1.25Gb/s 850nm Multi-mode SFP Transceiver

Widely used in 1x Fiber Channel, Switch to Switch Interface, Gigabit Ethernet, Switched Backplane Applications, Router/Server Interface, Other Optical Links.

• Description

• SFP-8512-M5BD Small Form Factor Pluggable (SFP) transceivers are compatible with the Small Form Factor Pluggable Multi-Sourcing Agreement (MSA). The transceiver consists of four sections: the LD driver, the limiting amplifier, the VCSEL laser and the PIN photo-detector .The module data link up to 550m in 50/125um multi mode fiber.

• The optical output can be disabled by a TTL logic high-level input of Tx Disable. Tx Fault is provided to indicate that degradation of the laser. Loss of signal (LOS) output is provided to indicate the loss of an input optical signal of receiver or the link status with partner.

• Advantages

- Up to 1.25Gb/s data links
- VCSEL laser transmitter and PIN photo-detector
- Hot-pluggable SFP footprint
- Duplex LC/UPC type pluggable optical interface
- Low power dissipation
- Metal enclosure, for lower EMI
- RoHS compliant and lead-free
- Single +3.3V power supply
- Compliant with SFF-8472
- Case operating temperature

  Commercial: 0°C to +70°C

  Extended: -10°C to +80°C

  Industrial: -40°C to +85°C

- Table 1- Ordering Information

Product part Number	Data Rate (Mbps)	Media	Wavelength (nm)	Transmission Distance (km)	Temperature Range (Tcase) (℃)	
SFP-8512-M5BD	1250	Multimode fiber	850	550	0~70	commercial
SFP-8512-M5BDE	1250	Multimode fiber	850	550	-10~80	extended
SFP-8512-M5BDA	1250	Multimode fiber	850	550	-40~85	industrial

Note:

1. Specified without connectors
2. Add an additional 0.2dB loss including connectors

Tips:

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- Table 2- Pin Description

Pin	Symbol	Name/Description	Notes
1	V_{EET}	Transmitter Ground (Common with Receiver Ground).	1
2	T_{FAULT}	Transmitter Fault.	
3	T_{DIS}	Transmitter Disable. Laser output disabled on high or open.	2
4	MOD-DEF(2)	Module Definition 2. Data line for Serial ID.	3
5	MOD-DEF(1)	Module Definition 1. Clock line for Serial ID.	3
6	MOD-DEF(0)	Module Definition 0. Grounded within the module.	3
7	Rate Select	No connection required.	4
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	5
9	V_{EER}	Receiver Ground (Common with Transmitter Ground)	1
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

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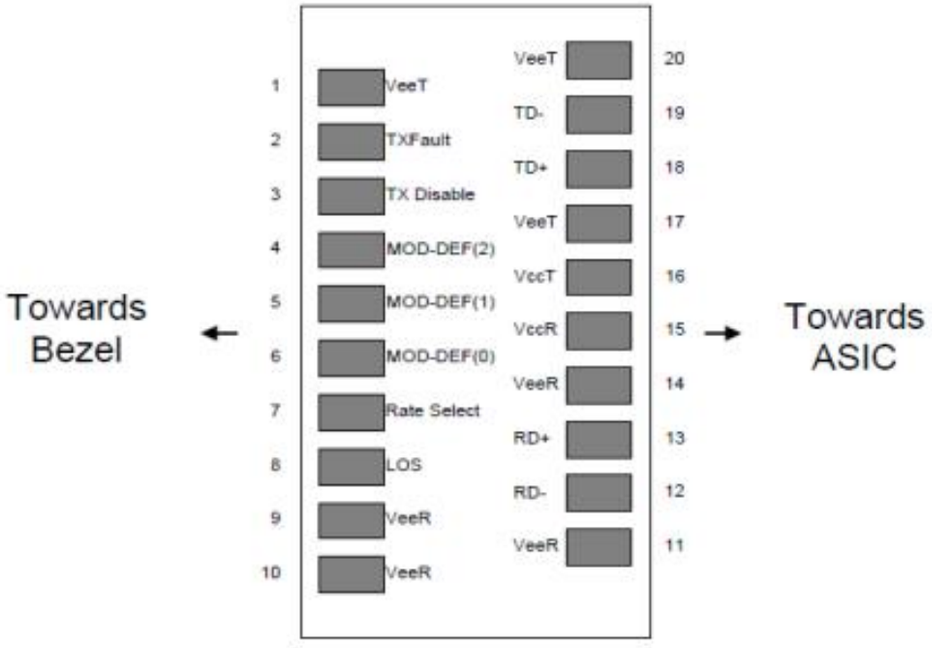
- **Notes:**

