



Features

- SFP Multi-Source Agreement compliant
- Industry standard small form pluggable (SFP) package
- Multi-Rate
- With APD
- Duplex 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	$I_{TX} + I_{RX}$	---	320	mA	

Diagnostics Monitoring

<i>Parameter</i>	<i>Range</i>	<i>Accuracy</i>	<i>Unit</i>	<i>Calibration</i>
Temperature	-20 to 95	± 3	$^{\circ}\text{C}$	External
Voltage	0 to VCC	± 0.1	V	
Bias Current	0 to 120	± 5	mA	
TX Power	-3 to +7	$\pm 3 \text{ dB}$	dBm	
RX Power	-28 to -10	$\pm 3 \text{ dB}$	dBm	

Transmitter Electro-optical Characteristics

V_{cc} = 3.1 V to 3.5 V, T_c = -10 °C to 70 °C

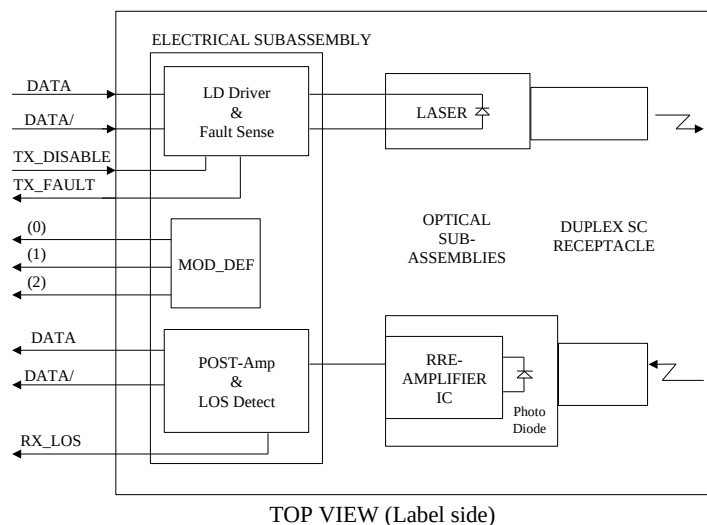
Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Output Optical Power 9/125 μ m fiber	P_{out}	+0	---	+5	dBm	Average
Extinction Ratio	ER	8.2	---	---	dB	
Center Wavelength (OP6E-C28-47-CM)	λ_C	1464.5	---	1477.5	nm	
Center Wavelength (OP6E-C28-49-CM)	λ_C	1484.5	---	1497.5	nm	
Center Wavelength (OP6E-C28-51-CM)	λ_C	1504.5	---	1517.5	nm	
Center Wavelength (OP6E-C28-53-CM)	λ_C	1524.5	---	1537.5	nm	
Center Wavelength (OP6E-C28-55-CM)	λ_C	1544.5	---	1557.5	nm	
Center Wavelength (OP6E-C28-57-CM)	λ_C	1564.5	---	1577.5	nm	
Center Wavelength (OP6E-C28-59-CM)	λ_C	1584.5	---	1597.5	nm	
Center Wavelength (OP6E-C28-61-CM)	λ_C	1604.5	---	1617.5	nm	
Spectral Width (-20dB)	$\Delta\lambda$	---	---	0.5	nm	
Side Mode suppression Ratio	SMSR	30	--	--	dB	
Relative Intensity noise	RIN	---	---	-120	dB/Hz	
Max P_{out} TX-DISABLE Asserted	P_{OFF}	---	---	-45	dBm	
Output Eye	Compliant with Telcordia GR-253-CORE Issue 3 and ITU-T recommendation G-957					
Differential Input Voltage	V_{DIFF}	0.4	---	2.0	V	
Optical path dispersion penalty				2	dB	
Maximum dispersion				1680	ps/nm	

