

SFP-модули

Технические характеристики

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RUGGEDCOM SFP Compatibility

The RUGGEDCOM accessories portfolio includes a wide range of Fast Ethernet small form-factor pluggable (SFP) transceivers for select RUGGEDCOM routers and switches



These convenient and cost-effective SFP transceivers offer a variety of speed, distance and interface options for extending the reach and functionality of networks. RUGGEDCOM SFPs are available for 10 GBit/s, 1 GBit/s and Fast Ethernet, and cover distances ranging from 0 – 115 km, depending on the SFP specification.

Introduction

Siemens offers a wide range of convenient and cost-effective Fast Ethernet Small Form-Factor Pluggable (SFP) transceivers for select RUGGEDCOM routers and switches. SFP transceivers offer a variety of options for speed, distance and interfaces to extend the reach and functionality of networks.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

Only use SFP transceivers approved by Siemens for RUGGEDCOM products. Siemens accepts no liability as a result of performance issues related in whole or in part to third-party components.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

SFP transceivers contain no user-serviceable parts. Attempted service by unauthorized personnel shall render all warranties null and void.

Changes or modifications not expressly approved by Siemens could invalidate specifications, test results, and agency approvals, and void the user's authority to operate the product.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

All SFP transceivers are compatible with the Small Form-Factor Pluggable 20-pin Multi-Source Agreement (MSA).

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

Maximum segment length is greatly dependent on factors such as fiber quality and the number of patches and splices. Consult a Siemens sales associate when determining maximum segment lengths.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

All optical power numbers are listed as dBm averages.

1.1 Selecting an SFP Transceiver

The following process for selecting an SFP transceiver is recommended:

1. Determine the basic application requirements, such as SFP type, link speed and operating distance, and then select an SFP transceiver.
2. Determine which RUGGEDCOM product(s) support the chosen SFP transceiver.
3. If the chosen SFP transceiver will be connected a fixed port or to a non-RUGGEDCOM device, review the full technical specifications for the SFP transceiver to make sure it is compatible with the other end of the link.

For a list of available SFP transceivers and general specifications, refer to ["Available SFP Transceivers \(Page 2\)"](#).

If assistance is required to select the appropriate SFP transceiver for the application, contact Siemens Customer Support.

1.2 Available SFP Transceivers

Each available SFP transceiver has been tested for compatibility with the following RUGGEDCOM routers and switches. Use in any other RUGGEDCOM or third-party router/switch is not supported or recommended by Siemens.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

Compatibility with some RUGGEDCOM routers/switches may contain restrictions. For more information about product-specific deviations, refer to the detailed description of the relevant SFP transceiver(s) in this catalog.

1.2 Available SFP Transceivers

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Copper SFP Transceivers

The following copper triple-speed SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 2\)"](#).

2.1 RUGGEDCOM SFP1112-1

Siemens' RUGGEDCOM SFP1112-1 is a 1 Gbps copper SFP transceiver that operates within a wide temperature range (0 to 70 °C or 32 to 158 °F) and provides high performance Gigabit Ethernet communication up to 100 m (328.1 ft).

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA and IEEE 802.3ab for 10/100/1000Base-T
- Transmission distance up to 100 m (328.1 ft)
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Characteristics

Speed	10/100/1000 Mbps
Connector	RJ45
Cable Type	> CAT-5e
Duplex	FDX/HDX
Wiring Standard	TIA/EIA T568A/B
Nominal Distance	100 m (328.1 ft)
Isolation	1.5 kV

Environment

Operating Temperature	0 to 70 °C (32 to 158 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	1382 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Requirements

Auto Negotiation	Auto negotiation must be disabled in RUGGEDCOM ROS v3.9 and higher to support 100 Mbps.
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Product-Specific Deviations

The RUGGEDCOM SFP1112-1 supports the following ratings when installed in the specified Siemens RUGGEDCOM routers and/or switches:

Specification	Product(s)	Rating
Speed	RUGGEDCOM RSG907R, RSG909R	RUGGEDCOM ROS v5.2.2 only supports 1000 Mbps on the coupler port (port 5 for RSG907R or port 7 for RSG909R). RUGGEDCOM ROS v5.3 and higher support 10/100/1000 Mbps on the coupler port (port 5 for RSG907R or port 7 for RSG909R).
	RUGGEDCOM RSG908C, RSG910C	RUGGEDCOM ROS v5.2.2 only supports 1000 Mbps on SFP transceiver ports (ports 5 to 8 for RSG908C or ports 7 to 10 for RSG910C). RUGGEDCOM ROS v5.3 and higher support 10/100/1000 Mbps on SFP transceiver ports (ports 5 to 8 for RSG908C or ports 7 to 10 for RSG910C).

