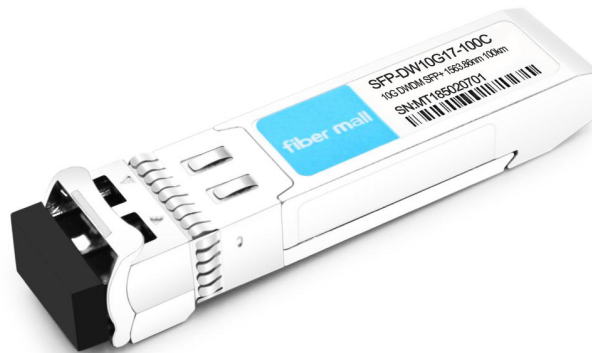


SFP-DW10Gxx-100C

10.3Gbps SFP+ DWDM Transceiver, Single Mode, 100km Reach



Product Features

- ❖ Up to 10.7Gb/s data links
- ❖ DWDM Cooled EML transmitter and APD receiver
- ❖ 100 GHz ITU channel spacing with integrated wavelength locker
- ❖ Up to 100km on 9/125 μ m SMF
- ❖ Hot-pluggable SFP+ footprint
- ❖ Duplex LC/UPC type pluggable optical interface
- ❖ RoHS compliant and lead-free

- ❖ Support Digital Diagnostic Monitoring interface
- ❖ Single +3.3V power supply
- ❖ Compliant with SFF+MSA and SFF-8472
- ❖ Metal enclosure, for lower EMI
- ❖ Meet ESD requirements, resist 8KV direct contact voltage
- ❖ Case operating temperature: 0 to +70°C

Applications

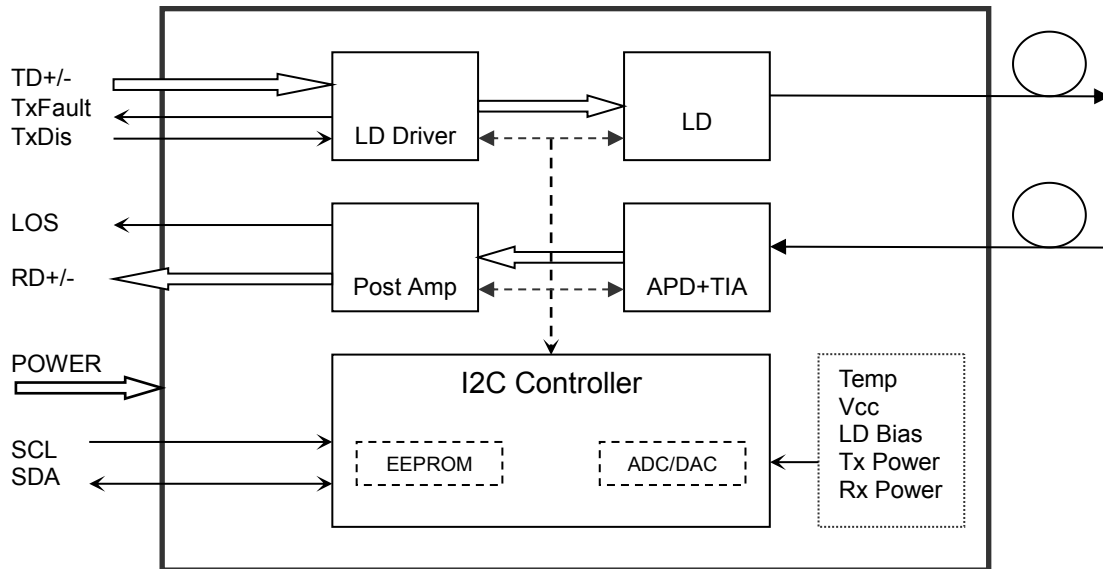
- ❖ 10GBASE-ZR/ZW & 10G Ethernet
- ❖ SDH STM64
- ❖ Other Optical Links

Description

The SFP-DW10Gxx-100C SFP+ transceiver is designed for use in 10-Gigabit Ethernet links up to 100km over single mode fiber. The module consists of DWDM EML Laser, APD and Pre-amplifier in high-integrated optical sub-assembly. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472. This module is designed for single mode fiber and operates at a nominal wavelength of 100GHz ITU Grid, C Band DWDM wavelength.

SFP-DW10Gxx-100C transceivers provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP+ MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8 bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8 bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.



Transceiver functional diagram

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	Ts	-40	+85	°C	
Power Supply Voltage	Vcc	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	THd	0		dBm	

Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
	TOP	0		70	°C	
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate		8.0	10.3	10.7	Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			100	km	9/125um

Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Power Consumption	p			1.6	W	
Supply Current	lcc			480	mA	
Transmitter						
Single-ended Input Voltage Tolerance	Vcc	-0.3		4.0	V	
AC Common Mode Input Voltage Tolerance (RMS)		15			mV	
Differential Input Voltage Swing	Vin,pp	120		820	mVpp	
Differential Input Impedance	Zin	90	100	110	Ohm	1
Transmit Disable Assert Time				10	us	
Transmit Disable Voltage	Vdis	Vcc-1.3		Vcc	V	
Transmit Enable Voltage	Ven	Vee		Vee +0.8	V	2
Receiver						
Differential Output Voltage Swing	Vout,pp	350		850	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	3
Data output rise/fall time	Tr/Tf	28			ps	4
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	5
LOS De-assert Voltage	VlosL	Vee		Vee +0.8	V	5
Power Supply Rejection	PSR	100			mVpp	6

Notes:

1. Connected directly to TX data input pins. AC coupled thereafter.
2. Or open circuit.
3. Input 100 ohms differential termination.
4. These are unfiltered 20-80% values.
5. Loss of Signal is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. Receiver sensitivity is compliant with power supply sinusoidal modulation of 20 Hz to 1.5 MHz up to specified value applied through the recommended power supply filtering network.

