

Product Specification Datasheet

TNSP852XL-CD100

RoHS Compliant 25Gb/s SFP28 850nm Optical Transceiver



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Product Features

- Supports up to 25.78Gb/s bit rates
- Duplex LC connector
- Hot pluggable SFP28 footprint
- 850nm VCSEL transmitter, PIN photo-detector
- Distance up to 100m @50 / 125 um OM4
- Distance up to 70m @50 / 125 um OM3
- Built-in dual CDR
- Low power consumption, < 1.2W
- Digital Diagnostic Monitor Interface
- Compliant with SFP28 Specification SFF-8402e
- Electrical interface compliant to SFF-8431
- Operating case temperature:
Commerical:0~70°C

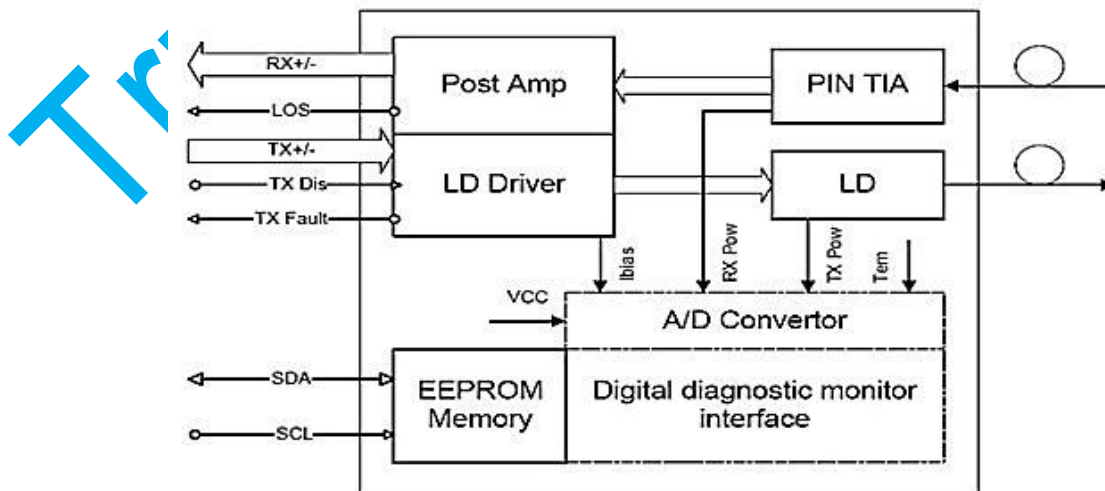
Applications

- 25.78Gb/s single lane 100GBE SR4
- 25GBE
- Other Optical Link

Product Descriptions

Trustnuo TNSP852XL-CD100 multi-mode transceiver is SFP28 module for duplex optical data communications up to 25.78Gb/s. It is with the SFP+ 20-pin connector to allow hot plug capability. Digital diagnostic functions are available via an I²C. It has built-in clock and data recovery (CDR). This module is designed for multi-mode fiber and operates at a nominal wavelength of 850 nm. The transmitter section uses a Vertical Cavity Surface Emitted Laser (VCSEL) and is a Class 1 laser compliant according to International Safety Standard IEC 60825. The receiver section uses an integrated GaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Functional Diagram



Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit	Note
Supply Voltage	V _{CC}	-0.5	4.0	V	
Storage Temperature	T _S	-40	85	°C	
Relative Humidity	RH	0	85	%	

Note: Stress in excess of the maximum absolute ratings can cause permanent damage to the transceiver.

