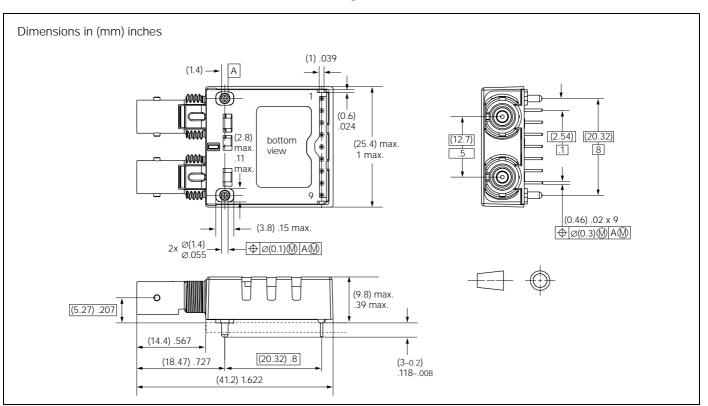


DC/DC (5 V/3.3 V) V23826-C18-T64/T364

Single Mode 155 MBd ATM/SDH/SONET 1x9 Long Haul Transceiver with ST[®] Connector





FEATURES

- Compliant with ATM, SONET OC-3, SDH STM-1
- Meets mezzanine standard height of 9.8 mm
- Compact integrated transceiver unit with
 MQW laser diode transmitter
 - InGaAs PIN photodiode receiver
 - Duplex ST[®] receptacle
- Class 1 FDA and IEC laser safety compliant
- FDA Accession No. 9520890-20
- Single power supply (5 V or 3.3 V)
- Signal detect indicator
- · PECL differential inputs and outputs
- · Process plug included
- Input Signal Monitor
- Wave solderable and washable with process plug inserted

- Typical dynamic range of 36 dB
- Industry standard multisource 1x9 footprint
- For distances of up to 40 km on single mode fiber

Absolute Maximum Ratings

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

Package Power Dissipation $^{(1)}$	
3.3 V 5 V	
Data Input LevelsV _{CC} +0.5 V	1
Differential Data Input Voltage 2.5 V	
Operating Ambient Temperature 0°C to 70°C	
Storage Ambient Temperature40°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.

ST[®] is a registered trademark of AT&T

DESCRIPTION

The Infineon single mode ATM transceiver 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, Bellcore-SONET OC-3/LR-1 and ITU-T G.957 STM-1/L.1.

ATM was 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.

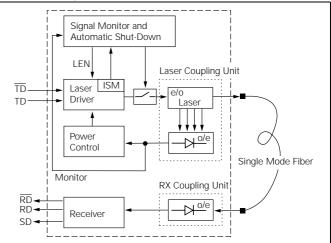
The Infineon single mode ATM long haul transceiver is a single unit comprised of a transmitter, a receiver, and an ST receptacle. This design frees the customer from many alignment and PC board layout concerns. The module is designed for low cost WAN applications. It can be used as the network end device 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 155.520 Mbit/s from a single power supply (+5 V or +3.3 Volt). The differential data inputs and outputs are PECL compatible.

Functional Description

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

Functional Diagram



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 into the laser coupling unit) as a controlling signal, to prevent the laser power from exceeding the operating limits.

This transceiver contains an Input Signal Monitor (ISM), that switches the optical power off if a continuously low level is applied at Data Input.

The receiver component converts the optical serial data into PECL compatible electrical data (RD and RDnot). The Signal Detect (SD, active high) shows whether optical data is present⁽¹⁾.

This module is a Class 1 laser product, due to an integrated automatic shutdown circuit that disables the laser when it detects transmitter failures.

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.

The transceiver contains a supervisory circuit to monitor the power supply. This circuit makes an internal reset signal whenever the supply voltage drops below the reset threshold. It keeps the reset signal active for at least 15 milliseconds after the voltage has risen above the reset threshold. During this time the laser is inactive.

Note

1. We recommend to switch off the transmitter supply (V_{CC} -Tx) if no transmitter input data is applied.

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	Symb	ol	Min.	Тур.	Max.	Units
Ambient Temperature	T _{AMB}		0		70	°C
Power Supply	V _{CC} -	3.3 V	3.1	3.3	3.5	V
Voltage	V _{EE}	5 V	4.75	5	5.25	
Supply Current ⁽¹⁾	I _{CC}	3.3 V		175	250	mΑ
		5 V		190	270	
Transmitter	Į.	I.	I.	I.		
Data Input High Voltage	V _{IH} - V _{CC}		-1165		-880	mV
Data Input Low Volt- age			-1810		-1475	
Input Data Rise/Fall Time, 10%–90%	t _R , t _F		0.4		1.3	ns
Receiver						
Output Current	I _O				25	mΑ
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.