Optical Characteristics

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Optical Wavelength	λ_c	$\lambda_c - 0.1$		$\lambda_c + 0.1$	nm	1
Center Wavelength Spacing			100		GHz	
Optical Spectral Width	$\Delta\lambda$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Optical Power	PAVG	1		5	dBm	2
Optical Extinction Ratio	ER	8.2			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	
Transmitter OFF Output Power	POff			-30	dBm	
Transmitter Eye Mask		Compliant with IEEE802.3ae				
Receiver						
Center Wavelength	λ_C	1450		1620	nm	
Receiver Sensitivity (Average Power)	Sen.			-25	dBm	3
Input Saturation Power (overload)	Psat	-8			dBm	
LOS Assert	LOSA	-35			dB	
LOS De-assert	LOSD			-27	dBm	
LOS Hysteresis	LOSH	0.5			dBm	

Notes:

1. λ_c refer to wavelength selection, and corresponds to approximately 0.8 nm.
2. Class 1 Laser Safety per FDA/CDRH and IEC-825-1 regulations.
3. Measured with Light source 1528.77~1563.86nm, ER=8.2dB; BER =10^{-12} @10.3125Gbps, PRBS=2³¹-1 NRZ.

Digital Diagnostic Functions

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	3	degC	Over operating temp
Supply voltage monitor absolute error	DMI_VCC	-0.15	0.15	V	Full operating range
RX power monitor absolute error	DMI_RX	-3	3	dB	
Bias current monitor	DMI_bias	-10%	10%	mA	
TX power monitor absolute error	DMI_TX	-3	3	dB	