General Operating Characteristics

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Data Rate	D _R		25.78		Gb/s	
Supply Voltage	V _{CC}	3.15	3.3	3.46	V	
Supply Current	I _{CCS}			340	mA	
Operating Case Temp.	T _C	0		70	°C	

Electrical Characteristics (T_{OP(C)} = 0 to 70 °C, V_{CC} = 3.15 to 3.46 V)

Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Differential data input swing	V _{INPP}	150		980	mV _{pp}	1
Transmit Disable Voltage-High	V _D	2		V _{CC}	V	
Transmit Disable Voltage-Low	V _L	0.8		0.8		
Input differential impedance	R _{in}		100		Ω	2
Receiver						
Differential data output swing	V _{out,pp}	300		900	mV _{pp}	3
Rx_LOS Output Voltage-High	V _{LOS_H}	2		V _{CC_HOST}	V	
Rx_LOS Output Voltage-Low	V _{LOS_L}	0		0.8	V	

Note:

1. AC coupled inputs.
2. Connected directly to TX pin
3. 2 AC coupled outputs

Optical Characteristics (T_{OP(C)} = 0 to 70 °C, V_{CC} = 3.15 to 3.46 V)

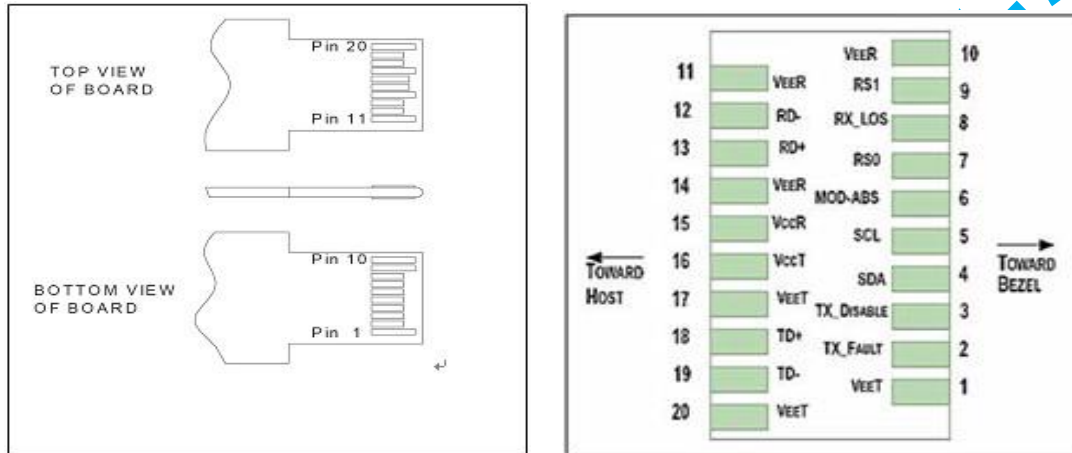
Parameter	Symbol	Min.	Typ	Max.	Unit	Note
Transmitter						
Operating Wavelength	λ	840	850	860	nm	
Ave. output power (Enabled)	P _{AVE}	-8.4		+2.4	dBm	
Extinction Ratio	ER	2			dB	
Spectral Width (RMS)@25Gb/s	Δλ			0.6	nm	
Receiver						
Operating Wavelength		840	850	860	nm	
Receiver Sensitivity	P _{SEN}			-10.3	dBm	
Stressed Receiver Sensitivity(OMA)	P _{Min}			-5.2		

Overload	PAVE	3			dBm	
Optical Return Loss	ORL			-12	dBm	1
LOS Assert	Pa	-30			dBm	
LOS De-assert	Pd			-13	dBm	
LOS Hysteresis	Pd-Pa	0.5			dB	

Notes:

1. The bit error ratio (BER) would be controlled less than 5E-5.

Pin Defintion And Functions



Pin	Symbol	Name/Description
1	VEET	Transmitter Ground
2	Tx_FAULT [1]	Transmitter Fault
3	Tx_DIS [2]	Transmitter Disable. Laser output disabled on high or open
4	SDA	2-wire Serial Interface Data Line
5	SCL	2-wire Serial Interface Clock Line
6	MOD_ABS [3]	Module Absent. Grounded within the module
7	RS0	Rate Select 0, optionally controls SFP28 receiver. This pin is pulled low to VeeT with a >30K resistor..
8	RX_LOS [4]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1	Rate Select 1, optionally controls SFP28 transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VEER [5]	Receiver Ground
11	VEER [5]	Receiver Ground
12	RD- [6]	Receiver Inverted DATA out. AC Coupled
13	RD+[6]	Receiver DATA out. AC Coupled
14	VEER [5]	Receiver Ground
15	VCCR[7]	Receiver Power Supply
16	VCCT[7]	Transmitter Power Supply
17	VEET [5]	Transmitter Ground
18	TD+[8]	Transmitter DATA in. AC Coupled

19	TD-[8]	Transmitter Inverted DATA in. AC Coupled
20	VEET [5]	Transmitter Ground

Notes:

- 1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- 2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up within the module with a 4.7K~10 K Ω resistor. Its states are:
 Low (0 – 0.8V): Transmitter on
 (>0.8, < 2.0V): Undefined
 High (2.0 – 3.465V): Transmitter Disabled
 Open: Transmitter Disabled
- 3) Module Absent, connected to VeeT or VeeR in the module.
- 4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor. Pull up voltage between 2.0V and Vcc_Host. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.
- 5) VeeR and VeeT may be internally connected within the SFP28 module.
- 6) RD-/+ : These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 185 and 425 mV differential (92.5 –212.5 mV single ended) when properly terminated.
- 7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V \pm 5% at the SFP+ connector pin. Maximum supply current is 340mA. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP28 input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP28 transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP28 transceiver module.
- 8) TD-/+ : These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 90 – 800 mV (45 – 400 mV single-ended), though it is recommended that values between 90 and 800 mV differential (45 – 400 mV single-ended) be used for best EMI performance.

Serial Interface for ID and Digital Diagnostic Monitor

The TNSP852XL-CD100 serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP28 transceiver. The negative edge clocks data from the SFP28 transceiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. If the module is defined as external calibrated, the diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in EEPROM locations 56 – 95 at wire serial bus address A2H. The digital diagnostic memory map specific data field define as following. For detail EEPROM information, please refer to the related document of SFF 8472 Rev 10.3.

