

EOLP-1560-40-N

1550nm SFP+ Single-Mode
Multi Rate 600Mbps~6.25Gbps
Duplex SFP+ Transceiver
RoHS 6 Compliant



Features

- ◆ Operating data rate up to 6.25Gbps
- ◆ 1550nm EML Transmitter
- ◆ Distance up to 40km
- ◆ 2-wire interface for digital diagnostic monitoring
- ◆ Single 3.3V Power supply and TTL Logic Interface
- ◆ Duplex LC Connector Interface
- ◆ Hot Pluggable
- ◆ Operating Case Temperature
Standard: 0°C to 70°C
Industrial: -40°C~85°C
- ◆ Compliant with SFF-8431 MSA
- ◆ Compliant with SFF-8432 MSA
- ◆ Compliant with SFF-8431 and 8472
- ◆ Compliant with FC standard INCITS 352

Applications

- ◆ High speed storage area networks
- ◆ OBSAI interface, such as
6.144/1.536/3.072/1.536Gbps and
768Mbps
- ◆ CPRI interface, such as
6.144/3.072/2.4576/1.228Gbps and
614Mbps

Ordering information

Part No.	Data Rate	Laser	Fiber Type	Distance	Temperature	DDMI
EOLP-1560-40-N	600Mbps to 6.25Gbp	1550nm EML	SMF	40km	Standard	YES
EOLP-1560-40-IN	600Mbps to 6.25Gbp	1550nm EML	SMF	40km	Industrial	YES

Regulatory Compliance*

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12
		EN 60825-1:2007
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
CB	JPTUV-049251	IEC 60825-1
		IEC 60950-1
FCC	WTF14F0514437E	47 CFR PART 15 OCT., 2013
FDA	1331340-000	CDRH 1040.10
ROHS	RHS01G006464	2011/65/EU

*The above certificate number updated to June 2014, because some certificate will be updated every year, such as FCC, FDA and ROHS. For the latest certification information, please check with Eoptolink.

Product Description

This module is designed for single mode fiber and operates at a nominal wavelength of 1550nm. The transmitter section uses a 1550nm EML laser and is a class 1 laser compliant according to International Safety Standard IEC-60825.

The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC.

Absolute Maximum Ratings^{*note1}

Parameter	Symbol	Min.	Max.	Unit
Storage Temperature	T_s	-40	+85	°C
Supply Voltage	V_{CC}	-0.5	3.6	V

*Note1: Exceeding any one of these values may destroy the device permanently.

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit
Operating Case Temperature	T_c	Standard	0	+70	°C
		Industrial	-40	85	°C
Power Supply Voltage	V_{CC}	3.15	3.3	3.45	V
Power Supply Current	I_{CC}			300	mA
Surge Current	I_{Surge}			+30	mA
Data Rate		0.6		6.25	Gbps

