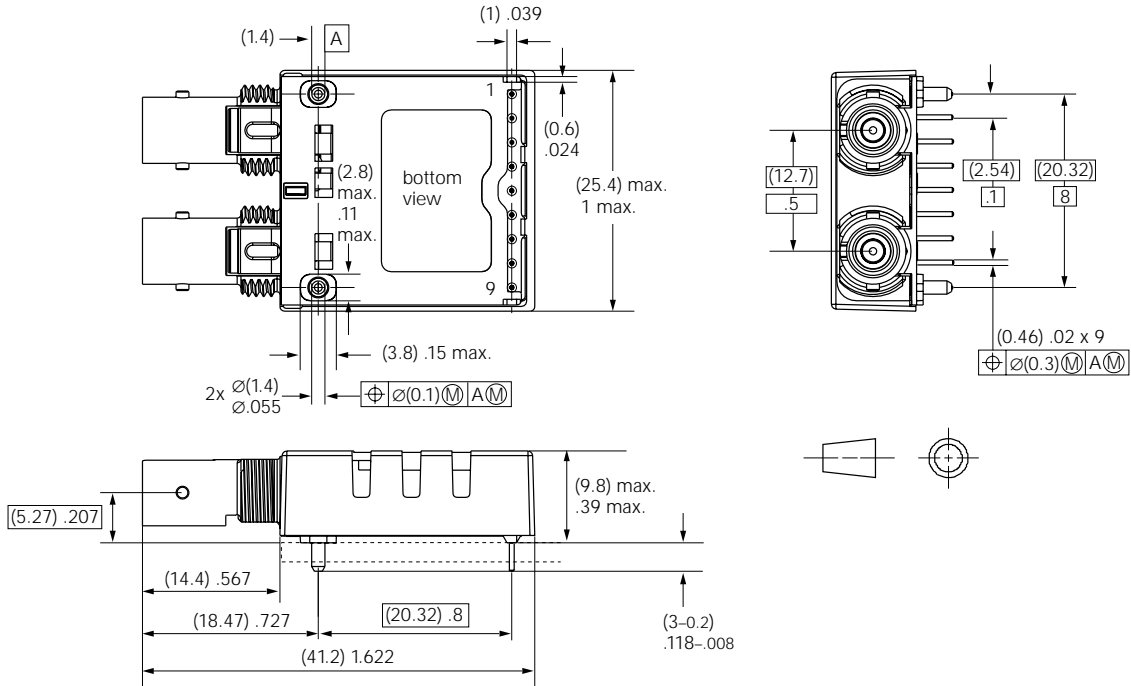




# DC/DC (5 V/3.3 V) V23826-C18-T64/T364

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

Dimensions in (mm) inches



- 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)	1.5 W
Supply Voltage ( $V_{CC}-V_{EE}$ )	5 V ..... 7 V
	3.3 V ..... 5 V
Data Input Levels	$V_{CC} +0.5$ V
Differential Data Input Voltage	2.5 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.

### 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

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## 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 <sub>AMB</sub>	0		70	°C
Power Supply Voltage	V <sub>CC</sub> -V <sub>EE</sub>	3.3 V	3.3	3.5	V
		5 V	4.75	5	
Supply Current <sup>(1)</sup>	I <sub>CC</sub>	3.3 V	175	250	mA
		5 V	190	270	
<b>Transmitter</b>					
Data Input High Voltage	V <sub>IH</sub> - V <sub>CC</sub>	-1165		-880	mV
Data Input Low Voltage	V <sub>IL</sub> - V <sub>CC</sub>	-1810		-1475	
Input Data Rise/Fall Time, 10%–90%	t <sub>R</sub> , t <sub>F</sub>	0.4		1.3	ns
<b>Receiver</b>					
Output Current	I <sub>O</sub>			25	mA
Input Center Wavelength	λ <sub>C</sub>	1260		1360	nm

#### Note

- 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.

### Transmitter Electro-Optical Characteristics

Transmitter	Symbol	Min.	Typ.	Max.	Units
Output Power (Average) <sup>(1)</sup>	P <sub>O</sub>	-5	-3	-0	dBm
Center Wavelength	λ <sub>C</sub>	1280		1335	nm
Spectral Width (FWHM)	D <sub>I</sub>		2.4	3	
Output Rise Time	t <sub>R</sub>	0,6		3,0	ns
Output Fall Time	t <sub>F</sub>				
Extinction Ratio (Dynamic)	ER	10			dB
Reset Threshold for T <sub>X</sub> V <sub>CC</sub> <sup>(2)</sup>	3.3 V	V <sub>TH</sub>	2.7		V
	5 V		3.5		
Reset Active Time Out <sup>(2)</sup>	t <sub>RES</sub>	15	25	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 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>		-36	-34	dBm
Saturation (Average Power)	P <sub>SAT</sub>	-2			
Signal Detect Assert Level <sup>(2)</sup>	P <sub>SDA</sub>		-37.5	-34	
Signal Detect Deassert Level <sup>(3)</sup>	P <sub>SDD</sub>	-44	-40		
Signal Detect Hysteresis	P <sub>SDA</sub> -P <sub>SDD</sub>	1	2.5	6	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	
Output Data, Rise/Fall Time, 20%–80%	t <sub>R</sub> , t <sub>F</sub>			375	ps
Output SD Rise/Fall Time <sup>(5)</sup>				40	ns

#### Notes

- Minimum average optical power at which the BER is less than 1x10<sup>-10</sup>. Measured with a 2<sup>23</sup>-1 NRZ PRBS as recommended by ANSI T1E1.2, SONET OC-3, and ITU-T G.957.
- 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.
- 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.
- DC/DC for data, DC/DC PECL for Signal Detect, PECL compatible. Load is 50 Ω into V<sub>CC</sub> -2 V for data, 500 Ω 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.
- PECL compatible. A high level on this output shows that an optical signal is applied to the optical input.