Pin Descriptions

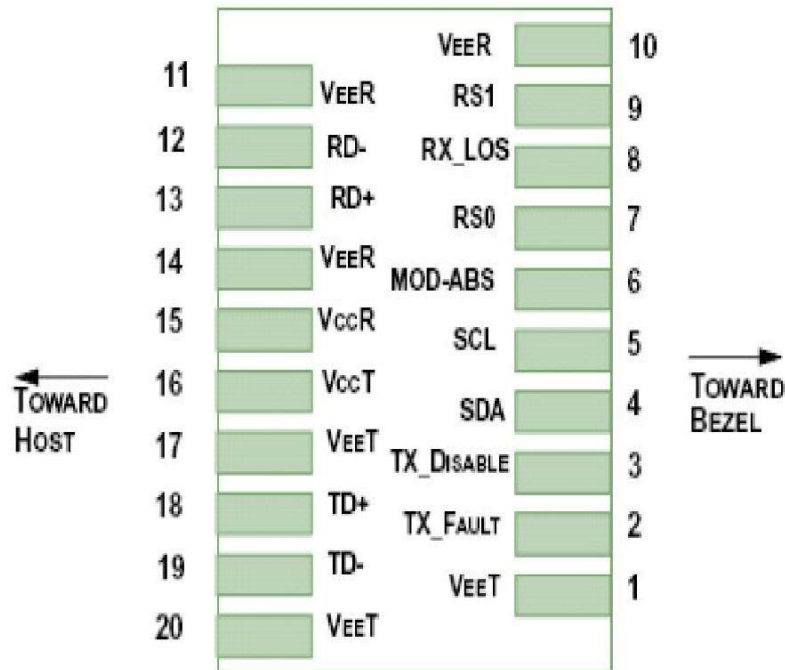


Diagram of host board connector block pin numbers and names

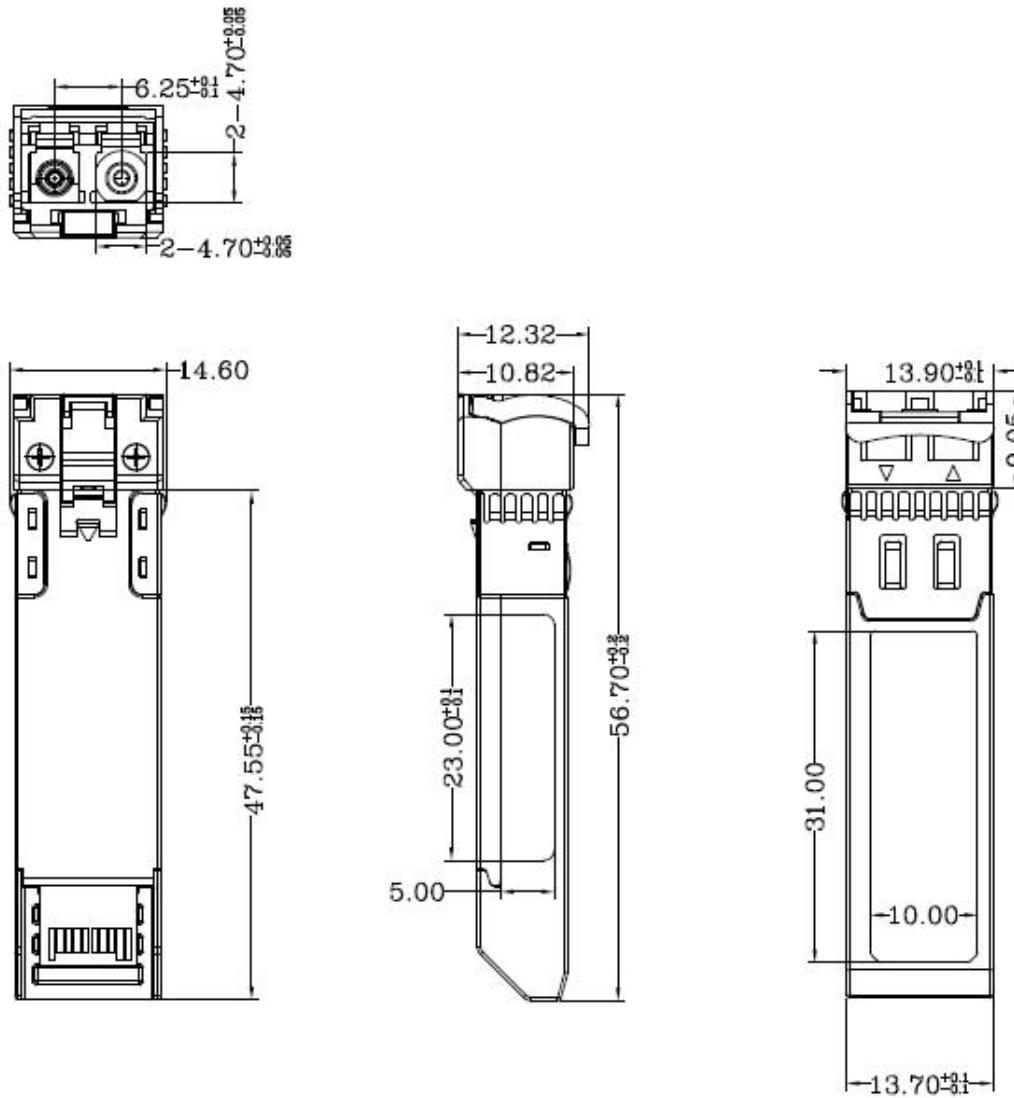
Pin	Symbol	Name/Description	Notes
1	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
2	T _{FAULT}	Transmitter Fault.	2
3	T	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	
10	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
11	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	V _{EER}	Receiver Ground (Common with Transmitter Ground)	1
15	V _{CCR}	Receiver Power Supply	
16	V _{CCT}	Transmitter Power Supply	
17	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	V _{EET}	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. T_{FAULT} is an open collector/drain output, which should be pulled up with a 4.7kΩ-10kΩ resistor on the host board if intended for use. Pull up voltage should be between 2.0V to V_{cc} + 0.3V. A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Should be pulled up with 4.7kΩ-10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.

6. LOS is open collector output. It should be pulled up with 4.7kΩ-10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Mechanical Dimensions



Ordering Information

Part Number	Product Description
SFP-DW10Gxx-100C	10G DWDM SFP+, 100GHz ITU channel xx (1528.77~1563.86nm) , LC, 100km, 0°C~+70°C, with DDM

λC Wavelength Guide

ITU Channel Product Code	Frequency (THz)	Wavelength	ITU Channel Product Code	Frequency (THz)	Wavelength
17	191.7	1563.86	40	194.0	1545.32
18	191.8	1563.04	41	194.1	1544.52
19	191.9	1562.23	42	194.2	1543.73
20	192.0	1561.41	43	194.3	1542.93
21	192.1	1560.60	44	194.4	1542.14
22	192.2	1559.79	45	194.5	1541.34
23	192.3	1558.98	46	194.6	1540.55
24	192.4	1558.17	47	194.7	1539.76
25	192.5	1557.36	48	194.8	1538.97
26	192.6	1556.55	49	194.9	1538.19
27	192.7	1555.74	50	195.0	1537.40
28	192.8	1554.94	51	195.1	1536.61
29	192.9	1554.13	52	195.2	1535.82
30	193.0	1553.32	53	195.3	1535.04
31	193.1	1552.52	54	195.4	1534.25
32	193.2	1551.72	55	195.5	1533.46
33	193.3	1550.92	56	195.6	1532.68
34	193.4	1550.11	57	195.7	1531.89
35	193.5	1549.32	58	195.8	1531.12
36	193.6	1548.51	59	195.9	1530.33
37	193.7	1547.71	60	196.0	1529.55
38	193.8	1546.92	61	196.1	1528.77
39	193.9	1546.12	-	-	-