Performance Specifications – Electrical

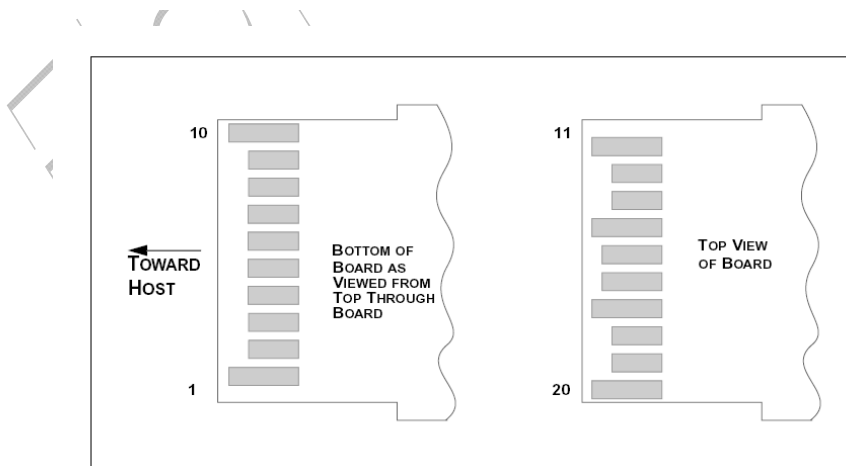
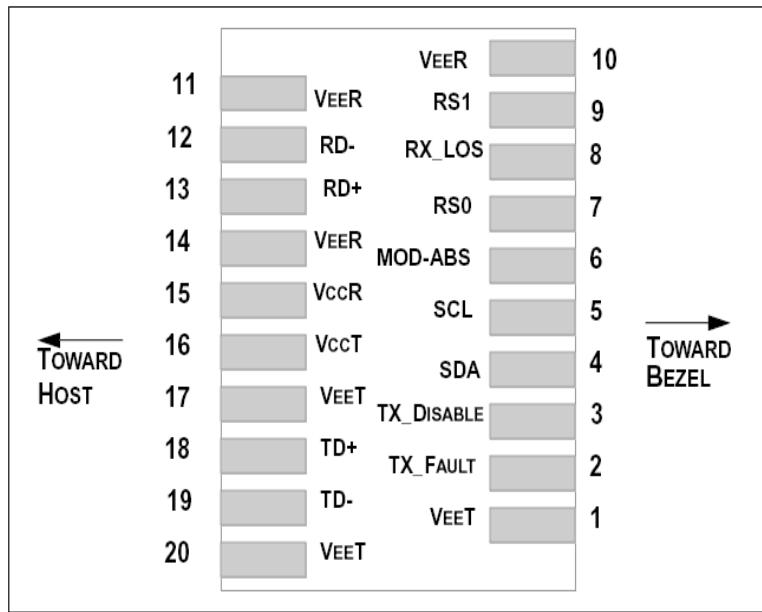
Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	V _{in}	150		1200	mVpp	AC coupled inputs
Input Impedance (Differential)	Z _{in}	85	100	115	ohm	R _{in} > 100 kohms @ DC
Tx_DISABLE Input Voltage – High		2		3.45	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	
Tx_FAULT Output Voltage – High		2		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Tx_FAULT Output Voltage – Low		0		0.5	V	I _o = -4.0mA
Receiver						
CML Outputs (Differential)	V _{out}	350		700	mVp p	AC coupled outputs
Output Impedance (Differential)	Z _{out}	85	100	115	ohm	
Rx_LOS Output Voltage – High		2.0		V _{cc} +0.3	V	I _o = 400μA; Host V _{cc}
Rx_LOS Output Voltage – Low		0		0.8	V	I _o = -4.0mA
MOD_DEF (2:0)	VoH	2.5			V	With Serial ID
	VoL	0		0.5	V	

Performance Specifications – Optical

Parameter	Symbol	Min.	Typical	Max.	Unit
9μm Core Diameter SMF supported Distance			40		km
Data Rate		0.6		6.25	Gbps
Transmitter					
Centre Wavelength	λ _c	1480	1550	1600	nm
Spectral Width (-20dB)	Δλ			1	nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power@10.3Gbps	P _{out}	0		4	dBm
Extinction Ratio@10.3Gbps	ER	4.5	6		dB
Transmitter and Dispersion Penalty	TDP			2	dB
Average Power of OFF Transmitter	P _{off}			-30	dBm
Input Differential Impedance	Z _{IN}	90	100	110	Ω
TX Disable Assert Time	t _{off}			10	us
Receiver					
Centre Wavelength	λ	1260		1600	nm
Sensitivity @ 6.25Gbps	P _{min}			-15.8	dBm

Receiver Overload	P_{max}	0.5			dBm
Optical Return Loss	ORL			-12	dB
LOS De-Assert	LOS_D			-16	dBm
LOS Assert	LOS_A	-25			dBm
LOS Hysteresis	LOS_H	0.5			dB
Output Differential Impedance	Z_{OUT}	90	100	110	Ω

