

# EDS-828

▶ Award-winning Product



reddot design award  
honorable mention 2008



## 24+4G-port Layer 3 Gigabit modular managed Ethernet switches



- ▶ 4 Gigabit plus 24 fast Ethernet ports for copper and fiber
- ▶ Turbo Ring and Turbo Chain (recovery time < 20 ms @ 250 switches), RSTP/STP, and MSTP\* for network redundancy
- ▶ TACACS+\*, SNMPv3, IEEE 802.1X, HTTPS, and SSH to enhance network security
- ▶ Easy network management by web browser, CLI, Telnet/serial console, Windows utility, and ABC-01
- ▶ Layer 3 routing interconnects multiple LAN segments

\*Available in Q2, 2012



IndustrialIT  
▶▶▶ enabled



### Introduction

The EDS-828 modular Gigabit Ethernet switch features a versatile modular design that allows different combinations of fiber and copper modules, creating a wide array of connection options ideal for any automation network. The modular design lets you install up to 4 Gigabit ports and 24 fast Ethernet ports. The EDS-828 is specially designed for redundant Gigabit network backbones and uses a modular configuration to provide a high degree of flexibility for network expansion. Top network performance, security, and reliability is assured through the EDS-828's advanced management and security

features. The EDS-828 also features industrial-grade construction, a console port for automatic configuration backup, and an angled LED troubleshooting panel that can be conveniently viewed from both horizontal and vertical orientations. In addition to Layer 2 features, the EDS-828 is a high-performance Layer 3 Ethernet switch designed for network routing. The improved hardware technology built into the EDS-828 replaces the software logic used by traditional routers, offering better performance, and making the switch ideal for large-scale local area networks.

### Features and Benefits

- Layer 3 switching functionality to move data and information across networks
- Command line interface (CLI) for quickly configuring major managed functions\*
- Supports advanced VLAN capability with Q-in-Q tagging\*
- Software based IEEE 1588 PTP V2 (Precision Time Protocol) for precise time synchronization of networks\*
- DHCP Option 82 for IP\* address assignment with different policies
- Support EtherNet/IP and Modbus/TCP protocols for device management and monitoring
- Compatible with EtherNet/IP and PROFINET protocols for transparent data transmission
- Redundant Gigabit 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
- IEEE 802.1Q VLAN and GVRP protocol to ease network planning
- QoS (IEEE 802.1p/1Q and TOS/DiffServ) to increase determinism
- Port Trunking for optimum bandwidth utilization
- TACACS+\*, SNMPv3, 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 function for blocking unauthorized access based on MAC address
- Port mirroring for online debugging
- Automatic warning by exception through e-mail, relay output
- Digital inputs for integrating sensors and alarms with IP networks
- Redundant, dual DC power inputs
- Configurable by Web browser, Telnet/Serial console, CLI, Windows utility, and ABC-01 automatic backup configurator

\*Available in Q2, 2012

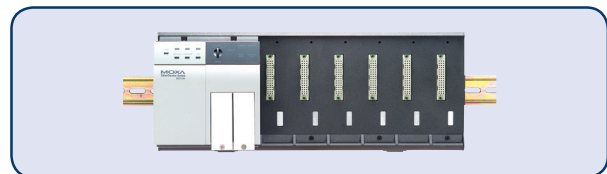
### Specifications

#### 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-2004 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

#### Layer 3 Modular Managed Ethernet Switch System, EDS-82810G



**Protocols:** IGMPv1/v2, GMRP, GVRP, SNMPv1/v2c/v3, DHCP Server/Client, BootP, TFTP, SNMP, SMTP, RARP, RMON, HTTP, HTTPS, Telnet, Syslog, DHCP Option 66/67/82, SSH, LLDP, IEEE 1588 PTP V2\*, EtherNet/IP\*, Modbus/TCP, SNMP Inform, NTP Server/Client\*

