



SFD28160GE0D524

HP® Compatible 1000Base-DWDM SFP Transceiver C-Band 100GHz (SMF, 1554.94nm, 160km, LC, DOM)

Product Description

This HP® SFP transceiver provides 1000Base-DWDM throughput up to 160km over single-mode fiber (SMF) using a wavelength of 1554.94nm via an LC connector. It is guaranteed to be 100% compatible with the equivalent HP® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow 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:

- Compliant with SFP MSA
- Single-mode Fiber
- Duplex LC Connector
- Hot Pluggable
- Metal with Lower EMI
- Single 3.3V Supply
- Commercial Temperature 0 to 70 Celsius
- Excellent ESD Protection
- RoHS Compliant and Lead Free



Applications:

- Gigabit Ethernet over DWDM
- Access and Enterprise

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.

SFP+ Channel Number and Wavelength

Channel	Frequency	Center Wavelength (nm)	Channel	Frequency (THz)	Center Wavelength (nm)
0	190.0	1577.86	50	195.0	1537.40
1	190.1	1577.03	51	195.1	1536.61
2	190.2	1576.20	52	195.2	1535.82
3	190.3	1575.37	53	195.3	1535.04
4	190.4	1574.54	54	195.4	1534.25
5	190.5	1573.71	55	195.5	1533.47
6	190.6	1572.89	56	195.6	1532.68
7	190.7	1572.06	57	195.7	1531.90
8	190.8	1571.24	58	195.8	1531.12
9	190.9	1570.42	59	195.9	1530.33
10	191.0	1569.59	60	196.0	1529.55
11	191.1	1568.77	61	196.1	1528.77
12	191.2	1567.95	62	186.2	1610.06
13	191.3	1567.13	63	186.3	1609.19
14	191.4	1566.31	64	186.4	1608.33
15	191.5	1565.50	65	186.5	1607.47
16	191.6	1564.68	66	186.6	1606.60
17	191.7	1563.86	67	186.7	1605.74
18	191.8	1563.05	68	186.8	1604.88
19	191.9	1562.23	69	186.9	1604.03
20	192.0	1561.42	70	187.0	1603.17
21	192.1	1560.61	71	187.1	1602.31
22	192.2	1559.79	72	187.2	1601.46
23	192.3	1558.98	73	187.3	1600.60
24	192.4	1558.17	74	187.4	1599.75
25	192.5	1557.36	75	187.5	1598.89
26	192.6	1556.55	76	187.6	1598.04
27	192.7	1555.75	77	187.7	1597.19
28	192.8	1554.94	78	187.8	1596.34
29	192.9	1554.13	79	187.9	1595.49
30	193.0	1553.33	80	188.0	1594.64
31	193.1	1552.52	81	188.1	1593.79
32	193.2	1551.72	82	188.2	1592.95
33	193.3	1550.92	83	188.3	1592.10
34	193.4	1550.12	84	188.4	1591.26
35	193.5	1549.32	85	188.5	1590.41
36	193.6	1548.51	86	188.6	1589.57
37	193.7	1547.72	87	188.7	1588.73
38	193.8	1546.92	88	188.8	1587.88
39	193.9	1546.12	89	188.9	1587.04
40	194.0	1545.32	90	189.0	1586.20

41	194.1	1544.53	91	189.1	1585.36
42	194.2	1543.73	92	189.2	1584.53
43	194.3	1542.94	93	189.3	1583.69
44	194.4	1542.14	94	189.4	1582.85
45	194.5	1541.35	95	189.5	1582.02
46	194.6	1540.56	96	189.6	1581.18
47	194.7	1539.77	97	189.7	1580.35
48	194.8	1538.98	98	189.8	1579.52
49	194.9	1538.19	99	189.9	1578.69

