



SBHEDB22L32D000

MSA Compliant 1000Base-CWDM HD1 SFP Transceiver (SMF, 1550nm HTx/LRx, 80km, LC, DOM)

Product Description

This MSA compliant SFP transceiver provides 1000Base-CWDM HD1 throughput up to 80km over single-mode fiber (SMF) at a bidirectional wavelength of 1550nm HTx/LRx via an LC connector. It can operate at temperatures between 0 and 70C. The listed reach has been determined using a link budget calculation and tested in a standard environment. Actual link distances achieved will be dependent upon the deployed environment. All of our transceivers are built to comply with Multi-Source Agreement (MSA) standards and are uniquely serialized and tested for data-traffic and application to ensure seamless network integration. Additional product features include Digital Optical Monitoring (DOM) support which allows access to real-time operating parameters. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

Skylane's transceivers are RoHS compliant and lead-free.

Features:

- INF-8074 and SFF-8472 Compliance
- Simplex LC Connector
- Commercial Temperature 0 to 70 Celsius
- Single-mode Fiber
- Hot Pluggable
- Excellent ESD Protection
- Metal with Lower EMI
- RoHS Compliant and Lead Free



Applications:

- Gigabit Ethernet over CWDM
- Access, Metro and Enterprise
- 1x Fibre Channel

For your product safety, please read the following information carefully before any manipulation of the transceiver:



ESD

This transceiver is specified as ESD threshold 1kV for SFI pins and 2kV for all others electrical input pins, tested per MIL-STD-883G, Method 3015.4 / JESD22-A114-A (HBM). However, normal ESD precautions are still required during the handling of this module.



LASER SAFETY

This is a Class1 Laser Product according to IEC 60825-1:2007. This product complies with 21 CFR 1040.10 and 1040.11 except for deviations pursuant to Laser Notice No. 50, dated (June 24, 2007).

The optical ports of the module need to be terminated with an optical connector or with a dust plug in order to avoid contamination.

CWDM Available Wavelengths

Wavelength	Min.	Typ.	Max.
27	1264.5	1271	1277.5
29	1284.5	1291	1297.5
31	1304.5	1311	1317.5
33	1324.5	1331	1337.5
35	1344.5	1351	1357.5
37	1364.5	1371	1377.5
39	1384.5	1391	1397.5
41	1404.5	1411	1417.5
43	1424.5	1431	1437.5
45	1444.5	1451	1457.5
47	1464.5	1471	1477.5
49	1484.5	1491	1497.5
51	1504.5	1511	1517.5
53	1524.5	1531	1537.5
55	1544.5	1551	1557.5
57	1564.5	1571	1577.5
59	1584.5	1591	1597.5
61	1604.5	1611	1617.5

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage	Vcc	+3.135	+3.30	+3.465	V	
Power Supply Current	Icc			500	mA	1
Power Supply Noise Rejection	PSNR			100	mVp-p	2
Operating Temperature	Tc	-40		+85	°C	3
Storage Temperature	Tstg	-40		+85	°C	4
Power Supply Storage	Vcc		< +4.0		V	
Ambient Humidity	AH	5		95	%	5

Notes:

1. Cooled type.
2. From 100Hz to 1MHz.
3. Case with airflow.
4. Ambient.

- Without dew.

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Data Rate		DR	1.0625		1.25	Gbps	
Differential Input Voltage		VIN,pp	150		1000	mV	
Differential Input Impedance		ZIN	90	100	110	Ω	
Tx_Disable	Input_Low	VIL	0		0.8	V	1
	Input_High	VIH	2.0		3.465	V	
	Assert Time	tOFF			10	us	2
	Negate Time	tON			1	ms	3
Tx_Disable to Reset		treset	10			us	4
Time to Initialize_Cooled (Including Reset of Tx_Fault)		tInit_cooled			10	sec	5
Tx_Fault	Output_Low	VFOL	0		0.8	V	6
	Output_High	VFOH	2.0		Vcc+0.3	V	
Receiver							
Data Rate		DR	1.0625		1.25	Gbps	
Differential Output Voltage		VOUT	300		850	mV	-
Differential Output Impedance		ZOUT	90	100	110	Ω	-
Rx_LOS (Loss of Signal)	Output_Low	VLOSL	0		0.8	V	6
	Output_High	VLOSH	2		Vcc+0.3	V	
	Assert Time	tLOS-ON			100	us	7
	De-Assert Time	tLOS-OFF			100	us	8

