E.C.I.NETWORKS

TECHNICAL DATASHEET

EN-SFP1G-ZX

1.25 Gb/s 1550 nm 80 km single-mode SFP transceiver · Version FY26.10.27T

1.25 Gb/s SFP | 1550 nm / 80 km | Digital diagnostics

NOTICE

Technical Specifications and Scope

This document reorganizes the technical specifications and engineering information provided for EN-SFP1G-ZX and EN-SFP1G-ZXi optical transceivers, version FY26.10.27T. Part numbers, numeric specifications, ordering variants, engineering notes and source diagrams are retained.

Specifications and regulatory references are presented as stated in the supplied datasheet. Confirm applicable performance, host compatibility and current compliance documentation with E.C.I. NETWORKS INC. for the intended deployment.

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PRODUCT FEATURES

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1.25Gb/s 1550nm 80km Single-mode SFP Transceiver

Up to 1.25Gb/s data links with DDM

DFB laser transmitter and PIN photo-detector

Up to 80km on 9/125μm SMF

Duplex LC/UPC type pluggable optical interface

Low power dissipation

Metal enclosure, for lower EMI

RoHS compliant and lead-free

Support Digital Diagnostic Monitoring interface

Single +3.3V power supply

Compliant with SFF-8472

Case operating temperature

Commercial: 0°C to +70°C

Industrial: -40°C to +85°C

APPLICATIONS

APPLICATIONS

Switch to Switch Interface

Gigabit Ethernet

Switched Backplane Applications

Router/Server Interface

Other Optical Links

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PRODUCT DESCRIPTION

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E.C.I. NETWORKS's EN-SFP1G-ZX Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of five sections: the LD driver, the limiting amplifier, the digital diagnostic monitor, the DFB laser and the PIN photo-detector .The module data link up to 80KM in 9/125um single mode fiber.

The optical output can be disabled by a TTL logic high-level input of Tx Disable, and the system also can disable the module via I2C. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner. The system can also get the LOS (or Link)/Disable/Fault information via I2C register access.

ORDERING INFORMATION

Ordering information

Part number	Data rate / media	Wavelength / reach	Operating temperature
EN-SFP1G-ZX	1.25 Gb/s; Single mode fiber	1550 nm; 80 km	0~70 °C; commercial
EN-SFP1G-ZXi	1.25 Gb/s; Single mode fiber	1550 nm; 80 km	-40~85 °C; industrial

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PIN DESCRIPTIONS

Pin Descriptions

Pin	Symbol	Name/Description	Ref.
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD_DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD_DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	VEER	Receiver Ground (Common with Transmitter Ground)	1
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1

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Pin	Symbol	Name/Description	Ref.
15	VCCR	Receiver Power Supply	
16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

PINOUT NOTES

Notes:

Circuit ground is internally isolated from chassis ground.

Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF (0) pulls line low to indicate module is plugged in.

This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates).If implemented, the input will be internally pulled down with > 30kΩ resistor. The input states are:

