

# PT-7528 Series

## IEC 61850-3 28-port managed rackmount Ethernet switches



- > IEC 61850-3, IEEE 1613 (power substations) compliant
- > Built-in MMS server based on IEC 61850-90-4 switch data modeling for Power SCADA
- > Noise Guard™ wire speed zero packet loss technology
- > Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- > Isolated redundant power supplies with universal 24/48 VDC or 110/220 VDC/VAC power supply range
- > -40 to 85°C operating temperature range



### Introduction

The PowerTrans PT-7528 series is designed for power substation automation applications that operate in extremely harsh environments. The PT-7528 series supports Moxa's new Noise Guard technology, is compliant with IEC 61850-3, and its EMC immunity exceeds IEEE 1613 Class 2 standards to ensure zero packet loss while transmitting at wire speed. The PT-7528 series also features critical packet prioritization (GOOSE, SMVs, and PTP), a built-in MMS server, and a configuration wizard designed specifically for substation automation. With Gigabit

Ethernet, redundant ring, and 110/220 VDC/VAC isolated redundant power supplies, the PT-7528 series further increases the reliability of your communications and saves cabling/wiring costs. The wide range of PT-7528 models available support multiple types of port configuration, with up to 28 copper or 24 fiber ports, and with up to 4 Gigabit ports. Taken together, these features allow greater flexibility, making the PT-7528 suitable for a variety of industrial applications.

### General Features and Benefits

- Built-in MMS server for integration with power SCADA systems
- Switch data modeling based on the IEC 61850-90-4 standard
- Fiber Check™ provides monitoring and diagnosis functions on MST/MSC/SSC/SFP fiber ports
- Noise Guard™ provides a high level of EMC immunity for critical applications, exceeding IEEE 1613 Class 2
- IPv6 Ready logo awarded (IPv6 Logo Committee certified)
- Software-based IEEE 1588v2 PTP (Precision Time Protocol) for precise time synchronization of networks
- VLAN Unaware: Supports priority-tagged frames to be received by specific IEDs
- DHCP Option 82 for IP address assignment with different policies
- EtherNet/IP and Modbus/TCP industrial Ethernet protocols supported
- Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP for network redundancy
- IGMP snooping and GMRP for filtering multicast traffic from industrial Ethernet protocols
- IEEE 802.3ad, LACP for optimum bandwidth utilization
- Bandwidth management prevents unpredictable network status
- Multiport mirroring for online debugging
- Automatic warning by exception through email, relay output
- RMON for efficient network monitoring and proactive capability
- Automatic recovery of connected device's IP addresses
- Line-swap fast recovery
- Configurable by web browser, Telnet/Serial console, CLI, Windows utility, and ABC-02 automatic backup configurator

### Cyber-security Features

- User passwords with multiple levels of security protect against unauthorized configuration
- SSH/HTTPS is used to encrypt passwords and data
- Lock switch ports with 802.1X port-based network access control so that only authorized clients can access the port
- Disable one or more ports to block network traffic
- 802.1Q VLAN allows you to logically partition traffic transmitted between selected switch ports
- Secure switch ports so that only specific devices and/or MAC addresses can access the ports
- Radius/TACACS+ allows you to manage passwords from a central location
- SNMPv3 provides encrypted authentication and access security

## Specifications

### Technology

#### Standards:

IEEE 802.3 for 10BaseT  
 IEEE 802.3u for 100BaseT(X) and 100BaseFX  
 IEEE 802.3ab for 1000BaseT(X)  
 IEEE 802.3z for 1000BaseX  
 IEEE 802.3x for Flow Control  
 IEEE 802.1D for Spanning Tree Protocol  
 IEEE 802.1w for Rapid Spanning Tree Protocol  
 IEEE 802.1s for Multiple Spanning Tree Protocol  
 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, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNTTP, SMTP, RARP, LACP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, LLDP, IEEE 1588v2 PTP, EtherNet/IP, Modbus/TCP, IPv6, SNMP Inform, NTP Server/Client, MMS

**MIB:** MIB-II, Ethernet-like MIB, P-BRIDGE MIB, Q-BRIDGE MIB, Bridge MIB, RSTP MIB, RMON MIB Group 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:** 256

