Features

- SFP Multi-Source Agreement compliance
- Compliant with Fiber Channel 100-MS-SN-I and 100-M6-SN-I standard
- Compliant with IEEE802.3z Gigabit Ethernet standard
- Industry standard small form pluggable (SFP) package
- 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

Application

- Distributed multi-processing
- Switch to switch interface
- High speed I/O for file server
- Bus extension application
- Channel extender, data storage

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Note
Storage Temperature	T_S	–40	85	°C	
Supply Voltage	*Vcc*	–0.5	4.0	V	
Input Voltage	V_{IN}	–0.5	*Vcc*	V	
Output Current	I_o	---	50	mA	
Operating Current	I_{OP}	---	400	mA	

Recommended Operating Conditions

Parameter	Symbol	Min.	Max.	Units	Note
Case Operating Temperature	T_C	0	70	°C	OP6C-MX5-85-C
		-40	85	°C	OP6C-MX5-85-I
Supply Voltage	*Vcc*	3.1	3.5	V	
Supply Current	$I_{TX} + I_{RX}$	---	250	mA	

Transmitter Electro-optical Characteristics

***Vcc* = 3.1 V to 3.5 V, T_C = 0 °C to 70 °C (-40 °C to 85 °C)**

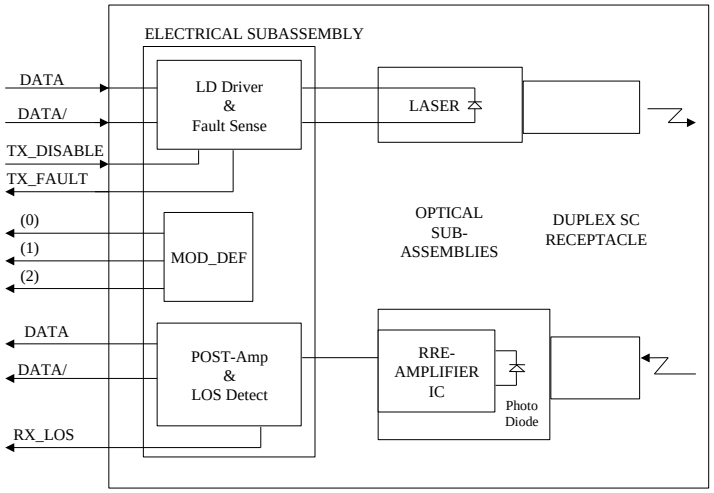
Parameter	*Symbol*	*Min.*	*Typ.*	*Max.*	*Units*	*Note*
Output Optical Power (50/125 μm fiber, NA=0.20) (62.5/125μm fiber, NA=0.275)	P_{out}	–9.5	---	-4	dBm	Average
Extinction Ratio	*ER*	9	---	---	dB	
Coupled Power Ratio	*CPR*	9	---	---	dB	
Center Wavelength	λ_C	830	850	860	nm	
Spectral Width (RMS)	$\Delta\lambda$	---	---	0.85	nm	
Rise/Fall Time, (20–80%)	$T_{r,\ f}$	---	---	260	ps	
Relative Intensity Noise	*RIN*	---	---	-117	dB/Hz	
Total Jitter	*TJ*	---	---	227	ps	
Output Eye			Compliant with IEEE802.3z			
Max. P_{out} TX-DISABLE Asserted	P_{OFF}	---	---	–45	dBm	
Differential Input Voltage	V_{DIFF}	0.4	---	2.0	V	

Receiver Electro-optical Characteristics

***Vcc* = 3.1 V to 3.5 V, T_C = 0 °C to 70 °C (-40 °C to 85 °C)**

Parameter	*Symbol*	*Min.*	*Typ.*	*Max.*	*Units*	*Note*
Optical Input Power-maximum	P_{IN}	0	---	---	dBm	BER < 10^{-12}
Optical Input Power-minimum (Sensitivity)	P_{IN}	---	---	–18	dBm	BER < 10^{-12}
Operating Center Wavelength	λ_C	770	---	860	nm	
Optical Return Loss	*ORL*	12	---	---	dB	
Signal Detect-Asserted	P_A	---	---	-18	dBm	
Signal Detect-Deasserted	P_D	–35	---	---	dBm	
Differential Output Voltage	V_{DIFF}	0.5	---	1.2	V	
Data Output Rise, Fall Time (20–80%)	$T_{r,f}$	---	---	0.35	ns	
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



TOP VIEW (Label side)

Transmitter Section

The transmitter section consists of a 850 nm VSCEL 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 (3.3V) logic signals into an analog laser driving current.