Regulator Compliance

The RUGGEDCOM SFP1112-1 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class A, CE Class A, VCCI Class A, C-Tick	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8CG01-0AA0	RUGGEDCOM SFP1112-1	1000Base-T SFP – RJ45, 100 m

2.2 RUGGEDCOM SFP1112-1I

Siemens' RUGGEDCOM SFP1112-1I is a 1 Gbps copper SFP transceiver that operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 100 m (328.1 ft).

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA and IEEE 802.3ab for 10/100/1000Base-T
- Transmission distance up to 100 m (328.1 ft)
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Characteristics

Speed	10/100/1000 Mbps
Connector	RJ45
Cable Type	> CAT-5e
Duplex	FDX/HDX
Wiring Standard	TIA/EIA T568A/B
Nominal Distance	100 m (328.1 ft)
Isolation	1.5 kV

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	984 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Requirements

Firmware	Only compatible with the following firmware versions: • RUGGEDCOM ROS v5.4.0 or higher
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Auto Negotiation	• RUGGEDCOM ROX v2.13.2 or higher
	Auto negotiation must be disabled in RUGGEDCOM ROS v5.5.2 and higher to support 100 Mbps. Applies to all compatible switches, with the exception of the following: • RUGGEDCOM RST2228 • RUGGEDCOM RSG907R • RUGGEDCOM RSG909R • RUGGEDCOM RSG908C • RUGGEDCOM RSG910C

Regulator Compliance

The RUGGEDCOM SFP1112-1I meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class A, CE Class A, VCCI Class A, C-Tick	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8CG02-0AA0	RUGGEDCOM SFP1112-1I	1000Base-T SFP – RJ45, 100 m

Fast Ethernet SFP Transceivers

The following Fast Ethernet SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 2\)"](#).

3.1 RUGGEDCOM SFP1121-1FX2

Siemens' RUGGEDCOM SFP1121-1FX2 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 2 km (1.2 mi) using multi-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3ab for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 2 km (1.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 µm and 62.5/125 µm multi-mode fiber
- Supports Smart SFP functionality
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power (50/125 µm)	-23.5 to -14.0 dBm
Transmit Power (62.5/125 µm)	-20.0 to -14.0 dBm
Receiver Sensitivity	-31.0 to -3.0 dBm
Power Budget (50/125 µm)	7.5 dB
Power Budget (62.5/125 µm)	11 dB

Cabling

Speed	100 Mbps ^a
Mode	MM (Multi-Mode)
Interface	FX
Connector	LC
Cable Type	50/125 or 62.5/125 µm
Wavelength (Tx)	1270 to 1380 nm
Wavelength (Rx)	1270 to 1380 nm
Nominal Distance	2 km (1.2 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1121-1FX2 can be used with Gigabit modules in RUGGEDCOM RX1500-series and RX5000 devices. For more information, refer to the "RUGGEDCOM ROX II Configuration Manual".

