

Product Features

- Supports up to 25.78Gbps bit rates
- Hot-pluggable SFP+ footprint
- 850nm VCSEL laser and PIN photodiode
- Up to 70m for OM3-MMF and 100m for OM4-MMF transmission
- Compliant with SFP+ MSA and SFF-8472 with duplex LC receptacle
- Compatible with RoHS
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- Operating case temperature:
 - Standard: 0 to +70°C
 - -40 to +85°C



Applications

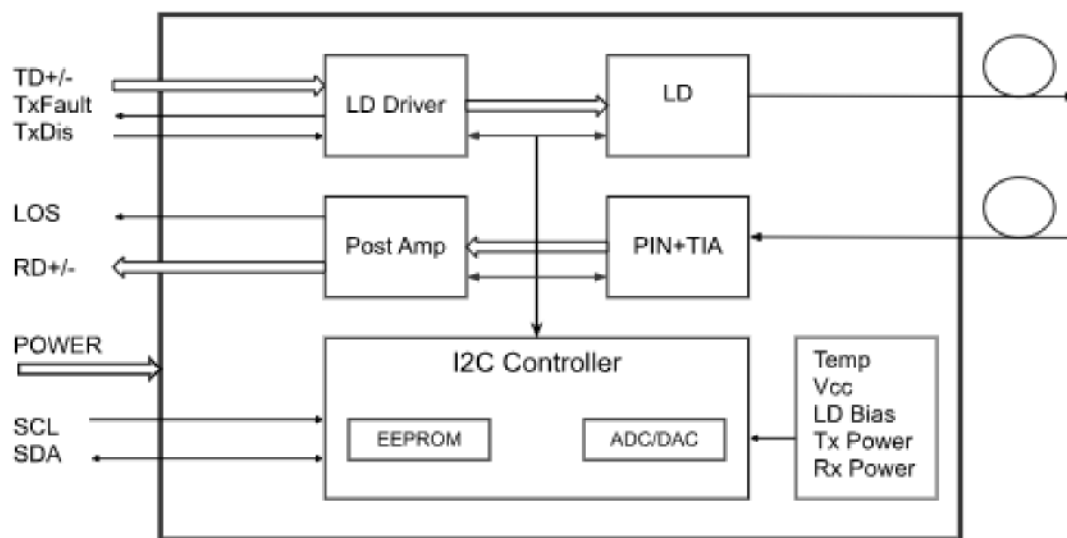
- 25.78Gb/s single lane 100GE SR4

Description

The SFP28 transceivers are high performance, cost effective modules supporting data rate of 25.78Gbps and 70m transmission distance with OM3 MMF or 100m transmission distance with OM4 MMF.

The transceiver consists of three sections: a VCSEL laser transmitter, a PIN photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

The transceivers are compatible with SFP Multi-Source Agreement and SFF-8472 digital diagnostics functions.



Transceiver functional diagram

Absolute Maximum Ratings

Table 1 – Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Unit
Supply Voltage	Vcc	-0.5	4.5	V
Storage Temperature	Ts	-40	+85	°C
Operating Humidity	-	5	85	%

Recommended Operating Environment

Table 2 – Recommended Operating Environment

Parameter	Symbol	Min.	Typical	Max	Unit
Operating Case Temperature	Tc	0		+70	°C
Power Supply Voltage	Vcc	3.135	3.30	3.465	V
Power Supply Current	Icc			300	mA
Data Rate			25.78		Gbps

Optical and Electrical Characteristics

Table 3 – Transmitter Optical and Electrical Specifications

Parameter		Symbol	Min.	Typical	Max	Unit	Notes
Transmitter							
Centre Wavelength		λ_c	840	850	860	nm	
Spectral Width (RMS)		$\Delta\lambda$			0.6	nm	
Side-Mode Suppression Ratio		SMSR	-	-	-	dB	
Average Output Power		Pout	-8.4		2.4	dBm	1
Extinction Ratio		ER	2.0			dB	
Data Input Swing Differential		VIN	180		950	mV	2
Input Differential Impedance		ZIN	90	100	110	Ω	
TX Disable	Disable		2.0		Vcc	V	
	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	

