

### OC48 2.5Gbps 1550nm Single-mode SFP Optical Transceiver, 80km Reach OSFP-2G55-80-xx



#### Features

- Data-rate of 2.5Gbps operation
- 80km with 9/125  $\mu$ m SMF
- 1550nm DFB Laser Transmitter
- Hot-pluggable SFP footprint duplex LC connector Interface
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- Compliant with SFP MSA
- Compliant with SFF-8472
- Single 3.3V Power Supply and TTL Control Logic Interface
- Operating case temperature  
Standard : 0°C to +70°C  
Extended: -20°C to +85°C  
Industrial: -40°C to +85°C

#### Applications

- SONET / SDH Switch Infrastructure
- STM16 Optical Interface
- ATM Switches and Routers
- Switch to Switch Interface
- Other Optical Links

#### Description

The FiberStore's Multi-rate Series 2.67Gb/s transceiver module integrates optics and electronics in a Small Form Factor Pluggable (SFP) package. It is Multisource Agreement (MSA) compatible and designed for operation at 1310 nm and 1550 nm. Although optimized for OC-48/STM-16, it provides multi-rate capabilities and can be used from OC-3/STM-1(155 Mb/s) up to 2.7 Gb/s. MultiRate SFP transceiver provides a fully OC-48 SONET compliant interface between the SONET/SDH photonic layer and the electrical layer. Its microprocessor - based modular design implements all features specified in the SFP MSA compatible 2-wire Serial Digital Diagnostic Monitoring Interface for Optical Transceivers. OC-48 / STM-16 is a network line with transmission speeds of up to 2488.32 Mbit/s (payload: 2405.376 Mbit/s; overhead: 82.944 Mbit/s).

### Specifications

**Table 1 - Absolute Maximum Ratings**

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.6	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-		95	%

**Table 2 - Recommended Operating Conditions**

Parameter	Symbol	Min	Typical	Max	Unit
Operating Case Temperature	Standard	0		+70	°C
	Industrial	-40		+85	°C
Power Supply Voltage	Vcc	3.15	3.3	3.45	V
Power Supply Current	Icc			300	mA
Data Rate	OC-48/STM-16		2.488		Gbps
	2×FC		2.125		

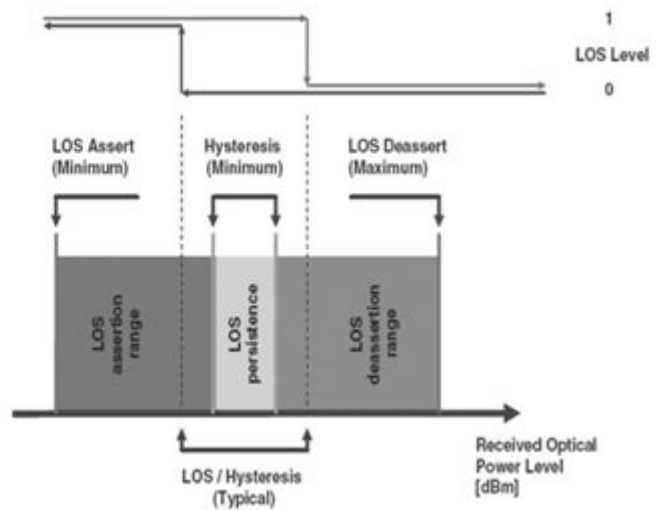
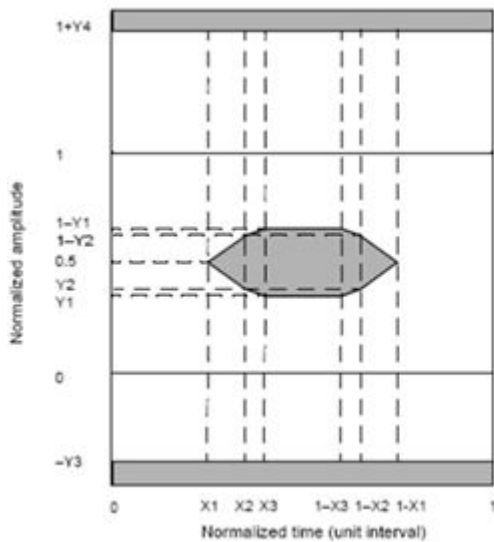
**Table 3- Optical and Electrical Characteristics**

