-100G-3M	100GBASE-CR4 QSFP to 2 x 50GBASE-CR2 QSFP Twinax Copper Cable, 3M
CAB-Q-2Q-100G-5M	100GBASE-CR4 QSFP to 2 x 50GBASE-CR2 QSFP Twinax Copper Cable, 5M

Order Number	Product Description
100 Gigabit Ethernet QSFP Active Optical Cables	
AOC-Q-Q-100G-1M	100GbE QSFP to QSFP Active Optical Cable, 1m
AOC-Q-Q-100G-3M	100GbE QSFP to QSFP Active Optical Cable, 3m
AOC-Q-Q-100G-5M	100GbE QSFP to QSFP Active Optical Cable, 5m
AOC-Q-Q-100G-7M	100GbE QSFP to QSFP Active Optical Cable, 7m
AOC-Q-Q-100G-10M	100GbE QSFP to QSFP Active Optical Cable, 10m
AOC-Q-Q-100G-15M	100GbE QSFP to QSFP Active Optical Cable, 15m
AOC-Q-Q-100G-20M	100GbE QSFP to QSFP Active Optical Cable, 20m
AOC-Q-Q-100G-25M	100GbE QSFP to QSFP Active Optical Cable, 25m
AOC-Q-Q-100G-30M	100GbE QSFP to QSFP Active Optical Cable, 30m
100 Gigabit Ethernet QSFP Optics	
QSFP-100G-SR4	100GBASE-SR4 QSFP Transceiver, MPO12 UPC connector, up to 70m/100m over parallel OM3/OM4 MMF
QSFP-100G-SR4-E	100GBASE-SR4-Enhanced QSFP E-Series Transceiver for low latency, MPO12 UPC connector, up to 30m/50m over parallel OM3/OM4 MMF without FEC (for low latency) or up to 70m/100m over OM3/OM4 MMF with FEC
QSFP-100G-XSR4	100GBASE-XSR4 QSFP Transceiver, MPO12 UPC connector, up to 150m / 300m over OM3 / OM4 MMF
QSFP-100G-SWDM4	100GBASE-SWDM4 QSFP Transceiver, up to 70m over OM3 or 100m over OM4 duplex multi-mode fiber
QSFP-100G-SRBD	100GBASE-BIDI QSFP Transceiver, up to 70m / 100m over OM3 / OM4 duplex multi-mode fiber
QSFP-100G-PSM4	100GBASE-PSM4 QSFP Transceiver, MPO12 APC connector, up to 500m over parallel SMF, 100G/40G dual rate
QSFP-100G-PLRL4	100GBASE-PLRL4 QSFP Transceiver, MPO12 APC connector, up to 2KMm over parallel SMF, 100G/40G dual rate
QSFP-100G-LR4	100GBASE-LR4 QSFP Transceiver, up to 10km over duplex SMF
QSFP-100G-LRL4	100GBASE-LRL4 QSFP Transceiver, up to 2km over duplex SMF
QSFP-100G-CWDM4	100GBASE-CWDM4 QSFP Transceiver, up to 2km over duplex SMF, 100G/40G dual rate
QSFP-100G-XCWDM4	100GBASE-XCWDM4 QSFP Transceiver, up to 10km over duplex SMF, 100G/40G dual rate
QSFP-100G-ERL4[1]	100GBASE-ERL4 QSFP Transceiver, 30 to 40km over single-mode fiber
QSFP-100G-ZR4[2]	100GBASE-ZR4 QSFP Transceiver, up to 80km over single-mode fiber
QSFP-100G-DR	100GBASE-DR single lambda QSFP Transceiver, up to 500m over duplex SMF
QSFP-100G-FR	100GBASE-FR single lambda QSFP Transceiver, up to 2km over duplex SMF
QSFP-100G-LR	100GBASE-LR single lambda QSFP Transceiver, up to 10km over duplex SMF
QSFP-100G-ER[1]	100GBASE-ER single lambda QSFP Transceiver, up to 40km over duplex SMF
OSFP to 100G QSFP Adapter	
ADPT-O-Q-100G[3]	OSFP to 100G QSFP adapter

1. Optical attenuation is required for shorter links to protect the receiver from permanent damage
2. QSFP-100G-ZR4 supported on specific platforms. Refer to Arista's Transceiver and Cable Guide for supported platforms.
3. Enables the use of 100G QSFP optical modules in an OSFP port when the port is configured for 100G. Copper cables or 200G QSFP optical modules should not be used with this adapter. The adapter does not allow a QSFP-DD module to be used in an OSFP port (only 100G QSFP optical modules).

Order Number	Product Description
100 Gigabit Ethernet SFP-DD Twin Copper Cables	
C-Z100-Z100-1M	100GBASE-CR2 SFP-DD to SFP-DD Twin Copper Cable, 1 meter
C-Z100-Z100-2M	100GBASE-CR2 SFP-DD to SFP-DD Twin Copper Cable, 2meter
C-Z100-Z100-3M	100GBASE-CR2 SFP-DD to SFP-DD Twinax Copper Cable, 2 meter
C-Z100-Q100-1M	100GBASE-CR2 SFP-DD to QSFP Twinax Copper Cable, 1 meter
C-Z100-Q100-2M	100GBASE-CR2 SFP-DD to QSFP Twinax Copper Cable, 2meter
C-Z100-Q100-3M	100GBASE-CR2 SFP-DD to QSFP Twinax Copper Cable, 3meter
C-Z100-2S50-1M	100GBASE-CR2 SFP-DD to 2x 50GBASE-CR SFP Twinax Copper Cable, 1 meter
C-Z100-2S50-2M	100GBASE-CR2 SFP-DD to 2x 50GBASE-CR SFP Twinax Copper Cable, 2meter
C-Z100-2S50-3M	100GBASE-CR2 SFP-DD to 2x 50GBASE-CR SFP Twinax Copper Cable, 3meter
100 Gigabit Ethernet DSFP Twin Copper Cables	
C-Y100-Y100-1M	100GBASE-CR2 DSFP to DSFP Twinax Copper Cable, 1 meter
C-Y100-Y100-2M	100GBASE-CR2 DSFP to DSFP Twinax Copper Cable, 2meter
C-Y100-Y100-3M	100GBASE-CR2 DSFP to DSFP Twinax Copper Cable, 2 meter
C-Y100-Q100-1M	100GBASE-CR2 DSFP to QSFP Twinax Copper Cable, 1 meter
C-Y100-Q100-2M	100GBASE-CR2 DSFP to QSFP Twinax Copper Cable, 2meter
C-Y100-Q100-3M	100GBASE-CR2 DSFP to QSFP Twinax Copper Cable, 3meter
C-Y100-2S50-1M	100GBASE-CR2 DSFP to 2x 50GBASE-CR SFP Twinax Copper Cable, 1 meter
C-Y100-2S50-2M	100GBASE-CR2 DSFP to 2x 50GBASE-CR SFP Twinax Copper Cable, 2meter
C-Y100-2S50-3M	100GBASE-CR2 DSFP to 2x 50GBASE-CR SFP Twinax Copper Cable, 3meter

Standards Compliance & Certifications

EMC Emissions & Immunity	Subpart B, Part 15 FCC Class A, ICES-003 Issue 7 EN 55032:2015, BS EN 55032:2015, EN 55035:2017, EN 300 386 V2.1.1
Safety	EN 62368-1:2014 + A11:2017, IEC 62368-1:2014 21CFR-1040.10 LN#50, Laser Class 1 or 1M IEC 60825-1, Laser Class 1 or 1M EN 60825-1,
Certifications	CE South Korea KCC Australia RCM UKCA
European Union Directives	2014/35/EU Low Voltage Directive 2014/30/EU EMC Directive 2012/19/EU WEEE Directive 2011/65/EU RoHS 2015/863/EU Commission Delegated Directive

Warranty

Arista pluggables and cables include a one-year limited hardware warranty, which covers parts, repair, or replacement with a 10 business day turn-around after the unit is received.