Table 4 – Receiver Optical and Electrical Specifications

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Receiver						
Centre Wavelength	λ_c	840	850	860	nm	
Receiver Sensitivity				-10	dBm	3
Receiver Overload		2.4			dBm	3
LOS De-Assert	LOSD			-13	dBm	
LOS Assert	LOSA	-30			dBm	
LOS Hysteresis		0.5		4	dB	
Data Output Swing Differential	Vout	500	700	900	mV	4
LOS	High	2.0		Vcc	V	
LOS	Low			0.8	V	

Notes:

1. The optical power is launched into MMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 231-1 test pattern @25.78Gbps, BER $\leq 5E-5$.
4. Internally AC-coupled.

Diagnostics

Table 5 – Diagnostics Specification

Parameter	Range	Unit	Accuracy	Calibration
Temperature	0 to +70	°C	±3°C	Internal
Voltage	3.0 to 3.6	V	±3%	Internal
Bias Current	0 to 20	mA	±10%	Internal
TX Power	-8.0 to 3	dBm	±3dB	Internal
RX Power	-14 to 0	dBm	±3dB	Internal

Timing and Electrical

Table 6 – Timing and Electrical

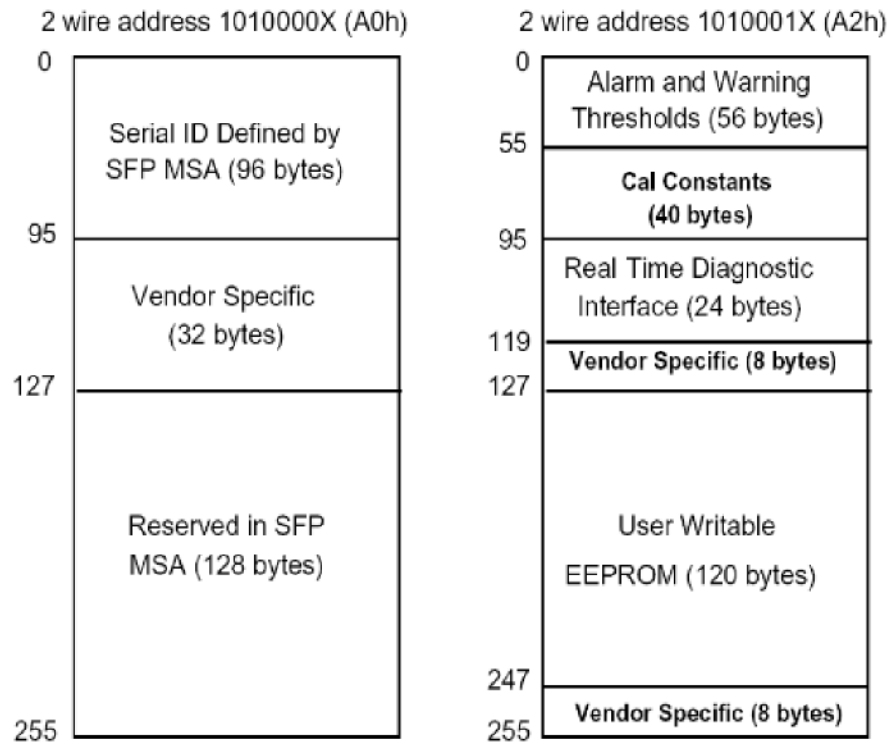
Parameter	Symbol	Min.	Typical	Max	Unit
Tx Disable Negate Time	t _{on}			2	ms
Tx Disable Assert Time	t _{off}			100	μs
Time To Initialize, including Reset of Tx Fault	t _{init}			300	ms
Tx Fault Assert Time	t _{fault}			100	μs
Tx Disable To Reset	t _{reset}	10			μs
LOS Assert Time	t _{loss_on}			100	μs
LOS De-assert Time	t _{loss_off}			100	μs
Serial ID Clock Rate	f _{serial_clock}		100	400	KHz
MOD_DEF (0:2)-High	VH	2		V _{cc}	V
MOD_DEF (0:2)-Low	VL			0.8	V

Digital Diagnostic Memory Map

The transceivers provide serial ID memory contents and diagnostic information about the present operating conditions by the 2-wire serial interface (SCL, SDA).