Parameter	Symbol	Min	Typical	Max	Unit	Notes
9µm Core Diameter SMF	L		80		km	
Data Rate		1	2.488	2.67	Gbps	
<b>Transmitter</b>						
Centre Wavelength	$\lambda_c$	1500	1550	1600	nm	
Spectral Width (-20dBm)	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Output Power	Pout	-2		+3	dBm	1
Extinction Ratio	ER	8.2			dB	2
Optical Rise/Fall Time (20%~80%)	tr/tf			150	ps	
Output Optical Eye	Compliant with IUT-T G.957					2,4
TX Disable Assert Time	t_off			10	us	
Pout@TX Disable Asserted	Pout			-45	dBm	
<b>Receiver</b>						
Centre Wavelength	$\lambda_c$	1260		1600	nm	
Receiver Sensitivity	OC-48/STM-16	Pmin		-28	dBm	

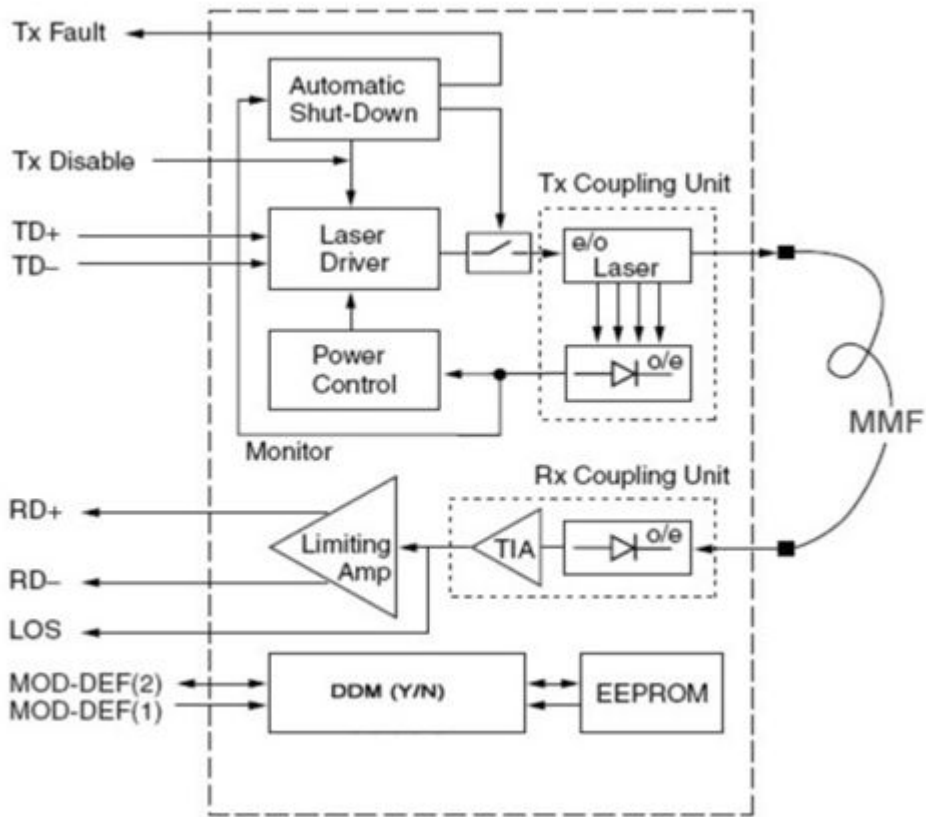
	2xFC				-28		
Receiver Overload	Pmax	-3				dBm	
LOS De-Assert	LOS <sub>D</sub>				-29	dBm	
LOS Assert	LOS <sub>A</sub>	-42				dBm	
LOS Hysteresis		0.5				dB	5
Reflection	Pmax				-27	dB	

