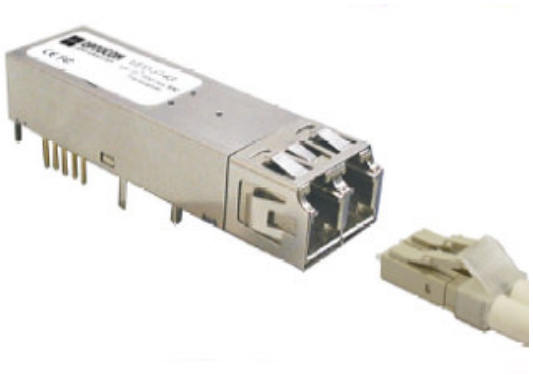
Fiber Optic SFF 2x5 850 nm LED
155 Mbps Lightwave Transceiver

Data Sheet

OSF2111



Features

- 850 nm LED
- Multimode fiber
- LC Duplex interface
- Single power supply (3.3V)
- Extremely low power consumption (<0.7W)
- Industry standard Small Form Factor (SFF) package
- 2 km link distance
- PECL differential inputs and outputs
- Signal Detect (SD) PECL compatible
- System optimized for 62.5/125µm graded index fiber
- Multisource 2x5 footprint
- Small footprint for high channel density
- 10 Mbps Ethernet compliant
- Fast Ethernet IEEE 802.3u 100Base-Fx compliant
- ESD Class 2 per MIL-STD 883 Method 3015
- FCC (Class B) and EN 55022 compliant
- FDDI PMD compliant

Applications

- 10 Mbps Ethernet
- Fiber-to-the-Desktop
- ATM/SONET OC-3/SDH STM-1
- Switches/bridges/routers/servers
- Fast Ethernet
- Local Area Network (LAN)
- FDDI
- High-speed computer links

Description

The OSF2111 transceiver provides signal conversion and processing for serial optical data communication applications. It operates over multimode fiber by converting lightwave information into an electrical signal and vice versa at a data rate of 155 Mb/s.

The transceiver is a single unit comprised of a transmitter, a receiver, and a duplex LC receptacle. This transceiver comforms to the Small Form Factor (SFF) Multi-Source Agreement (MSA) in 2x5 footprint and is specially developed for distances of up to 2 km with 62.5/125 µm or 50/125 µm multimode fibers.

This dual-fiber connector transceiver is designed for use from a single power supply (+3.3 V) for 10 Mbps Ethernet, Fast Ethernet, FDDI, and ATM/SONET applications.

Safety

Laser Compliance Statement

The OSF2111 is classified as a Class I LED Product. It complies with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions. Because the transceiver is designed to be inherently eye safe, it does not require open fiber control thus eliminating complex electronics or mechanics.

Caution – use of device other than those specified herein may result in hazardous LED radiation exposure or other damage. Please embrace all customary precautions and discretion while handling this device.

Performance Specifications

Absolute Maximum Ratings

Stresses in excess of the absolute maximum ratings can cause damage to the optical device. Operations of the optical device are suggested to remain within the recommended operating conditions. Exposure to the absolute maximum ratings for extended periods can adversely affect device reliability.

Parameter	Symbol	Minimum	Maximum	Unit
Supply Voltage	V_{CC} –V_{EE}	-0.5	5.5	V
Data Input Levels (PECL)	V_{IN}		V_{EE}-V_{CC}	V
Differential Data Input Voltage			3	V
Operating Ambient Temperature	T_{AMB}	-40	+85	˚C
Storage Ambient Temperature	T_{STG}	-40	+85	˚C
Humidity/Temperature Test Condition	R_H		85/85	%/˚C
Soldering Conditions, Temp/Time (MIL-STD 883C, Method 2003)	T_{SOLD} / t_{SOLD}		270/10	˚C /sec
ESD Resistance (all pins to V_{EE}, human body)			1.5	kV
Output Current	I_O		50	mA

Recommended Operating Conditions

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Ambient Temperature[1]	T_{AMB}	0		70	˚C
Power Supply Voltage[1]	V_{CC} -V_{EE}	3.1	3.3	3.5	V
Supply Current[2]	I_{CC}			230	mA
Transmitter					
Data Input High Voltage	V_{IH}-V_{CC}	-1165		-880	mV
Data Input Low Voltage	V_{IL}-V_{CC}	-1810		-1475	mV
Threshold Voltage	V_{BB}-V_{CC}	-1380		-1260	mV
Input Data Rise/Fall, 20%-80%	t_R, t_F	0.4		1.3	ns
Data High Time[3]	t_{on}			1000	ns
Receiver					
Output Current	I_O			25	mA
Input Duty Cycle Distortion	t_{DCD}			1.0	ns
Input Data Dependent Jitter	t_{DDj}			0.4	ns
Input Random Jitter	t_{RJ}			0.76	ns
Input Center Wavelength	I_C		850		nm
Electrical Output Load[4]	R_L		50		Ω