**Layer 3 Switching:** Static routing, RIP V1/V2, OSPF, DVMRP\*, PIM-DM\* (EDS-828)  
**Layer 3 Switching Redundancy:** VRRP (EDS-828)  
**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  
 \*Available in Q2, 2012

**Switch Properties**

**Priority Queues:** 4  
**Max. Number of Available VLANs:** 64  
**VLAN ID Range:** VID 1 to 4094  
**IGMP Groups:** 256  
**MAC Table Size:** 16 K  
**Packet Buffer Size:** 32 MB

**Interface**

**Fast Ethernet:** 6 slots for any combination of 4-port interface modules, 10/100BaseT(X) or 100BaseFX  
**Gigabit Ethernet:** 2 slots for any combination of 2-port interface modules, 10/100/1000BaseT(X) or 1000BaseSFP slot  
**Console Port:** RS-232 (RJ45 connector)  
**System LED Indicators:** STAT, PWR1, PWR2, FAULT, MSTR/HEAD, CPLR/TAIL, T.RING  
**Mode LED Indicators:** LNK/ACT, FDX/HDX, RING PORT, COUPLER PORT, SPEED  
**Alarm Contact:** 2 relay outputs with current carrying capacity of 1 A @ 24 VDC  
**Digital Inputs:** 2 inputs with the same ground, but electrically isolated from the electronics.  
 • +13 to +30V for state “1”  
 • -30 to +3V for state “0”  
 • Max. input current: 8 mA

**Power Requirements**

**Input Voltage:** 24 VDC (12 to 45 VDC), redundant dual inputs  
**Input Current:** 0.96 A @ 24 V  
**Overload Current Protection:** Present  
**Connection:** 2 removable 6-contact terminal blocks  
**Reverse Polarity Protection:** Present

**Physical Characteristics**

**Housing:** IP30 protection  
**Dimensions:** 362.4 x 142.5 x 28 mm (14.27 x 5.61 x 1.10 in)  
**Weight:** 1950 g  
**Installation:** DIN-Rail mounting, wall mounting (with optional kit)

**Environmental Limits**

**Operating Temperature:** 0 to 60°C (32 to 140°F)  
**Storage Temperature:** -40 to 85°C (-40 to 185°F)  
**Ambient Relative Humidity:** 5 to 95% (non-condensing)

**Standards and Certifications**

**Safety:** UL 508, UL 60950-1, CSA C22.2 No. 60950-1, EN 60950-1  
**EMI:** FCC Part 15 Subpart B Class A, EN 55022 Class A  
**EMS:**  
 EN 61000-4-2 (ESD) Level 3, EN 61000-4-3 (RS) Level 3,  
 EN 61000-4-4 (EFT) Level 4, EN 61000-4-5 (Surge) Level 4,  
 EN 61000-4-6 (CS) Level 3, EN 61000-4-8, EN 61000-4-12  
**Marine:** DNV, GL, LR, ABS, NK  
**Shock:** IEC 60068-2-27  
**Freefall:** IEC 60068-2-32  
**Vibration:** IEC 60068-2-6

