

PT-7828 Series

IEC 61850-3 24+4G-port Layer 3 Gigabit modular managed rackmount Ethernet switches



- > Layer 3 routing interconnects multiple LAN segments
- > IEC 61850-3, IEEE 1613 (power substations), NEMA TS2 (traffic control systems), and EN50121-4 (railway applications) compliant
- > Turbo Ring and RSTP/STP for Ethernet redundancy
- > Isolated redundant power inputs with universal 24/48 VDC or 110/220 VDC/VAC power supply range
- > Modular design for various media options: RJ45, fiber optic, M12, and SFP ports
- > -40 to 85°C operating temperature range

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.



Introduction

The PowerTrans PT-7828 switches are high performance Layer 3 Ethernet switches that support Layer 3 routing functionality to facilitate the deployment of applications across networks. The PT-7828 switches are also designed to meet the strict demands of power substation automation systems (IEC 61850-3, IEEE 1613), traffic control systems (NEMA TS2), and railway applications (EN50121-4).

The PT-7828's Gigabit and fast Ethernet backbone, redundant ring, and 24/48 VDC or 110/220 VDC/VAC dual isolated redundant power supplies increase the reliability of your communications and save on cabling and wiring costs. The modular design of the PT-7828 makes network planning easy, and allows greater flexibility by letting you install up to 4 Gigabit ports and 24 fast Ethernet ports. Optional front or rear wiring makes the PT-7828 switches suitable for a variety of applications.

Features and Benefits

- Layer 3 switching functionality to divide a large network into hierarchical subnets and allow data and information to communicate across networks
- IEEE 1588 PTP (Precision Time Protocol) for precise time synchronization of networks
- DHCP Option 82 for IP address assignment with different policies
- Modbus/TCP industrial Ethernet protocol supported
- Turbo Ring and RSTP/STP (IEEE 802.1w/D)
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.1Q VLAN and GVRP protocols to ease network planning
- QoS (IEEE802.1p/1Q) and TOS/DiffServ to increase determinism
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- IEEE 802.1X, HTTPS, and SSH to enhance network security
- SNMPv1/v2c/v3 for different levels of network management
- RMON for efficient network monitoring and proactive capability
- Bandwidth management prevents unpredictable network status
- Lock port to restrict access to authorized MAC addresses
- Port mirroring for online debugging
- Automatic warning by exception through email, relay output
- Automatic recovery of connected devices' IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/serial console, Windows utility, and ABC-01 automatic backup configurator

Specifications

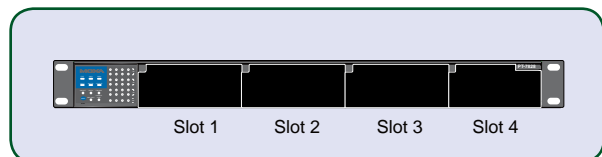
Technology

Standards:

- IEEE 802.3 for 10BaseT
- IEEE 802.3u for 100BaseT(X) and 100Base FX
- IEEE 802.3ab for 1000BaseT(X)
- IEEE 802.3z for 1000BaseSX/LX/LHX/ZX
- IEEE 802.3x for Flow Control
- IEEE 802.1D for Spanning Tree Protocol
- IEEE 802.1w for Rapid STP
- IEEE 802.1Q for VLAN Tagging
- IEEE 802.1p for Class of Service
- IEEE 802.1X for Authentication
- IEEE 802.3ad for Port Trunk with LACP

Protocols: IGMPv1/v2 device, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNMP, SMTP, RARP, RMON, RIP V1/V2, HTTP, HTTPS, Telnet, SSH, Syslog (Available Soon: DHCP Option 66/67/82, LLDP, Modbus/TCP, IEEE 1588 PTP)

Layer 3 Modular Rackmount Ethernet Switch System, PT-7828



Layer 3 Switching: Static routing, RIP V1/V2, OSPF, DVMRP, PIM-DM, VRRP for router redundancy

MIB: MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Groups 1, 2, 3, 9

Flow Control: IEEE 802.3x flow control, back pressure flow control

Switch Properties

- Priority Queues: 4
- Max. Number of Available VLANs: 64
- VLAN ID Range: VID 1 to 4094
- IGMP Groups: 256

