

SFPP-DT1-80-10GDI

10GBASE, SFP+, ZR, DWDM Tunable ITU-50GHz, SMF TRANSCEIVER 1528.77-1563.86nm (96ch), 80km REACH, DUPLEX LC CONNECTOR

Product Features

- Hot-pluggable SFP+ footprint
- Supports 8.5 and 9.95 to 11.3 Gb/s
- Up to 80km link length
- 50GHz ITU-based channel spacing (C-Band) with a wavelength locker.
- Available operating temperature ranges:
 - Industrial: -40°C to 85°C
 - (-40°C cold start)
- Single 3.3V power supply
- Monolithic MZM Tunable TOSA
- Limiting electrical interface APD receiver
- Duplex LC connector
- Built-in digital diagnostic functions
- RoHS-6 compliant (lead-free)



Product Applications

- DWDM 80km point to point links:
 - Remote PHY (R-PHY)
 - Wireless Backhaul
 - 10Gb/s SONET/SDH
 - 10G Ethernet
 - 8G/10G Fibre Channel
- ITU-T G.698.1 DS100S1-2Dz(C)
- ITU-T G.709

I. Maximum Ratings

Exceeding the limits below may damage the transceiver module permanently.

Parameter	Symbol	Min.	Typ.	Max.	Units
Maximum Supply Voltage	Vcc	-0.5		4.0	V
Storage Temperature	TS	-40		85	°C
Relative Humidity (non-condensing)	RH	0		85	%
Receiver Optical Damage Threshold	RxDamage	5			dBm

II. Operating Specifications

Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Case Operating Temperature	TC	-40		+85	°C	Industrial
Time to initialize cooled module	t_start_up_cooled		90*	s		
Data Rate	BR		11.3168		Gbps	1
Transmission Distance	TD			80	km	2

III. Optical Characteristics

Parameter		Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter							
Average Launch Power		P _{out}	-1		+3	dBm	1
Optical Wavelength		λ_c	As per ITU-T 694.1, 50GHz spacing 1528.77 to 1563.86			nm	See Pg.5
Side-Mode Suppression Ratio		SMSR	30			dB	
Optical Extinction Ratio		ER	8.2			dB	
Average Launch power when Tx is OFF		POFF			-30	dBm	
Tx Jitter 20kHz - 80MHz		Txj1			0.3	UI	
Tx Jitter 4MHz - 80MHz		Txj2			0.1	UI	
Relative Intensity Noise		RIN			-128	dB/Hz	
Center Wavelength	Beginning of Life	λ_{c_BOL}	z-1.5		z+1.5	GHz	
	End of Life	λ_{c_EOL}	z-2.5		z+2.5	GHz	
Receiver (at 0ps/nm)							
Bit Rate	BER						
8.5, 9.95	<1E-12	R _{SENS1}			-24.0	dBm	
10.7 Gb/s	<1E-12	R _{SENS2}			-23.0	dBm	
11.1 Gb/s	<1E-4	R _{SENS3}			-27.0	dBm	
11.3 Gb/s	<1E-4	R _{SENS4}			-27.0	dBm	
Overload (Average Power)		P _{AVE}			-7	dBm	
Optical Center Wavelength		λ_c	1260		1600	nm	
LOS De-Assert		LOS D			-25	dBm	
LOS Assert		LOS A	-34		-27	dBm	
LOS Hysteresis		LOS H	0.5			dB	
Receiver Reflectance		R _{rx}			-27	dB	

Receiver Sensitivity ³					
Data Rate (Gb/s)	BER	Dispersion (ps/nm)	Sensitivity back-to-back at OSNR>30dB (dBm)	Dispersion Penalty at OSNR>30dB (dB)	Threshold Adjust Required
9.95	1e-12	-300 to 1450	-24	2	No
10.3	1e-12	-300 to 1450	-23	2.5	No
10.7	1e-4	-300 to 1300	-27	3	Yes ⁵
11.1	1e-4	-300 to 1300	-27	3	Yes ⁵
11.3	1e-4	-300 to 1300	-27	3.5	Yes ⁵
OSNR Performance ⁴					
Data Rate (Gb/s)	BER	Dispersion (ps/nm)	Min OSNR Back- to-back at Power: -18dBm to -7dBm (dB)	Max OSNR Penalty at Power: -18 to -7dBm (dB)	Threshold Adjust Required
9.95	1e-12	-300 to 1450	24	4	Yes ⁵
10.3	1e-12	-300 to 1450	24	4	Yes ⁵
10.7	1e-4	-300 to 1300	16	4	Yes ⁵
11.1	1e-4	-300 to 1300	16	4	Yes ⁵
11.3	1e-4	-300 to 1300	17	4	Yes ⁵

Notes:

