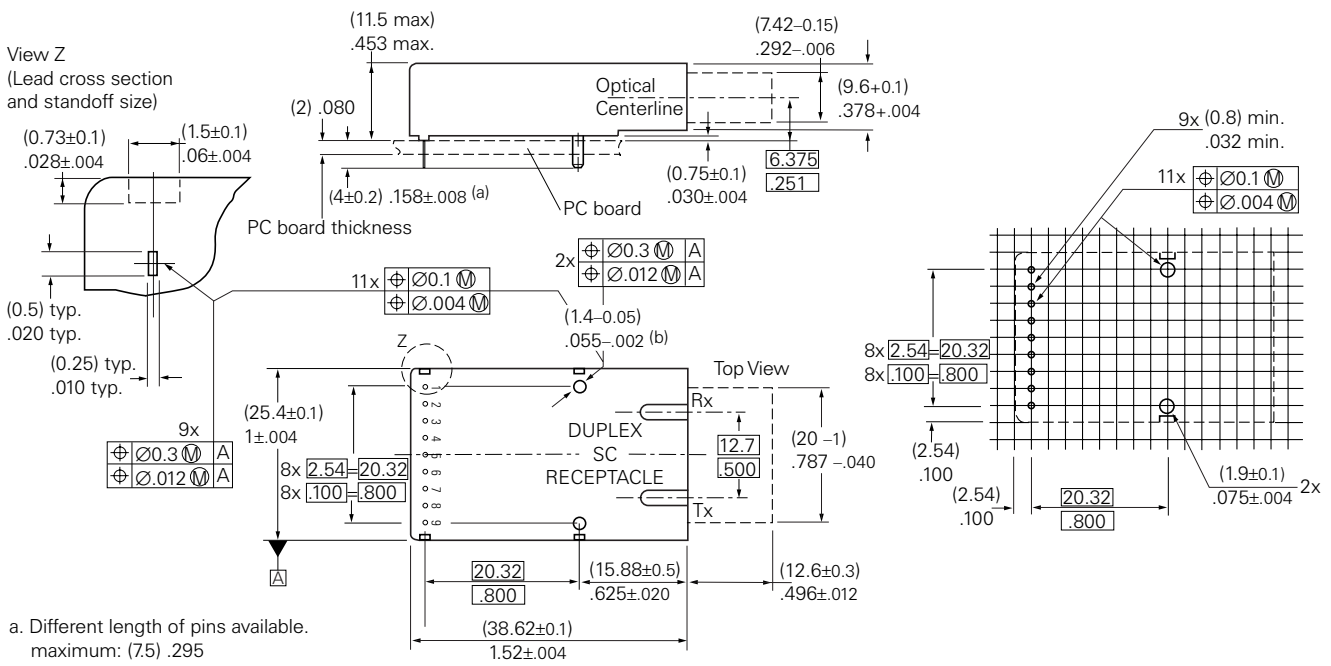
SIEMENS

V23806-A34-C2

Single Mode FDDI 1x9 Transceiver with SC Receptacle

Dimensions in (mm) inches



a. Different length of pins available.
maximum: (7.5) .295

b. Isolated posts on request

FEATURES

- **Compliant with existing FDDI standard**
- **Compact integrated transceiver unit with**
  - **MQW laser diode transmitter**
  - **InGaAs PIN photodiode receiver**
  - **Duplex SC receptacle**
- **Class 1 FDA and IEC laser safety compliant**
- **Single power supply (5 V)**
- **Loss of optical signal indicator**
- **PECL differential inputs and outputs**
- **Process plug included**
- **Wave solderable and washable with process plug inserted**

Absolute Maximum Ratings

Exceeding any one of these values may destroy the device immediately.

Package Power Dissipation(1)	1 W
Supply Voltage (V_{CC}–V_{EE})	6 V
Data Input Levels (PECL)	V_{CC}–0.7 V
Differential Data Input Voltage	3 V
Operating Ambient Temperature	0°C to 70°C
Storage Ambient Temperature	–40°C to 85°C
Soldering Conditions, Temp/Time (MIL-STD 883C, Method 2003)	250°C/5.5s

Note

1. For V_{CC}–V_{EE} (min., max.). 50% duty cycle. The supply current does not include the load drive current of the receiver output. Add max. 45 mA for the three outputs. Load is 50 Ω to V_{CC}–2 V.
2. After Power On the 5 V supply must be achieved within 50 ms. Otherwise the laser safety control circuitry switches the laser off.

