

Features

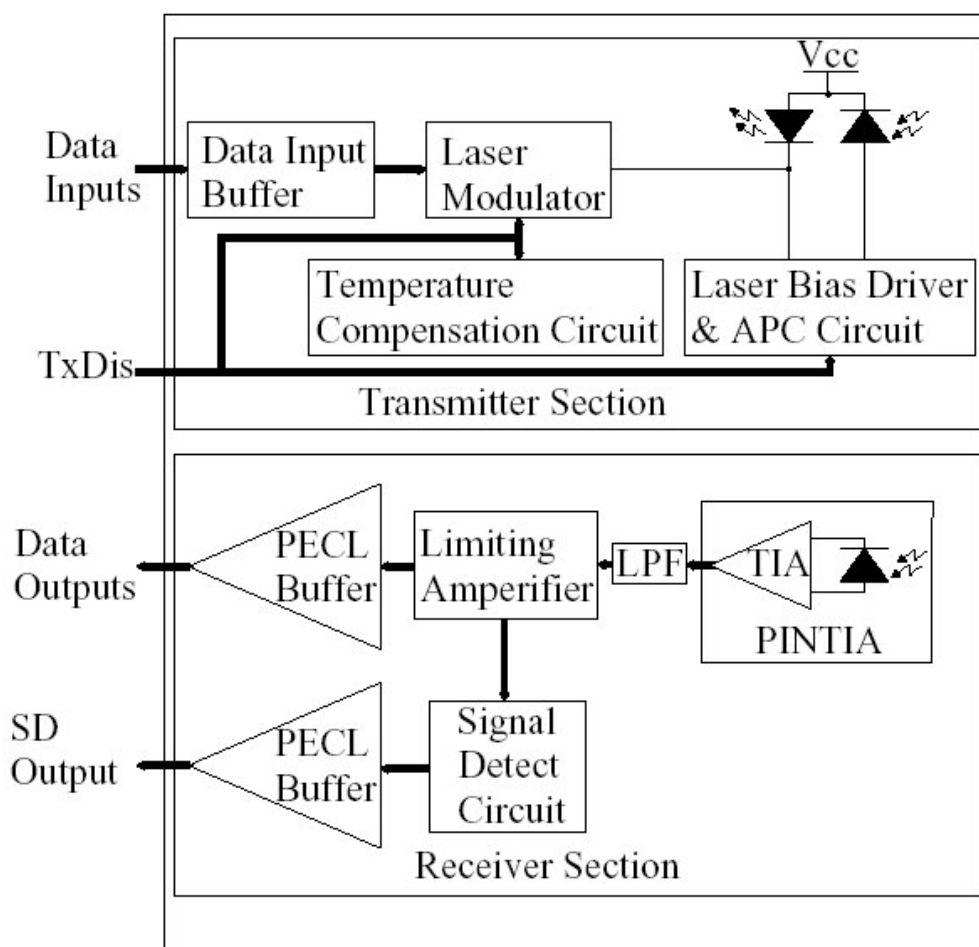
- Transceiver unit with independent
 - 1310nm DFB Laser diode transmitter
 - InGaAs PIN photodiode receiver
- Meet SFF MSA with duplex LC receptacle
- Metal enclosure for lower EMI
- +3.3V Single power supply
- Qualified to meet the intent of Bellcore reliability practices
- LVPECL logic interface simplifiers interface to external circuitry
- LVTTTL logic Signal detect output
- Links of 30km with 9/125 μm signal mode fiber (SMF)

Application

- ATM
- SONET
- Fiber Channel
- Ethernet
- Routers
- Switches
- Hubs

General

The optical transceiver is a high performance, cost effective module for serial optical data communication application.



Transmitter Section

Transmitter is designed for single mode fiber and operates at a nominal wavelength of 1310nm. The transmitter module uses a DFB laser diode and full IEC825 and CDRH class 1 eye safety. The output optical power can be disabled via the single TxDis pin. Logic LVTTTL HIGH level disables the transmitter. It contains APC function, temperature compensation circuit, PECL data inputs, LVTTTL TxDis input interface.