**Notes:**

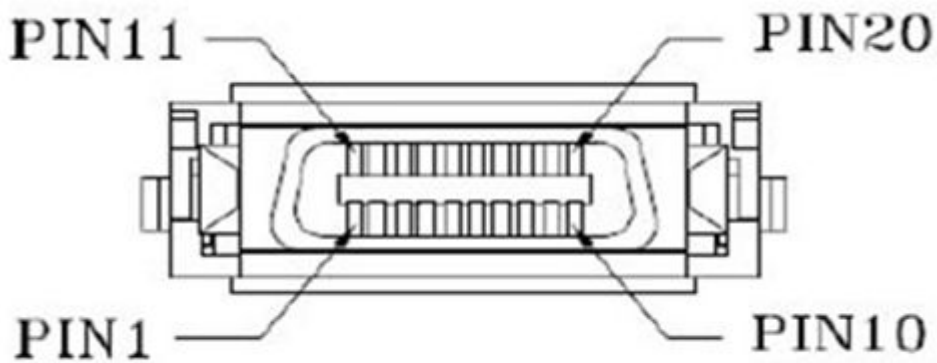
- 1: Output is coupled into a 9/125μm single-mode fiber.
- 2: Filtered, measured with a PRBS 2<sup>7</sup>-1 test pattern @1.25Gbps
- 3: Minimum average optical power measured at BER less than 1E-12, with a 2<sup>7</sup>-1 NRZ PRBS and ER=9dB.
- 4: Eye Pattern Mask
- 5: LOS Hysteresis

