SNR-SFP28-W37-20

SNR-SFP28-W73-20

Tx: 1271nm/Rx: 1331nm BIDI SFP28 Transceiver for 25GbE/CPRI Option 10
Tx: 1331nm/Rx: 1271nm BIDI SFP28 Transceiver for 25GbE/CPRI Option 10
With DDM and Dual CDR, RoHS6 Compliant

Features

◆ Operating data rate support 24.33G and 25.78Gbps with CDR engaged mode

◆ Operating data rate support 9.95G and 10.31Gbps with CDR bypassed mode

◆ Two types:

  A: 1271nm DFB Transmitter/ 1331nm Receiver

  B: 1331nm DFB Transmitter/ 1271nm Receiver

◆ Up to 20km over SMF

◆ Single 3.3V Power supply

◆ Power Dissipation < 1.2W(Standard)

◆ Power Dissipation < 1.5W(Industrial)

◆ LC Connector Interface, Hot Pluggable

◆ Built-in dual CDR

◆ Compliant with Specification SFF-8402

◆ Build-in digital diagnostic functions

◆ Operating Case Temperature:

  Standard: 0℃~+70℃

  Industrial: -40℃~+85℃

Applications

◆ CPRI Option 10

◆ 25GbE

◆ 10GbE Optical Link

Ordering information

Part No.	Data Rate	Laser	Distance	CDR	Interface
SNR-SFP28-W73-20[*Note1]	Up to 25.78Gbps	1271nm DFB	20km	YES	LC
SNR-SFP28-W37-20[*Note1]	Up to 25.78Gbps	1331nm DFB	20km	YES	LC
SNR-SFP28-W73-20-I[*Note2]	Up to 25.78Gbps	1271nm DFB	20km	YES	LC
SNR-SFP28-W37-20-I[*Note2]	Up to 25.78Gbps	1331nm DFB	20km	YES	LC

Note1: Standard version.

Note2: Industrial version.

*The product image only for reference purpose.

Regulatory Compliance*Note3

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50384190 0001	EN 55032:2012
		EN 55032:2015
		EN 55024:2010
		EN 55024:2010+A1
'FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

Note3: The above certificate number updated to June 2018, because some certificate will be updated every year, such as FDA and ROHS. For the latest certification information, please check with LLC NAG.

Product Description

The SNR-SFP28-Wxx-20 series optical transceiver is designed for fiber communications application up to 25.78Gbps, which fully compliant with the specification of SFF-8402. It is with the SFP+ 20-pin connector to allow hot plug capability.

The SNR-SFP28-W73-20 module is designed for single mode fiber and operates at a nominal wavelength of TX-1271nm/RX-1331nm. The SNR-SFP28-W37-20 module is designed for single mode fiber and operates at a nominal wavelength of TX-1331nm/RX-1271nm. It can communicate over single mode fibers(SMF) of length up to 20km. The transmitter section uses a multiple quantum well DFB, which is class 1 laser compliant according to International Safety Standard IEC-60825.

The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Absolute Maximum Ratings*Note4

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_S	-45	+100	°C
Supply Voltage	V_{CC}	-0.5	4.0	V
Operating Relative Humidity	RH	5	95	%

Note4: Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T_C	Standard	0		70	°C
		Industrial	-40		85	
Power Supply Voltage	V_{CC}		3.135		3.465	V
Power Supply Current	I_{CC}	Standard			360	mA
		Industrial			455	mA

Performance Specifications – Electrical

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs (Differetial)	Vin	200		900	mVpp	AC coupled inputs
Input Impedance (Differential)	Zin		100		ohms	Connected directly to TX pins
Tx_DISABLE Input Voltage – High		2		Vcc+0.3	V	
Tx_DISABLE Input Voltage – Low		-0.3		0.8	V	
Receiver						
CML Outputs (Differetial)	Vout	300		1000	mVpp	AC coupled outputs
Rx_LOS Output Voltage – High		2.4		Vcc+0.3	V	
Rx_LOS Output Voltage – Low		-0.3		0.8	V	

Optical and Electrical Characteristics

(SNR-SFP28-W73-20, 1271nm DFB & 1331nm PIN/TIA)