Receiver Section

The receiver section uses a hermetic packaged PINTIA (InGaAs PIN and trans-impedance amplifier) and a limiting amplifier. Which transforms input optical power to optical current through PIN PD. And the optical current is transformed to voltage signal by trans-impedance amplifier. Differential DATA and /DATA LVPECL data signal that is open emitter output is produced by limiting amplifier and voltage signal that is through limiting amplifier and filter. The receiver signal detect monitors input optical signal. When the optical power is not enough to support module operating normally, SD pin will beat LVTTTL logic level 0 and signal detect appears. The PINTIA is ac coupled to limiting amplifier through a low pass filter. The LPF are enough to pass the signal from 5Mb/s to 1270Mb/s without significant distortion or performance penalty.

Power Supply Filtering and Ground Planes

It is important to exercise care in circuit board layout to achieve optimum performance from these transceivers. It is further recommended that a continuous ground plane be provided in the circuit board directly under the transceiver to provide a low inductance ground for signal return current.

Electromagnetic Interference (EMI)

One of a circuit board designer’s foremost concerns is the control of electromagnetic equipment. Success in controlling generated Electromagnetic Interference (EMI) enables the designer to pass a governmental agency’s EMI regulatory standard and more importantly, it reduces the possibility of interference to neighboring equipment. The transceiver provides excellent EMI performance. STAROPTO LC transceiver use forward and backward shields, which obturates the interstice of LC module effectually, and improves EMI performance.

Application note

There are a few fundamental guidelines to follow when designing the transmitter circuit interface. On the board, every data connection should be an impedance match. The data inputs and outputs lines should be treaded as 50 ohm microstrip line, and vias should be avoided. The matching resistor should be placed at the end of each matched line. The transmitter is high frequency, high bandwidth circuits. To ensure stability, use good high frequency layout techniques, filter voltage circuit, and keep ground connections short.

Performance Specifications

stresses in excess of the absolute maximum ratings can cause catastrophic damage to the device, all parameters having values within the recommended operating conditions.

Table1. Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	
Storage Temperature	Tst	-40	+85	°C	
Input Voltage	-	GND	Vcc	V	
Power Supply Voltage	Vcc-Vee	0	+3.6	V	
Lead Soldering Temperature/Time	-	-	260/10	°C/S	
Operating Temperature	To	SSFF3251-23-115	0	+70	°C
		SSFF3251-23-215	-40	-85	

Note: Stress in excess of maximum absolute ratings can cause permanent damage to the module

Tabel 2. Operating Environment

Parameter	Symbol	Min	Max	Unit	
Power Supply Voltage	Vcc	+3.1	+3.5	V	
Ambient Operating Temperature	Tc	SSFF3251-23-115	0	+70	°C
		SSFF3251-23-215	-40	-85	

Table 3. Optical and Electrical Characteristics

Parameter	Symbol	Min	Typ	Max	Unit	Note
Transmitter						
Center Wavelength	λ_p	1280	1310	1335	nm	-
Spectral Width	$\Delta\lambda$	-	-	1	nm	-
Side Mode Suppression Ratio	SMSR	30	-	-	dB	-
Average Optical Output Power	Po	-3	-	+2	dBm	-
Extinction Ratio	EXT	8.2	-	-	Db	-
Transmitter disable Voltage	V _D	2.0	-	V _{CC}	V	-
Transmitter Enable Voltage	V _{EN}	0	-	0.8	V	-
Data Input HIGH Voltage	V _{IH}	VCC-1165	-	VCC-880	Mv	3
Data Input LOW Voltage	V _{IL}	VCC-1810	-	VCC-1475	Mv	3
Power Supply Current	I _{CC}	-	70	180	Ma	1
Optical Rise/Fall Time	Tr/TF			0.26	ns	
Receiver Specifications						
Parameter	Symbol	Min	Typ	Max	Unit	Note
Operate wavelength	λ	1260		1580	nm	
Sensitivity	Pr	-	-25	-23	dBm	2
Maximum input power	Ps	-3	-	-	dBm	2
Signal Detect Assert Level	-	-	-	-23	dBm	Low
Signal Detect Deassert Level	-	-35	-	-	dBm	Level:
Signal Detect Hysteresis		0.5	1.5	-	dB	Alarm
Operating Current	I _{CC}	-	70	180	mA	1
SD LOW-level output voltage	V _{Lout}	-	-	0.8	V	
SD HIGH-level output voltage	V _{Hout}	2.0	-	-	V	
Data Outputs	LVPECL					

