

Свойства

4 независимых канала

до 11.2Gbps на канал

1310nm DFB лазеры

до 10км на одномодовом оптическом кабеле

цифровая диагностика (DDMI)

MPO/APC коннектор

Применение

40G Ethernet 40Gbase-LR4

4 x 10G Ethernet 10Gbase-LR

● Максимальные параметры

Parameter	Symbol	Min.	Typical	Max.	Unit
Storage Temperature	T_S	-40		+85	°C
Supply Voltage	$V_{CC,T,R}$	-0.5		4	V
Relative Humidity	RH	0		85	%

● Рекомендованные параметры

Parameter	Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	T_C	0		+70	°C
Supply Voltage	$V_{CC,T,R}$	+3.13	3.3	+3.47	V
Supply Current	I_{CC}			1000	mA
Power Dissipation	PD			3.5	W

● **Электрические характеристики (T_{OP} = 0 to 70 °C, VCC = 3.13 to 3.47 Volts)**

✧ Parameter	Symbol	Min	Typ	Max	Unit	Note
Data Rate per Channel		-	10.3125	11.2	Gbps	
Power Consumption		-	2.5	3.5	W	
Supply Current	Icc		0.75	1.0	A	
Control I/O Voltage-High	VIH	2.0		Vcc	V	
Control I/O Voltage-Low	VIL	0		0.7	V	
Inter-Channel Skew	TSK			150	Ps	
RESETL Duration			10		Us	
RESETL De-assert time				100	ms	
Power On Time				100	ms	
Transmitter						
Single Ended Output Voltage Tolerance		0.3		4	V	1
Common mode Voltage Tolerance		15			mV	
Transmit Input Diff Voltage	VI	150		1200	mV	
Transmit Input Diff Impedance	ZIN	85	100	115		
Data Dependent Input Jitter	DDJ		0.3		UI	
Receiver						
Single Ended Output Voltage Tolerance		0.3		4	V	
Rx Output Diff Voltage	Vo	370	600	950	mV	
Rx Output Rise and Fall Voltage	Tr/Tf			35	ps	1
Total Jitter	TJ		0.3		UI	

Note: 1. 20~80%

● Оптические параметры (T_{OP} = 0 to 70 °C, VCC = 3.13 to 3.47 Volts)

Parameter	Symbol	Min	Typ	Max	Unit	Ref.
Transmitter						
Wavelength Assignment	λC	1260	1310	1355	nm	
Side-mode Suppression Ratio	SMSR	30	-	-	dB	
Total Average Launch Power	PT	-	-	7.5	dBm	
Average Launch Power, each Lane	PAVG	-5.5	-	1.5	dBm	
Optical Modulation Amplitude, each Lane	OMA	-4.5		2.5	dBm	
Difference in Launch Power between any two Lanes (OMA)		-	-	6.5	dB	
Launch Power in OMA minus Transmitter and Dispersion Penalty (TDP), each Lane		-	-	-5.5	dBm	
TDP, each Lane	TDP			3.2	dB	
Laser Off Power Per Channel	Poff			-30	dBm	
Optical Extinction Ratio	ER	3.5	-	-	dB	
Transmitter Eye Mask Definition {X1, X2, X3, Y1, Y2, Y3}		{0.25, 0.4, 0.45, 0.25, 0.28, 0.4}				
Relative Intensity Noise	Rin			-128	dB/HZ	1
Optical Return Loss Tolerance	TOL	-	-	12	dB	
Transmitter Reflexance	RT	-	-	-12	dB	
Receiver						
Damage Threshold	THd	3.3			dBm	1
Receiver Sensitivity(OMA), each Lane	SR	-	-	-12.6	dBm	
Receive Electrical 3 dB upper Cut off Frequency, each Lane				12.3	GHz	
RSSI Accuracy		-2		2	dB	

Модуль QSFP+, 40G, 4 x LR 1310nm, SM, 10km, MPO/APC

Receiver Reflectance	Rrx			-12	dB	
LOS De-Assert	LOS _D			-15	dBm	
LOS Assert	LOS _A	-30			dBm	
LOS Hysteresis	LOS _H	0.5			dB	

