2019

3CW-XFP-45/54-ZR

10G XFP BI-DI TRANSCEIVER 80KM

20190725-2368

3C-LINK OPTO CO,.LIMITED

3CW-XFP-45/54-ZR

10Gbps XFP Bi-Directional Transceiver, 80km Reach

1490/11550nm TX / 1550/1490 nm RX

Features

- Supports 9.95Gb/s to 10.3Gb/s data rates
- Simplex LC Connector Bi-Directional XFP 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
- XFP 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-XFP-45/32-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 XFP 20-pin connector to allow hot plug capability.

The 3CW-XFP-45/32-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	Tc	-40	+85	°C
Operating Case Temperature	Tc	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	Icc		200	300	mA
Operating Case Temperature	T_C	0	25	70	°C
Module Power Dissipation	Pm	-	0.7	1.1	W

Notes:
[1] Supply current is shared between VCCTX and VCCRX.
[2] In-rush is defined as current level above steady state current requirements.

Electrical Characteristics (TOP = 0 to 70 °C)

Parameter	Symbol	Min	Typ	Max	Unit	Note
Supply Voltage	Vcc3	3.13		3.45	V	
Supply Current	Icc3			500	mA	
Module total power	P			3.5	W	
Transmitter						
Input differential impedance	Rin		100		Ω	1
Differential data input swing	Vin,pp	150		820	mV	
Transmit Disable Voltage	V_D	2.0		Vcc	V	
Transmit Enable Voltage	V_{EN}	GND		GND+0.8	V	
Transmit Disable Assert Time	T_off			100	ms	
Tx Enable Assert Time	T_on			100	ms	

Receiver						
Differential data output swing	Vout,pp	300	500	850	mV	
Data output rise time	tr			35	ps	2
Data output fall time	tf			35	ps	2
LOS Fault	$V_{LOS\ fault}$	Vcc–0.5		V_{CCHOST}	V	3
LOS Normal	$V_{LOS\ norm}$	GND		GND+0.5	V	3
Power Supply Rejection	PSR	See Note 4 below				4

Notes

1. After internal AC coupling.
2. 20 – 80 %
3. Loss of Signal is open collector to be pulled up with a 4.7k – 10kohm resistor to 3.15 – 3.6V. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
4. Per Section 2.7.1. in the XFP MSA Specification.

Optical Characteristics (TOP = 0 to 70°C) (3CW-XFP-45-ZR, 1490 EML & APD/TIA)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Operating Date Rate	BR	9.95		11.3	Gb/s	
Bit Error Rate	BER			10^{-12}		
Average Optical Power	P_{MAX}	+1		+5	dBm	1
Optical Center Wavelength	λ	1480	1490	1500	nm	
Optical Extinction Ratio	ER	6			dB	
Spectral Width	Δλ			1	nm	
Side mode Suppression ratio	$SMSR_{min}$	30			dB	
Rise/Fall Time (20%~80%)	Tr/Tf			50	ps	
Average Launch power of OFF Transmitter	P_{OFF}			-30	dBm	
Tx Jitter	Txj	Compliant with each standard requirements				
Optical Eye Mask		IEEE802.3ae				2
Receiver						
Operating Date Rate	BR	9.95		11.3	Gb/s	
Receiver Sensitivity	Sen			-23	dBm	2
Maximum Input Power	P_{MAX}	-7			dBm	2
Optical Center Wavelength	λ_C	1540	1550	1560	nm	
Receiver Reflectance	Rrx			-27	dB	
LOS De-Assert	LOS_D			-24	dBm	

LOS Assert	LOS_A	-35			dBm	
LOS Hysteresis	LOS_H	0.5		5	dB	

Notes:
1. The optical power is launched into SMF.
2. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps BER<10^{-12}.