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on T_{DIS} >2.0V or open, enabled on T_{DIS} <0.8V.
3. Should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V.MOD_DEF (0) pulls line low to indicate module is plugged in.
4. This is an optional input used to control the receiver bandwidth for compatibility with multiple data rates (most likely Fiber Channel 1x and 2x Rates). If implemented, the input will be internally pulled down with >30kΩ resistor. The input states are:
    - Low (0 – 0.8V): Reduced Bandwidth
    - (>0.8, < 2.0V): Undefined
    - High (2.0 – 3.465V): Full Bandwidth
    - Open: Reduced Bandwidth
5. LOS is open collector output should be pulled up with 4.7k - 10kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

- **Figure 1. Pin out of Connector Block on Host Board**



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- **Table 3- Absolute Maximum Ratings**

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Storage Temperature	T_S	-40	-	85	ºC	
Relative Humidity	RH	5	-	95	%	
Power Supply Voltage	V_{CC}	-0.5	-	4	V	
Signal Input Voltage		-0.3	-	V_{CC}+0.3	V	
Receiver Damage Threshold		+5	-		dBm	

- **Table 4- Recommended Operating Conditions**

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Case Operating Temperature	T case	0	-	70	ºC	SFP-8512-M5BD
		-10	-	80		SFP-8512-M5BDE
		-40	-	85		SFP-8512-M5BDA
Power Supply Voltage	V_{CC}	3.13	3.3	3.47	V	
Power Supply Current	I_{CC}		-	280	mA	
Power Supply Noise Rejection				100	mVp - p	100Hz to 1Mz
Data Rate			1250/1250		Mbps	TX Rate/RX Rate
Transmission Distance				550	M	
Coupled Fiber	Multimode fiber					50/125um MMF

Note:

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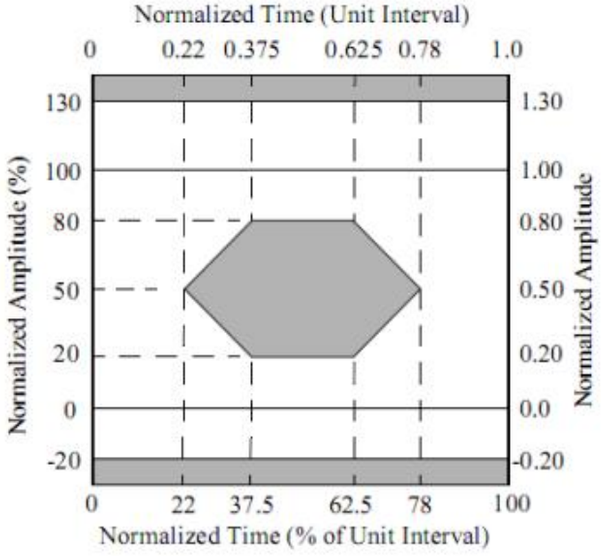
- Table 5- Specification of Transmitter

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Average Output Power	P_{OUT}	-9		-3	dBm	Note (1)
Extinction Ratio	ER	9			dB	
Center Wavelength	λ_C	830	850	860	nm	VCSEL Laser
Spectrum Bandwidth (RMS)	σ			1	nm	
Transmitter OFF Output Power	P_{Off}			-45	dBm	
Differential Line Input Impedance	RIN	90	100	110	Ohm	
Output Eye Mask	Compliant with IEEE802.3 z (class 1 laser safety)					Note (2)

Note (1): Measure at 2^7-1 NRZ PRBS pattern.

Note (2): Transmitter eye mask definition.

- Figure 2.



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- Table 6- Specification of Receiver

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Input Optical Wavelength	λ_{IN}	770	850	860	nm	PIN-TIA
Receiver Sensitivity	P_{IN}			-17	dBm	Note (1)
Input Saturation Power (Overload)	P_{SAT}	0			dBm	
Los Of Signal Assert	P_A			-18	dBm	
Los Of Signal De-assert	P_D	-35			dBm	Note (2)
LOS Hysteresis	P_A-P_D	0.5	2	6	dB	

Note (1): Measured with Light source 850nm, ER=9dB; BER =<10^-12 @PRBS=2^7-1 NRZ

Note (2): When LOS de-asserted, the RX data+/- output is High-level (fixed)

