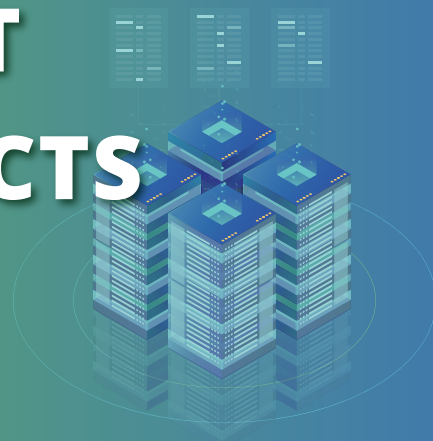
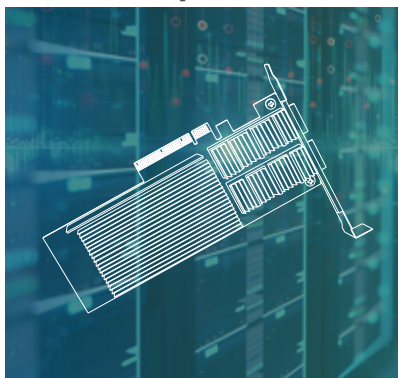


HPC INTERCONNECT HARDWARE PRODUCTS OVERVIEW



Network Adapters



Optical Transceivers



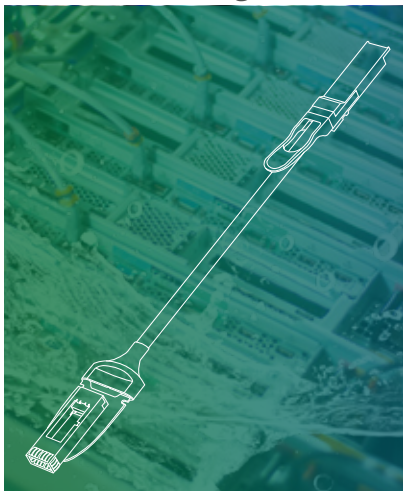
AOC/DAC



Immersion Cooling Optics



Immersion Cooling Extenders



Loopback Modules



Boost Up Server Network Capacity For Next-Gen HPC Data Center



Easy to install and replace



Low latency and high-throughput



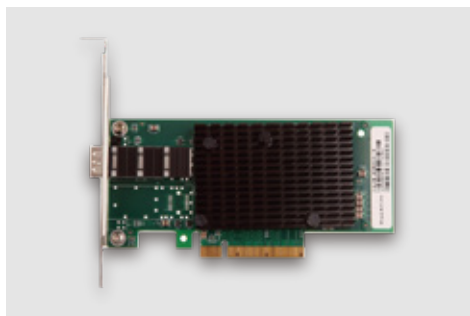
No frame loss/packet loss/lagging



Data rate range of 1 to 400 bandwidth



Ethernet Network Adapters



Features

- Based on Intel controllers
- Support standard PCIe interface
- Support MSI, MSI-X and VMDq queue
- Support iSCSI acceleration
- Support QOS strategy
- Support FCOE offload
- Support RSS/TX queue
- Support 802.3x flow control
- Widely deployable with support for most network operating systems