Low (0 – 0.8V): Reduced Bandwidth

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Full Bandwidth

Open: Reduced Bandwidth

LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

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PINOUT REFERENCE

20-Pin SFP Electrical Pinout

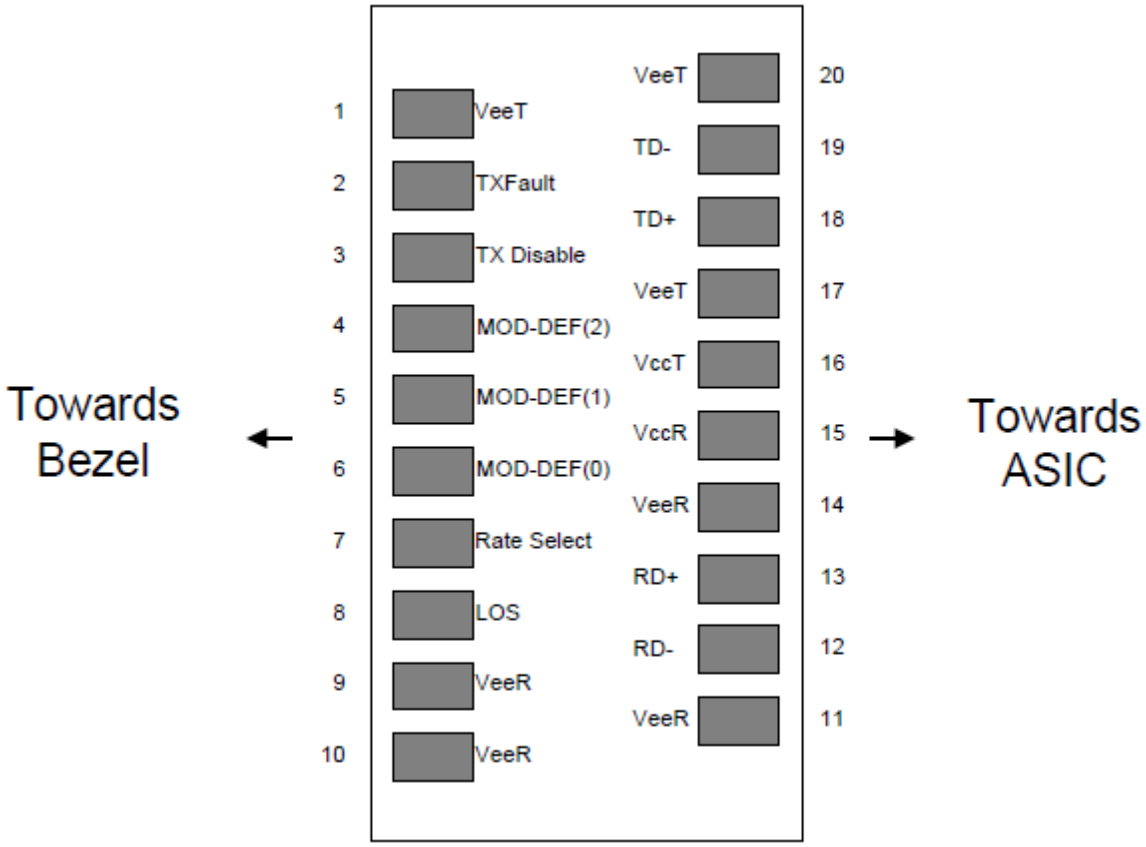


Figure 1. EN-SFP1G-ZX pin assignment diagram.

ABSOLUTE MAXIMUM RATINGS

Absolute Maximum Ratings

Parameter	Symbol	Min / Typ / Max	Unit / Note
Storage Temperature	Ts	Min: -40; Max: 85	ºC
Storage Ambient Humidity	HA	Min: 5; Max: 95	%
Power Supply Voltage	VCC	Min: -0.5; Max: 4	V
Signal Input Voltage		Min: -0.3; Max: Vcc+0.3	V

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Parameter	Symbol	Min / Typ / Max	Unit / Note
Receiver Damage Threshold		Min: 5	dBm

RECOMMENDED CONDITIONS

Recommended Operating Conditions

Parameter	Symbol	Min / Typ / Max	Unit / Note
Case Operating Temperature	Tcase	Min: 0; Max: 70	ºC; TS-SF-1512-80DC
Case Operating Temperature	Tcase	Min: -10; Max: 80	ºC; TS-SF-1512-80DE
Case Operating Temperature	Tcase	Min: -40; Max: 85	ºC; TS-SF-1512-80DI
Ambient Humidity	HA	Min: 5; Max: 70	%; Non-condensing
Power Supply Voltage	VCC	Min: 3.13; Typ: 3.3; Max: 3.47	V
Power Supply Current	ICC	Max: 300	mA
Power Supply Noise Rejection		Max: 100	mVp-p; 100Hz to 1MHz
Data Rate		Typ: 1.25/1.25	Gbps; TX Rate/RX Rate
Transmission Distance		Max: 80	KM
Coupled Fiber		Single mode fiber	9/125um SMF

