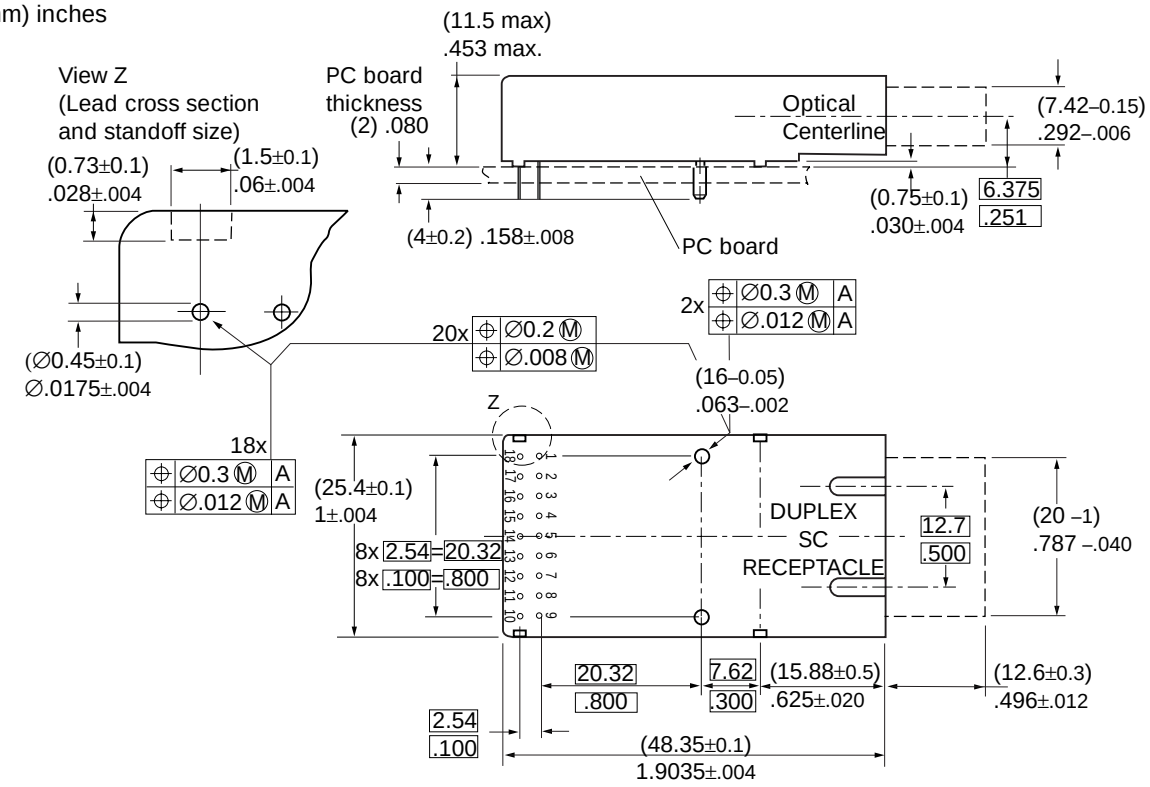
SIEMENS

V23806-A84-C1

Single Mode 155 MBd ATM Transceiver 2x9

Dimensions in (mm) inches



PIN Description

Pin#	Name	Pin#	Name	Pin#	Name
1	Rx V_{EE}	8	Tx D	14	Pwr Mon
2	Rx D	9	Tx V_{EE}	15	NC
3	Rx Dn	10	NC	16	NC
4	SD	11	Tx Alm	17	NC
5	Rx V_{CC}	11	Tx Alm	18	NC
6	Tx V_{CC}	12	Tx En	S1, S2	V_{EE} (GND)
7	Tx Dn	13	Bias Mon		

FEATURES

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

Maximum Ratings (Absolute maximum stress)

Exceeding any one of these values may destroy the device immediately. However, the electro-optical characteristics described in the following tables are only valid for use under the recommended operating conditions.

