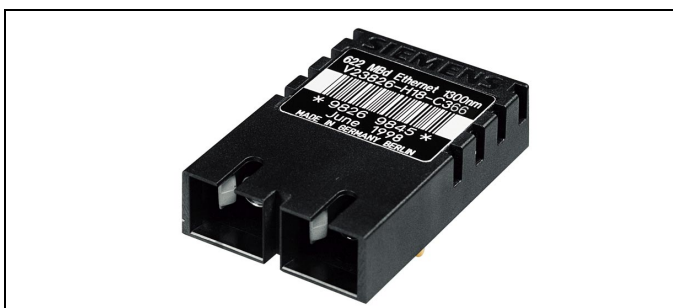
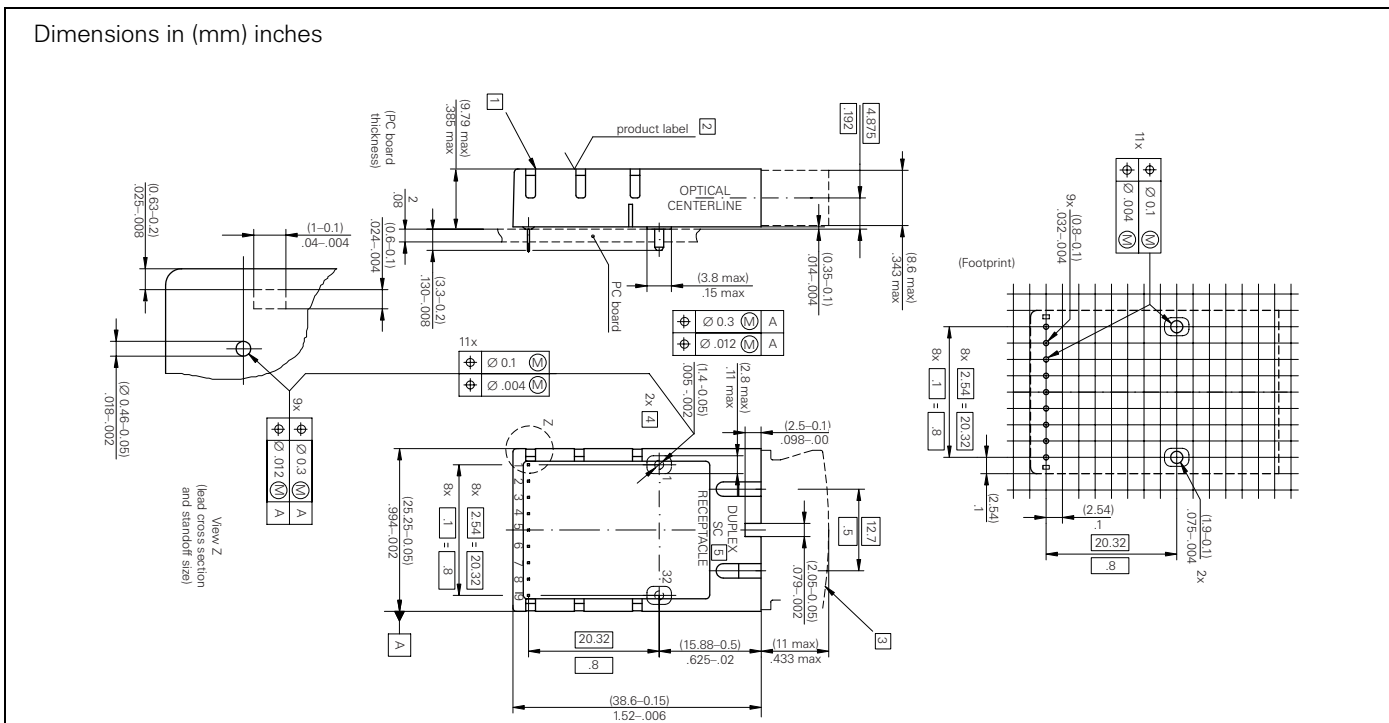




AC/DC (5V/3.3V) **V23826-H18-C16/C316**  
 AC/AC TTL (5V/3.3V) **V23826-H18-C56/C356**  
 DC/DC (5V/3.3V) **V23826-H18-C66/C366**  
 AC/AC PECL (5V/3.3V) **V23826-H18-C76/C376**  
**Single Mode 1300 nm 622 MBd ATM 1x9 Transceiver**  
**Extended Temperature Range (-40°C to 85°C)**