Service and Support

Support services including next business day and 4-hour advance hardware replacement are available. For service depot locations, please see: http://www.arista.com/en/service

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ARISTA

Arista 100G Transceivers and Cables: Q&A

What 100G Transceivers and Cables are available from Arista?

Arista supports a full range of 100G copper cables and optical transceivers compliant to IEEE standards and industry MSAs. Arista's 100G connectivity solutions include copper cables and Active Optical Cables (AOCs) to enable cost effective short reach options, as well as a wide range of optical transceivers in QSFP form factors for various fiber types, reach and interop requirements.

Product Number	Product Description
QSFP 100G Transceivers for parallel Multi-mode Fiber (MMF)	
QSFP-100G-SR4	100GBASE-SR4 QSFP optical transceiver, up to 70m over parallel OM3 or 100m over OM4 multi-mode fiber
QSFP-100G-XSR4	100GBASE-XSR4 QSFP optical transceiver, up to 150m over parallel OM3 or 300m over OM4 multi-mode fiber
QSFP 100G Transceivers for duplex MMF	
QSFP-100G-SWDM4	100GBASE-SWDM4 QSFP optical transceiver, up to 70m over OM3 or 100m over OM4 duplex multi-mode fiber
QSFP-100G-SRBD	100GBASE-BIDI QSFP optical transceiver, up to 70m over OM3 or 100m over OM4 duplex MMF
QSFP 100G Transceivers for Parallel Single-Mode Fiber (SMF)	
QSFP-100G-PSM4	100GBASE-PSM4 40G/100G dual speed QSFP optical transceiver, up to 500m over parallel SMF
QSFP-100G-PLRL4	100GBASE-PLRL4 40G/100G dual speed QSFP optical transceiver, up to 2km over parallel SMF
QSFP 100G Transceivers for duplex SMF	
QSFP-100G-CWDM4	100GBASE-CWDM4 QSFP optical transceiver, up to 2km over duplex SMF
QSFP-100G-XCWDM4	100GBASE-XCWDM4 QSFP optical transceiver, up to 10km over duplex SMF. Interop with 100GBASE-CWDM4 up to 2km.
QSFP-100G-LR4	100GBASE-LR4 QSFP optical transceiver, up to 10km over duplex SMF
QSFP-100G-LRL4	100GBASE-LRL4 QSFP optical transceiver, up to 2km over duplex SMF. Interop with 100GBASE-LR4 up to 2km.
QSFP-100G-ERL4	100GBASE-ERL4 QSFP optical transceiver, up to 40km over duplex SMF
QSFP-100G-ZR4	100GBASE-ZR4 QSFP optical transceiver, up to 80km over duplex SMF
QSFP-100G-DR	100GBASE-DR "100G lambda" QSFP optical transceiver, up to 500m over duplex SMF. Interop with 100G-FR/LR over 500m.
QSFP-100G-FR	100GBASE-FR "100G lambda" QSFP optical transceiver, up to 2km over duplex SMF. Interop with 100G-DR/LR over 500m/2km.

QSFP-100G-LR	100GBASE-LR “100G lambda” QSFP optical transceiver, up to 10km over duplex SMF. Interop with 100G-DR/FR over 500m/2km.
100G QSFP Active Optical Cables	
AOC-Q-Q-100G-xM	100GbE QSFP to QSFP Active Optical Cable, 1m to 30m
100G QSFP Twinax Copper Cables	
CAB-Q-Q-100G-xM	100GBASE-CR4 QSFP to QSFP Twinax Copper Cable, 0.5m to 5m
CAB-Q-4S-100G-xM	100GBASE-CR4 QSFP to 4 x 25GbE SFP Twinax Copper Cable, 1m to 5m

What is the difference between QSFP28 and 100G QSFP?

They are the same. The “QSFP” form factor was originally defined for <10G speeds. When it was adopted for 40G, the name became QSFP+ to denote the higher aggregate performance. The same “QSFP” form factor was later adopted for 100G but the electrical interface had to be upgraded to handle 25Gbps/lane. The electrical interface for 100G can handle up to 28Gbps, hence the engineering and industry name is QSFP28. Arista refers to the 100G form factor as “100G QSFP” to avoid any confusion.

Which 100G QSFPs are capable of supporting link distances over 10km?

The Arista QSFP-100G-ZR4 supports link distances up to 80km. A minimum of 12dB attenuation is required to prevent permanent damage to the receiver - refer to the optics datasheet for optical specs. The QSFP-100G-ZR4 is supported on a limited set of platforms – refer to the Transceiver and Cable Guide for supported platforms.

The Arista QSFP-100G-ERL4 supports link distances up to 40km when the forward error correction (FEC) is enabled on the host switch / router. In the default no-FEC mode, QSFP-100G-ERL4 supports a reach of up to 30km. A minimum of ~10dB attenuation is required to guarantee the receiver is not damaged. Please refer to the optics datasheet for optical specifications.

The QSFP-100G-LR4 supports links up to 10km over duplex single mode fiber. Enabling FEC with QSFP-100G-LR4 optics on Arista switches can allow for links beyond 10km with single mode fiber. However, as this is not fully characterized, customers are advised to measure the link distance and optical loss budget before deploying.

Are 100G copper cables supported on all Arista switches?

Most Arista switches support the use of copper cables, with a few exceptions which are listed below. Please refer to the individual switch datasheets for a comprehensive list of media types supported.

Arista Switch	Ports	Copper cable restrictions
7280SRAM-48C6	48 x SFP+ and 6 x QSFP100 with MACsec	Copper cables (100GBASE-CR4 and 40GBASE-CR4) are not supported on the QSFP100 ports.
7280CR2M-30	30 x QSFP100 with MACsec	
7500RM-36CQ	36 x QSFP100 with MACsec	
7500R2M-36CQ	36 x QSFP100 with MACsec	
7500R2AM-36CQ	36 x QSFP100 with MACsec	
7800R3-48CQM-LC	48 x QSFP100 with MACsec	

What industry standards are associated with each of the 100G Transceivers and Cables?

The table below summarizes the Arista 100G transceivers and cables and the associated industry standards.