**VLAN ID Range:** VID 1 to 4094

**IGMP Groups:** 256

### Interface

**RJ45 Ports:** 10/100/1000BaseT(X) auto negotiation speed

**Fiber Ports:** 100/1000BaseSFP slot, 100BaseFX Multi-mode ST/SC Connector

**Console Port:** USB console port (Type B connector)

**Storage Port:** USB storage port (Type A connector)

**System LED Indicators:** STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL

**Mode LED Indicators:** LNK/ACT, SPEED

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

### 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 <sup>a</sup> 4 km <sup>b</sup>	40 km <sup>c</sup>	80 km <sup>d</sup>
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)

### Power Requirements

#### Input Voltage:

- WV: 24/48 VDC (18 to 72 V)
- HV: 110/220 VDC/VAC (88 to 300 VDC and 85 to 264 VAC)

#### Input Current:

For models with fewer than 8 fiber ports:

- Max. 0.741 A @ 24 VDC
- Max. 0.364 A @ 48 VDC
- Max. 0.147/0.077 A @ 110/220 VDC
- Max. 0.283/0.19 A @ 110/220 VAC

For models with 8 or more fiber ports:

- Max. 1.428 A @ 24 VDC
- Max. 0.735 A @ 48 VDC
- Max. 0.313/0.167 A @ 110/220 VDC
- Max. 0.586/0.382 A @ 110/220 VAC

**Overload Current Protection:** Present

**Connection:** 10-pin terminal block

**Reverse Polarity Protection:** Present

### Physical Characteristics

**Housing:** IP40 protection

**Dimensions:** 440 x 44 x 325 mm (17.32 x 1.73 x 12.80 in)

**Weight:** 4900 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)

### Standards and Certifications

**Safety:** UL 508

**EMI:** FCC Part 15 Subpart B Class A, EN 55022 Class A

**Power Automation:** IE C61850-3, IEEE 1613 Class 2 (models with MCS and SSC fiber ports are compliant with IEEE 1613 Class 1)

**Traffic Control:** NEMA TS2

**Rail Traffic:** EN 50121-4

### Warranty

**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

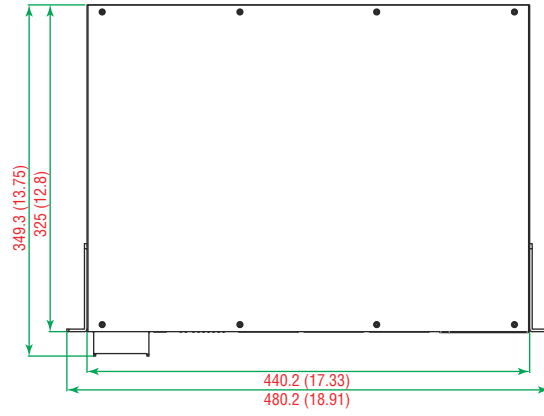
### Dimensions

Unit: mm (inch)