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 100 °C (-40 to 212 °F)

Mean Time Between Failures (MTBF)	3087 years ^a
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^a Tested at an operating temperature of 40 °C (104 °F)

Restrictions

RUGGEDCOM ROX v2.10.0 or higher is required when this SFP transceiver is installed in one of the following modules:

- RUGGEDCOM RX1500PN LM FG50
- RUGGEDCOM RX5000PN LM 4FG50

Regulator Compliance

The RUGGEDCOM SFP1121-1FX2 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C	HBM 2 kV
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Variation of IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	CENELEC CEN55022 Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	AEL Class 1 EN 60825-1 (+A11)	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE51-0AA0	RUGGEDCOM SFP1121-1FX2	100Base-FX SFP – MM, 1310 nm, LC, 2 km

3.2 RUGGEDCOM SFP1131-1FX20

Siemens' RUGGEDCOM SFP1131-1FX20 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 20 km (12.4 mi) using single-mode fiber.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

Maximum distance is 15 km (9.3 mi) in OC-3 mode.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 20 km (12.4 mi)
- LC duplex fiber connector
- Supports Smart SFP functionality
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-28 to -8 dBm
Power Budget	13 dB

Cabling

Speed	100 Mbps ^a
Interface	FX
Mode	SM (Single-Mode)
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1261 to 1360 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	20 km (12.4 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1131-1FX20 can be used with Gigabit modules in RUGGEDCOM RX1500-series and RX5000 devices. For more information, refer to the "RUGGEDCOM ROX II Configuration Manual".

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	653 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Restrictions

RUGGEDCOM ROX v2.10.0 or higher is required when this SFP transceiver is installed in one of the following modules:

- RUGGEDCOM RX1500PN LM FG50
- RUGGEDCOM RX5000PN LM 4FG50

Regulator Compliance

The RUGGEDCOM SFP1131-1FX20 complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C, Method 3015.4 JEDEC/EIA JESD22-A114-A	Class 2 (2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Bellcore GR1089-CORE	25 kV Air Discharge 10 Zaps at 8 kV (contact discharge) on the electrical faceplate on panel
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	US FDA CDRH AEL Class 1 IEC/EN 60825-1 and 60825-2 EN 60950 Class 1	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE52-0AA0	RUGGEDCOM SFP1131-1FX20	100Base-FX SFP – SM, 1300 nm, LC, 20 km

3.3 RUGGEDCOM SFP1131-1FX50

Siemens' RUGGEDCOM SFP1131-1FX50 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 50 km (31.1 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and SFF 8074i for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Compliant with ITU-T G957 STM-1 L1.1 Optical Interface
- Compliant with Telcordia GR253 OC3 LR-1 Optical Interface
- Transmission distance up to 50 km (31.1 mi)
- Supports Smart SFP functionality
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5 to -0 dBm
Receiver Sensitivity	-34 to -10 dBm
Power Budget	29

Cabling

Speed	100 Mbps ^a
Mode	SM (Single-Mode)
Interface	FX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1263 to 1360 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	50 km (31.1 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1131-1FX50 can be used with Gigabit modules in RUGGEDCOM RX1500-series and RX5000 devices. For more information, refer to the "RUGGEDCOM ROX II Configuration Manual".

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)

Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	640 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Restrictions

RUGGEDCOM ROX v2.10.0 or higher is required when this SFP transceiver is installed in one of the following modules:

- RUGGEDCOM RX1500PN LM FG50M
- RUGGEDCOM RX5000PN LM 4FG50

Regulator Compliance

The RUGGEDCOM SFP1131-1FX50 complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C, Method 3015.4 JEDEC/EIA JESD22-A114-A	Class 2 (2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Bellcore GR1089-CORE	25 kV Air Discharge 10 Zaps at 8 kV (contact discharge) on the electrical faceplate on panel
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	US FDA CDRH AEL Class 1 IEC/EN 60825-1 and 60825-2 EN 60950 Class 1	Class 1
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE53-0AA0	RUGGEDCOM SFP1131-1FX50	100Base-FX SFP – SM, 1300 nm, LC, 50 km

3.4 RUGGEDCOM SFP1131-1FX90

Siemens' RUGGEDCOM SFP1131-1FX90 industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 90 km (55.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 90 km (55.9 mi)
- LC duplex fiber connector
- Supports Smart SFP functionality
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5 to -0 dBm
Receiver Sensitivity	-34 to -10 dBm
Power Budget	29

Cabling

Speed	100 Mbps ^a
Mode	SM (Single-Mode)
Interface	FX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1480 to 1580 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	90 km (55.9 mi)

^a When Smart SFP mode is enabled, the RUGGEDCOM SFP1131-1FX90 can be used with Gigabit modules in RUGGEDCOM RX1500-series and RX5000 devices. For more information, refer to the "RUGGEDCOM ROX II Configuration Manual".

