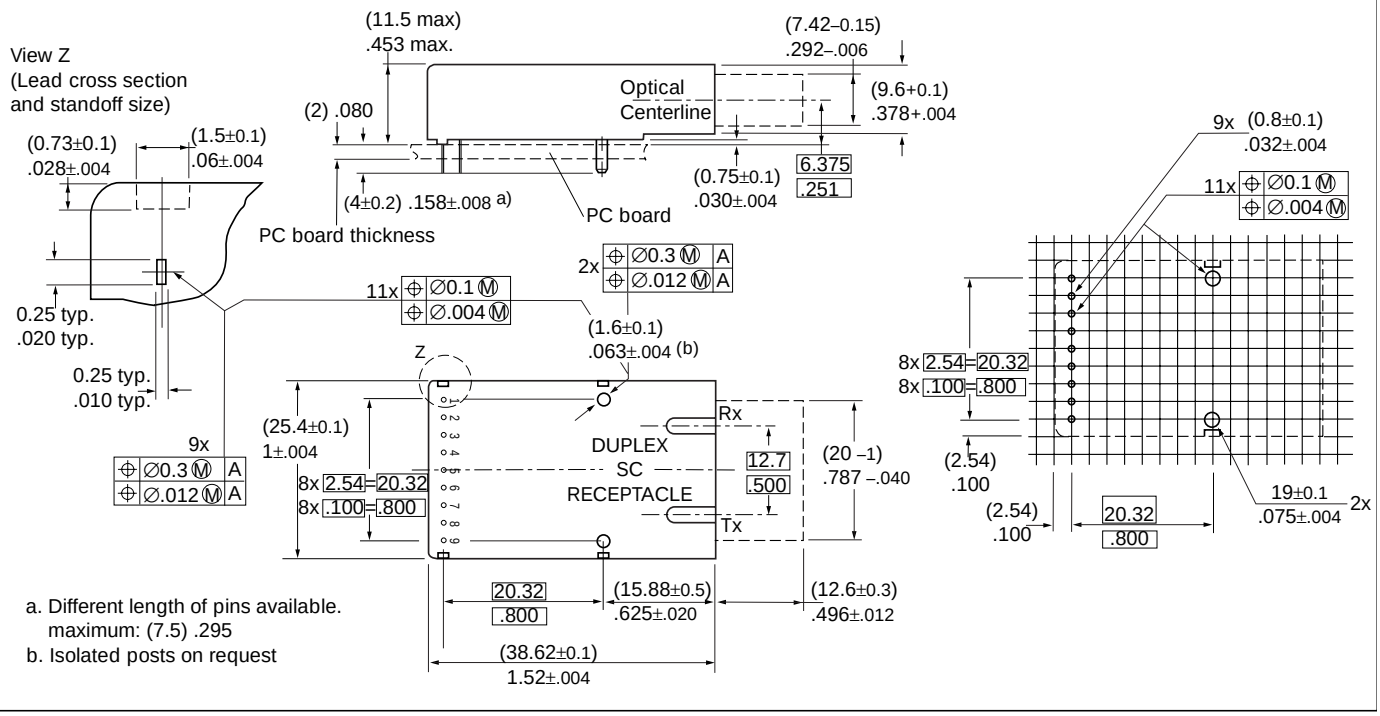
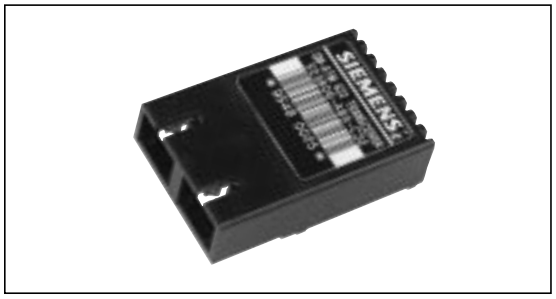
V23806-A84-C32

Single Mode 622 MBd ATM Transceiver 1x9

Dimensions in (mm) inches



a. Different length of pins available.
maximum: (7.5) .295
b. Isolated posts on request



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 (Accession No. 95 20 890 supplement 0.01) and IEC laser safety compliant**
- **Single power supply (5 V)**
- **Loss of optical signal indicator, TTL compatible**
- **Class 1 FDA an IEC laser safety compliant**
- **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)	1.5 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 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.