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- Table 7- Electrical Interface Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Total Supply Current	I_{CC}			A	mA	Note (1)
Transmitter Disable Input-High	V_{DISH}	2		Vcc+0.3	V	
Transmitter Disable Input-Low	V_{DISL}	0		0.8	V	
Transmitter Fault Input-High	V_{TxFH}	2		Vcc+0.3	V	
Transmitter Fault Input-Low	V_{TxFL}	0		0.8	V	
Receiver						
Total Supply Current	I_{CC}			B	mA	Note (1)
LOSS Output Voltage-High	V_{LOSH}	2		Vcc+0.3	V	LVTTL
LOSS Output Voltage-Low	V_{LOSH}	0		0.8	V	

Note (1): A (TX) + B (RX) = 280mA (Not include termination circuit)

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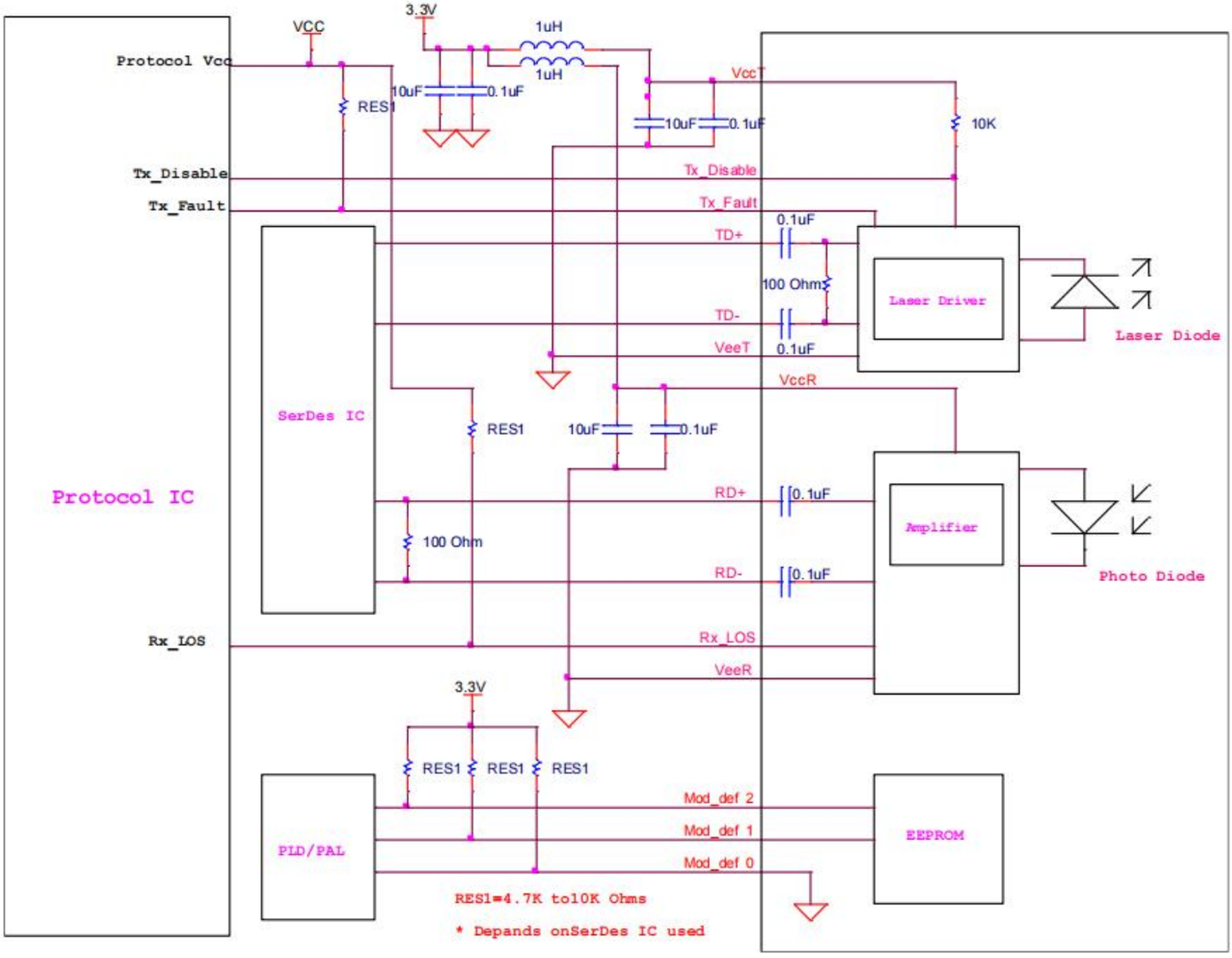
- Figure 3 Recommend Circuit Schematic