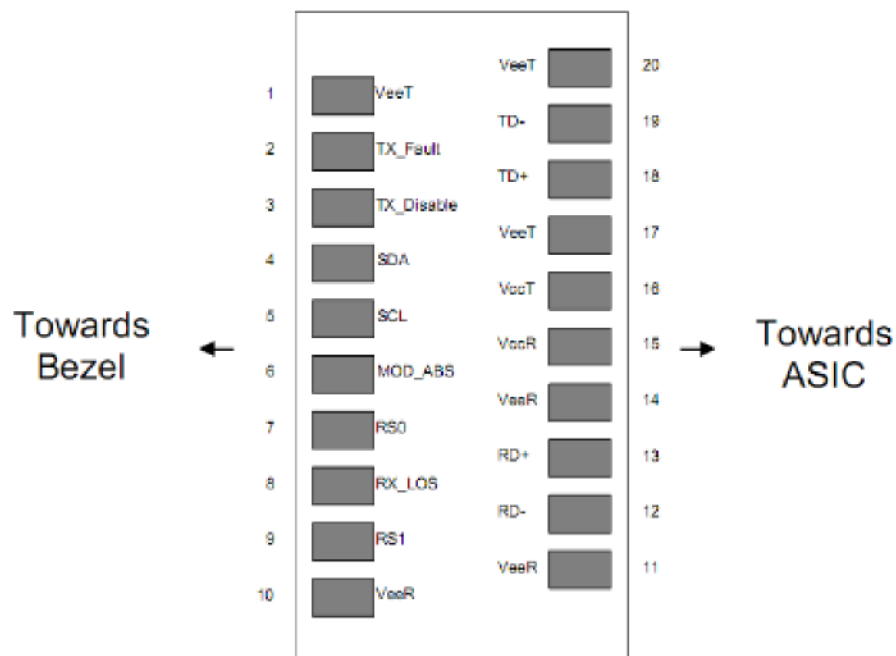
The diagnostic information with internal calibration or external calibration all are implemented, including received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring.

The digital diagnostic memory map specific data field defines as following.



Pin Assignment

Pin Diagram



Pin Descriptions

Table 7 – Module Pin Definitions

Pin	Signal Name	Description	Plug Seq.	Notes
1	VEET	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	VEER	Receiver ground	1	
11	VEER	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	VEER	Receiver ground	1	
15	VCCR	Receiver Power Supply	2	
16	VCCT	Transmitter Power Supply	2	
17	VEET	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	VEET	Transmitter Ground	1	

Notes:

Plug Seq.: Pin engagement sequence during hot plugging.

1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and Vcc+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.

