

SFC35B16FE0D000

MSA and TAA 100Base-CWDM SFP Transceiver (SMF, 1350nm, 40km, LC, DOM)

Product Description

This MSA compliant SFP transceiver provides 100Base-CWDM throughput up to 40km over single-mode fiber (SMF) using a wavelength of 1350nm 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. It has been programmed, uniquely serialized, and tested for data-traffic and application to ensure that it will initialize and perform identically. All of our transceivers comply with Multi-Source Agreement (MSA) standards to provide seamless network integration. This transceiver is Trade Agreements Act (TAA) compliant. 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:

- Operating data rate up to 2.67Gbps
- 18-Wavelength CWDM DFB LD Transmitter from 1270nm to 1610nm, with Step 20nm
- Single 3.3V Power Supply and TTL Control Logic Interface
- Hot-Pluggable SFP Footprint Duplex LC Connector Interface
- Class 1 FDA and IEC60825-1 Laser Safety Compliant
- Operating Temperature: 0 Celsius to 70 Celsius
- Compliant with SFP MSA Specification
- Compliant with SFF-8472 Digital Diagnostic Monitor Interface
- RoHS Compliant and Lead-Free

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

Wavelengths	Min.	Typ.	Max.
27	1264	1270	1277.5
29	1284	1290	1297.5
31	1304	1310	1317.5
33	1324	1330	1337.5
35	1344	1350	1357.5
37	1364	1370	1377.5
39	1384	1390	1397.5
41	1404	1410	1417.5
43	1424	1430	1437.5
45	1444	1450	1457.5
47	1464	1470	1477.5
49	1484	1490	1497.5
51	1504	1510	1517.5
53	1524	1530	1537.5
55	1544	1550	1557.5
57	1564	1570	1577.5
59	1584	1590	1597.5
61	1604	1610	1617.5

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Storage Temperature	Tstg	-40		85	°C	
Operating Case Temperature	Tc	0		70	°C	
Operating Humidity	RH			95	%	
Data Rate		0.1		2.67		Gbps
Power Budget		17				dB

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V _{CC}	3.15	3.3	3.45	V	
Power Supply Current		I _{CC}			300	Ma	
Transmitter							
CML Differential Input		V _{IN}	400		1600	mVp-p	1
Input Differential Impedance		Z _{IN}	85	100	115	Ω	2
Tx_Disable	Disable		2		V _{CC} +0.3		
	Enable		0		0.8		
Tx_Fault	Fault		2		V _{CC} +0.3		
	Normal		0		0.8		
Receiver							
CML Differential Outputs		V _{OUT}	400		1200	mVp-p	3
Output Differential Impedance		Z _{OUT}	85	100	115	Ω	
Rx_LOS	LOS		2		V _{CC} +0.3	V	
	Normal		0		0.8	V	
MOD_DEF (0:2)		VOH	2.5			V	4
		VOL	0		0.5	V	

Notes:

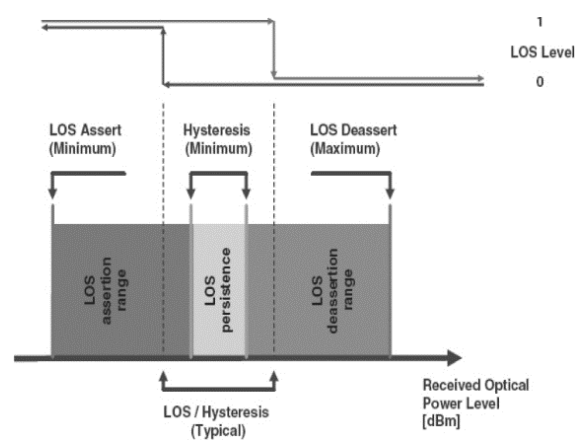
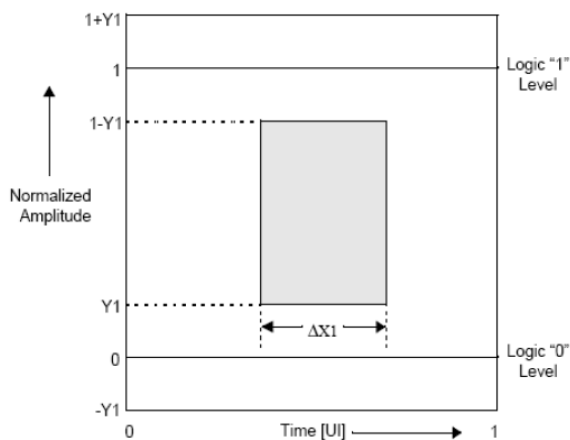
1. AC coupled inputs.
2. R_{IN}>100kΩ @ DC.
3. AC coupled outputs.
4. With Serial ID.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Center Wavelength	λ_C	λ_C-6	λ_C	$\lambda_C+7.5$	nm	
Spectral Width (-20dB)	$\Delta\lambda$			1	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Average Output Power @9/125 μ m SMF	POUT	-3		+2	dBm	
Extinction Ratio	ER	8.2			dB	1
Rise/Fall Time (20–80%)	Tr/Tf			150	ps	
Tx_Disable Assert Time	t_off			10	us	
POUT @Tx_Disable Asserted	POUT			-45	dBm	
Output Optical Eye		ANSI Fiber Channel and Gigabit Ethernet Compliant				1, 4
Receiver						
Center Wavelength	λ_C	1260		1600	nm	
Receiver Sensitivity	Pmin			-20	dBm	2
Receiver Overload	Pmax	-3			dBm	
Return Loss		12			dB	
Optical Path Penalty				1	dB	3
LOS De-Assert	LOSD			-21	dBm	
LOS Assert	LOSA	-35			dBm	
LOS Hysteresis		0.5			dB	5

Notes:

1. Filtered, measured with a PRBS $2^{23}-1$ test pattern @2.5Gbps.
2. Minimum average optical power measured at BER less than $1E^{-12}$ and ER=9dB.
3. Measured with a PRBS $2^{23}-1$ test pattern @2.5Gbps with $BER \leq 1 \times 10^{-12}$.
4. Eye Mask Pattern.
5. LOS Hysteresis.