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TRANSMITTER SPECIFICATIONS

Specification of Transmitter

Parameter	Symbol	Min / Typ / Max	Unit / Note
Average Output Power	POUT	Min: 0; Max: 5	dBm
Extinction Ratio	ER	Min: 9	dB
Center Wavelength	λC	Min: 1530; Typ: 1550; Max: 1570	nm; DFB Laser
Side Mode Suppression Ratio	SMSR	Min: 30	dB; DFB Laser
Spectrum Bandwidth(-20dB)	σ	Max: 1	nm
Transmitter OFF Output Power	POff	Max: -45	dBm
Differential Line Input Impedance	RIN	Min: 90; Typ: 100; Max: 110	Ohm
Jitter P-P	tJ	Max: 128	ps; Note (1)
Output Eye Mask		Compliant with IEEE802.3 z (class 1 laser safety)	Note (2)

TRANSMITTER NOTES

Transmitter Notes

Note (1): Measure at 2^7-1 NRZ PRBS pattern.

Note (2): Transmitter eye mask definition.

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OPTICAL EYE MASK

Transmitter Optical Eye Mask

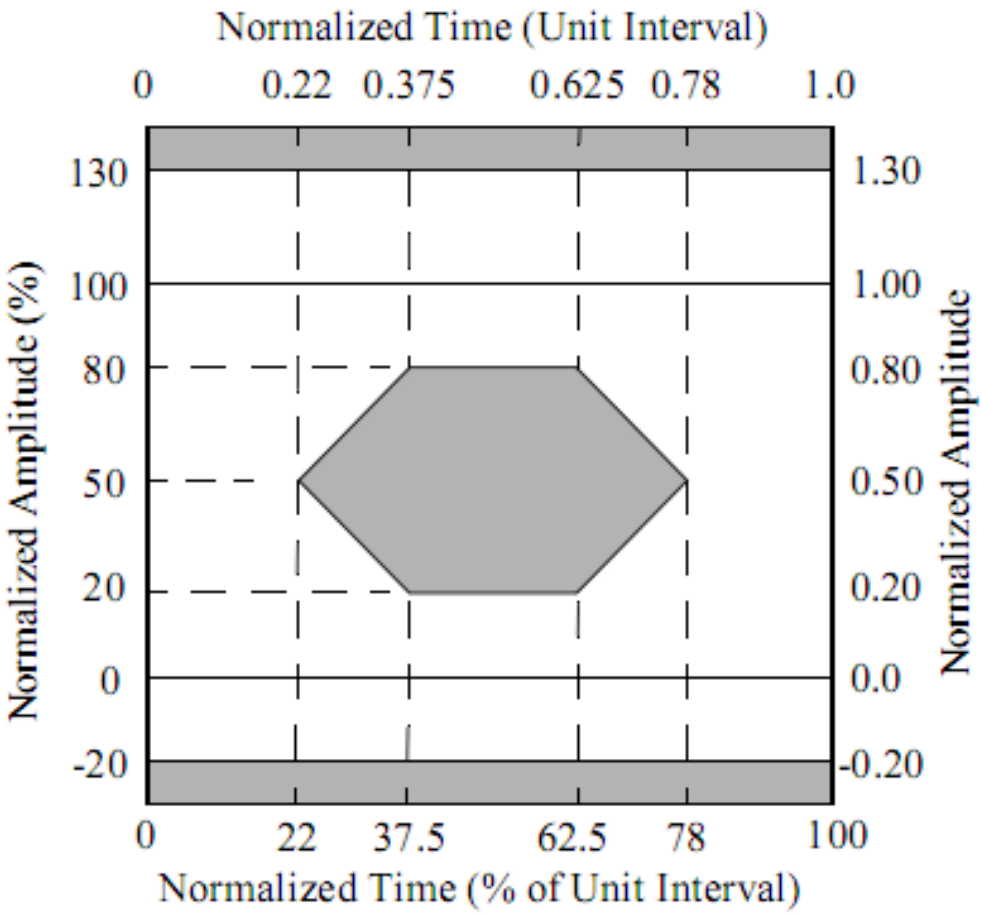


Figure 2. Transmitter eye mask definition.

