

**Preliminary**

## SXP3102DA-Fxxx (Rev. A)

February 10, 2010  
Standard

### 1. INTRODUCTION

This document is a preliminary specification for a single channel XFP MSA transceiver module. The transceiver shall be SDH STM DW100U-2A2C(F) compliant. The transceiver is a bi-directional device with a transmitter and receiver in a same package. The following describes common features and ability:

- XFP MSA compliant mechanical platform
- Up to 11.1Gbps rate amplified multichannel DWDM applications
- 1550nm range laser transmitter with automatic output power control
- InGaAs-APD photo-detector receiver
- LC-duplex receptacle optical connector
- +3.3V and +5.0V power supply
- Commercial operating temperature range 0 to +75°C
- No reference clock required
- Built-in EEPROM with digital diagnostic monitoring function
- Hot pluggable XFP compatible footprint

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### 2. MAXIMUM AND OPERATING OPTICAL AND ELECTRICAL REQUIREMENTS

#### 2.1. ABSOLUTE MAXIMUM RATINGS

The maximum ratings below indicate the stress over which the transceiver may be irrecoverably damaged.

Parameter	Symbol	Condition	Min	Max	Unit	Note
Storage Temperature	Tstg		-40	+85	°C	
Storage Humidity	Hst	continuous	5	85	%	*1
Storage Humidity	Hst	short-term	5	95	%	*2
Operating Case Temperature	Tcase		-5	+75	°C	*3
Supply Voltage	Vcc5		-0.3	+5.5	V	
Supply Voltage	Vcc3		-0.3	+3.63	V	

\*1: Non-condensing.

\*2: Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year.

\*3: Actual temperature, does not integrate monitor accuracy margin.

## 2.2. OPERATING CONDITIONS

The operating conditions below indicate the conditions under which the transceiver shall operate normally and meet the performance specification.

Parameter	Symbol	Condition	Min	Max	Unit	Note
Operational Humidity	RH		5	85	%	*1
Operating Case Temperature	Tcase	continuous	0	+70	°C	
Operating Case Temperature	Tcase	short-term	-5	+75	°C	*2,*3
Supply Voltage	Vcc5		+4.75	+5.25	V	
Supply Voltage	Vcc3		+3.13	+3.47	V	

\*1: Non-condensing.

\*2: Short-term refers to a period of not more than 96 consecutive hours and a total of not more than 15 days in 1 year.

\*3: Actual temperature, does not integrate monitor accuracy margin.

## 3. FUNCTIONAL DESCRIPTION

All performance in this chapter shall be specified under operating conditions described in chapter 2.2 unless otherwise specified.

### 3.1. OPTICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min (*1)		Typ	Max (*1)		Unit	Note
			non-FEC rate	FEC rate		non-FEC rate	FEC rate		
<b>TRANSMITTER</b>									
Signaling Speed			9.95/10.3/10.7/11.1					Gbps	
Output Average Power	Pout		-1			+4		dBm	
Wavelength	Lp_tx		See wavelength table					nm	
Wavelength Deviation			-100			+100		pm	
Spectral Excursion			-20			+20		GHz	
Dynamic Extinction Ratio	EX		8.7	8.2				dB	
Side-mode Suppression Ratio	Sr		30					dB	
Jitter Generation	J_tx	4MHz-80MHz				0.1		UIpp	*5
Eye Mask Margin	MM		10					%	*2
Average Launch Power off OFF Transmitter						-30		dBm	
<b>OPTICAL PATH</b>									
Chromatic Dispersion	D <sub>LR</sub>		0			1300   1600		ps/nm	

Parameter	Symbol	Condition	Min (*1)		Typ	Max (*1)		Unit	Note
			non-FEC rate	FEC rate		non-FEC rate	FEC rate		
<b>RECEIVER</b>									
Signaling Speed			9.95/10.3/10.7/11.1					Gbps	
Sensitivity	Pin						-24	dBm	*3,*4,*6
Sensitivity after Transmission	Pin						-22	dBm	*3,*4,*6
Mean Input Power for OSNR			-17	-20			-8	dBm	
Required OSNR	OSNR	0.6nm filter					25	dB/0.1nm	*3,*4,*6
Required OSNR after Transmission	OSNR	0.6nm filter					27	dB/0.1nm	*3,*4,*6
Wavelength	Lp_rx		1530				1565	nm	
Rx Reflectance							-27	dB	
Rx_LOS assert	LOSa						-33	dBm	
Rx_LOS de-assert	LOSd						-30	dBm	

\*1: non-FEC rate refers 9.9/10.3Gbps, and FEC rate refers 10.7/11.1Gbps

\*2: 9.95328Gbps for ITU-T mask, and 10.3125Gbps for IEEE mask

\*3: BER of 1E-12 for non-FEC rate, and 1E-4 for FEC rate

\*4: Source type EML

\*5: Jitter generated of Tx side

\*6: with Rx decision threshold set to factory preset value for non-FEC rate and set to optimal value for FEC rate.

### Transmitter Eye Mask Definition

Compliant with ITU-T G.691 STM-64 mask.

