SFP-Plus-16G-DWDM-40-Cxx

OptiCin

Модули SFP+ 16G, DWDM CH-17 - CH-60, 40km

Особенности:

- 100GHz DWDM ITU Grid
- возможность горячей замены
- двойной LC разъем
- встроенная функция диагностики DDMI
- Data rate up to 14.025Gbps
- соответствие спецификации SFF-8432 MSA

Области применения:

- Multi-rate 16x / 8x / 4x Fibre Channel

Длины волн и модели:

Channel	Model	Frequency (THz)	Center Wavelength (nm)
17	SFP-Plus-16G-DWDM-40-C17	191.7	1563.86
18	SFP-Plus-16G-DWDM-40-C18	191.8	1563.05
19	SFP-Plus-16G-DWDM-40-C19	191.9	1562.23
20	SFP-Plus-16G-DWDM-40-C20	192.0	1561.42
21	SFP-Plus-16G-DWDM-40-C21	192.1	1560.61
22	SFP-Plus-16G-DWDM-40-C22	192.2	1559.79
23	SFP-Plus-16G-DWDM-40-C23	192.3	1558.98
24	SFP-Plus-16G-DWDM-40-C24	192.4	1558.17
25	SFP-Plus-16G-DWDM-40-C25	192.5	1557.36
26	SFP-Plus-16G-DWDM-40-C26	192.6	1556.55
27	SFP-Plus-16G-DWDM-40-C27	192.7	1555.75
28	SFP-Plus-16G-DWDM-40-C28	192.8	1554.94
29	SFP-Plus-16G-DWDM-40-C29	192.9	1554.13
30	SFP-Plus-16G-DWDM-40-C30	193.0	1553.33
31	SFP-Plus-16G-DWDM-40-C31	193.1	1552.52
32	SFP-Plus-16G-DWDM-40-C32	193.2	1551.72
33	SFP-Plus-16G-DWDM-40-C33	193.3	1550.92
34	SFP-Plus-16G-DWDM-40-C34	193.4	1550.12
35	SFP-Plus-16G-DWDM-40-C35	193.5	1549.32
36	SFP-Plus-16G-DWDM-40-C36	193.6	1548.51
37	SFP-Plus-16G-DWDM-40-C37	193.7	1547.72
38	SFP-Plus-16G-DWDM-40-C38	193.8	1546.92
39	SFP-Plus-16G-DWDM-40-C39	193.9	1546.12
40	SFP-Plus-16G-DWDM-40-C40	194.0	1545.32
41	SFP-Plus-16G-DWDM-40-C41	194.1	1544.53
42	SFP-Plus-16G-DWDM-40-C42	194.2	1543.73
43	SFP-Plus-16G-DWDM-40-C43	194.3	1542.94
44	SFP-Plus-16G-DWDM-40-C44	194.4	1542.14
45	SFP-Plus-16G-DWDM-40-C45	194.5	1541.35
46	SFP-Plus-16G-DWDM-40-C46	194.6	1540.56
47	SFP-Plus-16G-DWDM-40-C47	194.7	1539.77
48	SFP-Plus-16G-DWDM-40-C48	194.8	1538.98
49	SFP-Plus-16G-DWDM-40-C49	194.9	1538.19
50	SFP-Plus-16G-DWDM-40-C50	195.0	1537.40

51	SFP-Plus-16G-DWDM-40-C51	195.1	1536.61
52	SFP-Plus-16G-DWDM-40-C52	195.2	1535.82
53	SFP-Plus-16G-DWDM-40-C53	195.3	1535.04
54	SFP-Plus-16G-DWDM-40-C54	195.4	1534.25
55	SFP-Plus-16G-DWDM-40-C55	195.5	1533.47
56	SFP-Plus-16G-DWDM-40-C56	195.6	1532.68
57	SFP-Plus-16G-DWDM-40-C57	195.7	1531.90
58	SFP-Plus-16G-DWDM-40-C58	195.8	1531.12
59	SFP-Plus-16G-DWDM-40-C59	195.9	1530.33
60	SFP-Plus-16G-DWDM-40-C60	196.0	1529.55

Absolute Maximum Ratings

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

Recommended Operating Conditions

Parameter	Symbol		Min.	Typical	Max.	Unit
Operating Case Temperature	T_c	SFP-Plus-16G-DWDM-40-Cxx	0		+70	°C
Power Supply Voltage	V_{CC}		3.15	3.3	3.45	V
Power Supply Current	I_{CC}			430	610	mA
Surge Current	I_{Surge}				+30	mA
Baud Rate			4.25	14.025		Gbps

PERFORMANCE SPECIFICATIONS - ELECTRICAL

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	Vin	250		1000	mVpp	AC coupled inputs
Input Impedance (Differential)	Zin	85	100	115	ohm	Rin > 100 kohms @ DC
Differential Input S-parameter	$S_{DD}11$	-	-	-10	dB	
Differential to Common Mode Conversion	$S_{CD}11$	-	-	-10	dB	
Tx_DISABLE Input Voltage – High		2		3.45	V	
Tx_DISABLE Input Voltage – Low		0		0.8	V	

Tx_FAULT Output Voltage – High		2		Vcc+0.3	V	Io = 400μA; Host Vcc
Tx_FAULT Output Voltage – Low		0		0.5	V	Io = -4.0mA
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	AC coupled outputs
Output AC Common Mode Voltage		0		15	mV	RMS
Output Impedance (Differential)	Zout	85	100	115	ohm	
Differential Output S-parameter	S_D22	-	-	-10	dB	
Rx_LOS Output Voltage – High		2		Vcc+0.3	V	Io = 400μA; Host Vcc
Rx_LOS Output Voltage – Low		0		0.8	V	Io = -4.0mA
MOD_DEF (0:2)	VoH	2.5			V	With Serial ID