SFP+ Transceiver Electrical Pad Layout



Pin Function Definitions

Pin Num.	Name	FUNCTION	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	Note 5
2	TX Fault	Transmitter Fault Indication	3	Note 1
3	TX Disable	Transmitter Disable	3	Note 2, Module disables on high or open
4	SDA	Module Definition 2	3	Data line for Serial ID.
5	SCL	Module Definition 1	3	Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTTL).	3	This pin has an internal 30k pull down to ground. A signal on this pin will not affect module performance.
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTTL).	1	This pin has an internal 30k pull down to ground. A signal on this pin will not affect module performance.
10	VeeR	Receiver Ground	1	Note 5
11	VeeR	Receiver Ground	1	Note 5
12	RD-	Inv. Received Data Out	3	Note 6
13	RD+	Received Data Out	3	Note 7
14	VeeR	Receiver Ground	1	Note 5
15	VccR	Receiver Power	2	3.3V ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3V ± 5%, Note 7
17	VeeT	Transmitter Ground	1	Note 5
18	TD+	Transmit Data In	3	Note 8
19	TD-	Inv. Transmit Data In	3	Note 8
20	VeeT	Transmitter Ground	1	Note 5

Notes:

1) TX Fault is an open collector/drain output, which should be pulled up with a 4.7K – 10KΩ resistor on the host board. Pull up voltage between 2.0V and VccT/R+0.3V. When high, output indicates a laser fault of some kind. Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

2) TX disable is an input that is used to shut down the transmitter optical output. It is pulled up

within the module with a 4.7K – 10 K Ω resistor. Its states are:

Low (0 – 0.8V): Transmitter on

(>0.8, < 2.0V): Undefined

High (2.0 – 3.465V): Transmitter Disabled

Open: Transmitter Disabled

3) Module Absent, connected to VeeT or VeeR in the module.

4) LOS (Loss of Signal) is an open collector/drain output, which should be pulled up with a 4.7K – 10K Ω resistor. Pull up voltage between 2.0V and VccT/R+0.3V. When high, this output indicates the received optical power is below the worst-case receiver sensitivity (as defined by the standard in use). Low indicates normal operation. In the low state, the output will be pulled to < 0.8V.

5) The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100 Ω differential lines which should be terminated with 100 Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V \pm 5% at the SFP+ connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain the required voltage at the SFP+ input pin with 3.3V supply voltage. When the recommended supply-filtering network is used, hot plugging of the SFP+ transceiver module will result in an inrush current of no more than 30mA greater than the steady state value. VccR and VccT may be internally connected within the SFP+ transceiver module.

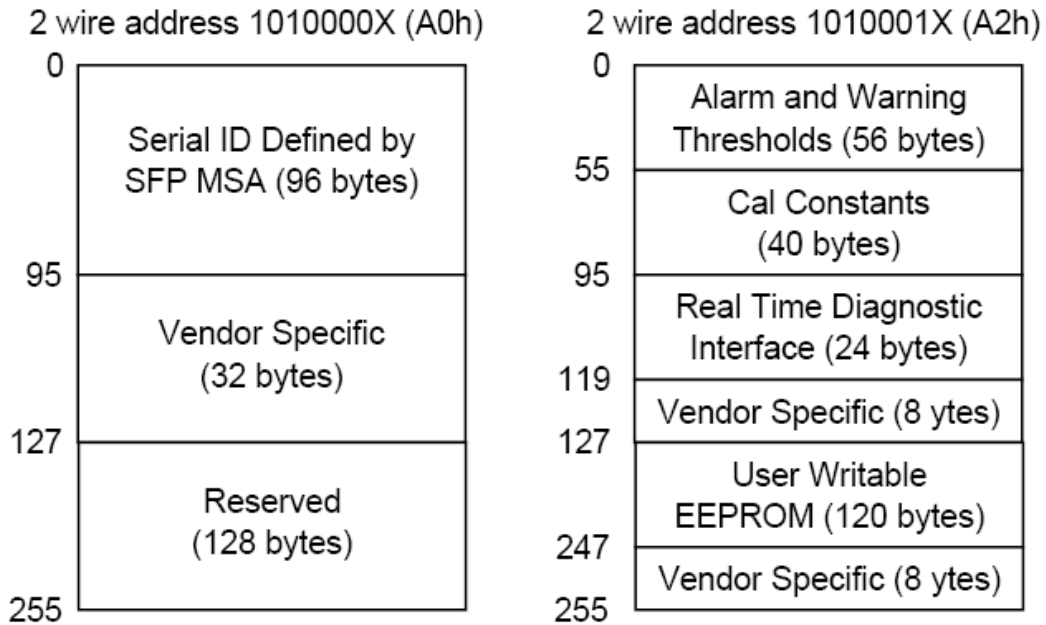
8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100 Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board.