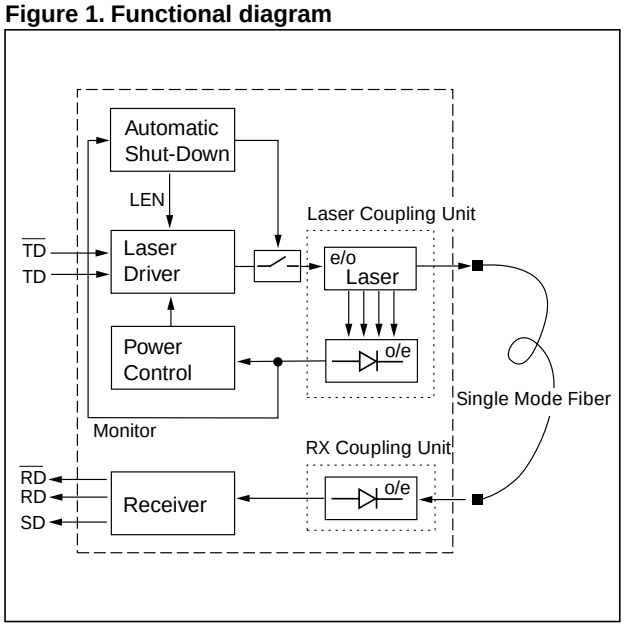
The Siemens single mode ATM transceiver is a single unit comprised of a transmitter, a receiver, and an SC receptacle. It thereby frees the customer from many alignment and PC board layout concerns. The module is designed for low cost WAN applications. It can be used as the network end device interface 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.

This 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 1x9 Pin Row Transceiver

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

Figure 1. Functional diagram



The receiver component converts the optical serial data into ECL-compatible electrical data (RD and RDnot). The Signal Detect (SD, active high) shows whether a 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 ECL 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.

This module ensures single fault condition with an integrated automatic shutdown circuit, which disables the laser when it detects transmitter failures. A reset is only possible by turnng the power off, then on again.

The transceiver contains a supervisory circuit to control the power supply. This circuit makes an internal reset signal whenever the sup ply voltage declines below the reset threshold. It keeps the reset sig nal active for at least 140 milliseconds after the voltage has risen above the reset threshold. During this time the laser is inactive.

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
Receiver					
Output Current	I_O			25	mA
Input Center Wavelength	λ_C	1260		1360	nm

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.

Transmitter Electro-Optical Characteristics

Transmitter	Symbol	Min.	Typ.	Max.	Units
Output Power (Average)	P_O	–15.0	–11.0	–8.0	dBm
Center Wavelength	λC	1293		1334	nm
Spectral Width (FWHM)	$\Delta\lambda$			2.4	
Reset Threshold for T_XV_{CC}(1)	V_{th}	4.25	4.38	4.5	V
Reset Active Timeout(1)		140	240	560	ms
Extinction Ratio (dynamic)	ER	8.2			dB
Eye Diagram(2)	ED				

1. Power supply Tx is shut down and switched on above V_{TH} after the reset active timeout.
2. Transmitter meets ANSI T1E1.2, SONET OC-12, and ITU G.957 mask pat terns.