Optical and Electrical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Unit
9μm Core Diameter SMF			40		Km
Data Rate		4.25	14.025		Gbps
Transmitter					
Centre Wavelength spacing			50		GHz
			0.4		nm
Side Mode Suppression Ratio	SMSR	30			dB
Average Output Power*Note4	P_{out}	0		+4	dBm
Extinction Ratio	ER	8.2			dB
Average Power of OFF Transmitter	P_{off}			-30	dBm
Transmitter Dispersion Penalty	TDP			2	dB
TX Disable Assert Time	t_off	-	-	10	us
TX_DISABLE Negate Time	t_on	-	-	1	ms
TX_BISABLE time to start reset	t_reset	10	-	-	us
Time to initialize, include reset of TX_FAULT	t_init	-	-	300	ms
TX_FAULT from fault to assertion	t_fault	-	-	100	us
Total Jitter	TJ	-	-	0.28	UI(p-p)
Data Dependant Jitter	DDJ	-	-	0.1	UI(p-p)
Uncorrelated Jitter	UJ	-	-	0.023	RMS
Receiver					
Centre Wavelength	λ	1260		1565	nm

Sensitivity*Note5		P_{min}			-14	dBm
Receiver Overload		P_{max}	0			dBm
Optical Return Loss		ORL			-12	dB
LOS De-Assert		LOS_D			-16	dBm
LOS Assert		LOS_A	-26			dBm
LOS	High		2.0		V_{CC}+0.3	V

Note4: Output is coupled into a 9/125um SMF.

Note5: Minimum average optical power measured at the BER less than 1E-12, back to back. The measure pattern is PRBS 231-1.

Pin Function Definitions

Pin Num.	Name	FUNCTION	Plug	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	2-wire Serial Interface Data Line.
5	SCL	Module Definition 1	3	2-wire Serial Interface Clock.
6	MOD-ABS	Module Definition 0	3	Note 3
7	RS0	RX Rate Select (LVTTL).	3	Rate Select 0, optionally controls SFP+ module receiver. This pin is pulled low to VeeT with a >30K resistor..
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	Rate Select 1, optionally controls SFP+ module transmitter. This pin is pulled low to VeeT with a >30K resistor.
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 KΩ 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 – 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.

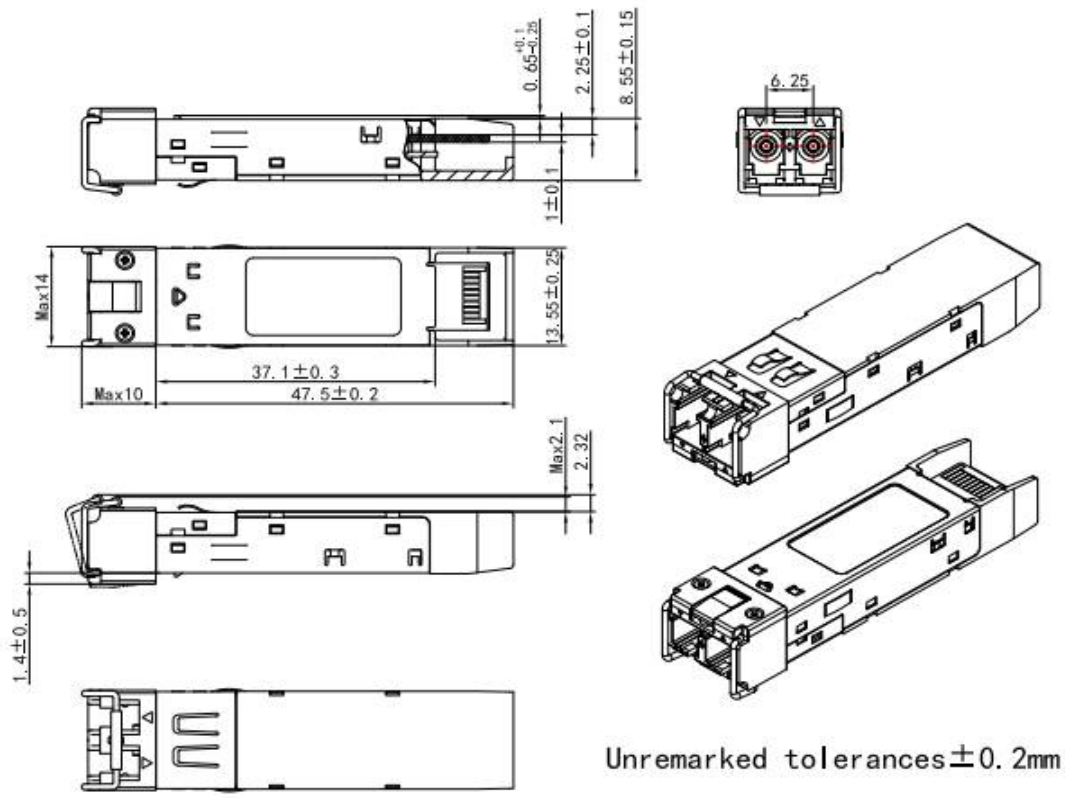
5) The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.

6) RD-/+: These are the differential receiver outputs. They are AC coupled 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.

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 610mA. 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 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 written 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.

Mechanical Specifications