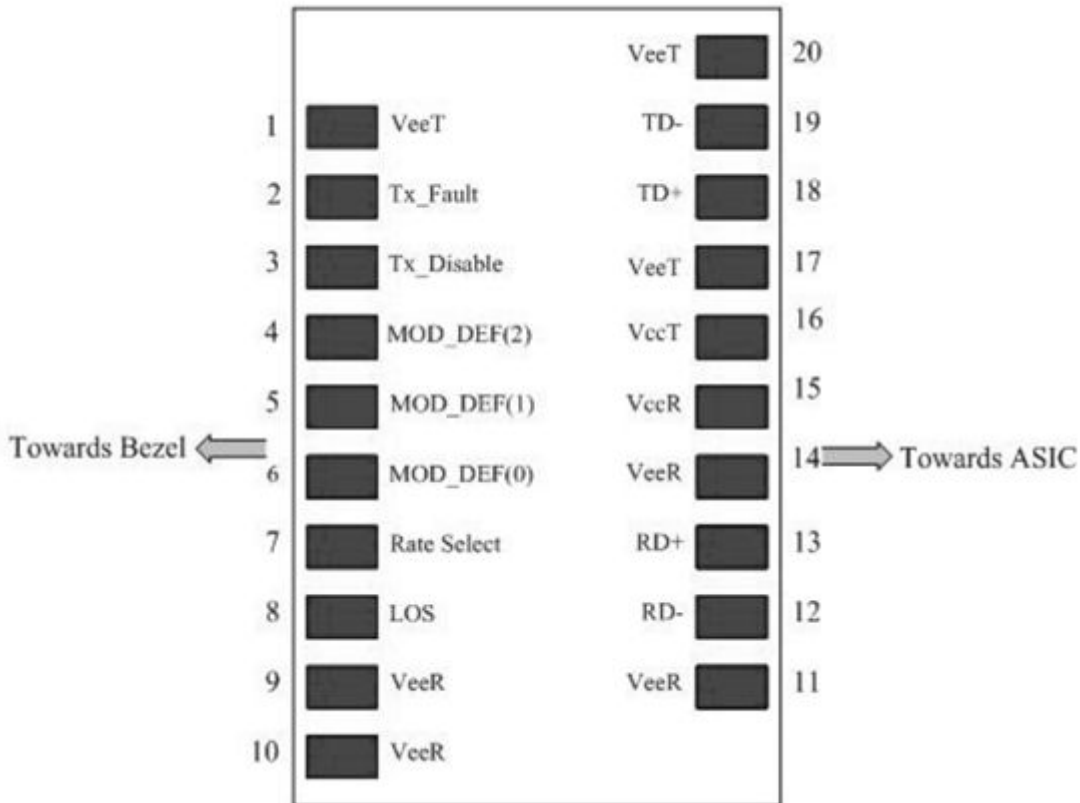


### Functional Description of Transceiver



### SFP Transceiver Electrical Pad Layout





### Pin Descriptions

Pin	Signal Name	Description	Plug Seq.	Notes
1	V <sub>EET</sub>	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	MOD_DEF(2)	SDA Serial Data Signal	3	Note 3
5	MOD_DEF(1)	SCL Serial Clock Signal	3	Note 3
6	MOD_DEF(0)	TTL Low	3	Note 3
7	Rate Select	Not Connected	3	
8	LOS	Loss of Signal	3	Note 4
9	V <sub>EER</sub>	Receiver ground	1	
10	V <sub>EER</sub>	Receiver ground	1	
11	V <sub>EER</sub>	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 5
13	RD+	Received Data Out	3	Note 5
14	V <sub>EER</sub>	Receiver ground	1	
15	V <sub>CCR</sub>	Receiver Power Supply	2	

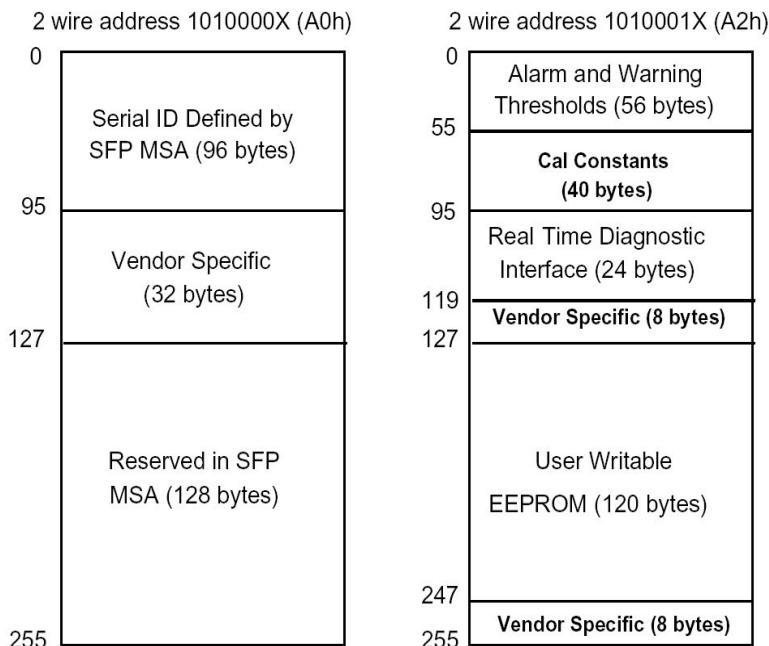
16	V <sub>CCT</sub>	Transmitter Power Supply	2	
17	V <sub>EET</sub>	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 6
19	TD-	Inv. Transmit Data In	3	Note 6
20	V <sub>EET</sub>	Transmitter Ground	1	

### Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

- 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 V<sub>cc</sub>+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.
- 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 to 0.8V):	Transmitter on
(>0.8V, < 2.0V):	Undefined
High (2.0 to 3.465V):	Transmitter Disabled
Open:	Transmitter Disabled
- Mod-Def 0, 1, 2. These 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 V<sub>ccT</sub> or V<sub>ccR</sub>.
  - 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
- LOS is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor. Pull up voltage between 2.0V and V<sub>cc</sub>+0.3V. Logic 1 indicates loss of signal; Logic 0 indicates normal operation. In the low state, the output will be pulled to less than 0.8V.
- RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.