Parameter	Symbol	Min.	Typical	Max.	Unit
9um Core Diameter SMF				20	Km
Data Rate				25.78	Gbps
Transmitter					
Optical Center Wavelength	λ	1264.5	1271	1277.5	nm
Spectral Width (-20dB)	$\Delta\lambda$			1	nm
Average Output Power@25.78Gb/s	P_{AVG}	0		4	dBm
Extinction Ratio	ER	3.5			dB
Transmitter Dispersion Penalty	TDP			3.5	dB
Side Mode Suppression Ratio	SMSR	30			Side Mode Suppression Ratio
Average Launch Power of OFF Transmitter	P_{OFF}			-30	Average Launch Power of OFF Transmitter
Receiver					
Center Wavelength	λ_C	1324.5	1331	1337.5	nm
Receiver Sensitivity[Note5]	Pmin			-14.5	dBm
Receiver Overload[Note6]	Pmin	2.5			dBm
LOS De-Assert	LOS_D			-17	dBm
LOS Assert	LOS_A	-30			dBm
LOS Hysteresis		0.5			dB

Note5: Measured with data rate at 25.78Gb/s, BER less than 5E-5 and PRBS 2^{31}-1.

Note6: SNR-SFP28-W73-20 is targeted for long reach application with high power transmitter. Please ensure at least 3dB optical attenuation for optical loopback test.

(SNR-SFP28-W37-20, 1331nm DFB & 1271nm PIN/TIA)

Parameter	Symbol	Min.	Typical	Max.	Unit
9um Core Diameter SMF				20	Km
Data Rate				25.78	Gbps
Transmitter					
Optical Center Wavelength	λ	1324.5	1331	1337.5	nm
Spectral Width (-20dB)	Δλ			1	nm
Average Output Power@25.78Gb/s	P_{AVG}	0		4	dBm
Extinction Ratio	ER	3.5			dB
Transmitter Dispersion Penalty	TDP			3.5	dB
Side Mode Suppression Ratio	SMSR	30			Side Mode Suppression Ratio
Average Launch Power of OFF Transmitter	P_{OFF}			-30	Average Launch Power of OFF Transmitter
Receiver					
Center Wavelength	$λ_C$	1264.5	1271	1277.5	nm
Receiver Sensitivity[*Note7]	Pmin			-14.5	dBm
Receiver Overload[*Note8]	Pmin	2.5			dBm
LOS De-Assert	LOS_D			-17	dBm
LOS Assert	LOS_A	-30			dBm
LOS Hysteresis		0.5			dB

Note7: Measured with data rate at 25.78Gb/s, BER less than 5E-5 and PRBS 2^{31}-1.

Note8: SNR-SFP28-W37-20 is targeted for long reach application with high power transmitter. Please ensure at least 3dB optical attenuation for optical loopback test.