Product Number	Associated Industry Standard
QSFP-100G-SR4	IEEE 802.3 100GBASE-SR4
QSFP-100G-XSR4	Based on IEEE 802.3 100GBASE-SR4, with extended reach
QSFP-100G-SWDM4	SWDM Multi-Source Agreement (MSA): http://www.swdm.org/msa
QSFP-100G-PSM4	100G PSM4 MSA: http://psm4.org/
QSFP-100G-CWDM4 and QSFP-100G-XCWDM4	CWDM4 MSA: http://www.cwdm4-msa.org/
QSFP-100G-LR4	IEEE 802.3 100GBASE-LR4
QSFP-100G-LRL4	Based on IEEE 802.3 100GBASE-LR4, with shorter reach. Compatible with LR4 up to 1km.
QSFP-100G-ERL4	Based on IEEE 802.3 100GBASE-ER4, with reach up to 30km.
QSFP-100G-DR	IEEE 802.3 100GBASE-DR
QSFP-100G-FR and QSFP-100G-LR	100G Lambda MSA: https://100glambda.com/
AOC-Q-Q-100G-yM	Based on IEEE 802.3 100GBASE-SR4, with pre-terminated cables
CAB-Q-Q-100G-yM	IEEE 802.3 100GBASE-CR4

Are there any 100G transceivers that allow the use of standard duplex multi-mode fiber?

Yes – Arista offers two 100G transceivers that operate over duplex multimode fiber: The QSFP-100G-SWDM4, and the QSFP-100G-SRBD (or “BIDI”) transceiver.

What is the 100G SWDM4 transceiver?

The QSFP-100G-SWDM4 provides 100Gbps bandwidth over a standard duplex multi-mode fiber eliminating the need for expensive parallel multi-mode fiber infrastructure and offers a seamless migration path from duplex 10G/40G to 100G. It is supported on all Arista QSFP 100G ports and can be used for links up to 70m of OM3 fiber or up to 100m of OM4 fiber. The SWDM4 Tx port transmits 100G data over 4 x 25Gbps wavelengths, and the Rx port receives data over 4 x 25Gbps wavelengths. The wavelengths are in the “short wavelength” range (850nm – 940nm).

What is the 100G-SRBD (or "BIDI") transceiver?

Like the QSFP-100G-SWDM4 transceiver described above, the Arista QSFP-100G-SRBD transceiver also provides 100Gbs bandwidth over standard duplex multi-mode fiber. However, unlike the SWDM4 transceiver (which transmits 4 x 25Gbps wavelengths out of the Tx port, and receives 4 x 25Gbps wavelengths on the Rx port), each optical port on the SRBD contains both a transmitter and receiver, running at full duplex 50Gb/s over a single fiber. The two ports of the QSFP-100G-SRBD provide an aggregate 100Gb/s of bandwidth. The QSFP-100G-SRBD is supported on all Arista QSFP 100G ports, and can be used for links up to 70m of OM3 or up to 100m of OM4 multi-mode fiber.

Both the 100G-SWDM4 and the 100G-SRBD transceivers support 100G over duplex multi-mode fiber. When should each transceiver be used?

Both the 100G-SWDM4 and 100G-SRBD (sometimes called a "BIDI" transceiver) have been widely deployed within the industry, and share the same optical reach and fiber type (70m/100m over OM3/OM4 duplex MMF). However, the 100G-SWDM4 and 100G-SRBD do not interoperate with each other.

If interop with future 400G optics is a consideration, then the QSFP-100G-SRBD should be considered. The QSFP-100G-SRBD transceiver will interoperate with future Arista "400G-BIDI" transceivers. That is, an Arista OSFP-400G-SRBD or QDD-400G-SRBD transceiver will support breakout into 4x QSFP-100G-SRBD. The SWDM4 does not have a path for interop with future 400G optics.

The decision on which optic to will often depend on interop requirements. For example, for applications that require optical interop with third party 100G BIDI optics, the QSFP-100G-SRBD should be used.

Are Arista 100G Transceivers interoperable with other 100G transceivers available in the industry?

Yes, as long as the non-Arista 100G transceivers meet the associated industry standard specifications, Arista 100G transceivers are fully interoperable.

Can 100G QSFP interfaces interoperate with SR10 based 100GbE?

No. The 100G QSFP form factor has just 4 electrical lanes, which is not enough to support 10 lanes of 10G electrical interface. A 100G QSFP can only support a 4x10G or 4x25G electrical interface, which can be used as 4x10GbE or 4x25GbE, but not 10x 10GbE.. As a result the 100G QSFP SR4 cannot interoperate with SR10 based 100GbE transceivers. A complex design with a reverse gearbox (4x25G to 10x10G) can achieve this but results in expensive and power hungry optics.

Can 100G QSFP copper cables be used for 40G?

Yes, Arista 100G QSFP copper cables can be used for 40G, but not vice versa.

Can Arista 40G QSFPs be used in Arista 100G QSFP switch ports?

Yes, 40GbE QSFP+ transceivers will be detected and enabled upon insertion.

Are there any dual speed 100G/40G optics to avoid costly replacement when I upgrade?

The QSFP-100G-CWDM4 (up to 2km over duplex SMF) and QSFP-100G-PSM4 (up to 500m over parallel SMF), are dual-rate optics which be used in both 40G and 100G modes.

Which Arista 100G Transceivers and Cables can be used in breakout mode?

Breakout mode refers to running a 100G port as 4 separate channels of 25GE. Transceivers or copper cables that enable optical or electrical breakout allow one 100G QSFP100 port to connect to four physically separate 25G links. When breaking out a single 100G port to 4x 25G links, care must be taken to use the same Forward Error Correction (FEC) mode on both ends of the link to ensure link-up. Arista transceivers and copper cables that support 100G to 4x25G breakout are listed below.

Product Number	Supported Breakout modes
QSFP-100G-SR4 & QSFP-100G-XSR4	4x25G to interoperate with 25GBASE-SR. Care must be taken to use the same forward error correction (FEC) mode on both ends to link-up.
QSFP-100G-PSM4	4x25G to interoperate with 25GBASE-LR up to 500m. Care must be taken to use the same forward error correction (FEC) mode on both ends to link-up.
QSFP-100G-PLRL4	4x25G to interoperate with 25GBASE-LR up to 2km. Care must be taken to use the same forward error correction (FEC) mode on both ends to link-up.
CAB-Q-4S-100G-xM	4x 25G Copper breakout cable (using a 100G QSFP to 25G SFP), lengths from 1m to 5m

What is the maximum power consumption of 100G QSFP transceivers?

The table below summarizes the power consumption of Arista 100G QSFP transceivers.

Product Number	Max Power Consumption
QSFP-100G-SR4 / XSR4 QSFP-100G-SWDM4 QSFP-100G-SRBD QSFP-100G-CWDM4 / XCWDM4 QSFP-100G-PSM4 QSFP-100G-PLRL4 AOC-Q-Q-100G-xM (1m to 30m)	3.5W
QSFP-100G-LRL4	4.0W
QSFP-100G-LR4 QSFP-100G-ERL4 QSFP-100G-DR QSFP-100G-FR QSFP-100G-LR	4.5W
QSFP-100G-ZR4*	5.5W

* The QSFP-100G-ZR4 is supported on specific platforms because of the higher power draw. Please refer to the Arista Transceivers and Cables Guide for Supported Platforms.