TX_DISABLE

The TX_DISABLE signal is high (TTL logic “1”) to turn off the laser output. The laser will turn on within 1ms when TX_DISABLE is low (TTL logic “0”).

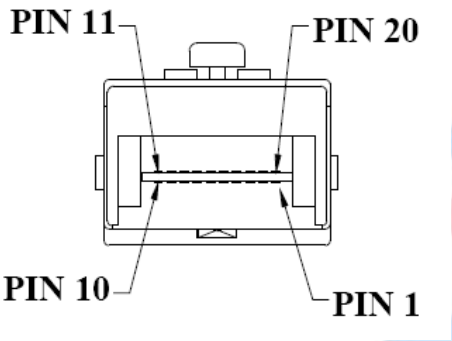
Receiver Section

The receiver utilizes a MSM detector integrated with a trans-impedance preamplifier 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 TTL level.

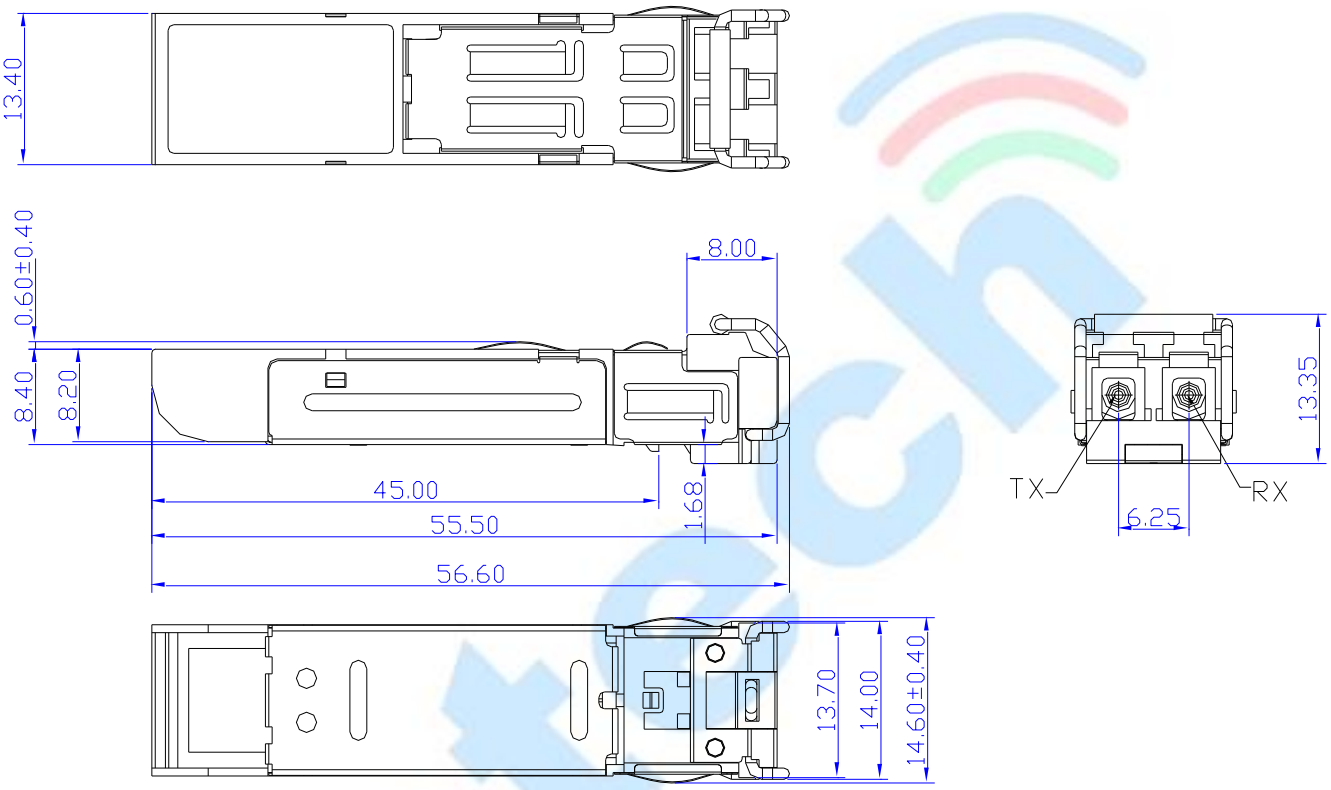
Pin Assignment



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 ± 0.2mm UNLESS OTHERWISE SPECIFIED

Ordering Information

OP 6 C - M X5 - 85 - C M

Product Code:
5=GBIC;
6=SFP-LC;
7=XFP;
8=XENPAK;
9=X2;
A=SFP+ (SFP28);
C=QSFP+ (QSFP28);
F=CFP;
G=CFP2;
H=CFP4;
P=SFP-SC;
Q=SFP-MTRJ

Data Rate:
A=155Mb/s;
B=622Mb/s;
C=1.25Gb/s;
D=2.125Gb/s;
E=2.5Gb/s;
F=4.25Gb/s;
G=3.1Gb/s;
J=2.97G
P=6.144G:
Q=7.37G;
H=8.5Gb/s;
K=10Gb/s;
T=1/10Gb/s
L=16Gb/s;
R=20Gb/s;
X=25Gb/s;
S=40Gb/s;
W=100Gb/s (4x25G or 10x10G);
M=100Base-X SGMII;
N=100/1000Base-X SGMII;

Type: S=Single-mode; M=Multi-mode; W=BWDM;
B=DUAL-BWDM;
C=CWDM;
D=DWDM;
T=Copper-T (RJ-45)