Package Power Dissipation (1) ..... Tbd W
Supply Voltage (V_{CC}–V_{EE}) ..... 6 V
Data Input Levels ..... V_{EE} to V_{CC}+0.5 V
Differential Data Input Voltage ..... –2.5 to 2.5 V
Operating Case Temperature ..... 0 to 70°C
Storage Ambient temperature ..... –40°C to 85°C
Soldering Conditions Temp/Time
(MIL-STD 883C, Method 2003) ..... 250/5.5°C/s

Notes

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.

DESCRIPTION

This data sheet describes the Siemens single mode ATM transceiver, which complies with the ATM Forum's *Network Compatible ATM for Local Network Applications* document and ANSI's *Broadband ISDN—Customer Installation Interfaces*, Physical Media Dependent Specification, T1.646-1995.

ATM is being developed to facilitate solutions in multimedia applications and real time transmission. The data rate is scalable, and the ATM protocol is the basis of the broadband public networks being standardized in the International Telecommunications Union (ITU), the former International Telegraph and Telephone Consultative Committee (CCITT). ATM can also be used in local private applications.

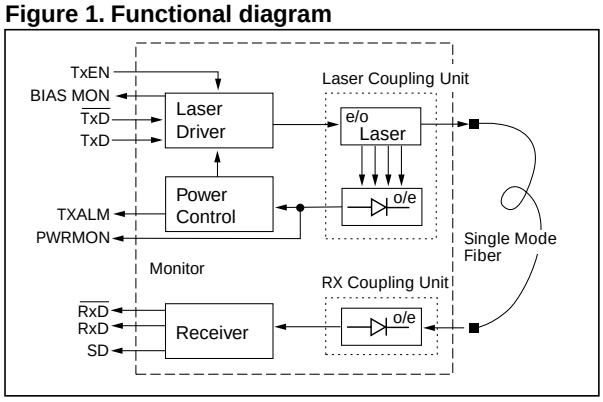
This Siemens single mode ATM transceiver is a single unit comprised of a transmitter, a receiver, and an SC receptacle. It thereby frees the customer from many alignment and PC board layout concerns. The module is designed for low cost WAN applications. It can be used as the network end device interface in workstations, servers, and storage devices, and in a broad range of network devices such as bridges, routers, intelligent hubs, and wide area ATM switches.

The transceiver operates at 622.080 Mbits per second from a single power supply (+5 Volt). The full differential data inputs and data and clock outputs are PECL compatible.

Functional Description of 2x9 Pin Row Transceiver

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

Figure 1. 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 which drives the modulation and bias current of the laser diode. The currents are controlled by a power control circuit to guarantee a 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) for the controlling function to prevent the laser power from exceeding the operating limits.

The laser can be switched on with a logical high signal on the Laser Enable Pin (LEN). The PWRMON Pin shows a voltage reflecting the optical power output. The bias current is monitored on the BIASMON Pin. Both signals can be used to supervise the function of the module.

The signal TXALM indicates an increasing of the optical output power of more than 2dB. Aging control is possible using the bias monitor output (BIASMON).

To build a laser Class 1 system it is necessary to use an application circuit to switch off the laser if a fault occurs.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units
Case Temperature	T_C	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, 10–90%	t_R, t_F	0.4		1.3	ns
TxEN Input High Voltage	V_{TIH}	2			V
TxEN Input Low Voltage	V_{TIL}			0.8	
TxEN Input High Current	V_{TIH}			0.8	mA
TxEN Input Low Current	V_{TIL}	–1			
TxALM Output High Voltage	V_{TOH}	3.2			V
TxALM Output Low Voltage	V_{TOL}			0.7	
TxALM Output High Current	I_{TOH}	–3			mA
TxALM Output Low Current	I_{TOL}			3	
Receiver					
Output Current	I_O			25	mA
Input Center Wavelength	λ_C	1260		1360	nm

Transmitter Electro-Optical Characteristics

Transmitter	Symbol	Min.	Typ.	Max.	Units
Output Power (Average)	P_O	–15	–11	–8	dBm
Center Wavelength	λC	1260		1360	nm
Spectral Width (FWHM), rms	$\Delta\lambda$			7.7	
Output Rise time	t_R			2.5	ns
Output Fall time	t_F			3	
Extinction Ratio (dynamic)	ER	8.2			dB
Eye Diagram(1)					