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	496 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Restrictions

RUGGEDCOM ROX v2.10.0 or higher is required when this SFP transceiver is installed in one of the following modules:

- RUGGEDCOM RX1500PN LM FG50
- RUGGEDCOM RX5000PN LM 4FG50

Regulator Compliance

The RUGGEDCOM SFP1131-1FX90 complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE54-0AA0	RUGGEDCOM SFP1131-1FX90	100Base-FX SFP – SM, 1550 nm, LC, 90 km

Active 100 Mbps SFP Transceivers

The following active 100 Mbps Ethernet SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 2\)"](#).

4.1 RUGGEDCOM SFP1121-1FX2A

Siemens' RUGGEDCOM SFP1121-1FX2A industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 2 km (1.2 mi) using multi-mode fiber.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA and IEEE 802.3 for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 2 km (1.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 µm and 62.5/125 µm multi-mode fiber
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power (50/125 µm)	-23.5 to -14 dBm
Transmit Power (62.5/125 µm)	-20 to -14 dBm
Receiver Sensitivity	-31.0 to -8 dBm
Power Budget	11.5 dB

Cabling

Speed	100 Mbps
Mode	MM (Multi-Mode)
Interface	FZ
Connector	LC
Cable Type	50/125 or 62.5/125 µm
Wavelength (Tx)	1260 to 1360 nm

Wavelength (Rx)	1260 to 1570 nm
Nominal Distance	2 km (1.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	236 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1121-1FX2A meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE50-0AA0	RUGGEDCOM SFP1121-1FX2A	100Base-FX SFP – MM, 1310 nm, LC, 2 km

4.2 RUGGEDCOM SFP1131-1FX10A

Siemens' RUGGEDCOMSFP1131-1FX10A industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Fast Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-15 to -8 dBm
Receiver Sensitivity	-31.5 to -8 dBm
Power Budget	16.5

Cabling

Speed	100 Mbps
Interface	FX
Mode	SM (Single-Mode)
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1570 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
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Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	544 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1131-1FX10A complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE60-0AA0	RUGGEDCOM SFP1131-1FX10A	100Base-LX SFP – SM, 1310 nm, LC, 10 km

4.3 RUGGEDCOM SFP1131S-1FX40A

Siemens' RUGGEDCOMSFP1131S-1FX40A industrial grade 100 Mbps fiber optic fast Ethernet SFP transceiver operates within a wide temperature range (-5 to 70 °C or 23 to 158 °F) and provides high performance Fast Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Note

Some RUGGEDCOM routers/switches may only support specific SFP transceivers in select sockets. For information about which socket(s) an SFP transceiver is compatible with, refer to the "Installation Guide" for the compatible RUGGEDCOM router/switch.

Note

This SFP transceiver is not recommended for use with IEEE 1588.

Highlights

- Compliant with SFP MSA for 100Base-FX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5 to 0 dBm
Receiver Sensitivity	-23 to 0 dBm
Power Budget	18

Cabling

Speed	100 Mbps
Interface	FX
Mode	SM (Single-Mode)
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1580 nm
Nominal Distance	40 km (24.9 mi)

Environment

Operating Temperature	-5 to 70 °C (23 to 158 °F)
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Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-5 to 70 °C (23 to 158 °F)
Mean Time Between Failures (MTBF)	181 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1131S-1FX40A complies with the following regulatory requirements when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE62-0AA0	RUGGEDCOM SFP1131S-1FX40A	100Base-LX SFP – SM, 1310 nm, LC, 40 km

Gigabit Ethernet SFP Transceivers

The following Gigabit Ethernet SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 2\)"](#).

5.1 RUGGEDCOM SFP1122-1SX

Siemens' RUGGEDCOM SFP1122-1SX industrial grade 1 Gbps fiber optic SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to either 0.5 km (0.3 mi) or 0.3 km (0.2 mi) using multi-mode fiber, depending on the cable type in use.