LVPECL Output Pins RD+ and RD-

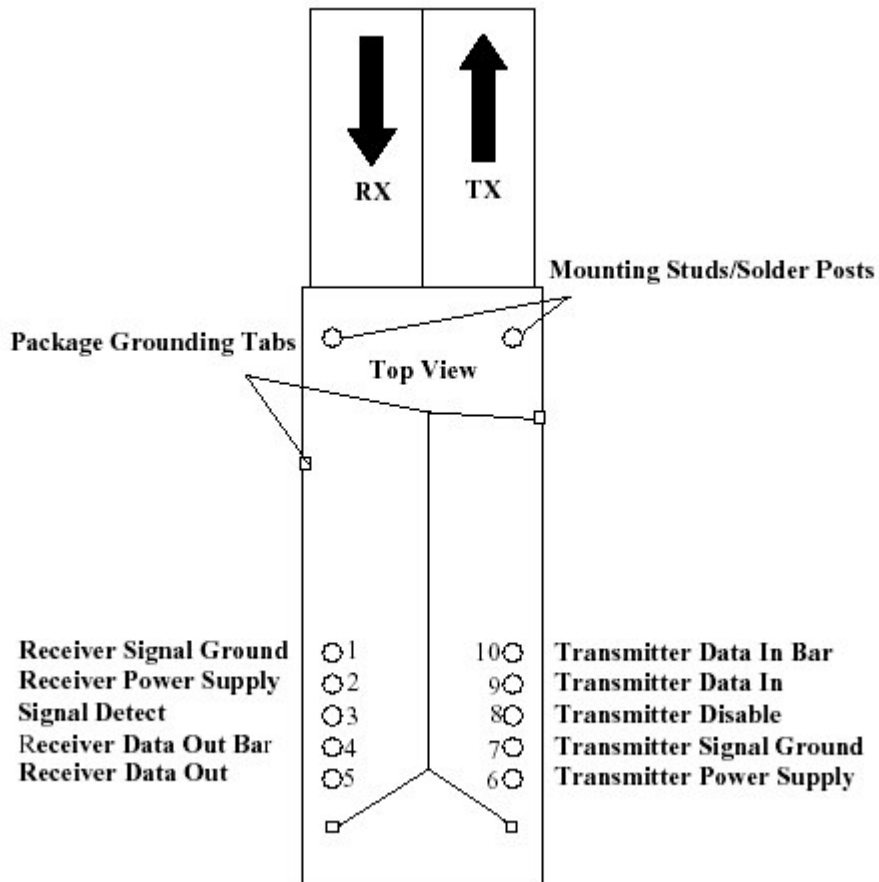
Parameter	Symbol	Min	Typ	Max	Unit	Note
LOW-level output voltage	V _{OL}	VCC - 1840	-	VCC - 1600	mV	3
HIGH-level output voltage	V _{OH}	VCC - 1100	-	VCC - 900	mV	3

Note :

- The current excludes the output load current.**
- Minimum Sensitivity and saturation levels for a $2^{23} - 1$ PRBS with 72 ones and 72 zeros inserted (ITU recommendation G958)**
- RL=50R connected to a level of Vcc - 2V.**

