

TITLE 25G SFP28 SR Transceiver	DOC No.	DTRX-180018
	REVISION : 02	AUTHORIZED BY : Mike Sun
	DATE : 2020.03.20	CLASSIFICATION : CONFIDENTIAL

1. SCOPE

The scope of this specification is the definition of a high performance, cost effective modules, which is optimized for 25G SR SFP28 and transmission distance up to 100m by OM4 MMF. The transceiver consists of two sections: The transmitter section incorporates a 850nm VCSEL. The receiver section consists of a PIN photodiode integrated with a transimpedance preamplifier (TIA).

2. PRODUCT FEATURES

- Up to 25.78 Gb/s bi-directional data links
- Hot-pluggable SFP+ footprint
- Built-in digital diagnostic functions
- 850nm Qxide VCSEL laser transmitter
- Duplex LC connector
- RoHS compliant
- 1.2W maximum power consumption
- Single 3.3V power supply
- Operating temperature range: 0°C to 70°C

3. PRODUCT DESCRIPTION

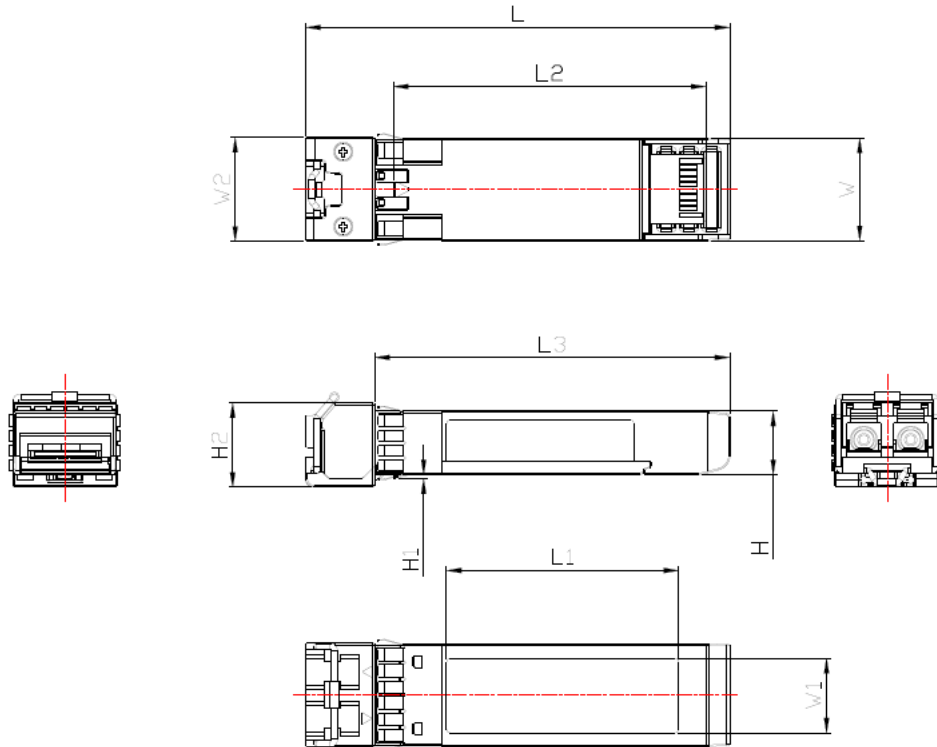
3.1 PRODUCT NAME AND SERIES NUMBER(S)

25G SR SFP28 Transceiver

Part Number	Data Rate	Wavelength (nm)	Distance	Media	Power (dBm)	Sen. (dBm)	Connector	Temp.
P58000CCCA01-1	25G	850	100m	MMF	-8.4 ~ 2.4	-11.0	LC	C

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3.2 DIMENSIONS, MATERIALS, PLATINGS AND MARKING



Unit : mm

	L	L1	L2	L3	W	W1	W2	H	H1	H2
MAX	56.9	31.2	41.95	47.7	13.8	10.2	14.0	8.6	0.6	11.5
Typical	56.7	31.0	41.80	47.5	13.7	10.0	-	8.5	0.55	11.3
MIN	56.5	30.8	41.65	47.3	13.5	9.8	-	8.4	0.5	11.1

Unit is millimeter. All dimensions are $\pm 0.1\text{mm}$ unless otherwise specified.

