



3CW-SFP+45/54-ZR

10G SFP+ BI-DI TRANSCEIVER 70KM

20180628-2369

3CW-SFP+-45/54-ZR

10Gbps SFP+ Bi-Directional Transceiver, 80km Reach

1490/1550nm TX / 1550/1490 nm RX

Features

- ◆ Supports 9.95Gb/s to 10.3Gb/s data rates
- ◆ Simplex LC Connector Bi-Directional SFP+ Optical Transceiver
- ◆ Single 3.3V Supply
- ◆ Up to 80km on 9/125um SMF
- ◆ A:1490nm EML Laser transmitter,1550nm APD receiver
B:1550nm EML Laser transmitter,1490nm APD receiver
- ◆ SFP+ MSA SFF-8431 Compliant
- ◆ Digital Diagnostic SFF-8472 Compliant
- ◆ RoHS compliant and Lead Free
- ◆ Operating case temperature:
Standard: 0 ~ 70 °C



Applications

- ◆ 10GBASE-ER at 10.3125Gbps
- ◆ 10GBASE-EW at 9.953Gbps
- ◆ Other Optical Links

Product description

The 3CW-SFP+-45/54-ZR series single mode transceiver is small form factor pluggable module for duplex optical data communications such as 10GBASE-ER/EW defined by IEEE 802.3ae. It is with the SFP+ 20-pin connector to allow hot plug capability.

The 3CW-SFP+-45/54-ZR module is designed for single mode fiber and operates at a nominal wavelength of 1490nm or 1550nm;.The transmitter section uses a multiple quantum well EML, which is class 1 laser compliant according to International Safety Standard IEC-60825.The receiver section consists of a APD photodiode integrated with a TIA.

Absolute Maximum Ratings

These values represent the damage threshold of the module. Stress in excess of any of the individual Absolute Maximum Ratings can cause immediate catastrophic damage to the module even if all other parameters are within Recommended Operating Conditions.

Parameters	Symbol	Min.	Max.	Unit
Supply Voltage	V _{cc}	-0.5	+3.6	V
Storage Temperature	T _c	-40	+85	°C
Operating Case Temperature	T _c	0	+70	°C
Relative Humidity	RH	0	85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max	Unit
Supply Voltage	V _{cc}	3.0	3.3	3.6	V
Supply Current	I _{cc}		200	300	mA
Operating Case Temperature	T _c	0	25	70	°C
Module Power Dissipation	P _m	-	0.7	1.1	W

Notes:

[1] Supply current is shared between VCCTX and VCCR_X.

[2] In-rush is defined as current level above steady state current requirements.

Specification:

★ Absolute Maximum Ratings

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T _s	-40		+85	°C
Supply Voltage	V _{ccT, R}	-0.3		4	V
Relative Humidity	RH	5		95	%

★ Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	T _c	0		+70	°C
Supply Voltage	V _{ccT, R}	+3.135		+3.465	V
Supply Current	I _{cc}			500	mA

Power Dissipation	P_D			1.5	W
-------------------	-------	--	--	-----	---

Electrical Characteristics (TOP = -40 to 85 °C, VCC = 3.135 to 3.465 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Not
Transmitter:						e
Differential Data Input Voltage	VDT	180	-	1200	mVp	
Differential line input Impedance	RIN	80	100	120	ρ V	
Transmitter Fault Output-High	VFaultH	2.4		Vcc+0.3	V	
Transmitter Fault Output-Low	VFaultL	80	100	120	Ω	
Transmitter Disable Voltage- High	VDisH	2		Vcc+0.3		
Transmitter Disable Voltage- low	VDisL	-0.3		0.8		
Receiver						
Differential output voltage swing	VDR	300		850	mVp	
Differential Data Output Voltage	ROUT	800	100	120	ρ V	
Receiver LOS Pull up Resistor	RLOS	4.7		10		
Data Output Rise/Fall time	tr/tf	24				
LOS Assert Level	VLOS	Vcc-1.3		VccHOST		
LOS De-assert Level	faultVLOS	Vee		Vee+0.8	Ω	

norm

Optical Characteristics (TOP = -40 to 85°C, VCC = 3.135 to 3.465 Volts) 3CW-XFP-54-ZR