DESCRIPTION

This data sheet describes the Siemens Single Mode SC FDDI transceiver, which complies with the current Fiber Distributed Data Interface (FDDI) Single Mode Fiber Physical Layer Medium Dependent (SMF-PMD ANSI standard).

The Siemens single mode SC FDDI transceiver is a single unit comprised of a transmitter, a receiver, and an SC receptacle. This design frees the customer from many alignment and PC board layout concerns. The module is designed for low cost LAN and WAN applications. It can

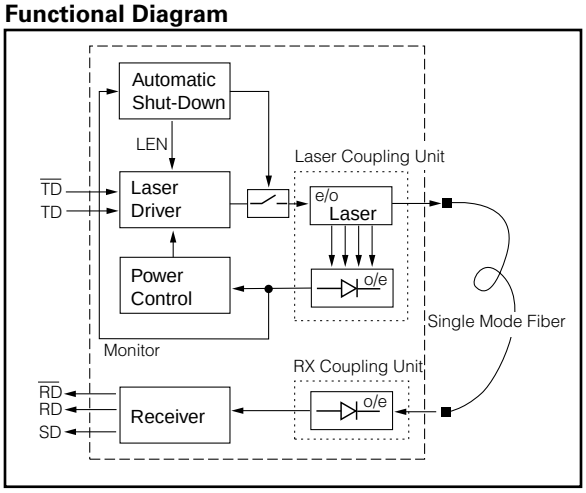
be used as the network end device interface in workstations, servers, and storage devices, and in a broad range of network intermediate devices such as bridges, routers, intelligent hubs, and concentrators.

This transceiver operates at 125 MBaud from a single power supply (+5 Volt). The full differential data inputs and outputs are PECL compatible.

Functional Description of 1x9 Pin Row Transceiver

This transceiver is designed to transmit serial data via single mode cable.

Functional Diagram



The receiver component converts the optical serial data into PECL compatible electrical data (RD and RDnot). The Signal Detect (SD, active high) shows whether an optical signal is present. If no optical input signal is present, the receiver data outputs are switched to static low level (RD=Low, RDnot=High).

The transmitter converts electrical PECL compatible serial data (TD and TDnot) into optical serial data. It contains a laser driver circuit that drives the modulation and bias current of the laser diode. The currents are controlled by a power control circuit to guarantee constant output power of the laser over temperature and aging. The power control uses the output of the monitor PIN diode (mechanically built in the laser coupling unit) as a controlling signal, to prevent the laser power from exceeding the operating limits.

Single fault condition is ensured by means of an integrated automatic shutdown circuit that disables the laser when it detects transmitter failures. A reset is only possible by turning the power off, and then on again.

TECHNICAL DATA

The electro-optical characteristics described in the following tables are valid only for use under the recommended operating conditions.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units
Ambient Temperature	T_{AMB}	0		70	°C
Power Supply Voltage	$V_{CC}–V_{EE}$	4.75	5.0	5.25	V
Supply Current(1)	I_{CC}		150	250	mA
Transmitter					
Data Input High Voltage	$V_{IH}–V_{CC}$	–1165		–880	mV
Data Input Low Voltage	$V_{IL}–V_{CC}$	–1810		–1475	
Input Data Rise/Fall Time, 10%–90%	t_R, t_F	0.4		1.3	ns
Receiver					
Output Current	I_O			25	mA
Input Center Wavelength	λ_C	1260		1360	nm

Note

1. For $V_{CC}–V_{EE}$ (min., max.). 50% duty cycle. The supply current does not include the load drive current of the receiver output. Add max. 45 mA for the three outputs. Load is 50 Ω to V_{CC}–2 V.

Transmitter Electro-Optical Characteristics

Transmitter	Symbol	Min.	Typ.	Max.	Units
Output Power (Average)(1)	P_O	–20	–16	–14	dBm
Center Wavelength(2, 3)	l_C	1270		1340	nm
Spectral Width (RMS)(3, 4)	σ_λ			15	
Output Rise Time(5)	t_R	0.6		3.5	ns
Output Fall Time(5)	t_F				
Extinction Ratio (Dynamic)	ER	10			dB
Overshoot	OS			25	%
Duty Cycle Distortion(6, 7)	DCD			1.0	ns
Data Dependent Jitter(7, 8)	DDJ			0.6	
Random Jitter(7, 9)	RJ			0.69	

Notes

1. Measured at the end of 5 meters of single mode fiber. The FDDI Halt Line state (12.5 MHz square wave) is used. Specified values are valid for EOL and over the whole temperature range.
2. The weighted average wavelength of the optical spectrum output.
3. FOTP-127 is used to measure central wavelength and RMS spectral width.
4. The weighted root mean square (RMS) width of the optical output spectrum.
5. To 90% (90% to 10%) levels. Measured using the Halt Line state (12.5 MHz square wave).
6. Measurement done using the Idle Line state (62.5 MHz square wave).
7. Test method as in PMD Appendix A. All jitter values are peak-to-peak.
8. Measurement done using the Worst Case test pattern described in the PMD Appendix A.5.
9. Measurement done using the Idle Line state (62.5 MHz square wave). BER=2.5E–10.