Transmitter Electro-Optical Characteristics

Transmitter		Symbol	Min.	Тур.	Max.	Units
Output Power (Average) ⁽¹⁾		PO	-5	-3	-0	dBm
Center Waveleng	gth	λ _C	1280		1335	nm
Spectral Width (FWHM)		DI		2.4	3	
Output Rise Tim	Output Rise Time		0,6		3,0	ns
Output Fall Time	Output Fall Time					
Extinction Ratio (Dynamic)		ER	10			dB
Reset Thresh-	3.3 V	V _{TH}		2.7		V
old for T _X V _{CC} ⁽²⁾	5 V			3.5		
Reset Active Time Out ⁽²⁾		t _{RES}	15	25	35	ms
Eye Diagram ⁽³⁾		ED				

Notes

1. Into single mode fiber, 9 μ m diameter

- 2. Laser power is shut down if power supply is below V_{TH} and switched on if power supply is above V_{TH} after $t_{RES}.$
- 3. Transmitter meets ANSI T1E1.2, SONET OC-3, and ITU-T G.957 mask patterns.

Receiver Electro-Optical Characteristics

Receiver	Symbol	Min.	Тур.	Max.	Units
Sensitivity (Aver- age Power) ⁽¹⁾	P _{IN}		-36	-34	dBm
Saturation (Average Power)	P _{SAT}	-2			
Signal Detect Assert Level ⁽²⁾	P _{SDA}		-37.5	-34	
Signal Detect Deassert Level ⁽³⁾	P _{SDD}	-44	-40		
Signal Detect Hysteresis	P _{SDA} -P _{SDD}	1	2.5	6	dB
Signal Detect Assert Time	t _{ASS}			100	μs
Signal Detect Deassert Time	t _{DAS}			350	
Output Low Volt- age(4)	V _{OL} -V _{CC}	-1950		-1620	mV
Output High Volt- age ⁽⁴⁾	V _{OH} -V _{CC}	-1025		-720	
Output Data, Rise/Fall Time, 20%–80%	t _R , t _F			375	ps
Output SD Rise/Fall Time ⁽⁵⁾				40	ns

Notes

- 1. Minimum average optical power at which the BER is less than 1×10^{-10} . Measured with a 2^{23} -1 NRZ PRBS as recommended by ANSI T1E1.2, SONET OC-3, and ITU-T G.957.
- 2. An increase in optical power of data signal above the specified level will cause the SIGNAL DETECT to switch from a Low state to a High state.
- 3. A decrease in optical power of data signal below the specified level will cause the SIGNAL DETECT to switch from a High state to a Low state.
- 4. DC/DC for data, DC/DC PECL for Signal Detect, PECL compatible. Load is 50 Ω into V_{CC} –2 V for data, 500 Ω to V_{EE} for Signal Detect. Measured under DC conditions. For dynamic measurements a tolerance of 50 mV should be added. V_{CC}=3.3 V / 5 V. T_{AMB}=25°C.
- 5. PECL compatible. A high level on this output shows that an optical signal is applied to the optical input.

Pin Description

Pin Nam	ie	Level / Logic	Pin#	Description
RxV _{EE}	Rx Ground	Power Supply	1	Negative power supply, normally ground
RD	Rx Output	PECL	2	Receiver output data
RDn	Data	Output	3	Inverted receiver output data
SD	Rx Signal Detect	PECL Output active high	4	A high level on this output shows that optical data is applied to the optical input.
RxV _{CC}	Rx +3.3V/ 5V	Power Supply	5	Positive power supply, +3.3V/5V
TxV _{CC}	Tx +3.3V/ 5V		6	Positive power supply, +3.3V/5V
TDn	Tx Input Data	PECL Input	7	Inverted transmitter input data
TD			8	Transmitter input data
TxV _{EE}	Tx Ground	Power Supply	9	Negative power supply, normally ground
	Stud Pin	Mech. Support	S1/2	Not connected

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 61000-4-2	Discharges of ±15kV with an air discharge probe on the receptacle cause no damage.
Immunity: Radio Frequency Electromagnetic Field	EN 61000-4-3 IEC 61000-4-3	With a field strength of 10 V/m rms, noise frequency ranges from 3 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 6 GHz, mar- gins depend on PCB lay- out and chassis design.