SFP28 Transceiver Electrical Pad Layout
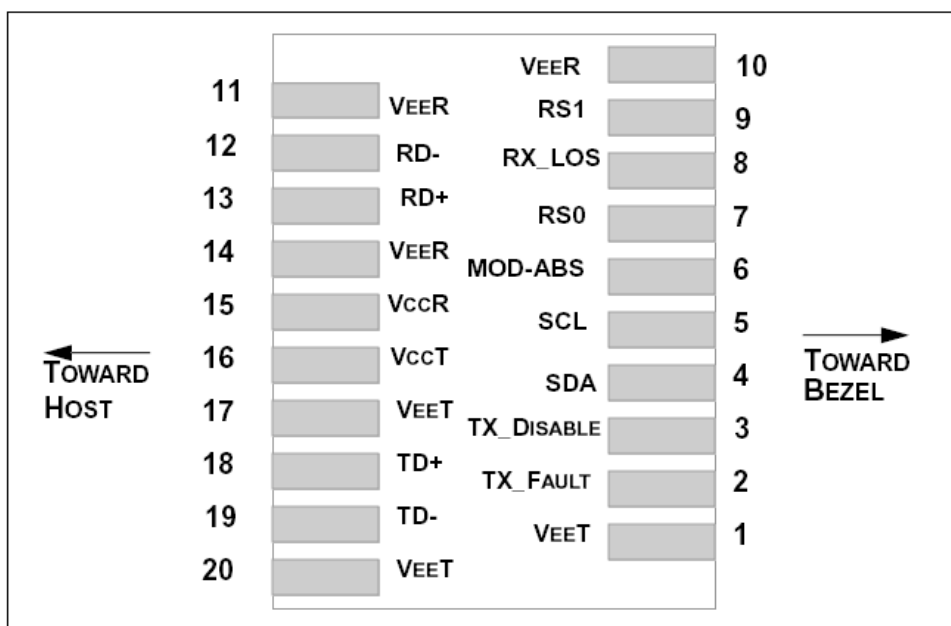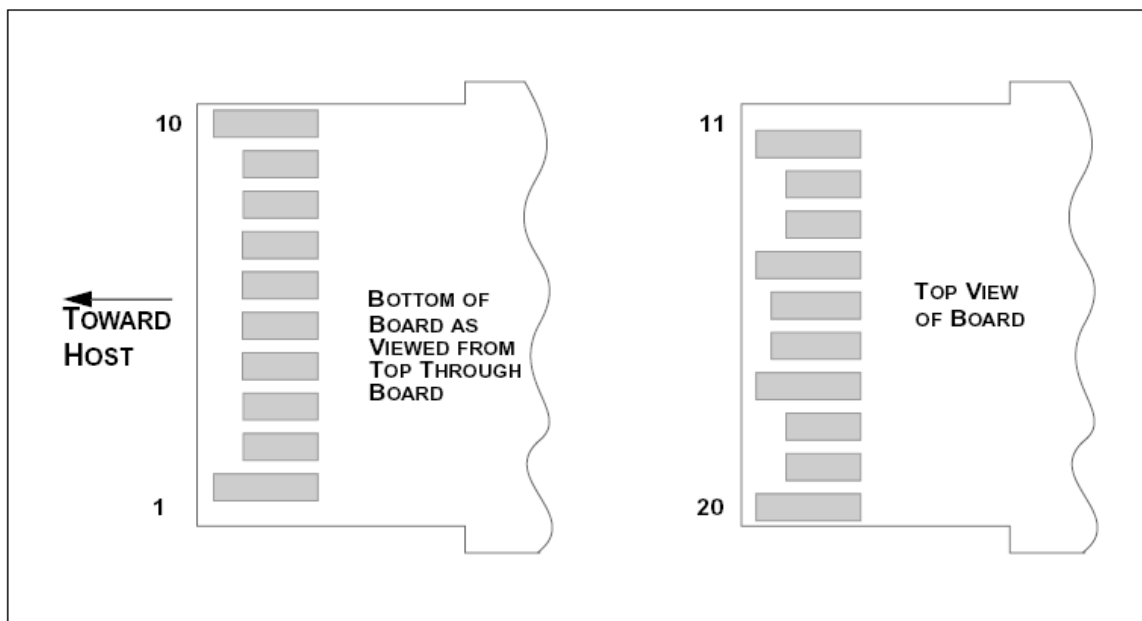
Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	Data line for Serial ID.
5	SCL	Module Definition 1	3	Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	Rate Select 0, optionally controls SFP28 module receiver. This pin is pulled low to VeeT with a >30K resistor.
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP28 module transmitter. This pin is pulled low to VeeT with a >30K resistor.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 6
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.4V 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 < 0.4V.

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 (-0.3 – 0.8V): Transmitter on
(>0.8, < 2.0V): Undefined
High (2.0 – VccT/R+0.3V): 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 – 10KΩ resistor. Pull up voltage between 2.4V and VccT/R+0.3V. 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 < 0.4V.

5) VeeR and VeeT may be internally connected within the SFP28 module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (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 150mV and 500mV single-ended when properly terminated.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 455mA. 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 100Ω 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 swings less than 450mV single-ended, though it is recommended that values between 90mV-900mV in differential be used for best EMI performance.

EEPROM

The serial interface uses the 2-wire serial CMOS EEPROM protocol. 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 12.2.
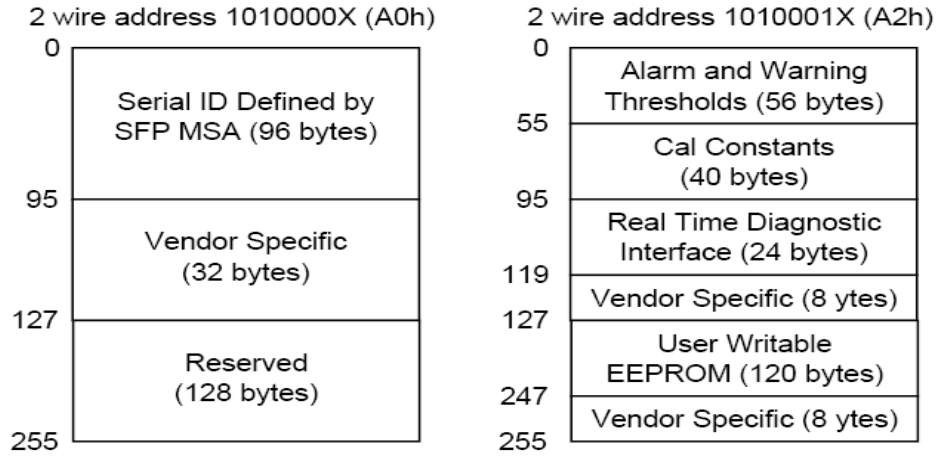
Mechanical Specifications*