Optical Characteristics (TOP = 0 to 70°C) (3CW-XFP-54-ZR, 1550 EML & APD/TIA)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Operating Date Rate	BR	9.95		11.3	Gb/s	
Bit Error Rate	BER			10^{-12}		
Average Optical Power	P_{MAX}	+1		+5	dBm	1
Optical Center Wavelength	λ	1530	1550	1570	nm	
Optical Extinction Ratio	ER	6			dB	
Spectral Width	Δλ			1	nm	
Side mode Suppression ratio	$SMSR_{min}$	30			dB	
Rise/Fall Time (20%~80%)	Tr/Tf			50	ps	
Average Launch power of OFF Transmitter	P_{OFF}			-30	dBm	
Tx Jitter	Txj	Compliant with each standard requirements				
Optical Eye Mask		IEEE802.3ae				2
Receiver						
Operating Date Rate	BR	9.95		11.3	Gb/s	
Receiver Sensitivity	Sen			-23	dBm	2
Maximum Input Power	P_{MAX}	-7			dBm	2
Optical Center Wavelength	λ_C	1540	1550	1560	nm	
Receiver Reflectance	Rrx			-27	dB	
LOS De-Assert	LOS_D			-24	dBm	
LOS Assert	LOS_A	-35			dBm	
LOS Hysteresis	LOS_H	0.5		5	dB	

Notes:
1. The optical power is launched into SMF.
2. Measured with a PRBS 2^{31}-1 test pattern @10.3125Gbps BER<10^{-12}.

Pin Descriptions

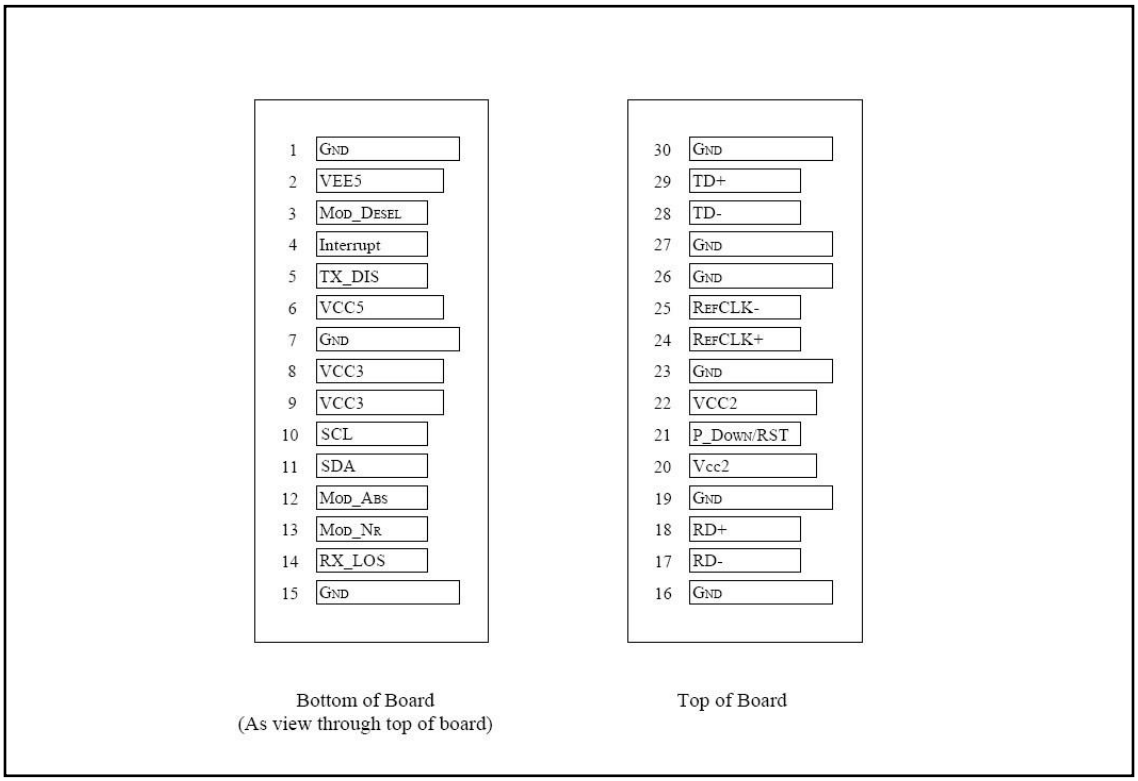


Figure1.Electrical Pin-out Details

Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Module Ground	1
2		VEE5	Optional –5.2 Power Supply – Not required	
3	LVTTL-I	Mod-Desel	Module De-select; When held low allows the module to respond to 2-wire serial interface commands	
4	LVTTL-O	$\overline{\text{Interrupt}}$	Interrupt (bar); Indicates presence of an important condition which can be read over the serial 2-wire interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Transmitter laser source turned off	
6		VCC5	+5 Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I	SCL	Serial 2-wire interface clock	2
11	LVTTL-I/O	SDA	Serial 2-wire interface data line	2