Receiver Electro-optical Characteristics

Vcc = 3.1 V to 3.5 V, T_C = -10 °C to 70 °C

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Optical Input Power-maximum	P_{IN}	-8	---	---	dBm	BER < 10 ⁻¹⁰
RX Sensitivity @2.67Gb/s	P_{IN}	---	---	-28	dBm	PRBS23, BER < 10 ⁻¹⁰
RX Sensitivity @OC-48	P_{IN}	---	---	-28	dBm	PRBS23, BER < 10 ⁻¹⁰
RX Sensitivity @2xFC	P_{IN}	---	---	-28	dBm	PRBS7, BER < 10 ⁻¹²
RX Sensitivity @GbE	P_{IN}	---	---	-28	dBm	PRBS7, BER < 10 ⁻¹²
RX Sensitivity @OC-12	P_{IN}	---	---	-28	dBm	PRBS23, BER < 10 ⁻¹⁰
RX Sensitivity @OC-3	P_{IN}	---	---	-28	dBm	PRBS23, BER < 10 ⁻¹⁰
RX Sensitivity @Fast ethernet	P_{IN}	---	---	-28	dBm	PRBS7, BER < 10 ⁻¹⁰
Operating Center Wavelength	λ_C	1260	---	1620	nm	
Optical Return Loss	ORL	-27	---	---	dB	
Loss of Signal-Asserted	P_A	---	---	-28	dBm	
Loss of Signal-Deasserted	P_D	-45	---	---	dBm	
Differential Output Voltage	V_{DIFF}	0.5	---	1.2	V	
Receiver Loss of Signal Output Voltage-Low	RX_LOS_L	0	---	0.5	V	
Receiver Loss of Signal Output Voltage-High	RX_LOS_H	2.4	---	V_{CC}	V	

Block Diagram of Transceiver



Transmitter Section

The transmitter section consists of a 1550 nm InGaAsP laser in an eye safe optical subassembly (OSA) which mates to the fiber cable. The laser OSA is driven by a LD driver IC which converts differential input LVPECL logic signals into an analog laser driving current.

TX_DISABLE

The TX_DISABLE signal is high (LVTTTL logic "1") to turn off the laser output. The laser will turn on when TX_DISABLE is low (LVTTTL logic "0").

Receiver Section

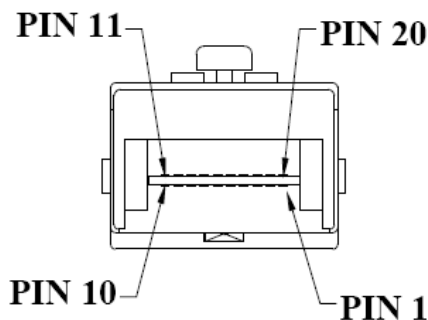
The receiver utilizes an InGaAs PIN photodiode mounted together with a trans-impedance preamplifier IC in an OSA. This OSA is connected to a circuit providing post-amplification quantization, and optical signal detection.

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 LVTTTL level.