Interface

- Fast Ethernet:** Slots 1, 2, and 3 for any combination of 4, 6, 7, or 8-port PM-7200 fast Ethernet modules with 10/100BaseT(X) (TP/M12 interface), 100BaseFX (SC/ST connector), or 100BaseSFP
- Gigabit Ethernet:** Slot 4 for 2 or 4-port PM-7200 Gigabit Ethernet combo module, 10/100/1000BaseT(X) or 1000BaseSFP
- Console Port:** RS-232 (RJ45)
- System LED Indicators:** STAT, PWR1, PWR2, FAULT, MASTER, COUPLER
- Module LED Indicators:** LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED

Alarm Contact: 1 relay output with current carrying capacity of 3 A @ 30 VDC or 3 A @ 240 VAC

Power Requirements

- Input Voltage:**
 - 24 VDC (18 to 36 V)
 - 48 VDC (36 to 72 V)
 - 110/220 VDC/VAC (88 to 300 VDC, 85 to 264 VAC)
- Input Current:** (all ports are equipped with fiber)
 - Max. 2.58 A @ 24 VDC
 - Max. 1.21 A @ 48 VDC
 - Max. 0.64/0.33 A @ 110/220 VDC
 - Max. 0.53/0.28 A @ 110/220 VAC

- Overload Current Protection:** Present
- Connection:** 10-pin terminal blocks
- Reverse Polarity Protection:** Present

Physical Characteristics

- Housing:** IP30 protection
- Dimensions:** 440 x 44 x 325 mm (17.32 x 1.73 x 12.80 in)
- Weight:** 5900 g
- Installation:** 19" rack mounting

Environmental Limits

- Operating Temperature:** -40 to 85°C (-40 to 185°F), cold start requires min. of 100 VAC at -40°C
- Storage Temperature:** -40 to 85°C (-40 to 185°F)
- Ambient Relative Humidity:** 5 to 95% (non-condensing)

Regulatory Approvals

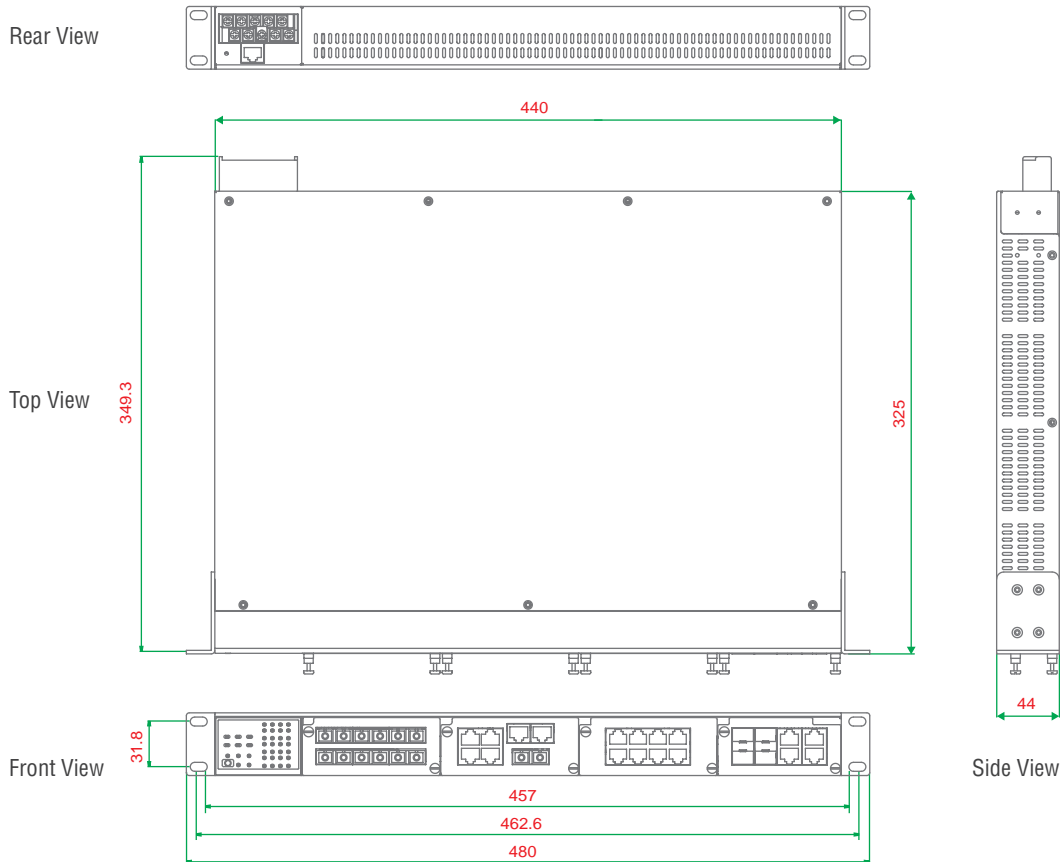
- Safety:** UL60950-1, CSA C22.2 No. 60950-1, EN60950-1 (Pending)
- EMI:** FCC Part 15, CISPR (EN55022) class A
- Power Automation:** IEC 61850-3, IEEE 1613
- Maritime:** DNV (Pending), GL (Pending)
- Traffic Control:** NEMA TS2 (Pending)
- Rail Traffic:** EN50155/EN50121-4
- Shock:** IEC 60068-2-27