- PECL differential inputs and outputs
- Process plug included
- Input Signal Monitor (DC/DC Version)
- Wave solderable and washable with process plug inserted
- For distances of up to 15 km on single mode fiber
- Industry standard multisource footprint

**Absolute Maximum Ratings**

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

Package Power Dissipation <sup>(1)</sup> .....	1.5 W
Supply Voltage (V <sub>CC</sub> -V <sub>EE</sub> ) 5 V .....	7 V
3.3 V .....	5 V
Data Input Levels (PECL) .....	V <sub>CC</sub> +0.5 V
Differential Data Input Voltage .....	2.5 V
Operating Ambient Temperature .....	-40°C to 85°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<sub>CC</sub>-V<sub>EE</sub> (min., max.). 50% duty cycle. The supply current does not include the load drive current of the receiver output.

**FEATURES**

- Compliant with ATM/SDH, SONET OC-3/STM-1 and SONET OC-12/STM-4 standards
- Meets mezzanine standard height of 9.8 mm
- Compact integrated transceiver unit with
  - MQW laser diode transmitter
  - InGaAs PIN photodiode receiver
  - Duplex SC receptacle
- Class 1 FDA and IEC laser safety compliant
- FDA Accession No. 9520890-12, 9520890-13
- Single power supply (5 V or 3.3 V)
- Signal detect indicator (PECL and TTL versions)



### Transmitter Electro-Optical Characteristics

Transmitter	Symbol	Min.	Typ.	Max.	Units
Launched Power (Average) <sup>(1)</sup>	P <sub>O</sub>	-15	-11	-8	dBm
Center Wavelength	λ <sub>C</sub>	1274		1355	nm
Spectral Width (RMS)	σ <sub>I</sub>			2.5	
Relative Intensity Noise	RIN			-120	dB/Hz
Extinction Ratio (Dynamic)	ER	8.2			dB
Reset Threshold <sup>(2)</sup>	V <sub>TH</sub>		2.7		V
Reset Time Out <sup>(2)</sup>	t <sub>RES</sub>	15	22	35	ms
Eye Diagram <sup>(3)</sup>	ED				

#### Notes

- Into single mode fiber, 9 μm diameter.
- Laser power is shut down if power supply is below V<sub>TH</sub> and switched on if power supply is above V<sub>TH</sub> after t<sub>RES</sub>.
- Transmitter meets ANSI T1E1.2, SONET OC-3 and OC-12, and ITU-T G.957 mask patterns.

### Receiver Electro-Optical Characteristics

Receiver	Symbol	Min.	Typ.	Max.	Units
Sensitivity (Average Power) <sup>(1)</sup>	P <sub>IN</sub>		-30	-28	dBm
Saturation (Average Power)	P <sub>SAT</sub>	-8			
Signal Detect Assert Level <sup>(2)</sup>	P <sub>SDA</sub>			-28	
Signal Detect Deassert Level <sup>(3)</sup>	P <sub>SDD</sub>	-38			
Signal Detect Hysteresis	P <sub>SDA</sub> - P <sub>SDD</sub>		1.5		dB
Signal Detect Assert Time	t <sub>ASS</sub>			100	μs
Signal Detect Deassert Time	t <sub>DAS</sub>			350	
Output Low Voltage <sup>(4)</sup>	V <sub>OL</sub> -V <sub>CC</sub>	-1950		-1620	mV
Output High Voltage <sup>(4)</sup>	V <sub>OH</sub> -V <sub>CC</sub>	-1025		-720	
Signal Detect Output Voltage AC/AC TTL <sup>(5)</sup>	Low	V <sub>SDL</sub>		0.5	V
	High	V <sub>SDH</sub>	2		
Data Output Differential Voltage <sup>(6)</sup>	V <sub>DIFF</sub>	0.5	0.8	1.23	
Output Data Rise/Fall Time, 20%–80%	t <sub>R</sub> , t <sub>F</sub>			375	ps
Return Loss of Receiver	A <sub>RL</sub>	12			dB