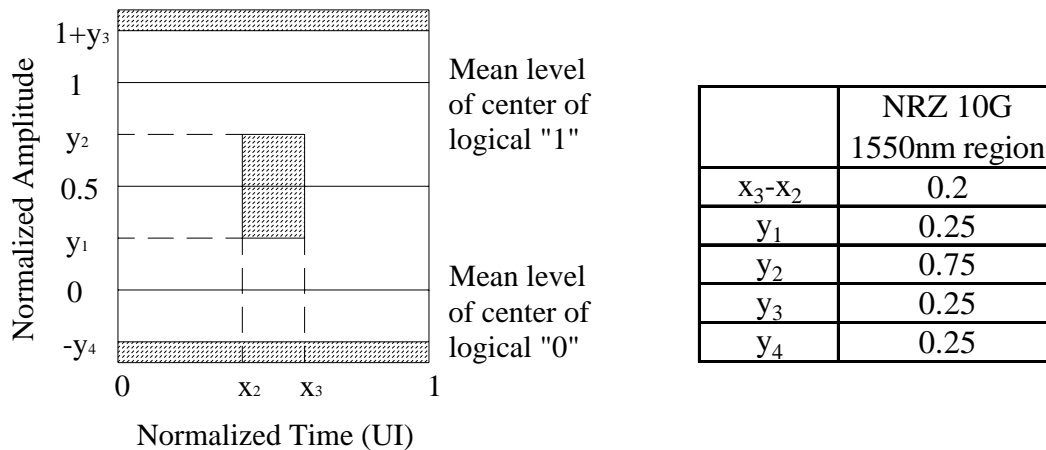
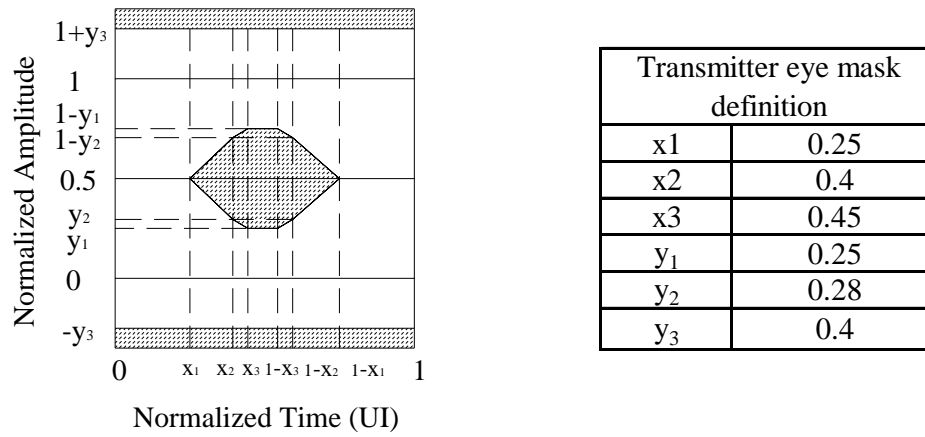


Fig. 1.1 Optical output eye mask (10Gbps)

Compliant with IEEE802.3ae Specifications.



**Fig. 1.2** Optical output eye mask (10Gbps)



Wavelength

Part Number	Frequency (THz)	Band	Min	Typ	Max	Unit	Note
SXP3102DA-F180	191.80	C-band	1562.9472	1563.0472	1563.1472	nm	
SXP3102DA-F190	191.90	C-band	1562.1327	1562.2327	1562.3327	nm	
SXP3102DA-F200	192.00	C-band	1561.3191	1561.4191	1561.5191	nm	
SXP3102DA-F210	192.10	C-band	1560.5062	1560.6062	1560.7062	nm	
SXP3102DA-F220	192.20	C-band	1559.6943	1559.7943	1559.8943	nm	
SXP3102DA-F230	192.30	C-band	1558.8831	1558.9831	1559.0831	nm	
SXP3102DA-F240	192.40	C-band	1558.0729	1558.1729	1558.2729	nm	
SXP3102DA-F250	192.50	C-band	1557.2634	1557.3634	1557.4634	nm	
SXP3102DA-F260	192.60	C-band	1556.4548	1556.5548	1556.6548	nm	
SXP3102DA-F270	192.70	C-band	1555.6471	1555.7471	1555.8471	nm	
SXP3102DA-F280	192.80	C-band	1554.8401	1554.9401	1555.0401	nm	
SXP3102DA-F290	192.90	C-band	1554.0340	1554.1340	1554.2340	nm	
SXP3102DA-F300	193.00	C-band	1553.2288	1553.3288	1553.4288	nm	
SXP3102DA-F310	193.10	C-band	1552.4244	1552.5244	1552.6244	nm	
SXP3102DA-F320	193.20	C-band	1551.6208	1551.7208	1551.8208	nm	
SXP3102DA-F330	193.30	C-band	1550.8180	1550.9180	1551.0180	nm	
SXP3102DA-F340	193.40	C-band	1550.0161	1550.1161	1550.2161	nm	
SXP3102DA-F350	193.50	C-band	1549.2150	1549.3150	1549.4150	nm	
SXP3102DA-F360	193.60	C-band	1548.4148	1548.5148	1548.6148	nm	
SXP3102DA-F370	193.70	C-band	1547.6153	1547.7153	1547.8153	nm	
SXP3102DA-F380	193.80	C-band	1546.8167	1546.9167	1547.0167	nm	
SXP3102DA-F390	193.90	C-band	1546.0189	1546.1189	1546.2189	nm	
SXP3102DA-F400	194.00	C-band	1545.2219	1545.3219	1545.4219	nm	
SXP3102DA-F410	194.10	C-band	1544.4258	1544.5258	1544.6258	nm	
SXP3102DA-F420	194.20	C-band	1543.6305	1543.7305	1543.8305	nm	
SXP3102DA-F430	194.30	C-band	1542.8360	1542.9360	1543.0360	nm	
SXP3102DA-F440	194.40	C-band	1542.0423	1542.1423	1542.2423	nm	
SXP3102DA-F450	194.50	C-band	1541.2494	1541.3494	1541.4494	nm	
SXP3102DA-F460	194.60	C-band	1540.4573	1540.5573	1540.6573	nm	
SXP3102DA-F470	194.70	C-band	1539.6661	1539.7661	1539.8661	nm	
SXP3102DA-F480	194.80	C-band	1538.8757	1538.9757	1539.0757	nm	
SXP3102DA-F490	194.90	C-band	1538.0860	1538.1860	1538.2860	nm	
SXP3102DA-F500	195.00	C-band	1537.2972	1537.3972	1537.4972	nm	
SXP3102DA-F510	195.10	C-band	1536.5092	1536.6092	1536.7092	nm	
SXP3102DA-F520	195.20	C-band	1535.7220	1535.8220	1535.9220	nm	
SXP3102DA-F530	195.30	C-band	1534.9356	1535.0356	1535.1356	nm	
SXP3102DA-F540	195.40	C-band	1534.1500	1534.2500	1534.3500	nm	
SXP3102DA-F550	195.50	C-band	1533.3653	1533.4653	1533.5653	nm	
SXP3102DA-F560	195.60	C-band	1532.5813	1532.6813	1532.7813	nm	
SXP3102DA-F570	195.70	C-band	1531.7981	1531.8981	1531.9981	nm	
SXP3102DA-F580	195.80	C-band	1531.0157	1531.1157	1531.2157	nm	
SXP3102DA-F590	195.90	C-band	1530.2341	1530.3341	1530.4341	nm	
SXP3102DA-F600	196.00	C-band	1529.4534	1529.5534	1529.6534	nm	

