DWDM-SFP-25G-20-XXXX

25Gb/s SFP28 DWDM 20km Transceiver

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Key Features

- OSFP Serial Optical Interface
  - 8x100G PAM4 retimed 800GAUI-8 electrical interface
  - Dual MPO-12 APC connector APC connector are provided
  - 8 channel VCSEL arrays and 8 channels PIN photo detector arrays
  - Maximum link length of 60m on OM3 or 100m on OM4

- OSFP MSA Compliant
  - Hot Pluggable OSFP form factor
  - Compliant to OSFP Module Specification Rev 5.0
  - Compliant with CMIS 5.2

- Support Protocol
  - Compliant with IEEE 802.3db
  - Compliant to IEEE 802.3ck

- Low Power Consumption
  - Less than 14W in temperature range of 0 to 70℃

Applications

- 800GBASE-SR8 800G Ethernet

- Data center

Functional Blcok Diagram
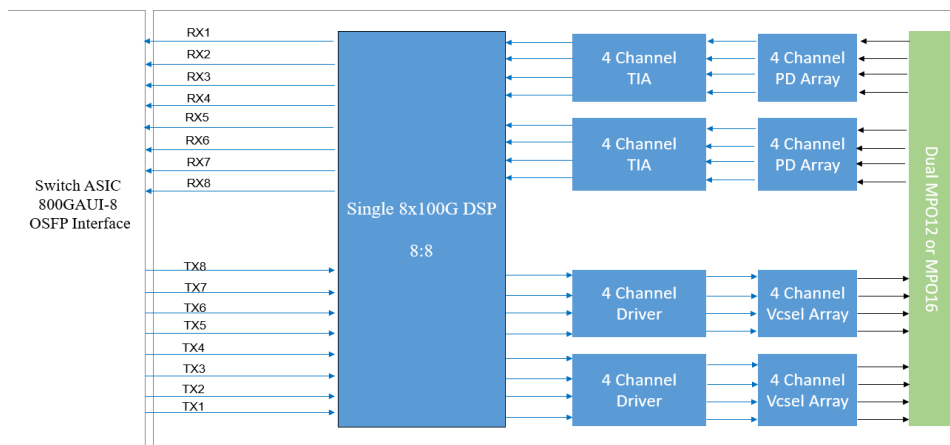
General Description

DWDM-SFP-25G-20-XXXX is an Eight-Channel, Parallel, Pluggable, Fiber-Optic OSFP for 800Gigabit

Ethernet applications. This transceiver is a high performance module for short-range data

communication and interconnect application. It integrates eight data lanes in each direction with

8x53.125GBd. The length of OSFP SR8 is up to 60 meters over OM3 MMF or 100 meters over OM4

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Features

- Up to 25.78Gb/s data links

- DWDM EML transmitter and APD receiver

- 100 GHz ITU channel spacing with integrated wavelength locker

- Up to 20km on 9/125um SMF

- Hot-pluggable SFP28 footprint

- Support Digital Monitoring interface

- Duplex LC/UPC type pluggable optical interface

- RoHS-10 compliant and lead-free

- With CDR function

- 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

    Commercial: 0 ~ +70oC

    Extended: -10 ~ +80oC

    Industrial: -40 ~ +85oC

Applications

- High-speed storage area networks

- Computer cluster cross-connect

- Custom high-speed data pipes

- Inter Rack Connection

- Other Optical Links

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General Description

Fibrenet's DWDM-SFP-25G-20-XXXX SFP28 transceiver is designed for use in 25-Gigabit Ethernet links up to 20km over single mode fiber. The module consists of DWDM EML Laser, APD and Preamplifier in a 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.

The module optical connection is duplex LC and shall be compatible with SFP+ 28Gbps and backward compatible with legacy 10G SFP+ pluggable. The SFP28 DWDM LR module is a dual directional device with a transmitter and receiver plus a control management interface (2-wire interface) in the same physical package. 2-wire interface is used for serial ID, digital diagnostics and module control function.