#### Notes

- Minimum average optical power at which the BER is less than 1x10<sup>-12</sup> or lower. Measured with a 2<sup>23</sup>-1 NRZ PRBS as recommended by ANSI T1E1.2, SONET OC-3 and OC-12, and ITU-T G.957.
- An increase in optical power above the specified level will cause the SIGNAL DETECT output to switch from a Low state to a High state.
- A decrease in optical power below the specified level will cause the SIGNAL DETECT to change from a High state to a Low state.
- DC/DC, AC/DC for data  
DC/DC, AC/DC, AC/AC PECL for Signal Detect  
PECL compatible. Load is 50 Ω into V<sub>CC</sub>-2 V for data, 510 Ω (5 V) or 270 Ω (3.3 V) to V<sub>EE</sub> for Signal Detect. Measured under DC conditions. For dynamic measurements a tolerance of 50 mV should be added. V<sub>CC</sub>=3.3 V/5 V. T<sub>AMB</sub>=25°C.

- Max. output current high: -0.4 mA (drive current)  
low: +2.0 mA (sink current)
- AC/AC for data. Load 50 Ω to GND or 100 Ω differential. For dynamic measurement a tolerance of 50mV should be added.

### LASER SAFETY

This single mode transceiver is a Class 1 laser product. It complies with IEC 825-1 and FDA 21 CFR 1040.10 and 1040.11. The laser Class 1 is guaranteed within the Absolute Maximum Ratings.

#### Caution

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

#### Usage Restrictions

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

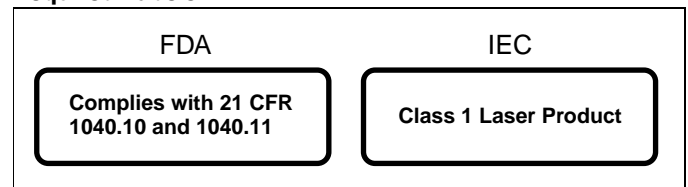
#### Note

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)).

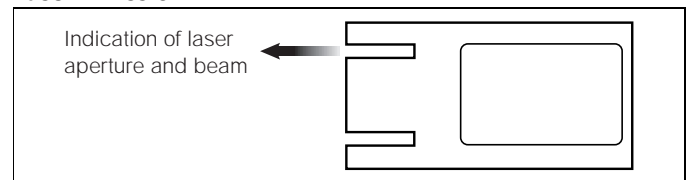
#### Laser Data

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

#### Required Labels



#### Laser Emission



## Pin Description

Pin Name		Level/Logic	Pin#	Description
RxV <sub>EE</sub>	Rx Ground	Power Supply	1	Negative power supply, normally ground
RD	Rx Output Data	PECL Output	2	Receiver output data
RD <sub>n</sub>			3	Inverted receiver output data
SD	RX Signal Detect	PECL or TTL	4	High level on this output shows there is an optical signal.
RxV <sub>CC</sub>	Rx 3.3 V/5 V	Power Supply	5	Positive power supply, 3.3 V/5 V
TxV <sub>CC</sub>	Tx 3.3 V/5 V		6	
TD <sub>n</sub>	Tx Input Data	PECL Input	7	Inverted transmitter input data
TD			8	Transmitter input data
TxV <sub>EE</sub>	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 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 3 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 6 GHz; Margins depend on PCB layout and chassis design