Absolute Maximum Ratings

Parameter		Symbol	Min.	Typ.	Max.	Unit
Maximum Supply Voltage		Vcc	-0.5		3.6	V
Storage Temperature		Tstg	-40		85	°C
Operating Case Temperature		Tc	0		70	°C
Operating Humidity		RH			95	%
Data Rate	GBE			1.25		Gbps
	FC			1.063		

Electrical Characteristics

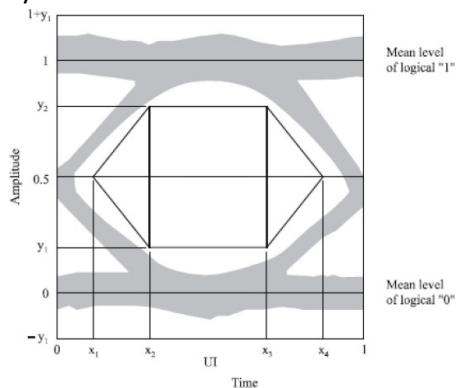
Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		Vcc	3.15	3.3	3.45	V	
Power Supply Current		Icc			450	mA	
Transmitter							
CML Differential Inputs		VIN	400		1600	mVp-p	AC Coupled Inputs
Input Differential Impedance		ZIN	85	100	115	Ω	RIN>100kΩ @ DC
Tx_Disable	Disable		2		Vcc	V	
	Enable		0		0.8		
Tx_Fault	Fault		2		Vcc	V	
	Normal		0		0.8		
Receiver							
CML Differential Outputs		VOUT	400	800	1200	mVp-p	AC Coupled Outputs
Output Impedance		ZOUT	85	100	115	Ω	
Rx_LOS	LOS		2		Vcc	V	
	Normal		0		0.8	V	
MOD-DEF (0:2)		VOH	2.5			V	
		VOL	0		0.8	V	

Optical Characteristics

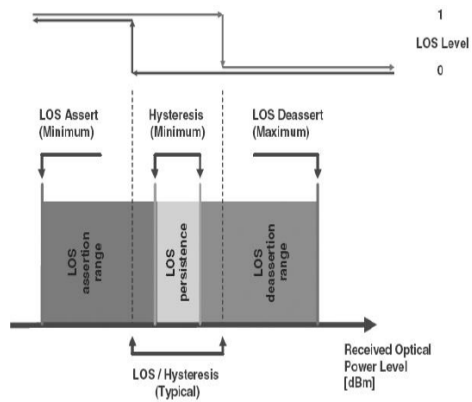
Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Optical Center Wavelength	λ_C	1528		1610	nm	
Spectral Width (-20dB)	$\Delta\lambda$			0.3	nm	
Side-Mode Suppression Ratio	SMSR	30			dB	
Channel Spacing	Δf		100		GHz	
Deviation From Central Frequency @ EOL		-12		12	GHz	
Average Output Power	POUT	2		5	dBm	1
Average Launch Power (Tx Off)	Poff			-45	dBm	
Extinction Ratio	ER	8.2			dB	1
Rise/Fall Time (20-80%)	Tr/Tf			150	ps	
Tx_Disable Assert Time	Toff			10	us	
POUT @ Tx_Disable Asserted	POUT			-45	dBm	
Optical Signal Noise Ratio @ 0.1nm	OSNR		40		dB	3
Relative Intensity Noise	RIN			-135	dB/Hz	
Dispersion Tolerance	DT		2400		Ps/nm	
Output Optical Eye	Compatible with IEEE 802.3					1, 4
Receiver						
Optical Input Wavelength	λ	1528		1620	nm	
Receiver Sensitivity	Pmin			-31	dBm	2
Receiver Overload	Pmax	-9			dBm	
LOS De-Assert	LOSD			-32	dBm	
LOS Assert	LOSA	-45			dBm	
LOS Hysteresis			0.5		dB	5

Notes:

1. Filtered. Measured with a PRBS $2^{23}-1$ test pattern at 2.5Gbps.
2. Measured with a PRBS $2^{23}-1$ test pattern at 2.5Gbps, G.652 SMF, and BER $\leq 1 \times 10^{-12}$.
3. OSNR at BER of $10e^{-12}$.
4. Eye Pattern Mask.