Notes:

- LVTTTL, normal at low, high is shutdown (Poff).
- Assert time tOFF: high.
- Negate time tON: low.
- Tx_Disable to reset treset: high.
- Cooled version, for wavelength stabilization at worst-case (low & high temperature).
- LVTTTL, low is normal.
- Assert time tLOS-ON: Low → High.
- De-Assert time tLOS-OFF: High → Low.

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Optical Transmit Power		Pf	-2.5		2.0	dBm	
Transmitter Disable (Off) Power		Poff			-35	dBm	2
Peak Wavelength		λ_P	$\lambda_C+2.0 \sim \lambda_C+6.5$			nm	1
Spectral Width		$\Delta\lambda$			1.0	nm	3
Side-Mode Suppression Ratio		SMSR	30			dB	
RIN ₁₂ OMA		RIN			-117	dB/Hz	
Dispersion Penalty		DP			1.5	dB	
Extinction Ratio		ER	8.2			dB	4
Eye Pattern Mask		IEEE802.3/2008 Section 3 Figure 38-2					4
Receiver							
Optical Sensitivity		S			-26.5	dBm	5
Optical Overload		OL	2.0			dBm	5
Operating Wavelength		λ_O	$\lambda_C-6.5 \sim \lambda_C-1.5$			nm	1
Rx_LOS (Loss of Signal)	Assert	PA	-38.0			dBm	6
	De-Assert	PD			-26.5	dBm	
	Hysteresis	PA-PD	0.5	2.0	5.0	dB	
Receiver Reflectance					-27	dB	7
RSSI Calibration		RCAL	Internally Calibrated				

Notes:

1. CWDM, DFB-LD, $\lambda_C = 1271, 1291, 1311, 1331, 1351, 1371, 1391, 1411, 1431, 1451, 1471, 1491, 1511, 1531, 1551, 1571, 1591, \text{ and } 1611\text{nm}$.
2. At Tx_Disable is high.
3. At -20dB.
4. At 1.25Gbps, PRBS 2⁷-1, Figure 1.
5. PRBS2⁷-1, BER=1x10⁻¹², and ER=8.2dB.
6. Squelch function enabled.
7. At λ_O .

Pin Descriptions

Pin	Symbol	Name/Description	Plug Sequence	Notes
1	VeeT	Module Ground.	1	
2	Tx_Fault	Status Out.	3	
3	Tx_Disable	Control In.	3	
4	MOD_DEF(2)	Input/Output (SDA, I ² C Data).	3	
5	MOD_DEF(1)	Input/Output (SCL, I ² C Clock).	3	
6	MOD_DEF(0)	Indicates that the module is present. Grounded internally.	3	
7	Rate Select	Rate Select In. Not Used.	3	1
8	Rx_LOS	Status Out.	3	
9	VeeR	Module Ground.	3	
10	VeeR	Module Ground.	1	
11	VeeR	Module Ground.	1	
12	Rx_Data-	Data Out Negative.	3	
13	Rx_Data	Data Out Positive.	3	
14	VeeR	Module Ground.	1	
15	VccR	Power.	2	
16	VccR	Power.	2	
17	VeeT	Module Ground.	1	
18	Tx_Data	Data In Positive.	3	
19	Tx_Data-	Data In Negative.	3	
20	VeeT	Module Ground.	1	

Notes:

1. Internally pulled down with a >51kΩ resistor.

Recommended Circuit Schematic

Tx_Disable: Transmitter Disable, logic high, 4.7kΩ to 10kΩ pull-up to the Vcc on the SFP.