Receiver Electro-Optical Characteristics

Receiver	Symbol	Min.	Typ.	Max.	Units
Sensitivity (Average Power)(1)	P_{IN}		–33	–31	dBm
Saturation (Average Power)(1)	P_{SAT}	–14			
Signal Detect Assert Level(2)	P_{SDA}			–31	
Signal Detect Deassert Level(3)	P_{SDD}	–40.5		–32.5	
Signal Detect Hysteresis	P_{SDA}–P_{SDD}	1			dB
Signal Detect Assert Time	t_{ASS}			100	µs
Signal Detect Deassert Time	t_{DAS}			350	
Output Low Voltage(4)	V_{OL}–V_{CC}	–1950		–1630	mV
Output High Voltage(4)	V_{OH}–V_{CC}	–1025		–735	
Output Data Rise/Fall Time, 10%–90%	t_R, t_F			1.3	ns
Output SD Rise/Fall Time(5)				40	
Duty Cycle Distortion(6, 7)	DCD			0.4	
Data Dependent Jitter(7, 8)	DDJ			1.0	
Random Jitter(7, 9)	RJ			2.1	

Notes

1. Minimum average power at which the BER is less than 2.5E–10 or lower. Measured with the ANSI Worst Case pattern from Appendix 5 of the PMD.
2. An increase in optical power above the specified level will cause the SIGNAL DETECT to change from Low to High.
3. A decrease in optical power below the specified level will cause the SIGNAL DETECT to change from High to Low.
4. PECL compatible. Load is 50 Ω into V_{CC}–2 V. Measured under DC conditions. For dynamic measurements a tolerance of 50 mV should be added. V_{CC}=5 V.
5. PECL compatible. A high level on this output shows that an optical signal is applied to the optical input.
6. Measurement done using the Idle Line state (62.5 MHz square wave).
7. Test method as in PMD Appendix A. All jitter values are peak-to-peak.
8. Measurement done using the Worst Case test pattern described in the PMD Appendix A.5.
9. Measurement done using the Idle Line state (62.5 MHz square wave). BER=2.5E–10.

Pin Description 1x9 Pin Row

Pin Name		Level	Pin #	Description
RxV_{EE}	Rx Ground	Power Supply	1	Negative power supply, normally ground
RD	Rx Output Data	PECL Output	2	Receiver output data
RDn	Rx Output Data	PECL Output	3	Inverted receiver output data
Rx SD	RX Signal Detect	PECL Output active high	4	A high level on this output shows that an optical signal is applied to the optical input.
RxV_{CC}	Rx +5 V	Power Supply	5	Positive power supply, +5 V
TxV_{CC}	Tx +5 V	Power Supply	6	Positive power supply, +5 V
TDn	Tx Input Data	PECL Input	7	Inverted transmitter input data
TD	Tx Input Data	PECL Input	8	Transmitter input data
TxV_{EE}	Tx Ground	Power Supply	9	Negative power supply, normally ground
	Ground	Power Supply	S1/2	V_{EE}/GND Support stud (GND) connect to V_{EENB}

Regulatory Compliance

Feature	Standard	Comments
Electrostatic Discharge (ESD) to the Electrical Pins	MIL-STD 883C Method 3015.4	Class 1 (>1000 V)
Immunity: Electrostatic Discharge (ESD) to the Duplex SC Receptacle	EN 61000-4-2 IEC 1000-4-2	Discharges of ±15kV 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. No effect on transceiver performance between the specification limits.
Emission: Electromagnetic Interference (EMI)	FCC Class B EN 55022 Class B CISPR 22	Noise frequency range: 30 MHz to 1 GHz

LASER SAFETY

This single mode FDDI transceiver is a Class 1 laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated under recommended operating conditions.

Caution

The use of optical instruments with this product will increase eye hazard!

General Restrictions

Classification is valid only if the module is operated within the specified temperature and voltage limits. The system using the module must provide power supply protection that guarantees that the system power source will cease to provide power if the maximum recommended operation limit or more is detected on the +5 V at the power source. The operating temperature of the module must be in the temperature range given in the recommended operating limits. These limits guarantee the laser safety.

