



S2DTU015252F000

MSA 10/25GBase-DWDM SFP28 Transceiver Dual-Rate 100GHz (SMF, Tunable, 15km, LC, DOM, -40 to 85C)

Product Description

This MSA Compliant SFP28 transceiver provides 10/25GBase-DWDM throughput up to 15km over single-mode fiber (SMF) using a tunable wavelength via an LC connector. It is built to MSA standards and is uniquely serialized and data-traffic and application tested to ensure that they will integrate into your network seamlessly. 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:

- SFF-8402 and SFF-8690 Compliant
- 100GHz Channel Spacing
- Duplex LC Connector
- Industrial Temperature -40 to 85 Celsius
- Single-mode Fiber
- Supports 9.8Gb/s to 25.78Gb/s
- Excellent ESD Protection
- Hot Pluggable
- RoHS Compliant and Lead Free
- Metal with Lower EMI



Applications:

- 25GBase
- Access, Metro 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.

Regulatory Compliance

- ESD to the Electrical PINs: compatible with MIL-STD-883E Method 3015.4.
- ESD to the LC Receptacle: compatible with IEC 61000-4-3.
- EMI/EMC: compatible with FCC Part 15 Subpart B Rules, EN55022:2010.
- Laser Eye Safety: compatible with FDA 21CFR, EN60950-1& EN (IEC) 60825-1, 2.
- RoHS: compliant with EU RoHS 2.0 directive 2015/863/EU.

DWDM Wavelength ITU Channels - 100 GHz Spacing

ITU Channel	Center Wavelength (nm)	Frequency (THz)	ITU Channel	Center Wavelength (nm)	Frequency (THz)
14	1566.31	191.4	38	1546.92	193.8
15	1565.50	191.5	39	1546.12	193.9
16	1564.68	191.6	40	1545.32	194.0
17	1563.86	191.7	41	1544.53	194.1
18	1563.05	191.8	42	1543.73	194.2
19	1562.23	191.9	43	1542.94	194.3
20	1561.42	192.0	44	1542.14	194.4
21	1560.61	192.1	45	1541.35	194.5
22	1559.79	192.2	46	1540.56	194.6
23	1558.98	192.3	47	1539.77	194.7
24	1558.17	192.4	48	1538.98	194.8
25	1557.36	192.5	49	1538.19	194.9
26	1556.55	192.6	50	1537.4	195.0
27	1555.75	192.7	51	1536.61	195.1
28	1554.94	192.8	52	1535.82	195.2
29	1554.13	192.9	53	1535.04	195.3
30	1553.33	193.0	54	1534.25	195.4
31	1552.52	193.1	55	1533.47	195.5
32	1551.72	193.2	56	1532.68	195.6
33	1550.92	193.3	57	1531.9	195.7
34	1550.12	193.4	58	1531.12	195.8
35	1549.32	193.5	59	1530.33	195.9
36	1548.51	193.6	60	1529.55	196.0
37	1547.72	193.7	61	1528.77	196.1

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Maximum Supply Voltage	V _{CC}	0		4	V	
Storage Temperature	T _{stg}	-40		85	°C	
Operating Case Temperature	T _c	-40		85	°C	
Ambient Humidity	RH	5		95	%	w/o dew
Data Rate	DR ₂₅	24.3		25.78	Gbps	
	DR ₁₀	9.8	10.3	12.5	Gbps	
Receiver Damage Threshold	THd	3			dBm	

Electrical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Power Supply Voltage		V _{CC}	+3.135	+3.3	+3.465	V	
Power Dissipation		P _{DISS}			2.5	W	1
Power Supply Noise Tolerance		PSNT			66	mVp-p	2
Transmitter							
Data Rate		DR ₂₅	24.3		25.78	Gbps	RS1 High Logic
		DR ₁₀	9.8	10.3	12.5	Gbps	RS1 Low Logic
Differential Input Voltage		V _{IN}	190		700	mV	AC Coupled
Differential Input Impedance		Z _{IN}	90	100	110	Ω	
Tx_Disable	Input_Low	V _{IL}	-0.3		0.8	V	3
	Input_High	V _{IH}	2.0		V _{CC} +0.3	V	3
	Assert Time	t _{OFF}			100	us	High
	Negate Time	t _{ON}			2.0	ms	Low
Tx_Disable to Start Reset		t _{Reset}	10			us	High
Time to Initialize		t _{Init}			90	s	4
Tx_Fault	Output_Low	V _{FOL}	-0.3		0.4	V	LVTTL - Low is Normal
	Output_High	I _{FOH}	-50		37.5	uA	
RS1 (Rate Select for Tx)		V _{IL}	-0.3		0.8	V	Internally pulled down
		V _{IH}	2.0		V _{CC} +0.3	V	
Receiver							
Data Rate		DR ₂₅	24.3		25.78	Gbps	RS0 High Logic
		DR ₁₀	9.8	10.3	12.5	Gbps	RS0 Low Logic
Differential Output Voltage		V _{OUT}	300		850	mV	AC Coupled
Differential Output Impedance		Z _{OUT}	90	100	110	Ω	