12	LVTTL-O	Mod_Abs	Module Absent; Indicates module is not present. Grounded in the module.	2
13	LVTTL-O	Mod_NR	Module Not Ready;	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver inverted data output	
18	CML-O	RD+	Receiver non-inverted data output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply – Not required	
21	LVTTL-I	P_Down/RST	Power Down; When high, places the module in the low power stand-by mode and on the falling edge of P_Down initiates a module reset	
			Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply – Not required	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board – Not required	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board – Not required	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter inverted data input	
29	CML-I	TD+	Transmitter non-inverted data input	
30		GND	Module Ground	1

Note

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15Vand 3.45V.
3. A Reference Clock input is not required.

Digital Diagnostic Functions

As defined by the XFP MSA 1, 3C-LINK's XFP transceivers provide digital diagnostic functions via a 2-wire serial interface, which allows real-time access to the following operating parameters:

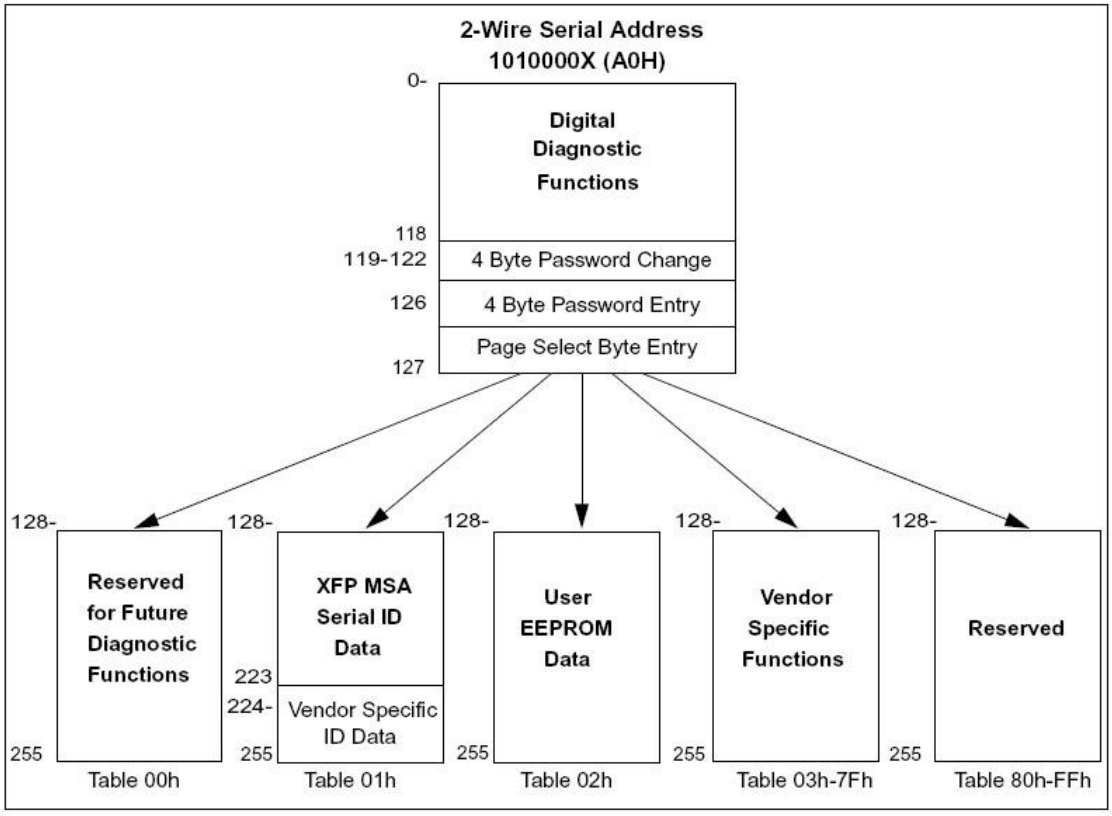
✓ Transceiver temperature ✓ Laser bias current