## APPLICATION NOTE

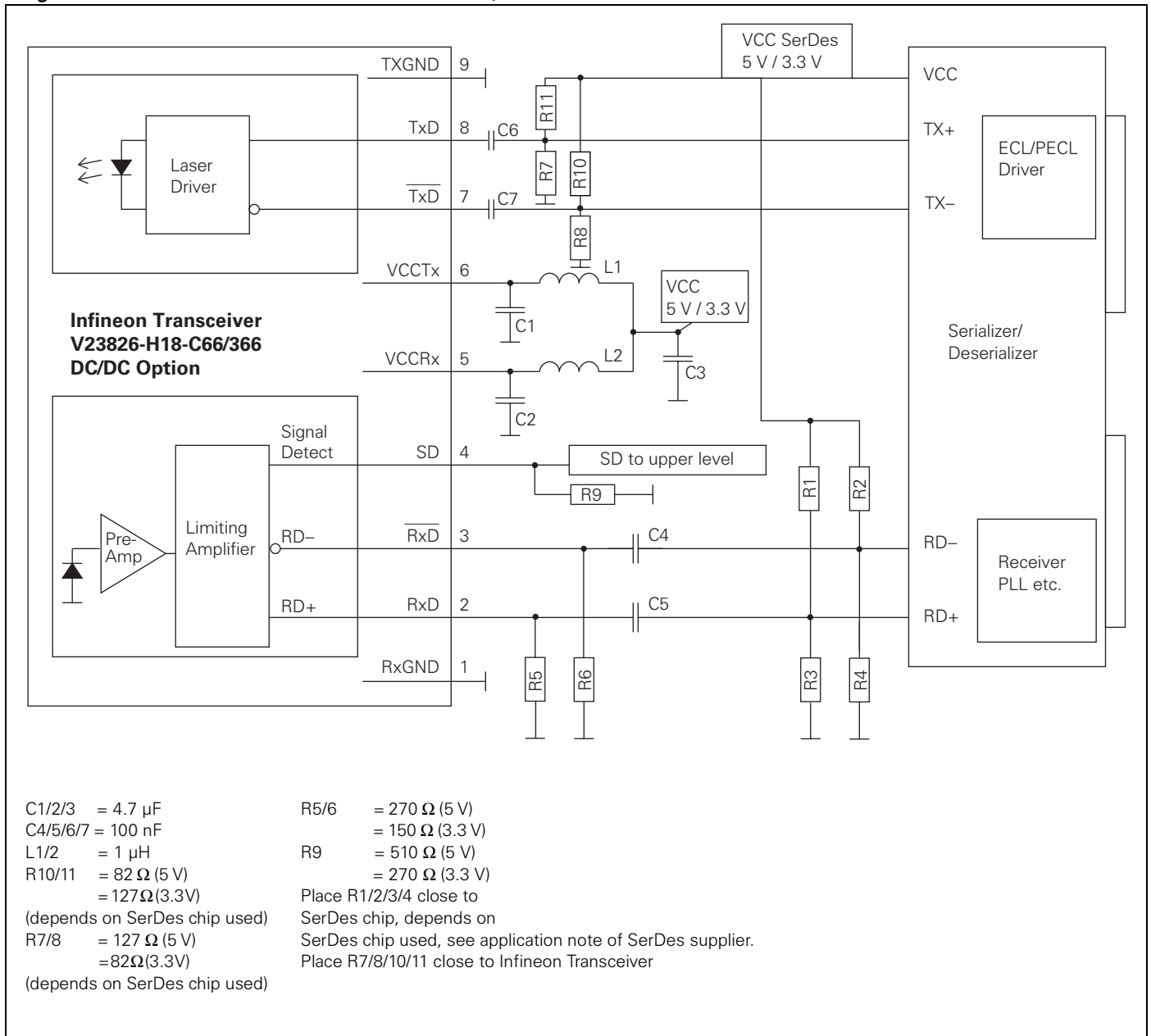
ATM transceivers and matching circuits are high frequency components and shall be terminated as recommended in the application notes for proper EMI performance. Electromagnetic emission may be caused by these components.

To prevent emissions it is recommended that cutouts for the fiber connectors be designed as small as possible.

It is recommended that the Tx plug and the Rx plug be separated with a bar that divides the duplex SC opening.

## APPLICATION NOTE

### Single Mode 1300 nm 622 MBd ATM 1x9 Transceiver, DC/DC Version



The following Application Notes assume 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.