Highlights

- Compliant with SFP MSA and IEEE 802.3 for 1000Base-SX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 0.5 km (0.3 mi) or 0.3 km (0.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 µm and 62.5/125 µm multi-mode fiber
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9 to -2.5 dBm
Receiver Sensitivity	-18 to 0 dBm
Power Budget	9 dB

Cabling

Speed	1 Gbps
Mode	MM (Multi-Mode)
Interface	SX
Connector	LC
Cable Type	50/125 or 62.5/125 µm
Wavelength (Tx)	830 to 860 nm
Wavelength (Rx)	770 to 860 nm
Nominal Distance (50/125 µm)	0.5 km (0.3 mi)
Nominal Distance (62.5/125 µm)	0.3 km (0.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 100 °C (-40 to 212 °F)

Mean Time Between Failures (MTBF)	697 years ^a
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^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1122-1SX meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG51-0AA0	RUGGEDCOM SFP1122-1SX	1000Base-SX SFP – MM, 850 nm, LC, 0.5 km

5.2 RUGGEDCOM SFP1122-1SX2

Siemens' RUGGEDCOM SFP1122-1SX2 industrial grade 1 Gbps fiber optic SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 2 km (1.2 mi) using multi-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3z for 1000Base-SX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 2 km (1.2 mi)
- LC duplex connector optical interface
- Operates with 50/125 µm and 62.5/125 µm multi-mode fiber
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9 to 1 dBm
Receiver Sensitivity	-19 to -1 dBm
Power Budget	10 dB

Cabling

Speed	1 Gbps
Mode	MM (Multi-Mode)
Interface	SX
Connector	LC
Cable Type	50/125 or 62.5/125 µm
Wavelength (Tx)	1280 to 1355 nm
Wavelength (Rx)	1270 to 1620 nm
Nominal Distance	2 km (1.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	182 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1122-1SX2 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE58-0AA0	RUGGEDCOM SFP1122-1SX2	1000Base-SX SFP – MM, 1310 nm, LC, 2 km

5.3 RUGGEDCOM SFP1132-1LX10

Siemens' RUGGEDCOM SFP1132-1LX10 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3 for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9.5 to -3.0 dBm
Receiver Sensitivity	-19.0 to 0.0 dBm
Power Budget	9.5 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1270 to 1355 nm
Wavelength (Rx)	1265 to 1600 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	761 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX10 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883C, Method 3015.4 JEDEC/EIA JESD22-A114-A	Class 2 (> 2000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	Bellcore GR1089-CORE	Compliant
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Eye Safety	US FDA CDRH AEL Class 1 IEC/EN 60825-1 and 60825-2 EN 60950 Class 1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG52-0AA0	RUGGEDCOM SFP1132-1LX10	1000Base-LX SFP – SM, 1310 nm, LC, 10 km

5.4 RUGGEDCOM SFP1132-1LX25

Siemens' RUGGEDCOM SFP1132-1LX25 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 25 km (15.5 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 25 km (15.5 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5.0 to 0.0 dBm
Receiver Sensitivity	-24.0 to -0.0 dBm
Power Budget	19 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1260 to 1610 nm
Nominal Distance	25 km (15.5 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	174 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX25 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG53-0AA0	RUGGEDCOM SFP1132-1LX25	1000Base-LX SFP – SM, 1310 nm, LC, 25 km

5.5 RUGGEDCOM SFP1132-1LX40

Siemens' RUGGEDCOM SFP1132-1LX40 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	0.0 to 5.0 dBm
Receiver Sensitivity	-22.0 to 0.0 dBm
Power Budget	22 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance	40 km (24.9 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	482 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX40 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG57-0AA0	RUGGEDCOM SFP1132-1LX40	1000Base-LX SFP – SM, 1550 nm, LC, 40 km

5.6 RUGGEDCOM SFP1132-1LX70

Siemens' RUGGEDCOM SFP1132-1LX70 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 70 km (43.5 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 70 km (43.5 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-0.0 to 5.0 dBm
Receiver Sensitivity	-22.0 to 0.0 dBm
Power Budget	22 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance	70 km (43.5 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	482 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX70 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG54-0AA0	RUGGEDCOM SFP1132-1LX70	1000Base-LX SFP – SM, 1550 nm, LC, 70 km