### 3.2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
<b>TRANSMITTER</b>							
Data Rate		NRZ		9.95/10.3/10.7/11.1		Gbps	
Input Single-ended Data Swing	V <sub>in</sub>		60		410	mV <sub>pp</sub>	
Input Differential Impedance	Z <sub>d</sub>			100		Ω	
<b>RECEIVER</b>							
Data Rate		NRZ		9.95/10.3/10.7/11.1		Gbps	
Output Single-ended Data Swing	V <sub>out</sub>		170		425	mV <sub>pp</sub>	
Rise/Fall Time	tr/tf	20% - 80%	24			psec	
<b>Low speed control and sense signals</b>							
XFP Interrupt, Mod_NR, RX_LOS	V <sub>OL</sub>		0		0.4	V	
	V <sub>OH</sub>		host_Vcc-0.5		host_Vcc+0.3	V	
XFP TX_Dis, P_Down/RST	V <sub>IL</sub>		-0.3		0.8	V	
	V <sub>IH</sub>		2.0		Vcc3+0.3	V	
XFP SCL and SDA	V <sub>OL</sub>		0		0.4	V	
	V <sub>OH</sub>		host_Vcc-0.5		host_Vcc+0.3	V	
XFP SCL and SDA	V <sub>IL</sub>		-0.3		Vcc3x0.3	V	
	V <sub>IH</sub>		Vcc3x0.7		Vcc3+0.5	V	
Leakage Current	I <sub>l</sub>		-10		10	μA	
Capacitance for XFP SCL and SDA I/O Pin	C <sub>i</sub>				14	pF	
Total bus capacitive load for SCL and for SDA	C <sub>b</sub>				100	pF	*1
					400	pF	*2
<b>DC AND POWER SUPPLY</b>							
Power Dissipation	P	Stable operation			3.5	W	
	P	P_Down mode			1.5	W	
Supply Voltage	Vcc5		4.75	5	5.25	V	
	Vcc3		3.13	3.3	3.47	V	
Supply Current	Icc5	Include inrush			500	mA	
	Icc3	Include inrush			750	mA	

\*1: At 400 kHz, 3.0 kohms Rpullup, max.

\*2: At 400 kHz, 0.8 kohms Rpullup, max.

#### Optional Functions

Feature	Behavior	Note
Lineside Loopback	NA	
XFI Loopback	Implemented	
Signal conditioner control	NA	*1
Optional variable power supply control	NA	
Soft Tx Disable	Implemented	
Soft P_Down	Implemented	
Soft_TX_Dither	NA	
Active FEC control	Implemented	
Auxiliary Monitoring 1	NA	
Auxiliary Monitoring 2	NA	

\*1: Optional synchronous REFCLK mode



Timing Requirements of Control and Status I/O

Parameter	Symbol	Min	Max	Unit	Condition	Note
TX Disable Assert Time	t_off		10	μsec	rising edge of TX_DIS to fall of output signal below 10% of nominal	
TX Disable Negate Time (cold-start)			120	sec	Falling edge of TX_DIS to rise of output signal above 90% of nominal	*1
TX Disable Negate Time (warm-start)	t_on		20	sec	Falling edge of TX_DIS to rise of output signal above 90% of nominal	*2
Time to initialize	t_init		300	msec	From power on or hot plug after supply power on host or from falling edge of P_Down/RST.	
Interrupt assert delay	Interrupt_on		200	msec	From occurrence of the condition triggering Interrupt	
Interrupt negate delay	Interrupt_off		500	μsec	From clear on read Interrupt flags	
P_Down/RST assert delay	P_Down/RST_on		100	μsec	From Power down initiation	
Mod_NR assert delay	Mod_nr_on		1	msec	From Occurrence of fault to assertion of MOD NR	
Mod_NR negate delay	Mod_nr_off		1	msec	From clearance of signal to negation of MOD NR	
P-Down reset time		10		μsec	Min length of P-Down assert to initiate	
RX_LOS assert delay	t_loss_on		100	μsec	From Occurrence of loss of signal to assertion of RX LOS	
RX_LOS negate delay	t_loss_off		100	μsec	From Occurrence of presence of signal to negation of RX LOS	

\*1: Cold-start time is the time for the module to reach its steady state operating condition after a power-up.

\*2: The warm-start time is measured from when the Tx\_DISABLE is negated on the module.



### 3.3. MANAGEMENT INTERFACE

Each module has unique data in hatching area.

#### A0h

Address	Size	Name of field	Description of Field	R/W	Hex	NOTE	
Lower Memory Map							
0	00	1	Identifier	XFP	R	06	
1	01	1			R,R/W	00	
2	02	2	Temp High Alarm	(+80degC)	R	50	80
3	03			Units defined in MSA (1/256deg.C).	R	00	
4	04	2	Temp Low Alarm	(-10degC)	R	F6	-10
5	05				R	00	
6	06	2	Temp High Warning	(+78degC)	R	4E	78
7	07				R	00	
8	08	2	Temp Low Warning	(-8degC)	R	F8	-8
9	09				R	00	
10	0A	8	Reserved A/D Flag Thresholds	Reserved A/D Flag Thresholds	R	00	
11	0B				R	00	
12	0C				R	00	
13	0D				R	00	
14	0E				R	00	
15	0F				R	00	
16	10				R	00	
17	11				R	00	
18	12	2	Bias High Alarm	(131mA)	R	FF	131
19	13			Units defined in MSA (2uA)	R	DC	
20	14	2	Bias Low Alarm	(1mA)	R	01	1
21	15				R	F4	
22	16	2	Bias High Warning	(78mA)	R	98	78
23	17				R	58	
24	18	2	Bias Low Warning	(18mA)	R	23	18
25	19				R	28	
26	1A	2	TX Power High Alarm	(+7.0dBm)	R	C3	7.00
27	1B			Units defined in MSA (0.1uW)	R	C6	
28	1C	2	TX Power Low Alarm	(-4.0dBm)	R	0F	-4.00
29	1D				R	8D	
30	1E	2	TX Power High Warning	(+5.0dBm)	R	7B	5.00
31	1F				R	86	
32	20	2	TX Power Low Warning	(-2.0dBm)	R	18	-2.00
33	21				R	A5	
34	22	2	RX Power High Alarm	(-5.0dBm)	R	0C	-5.00
35	23			Units defined in MSA (0.1uW)	R	5A	
36	24	2	RX Power Low Alarm	(-27.0dBm)	R	00	-27.21
37	25				R	13	
38	26	2	RX Power High Warning	(-7.0dBm)	R	07	-7.00
39	27				R	CB	
40	28	2	RX Power Low Warning	(-25.0dBm)	R	00	-25.09
41	29				R	1F	
42	2A	2	AUX 1 High Alarm	(not supported)	R	00	
43	2B				R	00	
44	2C	2	AUX 1 Low Alarm	(not supported)	R	00	
45	2D				R	00	
46	2E	2	AUX 1 High Warning	(not supported)	R	00	
47	2F				R	00	
48	30	2	AUX 1 Low Warning	(not supported)	R	00	
49	31				R	00	
50	32	2	AUX 2 High Alarm	(not supported)	R	00	
51	33				R	00	
52	34	2	AUX 2 Low Alarm	(not supported)	R	00	
53	35				R	00	
54	36	2	AUX 2 High Warning	(not supported)	R	00	
55	37				R	00	
56	38	2	AUX 2 Low Warning	(not supported)	R	00	
57	39				R	00	
58	3A	2	VPS Fields	(not supported)	R	00	
59	3B				R	00	