EEPROM

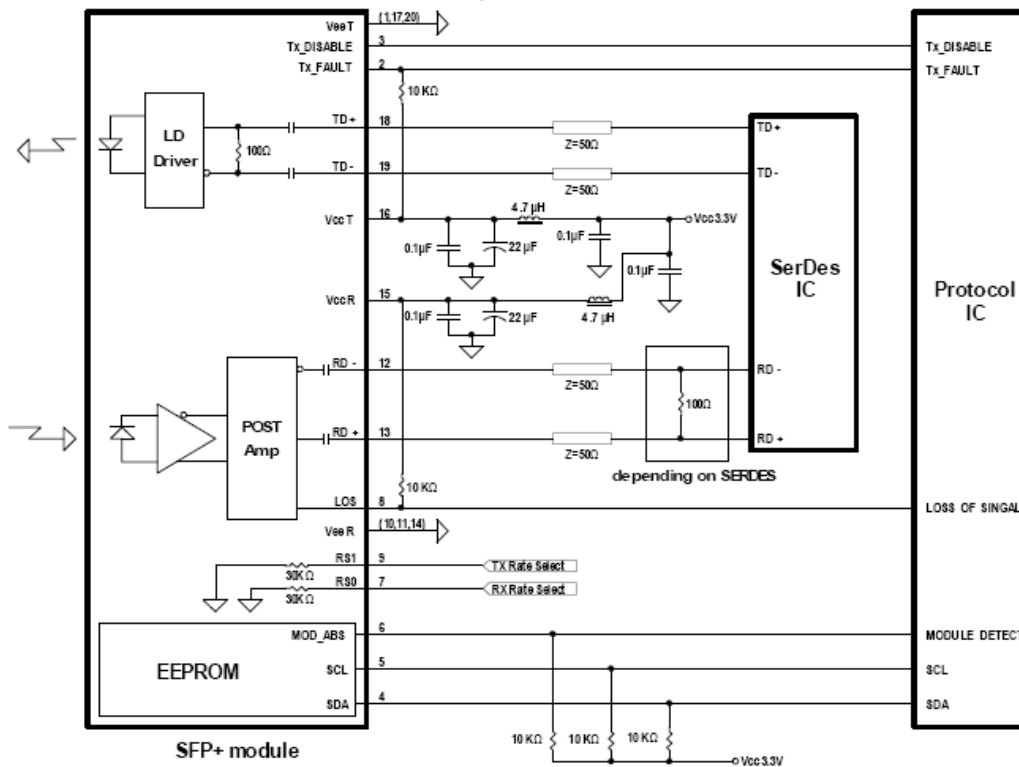
The serial interface uses the 2-wire serial CMOS EEPROM protocol defined for the ATMEL AT24C02/04 family of components. When the serial protocol is activated, the host generates the serial clock signal (SCL). The positive edge clocks data into those segments of the EEPROM that are not writing protected within the SFP+ transceiver. The negative edge clocks data from the SFP+ transceiver. The serial data signal (SDA) is bi-directional for serial data transfer. The host uses SDA in conjunction with SCL to mark the start and end of serial protocol activation. The memories are organized as a series of 8-bit data words that can be addressed individually or sequentially.

The Module provides diagnostic information about the present operating conditions. The transceiver generates this diagnostic data by digitization of internal analog signals. Calibration and alarm/warning threshold data is written during device manufacture. Received power monitoring, transmitted power monitoring, bias current monitoring, supply voltage monitoring and temperature monitoring all are implemented. If the module is defined as external calibrated, the diagnostic data are raw A/D values and must be converted to real world units using calibration constants stored in