Receiver Electro-Optical Characteristics

Receiver	Symbol	Min.	Typ.	Max.	Units
Sensitivity (Average Power)(1)	P_{IN}		–33.0	–29.0	dBm
Saturation (Average Power)	P_{SAT}	–8.0			
Signal Detect Assert Level(2)	P_{SDA}		tbd	tbd	
Signal Detect Deassert Level(3)	P_{SDD}	tbd			
Signal Detect Hysteresis	P_{SDA}–P_{SDD}		1.5		dB
Signal Detect Assert Time(6)	t_{ASS}		30		µs
Signal Detect Deassert Time(7)	t_{DAS}		150		
Output LO Voltage(4)	V_{OL}–V_{CC}	–1950		–1630	mV
Output HI Voltage(4)	V_{OH}–V_{CC}	–1025		–735	
Output SD, Rise/Fall Time(5)	t_R, t_F			40ns	V
Output Data Rise/ Fall Time, 20–80%					

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-12, and ITU G.957.
2. An increase in optical power above the specified level will cause the SIGNAL DETECT output to switch from a LO state to a HI state.
3. A decrease in optical power below the specified level will cause the SIGNAL DETECT to change 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.
6. Measured by switching the light from <–40 dBm to –25 dBm.
7. Measured by switching the light from –25 dBm to <–40 dBm. Switching from higher power levels increases this time.

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 the 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 +5 V 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.

PIN Description

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

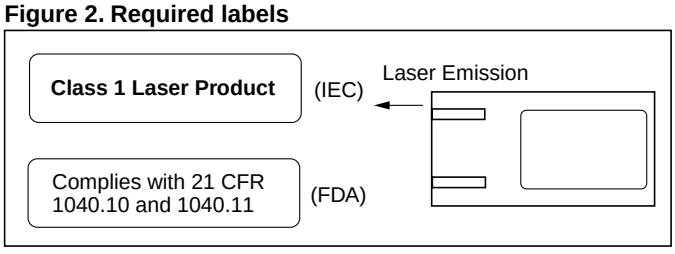
Usage Restrictions

The optical ports of the modules must 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