A0h (continued)

60	3C	10	Reserved	(reserved)	R	00	
61	3D				R	00	
62	3E				R	00	
63	3F				R	00	
64	40				R	00	
65	41				R	00	
66	42				R	00	
67	43				R	00	
68	44				R	00	
69	45				R	00	
70	46	1	Acceptable BER	(not supported)	R	00	
71	47	1	Actual BER	(not supported)	R	00	
72	48	2	Wavelength Set MSB	(not supported)	R	00	
73	49				R	00	
74	4A	2	Wavelength Error LSB	(not supported)	R	00	
75	4B				R	00	
76	4C		Amplitude Adjustment	(not supported)	R	00	
77	4D		Phase Adjustment	(not supported)	R	00	
78	4E		Reserved	(not supported)	R	00	
79	4F				R	00	
80	50	8	Latched Interrupt Flag Fields	Latched on flag condition. Cleared on host read	R		
81	51				R		
82	52				R		
83	53				R		
84	54				R		
85	55				R		
86	56				R		
87	57				R		
88	58	8	Interrupt Masking Bits	Set and readable by host. Cleared at power up or reset	R/W	00	
89	59				R/W	00	
90	5A				R/W	00	
91	5B				R/W	00	
92	5C				R/W	00	
93	5D				R/W	00	
94	5E				R/W	00	
95	5F				R/W	00	
96	60	2	Temperature	Temperature value in units defined in MSA (1/256deg.C).	R		
97	61				R		
98	62	2	Reserved	(reserved)	R	00	
99	63				R	00	
100	64	2	TX Bias	Tx bias value in units defined in MSA (2uA)	R		
101	65				R		
102	66	2	TX Power	Tx power value in units defined in MSA (0.1uW)	R		
103	67				R		
104	68	2	RX Power	Rx power value in units defined in MSA (0.1uW)	R		
105	69				R		
106	6A	2	AUX 1	(not supported)	R		
107	6B				R		
108	6C	2	AUX 2	(not supported)	R		
109	6D				R		
110	6E	2	State	TX DIS/MOD_NR/P_Down/Interrupt etc	R,R/W		
111	6F			TX_NR/TX_Fault/TX_CDR etc	R		
112	70	6	Reserved	(reserved)	R	00	
113	71				R	00	
114	72				R	00	
115	73				R	00	
116	74				R	00	
117	75				R	00	
118	76	1	Packet Error Checking	01h =Enable Packet Error Checking	R/W	00	
119	77	4	New Password Entry	Location of Entry of New Optional Password	W		
120	78				W		
121	79				W		
122	7A				W		
123	7B	4	Password Entry	Location for Entry of Optional Password	W		
124	7C				W		
125	7D				W		
126	7E				W		
127	7F	1	Table Select	Entry Location for Table Select Byte	W		

Table 01h

Address	Size	Name of field	Description of Field	R/W	Hex	NOTE
<b>Serial ID Data Fields</b>						
128	80	1	Identifier	XFP	R	06
129	81	1	Ext.Identifier	3.5W, w_CDR, wo_Refclk, wo_CLEI	R	90
130	82	1	Connector	LC Connector	R	07
131	83	8	Transceiver codes	10GbE: not supported	R	00
132	84			10G FC: not supported	R	00
133	85			10G Copper: not supported	R	00
134	86			Lower Speed: not supported	R	00
135	87			SONET (SR): not supported	R	00
136	88			SONET (IR): not supported	R	00
137	89			SONET (LR): not supported	R	00
138	8A			SONET (VLR): not supported	R	00
139	8B	1	Encoding	SONET Scrambled, NRZ	R	30
140	8C	1	BR-Min	9.9Gb/s	R	63 9.9
141	8D	1	BR-Max	11.1Gbps	R	6F 11.1
142	8E	1	Length(SMF)-km	80km	R	50 80
143	8F	1	Length (E-50 μm)		R	00
144	90	1	Length (50 μm)		R	00
145	91	1	Length (62.5 μm)		R	00
146	92	1	Length (Copper)		R	00
147	93	1	Device Technology	1550nm cooled EML, APD	R	76
148	94	16	Vendor name (ASCII code)		R	53 S
149	95			R	75 u	
150	96			R	6D m	
151	97			R	69 i	
152	98			R	74 t	
153	99			R	6F o	
154	9A			R	6D m	
155	9B			R	6F o	
156	9C			R	45 E	
157	9D			R	6C l	
158	9E			R	65 e	
159	9F			R	63 c	
160	A0			R	74 t	
161	A1			R	72 r	
162	A2			R	69 i	
163	A3			R	63 c	
164	A4	1	CDR Support	11.1Gbps, XFI Loopback	R	F9
165	A5	3	Vendor OUI	IEEE Company Identifier of SEI	R	00
166	A6				R	00
167	A7				R	5F
168	A8	16	Vendor PN (ASCII code)	(e.g. SXP3102DA-F220)	R	53 S
169	A9				R	58 X
170	AA				R	50 P
171	AB				R	33 3
172	AC				R	31 1
173	AD				R	30 0
174	AE				R	32 2
175	AF				R	44 D
176	B0				R	41 A
177	B1				R	2D -
178	B2				R	46 F
179	B3				R	32 2
180	B4				R	32 2
181	B5				R	30 0
182	B6				R	20
183	B7				R	20
184	B8	2	Vendor rev (ASCII code)	(revision of datasheet)	R	41 A
185	B9				R	30 0
186	BA	2	Wavelength	(1559.794nm)	R	79 1559.8
187	BB				R	DB Units defined in MSA (0.05nm)
188	BC	2	Wavelength Tolerance	(0.1nm)	R	00 0.1
189	BD				R	14 Units defined in MSA (0.005nm)
190	BE	1	Max Case Temp	(+75degC)	R	4B 75
191	BF	1	CC BASE	CC for the base ID fields (128-190)	R	
192	C0	4	Power Supply	Units defined in MSA (20mW)	R	AF 3.5
193	C1			Units defined in MSA (10mW)	R	96 1.5
194	C2			Maximum current	R	A7
195	C3				R	00