4. APPLICABLE DOCUMENTS AND SPECIFICATIONS

- Compliant to IEEE802.3by
- 25G electrical interface (OIF CEI-28G-VSR)

5. QUALIFICATION

- Electrostatic Discharge (ESD) to the Electrical Pins
- Electrostatic Discharge (ESD) to the LC Connector
- RoHS compliance

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6. Absolute Maximum Ratings & Recommended Operating Conditions

Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	Ts	-20	85	C
Operating Case Temperature	Tc	0	70	C
Maximum Supply Voltage	Vcc	-0.5	4.0	V
Relative Humidity (Non-condensing)	RH	0	85	%

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	Tc	0		70	C
Power Supply Voltage	Vcc	3.1	3.3	3.5	V
Data Rate, each Lane			25.78125		Gb/s
Supply Current	Icc			290	mA

Transmitter Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Average Output Power: 50 or 62.5 MMF	P _{OUT}	-8.4		2.4	dBm	1
Optical Wavelength	λ	840		860	nm	
Spectral Width (RMS)	σ			0.6	nm	
Optical Modulation Amplitude 25.78Gb/s 10.3Gb/s	OMA	-6.4 -5.2		3	dBm	
Transmitter Dispersion Penalty @ 10.3Gb/s	TDP			2.5	dB	
Transmitter and Dispersion Eye Closure @25.7Gb/s	TDEC			4.3	dB	

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Relative Intensity Noise	RIN			-128	dB/Hz	
Extinction Ratio @25.78Gb/s	ER	2			dB	
Input differential impedance	R _{in}		100		Ω	2
Single-ended data input swing	V _{in,pp}	125		450	mV	3
Transmit Disable Voltage	V _D	2		V _{cc}	V	4
Transmit Enable Voltage	V _{EN}	V _{ee}		V _{ee} +0.8	V	

Notes:

1. Class 1 Laser Safety limit per FDA/CDRH, and EN (IEC) 60825 laser safety standards.
2. Connected directly to TX data input pins. AC coupling from pins into laser driver IC.
3. The minimum value represents the minimum outer eye amplitude.
4. Or open circuit

Receiver Operating Characteristic-Optical, Electrical

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Optical Center Wavelength	λ _c	840		860	nm	
Stressed Receiver OMA Sensitivity 25.78Gb/s 10.3Gb/s	S			-5.2 -7.5	dBm	
Unstressed Receiver OMA Sensitivity @10.3Gb/s	R _{XSENS}			-11.0	dBm	
Average Receiver Power @25.78Gb/s	R _{XMAX}	-11.3		3	dBm	1
Optical Return Loss	ORL	12			dB	
LOS Assert	LOS_A	-30		-	dBm	
LOS Dessert	LOS_D			-13	dBm	
LOS Hysteresis	-	0.5	-	-	dB	
Single ended data output swing	V _{out,pp}	185		425	mV	2
LOS Fault	V _{LOS fault}	2		V _{cc} HOST	V	3

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LOS Normal	V _{LOS norm}	Vee		Vee+0.8	V	3
Power Supply Rejection	PSR	100			mVpp	4

Notes:

1. *Informative Only*
2. *Into 100 ohms differential termination.*
3. *LOS is an open collector output. Should be pulled up with 4.7k – 10kohms on the host board. Normal operation is logic 0; loss of signal is logic 1. Maximum pull-up voltage is 5.5V.*
4. *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.*

Special function

Receiver special description is defined in table as below.