Notes:
1. **Maximum power supply voltage cannot be used at maximum temperature range.**
2. **For V_{CC}-V_{EE} (min., max.), 50% duty cycle. The supply current (I_{CC}) does not include the load drive current. Add maximum 45 mA for the three outputs. Load is 50 Ω into V_{CC}-2V.**
3. **To maintain good LED reliability, the device should not be held in the ON state for more than the specified time. Normal operation should be done with 50% duty cycle.**
4. **To achieve proper PECL output levels, the 50 Ω termination should be done to V_{CC}-2V. For correct terminations, see the application notes.**

Transmitter Electro-Optical Characteristics

Parameter	Symbol	Minimum	Typical	Maximum	Unit
Data Rate	DR		155	160	Mbps
Launched Power (Average) into 62.5 µm Fiber[1,2]	Po	-20	-16	-14	dBm
Center Wavelength[2,3]	λc	1270		1360	nm
Spectral Width (FWHM) [2,4]	Δλ			200	nm
Optical Rise/Fall Time, 10%-90%[2,5]	t_R , t_F	0.6		3.0	ns
Extinction Ratio (Dynamic) [2,6]	Er	8.2			dB
Optical Power Low[7]	P_{TD}			-45	dBm

Notes:
1. **Measured at the end of 5 meters of 62.5/125 graded index fiber using calibrated power meter and a precision test ferrule. Cladding modes are removed. Values valid for EOL and worst-case temperature.**
2. **The input data pattern is a 12.5 MHz square wave pattern.**
3. **Center wavelength is defined as the midpoint between the two 50% levels of the optical spectrum of the LED.**
4. **Spectral width (full width, half max) is defined as the difference between 50% levels of the optical spectrum of the LED.**
5. **10% to 90% levels. Measured using the 12.5 MHz square wave pattern with an optoelectronic measurement system (detector and oscilloscope) having 3 dB bandwidth ranging from less than 0.1 MHz to more than 750 MHz.**
6. **Extinction Ratio is defined as PL/PH in dB, measurement system as in Note 5.**
7. **Optical Power Low is the output power level when a steady state low data pattern (FDDI Quiet Line state) is used to drive the transmitter. Value valid <1 ms after input low.**

Receiver Electro-Optical Specifications

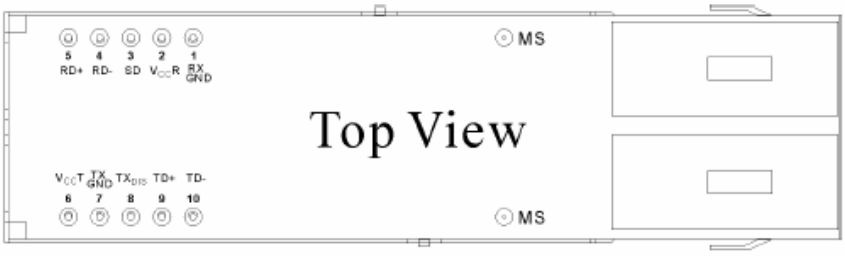
Parameter	Symbol	Minimum	Typical	Maximum	Unit
Data Rate	DR	10	155	160	Mbps
Sensitivity (Average Power) [1]			-34	-32	dBm
Saturation (Average Power) [1]	P_{SAT}	-14			dBm
Signal Detect Assert Level[2]	P_{SDA}	-42.5		-32	dBm
Signal Detect Deassert Level[3]	P_{SDD}	-47		-30.5	dBm
Signal Detect Hysteresis	P_{SDA}- P_{SDD}	0.5		4	dB
Output Low Voltage[4]	V_{OL}- V_{CC}	-1810		-1620	mV
Output High Voltage[4]	V_{OH}- V_{CC}	-1025		-880	mV
Output Data Rise/Fall Time, 10%-90%	t_R, t_F			1.5	ns
Output SD Rise/Fall Time, 10%-90%	t_{SDR}, t_{SDF}			40	ns

