



Features

- SFP Multi-Source Agreement compliant
- OC48/STM-16 application
- SFF-8472 diagnostic monitoring interface for optical transceivers
- Industry standard small form pluggable (SFP) package
- Simplex LC connector
- Differential LVPECL inputs and outputs
- Single power supply 3.3V
- TTL signal detect indicator
- Hot Pluggable
- Class 1 laser product complies with EN 60825-1
- RoHS Compliant

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Note
Storage Temperature	T_S	-40	85	°C	
Supply Voltage	V_{CC}	-0.5	4.0	V	
Input Voltage	V_{IN}	-0.5	V_{CC}	V	

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Units	Note
Case Operating Temperature	T_C	0	70	°C	
Supply Voltage	V_{CC}	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	---	300	mA	

Diagnostics Monitoring

Parameter	Range	Accuracy	Unit	Calibration
Temperature	-40 to 95	± 3	$^{\circ}\text{C}$	External
Voltage	0 to VCC	± 0.1	V	
Bias Current	0 to 120	± 5	mA	
TX Power	-5 to +6	± 3 dB	dBm	
RX Power	-20 to 0	± 3 dB	dBm	

Transmitter Electro-optical Characteristics

V_{CC} = 3.1 V to 3.5 V, T_C = 0 $^{\circ}\text{C}$ to 70 $^{\circ}\text{C}$

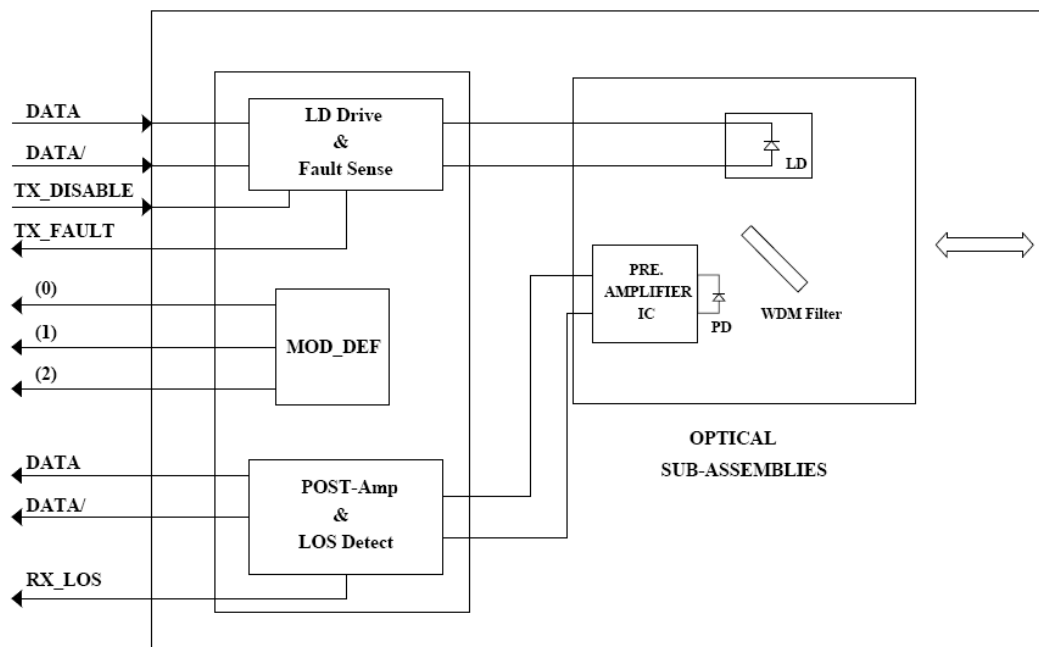
Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Bit Rate	<i>B</i>	---	2488	---	Mbps	
Output Optical Power 9/125 μm fiber	<i>P_{out}</i>	-2	---	+3	dBm	Average
Extinction Ratio	<i>ER</i>	6	---	---	dB	
Center Wavelength	λ_c	1480	1490	1500	nm	
Spectral Width (-20dB)	λ	---	---	0.6	nm	
Side Mode Suppression Ratio	<i>SMSR</i>	30			dB	
Output Eye	Compliant with Telcordia GR-253-CORE Issue 3 and ITU-T recommendation G957					
Max <i>P_{out}</i> TX-DISABLE Asserted	<i>P_{OFF}</i>	---	---	-45	dBm	
Differential Input Voltage	<i>V_{DIFF}</i>	0.4	---	2.0	V	