Note: Please check Moxa's website for the most up-to-date certification status.

Warranty

- Warranty Period:** 5 years
- Details:** See www.moxa.com/warranty

Dimensions (unit = mm)



Ordering Information

Step 1: Select Ethernet switch system

Step 2: Select interface modules

PT-7828 with power supply



PM-7200 module
(Gigabit or fast Ethernet)

Note: The PT-7828 Ethernet switch system is delivered without interface modules. See pages 4 and 5 to choose PM-7200 interface modules.

PT-7828 Layer 3 Modular Rackmount Ethernet Switch System

The PT-7828 switch system consists of 18 Layer 3 modular managed rackmount Ethernet switch systems, each with 3 slots for fast Ethernet modules and 1 slot for a Gigabit Ethernet module. A total of 24+4G ports can be installed, and the switch can be used in a temperature range from -40 to 85°C.

Available Models		Power Supply					
Front Cabling, Front Display	Rear Cabling, Front Display	Isolated Power Supply 1			Isolated Power Supply 2		
		24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC	24 VDC (18 to 36 V)	48 VDC (36 to 72 V)	HV: 88 to 300 VDC and 85 to 264 VAC
PT-7828-F-24	PT-7828-R-24	1	---	---	---	---	---
PT-7828-F-24-24	PT-7828-R-24-24	1	---	---	1	---	---
PT-7828-F-24-48	PT-7828-R-24-48	1	---	---	---	1	---
PT-7828-F-24-HV	PT-7828-R-24-HV	1	---	---	---	---	1
PT-7828-F-48	PT-7828-R-48	---	1	---	---	---	---
PT-7828-F-48-48	PT-7828-R-48-48	---	1	---	---	1	---
PT-7828-F-48-HV	PT-7828-R-48-HV	---	1	---	---	---	1
PT-7828-F-HV	PT-7828-R-HV	---	---	1	---	---	---
PT-7828-F-HV-HV	PT-7828-R-HV-HV	---	---	1	---	---	1

Note: The PT-7828 Layer 3 Ethernet switch systems provide 1 slot for a Gigabit Ethernet interface module and 3 slots for fast Ethernet interface modules. See pages 4 and 5 to select the PM-7200 Gigabit Ethernet and fast Ethernet interface modules for your own application.



Gigabit/Fast Ethernet Modules for the PT-7828

Product Model	Interface Module																							
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1LSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1MSC6TX	PM-7200-8PoE	PM-7200-8SFP
Slot 1	---	---	---	---	---	---	---	---	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	---	✓	✓
Slot 2	---	---	---	---	---	---	---	---	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	---	✓	✓
Slot 3	---	---	---	---	---	---	---	---	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	---	✓	✓
Slot 4	✓	✓	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Optional Accessories (can be purchased separately)

EDS-SNMP OPC Server Pro: OPC server software that works with all SNMP devices

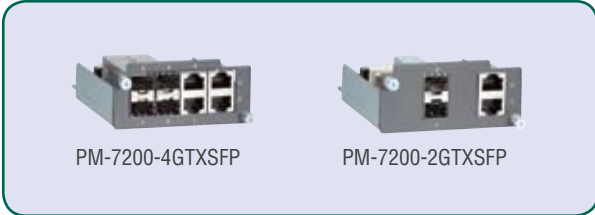
ABC-01: Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

PM-7200 Series

Gigabit and fast Ethernet modules for PT and IKS series switches

Specifications

Gigabit Ethernet Interface Modules, PM-7200-2G/4G series



Interface

RJ45 Ports: 10/100/1000BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

Fiber Ports: 1000BaseSFP slots

Note: The PM-7200-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots.