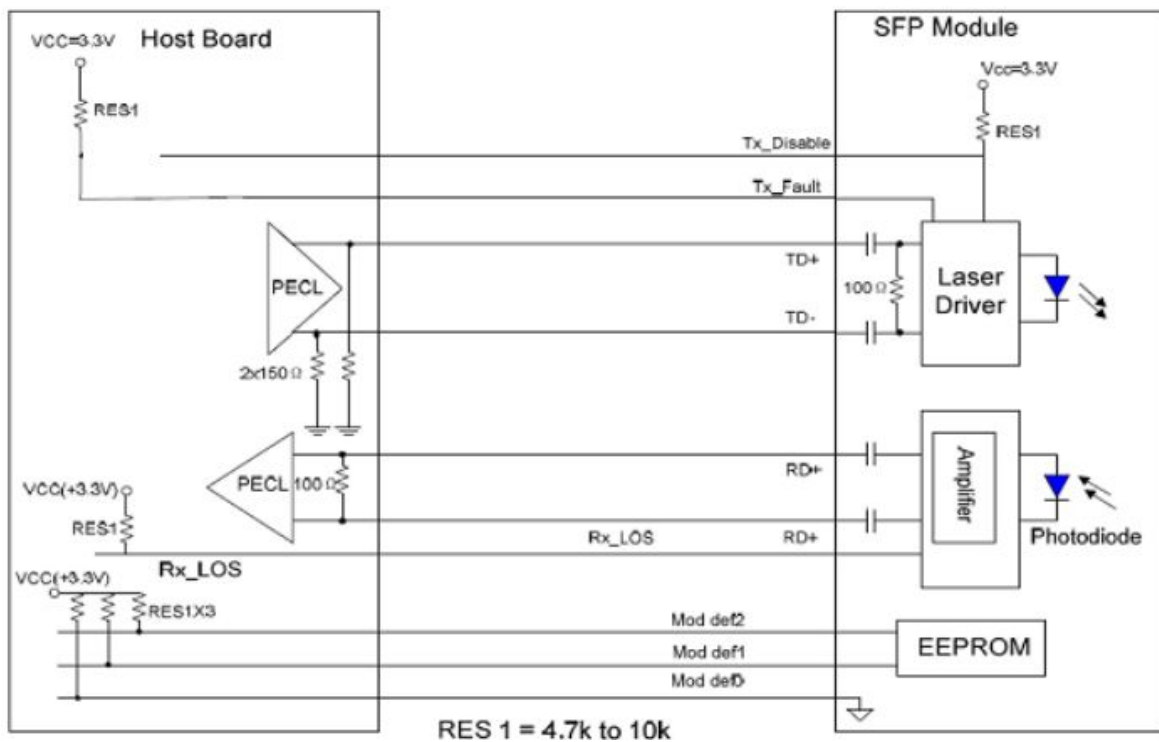
### EEPROM Serial ID Memory Contents

Addr.	Size (Bytes)	Name of Field	Hex	Description
BASE ID FIELDS				
0	1	Identifier	03	SFP
1	1	Ext. Identifier	04	SFP function is defined by serial ID only
2	1	Connector	07	LC Connector
3-10	8	Transceiver	XX <sup>(note)</sup>	Transmitter Code
11	1	Encoding	03	NRZ
12	1	BR, Nominal	06	2.5Gbps
13	1	Reserved	00	
14	1	Length (9μm) km	28/50/64/78	Transceiver Transmit Distance
15	1	Length(9μm) 100m	FF	
16	1	Length (50μm) 10m	00	
17	1	Length(62.5μm)10m	00	
18	1	Length (Copper)	00	Not Compliant
19	1	Reserved	00	
20-35	16	Vendor name	XX XX XX XX XX XX XX XX <sup>(note)</sup> 20 20 20 20 20 20 20 20	Vendor name (ASCII)
36	1	Reserved	00	
37-39	3	Vendor OUI	XX XX XX <sup>(note)</sup>	
40-35	16	Vendor PN	XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX XX	part number
56-59	4	Vendor rev	XX XX XX XX <sup>(note)</sup>	
60-61	2	Wavelength	06 0E	1550nm
62	1	Reserved	00	
63	1	CC_BASE	Check Sum (Variable)	Check Code for Base ID Fields
EXTENDED ID FIELDS				
64-65	2	Options	00 1A	TX_DISABLE, TX_FAULT and Loss of Signal implemented.
66	1	BR, max	00	
67	1	BR, min	00	