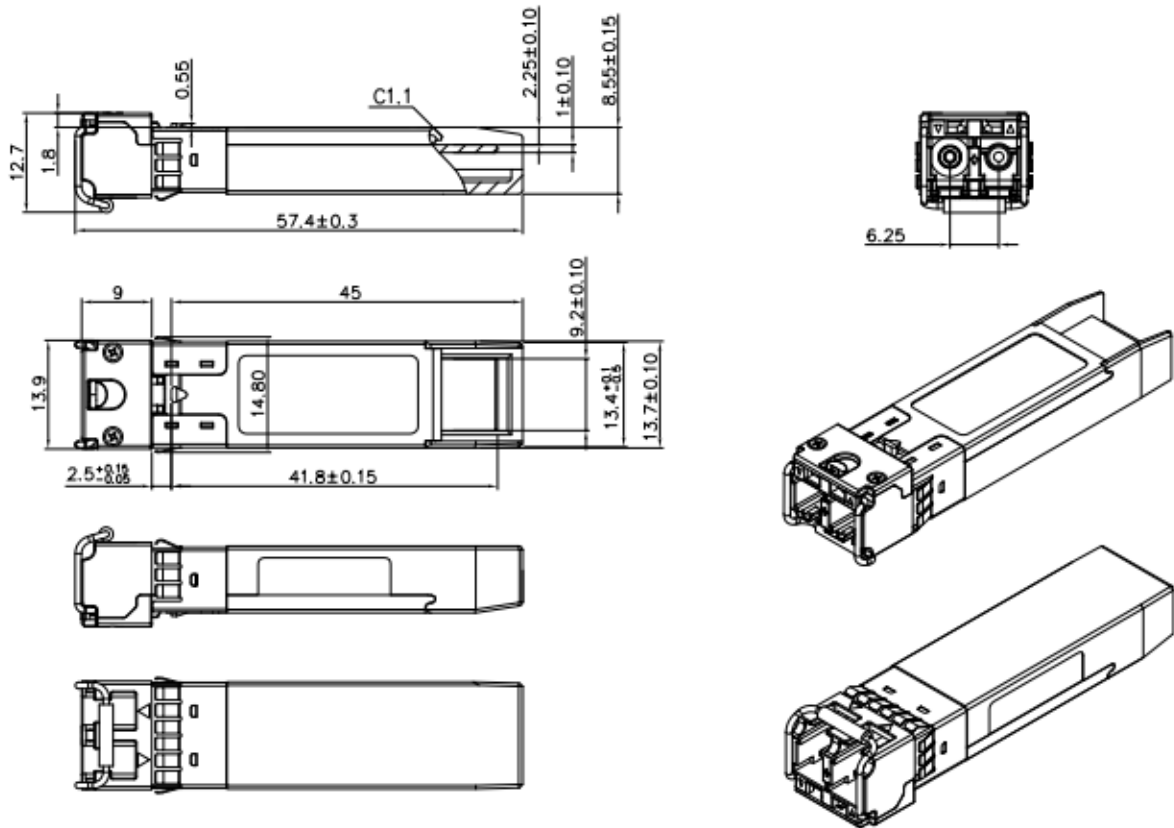
EEPROM locations 56 – 95 at wire serial bus address A2h. The digital diagnostic memory map specific data field define as following .For detail EEPROM information, please refer to the related document of SFF 8472 Rev 10.2.



Recommend Circuit Schematic



Mechanical Specifications



Unremarked tolerances $\pm 0.2\text{mm}$

Eye Safety

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

Obtaining Document

You can visit our website:

<http://www.eoptolink.com>

Or contact Eoptolink Technology Inc., Ltd. Listed at the end of the documentation to get the latest document.

Revision History

Revision	Initiated	Reviewed	Approved	DCN	Release Date
V1.a	Cathy			Released.	2009-12-15
V1.b	Kelly.Cao			Update Po and Sen.	2011-6-10
V2.0	Alex/Townie	Kelly		Update spelling mistake	Aug 10, 2011
V2.a	Kelly			Update photo and mechanical spec.	Sep 15, 2011
V2.b	Angela			Update regulatory compliance, ER and mechanical specifications.	October 16, 2013
V2.c	Angela	Kelly/Vina		Update regulatory compliance and mechanical spec.	Feb 04,2015
V2.d	Angela	Kelly		Add industrial temperature and update the 2D drawing.	July 15, 2015

Notice:

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