The transmitter converts 25Gbit/s serial PECL or CML electrical data into serial optical data compliant with the 25GBASE-LR standard. An open collector compatible Transmit Disable (Tx_Dis) is provided. Logic "1" or no connection on this pin will disable the laser from transmitting. Logic "0" on this pin provides normal operation. The transmitter has an internal automatic power control loop (APC) to ensure constant optical power output across supply voltage and temperature variations. An open collector compatible Transmit Fault (Tx_Fault) is provided. TX_Fault is module output contact that when high, indicates that the module transmitter has detected a fault condition related to laser operation or safety. The TX_Fault output contact is an open drain/collector and shall be pulled up to the Vcc_Host in the host with a resistor in the range 4.7-10 kΩ. TX_Disable is a module input contact. When TX_Disable is asserted high or left open, the SFP28 module transmitter output shall be turned off. This contact shall be pulled up to VccT with a 4.7 kΩ to 10 kΩ resistor.

The receiver converts 25Gbit/s serial optical data into serial PECL/CML electrical data. An open collector compatible Loss of Signal is provided. Rx_LOS when high indicates an optical signal level below that specified in the relevant standard. The Rx_LOS contact is an open drain/collector output and shall be pulled up to Vcc_Host in the host with a resistor in the range 4.7-10 kΩ, or with an active termination. Power supply filtering is recommended for both the transmitter and receiver. The Rx_LOS signal is intended as a preliminary indication to the system in which the SFP28 is installed that the received signal strength is below the specified range. Such an indication typically points to non-installed cables, broken cables, or a disabled, failing or a powered off transmitter at the far end of the cable.

Absolute Maximum Ratings

Table 1- Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	oC	
Power Supply Voltage	VCC	-0.5	3.6	V	
Relative Humidity (non-condensation)	RH	5	95	%	
Damage Threshold	THd	-3		dBm	

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Recommended Operating Conditions

Table 2- Recommended Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Operating Case Temperature	TOP	0		70	oC	commercial
		-10		80		extended
		-40		85		Industrial
Power Supply Voltage	VCC	3.135	3.3	3.465	V	
Data Rate			25.78		Gb/s	
Control Input Voltage High		2		Vcc	V	
Control Input Voltage Low		0		0.8	V	
Link Distance (SMF)	D			20	km	9/125um

Electrical Characteristics

Table 3- Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Power Consumption	p			1.75	W	
Supply Current	Icc			520	mA	
Transmitter						
Single-ended Input Voltage Tolerance	Vcc	-0.3		4.0	V	
Common mode voltage tolerance		15			mV	
Differential Input Voltage Swing	Vin,pp	180		700	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						
Single-ended Input Voltage Tolerance	Vcc	-0.3		4.0	V	
Differential Output Voltage Swing	Vout,pp	300		900	mVpp	
Differential Output Impedance	Zout	90	100	110	Ohm	3
Data output rise/fall time	Tr/Tf	9.5			ps	4
LOS Assert Voltage	VlosH	Vcc-1.3		Vcc	V	5
LOS De-assert Voltage	VlosL	Vee		Vee +0.8	V	5

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 LVTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.

Optical Characteristics

Table 4- Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Optical Wavelength	λC	λc -0.1		λc +0.1	nm	1
Center Wavelength Spacing			100		GHz	
Optical Spectral Width	Δλ			1	nm	
Average Optical Power	PAVG	0		5	dBm	2
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Extinction Ratio	ER	6			dB	
Transmitter OFF Output Power	Poff			-30	dBm	
Transmitter and Dispersion Penalty	TDP			2.7	dB	
Optical Return Loss Tolerance	ORLT			20	dB	
Transmitter Eye Mask	Compliant with IEEE802.3ae					
Receiver						
Center Wavelength	λC	1270		1610	nm	
Receiver Sensitivity	Sen.			-14	dBm	3
Average Receive Power		-20		-5	dBm	
Input Saturation Power (overload)	Psat	-8			dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-assert	LOSD			-21	dBm	
LOS Hysteresis	LOSH	0.5			dB	
Damage Threshold	THd	3			dBm	

Notes:

1. λc 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=6dB; BER =<10^-12 @ PRBS=2^31-1 NRZ.

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Digital Diagnostic Functions

Table 5- Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the Recommended Operating Environment unless otherwise specified. It is compliant to SFF-8472 Rev10.2 with internal calibration mode. For external calibration mode please contact our sales staff.