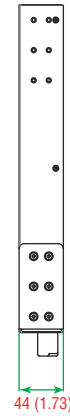
Rear View



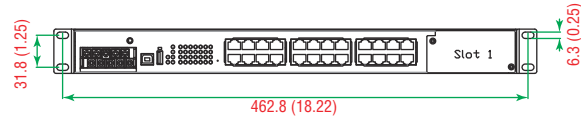
Top View



Side View



Front View



## Ordering Information

Available Models	Port Interface						Power Supply			
	Gigabit Ethernet	Fast Ethernet				Slot for PM-7500 Series	Isolated Power Supply 1		Isolated Power Supply 2	
		1000BaseX SFP Slot	100BaseFX Multi-mode, ST Connector	100BaseFX Multi-mode, SC Connector	100BaseFX Single-mode, SC Connector		10/100BaseT(X) RJ45	WV	HV	WV
PT-7528-24TX-WV	–	–	–	–	24	1	✓	–	–	–
PT-7528-24TX-HV	–	–	–	–	24	1	–	✓	–	–
PT-7528-24TX-WV-WV	–	–	–	–	24	1	✓	–	✓	–
PT-7528-24TX-WV-HV	–	–	–	–	24	1	✓	–	–	✓
PT-7528-24TX-HV-HV	–	–	–	–	24	1	–	✓	–	✓
PT-7528-8MST-16TX-4GSFP-WV	4	8	–	–	16	–	✓	–	–	–
PT-7528-8MST-16TX-4GSFP-WV-WV	4	8	–	–	16	–	✓	–	✓	–
PT-7528-8MST-16TX-4GSFP-HV	4	8	–	–	16	–	–	✓	–	–
PT-7528-8MST-16TX-4GSFP-HV-HV	4	8	–	–	16	–	–	✓	–	✓
PT-7528-12MST-12TX-4GSFP-WV	4	12	–	–	12	–	✓	–	–	–
PT-7528-12MST-12TX-4GSFP-WV-WV	4	12	–	–	12	–	✓	–	✓	–
PT-7528-12MST-12TX-4GSFP-HV	4	12	–	–	12	–	–	✓	–	–
PT-7528-12MST-12TX-4GSFP-HV-HV	4	12	–	–	12	–	–	✓	–	✓
PT-7528-16MST-8TX-4GSFP-WV	4	16	–	–	8	–	✓	–	–	–
PT-7528-16MST-8TX-4GSFP-WV-WV	4	16	–	–	8	–	✓	–	✓	–
PT-7528-16MST-8TX-4GSFP-HV	4	16	–	–	8	–	–	✓	–	–
PT-7528-16MST-8TX-4GSFP-HV-HV	4	16	–	–	8	–	–	–	–	✓
PT-7528-20MST-4TX-4GSFP-WV	4	20	–	–	4	–	✓	–	–	–
PT-7528-20MST-4TX-4GSFP-WV-WV	4	20	–	–	4	–	✓	–	✓	–
PT-7528-20MST-4TX-4GSFP-HV	4	20	–	–	4	–	–	✓	–	–
PT-7528-20MST-4TX-4GSFP-HV-HV	4	20	–	–	4	–	–	✓	–	✓
PT-7528-8MSC-16TX-4GSFP-WV	4	–	8	–	16	–	✓	–	–	–
PT-7528-8MSC-16TX-4GSFP-WV-WV	4	–	8	–	16	–	✓	–	✓	–
PT-7528-8MSC-16TX-4GSFP-HV	4	–	8	–	16	–	–	✓	–	–
PT-7528-8MSC-16TX-4GSFP-HV-HV	4	–	8	–	16	–	–	✓	–	✓
PT-7528-12MSC-12TX-4GSFP-WV	4	–	12	–	12	–	✓	–	–	–
PT-7528-12MSC-12TX-4GSFP-WV-WV	4	–	12	–	12	–	✓	–	✓	–
PT-7528-12MSC-12TX-4GSFP-HV	4	–	12	–	12	–	–	✓	–	–
PT-7528-12MSC-12TX-4GSFP-HV-HV	4	–	12	–	12	–	–	✓	–	✓
PT-7528-16MSC-8TX-4GSFP-WV	4	–	16	–	8	–	✓	–	–	–
PT-7528-16MSC-8TX-4GSFP-WV-WV	4	–	16	–	8	–	✓	–	✓	–
PT-7528-16MSC-8TX-4GSFP-HV	4	–	16	–	8	–	–	✓	–	–
PT-7528-16MSC-8TX-4GSFP-HV-HV	4	–	16	–	8	–	–	✓	–	✓
PT-7528-20MSC-4TX-4GSFP-WV	4	–	20	–	4	–	✓	–	–	–
PT-7528-20MSC-4TX-4GSFP-WV-WV	4	–	20	–	4	–	✓	–	✓	–
PT-7528-20MSC-4TX-4GSFP-HV	4	–	20	–	4	–	–	✓	–	–
PT-7528-20MSC-4TX-4GSFP-HV-HV	4	–	20	–	4	–	–	✓	–	✓
PT-7528-8SSC-16TX-4GSFP-WV-WV	4	–	–	8	16	–	✓	–	✓	–
PT-7528-8SSC-16TX-4GSFP-HV-HV	4	–	–	8	16	–	–	✓	–	✓

**Note:**

PT-7528-24TX high density copper port models have a slot reserved for PM-7500 series modules for fiber and gigabit extension. A selection table of PM-7500 interface modules is included towards the end of this datasheet.