Notes:
1. **For a bit error rate (BER) of less than $1x10^{-10}$ over a receiver eye opening of at least 1.5 ns. Measured with a 2^{23}-1 PRBS at 155 Mbps.**
2. **An increase in optical power through the specified level will cause the SIGNAL detect output to switch from a Low state to a High state.**
3. **A decrease in optical power through the specified level will cause the SIGNAL detect output to switch from a High state to a Low state.**
4. **PECL compatible. Load is 50 Ω into V_{CC}-2V. Measured under DC conditions. For dynamic measurements a tolerance of 50 mV should be added.**

Regulatory Compliance

Feature	Standard	Comments
Electromagnetic Interference (EMI)	FCC Class B EN 55022 Class B CISPR 22	Noise frequency range: 30 MHz to 1 GHz
Immunity: Electrostatic Discharge	EN 61000-4-2 IEC 1000-4-2	Discharges of ±1.5kV with an air discharge probe on the receptacle cause no damage.
Immunity: Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 1000-4-3	With a field strength of 10 V/m rms, noise frequency ranges from 10 MHz to 1 GHz.
Eye Safety	IEC 825-1	Class 1 LED Product (KLASSE 1 LED PRODUCT)

Connection Diagram

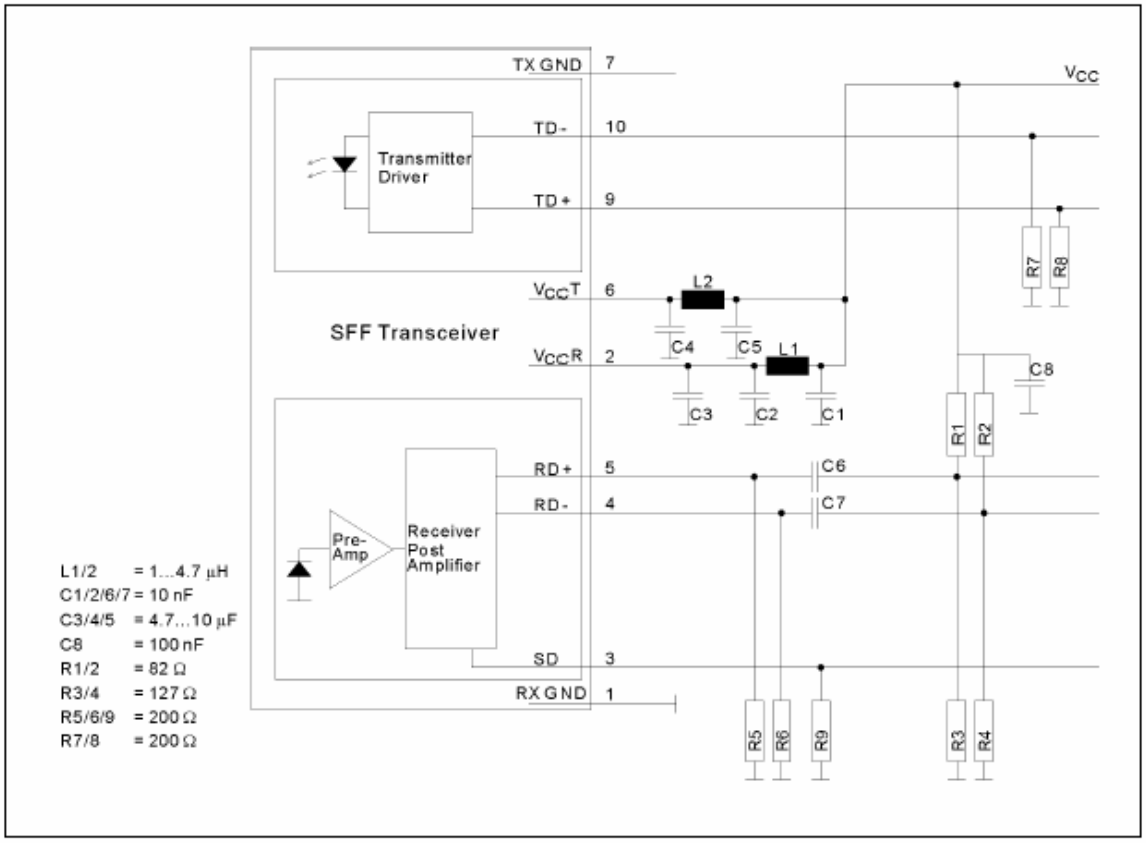


Pin Assignment and Description