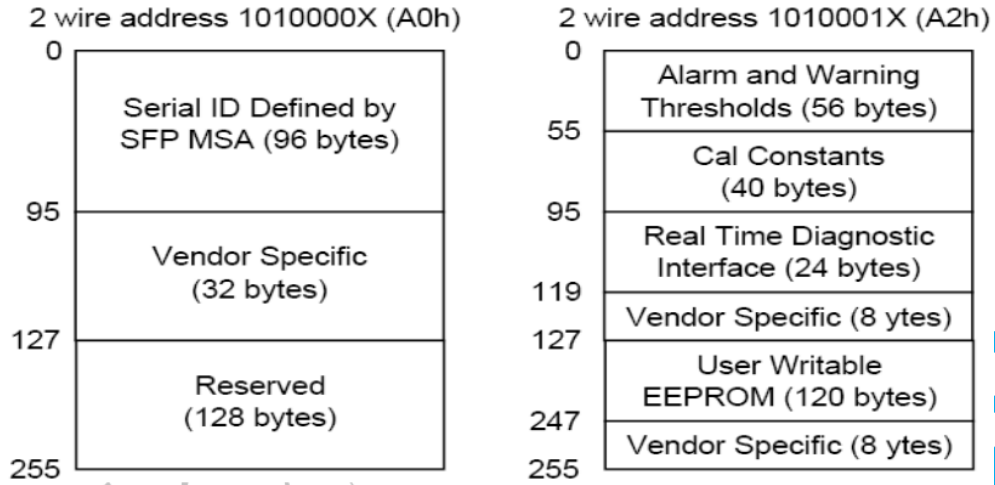
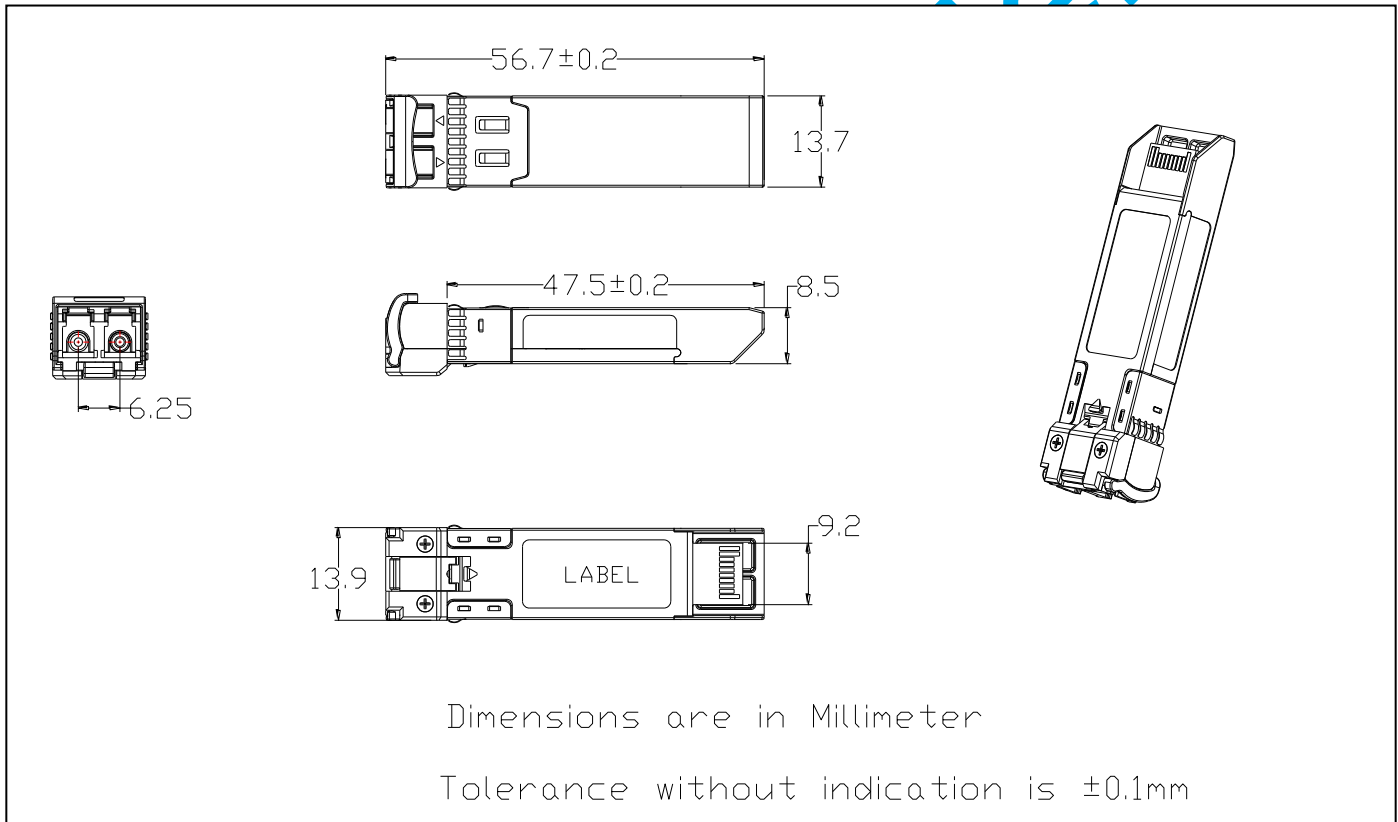


Table 1. Digital Diagnostic Memory Map (Specific Data Field Descriptions)

Package Dimensions



Ordering Information

Part Number	Description
TNSP852XL-CD100	SFP+, up to 25.78Gb/s, 850nm, 70/100m over OM3/OM4, 0~70°C