Fast Ethernet Interface Modules, PM-7200 series



Interface

RJ45 Ports: 10/100BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection

Fiber Ports: 100BaseFX ports (SC/ST or SFP LC connector)

PoE Ports: IEEE 802.3af Power-over-Ethernet Technology, provide up to 15.4 watts per port

M12 ports: 10/100BaseT(X) auto negotiation speed, and auto MDI/MDI-X connection

Optical Fiber

	100BaseFX		
	Multi-mode	Single-mode	Single-mode, 80 km
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-10 dBm	0 dBm	0 dBm
Min. TX	-20 dBm	-5 dBm	-5 dBm
RX Sensitivity	-32 dBm	-34 dBm	-34 dBm
Link Budget	12 dB	29 dB	29 dB
Typical Distance	5 km ^a 4 km ^b	40 km ^c	80 km ^d
Saturation	-6 dBm	-3 dBm	-3 dBm

a. 50/125 μm, 800 MHz*km fiber optic cable

b. 62.5/125 μm, 500 MHz*km fiber optic cable

c. 9/125 μm single-mode fiber optic cable

d. 9/125 μm single-mode fiber optic cable (80 km)

Ordering Information

Gigabit Ethernet Modules for PT and IKS Series Rackmount Ethernet Switches, PM-7200-2G/4G Series

Available Models	Port Interface	
	Combo Port, 10/100/1000BaseT(X) or 1000BaseSFP*	
PM-7200-2GTXSFP	2	
PM-7200-4GTXSFP	4	

*The PM-7200-2G/4G series Gigabit Ethernet combo modules support 2 or 4 SFP slots.

Rackmount Ethernet Switch System and Interface Module Compatibility Chart

Product Model	Interface Modules																							
	PM-7200-4GTXSFP	PM-7200-2GTXSFP	PM-7200-1MSC	PM-7200-1MST	PM-7200-2MSC	PM-7200-2MST	PM-7200-1SSC	PM-7200-2SSC	PM-7200-8TX	PM-7200-2MSC4TX	PM-7200-2MST4TX	PM-7200-2SSC4TX	PM-7200-4MSC2TX	PM-7200-4MST2TX	PM-7200-4SSC2TX	PM-7200-6MSC	PM-7200-6MST	PM-7200-6SSC	PM-7200-1MSC6TX	PM-7200-1MST6TX	PM-7200-1SSC6TX	PM-7200-1LSC6TX	PM-7200-8PoE	PM-7200-8SFP*
PT-7828	√	√	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
PT-7728	√	√	---	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
PT-7710	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
PT-7324	---	√	√	√	√	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
IKS-6726	---	√	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	---	√	√
IKS-6726-PoE	---	√	---	---	---	---	---	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√	√
IKS-6324	---	√	√	√	√	√	√	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

* If you are using an SFP-1FELLC module, the operating temperature is limited to -40 to 75°C (-40 to 167°F).

Fast Ethernet Modules for PT and IKS Series Rackmount Ethernet Switches, PM-7200 Series