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

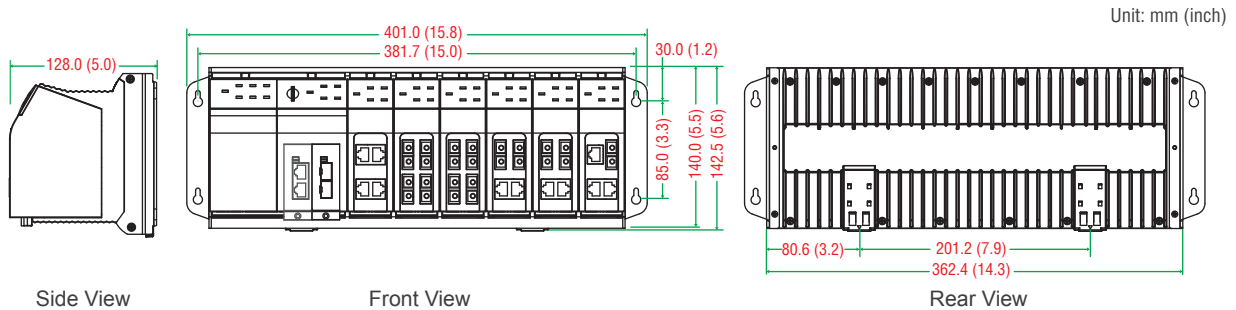
**MTBF (mean time between failures)**

**Time:** 191,203 hrs  
**Database:** Telcordia (Bellcore), GB

**Warranty**

**Warranty Period:** 5 years  
**Details:** See [www.moxa.com/warranty](http://www.moxa.com/warranty)

**Dimensions**



**Ordering Information**

**Step 1: Select Ethernet switch system**

EDS-82810G



**Step 2: Select interface modules**

IM series  
(Gigabit or fast Ethernet)

*Note: The82810G switch system is delivered without interface modules. See the IM series product information below to determine which Gigabit and Fast Ethernet interface modules are right for your application.*

**Available Models**

**EDS-82810G:** Layer 3 modular managed Ethernet switch system with 6 slots for 4-port Fast Ethernet interface modules and 2 slots for 2-port Gigabit interface modules, for up to 24+4G ports

**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-01:** Configuration backup and restoration tool for managed Ethernet switches, 0 to 60°C operating temperature
- DR-4524/75-24/120-24:** 45/75/120 W DIN-Rail 24 VDC power supplies
- MDR-40-24/60-24:** 40/60 W DIN-Rail 24 VDC power supplies, -20 to 70°C operating temperature
- WK-32:** Wall mounting kit for the EDS-728/828 series
- RK-4U:** 4U-high 19" rack mounting kit

**Package Checklist**

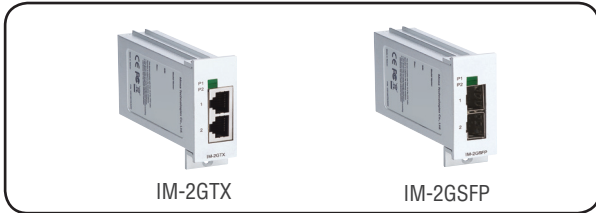
- EDS-828 switch
- RJ45 to DB9 console port cable
- Documentation and software CD
- Hardware installation guide (printed)
- Warranty card

# IM Series

## 2-port Gigabit Ethernet and 4-port Fast Ethernet interface modules for EDS-728/828 series Ethernet switches

### Specifications

#### Gigabit Ethernet Interface Modules, IM-2G Series



IM-2GTX

IM-2GSFP

#### Interface

**Fiber Ports:** 1000BaseSFP slot

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

**LED Indicators:** Port status

Note: See below for product information related to the SFP-1G series of Gigabit Ethernet SFP modules.