Receiver Electro-Optical Characteristics

Receiver	Symbol	Min.	Typ.	Max.	Units
Sensitivity (Ave. Power)(1)	P_{IN}		-33	–29.0	dBm
Saturation (Ave. Power)	P_{SAT}	–8	–7		
Signal Detect Assert Level(2)	P_{SDA}		–36	–33	
Signal Detect Deassert Level(3)	P_{SDD}	–42	37.5		
Signal Detect Hysteresis	P_{SDA}–P_{SDD}		1.5		dB
Signal Detect Assert Time	t_{ASS}		1		ms
Signal Detect Deassert Time	t_{DAS}		5		
Output LO Voltage(4)	V_{OL}-V_{CC}	–1950		–1630	mV
Output HI Voltage(4)	V_{OH}-V_{CC}	–1025		–735	
Output Data Rise /Fall Time, 10–90%	t_R, t_F			1.3ns	ns
Output SD Rise/Fall Time(5)				40ns	

Notes

1. Minimum average optical power at which the BER is less than 1x10E–10. Measured with a 2^{23}–1 NRZ PRBS as recommended by ANSI T1E1.2, SONET OC-3, and ITU G.957
2. An increase in optical power above the specified level will switch the SIGNAL DETECT from a LO state to a HI state.
3. A decrease in optical signal below the specified level will switch the SIGNAL DETECT from a HI state to a LO state.
4. PECL 10K compatible. Load is 50 Ω into V_{CC} –2V. Measured under DC conditions at 25°C. For dynamic measurements a tolerance of 50 mV should be added, V_{CC}=5V.
5. PECL compatible. A high level on this output shows that an optical signal is applied to the optical input.

Reliability (Qualification Results)

Test Temperature (HTB)	85°C/358 K
Reference Temperature	25°C/298 K
Duration of HTB Test	>4000 hrs
Activation Energy	0,85 eV
Confidencel Level	90%
Number of Tested Modules	> 30
Average Failure	λ≤ 74dpm/khrs
Lifetime	ti > 10 years

PIN Description 2x9 Pin Row

Pin Name		Level	Pin #	Description
TxEn	Tx Enable	TTL-Input active high	12	High level on this input switches the Laser on. High > 2.0 ; Low < 0.8
SD	RX Signal Detect	PECL-Output active high	4	High level on this output shows an optical signal is applied to the optical input.
Tx Alm	Tx+2dB Alarm	TTL Output active high	11	High level on this output indicates an increase of optical operating power output of+2 dB.
Pwr Mon*	Power Monitor	Analog Voltage	14	Shows an analog voltage which is proportional to the light output and can be used for Laser safety functions. Output Voltage Vmon=2.0±0.2 V, Source Resistance. Rs=100 kW
Bias Mon	Bias Monitor	Analog Voltage	13	Shows an analog voltage which is proportional to the laser bias current. Use to check proper laser operation and for end of life indications. Limit: Bias Current Ibias <60mA Output Voltage V_O=V_{CC}–Ibias * 42 W, Source Resistance Rs=500 Ohm
RxD	Rx Output Data	PECL Output	2	Receiver output data
RxDn	Rx Output Data		3	Inverted receiver output data
TxD	Tx Input Data	PECL Input	8	Transmitter input data
TxDn			7	Inverted transmitter input data
RxVee	Rx Ground	Power Supply	1	Negative power supply, normally ground
TxVee	Tx Ground		9	
RxVcc	Rx +5 V		5	Positive power supply, +5 V
TxVcc	Tx +5 V		6	
NC			10, 15–18	Pins not connected

* For Laser fault supervision: Check this output for 1.5 V< Vout < 2.5 V; if it is not, switch off laser via TX En pin.

LASER SAFETY

This single mode ATM 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 only valid 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 +5V at the power source. The temperature of the module case must be in the temperature range given in the recommended operating limits. These limits guarantee the laser safety.