## 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
RDn			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 <sub>CC</sub>	Rx +3.3V/5V	Power Supply	5	Positive power supply, +3.3V/5V
TxV <sub>CC</sub>	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 <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 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, margins depend on PCB layout 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.**

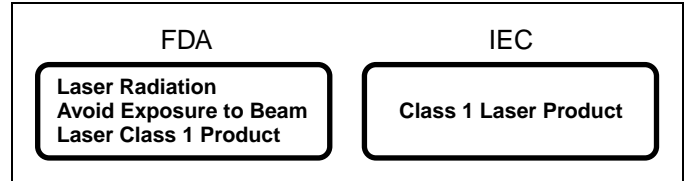
### Note

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 (l)).

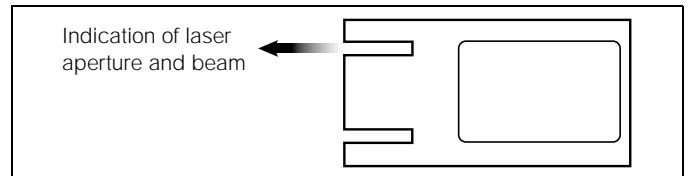
## Laser Data

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

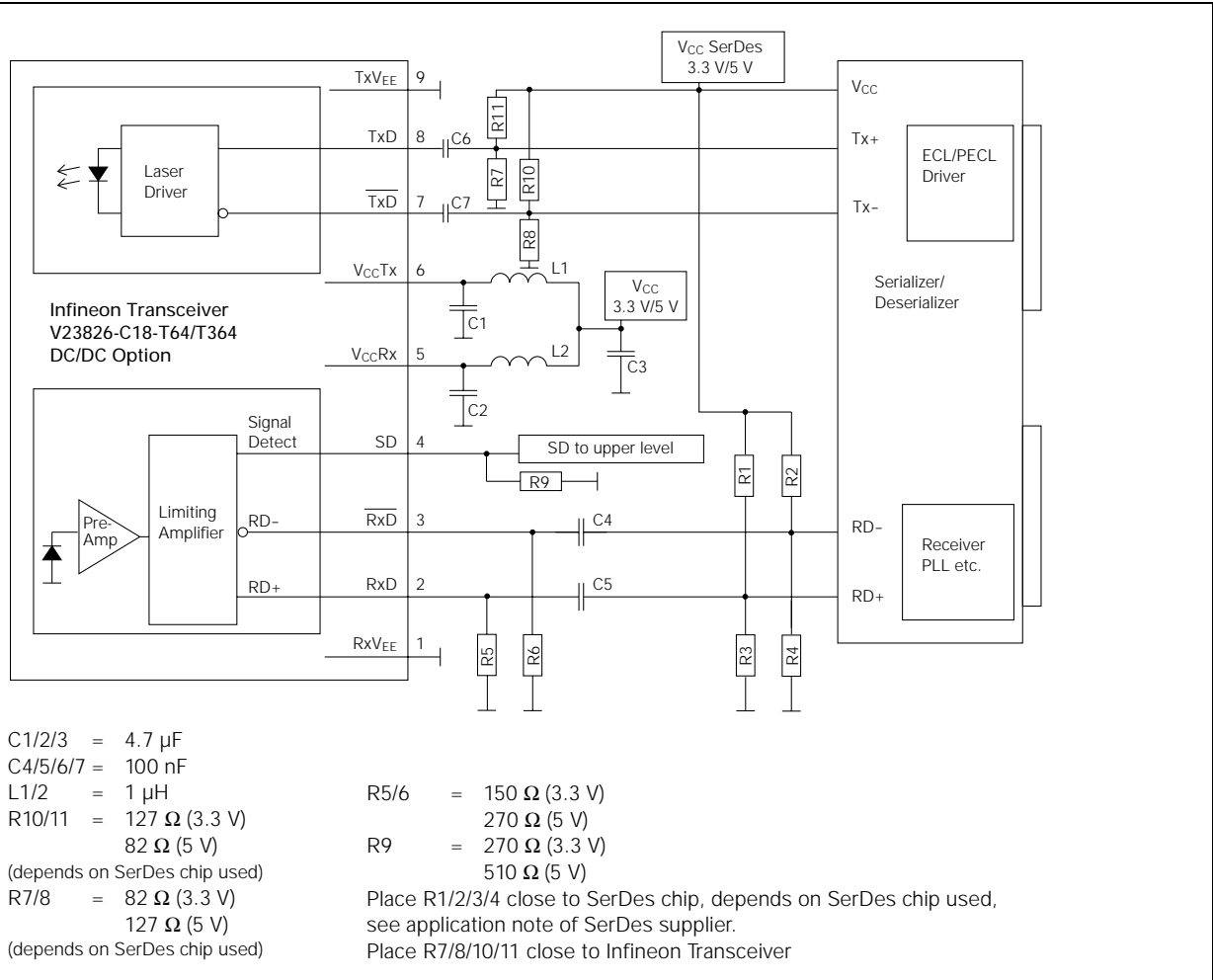


## APPLICATION NOTE

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  $\Omega$  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  $V_{CCRx}/V_{CCTx}$ . 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. ( $V_{CCTx}$  switched below  $V_{TH}$ ).

Application Board available on request.

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