5.7 RUGGEDCOM SFP1132-1LX100

Siemens' RUGGEDCOM SFP1132-1LX100 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (0 to 70 °C or 32 to 158 °F) and provides high performance Gigabit Ethernet communication up to 100 km (62.1 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEE 802.3 for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 100 km (62.1 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-0.0 to 5.0 dBm
Receiver Sensitivity	-30.0 to -8.0 dBm
Power Budget ^a	30 dB

^a Assumes the same SFP transceiver is used on both ends of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance:	100 km (62.1 mi)

Environment

Operating Temperature	0 to 70 °C (32 to 158 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	392 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX100 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	IEC/EN 60825-1	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FG55-0AA0	RUGGEDCOM SFP1132-1LX100	1000Base-LX SFP – SM, 1550 nm, LC, 100 km

5.8 RUGGEDCOM SFP1132-1LX115

Siemens' RUGGEDCOM SFP1132-1LX115 industrial grade 1 Gbps fiber optic long haul SFP transceiver operates within a wide temperature range (-10 to 70 °C or 14 to 158 °F) and provides high performance Gigabit Ethernet communication up to 115 km (71.5 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000Base-LX
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 115 km (71.5 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	0 to 5 dBm
Receiver Sensitivity	-30 to -9 dBm
Power Budget	30 dB

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	LX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1540 to 1570 nm
Wavelength (Rx)	1270 to 1600 nm
Nominal Distance	115 km (71.5 mi)

Environment

Operating Temperature	-10 to 70 °C (14 to 158 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	392 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1LX115 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Laser Eye Safety	IEC/EN 60825	Class 1
Electrical Safety	IEC/EN 60950	Compliant
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FE56-0AA0	RUGGEDCOM SFP1132-1LX115	1000Base-LX SFP – SM, 1550 nm, LC, 115 km

Bidirectional Gigabit Ethernet SFP Transceivers

The following Bidirectional (BiDi) SFP transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 2\)"](#).

6.1 RUGGEDCOM SFP1132-1BX10R

Siemens' RUGGEDCOM SFP1132-1BX10R industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000BASE-BX10-U
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9.0 to -3.0 dBm
Receiver Sensitivity	-19.5 to -3.0 dBm
Power Budget ^a	10.5 db

^a Assumes an SFP1132-1BX10T is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single Mode)
Interface	BX
Connector	LC
Cable Type (µm)	9/125
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1480 to 1500 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	384 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX10R meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2011/65/EU	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB51-0AA0	RUGGEDCOM SFP1132-1BX10R	1000Base-BX SFP – SM, 1310/1490 nm, LC, 10 km

6.2 RUGGEDCOM SFP1132-1BX10T

Siemens' RUGGEDCOM SFP1132-1BX10T industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA for 1000BASE-BX10-D
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 10 km (6.2 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-9.0 to -3.0 dBm
Receiver Sensitivity	-19.5 to -3.0 dBm
Power Budget ^a	10.5 dB

^a Assumes an SFP1132-1BX10R is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	BX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1480 to 1500 nm
Wavelength (Rx)	1260 to 1360 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	310 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX10T meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB52-0AA0	RUGGEDCOM SFP1132-1BX10T	1000Base-BX SFP – SM, 1490/1310 nm, LC, 10 km

6.3 RUGGEDCOM SFP1132-1BX40R

Siemens' RUGGEDCOM SFP1132-1BX40R industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3ah for 1000Base-BX40-U
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-2.0 to 3.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget ^a	21 dB

^a Assumes an SFP1132-1BX40T is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	BX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1260 to 1360 nm
Wavelength (Rx)	1480 to 1500 nm
Nominal Distance	40 km (24.9 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	336 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX40R meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB53-0AA0	RUGGEDCOM SFP1132-1BX40R	1000Base-BX SFP – SM, 1310/1490 nm, LC, 40 km

6.4 RUGGEDCOM SFP1132-1BX40T

Siemens' RUGGEDCOM SFP1132-1BX40T industrial grade 1 Gbps fiber optic bi-directional SFP transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP MSA and IEEE 802.3ah for 1000Base-BX-D
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Transmission distance up to 40 km (24.9 mi)
- LC duplex fiber connector
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-2.0 to 3.0 dBm
Receiver Sensitivity	-23.0 to -3.0 dBm
Power Budget ^a	21 dB

^a Assumes an SFP1132-1BX40R is used at the other end of the connection.