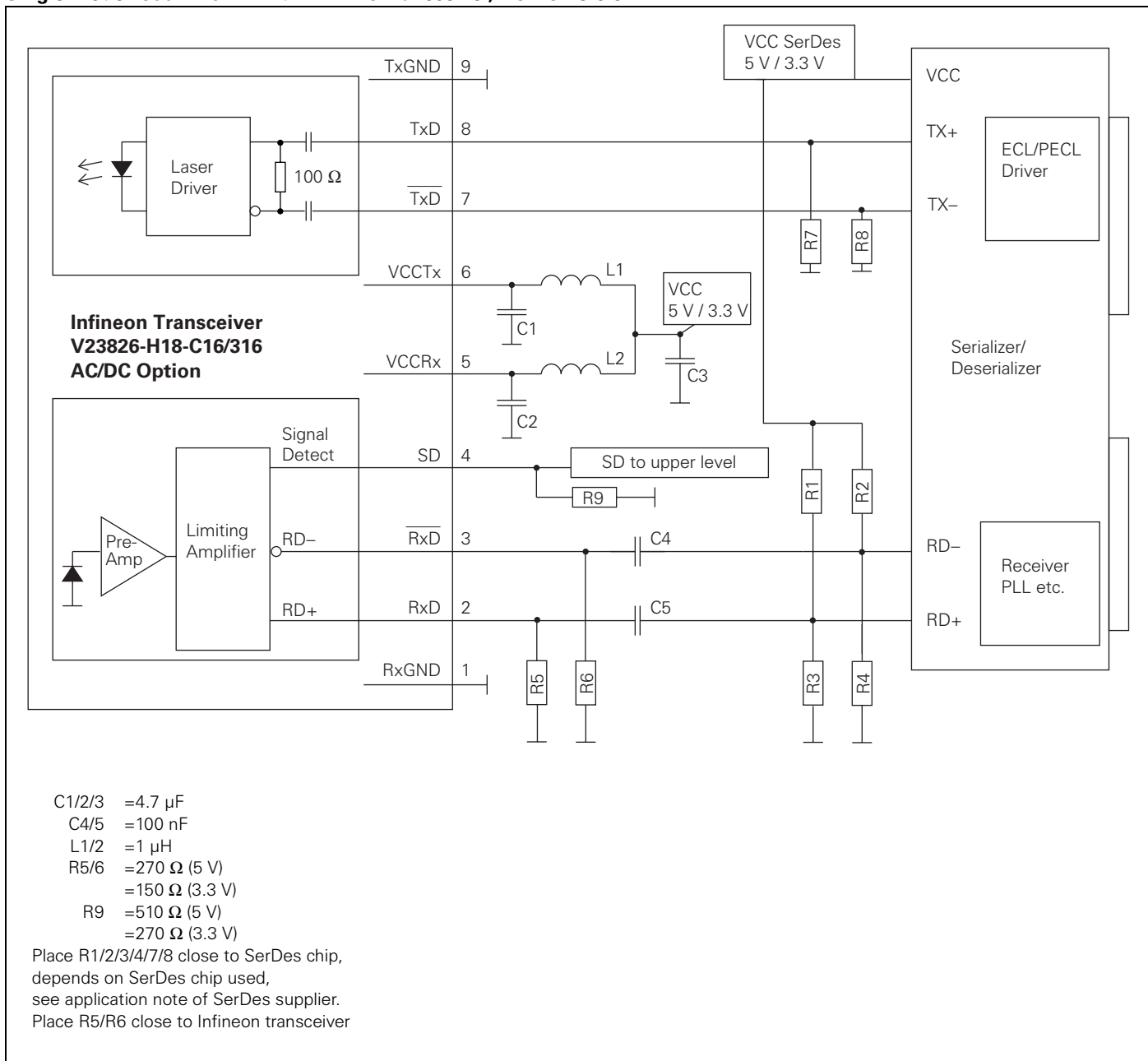
Value of R1...R4 may vary as long as proper 50  $\Omega$  termination to  $V_{EE}$  or 100  $\Omega$  differential is provided. The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module  $V_{CCRx}/V_{CCTx}$ . We strongly recommend a GND plane 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. ( $V_{CCTx}$  switched below  $V_{TH}$ ).

Application Board available on request.