Models with mixed WV and HV power and models with mixed Multi-mode and Single-mode fiber are available by request on a project basis.

**Optional Accessories** (can be purchased separately)

**MXview:** Moxa industrial network management software with 50, 100, 250, 500, 1000, or 2000 nodes

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

**ABC-02 Series:** Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature

**Package Checklist**

- PT-7528 switch
- USB-IF certified cable
- Protective caps for unused ports
- 2 rackmount ears
- Documentation and software CD
- Hardware installation guide
- Warranty card

# PM-7500 Series

**Gigabit and Fast Ethernet modules for rackmount models of the PT-7528-24TX series Ethernet switches**

## Specifications

### Interface

**RJ45 Ports:** 10/100/1000BaseT(X) auto negotiation speed, F/H duplex mode, and auto MDI/MDI-X connection

**Fiber Ports:** 100/1000BaseFX ports (SC/ST or SFP LC connector)

### Optical Fiber

Spec Label:

	100 BaseFX		
	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 <sup>a</sup> 4 km <sup>b</sup>	40 km <sup>c</sup>	80 km <sup>d</sup>
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

### Rackmount Ethernet Switch System and Interface Module Compatibility Chart

#### Modular Rackmount Ethernet Switch System:

PT-7528-24TX models, slot 1 reserved for installing PM-7500 modules

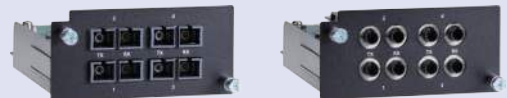


#### Fast Ethernet Interface Modules, PM-7500 Series



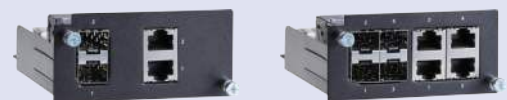
PM-7500-2MSC  
PM-7500-2SSC

PM-7500-2MST



PM-7500-4MSC  
PM-7500-4SSC

PM-7500-4MST



PM-7500-2GTXSFP

PM-7500-4GTXSFP

### Fast Ethernet Modules, PM-7500 Series

Available Models	Port Interface			
	100BaseFX			Combo Port, 10/100/1000BaseT(X) or 100/1000BaseSFP
	Multi-mode, ST Connector	Multi-mode, SC Connector	Single mode, SC Connector	
PM-7500-2MST	2	–	–	–
PM-7500-2MSC	–	2	–	–
PM-7500-2SSC	–	–	2	–
PM-7500-4MST	4	–	–	–
PM-7500-4MSC	–	4	–	–
PM-7500-4SSC	–	–	4	–
PM-7500-2GTXSFP	–	–	–	2
PM-7500-4GTXSFP	–	–	–	4

#### Package Checklist

- PM-7500 interface modules
- Warranty card

# SFP-1G Series

## 1-port Gigabit Ethernet SFP modules



- > IEEE 802.3z compliant
- > Differential LVPECL inputs and outputs
- > TTL signal detect indicator
- > Hot pluggable LC duplex connector
- > Class 1 laser product, complies with EN 60825-1



## 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-1G10ALC and SFP-1G10BLC)

**Note:** When connecting long distance SFP (SFP-ZX, EZX or EZX-120), please ensure at least 5 dB attenuation between both ends. Without attenuation, excessive optical power may damage the transceivers.