E=GEPON ONU;
F=GEPON OLT;
G=GPON ONU;
H=GPON OLT
X=MMF/SMF

Reach:
Normal:
X1=Under 150m;
X2=220m;
X3=300m;
X5=550m;
02=2km,
10=10km;
70=70km;
A0=100km;
C0=120km

CWDM:
20=20dB;
24=24dB;
28=28dB

Wavelength:
Normal:
85=850nm;
13=1310nm;
15=1550nm;
00=Copper T (RJ-45)

CWDM:
27=1270nm;
47=1470nm;
61=1610nm

BWDM:
B3=Tx1310/Rx1550; B5=Tx1550/Rx1310;
B4=Tx1310/Rx1490; B9=Tx1490/Rx1310;
51=Tx1510/Rx1570; 57=Tx1570/Rx1510;
27=Tx1270/Rx1330; 33=Tx1330/Rx1270;
B2=Tx1270/Rx1577; B7=Tx1577/Rx1270
T2=2TX1310nm; T3=TX1310nm;
T5=TX1550nm

DWDM:
17=Channel 17
34= Channel 34
00=Channel 17~61 Tunable

Operating Temperature:
C=Commercial Purpose
(0~70℃);
I= Industrial Purpose
(Extended Range)

Additional Feature:
M=Digital Optical Monitoring (DOM)
(RX_LOS for Copper TX);
F=with Fiber Stub;
I=with Isolator;
S=Customized Style

Model Number	Part Number	Reach	Input/Out	Signal Detect	Voltage	Temperature
SFP-SX	OP6C-MX5-85-C	550 m	AC/AC	TTL	3.3V	0°C to 70 °C
SFP-SX-I	OP6C-MX5-85-I	550 m	AC/AC	TTL	3.3V	-40°C to 85 °C

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