Pin Name		Level/ Logic	Pin#	Description
RX GND	Receiver Signal Ground	N/A	1	
VccR	Receiver Power Supply	N/A	2	
SD	Signal Detect	PECL compatible	3	Normal Operation: Logic "1" Output, represents that light is present at receiver input. Fault Condition: Logic "0" Output
RD-	Received Data Out Not	PECL, DC coupled	4	Receiver Data Out Not
RD+	Received Data Out	PECL, DC coupled	5	Receiver Data Out
VccT	Transmitter Power Supply	N/A	6	
TX GND	Transmitter Signal Ground	N/A	7	
TX_{DIS}	Transmitter Disable	NC	8	NC
TD+	Transmit Data	PECL, DC coupled	9	Transmitter Data In
TD-	Transmit Data Not	PECL, DC coupled	10	Transmitter Data Not In
CG	Case Ground	N/A		An optional connection of the transceiver to the equipment chassis ground. The holes in the circuit board must be tied to chassis ground.
MS	Mounting Stud	N/A		The mounting studs are provided for transceiver mechanical attachment to the circuit board.

Application Notes

Multimode 850 LED Ethernet/Fast Ethernet/FDDI/ATM 2x5 Transceiver Interface Diagram



Solutions for Connecting a 3.3V Fiber Optic Transceiver to a 5.0V Framer-/Phy- Device

Figure 1. Common GND

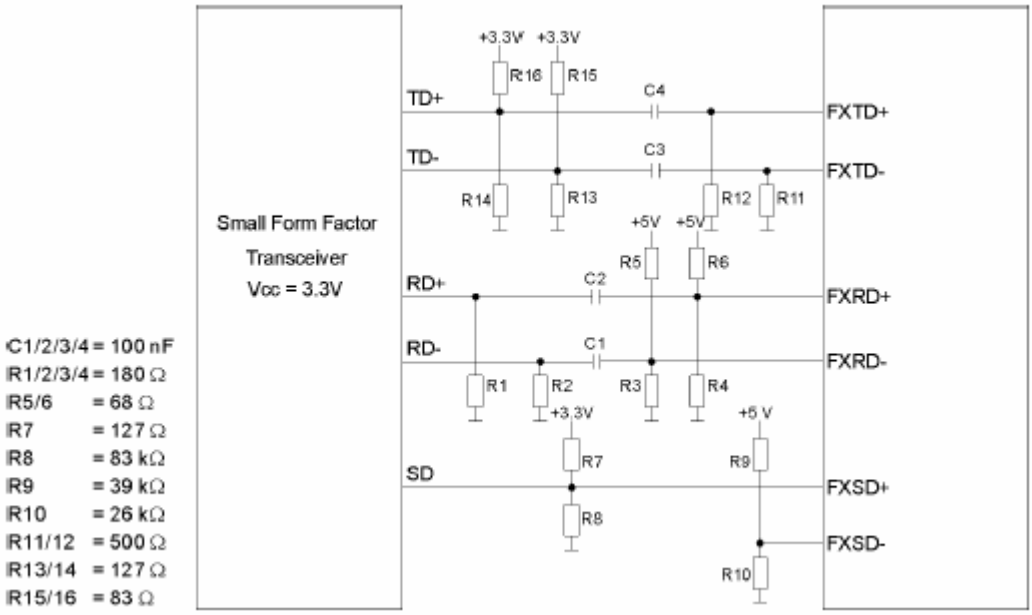
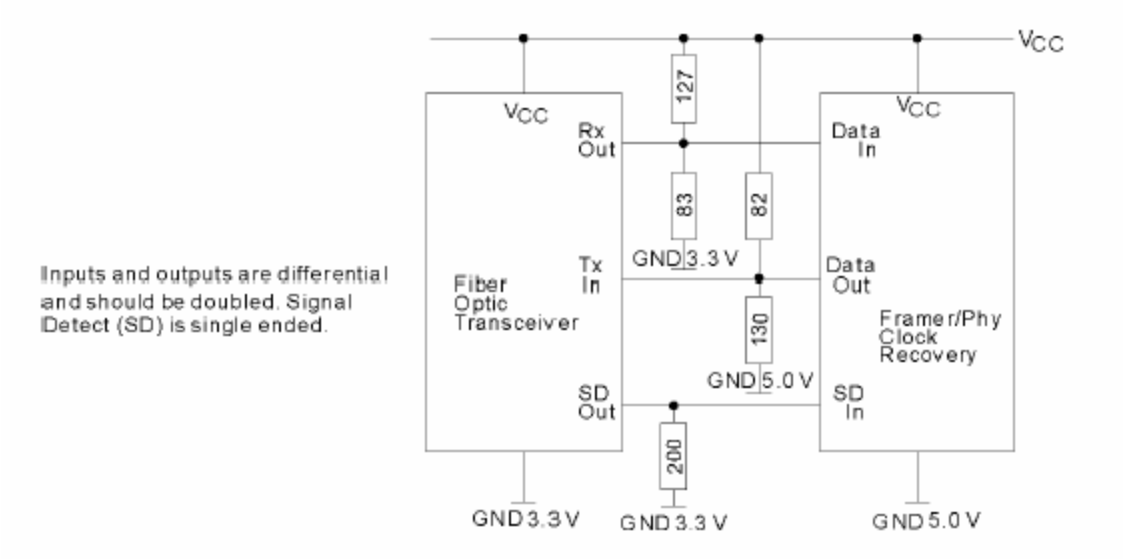