Pin Descriptions

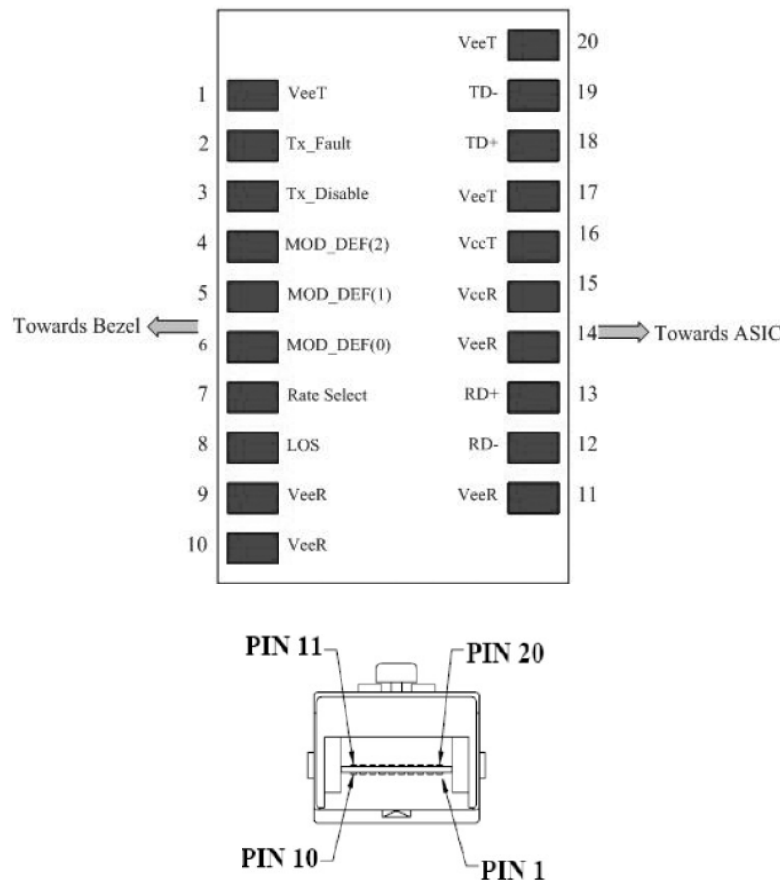
Pin	Symbol	Name/Description	Plug Sequence	Notes
1	VeeT	Transmitter Ground.	1	5
2	Tx_Fault	Transmitter Fault Indication.	3	1
3	Tx_Disable	Transmitter Disable. Module disables on “high” or “open.”	3	2
4	MOD-DEF2	Module Definition 2. Data Line for Serial ID.	3	3
5	MOD-DEF1	Module Definition 1. Clock Line for Serial ID.	3	3
6	MOD-DEF0	Module Definition 0. Grounded within the module.	3	3
7	Rate Select	Not Connected. Function not available.	3	
8	LOS	Loss of Signal.	3	4
9	VeeR	Receiver Ground.	1	5
10	VeeR	Receiver Ground.	1	5
11	VeeR	Receiver Ground.	1	5
12	RD-	Inverse Received Data Out.	3	6
13	RD+	Received Data Out.	3	6
14	VeeR	Receiver Ground.	1	5
15	VccR	3.3 ± 5% Receiver Power.	2	7
16	VccT	3.3 ± 5% Transmitter Power.	2	7
17	VeeT	Transmitter Ground.	1	5
18	TD+	Transmit Data In.	3	8
19	TD-	Inverse Transmit Data In.	3	8
20	VeeT	Transmitter Ground.	1	5

Notes:

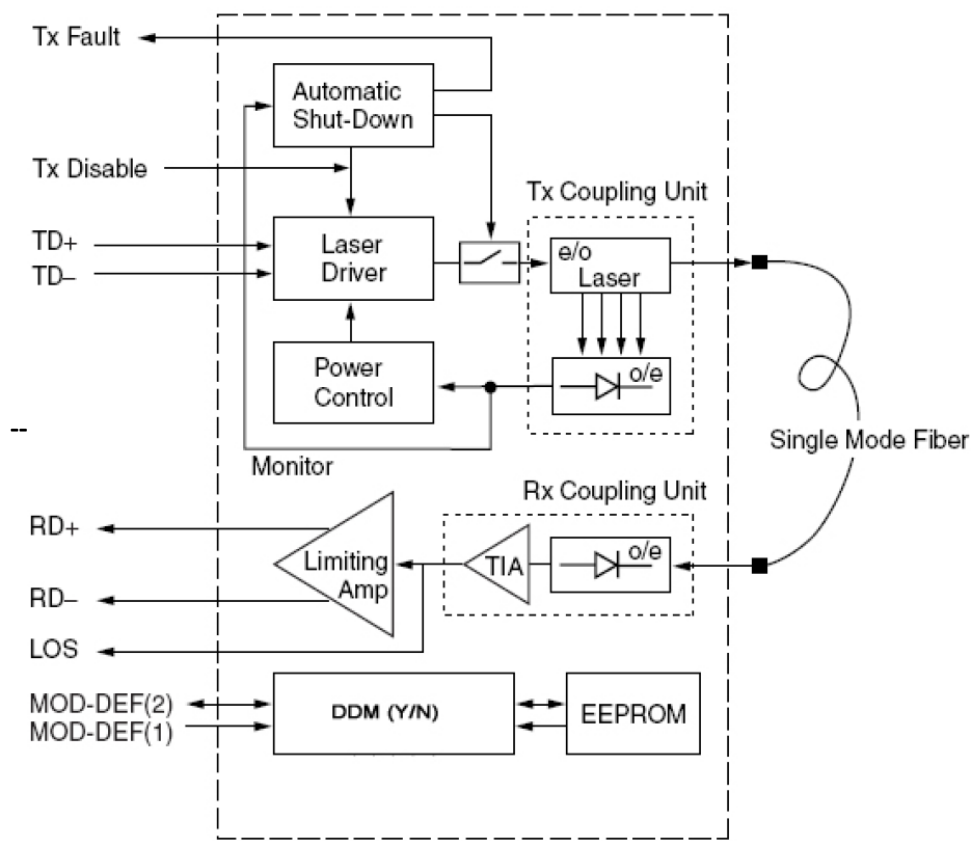
1. Tx_Fault is an open collector/drain output that should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. Pull-up voltage between 2.0V and VccT/R+0.3V. When “high,” output indicates a laser fault of some kind. “Low” indicates normal operation. In the “low” state, the output will be pulled 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 4.7kΩ to 10kΩ resistor. Its states are:
 - Low (0V – 0.8V): Transmitter On
 - (>0.8V, <2.0V): Undefined
 - High (2.0V – 3.465V): Transmitter Disabled
 - Open: Transmitter Disabled.
3. MOD-DEF0, 1, & 2. These are the module definition pins. They should be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. The pull-up voltage shall be VccT or VccR:
 - MOD-DEF0 is grounded by the module to indicate that the module is present.
 - MOD-DEF1 is the clock line of the 2-wire serial interface for serial ID.
 - MOD-DEF2 is the data line of the 2-wire serial interface for serial ID.