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						r
Date Rate		9.9	10.3125	11.3	Gb/s	
Optical Wavelength	λ	1540	1550	1560	nm	
Average output power	Po	+2		+6	dBm	
Optical Extinction Ratio	ER	7.5			dB	
RMS spectral width	$\Delta\lambda$			0.3	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Eye Mask		Compliant with IEEE802.3ae				
Receiver						
Date Rate		9.9		11.3	Gb/s	
Optical Wavelength	λ	1480	1490	1500	nm	
Receiver Sensitivity@10G	R			-23	dBm	1
Maximum Input Power	PMAX	-6			dBm	
LOS De-Assert	LOSD			-24	dBm	



LOS Assert	LOSA	-38				dBm
LOS Hysteresis		0.5		8		dB

Notes: Note 1) 1. Measured with a PRBS of $2^{31}-1$ at 1×10^{-12} BER and 3.5 dB extinction ratio.

Optical Characteristics (TOP = -40 to 85°C, VCC = 3.135 to 3.465 Volts) 3CW-XFP-45-ZR

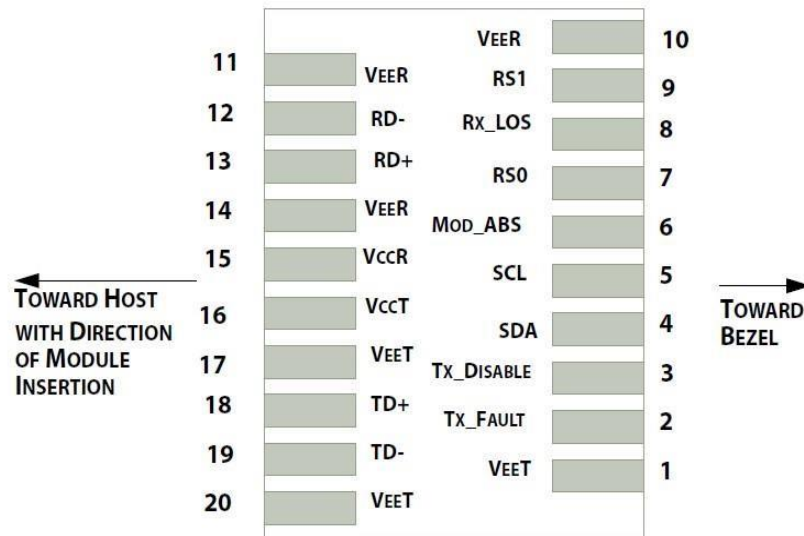
Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Date Rate		9.9	10.3125	11.3	Gb/s	
Optical Wavelength	λ	1480	1490	1500	nm	
Average output power	Po	+2		+6	dBm	
Optical Extinction Ratio	ER	7.5			dB	
RMS spectral width	$\Delta\lambda$			0.3	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Eye Mask		Compliant with IEEE802.3ae				
Receiver						
Date Rate		9.9		11.3	Gb/s	
Optical Wavelength	λ	1540	1550	1560	nm	
Receiver Sensitivity@10G	R			-23	dBm	1
Maximum Input Power	P _{MAX}	-6			dBm	
LOS De-Assert	LOSD			-24	dBm	
LOS Assert	LOSA	-38			dBm	
LOS Hysteresis		0.5		8	dB	

Notes: Note 1) 1. Measured with a PRBS of $2^{31}-1$ at 1×10^{-12} BER and 3.5 dB extinction ratio.