Table 01h (continued)

196	C4	16	Vendor SN (ASCII code)	(e.g. RZ9015)	R	52	R
197	C5				R	5A	Z
198	C6				R	39	9
199	C7				R	30	0
200	C8				R	31	1
201	C9				R	35	5
202	CA				R	20	
203	CB				R	20	
204	CC				R	20	
205	CD				R	20	
206	CE				R	20	
207	CF	R	20				
208	D0	R	20				
209	D1	R	20				
210	D2	R	20				
211	D3	R	20				
212	D4	8	Date code (ASCII code)	two low order digits of year. (00 =2000)	R	30	0
213	D5			R	39	9	
214	D6			date code -month (01 -12)	R	31	1
215	D7			R	32	2	
216	D8			date code-day (01 -31)	R	31	1
217	D9			R	35	5	
218	DA	vendor specific lot code (ASCII)	R	30	0		
219	DB	R	31	1			
220	DC	1	Diagnostic Monitoring Typ	Average Power	R	08	
221	DD	1	Enhanced Options	Soft_Tx_Dis,Soft_P_Down,Active_FEC	R	64	
222	DE	1	Aux Monitoring	(not supported)	R	00	
223	DF	1	CC_EXT	CC for the extended ID fields (192-222)	R		
224	E0	32	Vendor Specific	Vendor Specific ID Field	R	00	
225	E1				R	00	
226	E2				R	00	
227	E3				R	00	
228	E4				R	00	
229	E5				R	00	
230	E6				R	00	
231	E7				R	00	
232	E8				R	00	
233	E9				R	00	
234	EA				R	00	
235	EB				R	00	
236	EC				R	00	
237	ED				R	00	
238	EE				R	00	
239	EF				R	00	
240	F0				R	00	
241	F1				R	00	
242	F2				R	00	
243	F3				R	00	
244	F4				R	00	
245	F5	R	00				
246	F6	R	00				
247	F7	R	00				
248	F8	R	00				
249	F9	R	00				
250	FA	R	00				
251	FB	R	00				
252	FC	R	00				
253	FD	R	00				
254	FE	R	00				
255	FF	R	00				

See Wavelength Data Fields table regarding bytes 168-183 and bytes 186-187



Table 02h

Address	Size	Name of field	Description of Field	R/W	Hex	NOTE
User EEPROM Data						
128	80	128	User EEPROM Data	User EEPROM Data	R	00
129	81				R	00
130	82				R	00
131	83				R	00
132	84				R	00
133	85				R	00
134	86				R	00
135	87				R	00
136	88				R	00
137	89				R	00
138	8A				R	00
139	8B				R	00
140	8C				R	00
141	8D				R	00
142	8E				R	00
143	8F				R	00
144	90				R	00
145	91				R	00
146	92				R	00
147	93				R	00
148	94				R	00
149	95				R	00
150	96				R	00
151	97				R	00
152	98				R	00
153	99				R	00
154	9A				R	00
155	9B				R	00
156	9C				R	00
157	9D				R	00
158	9E				R	00
159	9F				R	00
160	A0				R	00
161	A1				R	00
162	A2				R	00
163	A3				R	00
164	A4				R	00
165	A5				R	00
166	A6				R	00
167	A7				R	00
168	A8				R	00
169	A9				R	00
170	AA				R	00
171	AB				R	00
172	AC				R	00
173	AD				R	00
174	AE				R	00
175	AF				R	00
176	B0				R	00
177	B1				R	00
178	B2				R	00
179	B3				R	00
180	B4				R	00
181	B5				R	00
182	B6				R	00
183	B7				R	00
184	B8				R	00
185	B9				R	00
186	BA				R	00
187	BB				R	00
188	BC				R	00
189	BD				R	00
190	BE				R	00

Table 02h (continued)

191	BF	(128)	(User EEPROM Data)	(User EEPROM Data)	R	00
192	C0				R	00
193	C1				R	00
194	C2				R	00
195	C3				R	00
196	C4				R	00
197	C5				R	00
198	C6				R	00
199	C7				R	00
200	C8				R	00
201	C9				R	00
202	CA				R	00
203	CB				R	00
204	CC				R	00
205	CD				R	00
206	CE				R	00
207	CF				R	00
208	D0				R	00
209	D1				R	00
210	D2				R	00
211	D3				R	00
212	D4				R	00
213	D5				R	00
214	D6				R	00
215	D7				R	00
216	D8				R	00
217	D9				R	00
218	DA				R	00
219	DB				R	00
220	DC				R	00
221	DD				R	00
222	DE				R	00
223	DF				R	00
224	E0				R	00
225	E1				R	00
226	E2				R	00
227	E3				R	00
228	E4				R	00
229	E5				R	00
230	E6				R	00
231	E7				R	00
232	E8				R	00
233	E9				R	00
234	EA				R	00
235	EB				R	00
236	EC				R	00
237	ED				R	00
238	EE				R	00
239	EF				R	00
240	F0				R	00
241	F1				R	00
242	F2				R	00
243	F3				R	00
244	F4				R	00
245	F5				R	00
246	F6				R	00
247	F7				R	00
248	F8				R	00
249	F9				R	00
250	FA				R	00
251	FB				R	00
252	FC				R	00
253	FD				R	00
254	FE				R	00
255	FF				R	00

All address of this table 02h is write enabled with valid password entry



Wavelength Data Fields

Bytes 168-183 and bytes 186-187 data correspond to part number and nominal transmitter wavelength of each parts, respectively. Different data set are stored in the fields as follows, when different wavelength grid is selected.