Cabling

Speed	1 Gbps
Mode	SM (Single-Mode)
Interface	BX
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1480 to 1500 nm
Wavelength (Rx)	1260 to 1360 nm
Nominal Distance	40 km (24.9 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	5 to 95% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	336 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP1132-1BX40T meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E, Method 3015.7	Class 1
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2	Compliant
Electromagnetic Interference (EMI)	FCC Part 15, Class B	Compliant
Immunity	Variation of IEC 61000-4-3	Compliant
Laser Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1 and 60825-2 EN 60950	Compliant with Class 1 laser product
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FB54-0AA0	RUGGEDCOM SFP1132-1BX40T	1000Base-BX SFP – SM, 1490/1310 nm, LC, 40 km

10-Gigabit Ethernet SFP+ Transceivers

The following 10-Gigabit Ethernet SFP+ transceivers are available from Siemens for select RUGGEDCOM routers and switches. To determine compatibility, refer to ["Available SFP Transceivers \(Page 2\)"](#).

7.1 RUGGEDCOM SFP2123-1SR

Siemens' RUGGEDCOM SFP2123-1SR industrial grade 10 Gbps fiber optic long reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 400 m (1312 ft) using multi-mode fiber.

Highlights

- Compliant with SFP+ MSA and IEEE 802.3ae for 10GBase-SR
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Transmission distance up to 400 m (1312 ft)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-5.0 to -1.0 dBm
Tx Typical OMA	-1.5
Minimum Extinction Ratio	3.0
Rx Sensitivity OMA (dBm)	-11.1
Stressed RX Sensitivity (dBm)	-7.5
Rx Saturation (dBm)	0.5

Cabling

Speed	10 Gbps
Mode	MM (Multi-Mode)
Interface	SR
Connector	LC
Cable Type	50/125 or 62.5/125 µm
Wavelength (Tx)	840 to 860 nm
Wavelength (Rx)	840 to 860 nm
Nominal Distance	400 m (1312 ft)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)

Mean Time Between Failures (MTBF)	611 years ^a
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^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP2123-1SR meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1	Class 1
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT50-0AA0	RUGGEDCOM SFP2123-1SR	10GBase-SR SFP – SM, 850 nm, LC, 400 m

7.2 RUGGEDCOM SFP2133-1LR10

Siemens' RUGGEDCOM SFP2133-1LR10 industrial grade 10 Gbps fiber optic long reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 10 km (6.2 mi) using single-mode fiber.

Highlights

- Compliant with SFP+ MSA and IEEE 802.3ae for 10GBase-LR/LW
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Transmission distance up to 10 km (6.2 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-8.2 to 0.5 dBm
Tx Minimum OMA	-5.2
Minimum Extinction Ratio	3.5
Rx Sensitivity OMA (dBm)	-12.6
Stressed RX Sensitivity (dBm)	-10.3
Rx Saturation (dBm)	0.5
Power Budget (dB)	4.4
Channel Insertion Loss (dB)	5.1
Allocation for Penalties (dB)	2.3

Cabling

Speed	10 Gbps
Mode	SM (Single-Mode)
Interface	LR
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1260 to 1355 nm
Wavelength (Rx)	1260 to 1600 nm
Nominal Distance	10 km (6.2 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
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Operating Relative Humidity	0 to 85% (non-condensing)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	247 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Product-Specific Deviations

The RUGGEDCOM SFP2133-1LR10 supports the following ratings when installed in the specified Siemens RUGGEDCOM routers and/or switches:

Product(s)	Specification	Rating
RUGGEDCOM RX5000	Operating Temperature	-40 to 80 °C (-40 to 176 °F)
RUGGEDCOM MX5000	Operating Temperature	-40 to 80 °C (-40 to 176 °F)