Note: 1. 12dB Reflection

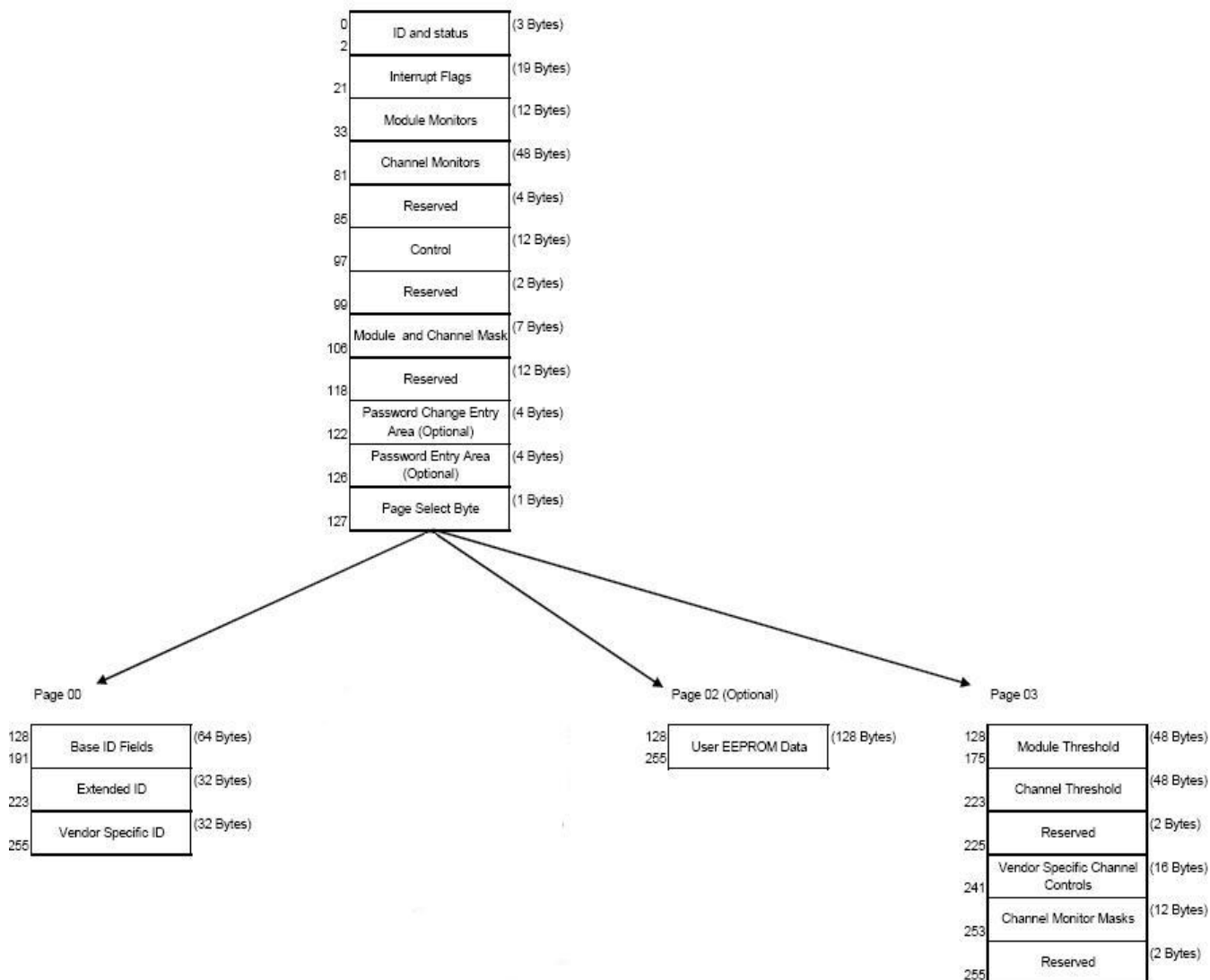
● **Цифровая диагностика (DDMI)**

Byte Address	Description	Type
0	Identifier (1 Byte)	Read Only
1-2	Status (2 Bytes)	Read Only
3-21	Interrupt Flags (31 Bytes)	Read Only
22-33	Module Monitors (12 Bytes)	Read Only
34-81	Channel Monitors (48 Bytes)	Read Only
82-85	Reserved (4 Bytes)	Read Only
86-97	Control (12 Bytes)	Read/Write
98-99	Reserved (2 Bytes)	Read/Write
100-106	Module and Channel Masks (7 Bytes)	Read/Write
107-118	Reserved (12 Bytes)	Read/Write
119-122	Reserved (4 Bytes)	Read/Write
123-126	Reserved (4 Bytes)	Read/Write
127	Page Select Byte	Read/Write

Byte Address	Description	Type
128-175	Module Thresholds (48 Bytes)	Read Only
176-223	Reserved (48 Bytes)	Read Only
224-225	Reserved (2 Bytes)	Read Only
226-239	Reserved (14 Bytes)	Read/Write
240-241	Channel Controls (2 Bytes)	Read/Write
242-253	Reserved (12 Bytes)	Read/Write
254-255	Reserved (2 Bytes)	Read/Write

Address	Name	Description
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2-wire serial address, 1010000x (A0h)"



221	Enhanced Options (1 Byte)	Indicates which optional enhanced features are implemented
222	Reserved (1 Byte)	Reserved
223	CC_EXT	Check code for the Extended ID Fields (addresses 192-222)
224-255	Vendor Specific (32 Bytes)	Vendor Specific EEPROM

- Page02 is User EEPROM and its format decided by user.
The detail description of low memory and page00.page03 upper memory please see SFF-8436 document.