Address	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	
Talbe 01h	F180		F190		F200		F210		F220		F230		F240		F250		
168	A8	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S
169	A9	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X
170	AA	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P
171	AB	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3
172	AC	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1
173	AD	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
174	AE	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2
175	AF	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D
176	B0	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A
177	B1	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-
178	B2	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F
179	B3	31	1	31	1	32	2	32	2	32	2	32	2	32	2	32	2
180	B4	38	8	39	9	30	0	31	1	32	2	33	3	34	4	35	5
181	B5	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
182	B6	20		20		20		20		20		20		20		20	
183	B7	20		20		20		20		20		20		20		20	
186	BA	7A	1563.0	7A	1562.2	79	1561.4	79	1560.6	79	1559.8	79	1559.0	79	1558.2	79	1557.4
187	BB	1C		0C		FC		EC		DB		CB		BB		AB	

Address	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	
Talbe 01h	F260		F270		F280		F290		F300		F310		F320		F330		F340		
168	A8	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S
169	A9	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X
170	AA	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P
171	AB	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3
172	AC	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1
173	AD	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
174	AE	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2
175	AF	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D
176	B0	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A
177	B1	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-
178	B2	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F
179	B3	32	2	32	2	32	2	32	2	33	3	33	3	33	3	33	3	33	3
180	B4	36	6	37	7	38	8	39	9	30	0	31	1	32	2	33	3	34	4
181	B5	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
182	B6	20		20		20		20		20		20		20		20		20	
183	B7	20		20		20		20		20		20		20		20		20	
186	BA	79	1556.6	79	1555.7	79	1554.9	79	1554.1	79	1553.3	79	1552.5	79	1551.7	79	1550.9	79	1550.1
187	BB	9B		8A		7A		6A		5A		4A		3A		2A		1A	



Wavelength Data Fields (continued)

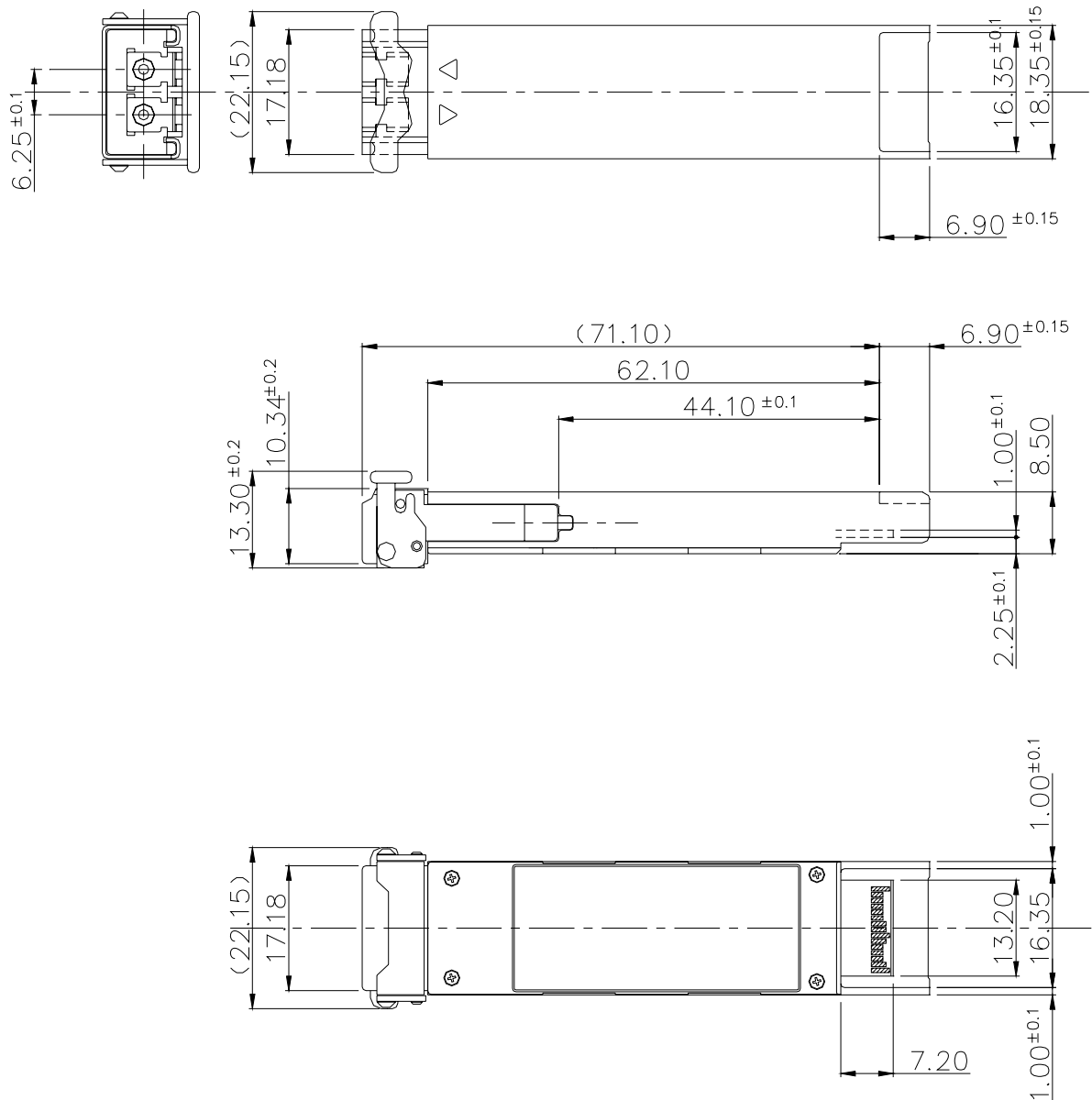
Address	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	
Talbe 01h	F350		F360		F370		F380		F390		F400		F410		F420		F430		
168	A8	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S
169	A9	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X
170	AA	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P
171	AB	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3
172	AC	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1
173	AD	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
174	AE	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2
175	AF	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D
176	B0	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A
177	B1	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-
178	B2	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F
179	B3	33	3	33	3	33	3	33	3	33	3	34	4	34	4	34	4	34	4
180	B4	35	5	36	6	37	7	38	8	39	9	30	0	31	1	32	2	33	3
181	B5	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
182	B6	20		20		20		20		20		20		20		20		20	
183	B7	20		20		20		20		20		20		20		20		20	
186	BA	79	1549.3	78	1548.5	78	1547.7	78	1546.9	78	1546.1	78	1545.3	78	1544.5	78	1543.7	78	1542.9
187	BB	0A		FA		EA		DA		CA		BA		AA		9A		8A	