What will happen if I plug in 100G QSFP transceivers that consume greater than 3.5W?

Unless otherwise specified in product datasheets, all Arista 100G QSFP ports are designed to handle QSFP transceivers that draw up to 4.5W. If a 100G QSFP draws greater than 4.5W Arista cannot guarantee the performance since there are other dependencies like airflow direction, ambient temperature, elevation etc.

If a QSFP optic requires more than 3.5W, it must identify accordingly and draw only up to 3.5W at initial insertion to avoid overloading a host system. The system will then determine if the higher power optic is supported and will enable the high power mode accordingly. If high power optics do not follow the specification caution should be taken to avoid the risk of damage to the equipment.

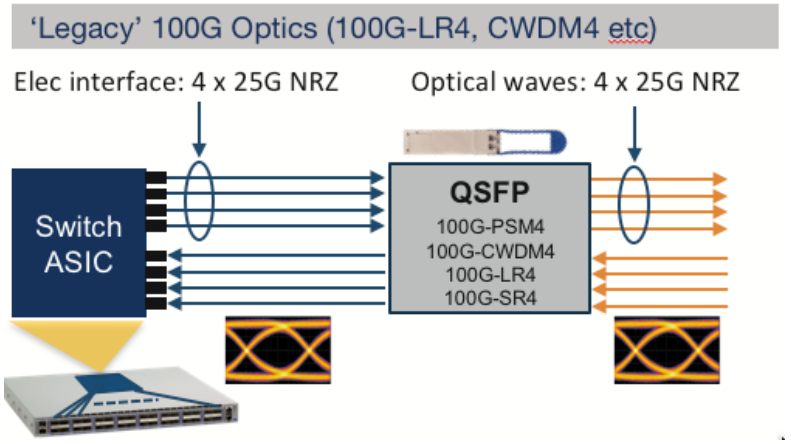
What are "100G Lambda" Optics?

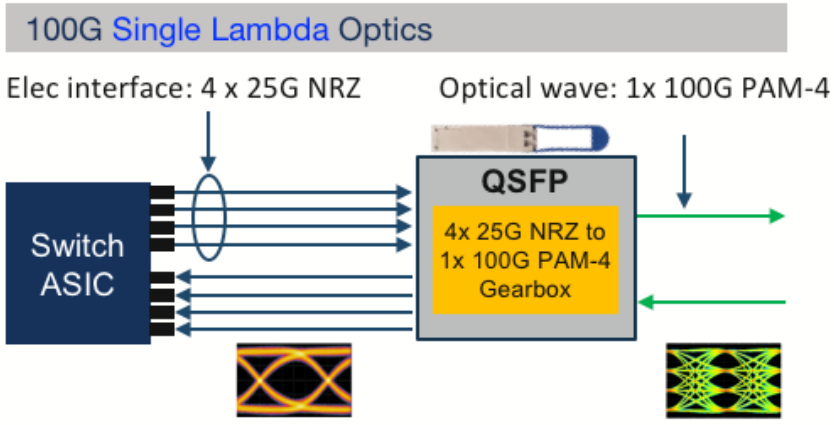
"100G Lambda" or "Single Lambda" optics are optical transceivers that have an optical output consisting of a single 100G PAM-4 optical signal. The Arista 100G "Single Lambda" SKUs are:

- **QSFP-100G-DR**: 100GBASE-DR single lambda QSFP, up to 500m over duplex SMF.
- **QSFP-100G-FR**: 100GBASE-FR single lambda QSFP, up to 2km over duplex SMF.
- **QSFP-100G-LR**: 100GBASE-LR single lambda QSFP, up to 10km over duplex SMF.

The 100G-DR/FR/LR transceivers can be plugged into any Arista 100G QSFP port. The electrical connector interface is 4 x 25G NRZ – the same as all existing 'legacy' 100G QSFP modules. The optical output is a single wavelength (or "lambda") 100Gbit/s PAM-4 optical signal. The 100G-DR/FR/LR modules include a gearbox chip to convert the 4 x 25G NRZ electrical signals to a 1 x 100G PAM-4 optical signal. This is in contrast to legacy QSFP100 modules (such as a CWDM4 or LR4 100G module), which have 4 x 25G NRZ optical wavelengths multiplexed onto one fiber.

Because of the different optical modulation scheme, 100G-DR / FR / LR modules **will not interoperate** with legacy 100G modules (such as CWDM4, LR4 etc), but they **will interop** with **400G-DR4 and 400G-XDR4** modules using breakout cables. Please refer to the 400G FAQ for more details about 400G to 4x 100G breakout options. The difference in optical modulation schemes between legacy 100G QSFP modules, and a 100G-DR / FR / LR module is illustrated below.





What optical fiber type is needed for 100G Transceivers?

The table below details the connector type of each 100G Transceiver and the cable type to be used.

Product Number	Optical Connector	Fiber Type to be used
QSFP-100G-SR4 / XSR4	MPO-12 (or MTP-12)	Parallel Multi-mode Fiber (MMF), OM3 or OM4
QSFP-100G-SWDM4 QSFP-100G-SRBD	Duplex LC	Multi-mode Fiber (MMF), OM3 or OM4
QSFP-100G-PSM4 QSFP-100G-PLRL4	MPO-12 (or MTP-12)	Parallel Single-mode Fiber (SMF)
QSFP-100G-CWDM4 / XCWDM4 QSFP-100G-XCWDM4 QSFP-100G-LR4 / LRL4 QSFP-100G-ERL4 QSFP-100G-ZR4 QSFP-100G-DR/FR/LR	Duplex LC	Single-mode Fiber

Where can customers buy splitter cables for 4x25G connectivity?

A large number of cabling companies have MTP-LC multimode fiber breakout cables available. Some example part numbers are provided below:

Product Description	Corning P/N	Leviton P/N	Wave2Wave P/N
OM4 MMF MPO-12 to 4x LC breakout, 5m	HE67908QPH-KB005M	FH-FH008MR1624K	51PU-8080P-5M
OM4 MMF MPO-12 to 4x LC breakout, 3m	HE67908QPH-KB003M	FH-FH008MR1024K	51PU-8080P-3M
OM4 MMF MPO-12 to 4x LC breakout, 5m	HE87808GPH-KB005M	FH-AH008MR1624K	51PU-3084P-5M
SMF MTP12 to 4x LC breakout, 3m	HE87808GPH-KB003M	FH-AH008MR1024K	51PU-3084P-3M

What Forward Error Correction (FEC) is required for Arista 100G Copper Cables?

For 100G QSFP to QSFP copper cables (CAB-Q-Q-100G-xM), Reed-Solomon RS FEC should be used to be compliant with the IEEE802.3 Ethernet specifications.