Transmitted optical power
Received optical power
Transceiver supply voltage

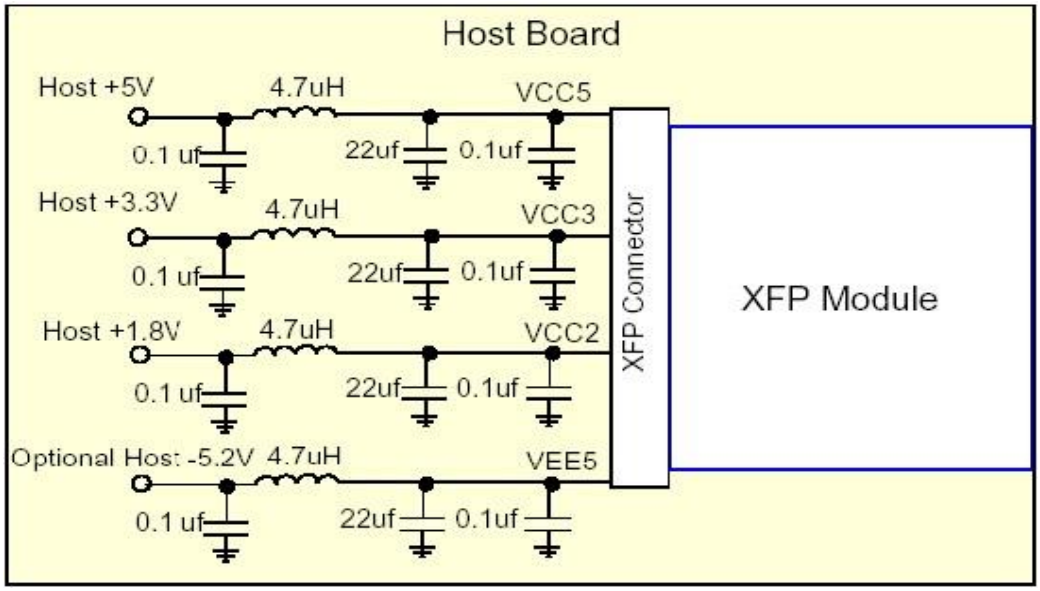
It also provides a sophisticated system of alarm and warning flags, which may be used to alert end-users when particular operating parameters are outside of a factory-set normal range.

The operating and diagnostics information is monitored and reported by a Digital Diagnostics Transceiver Controller (DDTC) inside the transceiver, which is accessed through the 2-wire serial interface. When the serial protocol is activated, the serial clock signal (SCL pin) is generated by the host. The positive edge clocks data into the XFP transceiver into those segments of its memory map that are not write-protected. The negative edge clocks data from the XFP transceiver. The serial data signal (SDA pin) 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. The 2-wire serial interface provides sequential or random access to the 8 bit parameters, addressed from 000h to the maximum address of the memory.