Usage Restrictions

The optical ports of the modules shall be terminated with an optical connector or with a dust plug.

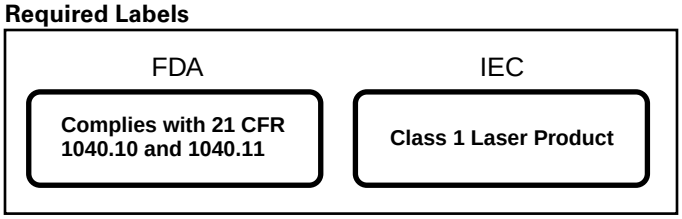
Note

Failure to adhere to the above restrictions could result in a modification that is considered an act of "manufacturing," and will require, under law, recertification of the modified product with the U.S. Food and Drug Administration (ref. 21 CFR 1040.10 (i)).

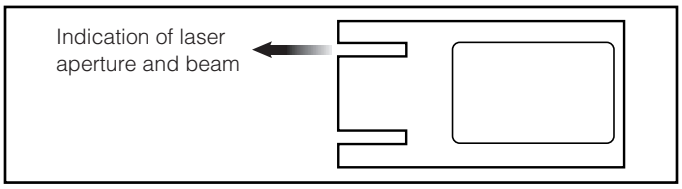
Laser Data

Wavelength	1300 nm
Total output power (as defined by IEC: 50 mm aperture at 10 cm distance)	2 mW
Total output power (as defined by FDA: 7 mm aperture at 20 cm distance)	180 µW
Beam divergence	4°

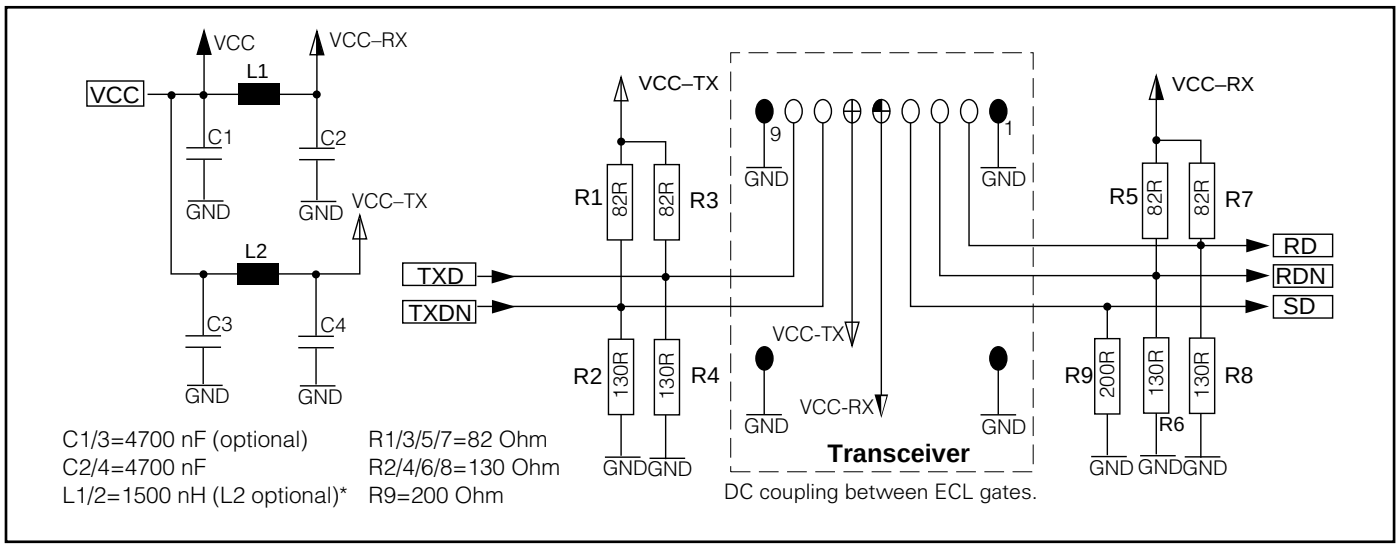
Required Labels



Laser Emission



APPLICATION NOTE FOR 1X9 PIN ROW TRANSCEIVER



*Recommended choke is Siemens Matsushita B78108-S1153-K or B78148-S1153-K (Q_{min}=60, max. DC resistance=0.6 Ohm).

The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module V_{CC}–RX/ V_{CC}–TX. The transceiver contains an automatic shutdown circuit. Reset is only possible if the power is turned off, and then on again. (V_{CC}TX=0 V).