For 4x25G breakout applications using 100G QSFP to 4x 25G SFP breakout copper cables (CAB-Q-4S-100G-xM), the IEEE802.3 Ethernet specification includes 3 different 25G cables types (CA-N, CA-S and CA-L) which are aligned to 3 different loss classification categories, each having a minimum FEC requirement:

CA-N	12.98dB loss	the highest grade, and no FEC is required
CA-S	16.48dB loss	the middle grade, and BASE-R or RS FEC is required
CA-L	22.48dB loss	the lowest grade, and RS FEC is required

The table below summarizes the loss specification of Arista 100G QSFP to 4x 25G copper breakout cables, and the corresponding FEC required by IEEE802.3 specifications:

Arista -4x25G Copper Cables		
SKU	Loss Category	FEC requirement
CAB-Q-4S-100G-1M CAB-Q-4S-100G-2M	CA-N	No FEC is required
CAB-Q-4S-100G-3M	CA-S	RS-FEC or Fire-Code (BASE-R) FEC is required
CAB-Q-4S-100G-5M	CA-L	RS-FEC is required

Can customers use third party copper cables?

Arista does not restrict the use of third party passive copper cables – however, all copper cables are required to comply with the associated IEEE specifications, as well as SFF-8636 management interface / EEPROM specifications to allow them to be correctly identified and recognized by an Arista switch / router. Interfaces with cables that are not recognized correctly will be disabled.

What is the thickness and bend radius of the 100G copper cables?

Arista 100G QSFP Copper Cables		
	100G Q-Q	100G Q-4S
Cable Type	Twinax	Twinax
Cable Thickness (Wire AWG)	1, 2, 3 meter cables: 30 AWG 5 meter cables: 26 AWG	1, 2 meter cables: 30 AWG 3 meter cables: 26 AWG
Bend Radius	1, 2, 3 meter cables: 45 mm 5 meter cables: 60 mm	1, 2 meter cables: 45 mm 3 meter cable: 60 mm

How do you change 100G QSFP ports to support QSFP+ 40GbE transceivers?

```
Configure the desired speed as 40G:
(config)# interface Ethernet1/1
(config-if-Et1/1)# speed forced 40gfull
```

How do you change 100G QSFP ports to support 4x10GbE mode using a QSFP+ transceiver?

```
Configure the desired speed as 10G:
(config)# interface Ethernet1/1 - 4
(config-if-Et1/1-4)# speed forced 10000full
```

How do you change 100G QSFP ports from 100GbE mode to 4x25G mode?

```
Configure the desired speed as 25G:
(config)# interface Ethernet1/1 - 4
(config-if-Et1/1-4)# speed forced 25gfull
```

How do you change 100G QSFP ports back to the default mode?

```
Configure the port to default mode:
(config)# interface Ethernet1/1-4
(config-if-Et1/1)# no speed
```

How do you enable FEC to achieve 40km distance with QSFP-100G-ERL4?

Enable FEC for maximum 40km reach

```
(config-if-Et3/4/1)#error-correction encoding reed-solomon
```

Disable FEC for IEEE compliance (maximum 30km reach)

```
(config-if-Et3/4/1)# no error-correction encoding
```

What additional resources are available on Transceivers and Cables?

Below is a list of additional resources available on the transceivers and cables page of www.arista.com.

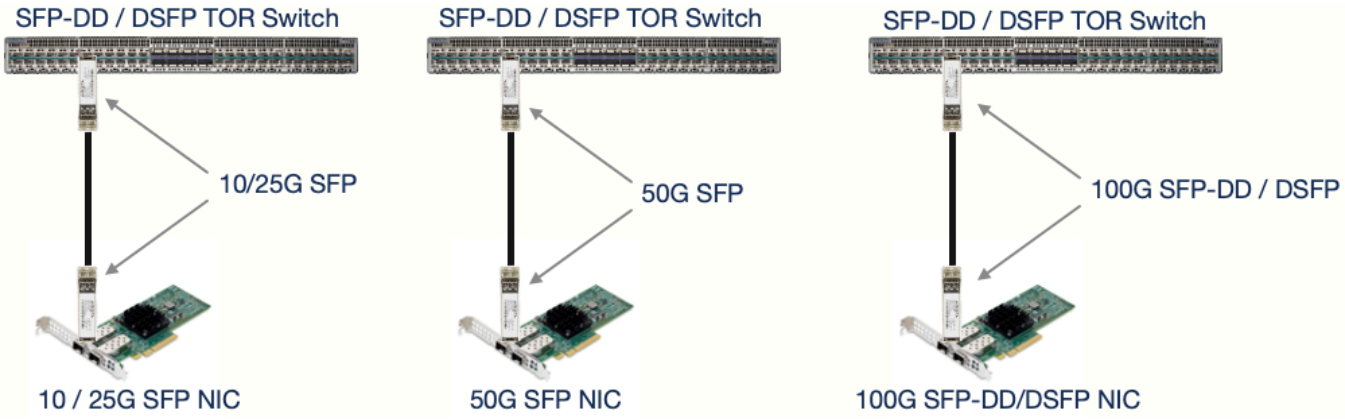
Document	Description
Transceiver and Cable Datasheet	Detailed technical specifications and ordering information
Transceiver and Cable Guide	Minimum EOS Software Rev required for each optics SKU, interoperability, physical attributes, laser safety and fiber cleaning instructions
Arista 40G Optics and Cable FAQ	100G and 40G Frequently asked questions
Whitepapers	Whitepapers on 25G Ethernet, the 40G UNIV transceiver, and more, on the transceivers and cables pages on the arista website here
Partner Documents	Fiber cabling reference guides from Cabling companies like Corning and Leviton on the arista website here

Arista 100G SFP-DD and DSFP Connectivity Solutions: Q&A

What are the benefits of using 100G SFP-DD or DSFP systems?

Arista's 100G/port SFP-DD and DSFP systems are quad-rate systems, enabling the use of 10G, 25G and 50G SFP optics and cables, as well as 100G SFP-DD / DSFP cables – enabling one system to support 4 generations of speeds and transceivers. Key benefits & applications include:

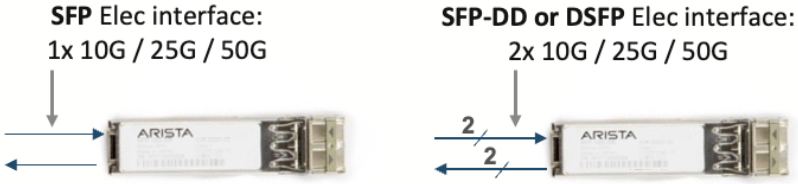
- Future-proof Top of Rack (TOR) switch to Network Interface Card (NIC) connectivity: Arista's SFP-DD and DSFP switch ports can be deployed using mature 10G/25G SFP technology today, while being future proof to support 50G SFP and 100G SFP-DD/DSFP modules and cables.