Unremarked tolerances±0.2mm
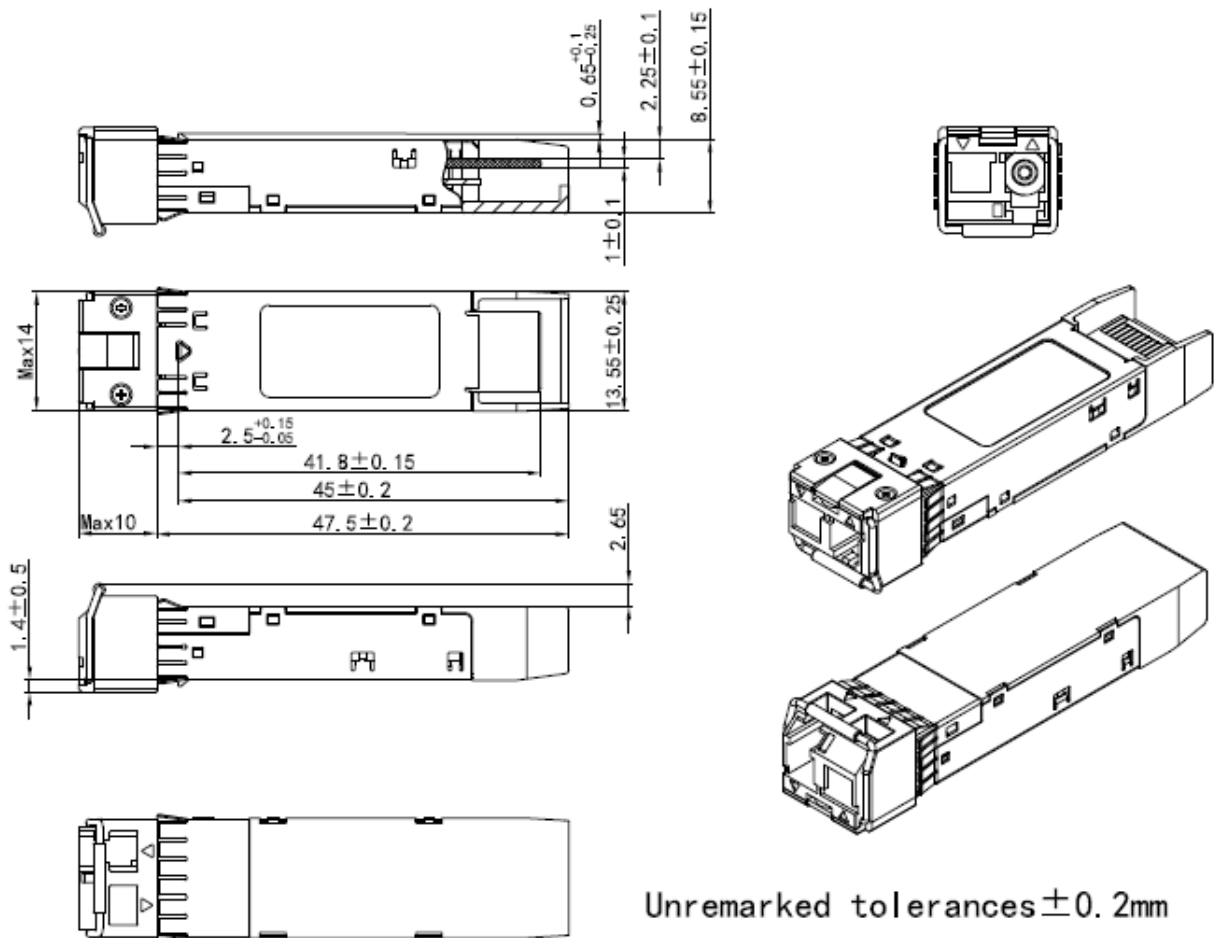
*This 2D drawing only for reference, please check with Eoptolink before ordering.

Eye Safety

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

GUARANTEE:

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