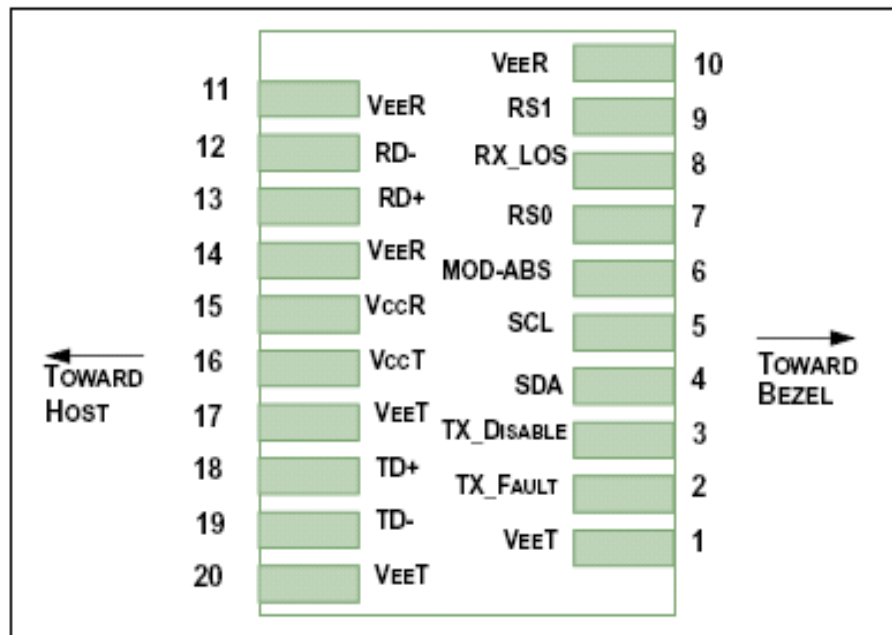
Parameter	Symbol	Min	Typ	Max	Units	Note
Data Rate	DR		25.78 10.3		Gbps	
Bit Error Rate	BERT	5E(-5) 10-12				1 2
Fiber Length on 50/125 m high bandwidth (OM3/M5E) MMF	FL1			70	M	
Fiber Length on 50/125 m high bandwidth (OM4/M5F) MMF	FL2			100	M	

Notes:

1. *At 25.78Gb/s Ethernet data rate (IEEE 802.3by)*
2. *At 10.3Gb/s Ethernet data rate*

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6. Applications Note :



Pin Definitions

Pin Assignment

Pin	Symbol	Name/Description	Note
1	VeeT	Transmitter Ground	1
2	TX_Fault	Transmitter Fault (LVTTTL-O) - High indicates a fault condition	2
3	TX_Disable	Transmitter Disable (LVTTTL-I) – High or open disables the transmitter	3
4	SDA	Two wire serial interface Data Line (LVCMOS-I/O) (MOD-DEF2)	4
5	SCL	Two wire serial interface Clock Line (LVCMOS-I/O) (MOD-DEF1)	4
6	MOD_ABS	Module Absent (Output), connected to VeeT or VeeR in the module	5
7	RS0	NA	
8	RX_LOS	Receiver Loss of Signal (LVTTTL-O)	2
9	RS1	NA	
10	VccRx	Receiver Ground	1
11	SCL	Receiver Ground	1
12	RD-	Inverse Received Data out (CML-O)	
13	RD+	Received Data out (CML-O)	
14	VeeR	Receiver Ground	
15	VccR	Receiver Power - +3.3V	