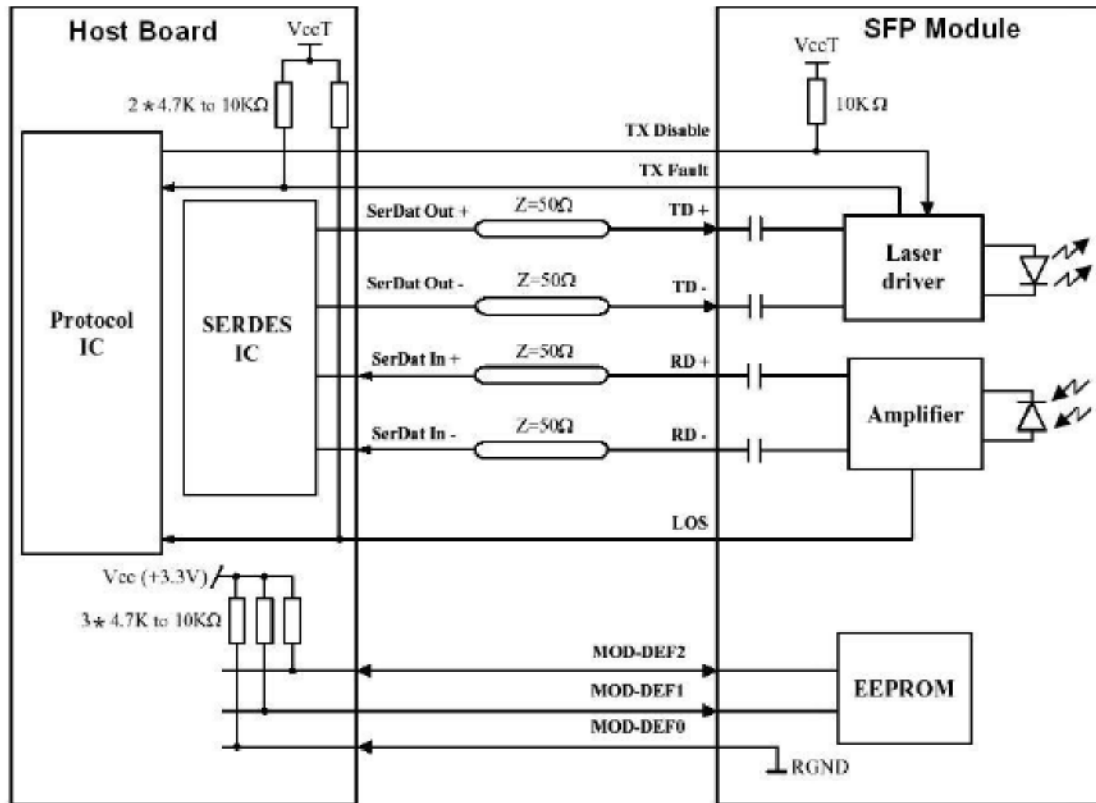
2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.

3) LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

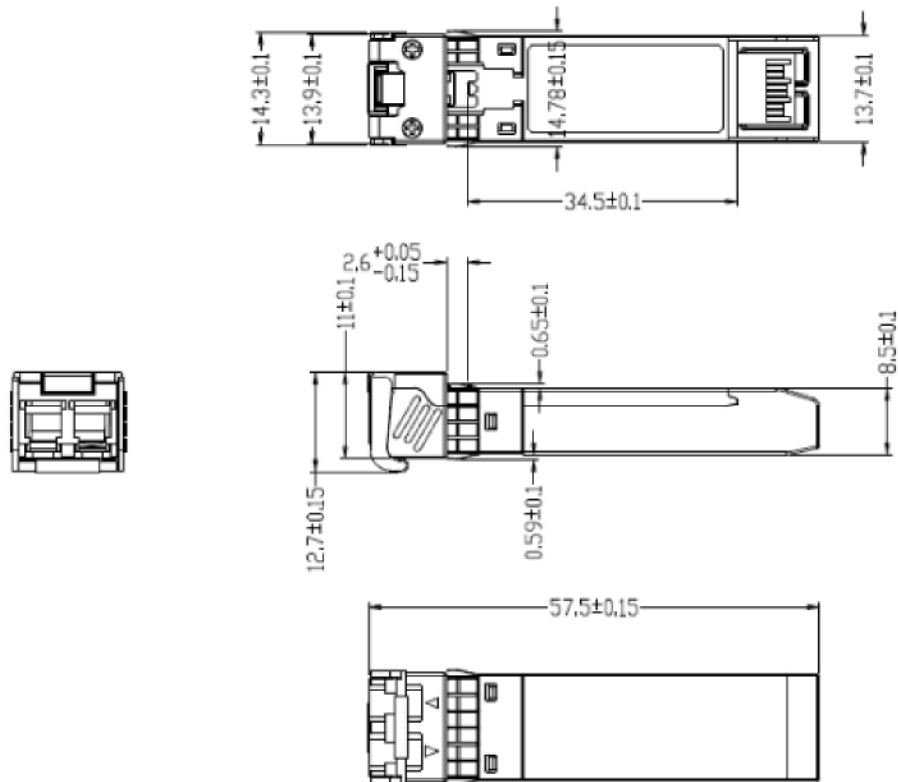
4) RD-/+: These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.

5) TD-/+: These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit



Mechanical Dimensions



Contact Information

sales@equaloptics.com

(855) 330-3978

equaloptics.com