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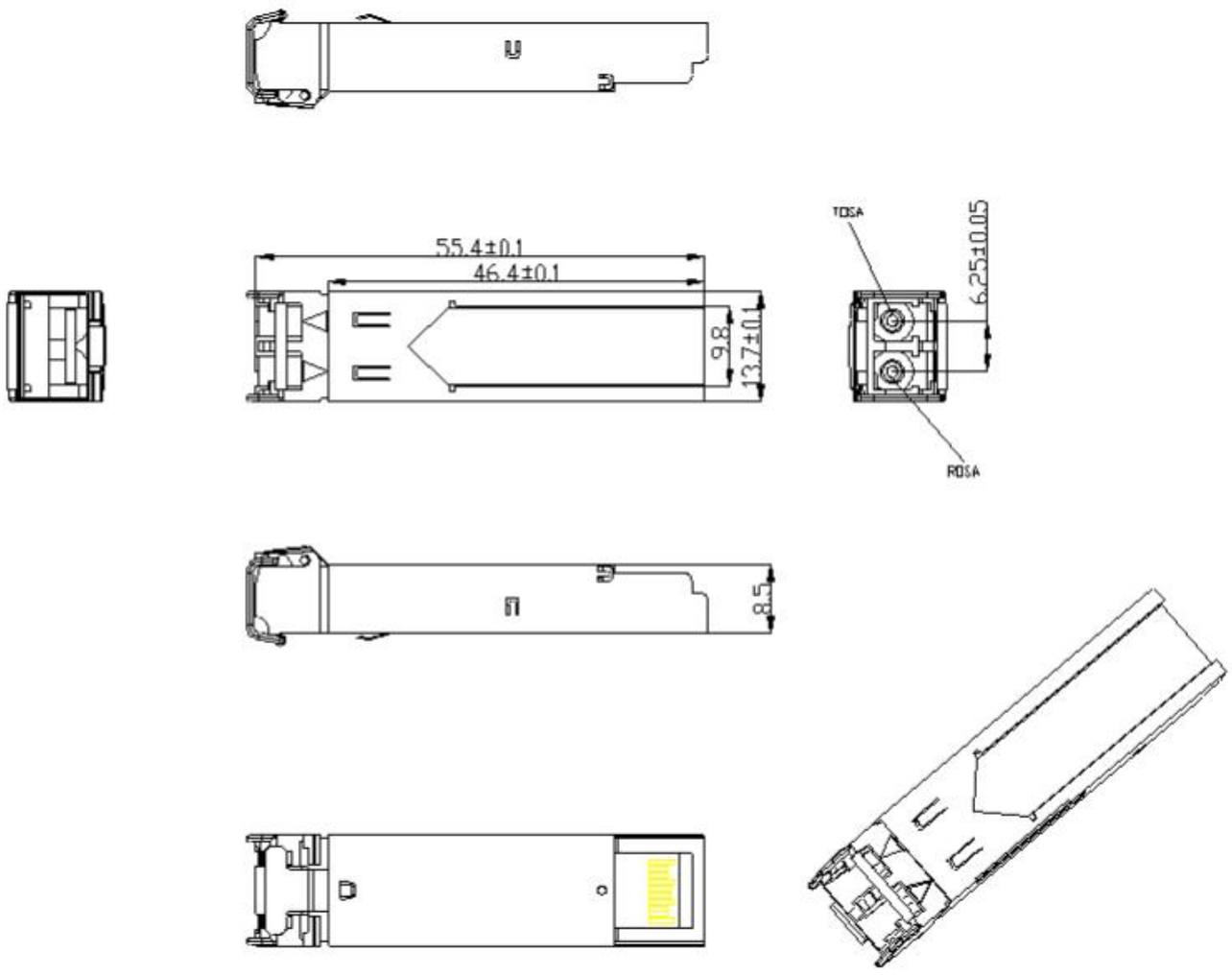
- Figure 4 Mechanical Specifications (Unit: mm)
  SFP-8512-M5BD



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- Table 8- Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge（ESD）	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10, 1040.11 IEC/EN 60825-1，2	Class 1 laser product
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards

- Appendix A. Document Revision

Version No.	Date	Description
1.0	2010-04-26	Preliminary datasheet
2.0	2011-09-10	Update format and company's logo

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