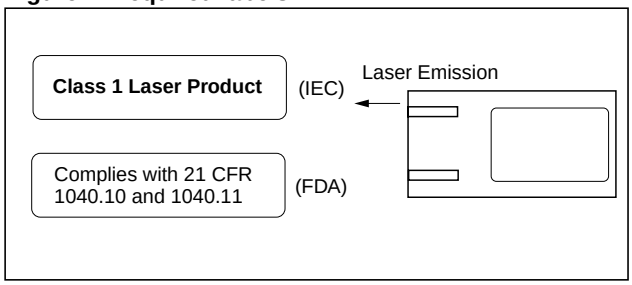
Usage Restrictions

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)).

Figure 2. Required labels



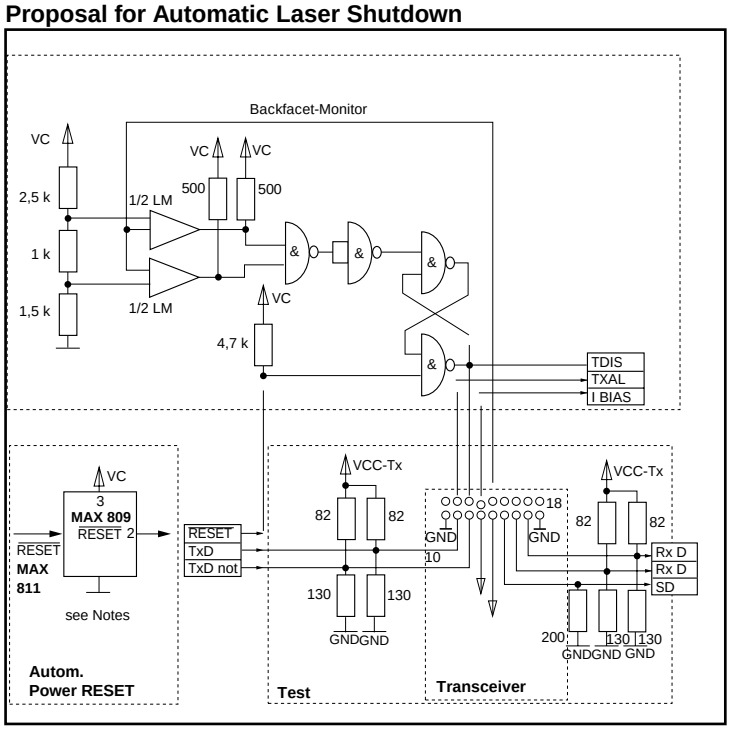
Additional Information

Laser Data

Wavelength	1300 nm
Total output power (in accordance with IEC: 50mm aperture at 10cm distance)	1mW
Total output power (in accordance with FDA: 7mm aperture at 20cm distance)	180µW
Beam divergence	4°

APPLICATION NOTE FOR 2X9 PIN ROW TRANSCEIVER

Proposal for Automatic Laser Shutdown



Notes

1. Minimum length of RESET pulse is 3 ms.
2. After switch on (Vcc) manual RESET necessary or automatic RESET with IC (e. g. MAX 809).

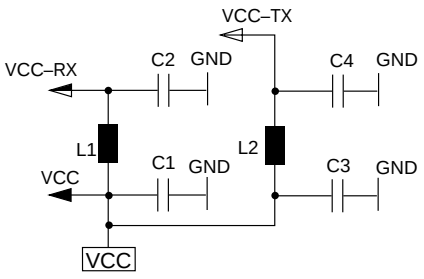
$\overline{\text{RESET}}$	Function	C	Laser	TDIS
low	Norm	high	ON	high
	Fail	low		
high	Norm	high		high*
	Fail	low	OFF	low

* Depends on previous flip-flop state.

The shut down circuit checks the monitor voltage (PWRMON). A deviation of ± 0.5 V shuts down the laser in the circuit shown above. The transceiver can be reenabled using the reset circuit.

The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module VCC-RX/ VCC-TX.

A GND plane under the module is required for good EMI and sensitivity performance. Studs must be connected this GND plane.



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