Product Name	Controller	Optical Interface	Data Rate Per Port	System Interface Type	Max. Power Consumption	Part Number
Single-Port 400G QSFP112 Ethernet Network Adapter	NVIDIA ConnectX-7	1x QSFP112	400GE	PCIe v5.0 (32GT/s)	19.3W	FS-X7-QF1
Single-Port 200G QSFP56 Ethernet Network Adapter	NVIDIA ConnectX-6 Dx	1x QSFP56	200GE	PCIe v5.0 (32GT/s)	19.3W	FS-X6DX-QF1
Dual-Port 100G QSFP28 Ethernet Network Adapter For OCP3.0	Intel E810	2x QSFP28	100/50/25/10GE	OCP3.0 SFF	27.1W	FS-E810-QF2-OCP
Dual-Port 100G Ethernet Network Adapter	Intel E810-CAM2	2x QSFP28	100Gbps	PCIe 3.0/4.0 x16 (16.0 GT/s)	20.8W	FS-E810CAM2-QF2
Dual-Port 40G Ethernet Network Adapter	Intel XL710-BM2	2x QSFP+	40/10/1Gbps	PCIe 3.0 x8 (8.0 GT/s)	8.5W	FS-XL710BM2-QF2
Single-Port 40G Ethernet Network Adapter	Intel XL710-BM1	1x QSFP+	40/10/1Gbps	PCIe 3.0 x8 (8.0 GT/s)	3.82W	FS-XL710BM1-QF1
Dual-Port 25G SFP28 Ethernet Network Adapter For OCP3.0	Intel E810	2x SFP28	25/10/1GE	OCP3.0 SFF	14.3W	FS-E810-F2-OCP
Quad-Port 25G SFP28 Ethernet Network Adapter For OCP3.0	Intel E810	4x SFP28	25/10/1GE	OCP3.0 SFF	25W	FS-E810-F4-OCP
Dual-Port 25G Ethernet Network Adapter	Intel E810-XXVAM2	2x SFP28	25Gbps	PCIe 3.0/4.0 x16 (16.0 GT/s)	20.8W	FS-E810XXVAM2-F2
	Intel XXV710-AM2	2x SFP28	25/10/1Gbps	PCIe 3.0 x8 (8.0 GT/s)	10.3W	FS-XXV710AM2-F2
Quad-Port 10G SFP+ Ethernet Network Adapter For OCP3.0	Intel XL710	4x SFP+	10GE	OCP3.0 SFF	7.4W	FS-XL710-F4-OCP
Quad-Port 10G Ethernet Network Adapter	Intel XL710-BM1	4x SFP+	10/1Gbps	PCIe 3.0 x8 (8.0 GT/s)	6.9W	FS-XL710BM1-F4
Dual-Port 10G Ethernet Network Adapter	Intel X710-BM2	2x SFP+	10/1Gbps	PCIe 3.0 x8 (8.0 GT/s)	6.9W	FS-X710BM2-F2
	Intel 82599ES	2x SFP+	10/1Gbps	PCIe 2.0 x8 (5.0 GT/s)	6.6W	FS-82599ES-F2
Single-Port 10G Ethernet Network Adapter	Intel 82599EN	1x SFP+	10/1Gbps	PCIe 2.0 x8 (5.0 GT/s)	4.5W	FS-82599EN-F1

800G High Speed Optical Modules Are Here Scale up the HPC Data Center Connectivity

OSFP / QSFP-DD SR8

OSFP / QSFP-DD DR8/DR8+ (SiPh)

NEW



100G PAM4 Technology



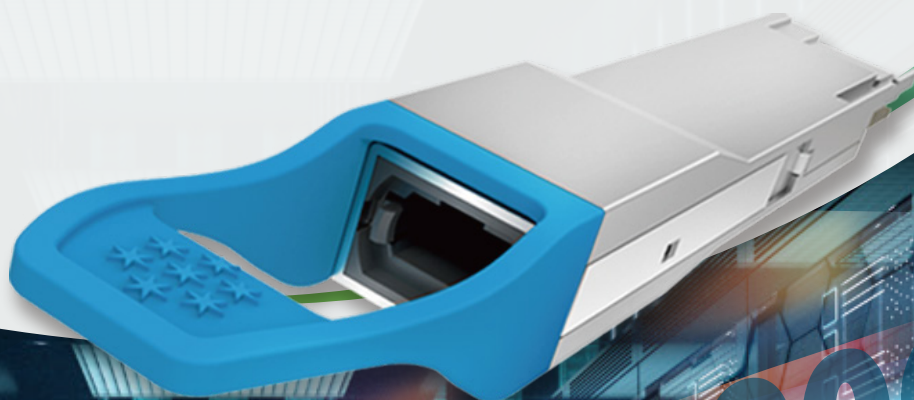
High Integration



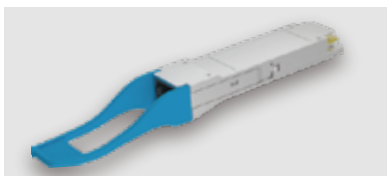
Easy Production



Low Consumption



800G/400G/200G/100G/40G/25G/10G Optical Transceivers



Features

- Hot-pluggable optical transceiver modules
- Data rate up to 10.3125-850Gbps
- 1/2/4/8-channel full-duplex transceiver modules
- Compliant with MSA, InfiniBand and Ethernet