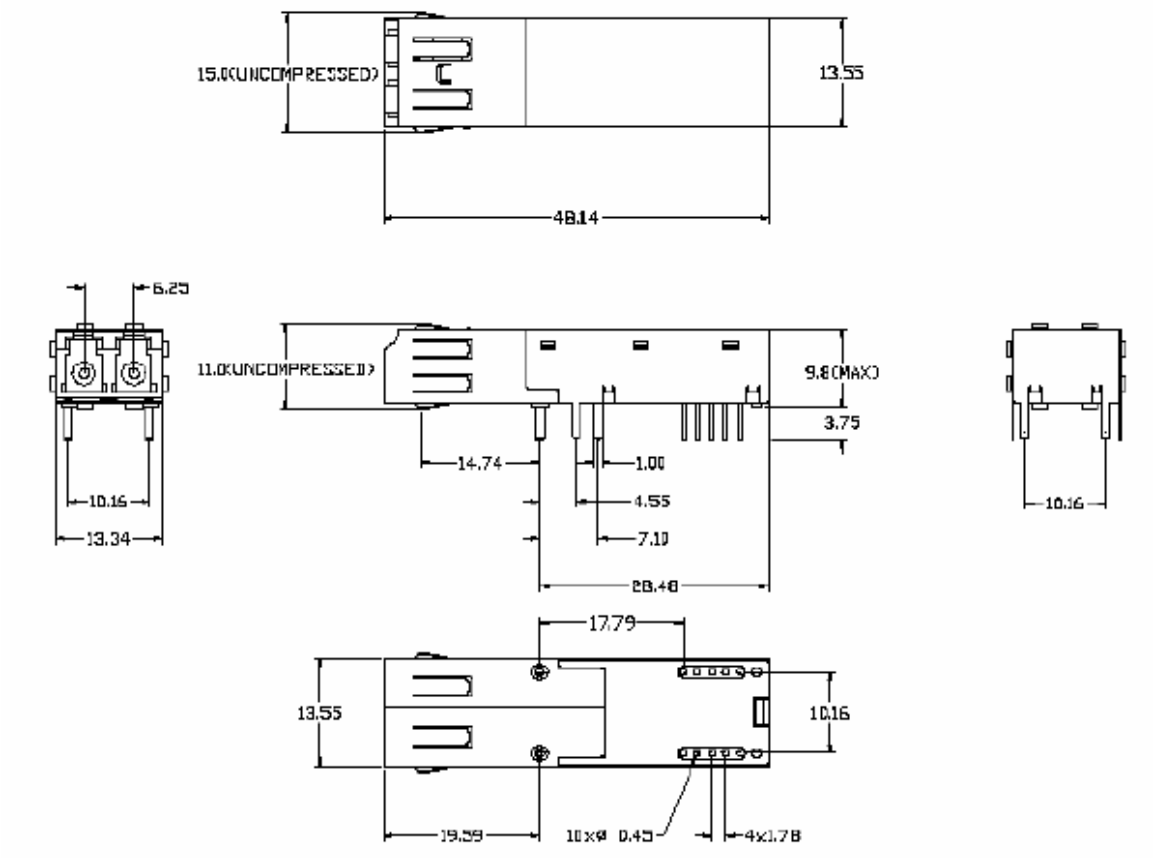
Figure 2. Common Vcc



Physical Characteristics

Outline Diagram

Dimensions for the device package are given in millimeters.



Additional Information

Contact

For additional information, product specifications, or information about Optocom:

Internet: http://www.optocom.com
Email: sales@optocom.com
Tel: +1 978 988 8711
Fax: +1 978 988 8722