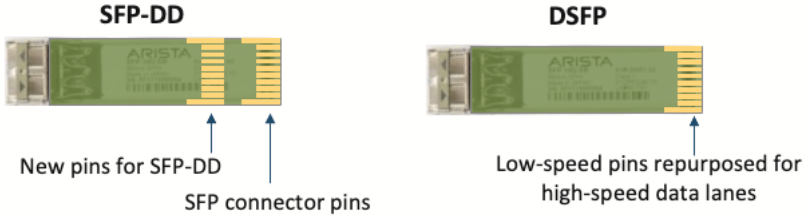
- Easy connectivity 100G-2 QSFP56 based NICs, or breakout to NICs that use 2x 10G/25G/50G SFP ports
- Increase in bandwidth density by a factor of 4 when compared to 25G/port SFP systems.

What are the SFP-DD and DSFP form factors?

The SFP-DD ("Double-Density SFP") and the DSFP ("Dual SFP") are two approaches to achieving the same objective: A compact, SFP-like form factor with 2x 50Gb/s PAM-4 electrical lanes in each direction to enable a total bandwidth of 100G / port. The basic concept is shown below:



The SFP-DD form-factor is defined by the SFP-DD MSA. The SFP-DD adds a second row of contacts to the SFP electrical connector to enable a 2x 10G/25G/50G electrical interface. The DSFP is defined by the DSFP MSA. The DSFP repurposes some of the low-speed pins of the SFP to enable a 2x 10G/25G/50G electrical interface. The figure below summarizes the approach of the SFP-DD and the DSFP to achieve a dual-lane interface.



What 100G SFP-DD and DSFP Connectivity options does Arista offer?

Arista offers a variety of SFP-DD / DSFP passive copper DAC cables for cost effective TOR to NIC connectivity. The table below summarizes the SFP-DD and DSFP connectivity options available from Arista.

Product Number	Product Description
SFP-DD Twinax Copper Cables	
C-Z100-Z100-1M C-Z100-Z100-2M C-Z100-Z100-3M	100G / 50GBASE-CR2 SFP-DD TO SFP-DD Twinax Copper Cable, 1 to 3 meters. TOR to NIC connectivity for NICs using native SFP-DD ports.
C-Z100-Q100-1M C-Z100-Q100-2M C-Z100-Q100-3M	100G / 50GBASE-CR2 SFP-DD TO QSFP Twinax Copper Cable, 1 to 3 meters. TOR to NIC connectivity for NICs using 100G-2 QSFP (QSFP56), or 50G-2 (QSFP28) ports. 100G-2 and 50G-2 QSFP ports use 2 electrical lanes, with each lane operating at 50G (for 100G-2) and 25G (for 50G-2).
C-Z100-2S50-1M C-Z100-2S50-2M C-Z100-2S50-3M	100GBASE-CR2 SFP-DD to 2x 50G / 25G / 10GBASE-CR SFP Twinax Copper Cable, 1 to 3 meters. TOR to NIC connectivity for NICs using SFP ports at any data rate from 10G to 50G.
DSFP Twinax Copper Cables	
C-Y100-Y100-1M C-Y100-Y100-2M C-Y100-Y100-3M	100G / 50GBASE-CR2 DSFP TO DSFP Twinax Copper Cable, 1 to 3 meters. TOR to NIC connectivity for NICs using 100G DSFP ports.
C-Y100-Q100-1M C-Y100-Q100-2M C-Y100-Q100-3M	100G / 50GBASE-CR2 DSFP TO QSFP Twinax Copper Cable, 1 to 3 meters. TOR to NIC connectivity for NICs using 100G-2 QSFP (QSFP56), or 50G-2 (QSFP28) ports. 100G-2 and 50G-2 QSFP ports use 2 electrical lanes, with each lane operating at 50G (for 100G-2) and 25G (for 50G-2).
C-Y100-2S50-1M C-Y100-2S50-2M C-Y100-2S50-3M	100GBASE-CR2 DSFP to 2x 50G / 25G / 10GBASE-CR SFP Twinax Copper Cable, 1 to 3 meters. TOR to NIC connectivity for NICs using SFP ports at any data rate from 10G to 50G.

Why does Arista support both the SFP-DD and DSFP form factors?

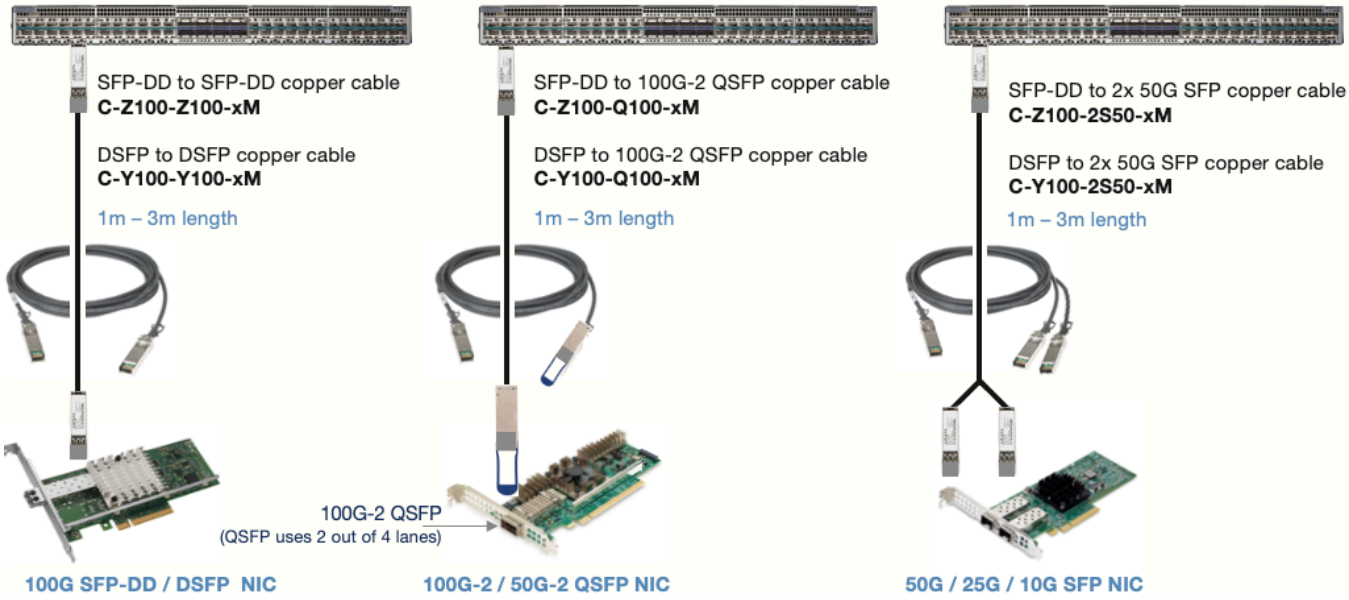
While both the SFP-DD and DSFP achieve the same objective (supporting up to 100G in an SFP-like form-factor), Arista provides both form-factors to satisfy customer preference. The SFP-DD and DSFP have seen varying levels of deployment in different geographical regions: The DSFP in Asia, and the SFP-DD outside Asia.