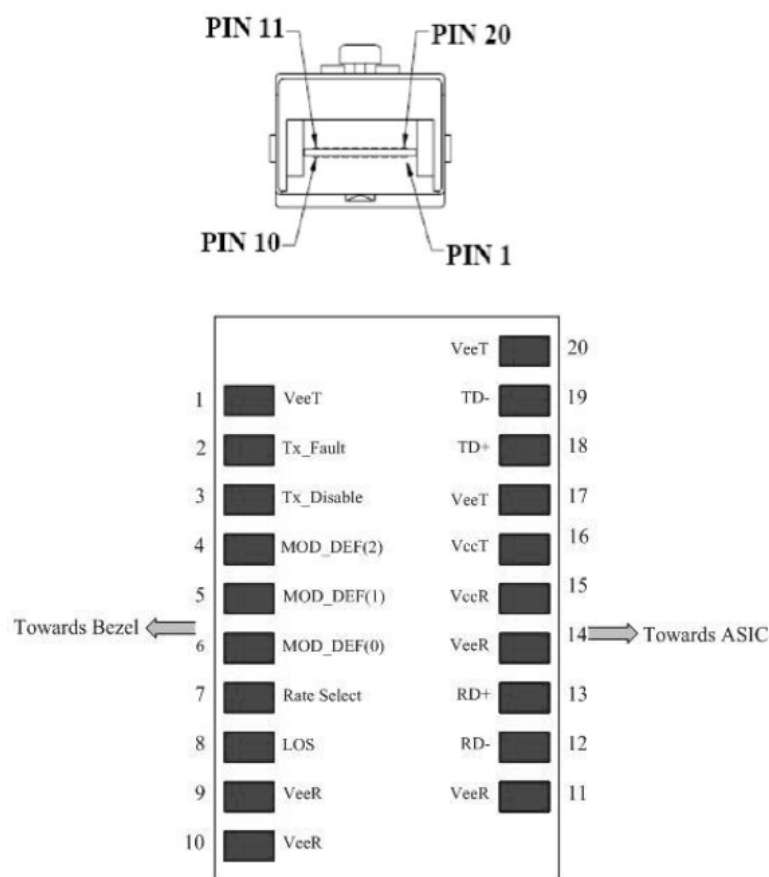
5. LOS Hysteresis.