Address	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	
Talbe 01h	F440		F450		F460		F470		F480		F490		F500		F510		F520		
168	A8	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S	53	S
169	A9	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X	58	X
170	AA	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P	50	P
171	AB	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3	33	3
172	AC	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1	31	1
173	AD	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
174	AE	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2	32	2
175	AF	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D	44	D
176	B0	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A	41	A
177	B1	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-
178	B2	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F	46	F
179	B3	34	4	34	4	34	4	34	4	34	4	34	4	35	5	35	5	35	5
180	B4	34	4	35	5	36	6	37	7	38	8	39	9	30	0	31	1	32	2
181	B5	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0	30	0
182	B6	20		20		20		20		20		20		20		20		20	
183	B7	20		20		20		20		20		20		20		20		20	
186	BA	78	1542.1	78	1541.3	78	1540.6	78	1539.8	78	1539.0	78	1538.2	78	1537.4	78	1536.6	77	1535.8
187	BB	7A		6A		5B		4B		3B		2B		1B		0C		FC	

Address	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE			
Talbe 01h	F530		F540		F550		F560		F570		F580		F590		F600		
168	A8	53	S	53	S	53	S	53	S	53	S	53	S	53	S		
169	A9	58	X	58	X	58	X	58	X	58	X	58	X	58	X		
170	AA	50	P	50	P	50	P	50	P	50	P	50	P	50	P		
171	AB	33	3	33	3	33	3	33	3	33	3	33	3	33	3		
172	AC	31	1	31	1	31	1	31	1	31	1	31	1	31	1		
173	AD	30	0	30	0	30	0	30	0	30	0	30	0	30	0		
174	AE	32	2	32	2	32	2	32	2	32	2	32	2	32	2		
175	AF	44	D	44	D	44	D	44	D	44	D	44	D	44	D		
176	B0	41	A	41	A	41	A	41	A	41	A	41	A	41	A		
177	B1	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-	2D	-		
178	B2	46	F	46	F	46	F	46	F	46	F	46	F	46	F		
179	B3	35	5	35	5	35	5	35	5	35	5	35	5	36	6		
180	B4	33	3	34	4	35	5	36	6	37	7	38	8	39	9		
181	B5	30	0	30	0	30	0	30	0	30	0	30	0	30	0		
182	B6	20		20		20		20		20		20		20			
183	B7	20		20		20		20		20		20		20			
186	BA	77	1535.0	77	1534.3	77	1533.5	77	1532.7	77	1531.9	77	1531.1	77	1530.3		
187	BB	EC		DD		CD		BD		AD		9E		8E		7F	1529.6

#### 4. MECHANICAL DESCRIPTION

XFP MSA compliant. Color coding is "White" and indicated at latch portion.



**Fig. 2.1** Mechanical drawing of XFP



### Laser Emission

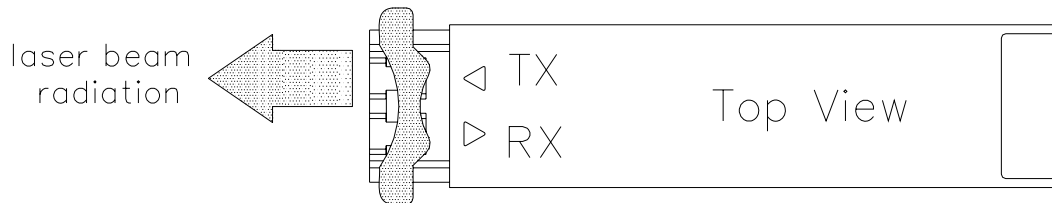


Fig. 2.2 Aperture and direction of laser beam radiation

## 5. PIN FUNCTION

Pin	Symbol	I/O	Use	Logic	Note
1	GND	-	Module Ground	NA	*1
2	VEE5	-	Optional -5.2V Power Supply	NA	*2
3	Mod_Dessel	I	Module De-select	LVTTTL	*3
4	Interrupt	O	Interrupt	LVTTTL	*4,*5
5	TX_DIS	I	Transmitter Disable	NA	
6	VCC5	-	+5V Power Supply	NA	
7	GND	-	Module Ground	NA	*1
8	VCC3	-	+3.3V Power Supply	NA	
9	VCC3	-	+3.3V Power Supply	NA	
10	SCL	I/O	2-Wire Serial Interface Clock	LVTTTL	*5
11	SDA	I/O	2-Wire Serial Interface Data Line	LVTTTL	*5
12	Mod_Abs	O	Indicates Module is not present. Grounded in the Module	LVTTTL	*5
13	Mod_NR	O	Module Not Ready; Indicating Module Operational Fault	LVTTTL	*5
14	RX_LOS	O	Receiver Loss Of Signal Indicator	LVTTTL	*5
15	GND	-	Module Ground	NA	*1
16	GND	-	Module Ground	NA	*1
17	RD-	O	Receiver Inverted Data Output	CML	
18	RD+	O	Receiver Non-Inverted Data Output	CML	
19	GND	-	Module Ground	NA	*1
20	VCC2	-	+1.8V Power Supply	NA	*2
21	P_DOWN/RST	I	Power down / Reset	LVTTTL	*6,*7
22	VCC2	-	+1.8V Power Supply	NA	*2
23	GND	-	Module Ground	NA	*1
24	RefCLK+	I	Reference Clock Non-Inverted Input, AC coupled on the host board	PECL	*8
25	RefCLK-	I	Reference Clock Inverted Input, AC coupled on the host board	PECL	*8
26	GND	-	Module Ground	NA	*1
27	GND	-	Module Ground	NA	*1
28	TD-	I	Transmitter Inverted Data Input	CML	
29	TD+	I	Transmitter Non-Inverted Data Input	CML	
30	GND	-	Module Ground	NA	*1

\*1: Module ground pins Gnd are isolated from the module case and chassis ground within the module.