1. Measured with worst ER=8.2dB; BER<10-12; 231 – 1 PRBS.
2. For 10GEthernet application, -24dBm is equivalent to an OMA of -22.09dBm for an ER = 8.2 dB.
3. Measured at 1528-1600nm with worst ER; PRBS31.
4. All OSNR measurements are performed with 0.1nm resolution.
5. RxDTV control required for Limiting ROSA

IV. Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Supply Voltage	V _{cc}	3.14	3.3	3.46	V	
Supply Current	I _{cc}			360	mA	
Module total power dissipation	P			2.5	W	2
Transmitter						
Input differential impedance	R _{in}	80	100	120	Ω	
Differential data input swing	V _{in,pp}	200		850	mV	3
Transmit Disable Voltage	V _D	V _{cc} -0.8		V _{cc}	V	
Transmit Enable Voltage	V _{EN}	V _{ee}		V _{ee} + 0.8	V	
Receiver						
Output differential impedance	R _{out}	80	100	120	Ω	
Differential data output swing (Rx input power -18dBm to -7dBm)	V _{out,pp}	150		850	mV	4
Output rise time and fall time	T _r , T _f	28			ps	4,5
LOS asserted	V _{LOS_A}	V _{cc} -0.8		V _{cc}	V	
LOS de-asserted	V _{LOS_D}	V _{ee}		V _{ee} +0.8	V	
Power Supply Noise Tolerance	V _{ccT} /V _{ccR}	Per SFF-8431 Rev 4.1			mVpp	

Notes:

1. Compliant with the SFP+ Module Power Supply Requirements
2. Maximum total power value is specified across the full temperature and voltage range.
3. Connected directly to TX data input pins.
4. Into 100Ω differential termination.
5. 20 – 80%. Measured with Module Compliance Test Board and OMA test pattern. Use of four 1's and four 0's sequence in the PRBS 9 is an acceptable alternative. SFF-8431 Rev 4.1.

V. Timing Parameters

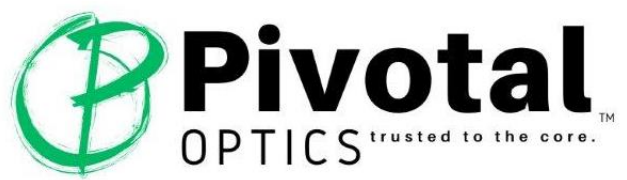
Parameter	Symbol	Min.	Typ.	Max.	Units	Notes
Time to initialize cooled module	t_start_up_cooled		90*	s		

VI. Wavelength Guide

Channel #	Frequency GHz	Wavelength nm	Part # D(XX)	Channel #	Frequency GHz	Wavelength nm	Part # D(XX)
17	191700	1563.86	D17	40	194000	1545.32	D40
18	191800	1563.05	D18	41	194100	1544.53	D41
19	191900	1562.23	D19	42	194200	1543.73	D42
20	192000	1561.42	D20	43	194300	1542.94	D43
21	192100	1560.61	D21	44	194400	1542.14	D44
22	192200	1559.79	D22	45	194500	1541.35	D45
23	192300	1558.98	D23	46	194600	1540.56	D46
24	192400	1558.17	D24	47	194700	1539.77	D47
25	192500	1557.36	D25	48	194800	1538.98	D48
26	192600	1556.56	D26	49	194900	1538.19	D49
27	192700	1555.75	D27	50	195000	1537.4	D50
28	192800	1554.94	D28	51	195100	1536.61	D51
29	192900	1554.13	D29	52	195200	1535.82	D52
30	193000	1553.33	D30	53	195300	1535.04	D53
31	193100	1552.52	D31	54	195400	1534.25	D54
32	193200	1551.72	D32	55	195500	1533.47	D55
33	193300	1550.92	D33	56	195600	1532.68	D56
34	193400	1550.12	D34	57	195700	1531.9	D57
35	193500	1549.32	D35	58	195800	1531.12	D58
36	193600	1548.52	D36	59	195900	1530.33	D59
37	193700	1547.72	D37	60	196000	1529.55	D60
38	193800	1546.92	D38	61	196100	1528.77	D61
39	193900	1546.12	D39				
Non-ITU: Peak wavelength between 1563.86-1528.77nm [Channel: 17-61]							

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1528.77-1563.86nm (96ch), 80km REACH, DUPLEX LC CONNECTOR



VII. Ordering Information

Pivotal Part Number	Description
SFPP-DT1-80-10GDI	SFP+, DWDM Tunable 1528.77-1566.72nm (96Ch), ZR SMF 80km, 10G DDM I-Temp

Notes:

1. Please contact sales for specific OEM Platform part numbers to fit your network.

Warranty

<https://pivotaloptics.com/warranty/>

Disclaimer

External physical characteristics are subject to variation. This may include, but is not limited to, external case designs, pull tab colors and/or shapes, removal latch styles or colors, and label sizes and placement. These variations do not affect the function or characteristics of the transceivers.