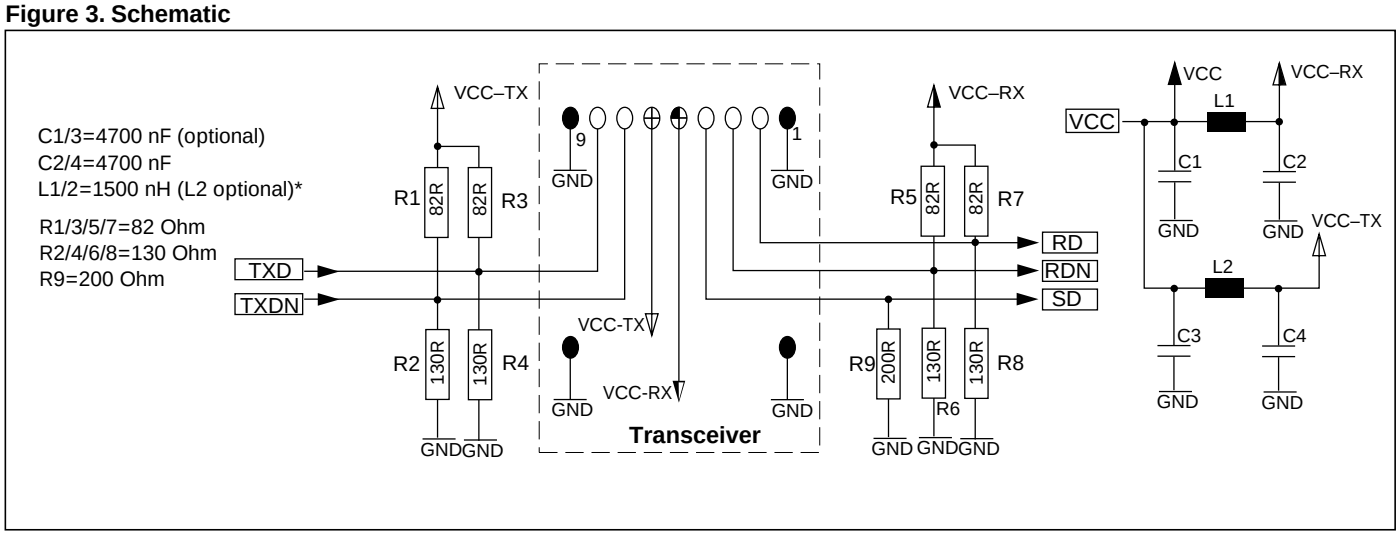
Additional Information

Laser Data

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

APPLICATION NOTE FOR 1X9 PIN ROW TRANSCEIVER

Figure 3. Schematic



* 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 VCC-RX/VCC-TX.

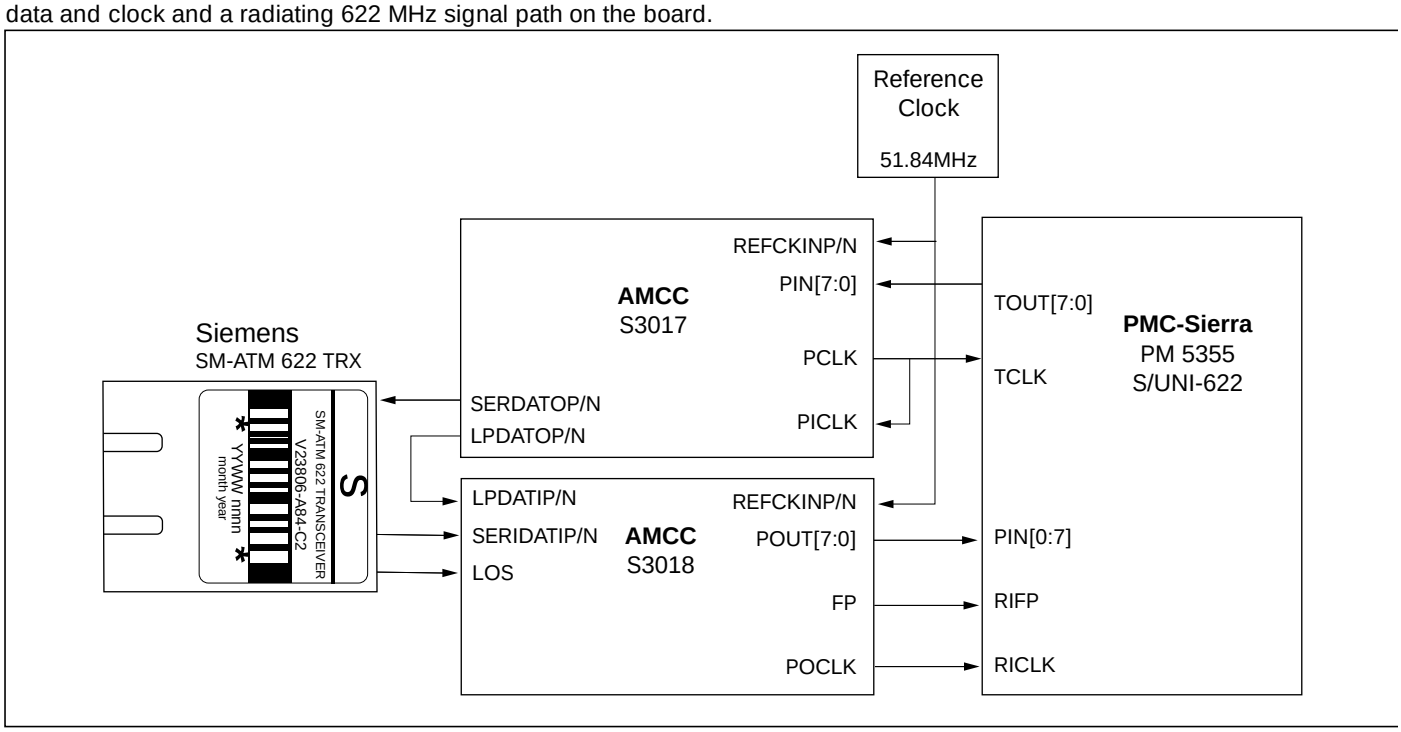
A GND plane under the module is required for good EMI and sensitivity performance. Studs must be connected to this GND plane.