Tx_Fault: Transmitter Fault, logic high, 4.7kΩ to 10kΩ pull-up to the Vcc on the host.

Rx_LOS: Receiver Loss of Signal, logic high, 4.7kΩ to 10kΩ pull-up to the Vcc on the host.

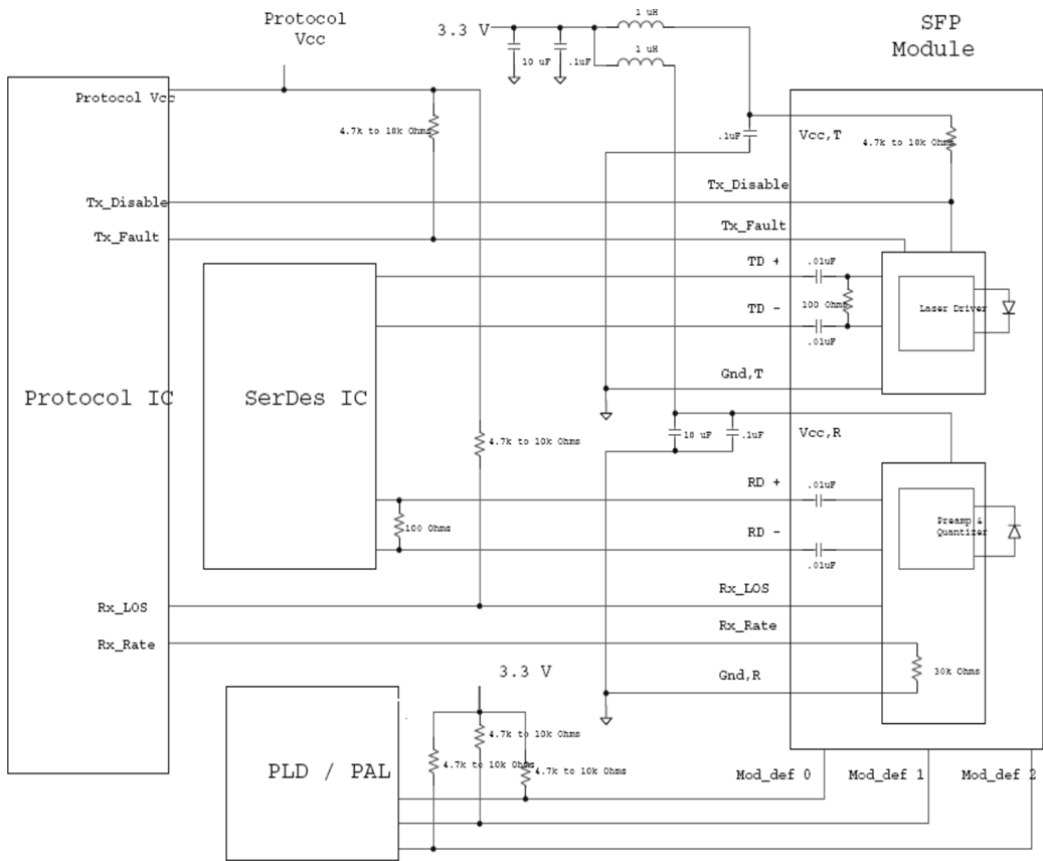
Signal Definitions



Power Coupling



SFP Host Board Schematic



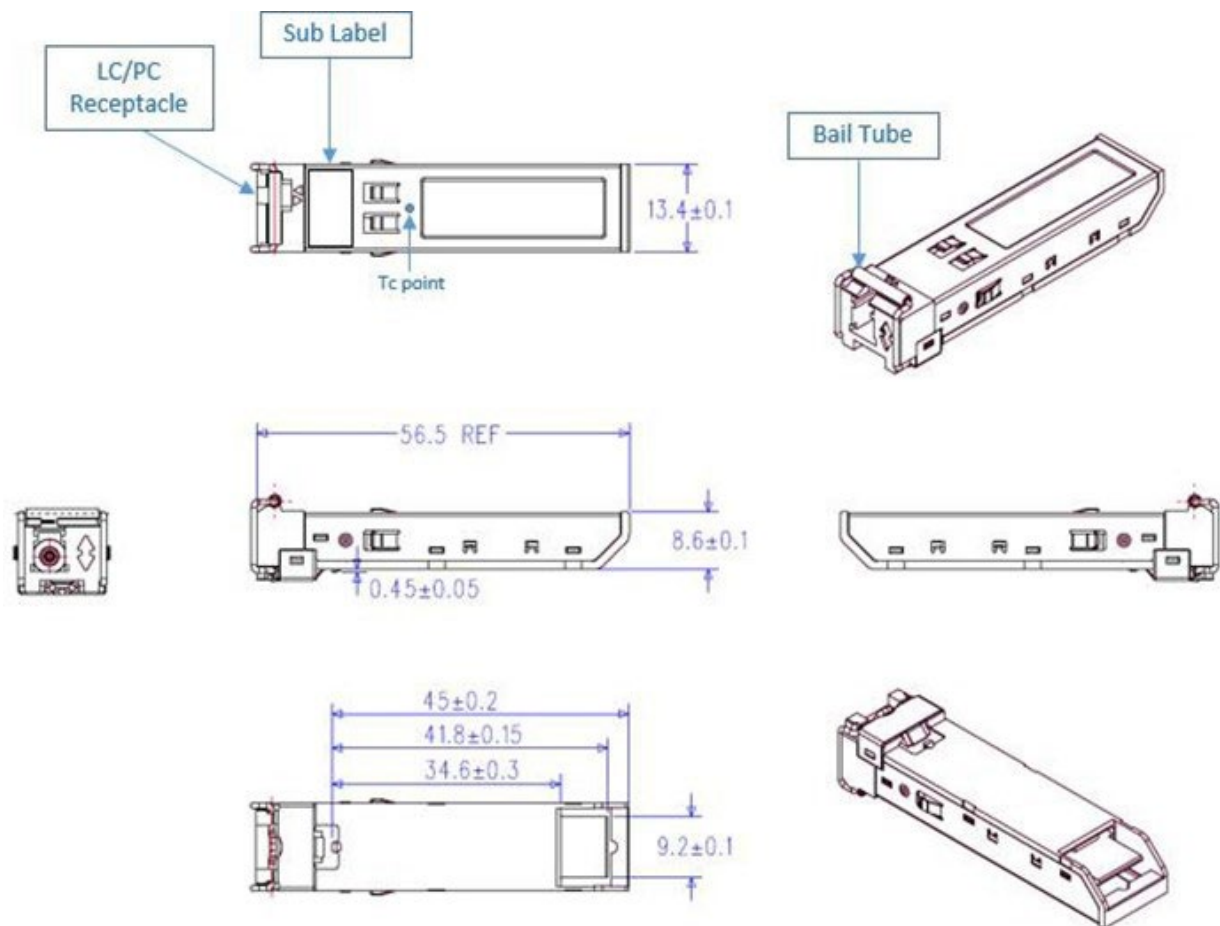
20-Pin Connector



2-Wire Data Transfer Protocol



Mechanical Specifications



About Skylane Optics

Skylane is a leading provider of transceivers for optical communication.

We offer an extensive portfolio for the enterprise, access, datacenter and metropolitan fiber optical market as well as for smart home applications and home networks.

We cover the European, South American and North American market with a strong partner network and have offices in Belgium, Brazil, Sweden and USA.

Our offerings are characterized by high quality and performance. In combination with our strong technical support, we enable our customers to build cost optimized network solutions.

We offer an extensive range of high-quality products including transceivers (Optical and copper), Active Optical Cable (AOC), Direct Attach Cable (DAC), Mux/Demux, Coding Box.