#### Power Requirements

**Power Consumption (@ 24 V):**

IM-2GTX: 2.96 W

IM-2GSFP: 3.04 W

#### Physical Characteristics

**Dimensions:** 24 x 65.9 x 101.1 mm (0.94 x 2.59 x 3.98 in)

**Weight:**

IM-2GTX: 150 g

IM-2GSFP: 148 g

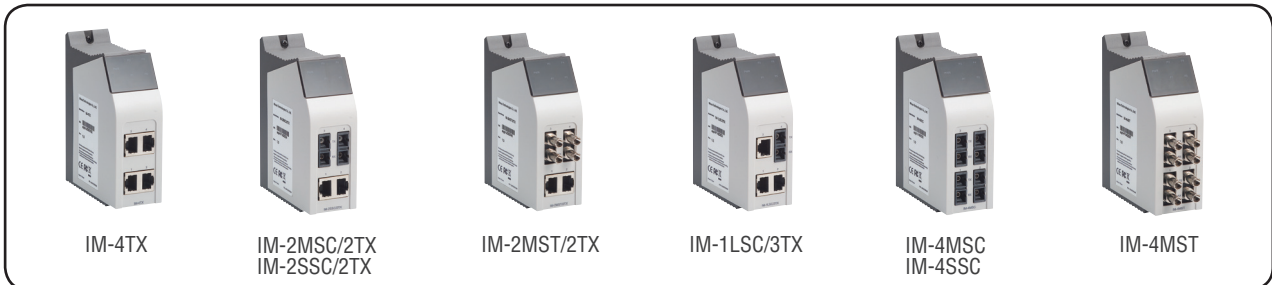
**Time:**

IM-2GTX: 417,521 hrs

IM-2GSFP: 424,955 hrs

**Database:** Telcordia (Bellcore), GB

#### Fast Ethernet Interface Modules, IM Series



IM-4TX

IM-2MSC/2TX  
IM-2SSC/2TX

IM-2MST/2TX

IM-1LSC/3TX

IM-4MSC  
IM-4SSC

IM-4MST

#### Interface

**Fiber Ports:** 100BaseFX ports (SC/ST connector)

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

**LED Indicators:** PWR, P1, P2, P3, P4 port status

#### 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><br>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

**Power Consumption (@ 24 V):**

IM-4TX: 1.52 W

IM-2MSC/2TX: 2.43 W

IM-2MST/2TX: 2.43 W

IM-2SSC/2TX: 2.43 W

IM-1LSC/3TX: 2.5 W

IM-4MSC: 6.6 W

IM-4MST: 6.6 W

IM-4SSC: 6.6 W

#### Physical Characteristics

**Housing:** IP30 protection

**Dimensions:** 40 x 127.8 x 100 mm (1.57 x 5.03 x 3.94 in)

**Weight:**

IM-4TX: 215 g

IM-2MSC/2TX: 245 g

IM-2MST/2TX: 250 g

IM-2SSC/2TX: 245 g

IM-1LSC/3TX: 235 g

IM-4MSC: 250 g

IM-4MST: 270 g

IM-4SSC: 270 g

**MTBF** (mean time between failures)

**Time:**

IM-4TX: 4,403,579 hrs  
 IM-2MSC/2TX, IM-2MST/2TX, IM-2SSC/2TX: 1,011,453 hrs  
 IM-1LSC/3TX: 3,924,924 hrs  
 IM-4MSC, IM-4MST, IM-4SSC: 696,138 hrs

**Database:** Telcordia (Bellcore), GB

**Warranty**

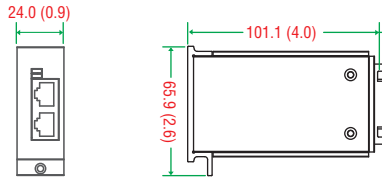
**Warranty Period:** 5 years

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

**Dimensions**

Unit: mm (inch)