Receiver Electro-optical Characteristics

V_{CC} = 3.1 V to 3.5 V, T_c = 0 °C to 70 °C

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Bit Rate	<i>B</i>	---	2488	---	Mbps	
Optical Input Power-maximum	<i>P_{IN}</i>	0	---	---	dBm	BER < 10 ⁻¹⁰
Optical Input Power-minimum (Sensitivity)	<i>P_{IN}</i>	---	---	-24	dBm	BER < 10 ⁻¹⁰
Operating Center Wavelength	<i>λ_C</i>	1260	---	1360	nm	
Optical Return Loss	<i>ORL</i>	14	---	---	dB	λ=1260~1360nm
Loss of signal-Asserted	<i>P_A</i>	-35	---	---	dBm	
Loss of signal-Deasserted	<i>P_D</i>	---	---	-24	dBm	
Differential Output Voltage	<i>V_{DIFF}</i>	0.5	---	1.2	V	
Receiver Loss of Signal Output Voltage-Low	<i>RX_LOS_L</i>	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	<i>RX_LOS_H</i>	2.4	---	V _{CC}	V	

Block Diagram of Transceiver



Transmitter and Receiver Optical Sub-assembly Section

A 1490 nm InGaAsP laser and an InGaAs PIN photodiode integrate with an WDM filter to form a bi-directional single fiber optical subassembly (OSA). The laser of OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current. And, The photodiode of OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

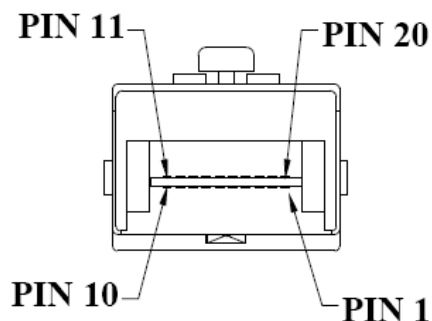
TX_DISABLE

The TX_DISABLE signal is high (TTL logic "1") to turn off the laser output.

Receive Loss (RX_LOS)

The RX_LOS is high (logic "1") when there is no incoming light from the companion transceiver. This signal is normally used by the system for the diagnostic purpose. The signal is operated in TTL level.