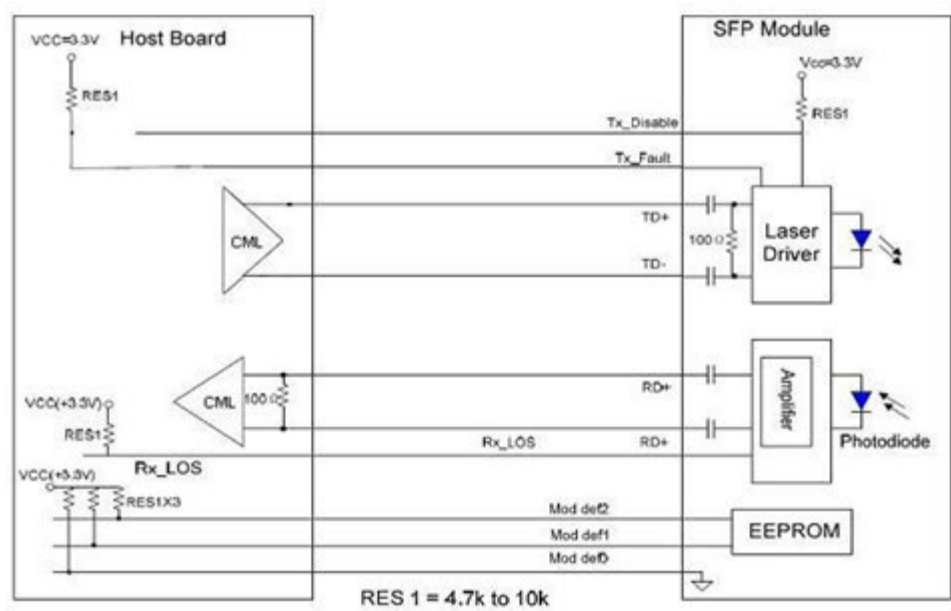
Pin Descriptions

Pin	Symbol	Name/Description	Note
1	VeeT	Transmitter Ground.	
2	Tx_Fault	Transmitter Fault Indication. Open Collector/Drain Output.	
3	Tx_Disable	Transmitter Disable.	
4	MOD-DEF2	Module Definition 2. 2-Wire Serial Interface Data.	
5	MOD-DEF1	Module Definition 1. 2-Wire Serial Interface Clock.	
6	MOD-DEF0	Module Definition 0. Grounded within the module.	
7	Rate Select	Rate Select 0. Not Used.	
8	LOS	Loss of Signal. Open Collector/Drain Output.	
9	VeeR	Receiver Ground.	
10	VeeR	Receiver Ground.	
11	VeeR	Receiver Ground.	
12	RD-	Inverted Receiver Data Out.	
13	RD+	Received Data Out.	
14	VeeR	Receiver Ground.	
15	VccR	Receiver Power. 3.3 ± 5%.	
16	VccT	Transmitter Power. 3.3 ± 5%.	
17	VeeT	Transmitter Ground.	
18	TD+	Transmitter Data In.	
19	TD-	Inverted Transmit Data In.	
20	VeeT	Transmitter Ground.	