### Optical Fiber

	Gigabit Ethernet													
	SFP-SX	SFP-LSX	SFP-LX	SFP-LH	SFP-LHX	SFP-ZX	SFP-EZX	SFP-EZX-120	SFP-10A	SFP-10B	SFP-20A	SFP-20B	SFP-40A	SFP-40B
Wavelength	850 nm	1310 nm	1310 nm	1310 nm	1310 nm	1550 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	-3 dBm		-2 dBm		2 dBm	
Min. TX	-9.5 dBm	-9 dBm	-9.5 dBm	-8 dBm	-4 dBm	0 dBm	0 dBm	-2 dBm	-9 dBm		-8 dBm		-3 dBm	
RX Sensitivity	-18 dBm	-19 dBm	-20 dBm	-23 dBm	-24 dBm	-24 dBm	-30 dBm	-33 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	31 dB	12 dB		15 dB		20 dB	
Typical Distance	550 m <sup>a</sup>	2 km <sup>b</sup>	10 km <sup>c</sup>	30 km <sup>c</sup>	40 km <sup>c</sup>	80 km <sup>c</sup>	110 km <sup>c</sup>	120 km <sup>c</sup>	10 km <sup>c</sup>		20 km <sup>c</sup>		40 km <sup>c</sup>	
Saturation	0 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-3 dBm	-8 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

**Note:** The actual communication distance depends on many factors, including connector loss, cable deployment, and the age of the cabling system. We recommend doing a link budget analysis and reserving a 3 dB margin for such factors.

### Environmental Limits

#### Operating Temperature:

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

Wide 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)

### Standards and Certifications

**Safety:** UL 60950-1, TÜV

**Marine:** DNV, GL, LR, NK

### Warranty

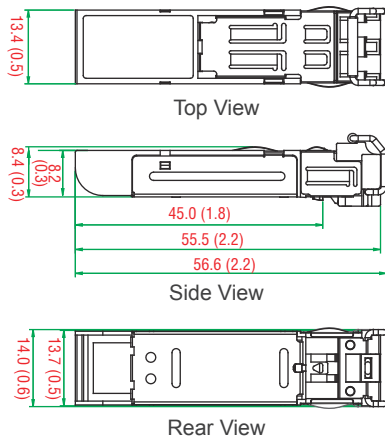
**Warranty Period:** 5 years

**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

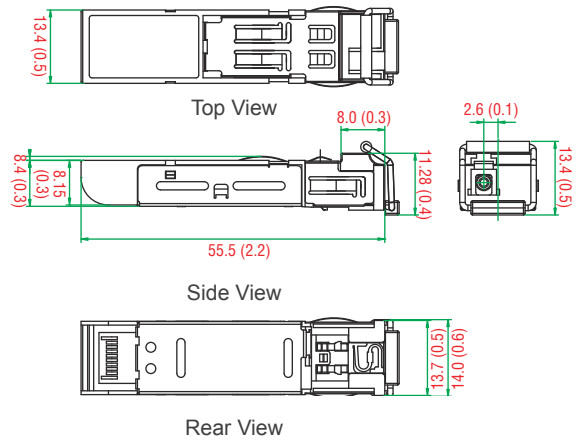
## Dimensions

Unit: mm (inch)

### SFP-1G Series



### SFP-1G Series (WDM Type)



## 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	1000BaseEZ, LC Connector, 120 km
SFP-1GSXLC	SFP-1GSXLC-T*	1	-	-	-	-	-	-	-
SFP-1GLSXL	SFP-1GLSXL-T	-	1	-	-	-	-	-	-
SFP-1GLXL	SFP-1GLXL-T	-	-	1	-	-	-	-	-
SFP-1GLHLC	SFP-1GLHLC-T	-	-	-	1	-	-	-	-
SFP-1GLHXL	SFP-1GLHXL-T	-	-	-	-	1	-	-	-
SFP-1GZXL	SFP-1GZXL-T	-	-	-	-	-	1	-	-
SFP-1GEZXL	-	-	-	-	-	-	-	1	-
SFP-1GEZXL-120	-	-	-	-	-	-	-	-	1

\*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

### Available Models

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

ICS-G7850A/G7852A series, ICS-G7850/G7852 series, ICS-G7750A/G7752A series, ICS-G7750/G7752 series, IM-G7000A-4GSFP, IM-G7000-4GSFP, ICS-G7826A/G7828A series, ICS-G7826/G7828 series, ICS-G7526A/G7528A series, ICS-G7526/G7528 series, IKS-G6524A/G6824A series, IKS-G6524/G6824 series, IKS-6726A/6728A series, IKS-6726/6728 series, IM-2GSFP, EDS-611/619 series, EDS-G516E series, EDS-G512E series, EDS-G509 series, EDS-518A series, EDS-510A series, EDS-510E series, EDS-G308 series, EDS-210A series, IKS-6728A-8PoE series, IKS-6728-8PoE series, EDS-P510A-8PoE series, EDS-P510 series, EDS-G205A-4PoE series, PM-7200-2G/4G series, PM-7500-2G/4G series, PT-G7509 series, IMC-101G series, EDR-G903/G902 series, EDR-810 series, PT-7528 series