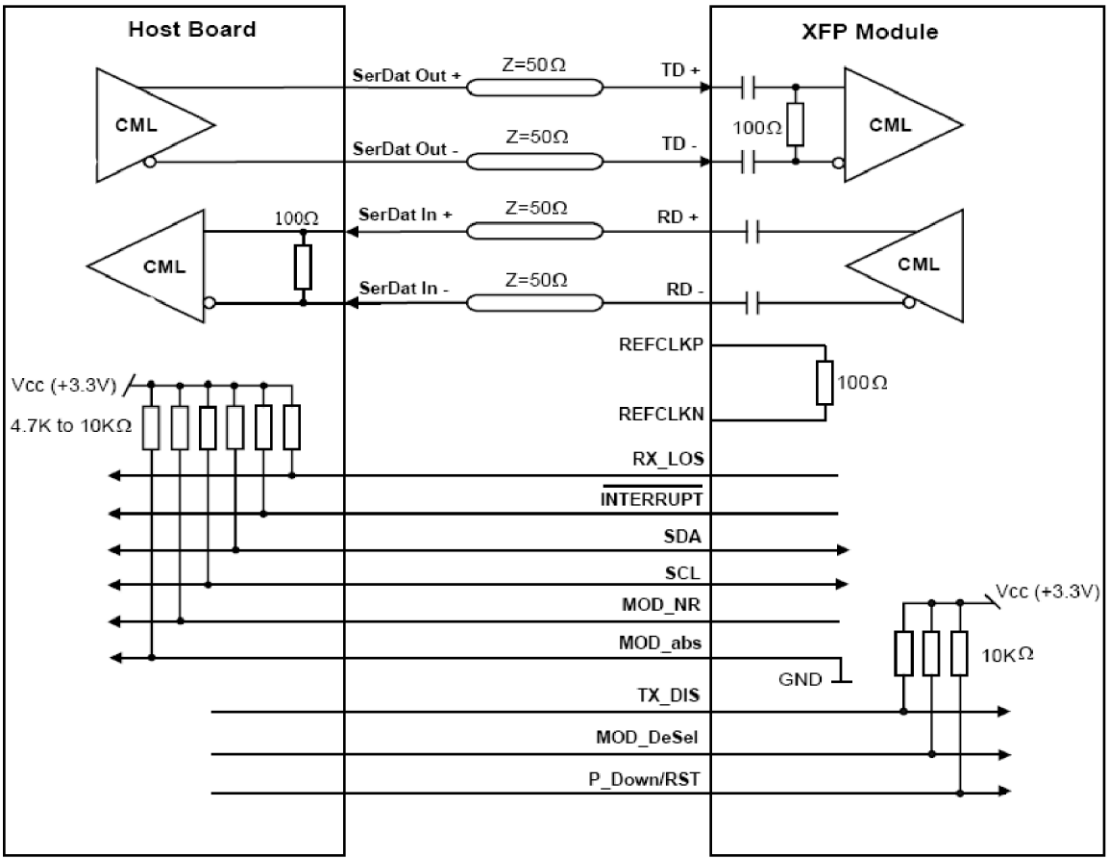
For more detailed information including memory map definitions, please see the XFP MSA Specification.



Recommended Circuit:

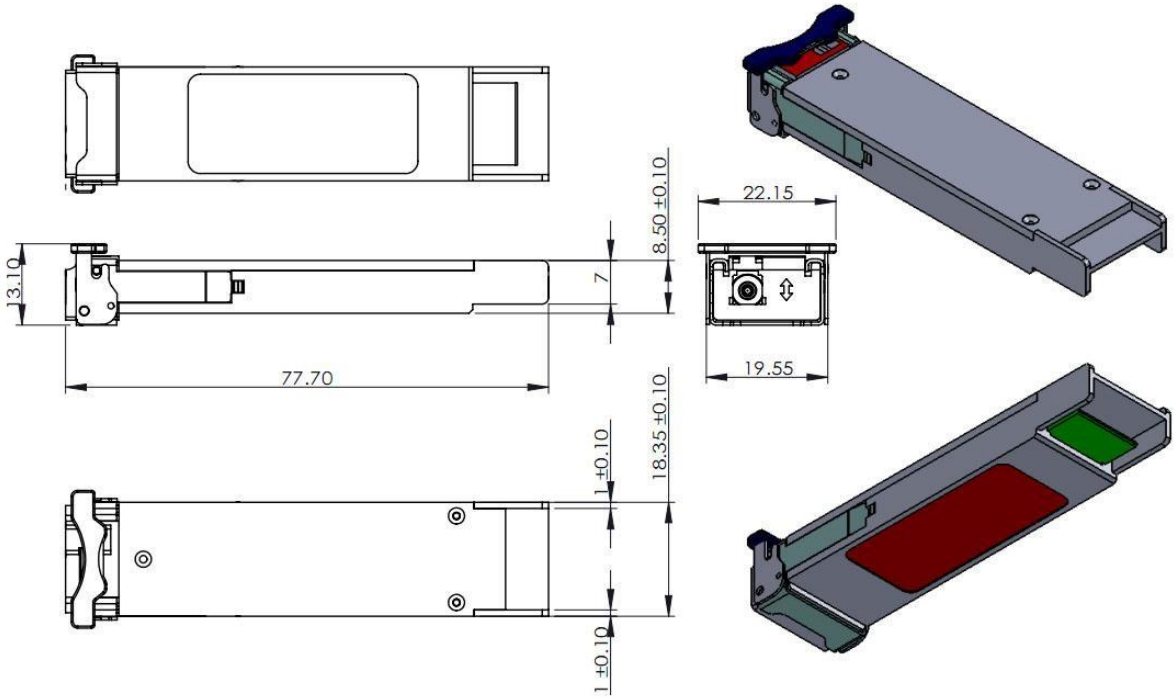


Recommended Host Board Power Supply Circuit



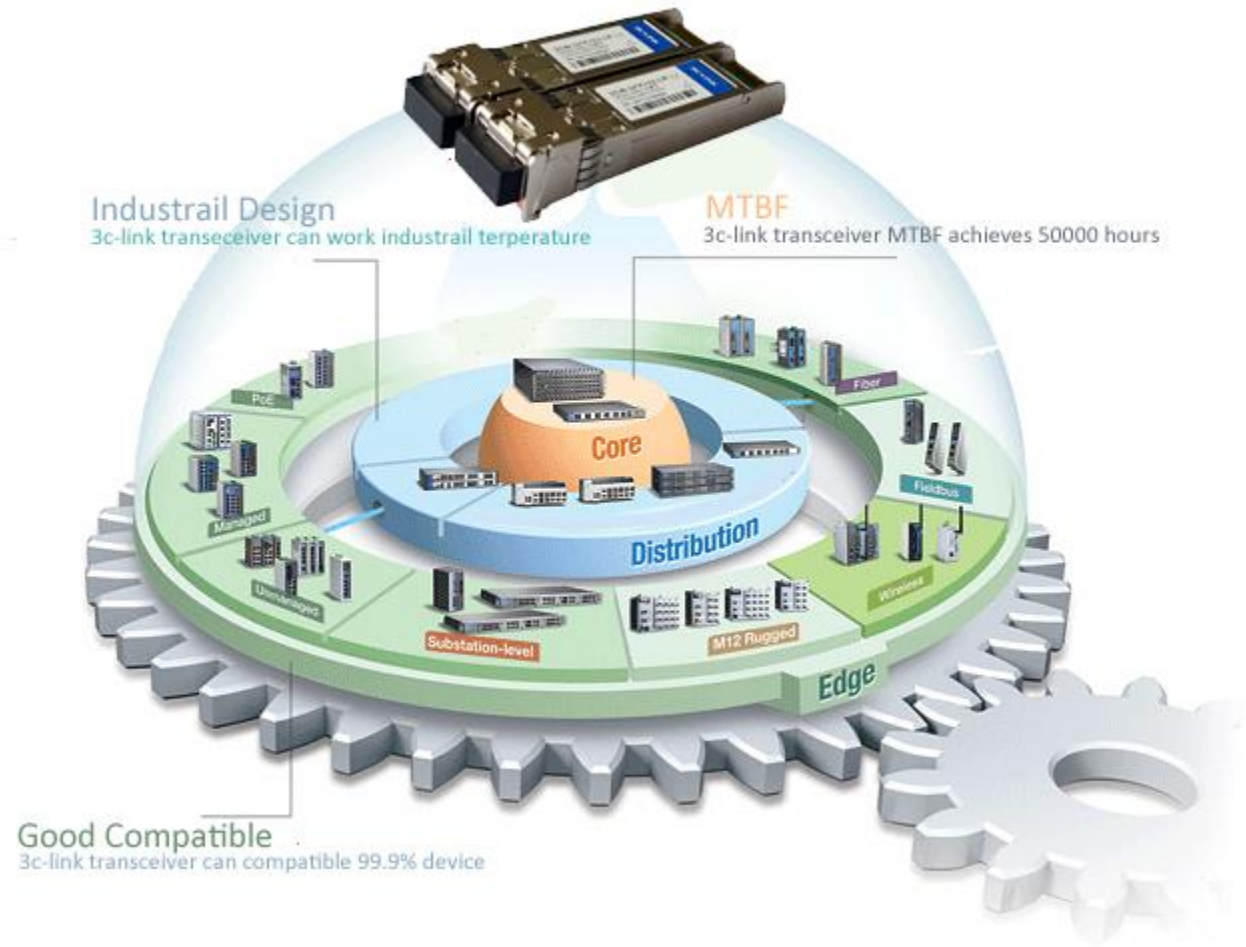
Recommended High-speed Interface Circuit

Mechanical Dimensions:



Ordering information

Part Number	Product Description
3CW-XFP-45-ZR	1490nm/1550nm, 10Gbps, LC Simplex, 80km, 0ºC ~ +70ºC
3CW-XFP-54-ZR	1550nm/1490nm, 10Gbps, LC Simplex, 80km, 0ºC ~ +70ºC



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