Bi-Di SFP 1.25Gb/s Optical Transceiver

Features:

- Single Mode bi-directional Transmission
- SFP Multi-source Package with LC Receptacle
- Standard 1.25Gb/s Data Links
- Hot-Pluggable Capability
- Single +3.3V Power Supply
- Isolation > 30dB, Cross Talk < -45dB
- Compliant with Specifications for IEEE802.3Z
- Compliant with Bellcore TA-NWT-000983
- Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825-1
- Compliant with CPRI/Interface OBSAI

Applications:

- GSM digital fiber repeater
- Gigabit Ethernet
- Fiber Channel
- WDM Application

Specification:

- **Electrical and Optical Characteristics: (Condition: T_a=T_{OP})**

Parameter	Symbol	Min.	Typical	Max.	Unit
Transmitter Differential Input Volt	+/-TX_DAT	200		2400	mV p-p
Supply Current	I		13	180	mA
Tx_Disable Input Voltage – Low	V	0		0.8	V
Tx_Disable Input Voltage – High	V	2.0		Vcc	V
Tx_Fault Output Voltage – Low	V	0		0.8	V
Tx_Fault Output Voltage – High	V	2.0		Vcc	V
Receiver Differential Output Volt	+/-RX_DAT	600		1400	mV p-p
Rx_LOS Output Voltage- Low	V	0		0.8	V
Rx_LOS Output Voltage- High	V	2.0		Vcc	V

Transmitter Section (LWFTR-3512L-10):

Parameter	Symbol	Min.	Typical	Max.	Uni
Data Rate	B	-	1250	-	Mb/s
Centre Wavelength	c	1270	1310	1355	nm
Output Spectral Width	(RMS)	-	-	4	nm
Average Output Power	P_o	-9.0	-	-	dB
Extinction Ratio	EXT	9	-	-	dB
Data Input Voltage-High	V_{IHS}	V_{cc}-1.16	-	V_{cc}-0.89	V

Data Input Voltage -Low	V_{ILS}	V_{cc}-1.82	-	V_{cc}-1.48	V
Supply Current	I_{CC}	-	9	1	mA
Output Optical Eye	Compliant with IEEE802.3Z				
Receiver Section (LWFTR-3512L-10):					
Parameter	**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**
Receive Sensitivity	P_{min}	-	-	-	dBm
Maximum Input Power	P_{MAX}	-	-	-	dBm
LOS De-Assert	LOS_D	-	-	-	dBm
LOS Assert	LOS_A	-	-	-	dBm
Hysteresis	-	-	3	-	dBm
Output High Voltage	V_{OH}	V_{cc}-1.03	-	V_{cc}-0.89	V
Output Low Voltage	V_{OL}	V_{cc}-1.82	-	V_{cc}-1.63	V
Operating Wavelength	c	1480	1550	1580	nm
Supply Current	I_{CC}	-	8	1	mA

Transmitter Section (LWFTR-5312L-10):

Parameter	**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**
Data Rate	B	-	1250	-	Mb/s
Centre Wavelength	c	1480	1550	1580	nm
Output Spectral Width	(-20dB)	-		1	nm
Average Output Power	P_o	-	-	-	dBm
Extinction Ratio	EXT	9	-	-	dB
Data Input Voltage-High	V_{IHS}	V_{cc}-1.16	-	V_{cc}-0.89	V
Data Input Voltage -Low	V_{ILS}	V_{cc}-1.82	-	V_{cc}-1.48	V
Supply Current	I_{CC}	-	9	1	mA
Output Optical Eye	Compliant with IEEE802.3Z				
Receiver Section (LWFTR-5312L-10):					
Parameter	**Symbol**	**Min.**	**Typical**	**Max.**	**Unit**
Receive Sensitivity	P_{min}	-	-	-	dBm
Maximum Input Power	P_{MAX}	-	-	-	dBm
LOS De-Assert	LOS_D	-	-	-	dBm
LOS Assert	LOS_A	-	-	-	dBm
Hysteresis	-	-	3	-	dBm
Output High Voltage	V_{OH}	V_{cc}-1.03	-	V_{cc}-0.89	V
Output Low Voltage	V_{OL}	V_{cc}-1.82	-	V_{cc}-1.63	V

Operating Wavelength	c	1260	1310	1360	nm
Supply Current	I_{CC}	-	80	110	mA

● Absolute Maximum Ratings:

Parameter	Symbol	M	M	Unit
Storage Temperature	T	-	+	
Operating Temperature	T	-	+	
Input Voltage	T	0	+	V

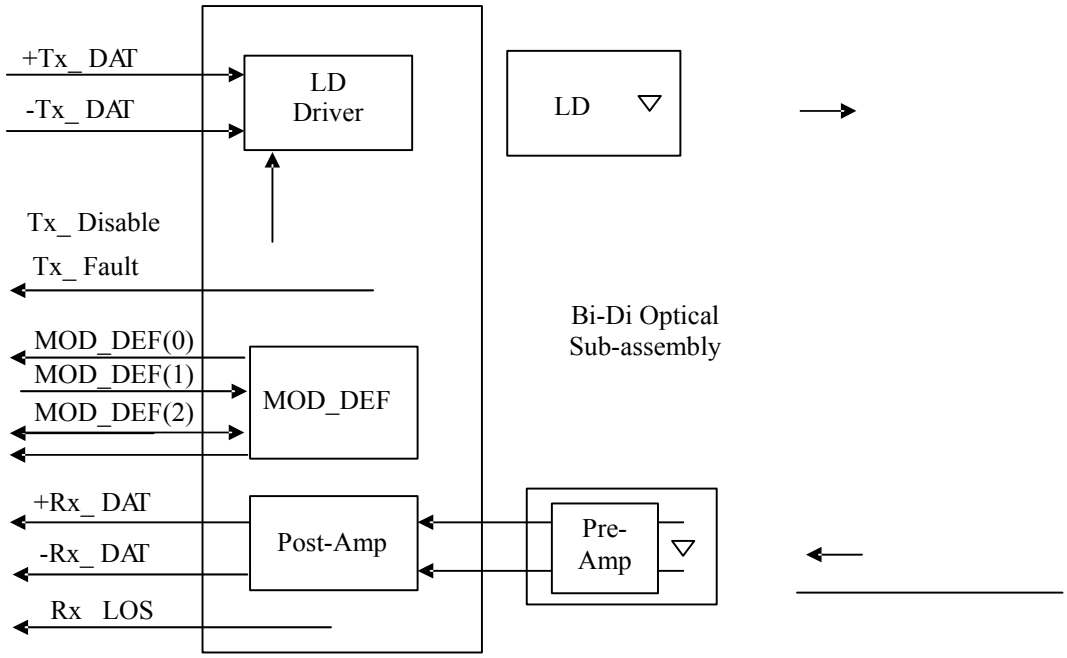
● Recommended Operating Environment:

Parameter	Symbol	Min.	Typical	Max.	Unit
Supply Voltage	V_{CC}	+3.1	+	+3.5	V
Operating Temperature	T_{OP}	-40	-	+80	

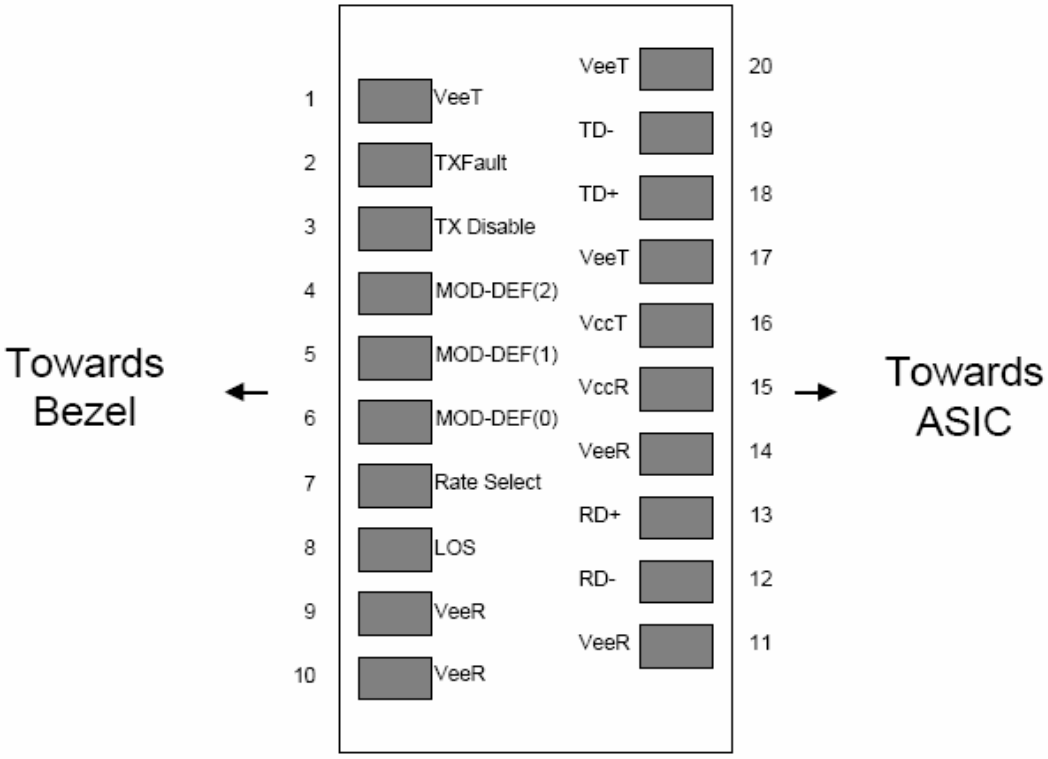
● Timing Characteristics:

Parameter	Symbol	Min.	Typical	Max.	Unit
TX_DISABLE Assert Time	t_off		3	10	usec
TX_DISABLE Negate Time	t_on		0.5	1	msec
Time to initialize include reset of TX_FAULT	t_int		30	300	msec
TX_FAULT from fault to assertion	t_fault		20	100	usec
TX_DISBEL time to start reset	t_reset	10			usec
Receiver Loss of Signal Assert Time (off to On)	T_A,RX_LOS			100	usec
Receiver Loss of Signal Assert Time (on to off)	T_d,RX_LOS			100	usec

Block Diagram of Transceiver:



Pin Assignment:



Pin out of Connector Block on Host Board

Pin Description:

Pin No.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2
4	MOD-DEF2	Module Definition 2	3	Note 3
5	MOD-DEF1	Module Definition 1	3	Note 3
6	MOD-DEF0	Module Definition 0	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	VeeR	Receiver Ground	1	
10	VeeR	Receiver Ground	1	
11	VeeR	Receiver Ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	VeeR	Receiver Ground	1	
15	VeeR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	VeeT	Transmitter Ground	1	

Notes:

1. TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.

2. TX Disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7k~10kΩ resistor. Its states are:

Low (0~0.8V): Transmitter on

(>0.8V, <2.0V): Undefined

High (2.0~3.465V): Transmitter Disabled

Open: Transmitter Disabled

3. MOD-DEF 0,1,2 are the module definition pins. They should be pulled up with a 4.7k~10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR.

MOD-DEF 0 is grounded by the module to indicate that the module is present

MOD-DEF 1 is the clock line of two wire serial interface for serial ID

MOD-DEF 2 is the data line of two wire serial interface for serial ID

4. LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; logic 1 indicates loss of signal. In the low state, the output will be pulled to less than 0.8V.

5. These are the differential receiver output. They are internally AC-coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES.

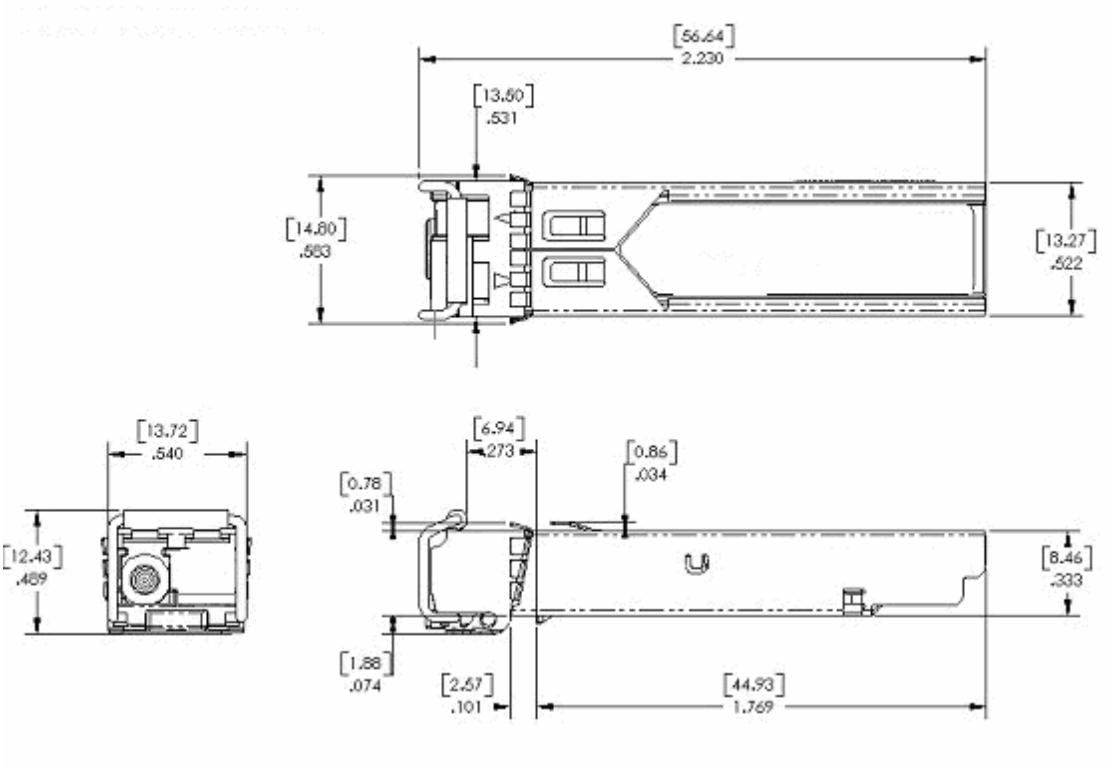
6. These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differentia