\*2: Not used (internally left open)

\*3: Module De-select; When held low allows module to respond to 2-wire serial interface.

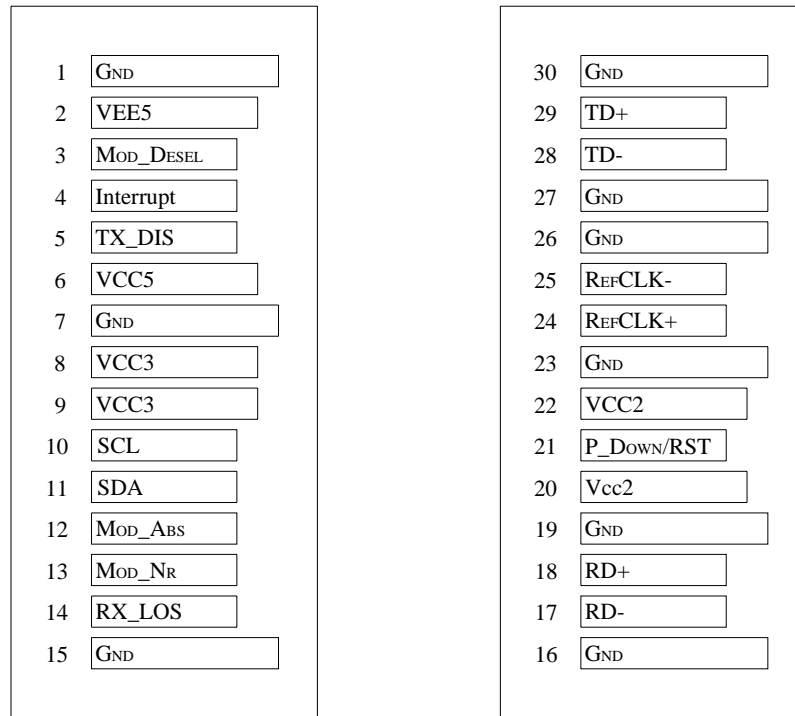
\*4: Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface.

\*5: Shall be pulled up with 4.7K-10Kohms to a voltage between 3.15V and 3.45V on the host board.

\*6: Power down; When high, requires the module to limit power consumption to 1.5W or below. 2-Wire serial interface must be functional in the low power mode.

\*7: Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.

\*8: Not used. Differential input impedance is 100Ω typ.

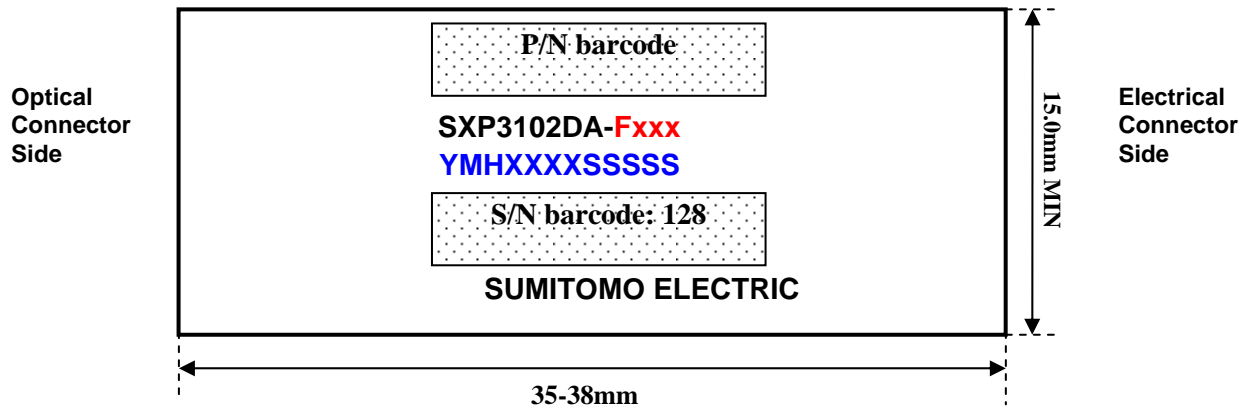


Bottom of Board  
(As view through top of board)

Top of Board

**Fig. 3** XFP Transceiver Electrical Pad Layout

## 6. LABEL



P/N: -Fxxx= -F180, -F190... through -F600

S/N: YMHXXXSSSSS is vendor specific

All logo, text, barcode and marking are printed in black

Example of standard XFP label layout



## 7. PACKING

Up to 5pcs transceivers shall be packed in a single box. Outer dimension of the box is 200 x 165 x 40mm (L x W x H). Fiber optic endcaps are individually installed on each transceivers.

## 8. REFERENCES

- 10 Gigabit Small Form Factor Pluggable (XFP) Transceiver Multi Source Agreement (MSA), April 2005
- ITU-T G.698.2 and Telcordia GR-253 Specifications
- IEEE802.3ae Specifications



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## 9. HANDLING PRECAUTIONS

- The product is ESD sensitive device. Open and handle in a static-free environment only.
- The product is designed to be Class 1 and Class I laser compliant per IEC60825-1 and FDA/CDRH 21 CFR 1040 respectively. Do not look at laser beam direct exposure or its reflection while laser is on.
- Housing of the product during operation may be thermally hot and could cause personal injury.
- Clean connector endface of optical cable adequately before you make a connection.
- The product is unable to be aqueous washed. Do not wash the product in water, and not use this product near a wash bowl, sink or laundry, or in a wet place.

## 10. CHANGE NOTES FOR SPECIFICATION

<b>Date</b>	<b>Rev.</b>	<b>Remarks</b>
February 10, 2010	A01	Initial (created from SXP3102DA-M-Fxxx, rev A02).

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