● Блок-схема

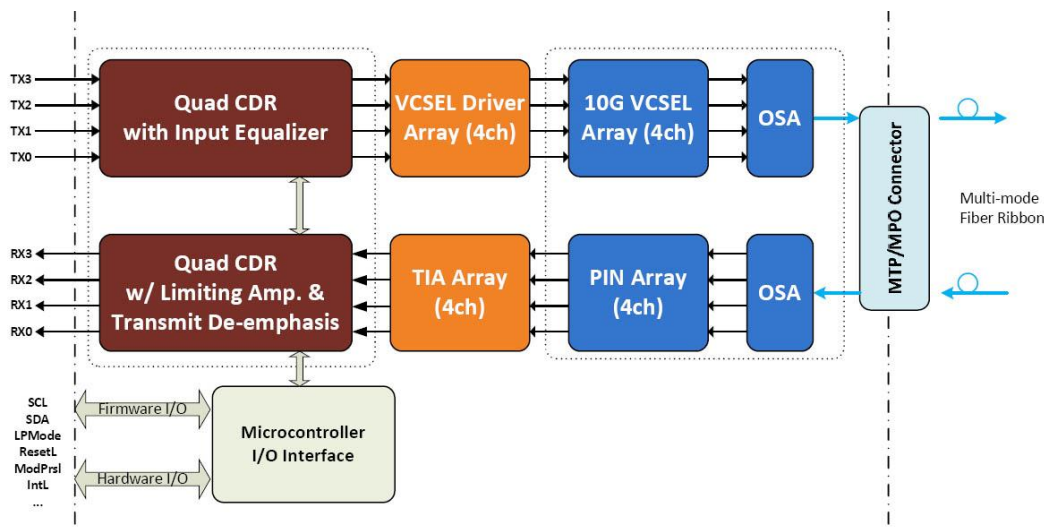


Figure1: Block Diagram

● Назначение контактов

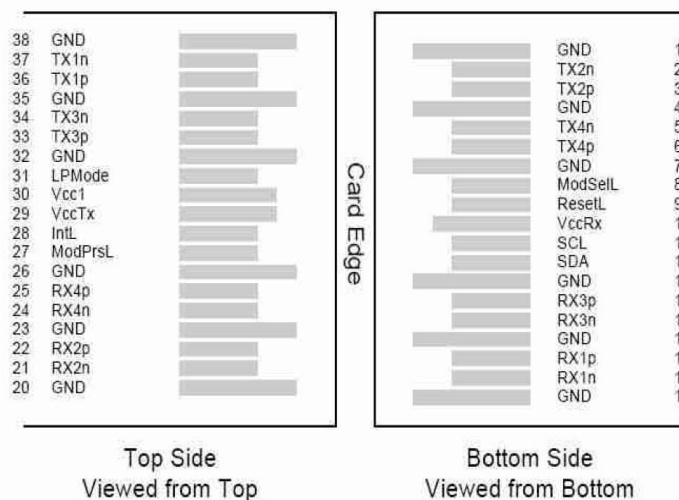


Diagram of Host Board Connector Block Pin Numbers and Name

● **Описание контактов**

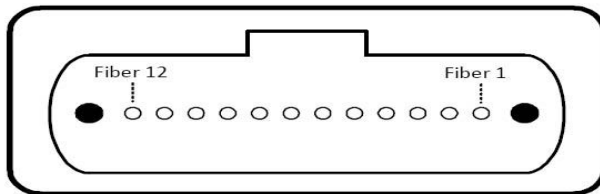
Pin	Logic	Symbol	Name/Description	Ref.
1		GND	Ground	1
2	CML-I	Tx2n	Transmitter Inverted Data Input	
3	CML-I	Tx2p	Transmitter Non-Inverted Data output	
4		GND	Ground	1
5	CML-I	Tx4n	Transmitter Inverted Data Output	
6	CML-I	Tx4p	Transmitter Non-Inverted Data Output	
7		GND	Ground	1
8	LVTTL-I	ModSelL	Module Select	
9	LVTTL-I	ResetL	Module Reset	
10		VccRx	+3.3V Power Supply Receiver	2
11	LVCMO S-I/O	SCL	2-Wire Serial Interface Clock	
12	LVCMO S-I/O	SDA	2-Wire Serial Interface Data	
13		GND	Ground	1
14	CML-O	Rx3p	Receiver Inverted Data Output	
15	CML-O	Rx3n	Receiver Non-Inverted Data Output	
16		GND	Ground	1
17	CML-O	Rx1p	Receiver Inverted Data Output	
18	CML-O	Rx1n	Receiver Non-Inverted Data Output	
19		GND	Ground	1
20		GND	Ground	1
21	CML-O	Rx2n	Receiver Inverted Data Output	

22	CML-O	Rx2p	Receiver Non-Inverted Data Output	
23		GND	Ground	1
24	CML-O	Rx4n	Receiver Inverted Data Output	
25	CML-O	Rx4p	Receiver Non-Inverted Data Output	
26		GND	Ground	1
27	LVTTTL-O	ModPrsL	Module Present	
28	LVTTTL-O	IntL	Interrupt	