Serial ID Memory Contents:

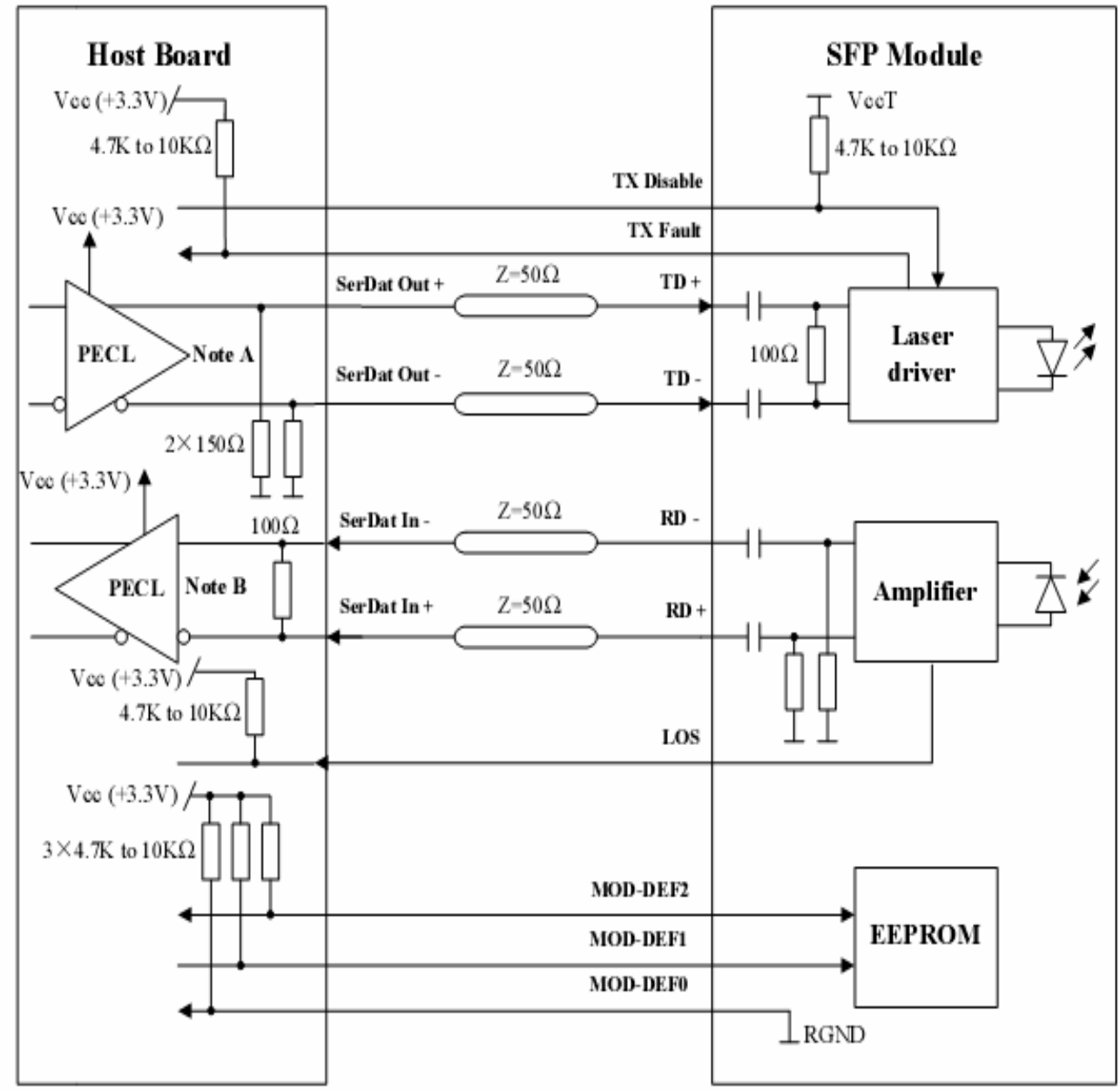
Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (07=LC)
3-10	8	Transceiver	Gigabit Ethernet 1000Base-LX & Fiber Channel
11	1	Encoding	8B10B (01h)
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: FUTURE
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: “LWFTR-xxxxxx” (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	Future’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	Future specific date, read only