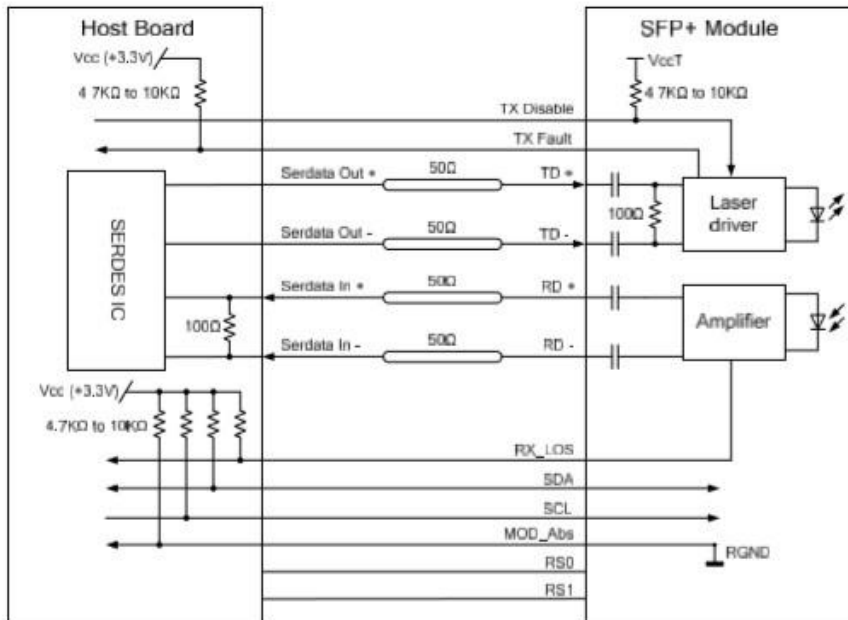
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16	VccT	Transmitter Power - +3.3 V	
17	VeeT	Transmitter Ground	1
18	TD+	Transmitter Data In (CML-I)	
19	TD-	Inverse Transmitter Data In (CML-I)	
20	VeeT	Transmitter Ground	1

Notes:

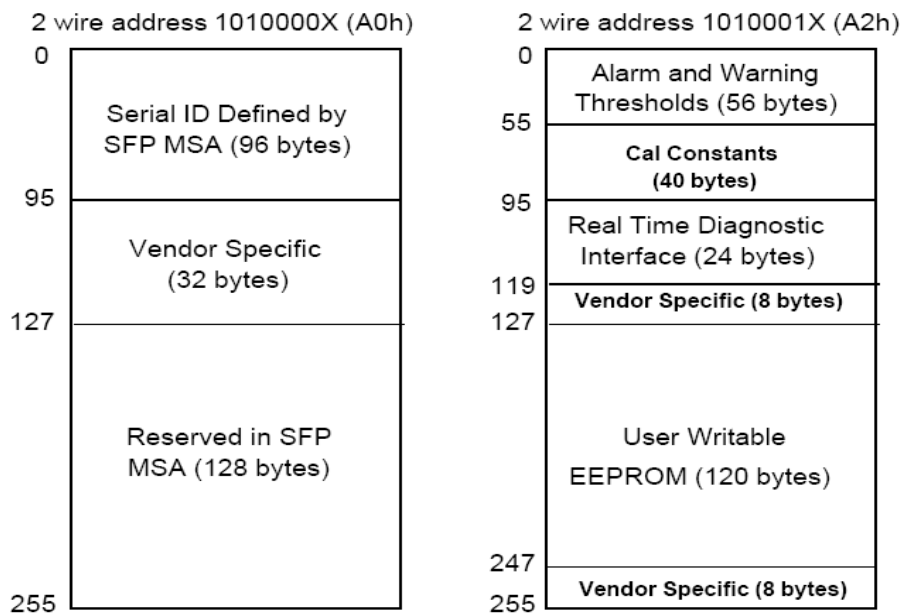
- [1] The module signal ground pins, VeeR and VeeT, shall be isolated from the module case.
- [2] This pin is an open collector/drain output pin and shall be pulled up with 4.7k-10kohms to Host_Vcc on the host board. Pull ups can be connected to multiple power supplies, however the host board design shall ensure that no module pin has voltage exceeding module VccT/R + 0.5 V.
- [3] This pin is an open collector/drain input pin and shall be pulled up with 4.7k-10kohms to VccT in the module.
- [4] See [sff-8431 4.2 2-wire Electrical Specifications](#) .
- [5] This pin shall be pulled up with 4.7k-10kohms to Host_Vcc on the host board.

Recommended Interface Circuit



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Digital Diagnostic Memory Map



8. Modification History

Rev.	Comments	Date	Originator	Approval
01	Preliminary Draft	2018.05.22	Mike Sun	Ray Yang
02	Revised Spec	2020.03.20	Mike Sun	Ray Yang