The transceiver contains an automatic shutdown circuit. Reset is only possible when the power off is switched off, then on again. (VCCTX=0V).

SONET/ATM APPLICATIONS FOR 1X9 PIN ROW TRANCEIVERS

Description

The 1x9 Pin Row transceiver requires an external clock recovery device. The best solution is the use of transceiver circuits (serializer / deserializer) which include the clock recovery function. This avoids any additional circuitry skew problems between data and clock and a radiating 622 MHz signal path on the board.



RxTx Chipsets including PLL Function

AMCC	Receiver S3017, Transmitter S3018	(Preliminary, detailed description available)
Sony:	Transceivers CXB 1590 Q	(Preliminary, detailed description available)
Texas Instruments	Transceivers TNETA 16611	(Preliminary)

Detailed information is available upon request.

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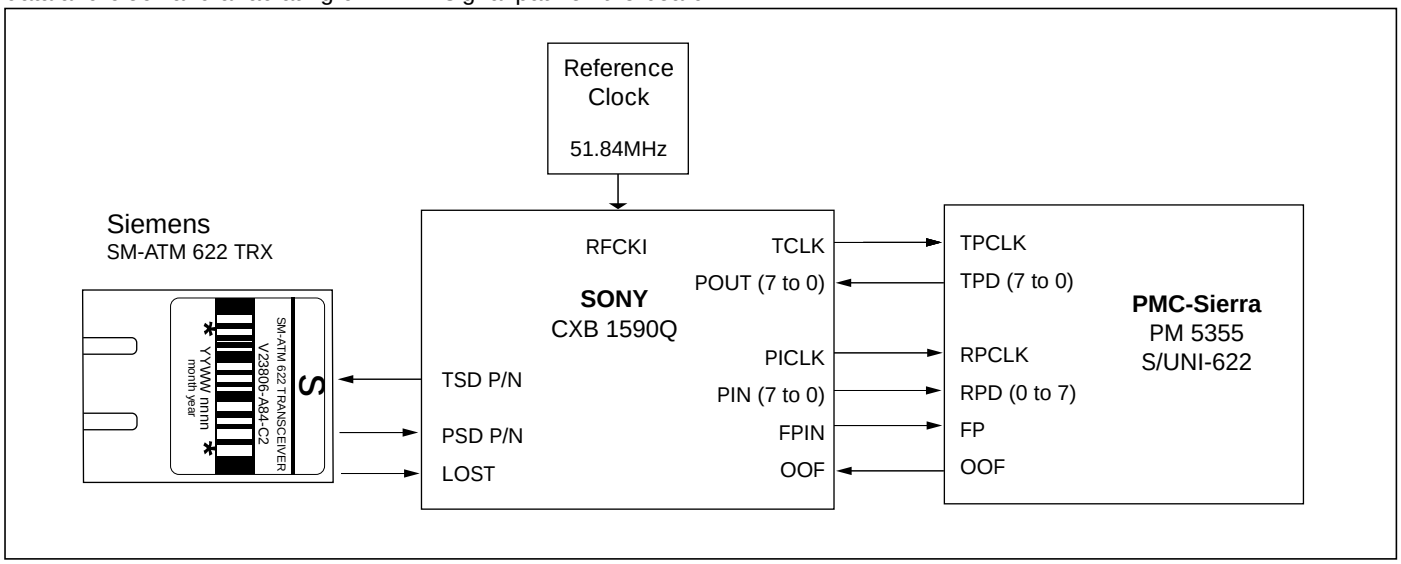

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