Parameter	Symbol	Min.	Max	Unit	Notes
Temperature monitor absolute error	DMI_ Temp	-3	3	℃	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 Assignment

Pin Diagram
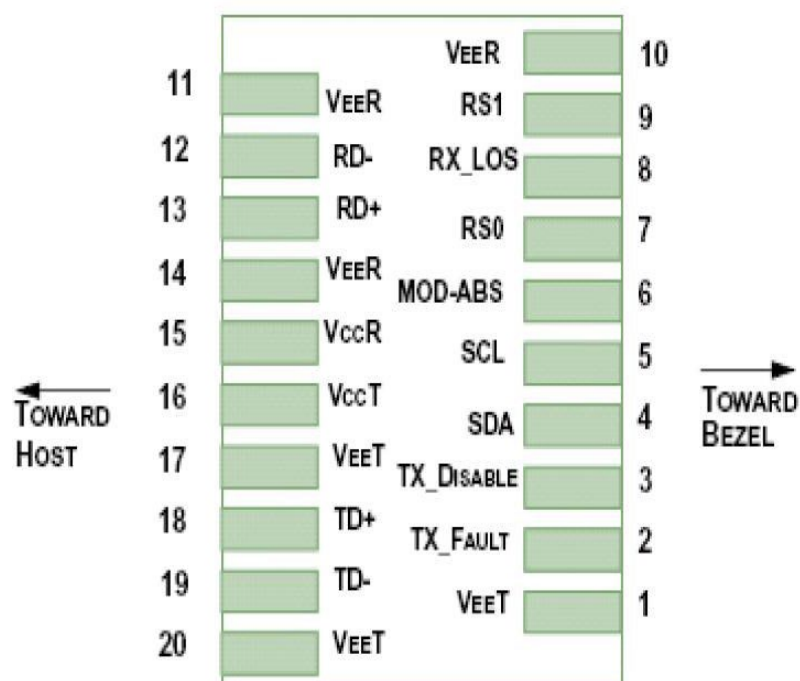
Figure1. Diagram of host board connector block pin numbers and names

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Pin Descriptions

Table 6- Pin Description

PIN	Name	Name/Description	Notes
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault	
3	TX_Disable	Transmitter Disable; Turns off transmitter laser output	
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	2
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	2
6	MOD_ABS	Module Definition, Grounded in the module	
7	RS0	Rx Rate Select:	
8	RX_LOS	Receiver Loss of Signal Indication Active LOW	
9	RS1	Transmitter Rate Select (not used)	
10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Receiver Inverted Data Output	
13	RD+	Receiver Data Output	
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power - +3.3V	
16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Non-Inverted Data Input	
19	TD-	Transmitter Inverted Data Input	
20	VeeT	Transmitter Ground	1

Notes:

1. Module ground pins GND are isolated from the module case.

2. Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.47V on the host board.

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Mechanical Dimensions
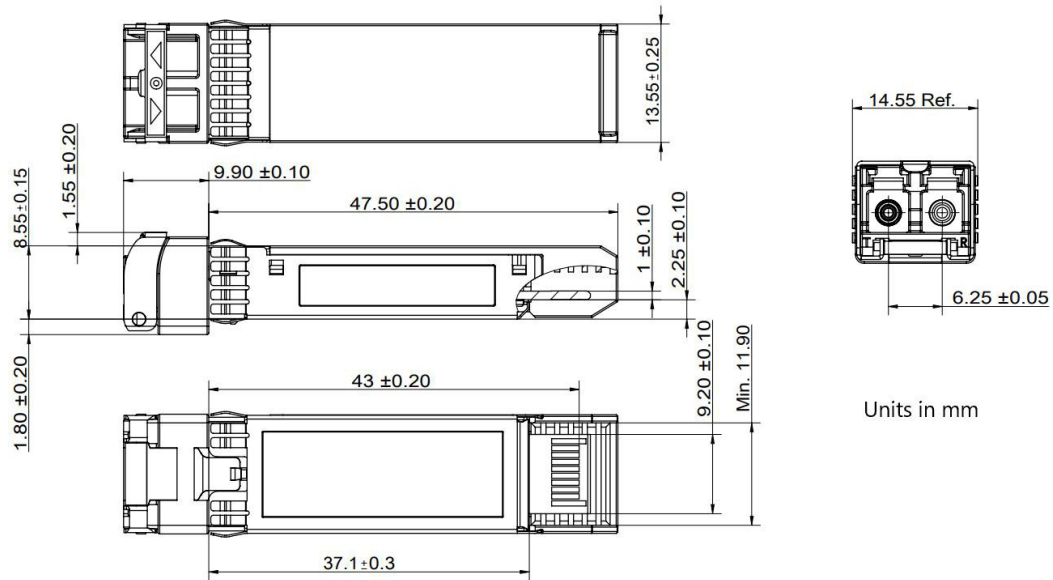
Figure2. Mechanical Outline

Units in mm

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