Product Name	Application	Max. Distance or Length	Center Wavelength	LD	PD	Optical Interface	Max. Power Consumption	Case Operating Temperature Range Grade	Part Number
800G QSFP-DD SR8	800GE	100m	850nm	VCSEL	PIN	MPO24/16	12W	C	FEL-800S8M10C
800G QSFP-DD DR8/DR8+	800GE	500m/2km	1310nm	SiPh	PIN	MPO24/16	15W	C	FUL-800P8M50C FUL-800P8K02C
800G OSFP SR8	800GE	100m	850nm	VCSEL	PIN	MPO16	15W	C	FUU-800S8M10C
800G OSFP DR8/DR8+	800GE	500m/2km	1310nm	SiPh	PIN	MPO24/16	15W	C	FUU-800P8M50C FUU-800P8K02C
400G QSFP112 DR4/DR4+	400GE	500m/2km	1310nm	SiPh	PIN	MPO12	9W	C	FUJ-400P4M50C FUJ-400P4K02C
400G QSFP112 SR4	400GE	100m	850nm	VCSEL	PIN	MPO12	9W	C	FEJ-400S4M10C
400G QSFP-DD SR8	400GE	100m	850nm	VCSEL	PIN	MPO24/16	10W	C	FEL-400S8M10C
400G QSFP-DD DR4/DR4+	400GE	500m/2km	1310nm	SiPh	PIN	MPO12	9W	C	FUL-400P4M50C FUL-400P4K10C
400G QSFP-DD xDR4/PLR4	400GE	2km/10km	1310nm	EML/SiPh	PIN	MPO12	9W	C	FEL-400P4K02C FEL-400P4K10C
400G QSFP-DD FR4/CWDM4	400GE	2km	CWDM4	EML/SiPh	PIN	Dual LC	10W	C	FBL-400C4K02C FTL-400C4K02C
200G QSFP56 SR4	200GE/HDR	100m	850nm	VCSEL	PIN	MPO12	5W	C	FEH-200S4M10C
200G QSFP56 DR4	200GE/HDR	500m	1310nm	DML	PIN	MPO12	5W	C	FEH-200P4M50C
200G QSFP56 FR4	200GE/HDR	2km	CWDM4	DML	PIN	Dual LC	5W	C	FBH-200C4K02C
200G QSFP56 LR4	200GE	10km	LWDM4	EML	PIN	Dual LC	7.5W	C	FBH-200L4K10C
200G QSFP-DD SR8	200GE/EDR	100m	850nm	VCSEL	PIN	MPO24/16	4W	C/I	FEL-200S8M10x
200G QSFP-DD PSM8	200GE/EDR	2km/10km	1310nm	DML	PIN	MPO24/16	6W/6.5W	C/I	FEL-200P8K02x FEL-200P8K10x
200G QSFP-DD LR8	200GE	10km	1310nm	DML	PIN	Dual LC	7.5W	C	FBL-200L8K10C
100G QSFP28 BiDi SR1.2	100GE	100m	850/900nm	VCSEL	PIN	Dual LC	4W	C	FBG-100B2M10C
100G QSFP28 SWDM4	100GE/EDR	150m	SWDM4	VCSEL	PIN	MPO12	3.5W	C	FBG-100S4M15C
100G QSFP28 SR4	100GE/EDR	100m/300m	850nm	VCSEL	PIN	MPO12	2W	C/I	FEG-100S4M10x
100G QSFP28 PSM4	100GE/EDR	2km/10km	1310nm	DML	PIN	MPO12	3.5W	C/I	FEG-100P4K02x
100G QSFP28 CLR4	100GE/EDR	2km/10km	CWDM4	DML	PIN	Dual LC	3.5W	C/I	FBG-100C4K02x
100G QSFP28 CWDM4	100GE/EDR	2km/10km	CWDM4	DML	PIN	Dual LC	3.5W	C/I	FBG-100CLK02x
100G QSFP28 4WDM-10	100GE/EDR	10km	CWDM4	DML	PIN	Dual LC	3.5W	C/I	FBG-100W4K10x
100G QSFP28 LR4	100GE/OTU4	10km	LWDM4	DML	PIN	Dual LC	4.5W	C/I	FBG-100L4K10x
40G QSFP+ SR4	40GE/OTU3	150m	850nm	VCSEL	PIN	MPO12	1.5W	C/I	FEF-E40S4M15x
40G QSFP+ CSR4	40GE/OTU3	400m	850nm	VCSEL	PIN	MPO12	1.5W	C	FEF-N40S4M40C
40G QSFP+ PSM4	40GE/OTU3	2km/10km	1310nm	DML	PIN	MPO12	3.5W	C	FEF-N40P4K02C FEF-N40P4K10C
40G QSFP+ LR4	40GE/QDR/OTU3	2km/10km	CWDM4	CWDM4	PIN	Dual LC	2.5W	C	FBF-E40C4K02C FBF-N40C4K10C
25G SFP28 SR	10GE/25GE/CPRI	100m	850nm	VCSEL	PIN	Dual LC	1W	C/I	FBC-M258S5M10x
25G SFP28 LR	10GE/25GE/CPRI	10km	1310nm	DML	PIN	Dual LC	1.8W	C/I	FBC-M2531K10x
10G SFP+ SR	10GE/CPRI	300m	850nm	VCSEL	PIN	Dual LC	0.8W	C/I	FBB-E108S5M30x
10G SFP+ LR	10GE/CPRI	10km	1310nm	DML	PIN	Dual LC	0.8W	C/I	FBB-E1031K10x