Rx_LOS (Loss of Signal)	Output_Low	V_{LOSL}	-0.3		0.4	V	LVTTL - Low is Normal
	Output_High	I_{LOSH}	-50		37.5	uA	
	Assert Time	$t_{\text{LOS-ON}}$			100	us	High@S
	De-Assert Time	$t_{\text{LOS-OFF}}$			100	us	Low@S
RS0 (Rate Select for Rx)		VIL	-0.3		0.8	V	Internally pulled down
		VIH	2		Vcc+0.3	V	

Notes:

1. Conditions: @3.3V and -40°C to 85°C.
2. From 10Hz to 10MHz.
3. LVTTL – “Low” at normal operation and “High” at shutdown (Poff).
4. Including reset of Tx_Fault.

Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Average Launch Power		Pavg	-1.0		+3.0	dBm	
Optical Power Flatness		ΔPO	-1.0		+1.0	dB	All Channels
Transmitter Disabled Power		Poff			-30	dBm	@Tx_Disable is High
Optical Center Wavelength		λC	1528.77		1566.31	nm	1
Optical Center Frequency			191.40		196.10	THz	1
Center Wavelength Spacing			100			GHz	1
Wavelength Stability	Beginning of Life	$\lambda_{\text{p_BOL}}$	-1.7	λC	+1.7	GHz	2
	End of Life	$\lambda_{\text{p_EOL}}$	-2.5	λC	+2.5	GHz	2
Wavelength Tuning Speed		T_{TUNE}			30	ms	3
Spectral Width		σ			0.5	nm	@-20dB
Side-Mode Suppression Ratio		SMSR	30			dB	
Extinction Ratio		ER	8.0			dB	PRBS 2 ³¹ -1
Relative Intensity Noise		RIN _{20OMA}			-130.0	dB/Hz	
Optical Return Loss Tolerance		ORLT			20.0	dB	
Transmitter Reflectance					-26.0	dB	
Optical Eye Mask			IEEE 802.3cc 114.6 25GBASE- LR/ER {X1, X2, X3, Y1, Y2, Y3} = {0.31, 0.40, 0.45, 0.34, 0.38, 0.40}				Hit ratio 5E ⁻⁵

Receiver							
Optical Sensitivity	25.78Gbps or 24.33Gbps	S1			-19.0		4
	10.7Gbps, 10.3Gbps, 9.8Gbps	S2			-19.0		5
	11.3 - 11.1Gbps	S3			-19.0		6
Optical Overload			-4.0			dBm	7
Operating Wavelength		λ	1525		1575	nm	
Rx_LOS (Loss of Signal)	Assert	LOSA	-30.0			dBm	Rx Squelch Activated
	De-Assert	LOSD			-23.0	dBm	
	Hysteresis	LOSH	0.5		5.0	dB	
Return Loss of Receiver					-26.0	dB	
Auxiliary Management and Control Channel							
Bit Rate		BR _{AMCC}		1200		bps	
Modulation Depth		AMCC _{MD}	5		10	%	
Dynamic Range		DR _{AMCC}	-4		-24	dBm	8

Notes:

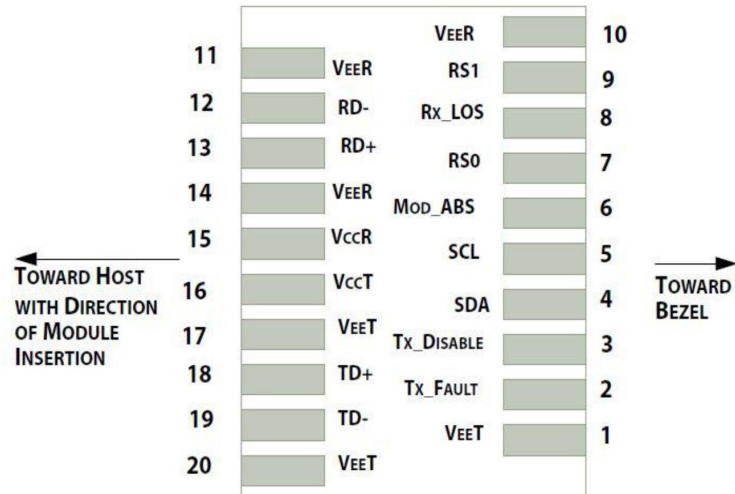
1. ITU-T 694.1 Grid Wavelength.
2. λ_C = ITU Grid Wavelength.
3. From any CH to any other CH. ASP Disable.
4. PRBS 2³¹, BER 5x10⁻⁵, Source ER=8.0dB, SMF 15km, G.652.
5. PRBS 2³¹, BER 5x10⁻¹², Source ER=8.0dB, SMF 15km, G.652.
6. PRBS 2³¹, BER 1x10⁻⁴, Source ER=8.0dB, SMF 15km, G.652.
7. PRBS 2³¹, Source ER=8.0dB.
8. AMCC_{MD} : 5%, 1200bps.

Pin Descriptions

Pin	Symbol	Name	Ref.
1	VeeT	Transmitter Ground.	1
2	Tx_Fault	Transmitter Fault Indication.	
3	Tx_Disable	Disables the transmitter or laser output.	2
4	SDA	2-Wire Serial Interface Data.	2
5	SCL	2-Wire Serial Interface Clock.	2
6	Mod_ABS	Indicates the module online state. This pin is connected to the VeeT or VeeR pin.	
7	RS0	Selects a rate for the module. This pin is connected to the 33k Ω resistor.	
8	LOS	Indicates a loss of received signals.	2
9	RS1	Selects a rate for the module. This pin is connected to the 33k Ω resistor.	
10	VeeR	Receiver Ground.	1
11	VeeR	Receiver Ground 1.	1
12	RD-	Inverse Received Data Output.	
13	RD+	Received Data Output.	
14	VeeR	Receiver Ground.	1
15	VccR	+3.3V Receiver Power.	1
16	VccT	+3.3V Transmitter Power.	1
17	VeeT	Transmitter Ground.	1
18	TD+	Transmit Data Input.	
19	TD-	Inverse Transmit Data Input.	
20	VeeT	Transmitter Ground.	1

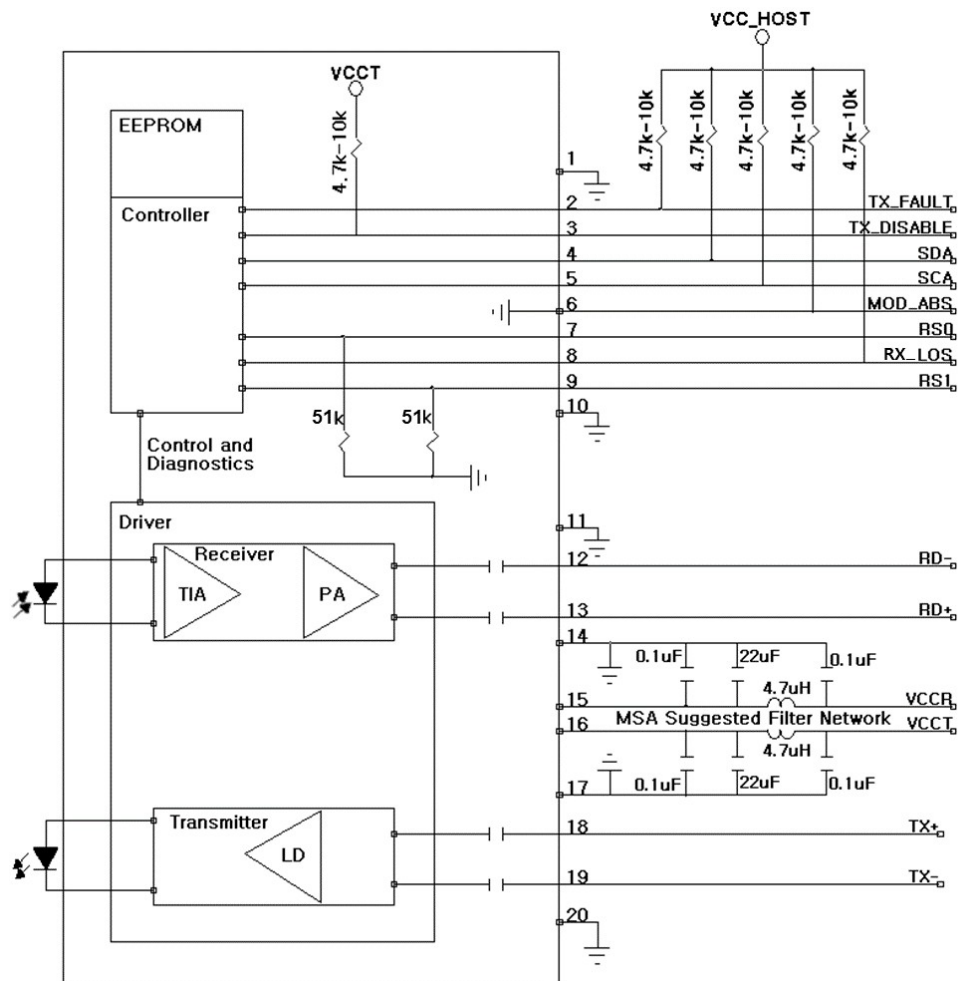
Notes:

1. The ground of the module (operating module ground) and that of the module shell are separate from each other.
2. 4.7k Ω –10k Ω resistor is used on the module to pull the output up to 3.15–3.45V.



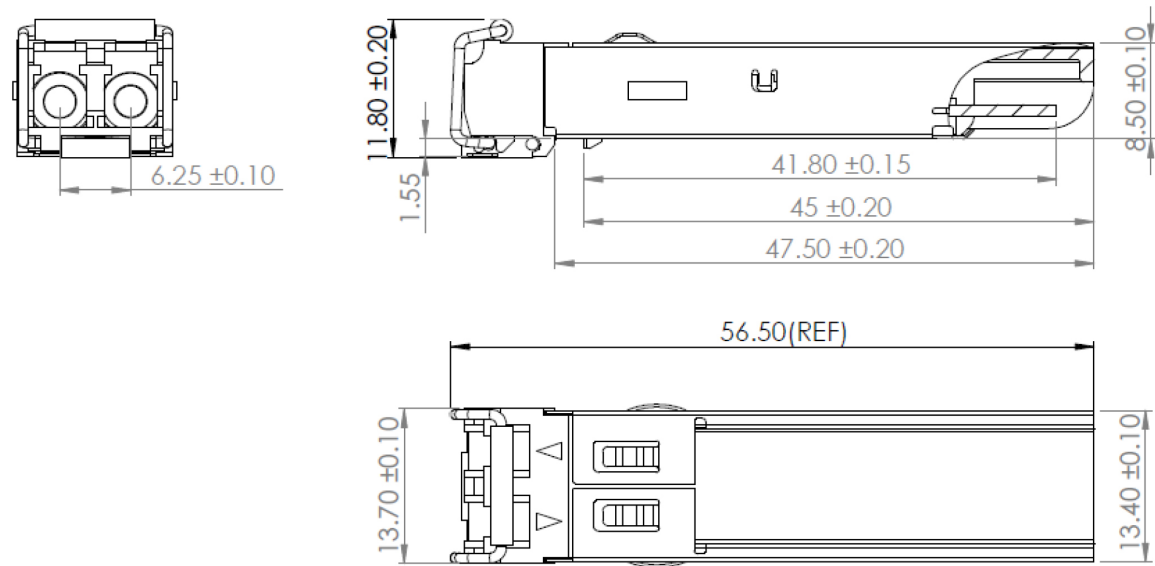
Pin-Out of Connector Block on the Host Board

Recommended Circuit Schematic



Mechanical Specifications

Small Form Factor Pluggable (SFP) transceivers are compatible with the dimensions defined by the SFP Multi-Sourcing Agreement (MSA).



EEPROM Information

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

2 wire address 1010000X (A0h)	2 wire address 1010001X (A2h)
0	0
Serial ID Defined by SFP MSA (96 bytes)	Alarm and Warning Thresholds (56 bytes)
95	55
Vendor Specific (32 bytes)	Cal Constants (40 bytes)
127	95
Reserved, SFF8079 (128 bytes)	Real Time Diagnostic Interface (24 bytes)
255	119
	Vendor Specific (8 bytes)
	127
	User Writable EEPROM (120 bytes)
	247
	Vendor Specific (8 bytes)
	255

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.