Regulator Compliance

The RUGGEDCOM SFP2133-1LR10 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Class B	Compliant
Eye Safety	US FDA 21CFR 1040.10 and 1040.11 IEC/EN 60825-1	Class 1
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT51-0AA0	RUGGEDCOM SFP2133-1LR10	10GBase-LR SFP – SM, 1310 nm, LC, 10 km

7.3 RUGGEDCOM SFP2133-1ER40

Siemens' RUGGEDCOM SFP2133-1ER40 industrial grade 10 Gbps fiber optic extended reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 40 km (24.9 mi) using single-mode fiber.

Highlights

- Compliant with SFP+ MSA and IEEE 802.3ae for 10GBase-ER/EW
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface (Rev 10.4)
- Transmission distance up to 40 km (24.9 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-4.4 to 4.0 dBm
Tx Minimum OMA	-1.7
Minimum Extinction Ratio	8.2
Rx Sensitivity OMA (dBm)	-14.1
Stressed RX Sensitivity (dBm)	-11.3
Rx Saturation (dBm)	-1.0
Power Budget (dB)	9.4
Channel Insertion Loss (dB)	10.9
Allocation for Penalties (dB)	4.1

Cabling

Speed	10 Gbps
Mode	SM (Single-Mode)
Interface	ER
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1530 to 1565 nm
Wavelength (Tx)	1530 to 1565 nm
Nominal Distance	40 km (24.9 mi)

Environment

Operating Temperature	-40 to 85 °C (-40 to 185 °F)
Storage Temperature	-40 to 85 °C (-40 to 185 °F)
Mean Time Between Failures (MTBF)	630 years ^a

^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP2133-1ER40 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT53-0AA0	RUGGEDCOM SFP2133-1ER40	10GBase-ER SFP – SM, 1550 nm, LC, 40 km

7.4 RUGGEDCOM SFP2133-1ZR80

Siemens' RUGGEDCOM SFP2133-1ZR80 industrial grade 10 Gbps fiber optic extended reach SFP+ transceiver operates within a wide temperature range (-40 to 85 °C or -40 to 185 °F) and provides high performance Gigabit Ethernet communication up to 80 km (49.7 mi) using single-mode fiber.

Highlights

- Compliant with SFP+ MSA and OC-192/STM-64 for 10GBase-ZR/ZW
- Compliant with SFF-8431 (Rev 2)
- Compliant with SFF-8432 (Rev 4.3)
- Compliant with SFF-8472 Digital Diagnostic Monitoring Interface (Rev 10.4)
- Transmission distance up to 80 km (49.7 mi)
- LC duplex connector optical interface
- Bail latch
- Hot swappable
- RoHS compliant

Specifications

Optical Characteristics

Transmit Power	-1.0 to 4.0 dBm
Minimum Extinction Ratio	9.0
Rx Sensitivity OMA (dBm)	-23.0
Rx Saturation (dBm)	-7.0
Power Budget (dB)	22.0

Cabling

Speed	10 Gbps
Mode	SM (Single-Mode)
Interface	ZR
Connector	LC
Cable Type	9/125 µm
Wavelength (Tx)	1520 to 1565 nm
Wavelength (Rx)	1530 to 1565 nm
Nominal Distance	80 km (49.7 mi)

Environment

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

Mean Time Between Failures (MTBF)	950 years ^a
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^a Tested at an operating temperature of 40 °C (104 °F)

Regulator Compliance

The RUGGEDCOM SFP2133-1ZR80 meets the following standards when installed in Siemens RUGGEDCOM routers and/or switches:

Feature	Standard	Performance
RoHS	EU RoHS Directive 2002/95/EC	Compliant
Eurasian Conformity (EAC)	CU TR 004/2011, CU TR 020/2011	Compliant

Ordering Information

Article Number	Name	Description
6GK6000-8FT52-0AA0	RUGGEDCOM SFP2133-1ZR80	10GBase-ZR SFP – SM, 1550 nm, LC, 80 km

По вопросам продаж и поддержки обращайтесь:

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