Pin Assignment

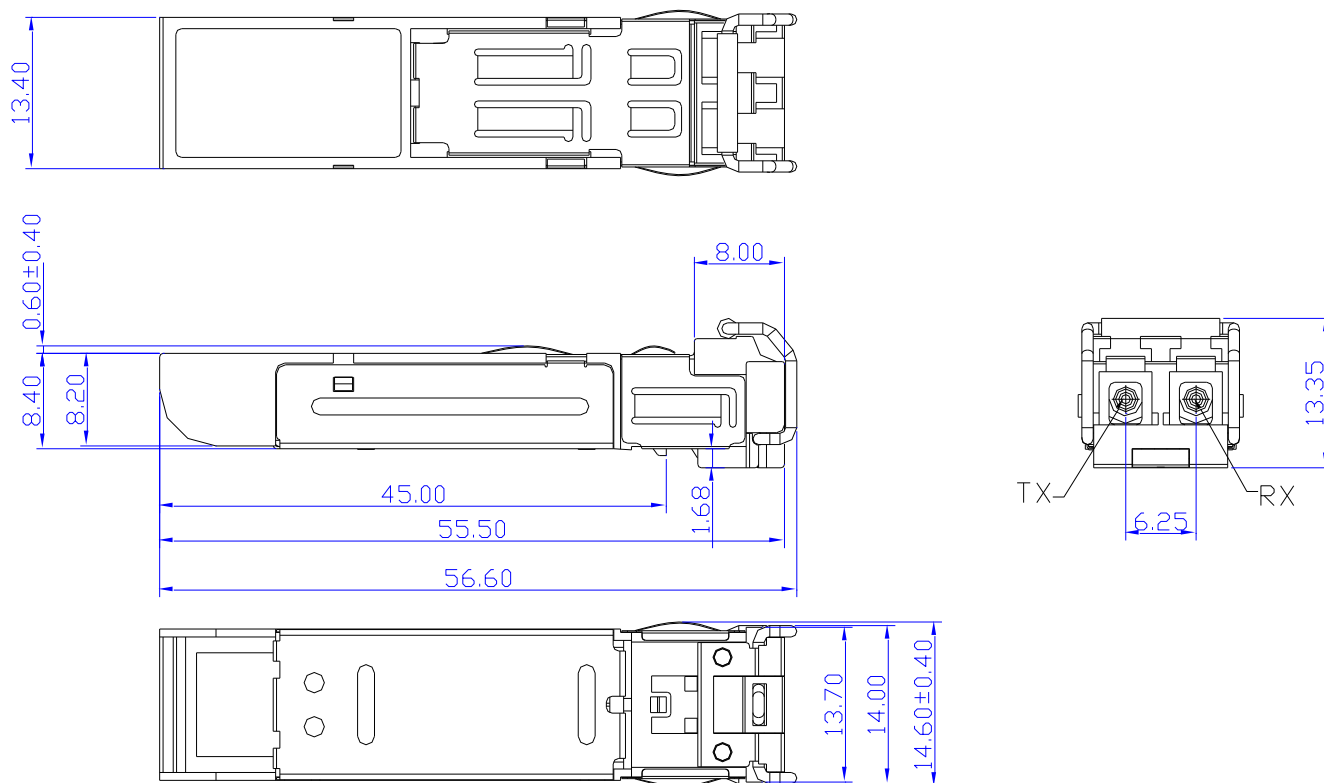
Pin-Out



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)	LVTTL Low
7	RATE SELECT	Open Circuit
8	RX_LOS	Receiver Loss of Signal, LVTTL High, Open collector
9	R _{GND}	Receiver Ground
10	R _{GND}	Receiver Ground
11	R _{GND}	Receiver Ground
12	RX-	Receive Data Bar, Differential LVPECL, ac coupled
13	RX+	Receive Data, Differential LVPECL, 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 LVPCEL, ac coupled
19	TX-	Transmit Data Bar, Differential LVPCEL, ac coupled
20	T _{GND}	Transmitter Ground

Dimensions



DIMENSIONS ARE IN MILLIMETERS

ALL DIMENSIONS ARE ± 0.2mm 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;					
P=SFP-SC;	J=2.97G	F=GEPON OLT;		A0=100km;	47=1470nm;					
Q=SFP-MTRJ	P=6.144G;	G=GPON ONU;		C0=120km	61=1610nm					
	Q=7.37G;	H=GPON OLT			BWDM:					
	H=8.5Gb/s;			CWDM:	B3=Tx1310/Rx1550; B5=Tx1550/Rx1310;					
	K=10Gb/s;			20=20dB;	B4=Tx1310/Rx1490; B9=Tx1490/Rx1310;					
	R=20Gb/s;			24=24dB;	51=Tx1510/Rx1570; 57=Tx1570/Rx1510;					
	S=40Gb/s;			28=28dB	27=Tx1270/Rx1330; 33=Tx1330/Rx1270;					
	M=100Base-X SGMII;				B2=Tx1270/Rx1577; B7=Tx1577/Rx1270					
	N=100/1000Base-X SGMII;				T2=2TX1310nm; T3=TX1310nm;					
					T5=TX1550nm					
					DWDM:					
					17=Channel 17					
					34= Channel 34					

Model Number	Part Number	Input/Output	Signal Detect	Voltage	Temperature
SFP-2.5-CWDM-28-yy-DM	OP6E-C28-yy-CM	AC/AC	TTL	3.3V	-10℃ to 70℃

Note: yy=47, Center Wavelength=1470nm ,yy=49, Center Wavelength=1490nm
 yy=51, Center Wavelength=1510nm ,yy=33, Center Wavelength=1530nm
 yy=55, Center Wavelength=1550nm ,yy=37, Center Wavelength=1570nm
 yy=59, Center Wavelength=1590nm ,yy=41, Center Wavelength=1610nm

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