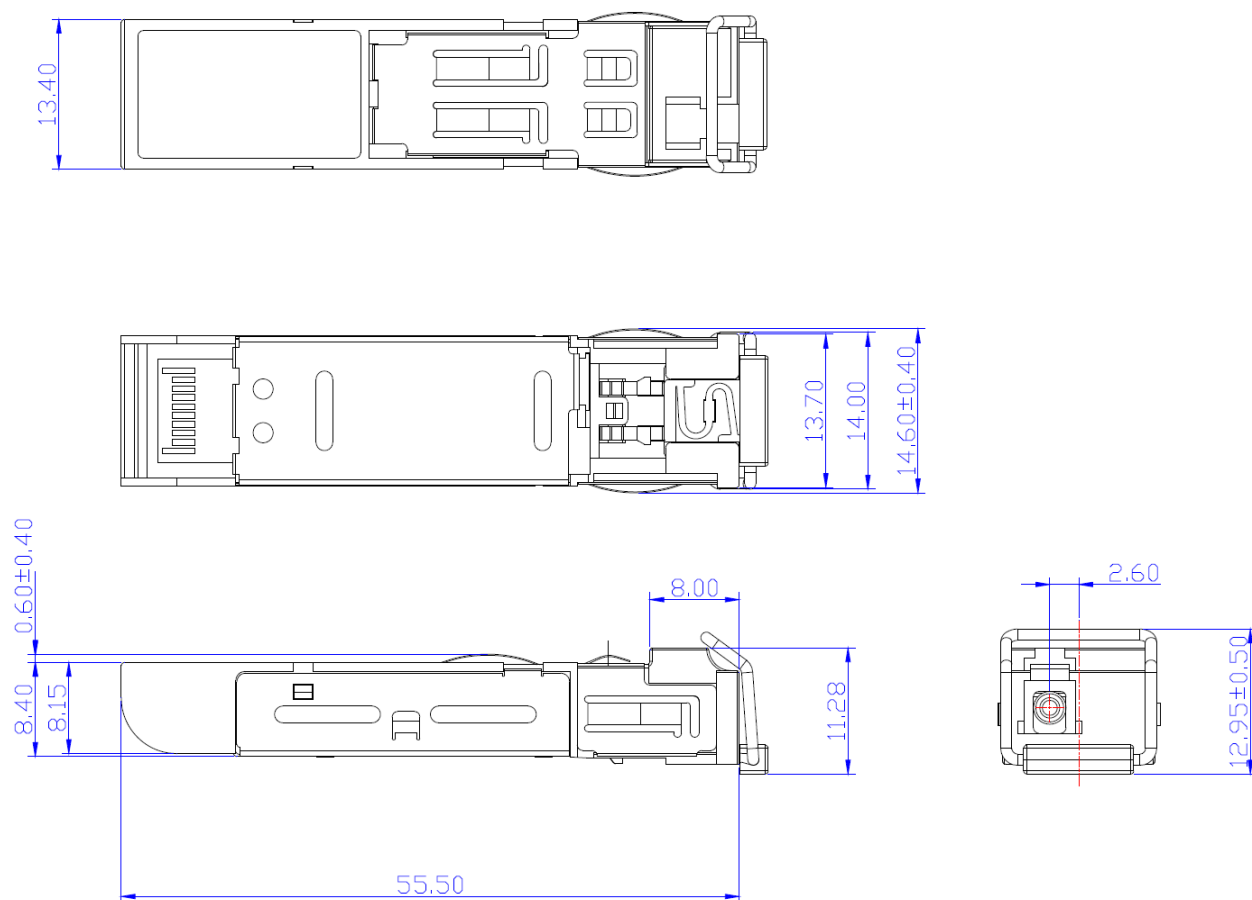
Pin Assignment



Pin Descriptions

Pin	Signal Name	Description
1	T _{GND}	Transmitter Ground
2	TX_FAULT	Transmit Fault
3	TX_DISABLE	Transmit Disable
4	MOD_DEF(2)	SDA Serial Data Signal
5	MOD_DEF(1)	SCL Serial Clock Signal
6	MOD_DEF(0)	TTL Low
7	RATE SELECT	Open Circuit
8	RX_LOS	Receiver Loss of Signal, TTL High, Open collector
9	R _{GND}	Receiver Ground
10	R _{GND}	Receiver Ground
11	R _{GND}	Receiver Ground
12	RX-	Receive Data Bar, Differential PECL, ac coupled
13	RX+	Receive Data, Differential PECL, ac coupled
14	R _{GND}	Receiver Ground
15	V _{CCR}	Receiver Power Supply
16	V _{CCT}	Transmitter Power Supply
17	T _{GND}	Transmitter Ground
18	TX+	Transmit Data, Differential PCEL, ac coupled
19	TX-	Transmit Data Bar, Differential PCEL, ac coupled
20	T _{GND}	Transmitter Ground

Dimensions



DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE $\pm 0.2\text{mm}$ UNLESS OTHERWISE SPECIFIED

Ordering Information

OP	6	C	-	S	10	-	13	-	C	M
	↑	↑		↑	↑		↑		↑	↑
Product Code:	Data Rate:	Type:		Reach:	Wavelength:		Operating Temperature:		Additional Feature:	
5=GBIC;	A=155Mb/s;	S=Single-mode;		Normal:	Normal:		C=Commercial Purpose		M=Digital Optical Monitoring	
6=SFP-LC;	B=622Mb/s;	M=Multi-mode;		X1=Under 150m;	85=850nm;		(0~70℃);		(DOM)	
7=XFP;	C=1.25Gb/s;	W=BWDM;		X3=300m;	13=1310nm;		I= Industrial Purpose		(RX_LOS for Copper TX);	
8=XENPAK;	D=2.125Gb/s;	C=CWDM;		X5=550m;	15=1550nm;		(Extended Range)		F=with Fiber Stub;	
9=X2;	E=2.5Gb/s;	D=DWDM;		02=2km,	00=Copper T (RJ-45)				I=with Isolator;	
A=SFP+;	F=4.25Gb/s;	T=Copper-T (RJ-45)		10=10km;	CWDM:				S=Customized Style	
C=QSFP;	G=3.1Gb/s;	E=GEPON ONU;		70=70km;	27=1270nm;					
F=CFP;	J=2.97G	F=GEPON OLT;		A0=100km;	47=1470nm;					
P=SFP-SC;	P=6.144G;	G=GPON ONU;		C0=120km	61=1610nm					
Q=SFP-MTRJ	Q=7.37G;	H=GPON OLT			BWDM:					
	H=8.5Gb/s;				B3=Tx1310/Rx1550; B5=Tx1550/Rx1310;					
	K=10Gb/s;				B4=Tx1310/Rx1490; B9=Tx1490/Rx1310;					
	T=1/10Gb/s				51=Tx1510/Rx1570; 57=Tx1570/Rx1510;					
	L=11.09Gb/s;				27=Tx1270/Rx1330; 33=Tx1330/Rx1270;					
	R=20Gb/s;				B2=Tx1270/Rx1577; B7=Tx1577/Rx1270					
	S=40Gb/s;				T2=2TX1310nm; T3=TX1310nm;					
	M=100Base-X SGMII;				T5=TX1550nm					
	N=100/1000Base-X SGMII;				DWDM:					
					17=Channel 17					
					34= Channel 34					
					00=Channel 17~61 Tunable					

Model Number	Part Number	Reach	TX/RX	Input/Out	Signal Detect	Temperature	LD Type
SFP-2.5-BWDM-60-49-DM	OP6E-W60-B9-CM	60 km	1490/1310	AC/AC	LVTTL	0℃ to 70℃	1490 DFB

Note: All information contained in this document is subject to change without notice.