EYE SAFETY

This laser based single mode transceiver is a Class 1 product. It complies with IEC 60825-1 and FDA 21 CFR 1040.10 and 1040.11.

To meet laser safety requirements the transceiver shall be operated within the Absolute Maximum Ratings.

Caution

All adjustments have been made at the factory prior to shipment of the devices. No maintenance or alteration to the device is required.

Tampering with or modifying the performance of the device will result in voided product warranty. Do not view into the open optical port for more than

60 seconds.

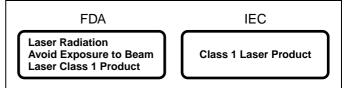
Note

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)).

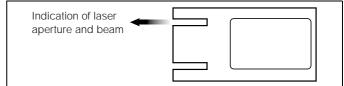
Laser Data

Wavelength	1300 nm
Total output power (as defined by IEC: 50 mm aperture at 10 cm distance)	8 mW
Total output power (as defined by FDA: 7 mm aperture at 20 cm distance)	600 μW
Beam divergence	4°

Required Labels



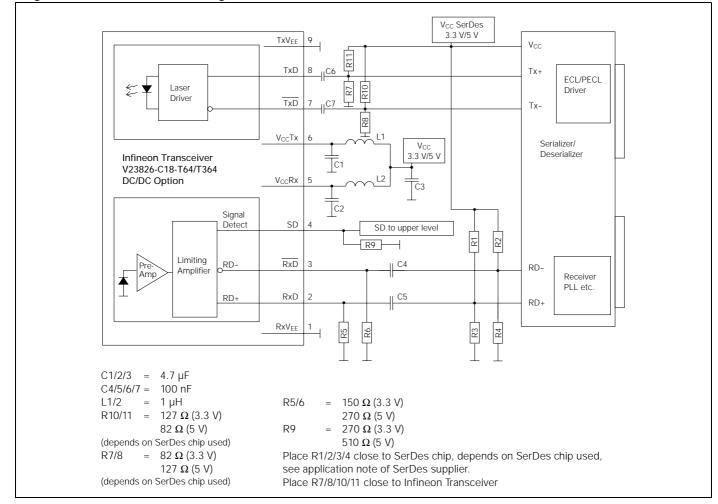
Laser Emission



APPLICATION NOTE

ATM transceivers and matching circuits are high frequency components and shall be terminated as recommended in the application notes for proper EMI performance. Electromagnetic emission may be caused by these components.

APPLICATION NOTE Single Mode 155 MBd ATM 1x9 Long Haul Transceiver



This Application Note assumes Fiber Optic Transceivers using 5 V power supply and SerDes Chips using 3.3 V power supply. It also assumes no self biasing at the receiver data inputs (RD+/RD-) of the SerDes chip (Refer to the manufacturer data sheet for other applications). 3.3 V-Transceivers can be directly connected to SerDes-Chips using standard PECL Termination network.

Value of R1...R4 may vary as long as proper 50 Ω termination to V_{FF} or 100 Ω differential is provided. The power supply filtering

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Attention please!

The information herein is given to describe certain components and shall not be considered as warranted characteristics.

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Information

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is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module $V_{CC}Rx/V_{CC}Tx$. Further application notes for electrical interfacing are available upon request. Ask for Appnote 82. We strongly recommend a V_{EE} plane under the module for getting good EMI performance. The transceiver contains an automatic shutdown circuit. Reset is only possible if the power is turned off, and then on again. ($V_{CC}Tx$ switched below V_{TH}).

Application Board available on request.

Warnings

Due to technical requirements components may contain dangerous substances. For information on the types in question please contact your Infineon Technologies offices.

Infineon Technologies Components may only be used in life-support devices or systems with the express written approval of Infineon Technologies, if a failure of such components can reasonably be expected to cause the failure of that life-support device or system, or to affect the safety or effectiveness of that device or system. Life support devices or systems are intended to be implanted in the human body, or to support and/or maintain and sustain and/or protect human life. If they fail, it is reasonable to assume that the health of the user or other persons may be endangered.