Mechanical Dimensions:



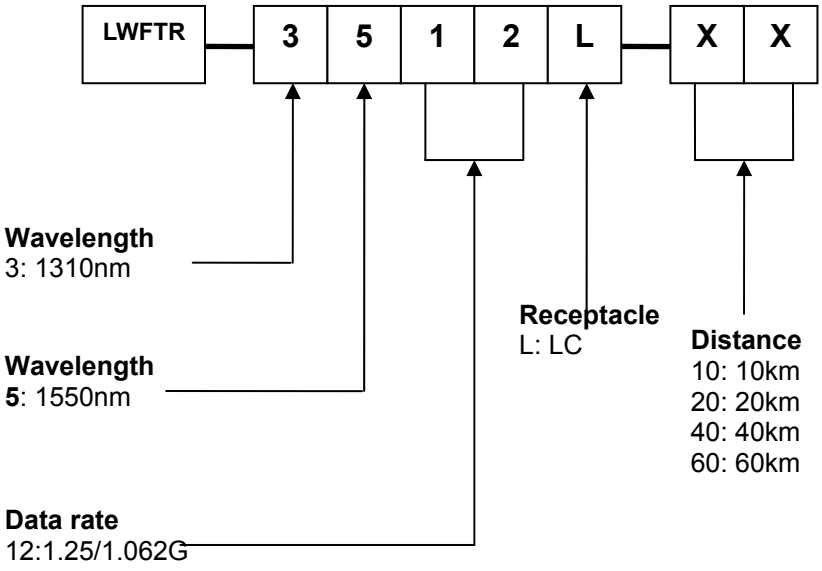
Recommended Circuit:



Note A: Circuit assumes open emitter output

Note B: Circuit assumes high impedance internal bias @Vcc-1.3V

Ordering Information



Note: 1.The "Distance" bit may be omitted when it is "10".

2.The "Temperature" bit may be omitted when it is standard temp.

Part No.	Product Description
LWFTR-3512L-10	1310nm/1550nm, 1.25Gbps, 10km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-5312L-10	1550nm/1310nm, 1..25Gbps, 10km, SFP with Spring-Latch, 40°C~+85°C
LWFTR-3512L-20	1310nm/1550nm,1.25Gbps, 20km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-5312L-20	1550nm/1310nm,1.25Gbps, 20km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-3412L-10	1310nm/1490nm, 1.25Gbps, 10km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-4312L-10	1490nm/1310nm, 1.25Gbps, 10km, SFP with Spring-Latch,- 40°C~+85°C
LWFTR-3412L-20	1310nm/1490nm, 1.25Gbps, 20km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-4312L-20	1490nm/1310nm,1.25Gbps, 20km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-4512L-10	1490nm/1550nm, 1.25Gbps, 10km, SFP with Spring-Latch,-40°C~+85°C
LWFTR-5412L-10	1550nm/1490nm, 1.25Gbps, 10km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-4512L-20	1490nm/1550nm,1.25Gbps, 20km, SFP with Spring-Latch, -40°C~+85°C
LWFTR-5412L-20	1550nm/1490nm,1.25Gbps, 20km, SFP with Spring-Latch, -40°C~+85°C

Related Documents

For further information, please refer to the following documents:

- Future Spring-Latch SFP Installation Guide
- Future SFP Application Notes
- SFP Multi-Source Agreement (MSA)