Available Models	Port Interface							
	10/100BaseT(X)			100BaseFX				100BaseSFP
	TP	PoE	M12	Multi-mode, SC Connector	Multi-mode, ST Connector	Single-mode, SC Connector	Single-mode, SC Connector, 80 km	
PM-7200-8TX	8	---	---	---	---	---	---	---
PM-7200-6MSC	---	---	---	6	---	---	---	---
PM-7200-6MST	---	---	---	---	6	---	---	---
PM-7200-6SSC	---	---	---	---	---	6	---	---
PM-7200-4MSC2TX	2	---	---	4	---	---	---	---
PM-7200-4MST2TX	2	---	---	---	4	---	---	---
PM-7200-4SSC2TX	2	---	---	---	---	4	---	---
PM-7200-2MSC4TX	4	---	---	2	---	---	---	---
PM-7200-2MST4TX	4	---	---	---	2	---	---	---
PM-7200-2SSC4TX	4	---	---	---	---	2	---	---
PM-7200-1LSC6TX	6	---	---	---	---	---	1	---
PM-7200-2MSC	---	---	---	2	---	---	---	---
PM-7200-2MST	---	---	---	---	2	---	---	---
PM-7200-2SSC	---	---	---	---	---	2	---	---
PM-7200-1MSC	---	---	---	1	---	---	---	---
PM-7200-1MST	---	---	---	---	1	---	---	---
PM-7200-1SSC	---	---	---	---	---	1	---	---
PM-7200-1MSC6TX	6	---	---	1	---	---	---	---
PM-7200-1MST6TX	6	---	---	---	1	---	---	---
PM-7200-1SSC6TX	6	---	---	---	---	1	---	---
PM-7200-8PoE	---	8	---	---	---	---	---	---
PM-7200-8SFP	---	---	---	---	---	---	---	8
PM-7200-4M12	---	---	4	---	---	---	---	---

SFP-1G Series

1G-port Gigabit Ethernet SFP modules



- > Compliant with IEEE 802.3z
- > Differential LVPECL inputs and outputs
- > Single 3.3 V power supply
- > TTL signal detect indicator
- > Hot pluggable
- > Class 1 laser product, complies with EN60825-1

The certification logos shown here apply to some or all of the products in this section. For details, see "Regulatory Approvals" under "Specifications" below.



Specifications

Interface

Ethernet Ports: 1

Connectors: Duplex LC Connector or Simplex LC Connector (WDM-type only)

Note: WDM-type SFP modules must be used in pairs (e.g., SFP-1GXXALC and SFP-1GXXBLC)

Optical Fiber

	Gigabit Ethernet												
	SFP-SX	SFP-LSX	SFP-LX	SFP-LH	SFP-LHX	SFP-ZX	SFP-EZX	SFP-10A	SFP-10B	SFP-20A	SFP-20B	SFP-40A	SFP-40B
Wave-length	850 nm	1310 nm	1310 nm	1310 nm	1310 nm	1550 nm	1550 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm
Max. TX	-4 dBm	-1 dBm	-3 dBm	-2 dBm	1 dBm	5 dBm	5 dBm	-3 dBm		-2 dBm		2 dBm	
Min. TX	-9.5 dBm	-9 dBm	-9.5 dBm	-8 dBm	-4 dBm	0 dBm	0 dBm	-9 dBm		-8 dBm		-3 dBm	
RX Sensitivity	-18 dBm	-19 dBm	-20 dBm	-23 dBm	-24 dBm	-24 dBm	-30 dBm	-21 dBm		-23 dBm		-23 dBm	
Link Budget	8.5 dB	10 dB	10.5 dB	15 dB	20 dB	24 dB	30 dB	12 dB		15 dB		20 dB	
Typical Distance	550 m ^a	2 km ^b	10 km ^c	30 km ^c	40 km ^c	80 km ^c	110 km ^c	10 km ^c		20 km ^c		40 km ^c	
Saturation	0 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-1 dBm		-1 dBm		-1 dBm	

a. 50/125 μm, 400 MHz * km or 62.5/125 μm, 500 MHz * km @ 850 nm multi-mode fiber optic cable

b. 62.5/125 μm, 750 MHz * km @ 1310 nm multi-mode fiber optic cable

c. 9/125 μm single-mode fiber optic cable

Environmental Limits

Operating Temperature:

Standard Models: 0 to 60°C (32 to 140°F)

Wide Operating Temp. Models: -40 to 85°C (-40 to 185°F)

Storage Temperature: -40 to 85°C (-40 to 185°F)

Ambient Relative Humidity: 5 to 95% (non-condensing)