RECEIVER SPECIFICATIONS

Specification of Receiver

Parameter	Symbol	Min / Typ / Max	Unit / Note
Input Optical Wavelength	λIN	Min: 1270; Max: 1610	nm; PIN-TIA
Receiver Sensitivity	PIN	Max: -26	dBm; Note (1)

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Parameter	Symbol	Min / Typ / Max	Unit / Note
Input Saturation Power (Overload)	PSAT	Min: -3	dBm
Los Of Signal Assert	PA	Max: -27	dBm
Los Of Signal De-assert	PD	Min: -38	dBm; Note (2)
LOS Hysteresis	PA-PD	Min: 0.5; Typ: 2; Max: 6	dB

RECEIVER NOTES

Receiver Notes

Note (1): Measured with Light source 1550nm, ER=9dB; BER =<10^-12 @PRBS=2^7-1 NRZ

Note (2): When LOS de-asserted, the RX data+/- output is High-level (fixed)

ELECTRICAL INTERFACE

Electrical Interface Characteristics

Parameter	Symbol	Min / Typ / Max	Unit / Note
Transmitter			
Total Supply Current	ICC	Max: A	mA; Note (1)
Transmitter Disable Input-High	VDISH	Min: 2; Max: Vcc+0.3	V
Transmitter Disable Input-Low	VDISL	Min: 0; Max: 0.8	V
Transmitter Fault Input-High	VDISL	Min: 2; Max: Vcc+0.3	V
Transmitter Fault Input-Low	VTxFH	Min: 0; Max: 0.8	V
Receiver			
Total Supply Current	ICC	Max: B	mA; Note (1)

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Parameter	Symbol	Min / Typ / Max	Unit / Note
LOSS Output Voltage-High	VLOSH	Min: 2; Max: Vcc+0.3	V; LVTTL
LOSS Output Voltage-Low	VLOSL	Min: 0; Max: 0.8	V; LVTTL

ELECTRICAL NOTES

Electrical Interface Notes

Note (1): A (TX) + B (RX) = 300mA (Not include termination circuit)

DIGITAL DIAGNOSTICS

Digital Diagnostic Functions

E.C.I. NETWORKS EN-SFP1G-ZX transceivers support the 2-wire serial communication protocol as defined in the SFP MSA. It is very closely related to the E2PROM defined in the GBIC standard, with the same electrical specifications. The standard SFP serial ID provides access to identification information that describes the transceiver's capabilities, standard interfaces, manufacturer, and other information.

Additionally, E.C.I. NETWORKS SFP transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage .It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP MSA defines a 256-byte memory map in E2PROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged. The interface is identical to, and is thus fully backward compatible with both the GBIC Specification and the SFP Multi Source Agreement.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through a 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL, Mod Def 1) is generated by the host. The positive edge clocks data into the SFP transceiver into those segments of the E2PROM that are not write-protected. The negative edge clocks data from the SFP transceiver. The serial data signal (SDA, Mod Def 2) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially. Digital diagnostics for the EN-SFP1G-ZX are internally calibrated by default.