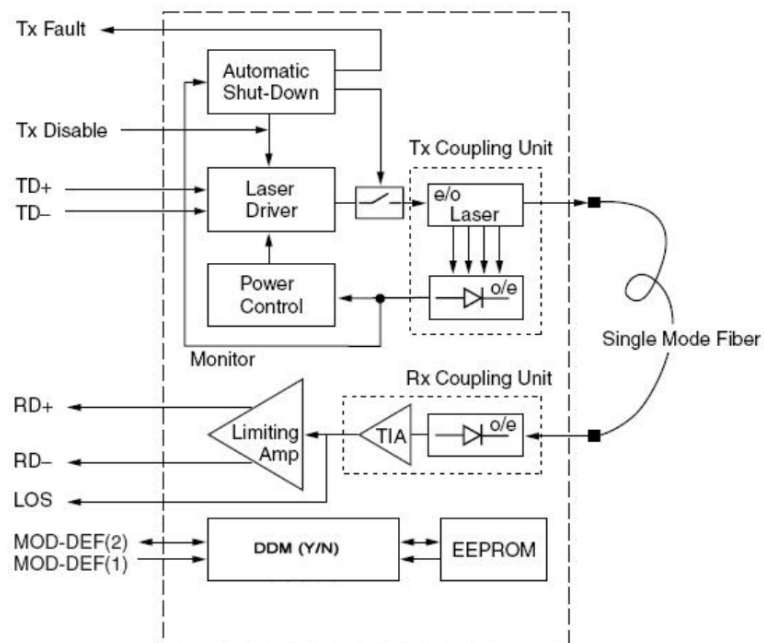
Electrical Pad Layout



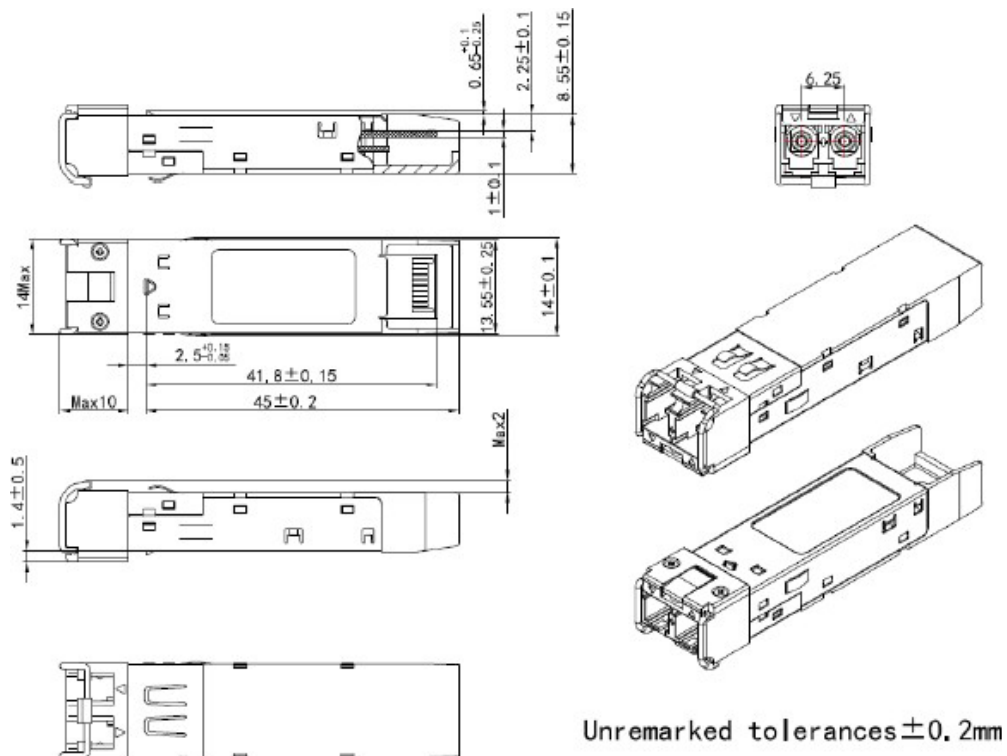
Recommended Circuit Schematic



Functional Description of Transceiver

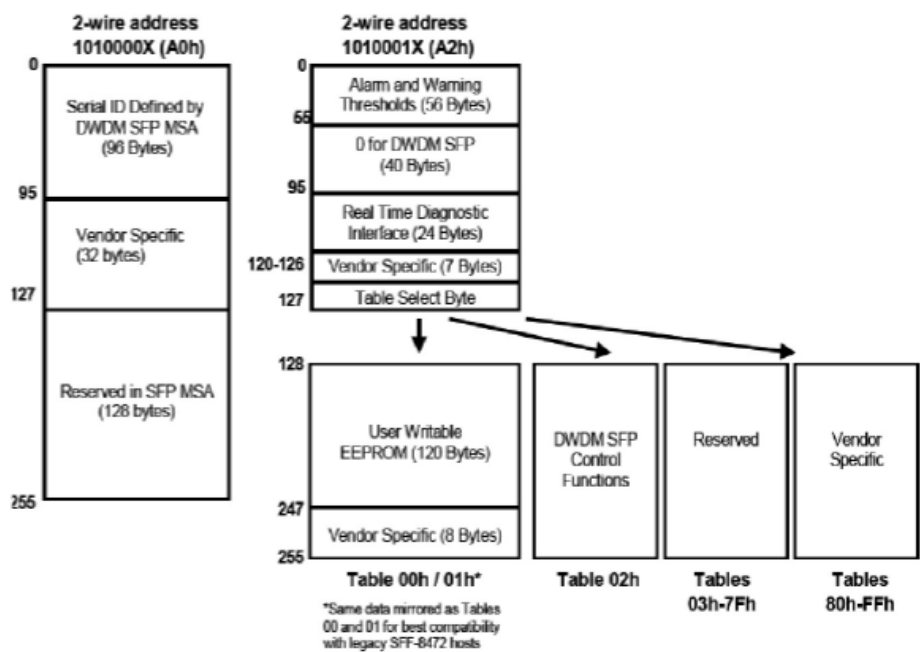


Mechanical Specifications



EEPROM Information

EEPROM memory map-specific data field description is as below:



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.