Pin Definitions

Pin Out Diagram



Pin Description

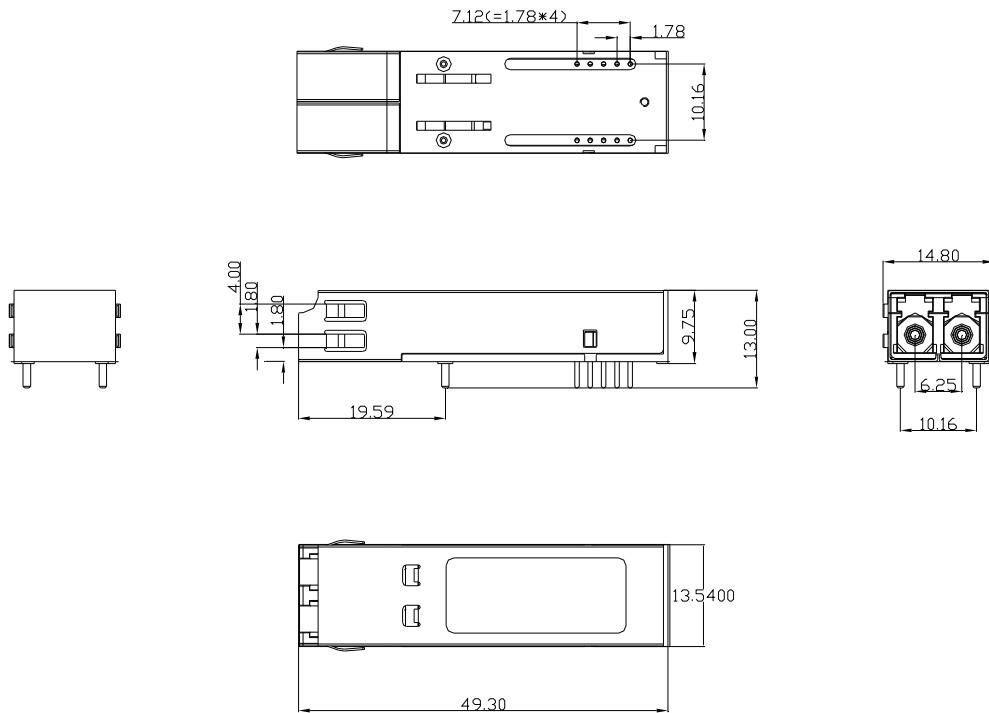
Pin#	Name	Function	Notes
		Mounting Studs/Solder Poster	Note 1
		Package Grounding Tabs	Note 2
1	VEER	Receiver Signal Grounding	Note 3
2	VCCR	Receiver Power Supply	Note 4
3	SD	Signal Detect	Note 5
4	RD-	Receiver Data Out Bar	Note 6
5	RD+	Receiver Data Out	Note 6
6	VCCT	Transmitter Power Supply	Note 7
7	VEET	Transmitter Signal Ground	Note 8
8	TxDis	Transmitter Disable	Note 9
9	TD+	Transmitter Data In	Note 10
10	TD-	Transmitter Data In Bar	Note 10

Note:

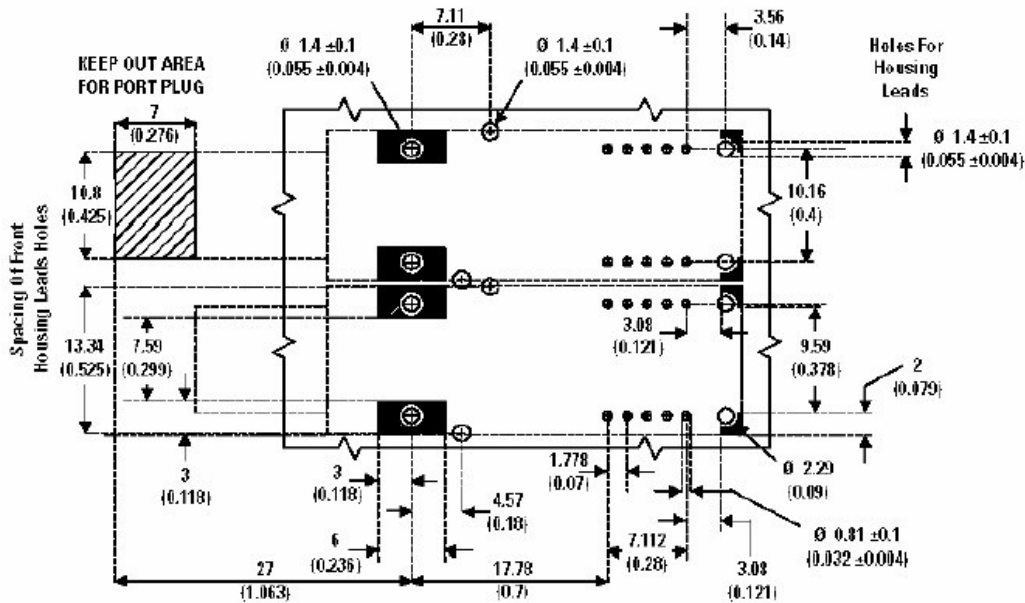
1. **The two mounting studs did not be connected to the interior of ground. They are provided for transceiver mechanical attachment to the circuit board. It is recommended that the holes in the circuit board be connected to chassis ground.**
2. **Those Tabs did not be connected to the interior of ground. Connect four package grounding tabs to receiver signal ground.**
3. **Directly connect these pins to the receiver ground plane.**
4. **Provide +3.3V DC via the recommend receiver power supply filter circuit. Locate the power supply filter circuit as close as possible to the VCC RX pin.**
5. **Normal optical input levels to the receiver result in logic "1" output. Low optical input levels to the receiver result in a logic "0" output.**
6. **These are the differential receiver outputs. They are open emitter output**
7. **Provide +3.3V DC via the recommended transmitter power supply filter circuit. Locate the power supply filter circuit as close as possible to the VCCR TX pin.**
8. **Directly connect these pins to the transmitter signal ground plane.**
9. **LVTTL logic lever, to enable module connect to TTL logic low "0".**
10. **These are the differential transmitter inputs. They are DC-coupled, differential lines with 100ohm differential termination inside the module.**

Package Information

Unit: mm



Recommended Board Layout Hole Pattern



Obtaining Document

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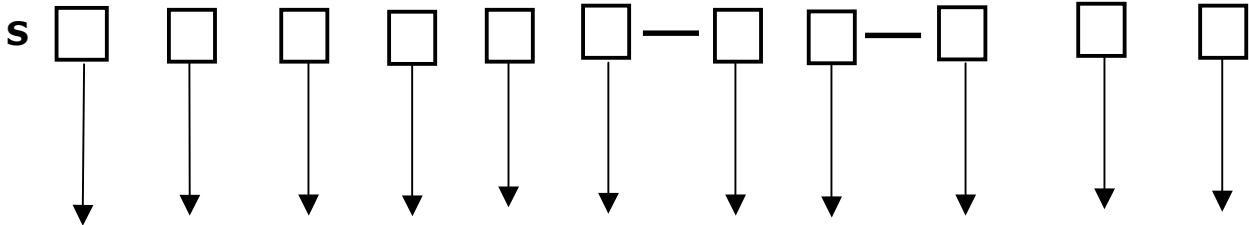
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Ordering Information



Classification: Type: Wavelength: LD Type: Data Package Output Power: Operate Signal Detect: 5:LC/PC
 S: General Product FF 3:1310 nm 1: FP rata: 1:2*5(FF) Power: -3~+2 (dBm) 3:3.3V Temperature: 1: 0~+70°C 2: -40~+85°C 2: PECL Signal/PECL Alarm

Part number	Product Information
SSFF3251-23-115	1310nm 1.25Gb/s 2*5 0~+70°C
SSFF3251-23-215	1310nm 1.25Gb/s 2*5 -40~+85°C