★ **Pin Assignment:**

Diagram of Host Board Connector Block Pin Numbers and Name





★ Pin Function Definitions

PIN #	Name	Function	Notes
1	VeeT	Module transmitter ground	1
2	Tx Fault	Module transmitter fault	2
3	Tx Disable	Transmitter Disable; Turns off transmitter laser output	3
4	SDL	2 wire serial interface data input/output (SDA)	
5	SCL	2 wire serial interface clock input (SCL)	
6	MOD-ABS	Module Absent, connect to VeeR or VeeT in the module	2
7	RS0	Rate select 0, optionally control SFP+ receiver. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
8	LOS	Receiver Loss of Signal Indication	4
9	RS1	Rate select0, optionally control SFP+ transmitter. When high, input data rate >4.5Gb/s; when low, input data rate <=4.5Gb/s	
10	VeeR	Module receiver ground	1
11	VeeR	Module receiver ground	1
12	RD-	Receiver inverted data out put	
13	RD+	Receiver non-inverted data out put	
14	VeeR	Module receiver ground	1

15	VccR	Module receiver 3.3V supply	
16	VccT	Module transmitter 3.3V supply	
17	VeeT	Module transmitter ground	1
18	TD+	Transmitter inverted data out put	
19	TD-	Transmitter non-inverted data out put	
20	VeeT	Module transmitter ground	1

Note 1) The module ground pins shall be isolated from the module case.

Note 2) This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.

Note 3) This pin shall be pulled up with 4.7K-10Kohms to VccT in the module.

Note 4) This pin is an open collector/drain output pin and shall be pulled up with 4.7K-10Kohms to Host_Vcc on the host board.

★ SFP Module EEPROM Information and Management

The SFP+ modules implement the 2-wire serial communication protocol as defined in the SFP -8472. The serial ID information of the SFP modules and Digital Diagnostic Monitor parameters can be accessed through the I2C interface at address A0h and A2h.

The memory is mapped in Table 1.

Detailed ID information(A0h) is listed in Table 2.

And the DDM specification at address A2h.

For more details of the memory map and byte definitions, please refer to the SFF-8472, “Digital Diagnostic Monitoring Interface for Optical Transceivers”. The DDM parameters have been internally calibrated.

Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)



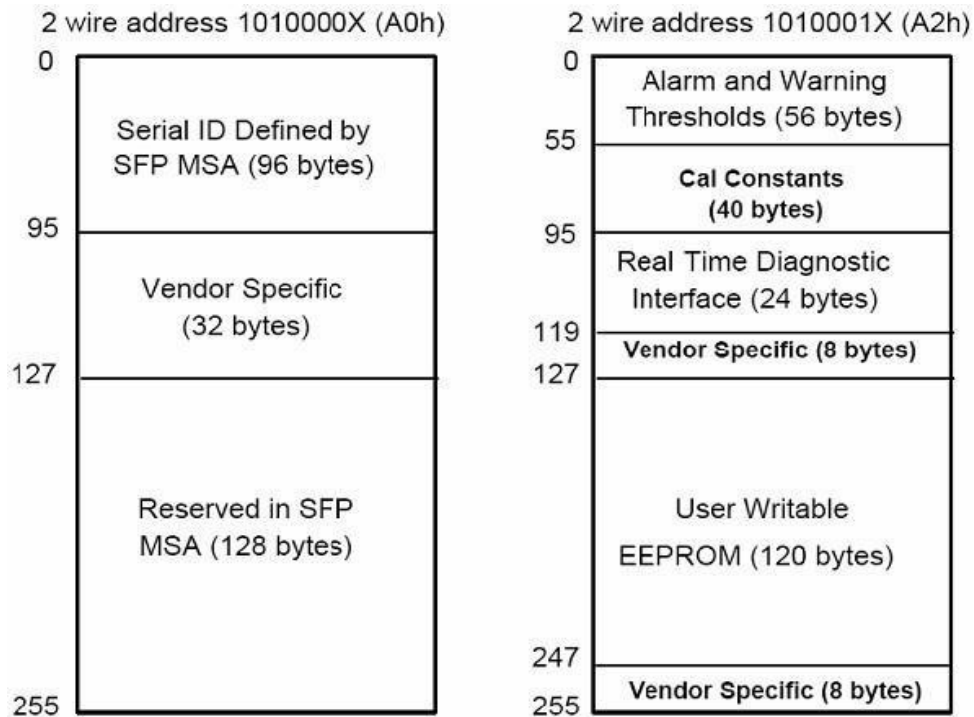


Table 2 - EEPROM Serial ID Memory Contents (A0h)