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REFERENCE SCHEMATIC

Recommend Circuit Schematic

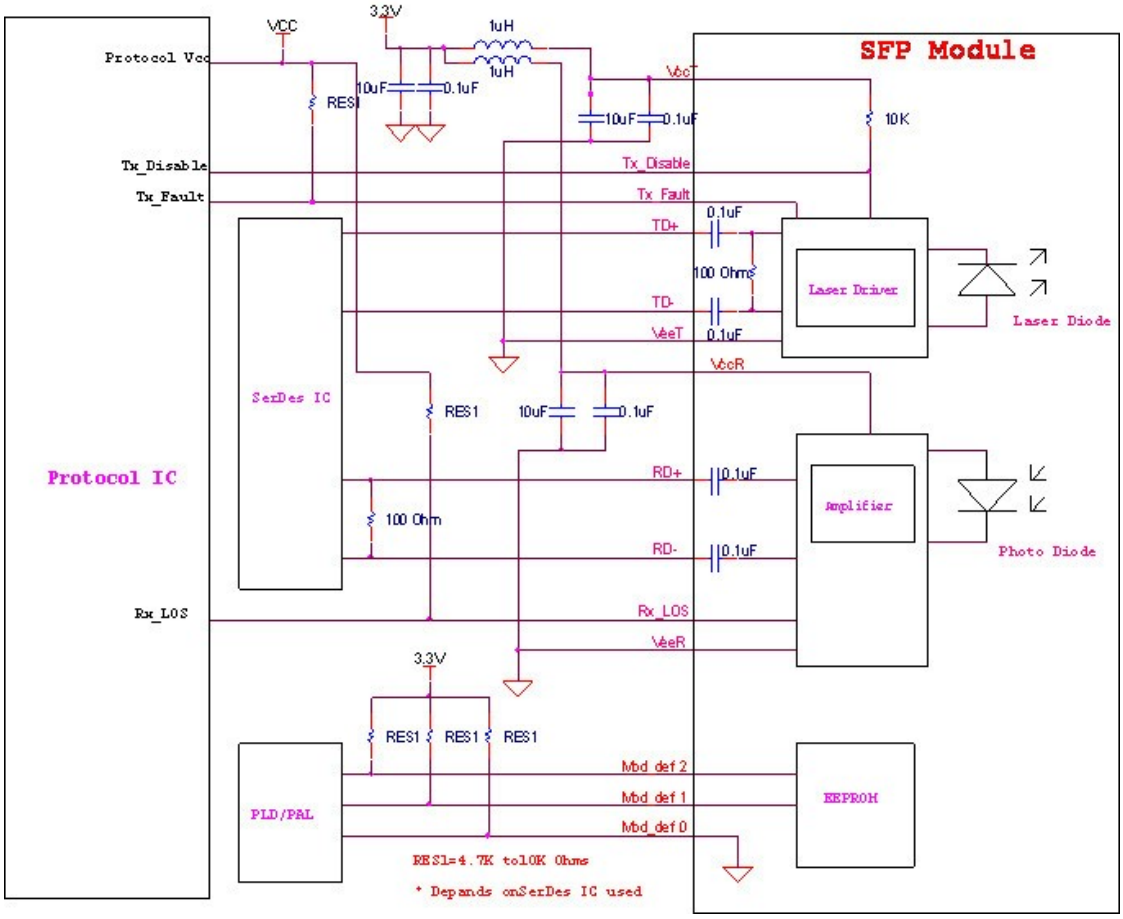


Figure 3. Recommended SFP module circuit schematic.

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MECHANICAL DRAWING

Mechanical Specifications (Unit: mm)

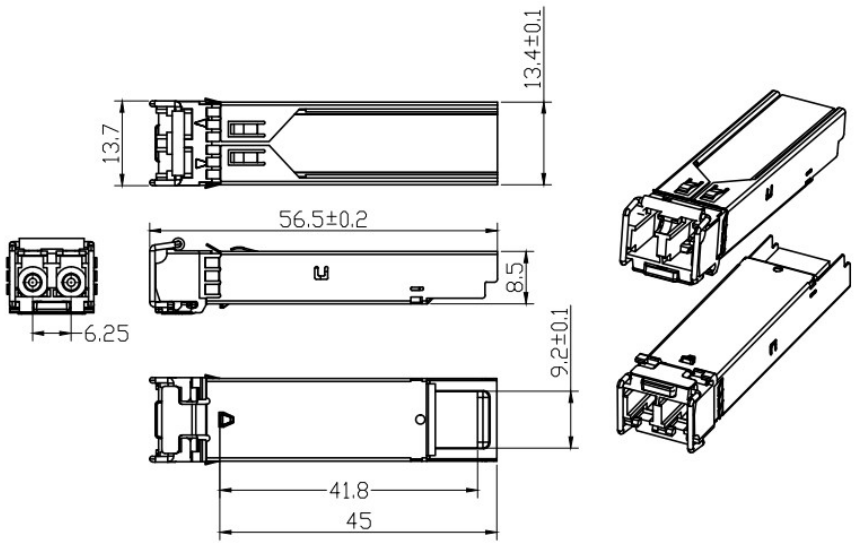


Figure 4. EN-SFP1G-ZX mechanical specifications (unit: mm).

REGULATORY COMPLIANCE

Regulatory Compliance

Product: EN-SFP1G-ZX

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1，2	Class 1 laser product
Component Recognition	IEC/EN 60950 ，UL	Compatible with standards
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

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CONTACT US

LET'S CONNECT

Contact Us

For EN-SFP1G-ZX technical specifications, compatibility and ordering, contact E.C.I. Networks.

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