### Package Checklist

- SFP-1G module
- Warranty card

# SFP-1FE Series

## 1-port Fast Ethernet SFP modules



- > IEEE 802.3u compliant
- > Differential PECL inputs and outputs
- > TTL signal detect indicator
- > Hot pluggable LC duplex connector
- > Class 1 laser product; complies with EN 60825-1



### Specifications

#### Interface

Ethernet Ports: 1

Connectors: Duplex LC Connector

#### Optical Fiber

	Fast Ethernet		
	SFP-M	SFP-S	SFP-L
Wavelength	1300 nm	1310 nm	1550 nm
Max. TX	-8 dBm	0 dBm	0 dBm
Min. TX	-18 dBm	-5 dBm	-5 dBm
RX Sensitivity	-34 dBm	-34 dBm	-34 dBm
Link Budget	26 dB	29 dB	29 dB
Typical Distance	4 km <sup>a</sup>	40 km <sup>b</sup>	80 km <sup>b</sup>
Saturation	0 dBm	-3 dBm	-3 dBm

a. 50/125 μm or 62.5/125 μm, 800 MHz \* km @ 1300 nm multi-mode fiber optic cable

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

#### Environmental Limits

Operating Temperature: -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)

#### Standards and Certifications

Safety: UL 60950-1, TÜV

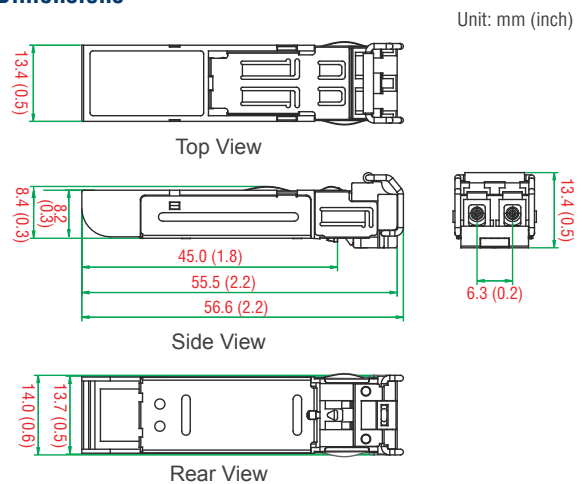
Marine: DNV, GL, LR, NK

#### Warranty

Warranty Period: 5 years

Details: See [www.moxa.com/warranty](http://www.moxa.com/warranty)

#### Dimensions



### Ordering Information

Available Models	Port Interface			
	Wide Temperature (-40 to 85°C)	100BaseFX, Multi-mode, LC Connector, 4 km	100BaseFX, Single-mode, LC Connector, 40 km	100BaseFX, Single-mode, LC Connector, 80 km
SFP-1FEMLC-T		1	-	-
SFP-1FESLC-T		-	1	-
SFP-1FELLC-T		-	-	1

#### Available Models

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

IM-G7000A-4GSFP, IM-G7000-4GSFP, ICS-G7826A/ G7828A series, ICS-G7826/G7828 series, ICS-G7526A/G7528A series, ICS-G7526/G7528 series, IKS-G6524A/G6824A series, IKS-G6524/G6824 series, IKS-6726A/6728A series, IKS-6726/6728 series, IM-6700A-8SFP, IM-6700-8SFP, EDS-611/619 series, EDS-G516E series, EDS-G512E series, EDS-G509 series, EDS-510E series, EDS-G308-2SFP, EDS-210A series, IKS-6728A-8PoE series, IKS-6728-8PoE series, EDS-P510A-8PoE series, EDS-P510 series, PM-7200-8SFP, EDR-G903/G902 series, PT-7528 series

#### Package Checklist

- SFP-1FE module
- Warranty card