Best Reliable and High-Speed Cables For Innovative Deployments of HPC Server Interconnects



High Reliability



Cost-Effective



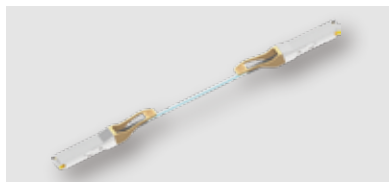
Low Latency



Low Power Consumption

800G/400G/200G/100G/40G/25G/10G AOC & DAC

Active Optical Cables (AOC)



Features

- Hot-pluggable optical transceiver modules
- Data rate up to 10.3125-850Gbps
- Commercial case temperature range of 0°C to 85°C
- Compliant with InfiniBand HDR/EDR, and CPRI/eCPRI

Product Name	Application	Max. Distance or Length	Center Wavelength	LD	PD	Optical Interface	Max. Power Consumption	Case Operating Temperature Range Grade	Part Number
800G QSFP112 DD AOC	800GE	100m	850nm	VCSEL	PIN	N/A	13W per end	C	FYJ-800MxxxC
800G OSFP AOC	800GE	30m	850nm	VCSEL	PIN	N/A	13W per end	C	FTU-800MxxxC
400G QSFP112 AOC	400GE	100m	850nm	VCSEL	PIN	N/A	9W per end	C	FYJ-400MxxxC
400G QSFP DD AOC	400GE	100m	850nm	VCSEL	PIN	N/A	10W per end	C	FYL-400MxxxC
200G QSFP56 AOC	200GE/HDR	100m	850nm	VCSEL	PIN	MPO12	5W per end	C	FYL-200MxxxC
100G QSFP28 AOC	100GE/EDR	100m/300m	850nm	VCSEL	PIN	N/A	2W per end	C	FYG-100MxxxC FYG-100MxxxC
40G QSFP+ AOC	40GE	300m(OM3)	850nm	VCSEL	PIN	I2C	1.5W	C/I	FYF-E40Mxxxx
25G SFP28 AOC	10GE/25GE/CPRI	100m	850nm	VCSEL	PIN	N/A	1W per end	C/I	FYC-M25Mxxxx
10G SFP+ AOC	10GE	300m(OM3)	850nm	VCSEL	PIN	I2C	0.8W	C/I	FYB-E10Mxxxx