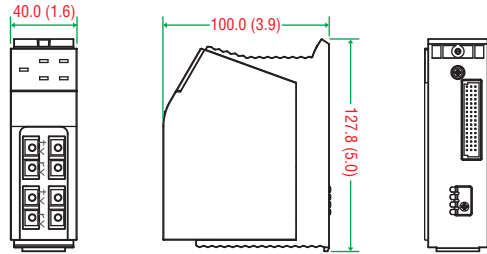
**Gigabit Ethernet Interface Modules**



Front View

Side View

**Fast Ethernet Interface Modules**



Front View

Side View

Rear View

**: Ordering Information**

| Available Models<br>(0 to 60°C) | Port Interface      |              |                |                             |                              |   |  |
|---------------------------------|---------------------|--------------|----------------|-----------------------------|------------------------------|---|--|
|                                 | Gigabit Ethernet    |              | Fast Ethernet  |                             |                              |   |  |
|                                 | 10/100/1000BaseT(X) | 1000BaseSFP* | 10/100BaseT(X) | 100BaseFX                   |                              |   | Single-mode,<br>SC Connector,<br>80 km |
| Multi-mode,<br>SC Connector     |                     |              |                | Multi-mode,<br>ST Connector | Single-mode,<br>SC Connector |   |  |
| <b>IM-2G Series</b>             |                     |              |                |                             |                              |   |  |
| IM-2GTX                         | 2                   | -            | -              | -                           | -                            | - | -                                      |
| IM-2GSFP                        | -                   | 2            | -              | -                           | -                            | - | -                                      |
| <b>IM Series</b>                |                     |              |                |                             |                              |   |  |
| IM-4TX                          | -                   | -            | 4              | -                           | -                            | - | -                                      |
| IM-4MSC                         | -                   | -            | -              | 4                           | -                            | - | -                                      |
| IM-4MST                         | -                   | -            | -              | -                           | 4                            | - | -                                      |
| IM-2MSC/2TX                     | -                   | -            | 2              | 2                           | -                            | - | -                                      |
| IM-2MST/2TX                     | -                   | -            | 2              | -                           | 2                            | - | -                                      |
| IM-4SSC                         | -                   | -            | -              | -                           | -                            | 4 | -                                      |
| IM-2SSC/2TX                     | -                   | -            | 2              | -                           | -                            | 2 | -                                      |
| IM-1LSC/3TX                     | -                   | -            | 3              | -                           | -                            | - | 1                                      |

\*See below for product information related to the SFP-1G series Gigabit Ethernet SFP modules.

**Package Checklist**

- IM series 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-1GXXALC and SFP-1GXXBLC)

**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,<br>RX 1550 nm | TX 1550 nm,<br>RX 1310 nm | TX 1310 nm,<br>RX 1550 nm | TX 1550 nm,<br>RX 1310 nm | TX 1310 nm,<br>RX 1550 nm | TX 1550 nm,<br>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

#### Warranty

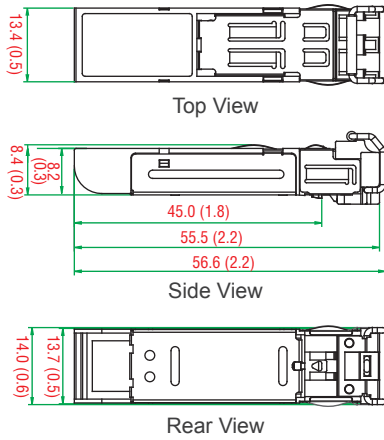
**Warranty Period:** 5 years

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

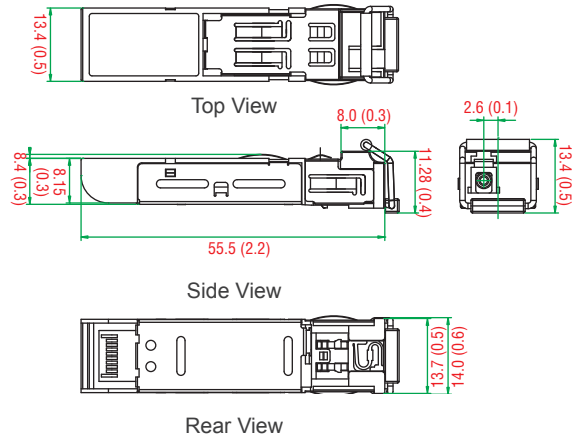
## Dimensions

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-1GLHL                        | SFP-1GLHL-T                    | -                                | -                               | -                               | 1                               | -                                | -                               | -                                | -                                |
| SFP-1GLHLX                       | SFP-1GLHLX-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-G7826/G7828 series, ICS-G7526/G7528 series, IKS-G6524/G6824 series, IKS-6726/6728 series, EDS-611/619 series, EDS-G509 series, EDS-518A series, EDS-510A series, EDS-G308 series, EDS-P510 series, EDS-G205-4PoE series, IM-G7000-4GSFP, IM-2GSFP, PM-7200-2G/4G series, PT-G7509, EDR-G903/G902 series, IMC-101G series

### Package Checklist

- SFP-1G module
- Warranty card