29		VccTx	+3.3V Power Supply Transmitter	2
30		Vcc1	+3.3V Power Supply	2
31	LVTTTL-I	LPMMode	Low Power Mode	
32		GND	Ground	1
33	CML-I	Tx3p	Transmitter Inverted Data Output	
34	CML-I	Tx3n	Transmitter Non-Inverted Data Output	
35		GND	Ground	1
36	CML-I	Tx1p	Transmitter Inverted Data Output	
37	CML-I	Tx1n	Transmitter Non-Inverted Data Output	
38		GND	Ground	1

Notes:

1. GND is the symbol for single and supply(power) common for QSFP modules, All are common within the QSFP module and all module voltages are referenced to this potential otherwise noted. Connect these directly to the host board signal common ground plane. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
2. VccRx, Vcc1 and VccTx are the receiver and transmitter power suppliers and shall be applied concurrently. Recommended host board power supply filtering is shown below. VccRx, Vcc1 and VccTx may be internally connected within the QSFP transceiver module in any combination. The connector pins are each rated for maximum current of 500mA.

● **MPO разъем**

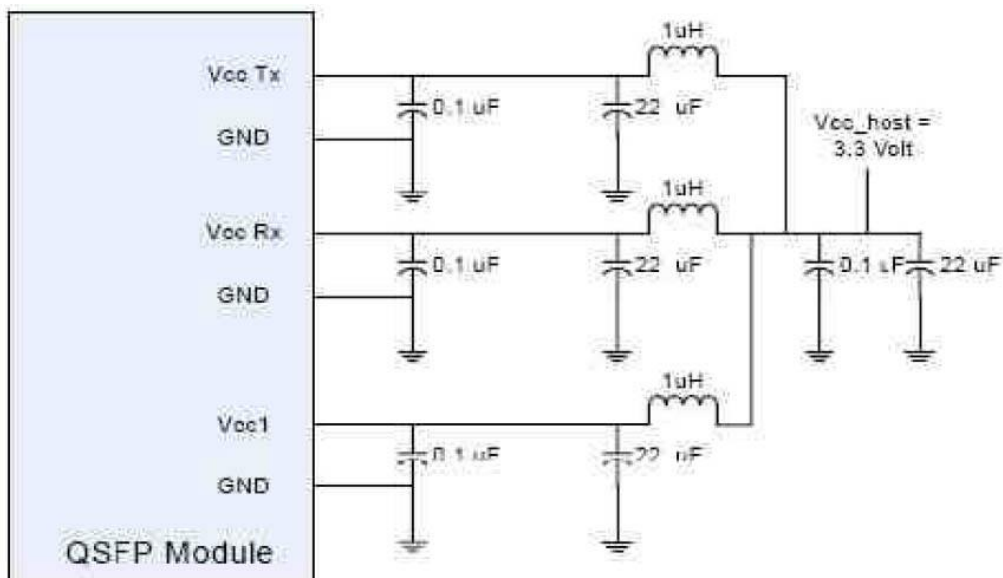


Outside View of the QSFP Module MPO

Fiber NO.	Lane Assignment
1	RX0
2	RX1
3	RX2
4	RX3
5	Not Used
6	Not Used
7	Not Used
8	Not Used
9	TX3
10	TX2
11	TX1
12	TX0

Lane Assignment Table

● Рекомендованная схема включения



● Размеры