4. LOS (Loss of Signal) is an open collector/drain output that should be pulled up with a 4.7k Ω to 10k Ω resistor. Pull-up voltage between 2.0V and $V_{ccT}/R+0.3V$. When "high," this output indicates that 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 SFP 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 400mV and 2000mV differential (200mV–1000mV 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 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 Ω should be used in order to maintain the required voltage at the SFP input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP transceiver module will result in an in-rush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP transceiver module.
8. TD-/+. These are the differential transmitter inputs. They are AC coupled, differential lines with 100 differential terminations 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 between 400mV and 2000mV (200mV–1000mV single-ended).

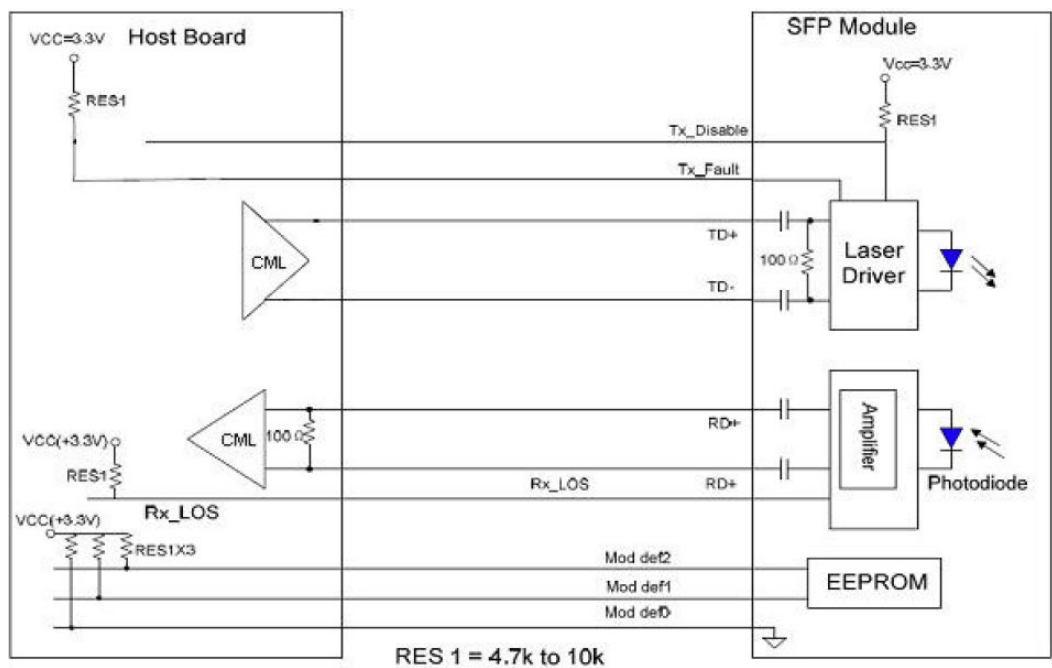
Electrical Pad Layout



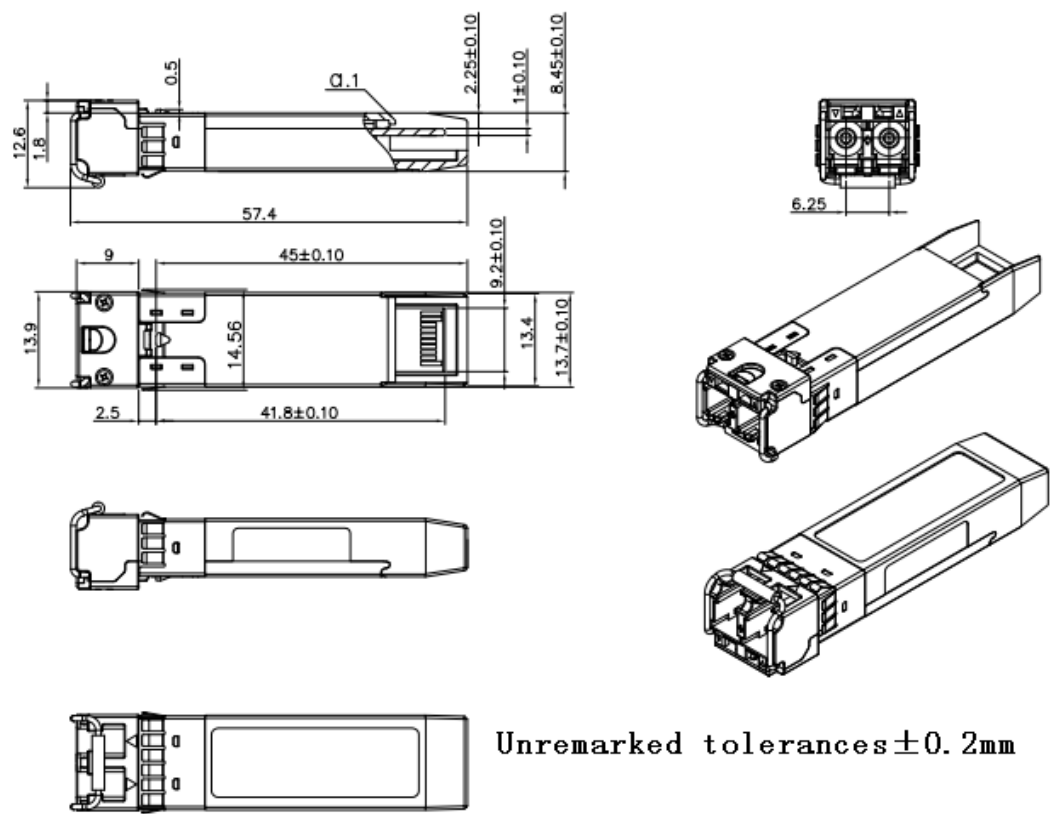
Functional Description of Transceiver



Recommended Circuit Schematic



Mechanical Specifications



Unremarked tolerances±0.2mm

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.