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	10G Base-LR
11	1	Encoding	64B/66B
12	1	BR, Nominal	Nominal baud rate, unit of 100Mbps
13-14	2	Reserved	(0000h)
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	

20-35	16	Vendor Name	SFP vendor name: 3C-LINK
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "3CW-SFP+54-UR" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented (001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	3C-LINK's Manufacturing date code
92-94	3	Reserved	
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	3C-LINK specific date, read only
128-255	128	Reserved	Reserved for SFF-8079

● Digital Diagnostic Monitor Characteristics

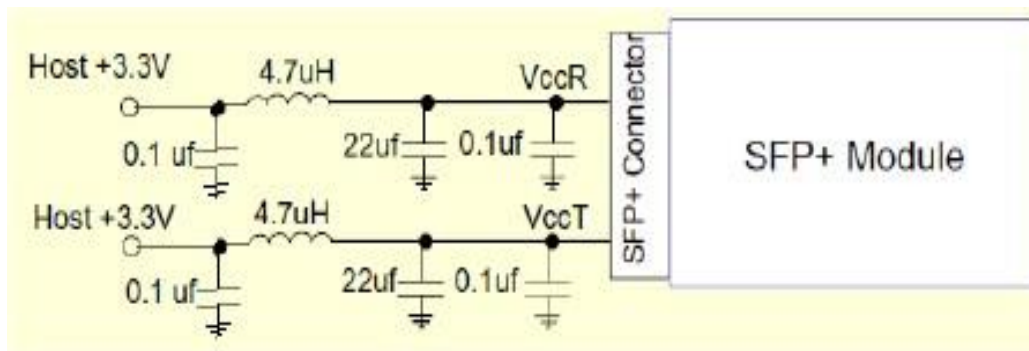
Data Address	Parameter	Accuracy	Unit
96-97	Transceiver Internal Temperature	±3.0	°C
98-99	VCC3 Internal Supply Voltage	±3.0	%
100-101	Laser Bias Current	±10	%
102-103	Tx Output Power	±3.0	dBm
104-105	Rx Input Power	±3.0	dBm

★ Regulatory Compliance

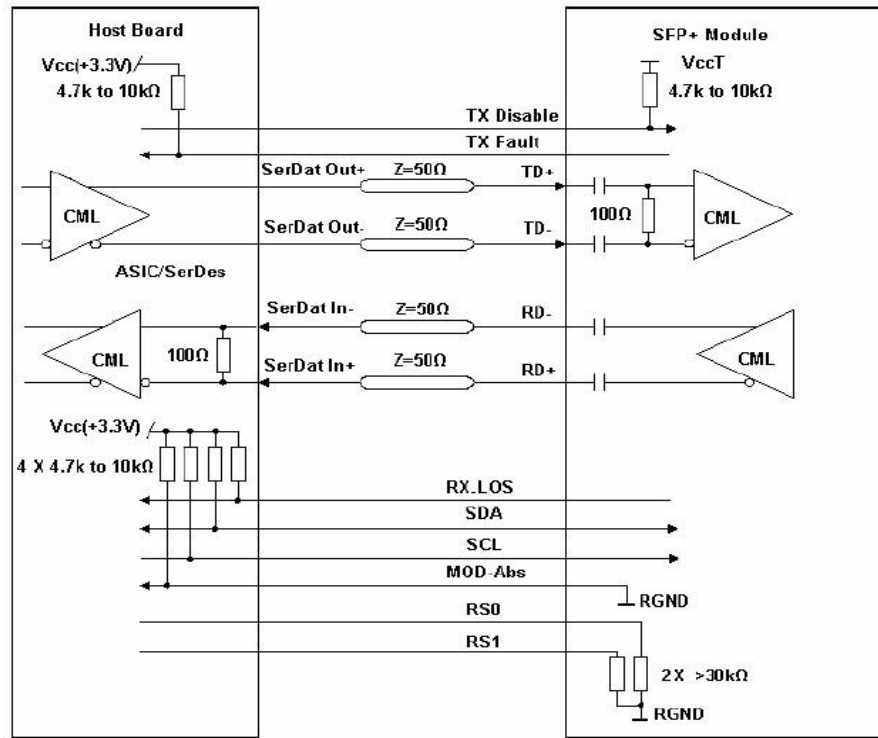
The 3CW-SFP+54-UR complies with international Electromagnetic Compatibility (EMC) and international safety requirements and standards (see details in Table following).

Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD-883E Method 3015.7	Class 1(>1000 V)
Electrostatic Discharge (ESD) to the Duplex LC Receptacle	IEC 61000-4-2 GR-1089-CORE	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN55022 Class B (CISPR 22B) VCCI Class B	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11 EN60950, EN (IEC) 60825-1,2	Compatible with Class 1 laser product.

★ **Recommended Circuit:**



Recommended Host Board Power Supply Circuit



Recommended High-speed Interface Circuit

★ **Mechanical Dimensions:**

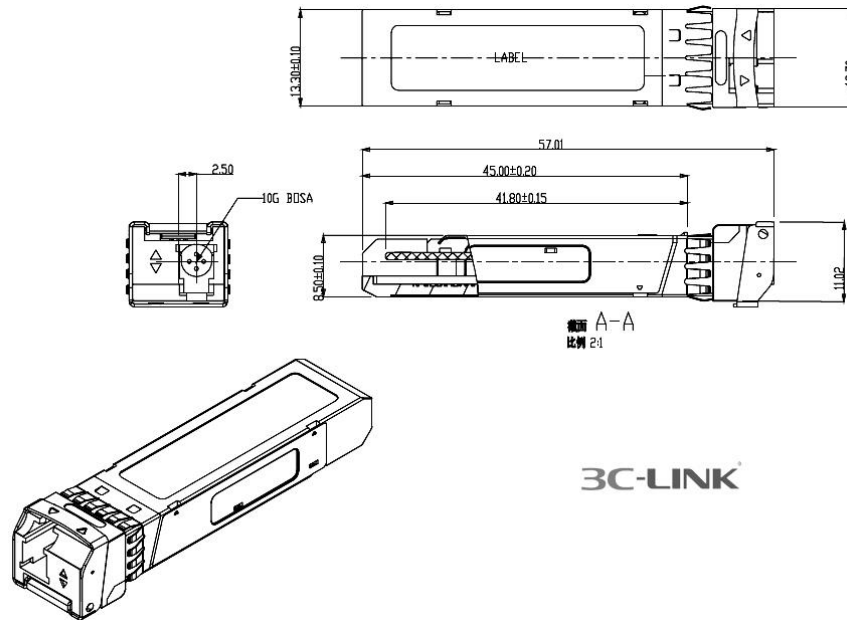
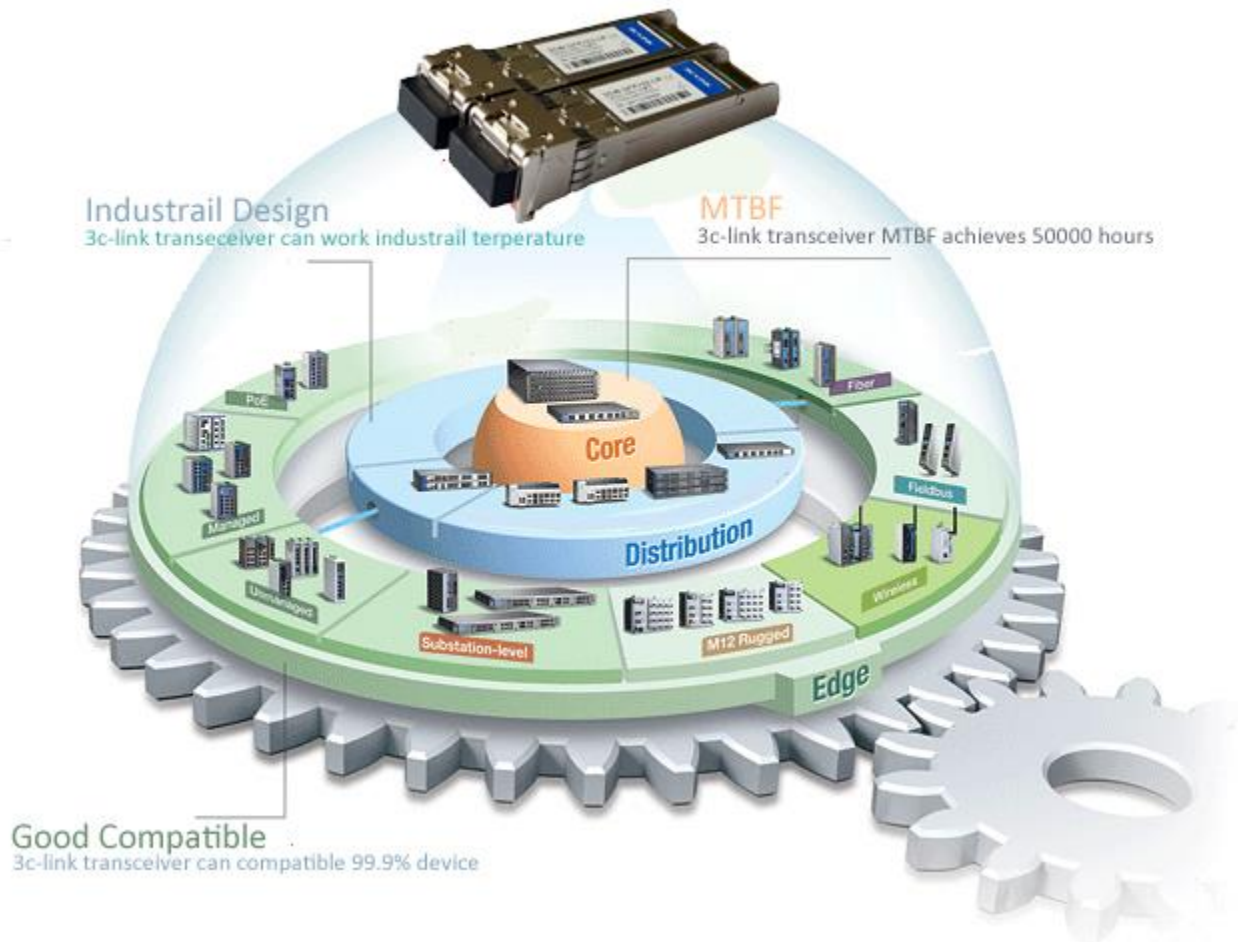


Figure4. Key Mechanical Dimensions

Ordering information

Part Number	Product Description
3CW-SFP+-23-L70	1490nm/1550nm, 10Gbps, 80km, 0°C ~ +70°C
3CW-SFP+-32-L70	1550nm/1490nm, 10Gbps, 80km, 0°C ~ +70°C



Specifications are subject to change without notice. It is a registered trademark of 3C-LINK Technology Co., Ltd. Other brands and product names are trademarks or registered trademarks of their respective holders. No part of the specifications can reproduced in any form or by any means or used to make any derivative such as translation, transformation, or adaptation without permission from 3C-LINK Technology Co., Ltd.