Direct Attach Copper Cables (DAC)



Features

- Hot-pluggable MSA-compliant DAC cables
- Data rate up to 10.3125-850Gbps
- 24/26/28/30 AWG optional
- ACC/PCC BER better than 1E-13
- Commercial case temperature range of 0°C to 70°C
- RoHS compliant

Product Name	Application	Modulation	Max. Length	AWG	Part Number
800G QSFP-DD PCC	800GE to 800GE	8x 100G PAM4	2m	30/26	FWL-800xxxxxC
800G OSFP PCC	800GE to 800GE	8x 100G PAM4	2m	30/26	FWL2J-800xxxxxC
400G QSFP112 PCC	400GE to 400GE	4x 100G PAM4	2m	30/26	FWJ-400xxxxxC
400G OSFP PCC	400GE to 400GE	8x 50G PAM4	3m	30/26	FWU-400xxxxxC
200G QSFP56 PCC	200GE to 200GE	4x 50G PAM4	3m	30/26	FWH-20030xxxC
100G QSFP28 PCC	100GE to 100GE	4x 25G NRZ	5m	30/26	FWG-10030xxxC
40G QSFP+ PCC	40GE to 40GE	4x 10G NRZ	6m	30/26	FWF-E40xxxxxC
25G SFP28 PCC	25GE to 25GE	1X 25G NRZ	5m	30/26	FWC-E2530xxxC
10G SFP+ PCC	10GE to 10GE	1X 10G NRZ	7m	30/24	FWB-E1030xxxC
800G QSFP-DD ACC	800GE to 800GE	8x 100G PAM4	5m	30/28/26	FZL-800xxxxxC
800G OSFP ACC	800GE to 800GE	8x 100G PAM4	5m	30/28/26	FZU-800xxxxxC
400G QSFP112 ACC	400GE to 400GE	4x 100G PAM4	5m	30/28/26	FZJ-400xxxxxC
400G QSFP-DD ACC	400GE to 400GE	8x 50G PAM4	7m	30/28/26	FZL-400xxxxxC
400G OSFP ACC	400GE to 400GE	8x 50G PAM4	7m	30/28/26	FZU-400xxxxxC
200G QSFP-DD ACC	200GE to 200GE	8x 25G NRZ	9m	30/26	FZL-200xxxxxC
200G QSFP 56 ACC	200GE to 200GE	4x 50G PAM4	7m	30/28/26	FZH-200xxxxxC