What are the main applications for SFP-DD and DSFP copper cables?

To achieve higher data rates, NICs are transitioning from 10G/25G NRZ to 50Gb/s PAM-4 signaling per lane. SFP-DD and DSFP copper cables enable easy connectivity from TOR switches that use SFP-DD / DSFP ports to:

- NICs that use SFP-DD / DSFP ports at 100G-2 (PAM-4) or 50G-2 (NRZ) data rates
- NICs that use QSFP ports at 100G-2(PAM-4) or 50G-2 (NRZ) data rates, and
- NICs that use SFP ports at 10G/25G (NRZ) or 50G (PAM-4) data rates.

The diagrams below summarize the simplest options to connect SFP-DD/DSFP TOR ports to NICs



Can 10G, 25G and 50G SFPs be used in SFP-DD and DSFP ports?

Yes. The SFP-DD and DSFP ports can be considered “quad-rate” ports, and support 10G, 25G and 50G SFP optics and cables, as well as 100G SFP-DD / DSFP copper cables. This allows a single platform to support 4 generations of speeds – a unique feature of SFP-DD and DSFP systems.

Can SFP-DDs or DSFPs be used in 10G, 25G or 50G SFP ports?

No. SFP-DDs should only be inserted into SFP-DD ports, and DSFPs should only be inserted into DSFP ports.

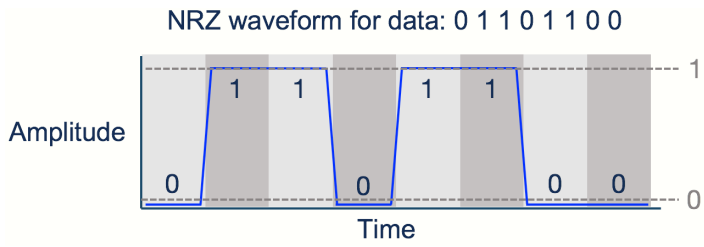
Why doesn’t Arista offer SFP-DD and DSFP optical transceivers?

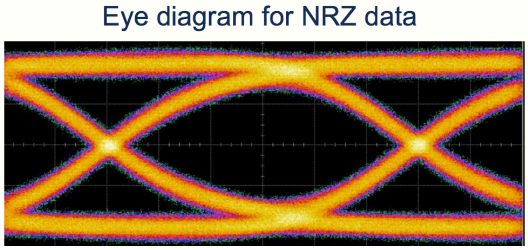
The main application of SFP-DD and DSFP ports in the datacenter is for TOR to NIC connections, where passive copper DACs provide the most cost-effective connectivity. Arista will continue to assess customer demand and may introduce new SFP-DD / DSFP media types (including optics) over time.

What does it mean when an electrical or optical channel is PAM-4 or NRZ?

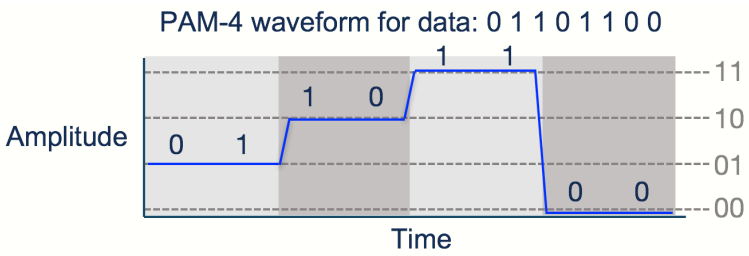
As switch silicon bandwidth increases, the switch silicon IO, or serializer-deserializer (serdes), needs to be driven at faster speeds. Switch silicon serdes speeds have evolved from 10Gb/s NRZ (used for SFP+ and 40G QSFP ports), to 25Gb/s NRZ (used for SFP25 and QSFP100 ports) to 50G PAM-4 (used for 50G SFP, 100G SFP-DD/DSFP, 200G QSFP and 400G OSFP / QSFP-DD ports). Next generation switch silicon will see the serdes driven at 100Gb/s PAM-4 (enabling 800G OSFP and QSFP-DD ports).

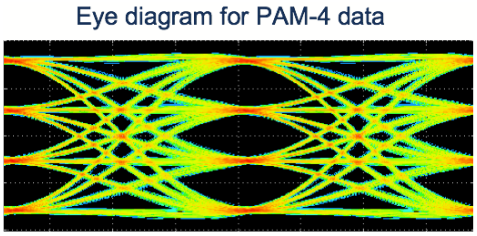
NRZ stands for “Non Return to Zero” modulation, and describes an electrical or optical data channel where there are only two amplitude levels (or symbols), with one amplitude level representing a digital ‘1’ and the other level representing a digital ‘0’. This is the predominate modulation scheme for transmitting data up to 25Gb/s, and is the simplest way to transmit digital data. The diagram below shows an example of an NRZ waveform, along with an ‘eye diagram’ for NRZ data. An eye diagram is simply a way of viewing a modulation scheme with each bit value superimposed on each other.





PAM-4 stands for Pulse Amplitude Modulation – 4, where ‘4’ refers to the number of different amplitude levels (or symbols) of the electrical or optical signal carrying the digital data. In this case, each amplitude level (or symbol) represents two bits of digital data. This enables a PAM-4 waveform to transmit twice as many bits as a NRZ waveform at the same symbol (or “baud”) rate. The diagram below shows an example of a PAM-4 waveform, along with an eye diagram for PAM-4 data.





When a signal is referred to as “25Gb/s NRZ” or “25G NRZ”, it means the signal is carrying data at 25 Gbit / second with NRZ modulation. When a signal is referred to as “50G PAM-4”, it means the signal is carrying data at a rate of 50 Gbit / second using PAM-4 modulation.

What is the speed and modulation format of the electrical interface of a 100G SFP-DD module?

SFP-DD and DSFP modules utilize 2x electrical lanes in each direction (2 transmit lanes and 2 receive lanes), operating at a maximum data rate of 50Gb/s PAM-4, enabling an aggregate bandwidth of 100Gb/s. All Arista SFP-DD and DSFP copper cables can also be configured at lower speeds, enabling 2x 25G & 2x 10G operation.

What do the terms 100G-2 and 50G-2 mean?

These terms describe the bandwidth of an ethernet link, and the number of lanes used to achieve this bandwidth.