## APPLICATION NOTE

### Single Mode 1300nm 622 MBd ATM 1x9 Transceiver, AC/DC Version



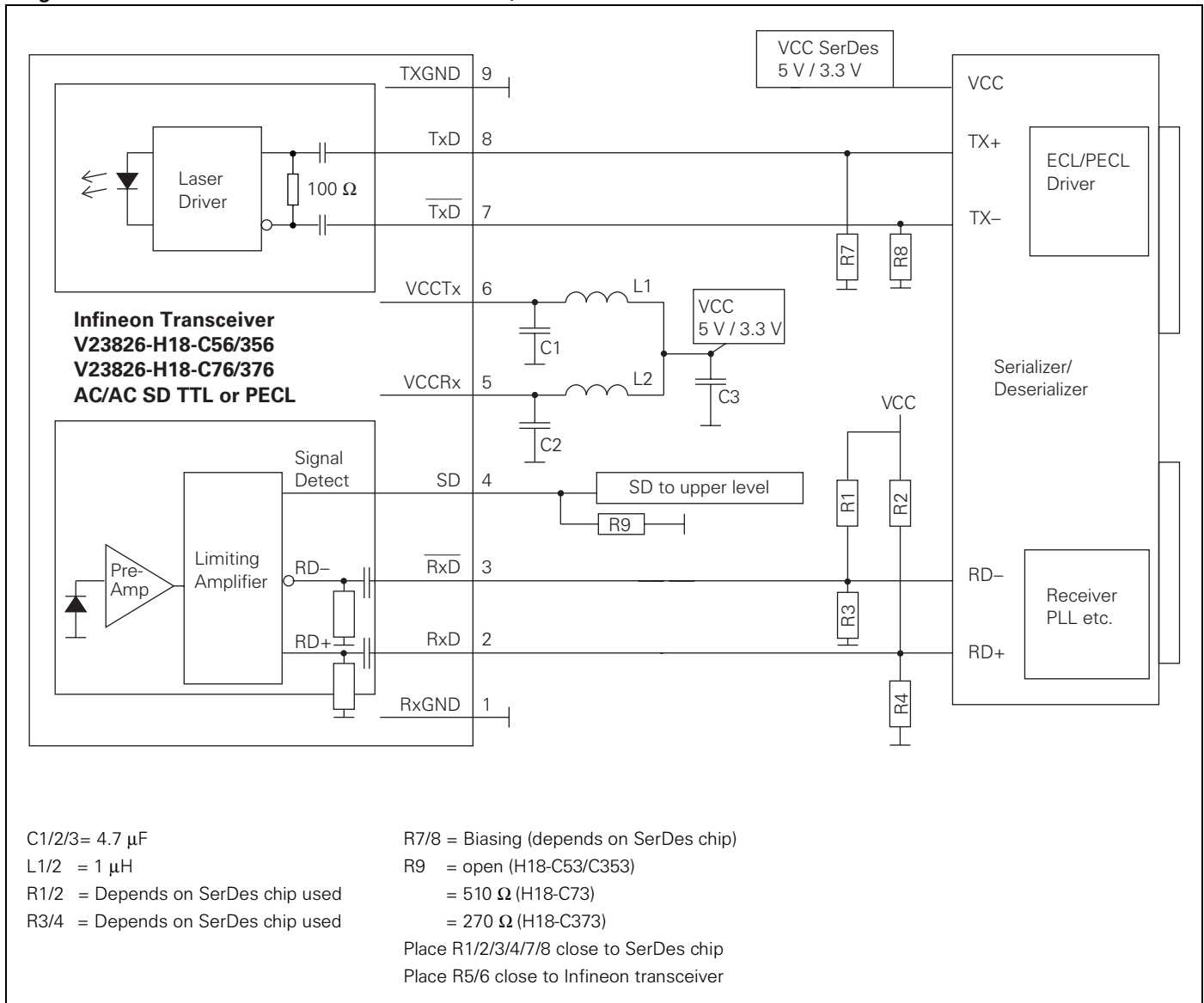
Values of R1/2/3/4 may vary as long as proper 50  $\Omega$  termination to  $V_{EE}$  or 100  $\Omega$  differential is provided. The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module  $V_{CCRx}/V_{CCTx}$ . We strongly recommend a GND 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. ( $V_{CCTx}$  switched below  $V_{TH}$ ).

Application Board available on request.

**APPLICATION NOTE**

**Single Mode 1300nm 622 MBd ATM 1x9 Transceiver, AC/AC TTL and AC/AC PECL Versions**



Values of R1/2/3/4 may vary as long as proper 50  $\Omega$  termination to  $V_{EE}$  or 100  $\Omega$  differential is provided. The power supply filtering is required for good EMI performance. Use short tracks from the inductor L1/L2 to the module  $V_{CCRx}/V_{CCTx}$ .

We strongly recommend a GND 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. ( $V_{CCTx}$  switched below  $V_{TH}$ ).

Application Board available on request.