Next-gen Energy Consumption Solutions for High Density and HPC Data Center



Direct Immersion Setting



Reduce Considerable Space

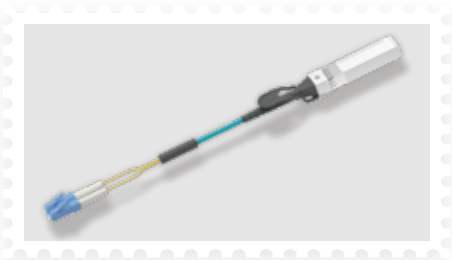


Enhance Operating Stability



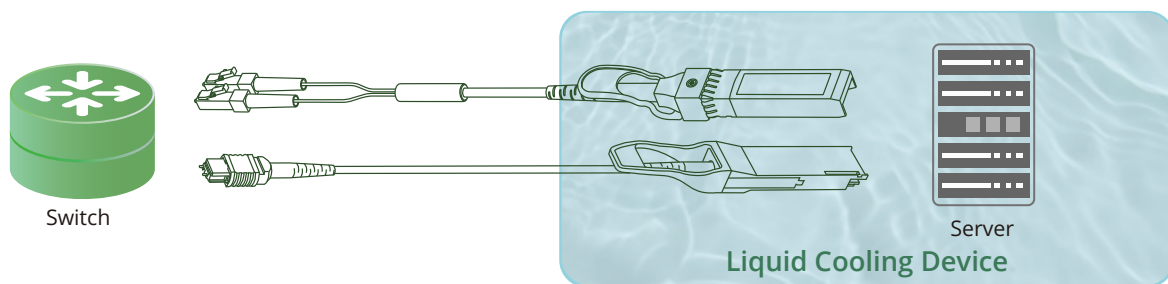
Lower PUE to 1.05

Immersion Cooling Optics



Features

- Hot-pluggable MSA-compliant pigtailed transceiver assemblies
- Data rate up to 25.78125-212.5Gbps
- Support immersion liquid cooling
- Customized pigtail length up to 99m
- Commercial case temperature range of 0°C to 60°C
- RoHS compliant

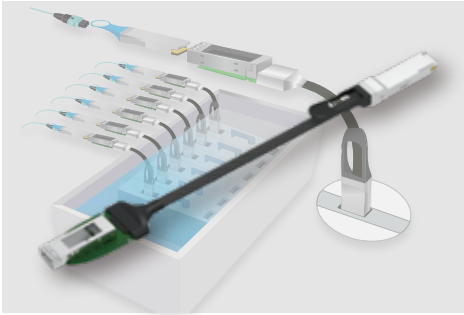


Product Name	Application	Max. Distance or Length	Center Wavelength	LD	PD	Pigtail Type	Max. Power Consumption	Part Number
200G QSFP56 SR4	200GE/HDR	100m	850nm	VCSEL	PIN	MPO12	5W	FQH-200S4M10xxx
100G QSFP28 PSM4	100GE/EDR	2km/10km	1310nm	DML	PIN	MPO12	3.5W	FQG-100P4K02xxx FQG-100P4K10xxx
100G QSFP28 SR4/eSR4	100GE/EDR	100m/300m	850nm	VCSEL	PIN	MPO12	2W	FQG-100S4M10xxx FQG-100S4M30xxx
25G SFP28 SR/eSR	10GE/25GE/CPRI	100m/300m	850nm	VCSEL	PIN	Dual LC	1W	FMC-M2585M10xxx FMC-M2585M30xxx
25G SFP28 LR	10GE/25GE/CPRI	10km	1310nm	DML	PIN	Dual LC	1.8W	FMC-M2531K10xxx
25G SFP28 BiDi LR	10GE/25GE/CPRI	10km	1270/1330nm	DML	PIN	Single LC	1.6W	FRC-M2523K10xxx FRC-M2532K10xxx

PRELIMIANRY

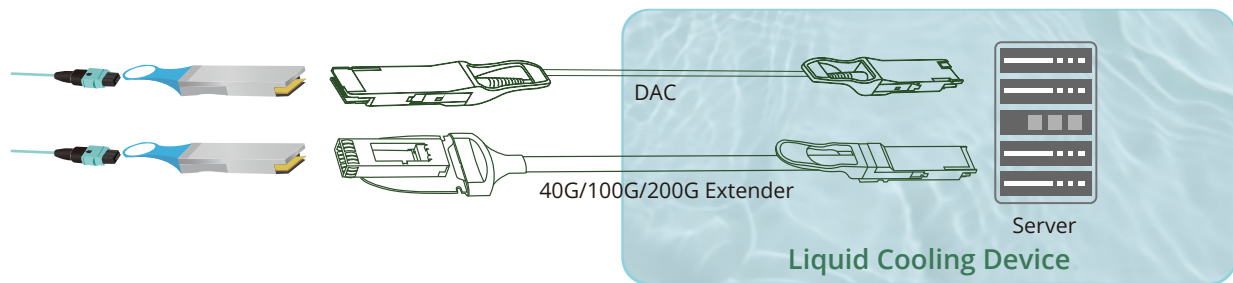
Product Name	Application	Max. Distance or Length	Center Wavelength	LD	PD	Pigtail Type	Max. Power Consumption	Part Number
800G QSFP-DD SR8	800GE	100m	850nm	VCSEL	PIN	MPO24/16	12W	FQL-800SR8M10xxx
800G QSFP-DD DR8/DR8+	800GE	500m/2km	1310nm	SiPh	PIN	MPO24/16	15W	FQL-800P8M50xxx FQL-800P8K02xxx
800G OSFP-DD DR8/DR8+	800GE	500m/2km	1310nm	SiPh	PIN	MPO24/16	15W	FQU-800P8M50xxx FQU-800P8K02xxx
400G QSFP-DD SR8	400GE	100m	850nm	VCSEL	PIN	MPO24/16	10W	FQL-400SR8M10xxx
400G QSFP112 SR4	400GE	100m	850nm	VCSEL	PIN	MPO12	10W	FQJ-400SR4M10xxx
400G QSFP-DD DR4/DR4+	400GE	500m/2km	1310nm	SiPh	PIN	MPO12	9W	FQL-400P4M50xxx FQL-400P4K02xxx
400G QSFP112 DR4/DR4+	400GE	500m/2km	1310nm	SiPh	PIN	MPO12	9W	FUJ-400P4M50xxx FUJ-400P4K02xxx