68-83	16	Vendor SN	XX XX XX XX XX XX XX XX <sup>(note)</sup> 20 20 20 20 20 20 20 20	Serial Number of transceiver (ASCII). For example "B000822".
84-91	8	Date Code	XX XX XX XX XX XX XX XX <sup>(note)</sup>	Manufactory Date Code. For example "080405"
92	1	Diagnostic Monitoring Type	XX <sup>(note9)</sup>	Digital Diagnostic Monitoring Implemented
93	1	Enhanced Options	XX <sup>(note)</sup>	Optional Flags
94	1	SFF_8472 Compliance	XX <sup>(note)</sup>	01 for Rev9.3 SFF-8472
95	1	CC_EXT	Check Sum (Variable)	Check Sum for Extended ID Field
VENDOR SPECIFIC ID FIELDS				
96-127	32	Vendor Specific	Read Only	Depends on Customer Information
128-255	128	Reserved	Read Only	

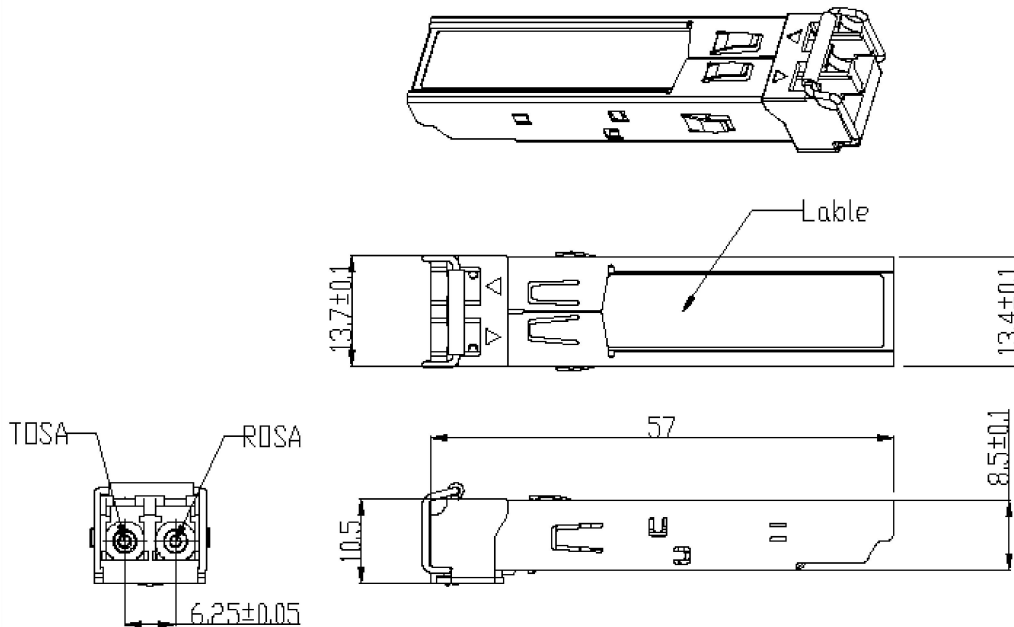
Note: The "XX" byte should be filled in according to practical case. For more information, please refer to the related document of SFP Multi-Source Agreement (MSA).

### Recommended Interface Circuit





### Mechanical Dimensions



### Ordering Information

Part No.	Data Rate (Gbps)	Wavelength (nm)	Connector Type	Transmission Distance (km)	Operating case temperature (°C)	Digital Diagnostics
OSFP-2G55-80-xx	2.5	1550	LC	80	0 to +70	No
OSFP-2G55-80D-xx	2.5	1550	LC	80	0 to +70	Yes
OSFP-2G55-80E-xx	2.5	1550	LC	80	-20 to +85	No
OSFP-2G55-80ED-xx	2.5	1550	LC	80	-20 to +85	Yes
OSFP-2G55-80I-xx	2.5	1550	LC	80	-40 to +85	No
OSFP-2G55-80ID-xx	2.5	1550	LC	80	-40 to +85	Yes

#### Notes:

xx means compatible brand. (For example: CO= Cisco, JU=Juniper, FD=Foundry, EX=Extreme, NE=Netgear,etc.)

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