Regulatory Approvals

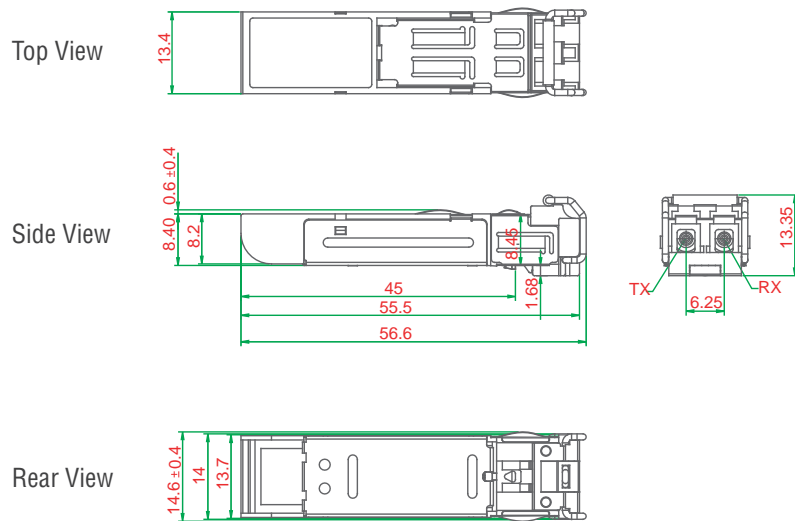
Safety: UL, TÜV

Warranty

Warranty Period: 3 years

Details: See www.moxa.com/warranty

Dimensions (unit = mm)



Ordering Information

SFP Modules

Available Models		Port Interface						
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 85°C)	1000BaseSX, LC Connector, 0.5 km	1000BaseLSX, LC Connector, 2 km	1000BaseLX, LC Connector, 10 km	1000BaseLH, LC Connector, 30 km	1000BaseLHX, LC Connector, 40 km	1000BaseZX, LC Connector, 80 km	1000BaseEZ, LC Connector, 110 km
SFP-1GSXLC	SFP-1GSXLC-T*	1	---	---	---	---	---	---
SFP-1GLSXLC	SFP-1GLSXLC-T	---	1	---	---	---	---	---
SFP-1GLXLC	SFP-1GLXLC-T	---	---	1	---	---	---	---
SFP-1GLHLC	SFP-1GLHLC-T	---	---	---	1	---	---	---
SFP-1GLHXL	SFP-1GLHXL-T	---	---	---	---	1	---	---
SFP-1GZXLC	SFP-1GZXLC-T	---	---	---	---	---	1	---
SFP-1GEZXL	---	---	---	---	---	---	---	1

Note: SFP-1GSXLC-T: -20 to 75°C operating temperature

WDM-type (BiDi) SFP Modules

Available Models		Port Interface					
Standard Temperature (0 to 60°C)	Wide Temperature (-40 to 85°C)	1000BaseSFP, LC Connector, 10 km		1000BaseSFP, LC Connector, 20 km		1000BaseSFP, LC Connector, 40 km	
		TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm	TX 1310 nm, RX 1550 nm	TX 1550 nm, RX 1310 nm
SFP-1G10ALC	SFP-1G10ALC-T	1	---	---	---	---	---
SFP-1G10BLC	SFP-1G10BLC-T	---	1	---	---	---	---
SFP-1G20ALC	SFP-1G20ALC-T	---	---	1	---	---	---
SFP-1G20BLC	SFP-1G20BLC-T	---	---	---	1	---	---
SFP-1G40ALC	SFP-1G40ALC-T	---	---	---	---	1	---
SFP-1G40BLC	SFP-1G40BLC-T	---	---	---	---	---	1

The SFP-1G series modules can be used with the following products

- EDS-728/828 series: IM-2GSFP series Gigabit Ethernet interface modules
- EDS-G509 series: 9G-port full Gigabit managed Ethernet switches
- EDS-518A series: 16+2G-port Gigabit managed Ethernet switches
- EDS-510A series: 7+3G-port Gigabit managed Ethernet switches
- EDS-P510 series: 7+3G-port Gigabit PoE managed Ethernet switches
- PT and IKS series: PM-7200-2G/4G series Gigabit Ethernet interface modules
- EDS-G308 series: 8G-port full Gigabit unmanaged Ethernet switches
- IMC-101G series: Industrial Gigabit media converters