Особенности:
- CWDM EML лазер + PIN фотоприемник
- 14dB бюджет
- функция диагностики (DDMI) в соответствии с SFF-8472
- Data rate до 10.3Gbps
- соответствие спецификации MSA для SFP+

Область применения:
- 10GBASE-LR/LW 10G Ethernet

Recommended Operating Conditions

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T_A	SFP-Plus-CWDM47.14 SFP-Plus-CWDM49.14 SFP-Plus-CWDM51.14 SFP-Plus-CWDM53.14 SFP-Plus-CWDM55.14 SFP-Plus-CWDM57.14 SFP-Plus-CWDM59.14 SFP-Plus-CWDM61.14	-5		+70	°C
Power Supply Voltage	V_{CC}		3.13	3.3	3.45	V
Power Supply Current	I_{CC}				430	mA
Baud Rate				10.3125	10.5	GBaud

CWDM Wavelength

Band	model	Wavelength(nm)		
		Min.	Typ.	Max.
S-band Short Wavelength	SFP-Plus-CWDM47.14	1464	1470	1477.5
	SFP-Plus-CWDM49.14	1484	1490	1497.5
	SFP-Plus-CWDM51.14	1504	1510	1517.5
	SFP-Plus-CWDM53.14	1524	1530	1537.5
C-band Conventional	SFP-Plus-CWDM55.14	1544	1550	1557.5
L-band Long Wavelength	SFP-Plus-CWDM57.14	1564	1570	1577.5
	SFP-Plus-CWDM59.14	1584	1590	1597.5
	SFP-Plus-CWDM61.14	1604	1610	1617.5

PERFORMANCE SPECIFICATIONS - ELECTRICAL

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
TRANSMITTER						
CML Inputs(Differential)	Vin	180		1000	mVp	After internal AC coupling
Input Impedance (Differential)	Zin	85	100	115	ohm	
Tx_DISABLE Input Voltage - High		2		Vcc+0.3	V	
Tx_DISABLE Input Voltage - Low		0		0.8	V	
Tx_FAULT Output Voltage -- High		2		Vcc+0.3	V	
Tx_FAULT Output Voltage -- Low		0		0.8	V	
RECEIVER						
CML Outputs (Differential)	Vout	350		700	mVpp	After internal AC coupling
Output Impedance (Differential)	Zout	85	100	115	ohm	
Rx_LOS Output Voltage - High		2		Vcc+0.3	V	
Rx_LOS Output Voltage - Low		0		0.8	V	
MOD_DEF (0:2)	VoH	2.5			V	Reference the SFF-8472 MSA
	VoL	0		0.5	V	

Optical Characteristics

Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Output Opt. Pwr: 9/125 SMF	Pout	**-1**		+4	dBm	
Optical Extinction Ratio	ER	3.5			dB	
Optical Wavelength	λ	Λc–6.0	λc	λc+7.5	nm	ITU-T G.694.2, from 1470 to 1610nm,

						step 20nm
-20dB Spectrum Width	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power of OFF Transmitter	P_{OFF}			-30	dBm	
Transmitter Dispersion Penalty	TDP			3	dB	
Relative Intensity Noise	RIN			-128	dB/ Hz	
Receiver						
Receiver Sensitivity (OMA) @ 10.3125Gb/s	Pmin			**-15**	dBm	Average received power; BER less than 1E-12 and PRBS 2^{31}-1 test pattern
Maximum Input Power	Pmax	**+0.5**			dBm	
Optical Center Wavelength	λ	1260		1620	nm	
Receiver Reflectance	Rrf			-12	dB	
LOS De-Assert	LOS_D			-20	dBm	
LOS Assert	LOS_A	-28			dBm	
LOS Hysteresis		1			dB	

Pin Function Definitions

Pin Num.	Name	FUNCTION	Plug	Notes
1	VeeT	Transmitter Ground	1	
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	Note 3, Data line for Serial ID.
5	SCL	Module Definition 1	3	Note 3, Clock line for Serial ID.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	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 (LVTTL).	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	3.3 ± 5%, Note 7
16	VccT	Transmitter Power	2	3.3 ± 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 4.7 – 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) Modulation 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 – 10KΩ 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) VeeR and VeeT may be internally connected within the SFP+ module.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 100Ω differential lines which should be terminated with 100Ω (differential) at the user SERDES. The AC coupling is done inside the module and is thus not required on the host board. The voltage swing on these lines will be between 370 and 2000 mV differential (185 – 1000 mV single ended) when properly terminated.

7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±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.

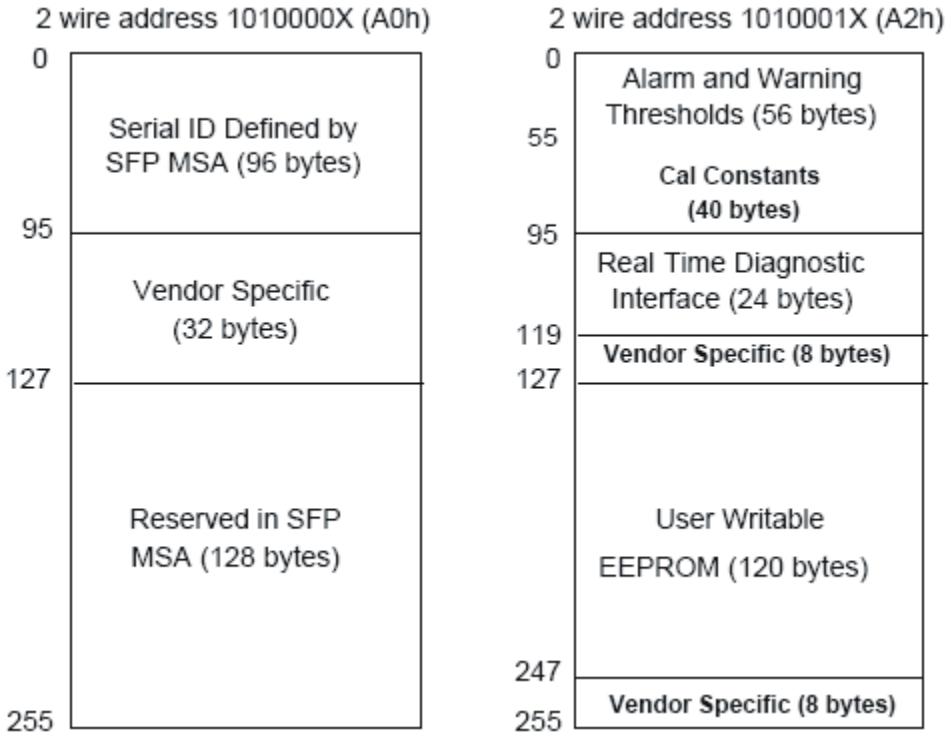
8) TD-/+: These are the differential transmitter inputs. They are AC-coupled, differential lines with 100Ω differential termination inside the module. The AC coupling is done inside the module and is thus not required on the host board. The inputs will accept differential swings of 500 – 2400 mV (250 – 1200mV single-ended), though it is recommended that values between 500 and 1200 mV differential (250 – 600mV single-ended) be used for best EMI performance.

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 write 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. 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.



Mechanical Specifications