Every front panel port of an ethernet switch consists of one or more electrical lanes that transmit and receive ethernet data. For 10G SFP, 25G SFP or 50G SFP ports, a single electrical lane is used (in each direction) and modulated at 10G, 25G or 50G. For SFP-DD and DSFP ports, 2 electrical lanes are used (in each direction) and can be operated at a rate of up to 50Gbs per lane (for a total of 100Gb/s per SFP-DD / DSFP port)

The table below summarizes the terminology used to describe common ethernet speeds used by SFP and SFP-DD/DSFP ports, the number of lanes required to achieve this bandwidth, and some common applications of these interface types:

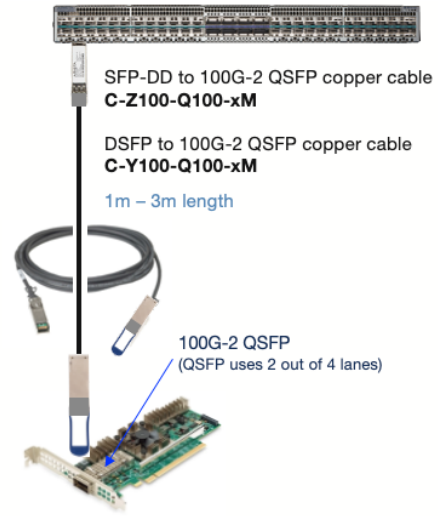
Ethernet link description	Link bandwidth	No. of lanes	Modulation of each lane	Common applications
10G	10Gb/s	1	10G NRZ	All 10G SFP+ ports.
25G	25Gb/s	1	25G NRZ	All 25G SFP ports
50G	50Gb/s	1	50G PAM-4	All 50G SFP ports
50G-2	50Gb/s	2	25G NRZ	All Arista SFP-DD / DSFP ports can be configured as a 50G-2 Ethernet link, and QSFP100 and QSFP200 ports on an Arista switch can often be configured to operate as 2x 50G-2 Ethernet links. 50G-2 QSFP interfaces are sometimes found in 50G NICs. Only 2 lanes (out of the 4 lanes available on a QSFP connector) are used.
100G-2	100Gb/s	2	50G PAM-4	All Arista SFP-DD / DSFP ports can be configured as a 100G-2 Ethernet link, and a QSFP200 port on an Arista switch can often be configured to operate as 2x 100G-2 Ethernet links. 100G-2 QSFP interfaces are sometimes used on 100G NICs that use 50G PAM-4 serdes. Only 2 electrical lanes (out of the 4 electrical lanes) are used.

What are the complete set of ethernet speeds that each SFP-DD / DSFP cable supports?

Each SFP-DD and DSFP port has a 2-lane electrical interface, which can support a maximum data rate of 50Gb/s per lane, enabling a total bandwidth of 100Gbs per SFP-DD and DSFP port. Each lane can be operated at lower speed data rates, and since the SFP-DD and DSFP DACs are passive copper cables, the cable does not impose restrictions on lane speed configuration (except that each lane must be operated at 50Gb/s or lower data rate).

The most common port configurations and applications for each SFP-DD / DSFP copper cable are summarized below. The column labels “Lane 1” & Lane “2” represent the 2-lane electrical interface of the SFP-DD / DSFP port. The values in the “Lane” columns refer to the speed configuration of the SFP-DD / DSFP switch port.

Port configuration & common applications for: SFP-DD to SFP-DD DACs (C-Z100-Z100-xM) and DSFP to DSFP DACs (C-Y100-Y100-xM)			
SFP-DD / DSFP Logical port configuration		Common applications	
Lane 1	Lane 2		
100G-2		100G-2 SFP-DD/DSFP TOR port → 100G-2 SFP-DD/DSFP NIC port	
50G-2		50G-2 SFP-DD/DSFP TOR port → 50G-2 SFP-DD/DSFP NIC port	
50G	50G	SFP-DD/DSFP TOR port configured as 2x 50GE → SFP-DD/DSFP NIC port configured as 2x 50GE	
25G	25G	SFP-DD/DSFP TOR port configured as 2x 25GE → SFP-DD/DSFP NIC port configured as 2x 25GE	
10G	10G	SFP-DD/DSFP TOR port configured as 2x 10GE → SFP-DD/DSFP NIC port configured as 2x 10GE	

Port configuration & common applications for: SFP-DD to QSFP DACs (C-Z100-Q100-xM) and DSFP to QSFP DACs (C-Y100-Q100-xM)			
SFP-DD / DSFP Logical port configuration		Common applications	
Lane 1	Lane 2		
100G-2		100G-2 SFP-DD/DSFP TOR port → 100G-2 QSFP NIC port	
50G-2		50G-2 SFP-DD/DSFP TOR port → 50G-2 QSFP NIC port	
50G	50G	SFP-DD/DSFP TOR port configured as 2x 50GE → QSFP NIC port configured as 2x 50GE	
25G	25G	SFP-DD/DSFP TOR port configured as 2x 25GE → QSFP NIC port configured as 2x 25GE	
10G	10G	SFP-DD/DSFP TOR port configured as 2x 10GE → QSFP NIC port configured as 2x 10GE	

100G-2 / 50G-2 QSFP NIC

Port configuration & common applications for: SFP-DD to QSFP DACs (C-Z100-2S50-xM) and DSFP to QSFP DACs (C-Y100-2S50-xM)			
SFP-DD / DSFP Logical port configuration		Common applications	
Lane 1	Lane 2		
50G	50G	SFP-DD/DSFP TOR port configured as 2x 50GE → 2x SFP NIC ports configured as 50GE	
25G	25G	SFP-DD/DSFP TOR port configured as 2x 25GE → 2x SFP NIC ports configured as 25GE	
10G	10G	SFP-DD/DSFP TOR port configured as 2x 10GE → 2x SFP NIC ports configured as 10GE	

50G / 25G / 10G SFP NIC

What are the CLI commands to configure a 100G SFP-DD or DSFP port for different speeds & logical interfaces?

For 100G-2 operation:

```
switch(config)#interface Ethernet1/1
switch(config-if-Et1/1)#speed 100g-2
```

For 1x 50G-2 operation:

```
switch(config)#interface Ethernet1/1
switch(config-if-Et1/1)#speed 50g-2
```

For 2x 50G-1 operation

```
switch(config)#interface Ethernet1/1-2
switch(config-if-Et1/1-2)#speed 50g-1
```

For 2x 25G operation

```
switch(config)#interface Ethernet1/1-2
switch(config-if-Et1/1-2)#speed 25g
```

What industry standards are associated with each of the 100G SFP-DD / DSFPs?

The table below summarizes the Arista 200G transceivers and cables and the associated industry standards.

Product Number	Associated Industry Standard
C-Z100-Z100-xM, C-Y100-Y100-xM C-Z100-Q100-xM, C-Y100-Q100-xM	IEEE 802.3 100GBASE-CR2
C-Z100-2S50-xM C-Y100-2S50-xM	IEEE 802.3 50GBASE-CR

What additional resources are available on Transceivers and Cables?

Below is a list of additional resources available on the transceivers and cables page of www.arista.com.

Document	Description
Arista Transceivers and Cables Datasheet	Detailed specifications and ordering information
Transceiver and Cable Guide	Arista EOS support, physical attributes, laser safety and fiber cleaning instructions
400G Transceivers and Cables: Q&A	400G Optics and cables FAQ
200G Transceivers and Cables: Q&A	200G Optics and cables FAQ
100G Transceivers and Cables: Q&A	100G Optics and cables FAQ
Corning 400G Cabling Guide Leviton 100G/400G Cabling Guide Siemon Cabling Guide for 100G and 400G Fiber Optics	Partner documents: Fiber cabling reference guides and loss budget guidelines from Cabling companies like Corning and Leviton