Immersion Liquid Cooling DAC & Extender



Features

- Significant CAPEX savings for immersion liquid-cooling data centers
- Support 40G/100G/200G QSFP transceivers or AOC with QSFP-QSFP flat cage
- 30AWG twinax copper cable with length up to 50cm
- Simple deployment and fast connection
- Ultra-high reliability with simple structure
- Commercial case temperature range of 0°C to 60°C
- RoHS compliant

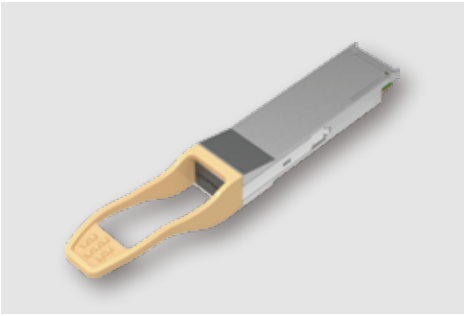


Product Name	Package Type	AWG	Length	Temperature (°C)
Immersible 200G QSFP56 Extender	QSFP56 to QSFP56 Flat Cage	30AWG	up to 50cm	0~60
Immersible 100G QSFP28 Extender	QSFP28 to QSFP28 Flat Cage	30AWG	up to 50cm	0~60
Immersible 40G QSFP+ Extender	QSFP+ to QSFP+ Flat Cage	30AWG	up to 50cm	0~60

PRELIMINARY

Product Name	Package Type	AWG	Length	Temperature (°C)
Immersible 800G QSFP-DD Extender	QSFP-DD to QSFP-DD Flat Cage	30AWG	up to 50cm	0~60
Immersible 400G QSFP-DD Extender	QSFP-DD to QSFP-DD Flat Cage	30AWG	up to 50cm	0~60
Immersible 200G QSFP-DD Extender	QSFP-DD to QSFP-DD Flat Cage	30AWG	up to 50cm	0~60

Electrical Loopback Modules



Features

- Hot-pluggable MSA-compliant active electrical loopback modules
- Data rate up to 25.78125-850Gbps
- Low power consumption
- Commercial case operating temperature range of 0°C to 70°C
- Single 3.3V power supply
- RoHS compliant

Product Name	Application	Modulation	Number of Channels	Max. Data Rate per Channel	Max. Power Consumption	Part Number
800G QSFP DD Loopback	800GE	PAM4	8	106.25Gbps	5W	FLPL-800
400G QSFP-DD Loopback	400GE	PAM4	8	53.125Gbps	5W	FLPL-400
200G QSFP56 Loopback	200GE	PAM4	4	53.125Gbps	2.5W	FLPH-200
200G QSFP-DD Loopback	200GE	NRZ	8	25.78125Gbps	5W	FLPL-200
100G QSFP28 Loopback	100GE	NRZ	4	25.78125Gbps	1W	FLPG-100
25G SFP28 Loopback	25GE	NRZ	1	25.78125Gbps	1W	FLPC-E25

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