10Gb/s XFP Optical Transceiver Module

SXP3102CP-xx

(CWDM 40km, 1471 to 1611nm EML, PIN-PD)

1. INTRODUCTION

This document is a specification for a single channel XFP MSA transceiver module. 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 CWDM-SH applications
- Up to 40km link distance
- 1550nm range laser transmitter with automatic output power control
- InGaAs-PIN photo-detector receiver
- LC-duplex receptacle optical connector
- +3.3V and +5.0V power supply
- Commercial operating temperature range 0 to +70ºC
- No reference clock required
- Built-in EEPROM with digital diagnostic monitoring function
- Hot pluggable XFP compatible footprint

Notice: This document has been created by Sumitomo Electric Industories, Ltd. (SEI). SEI reserves the rights to at any time to add, amend, or withdraw statements contained herein.

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	ºC	
Storage Humidity	Hst	continuous	5	85	%	*1
Storage Humidity	Hst	short-term	5	95	%	*2
Operating Case Temperature	Tcase		-5	+75	ºC	*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	ºC	
Operating Case Temperature	Tcase	short-term	-5	+75	ºC	*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.

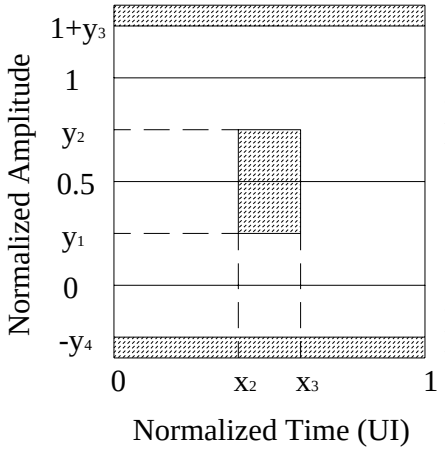
3.1. OPTICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min (*1)		Typ	Max (*1)		Unit	Note
			non-FEC rate	FEC rate		non-FEC rate	FEC rate		
TRANSMITTER									
Signaling Speed			9.95/10.3/10.5/10.7/11.1					Gbps	
Output Average Power	Pout	S-band, C-band	+1			+4		dBm	
		L-band	+0.5			+3.5		dBm	*6
Wavelength	Lc_tx		See wavelength table					nm	
Spectral Width	dLc					1		nm	
Dynamic Extinction Ratio	EX		8.2					dB	
Eye Mask Margin	MM		10					%	*2
OPTICAL PATH									
Attenuation		S-band, C-band	6	6		15	18	dB	*5
		L-band	5.5	5.5		13.5	16.5	dB	*5
Chromatic Dispersion	D_{LR}		0			(800)		ps/nm	*4
RECEIVER									
Signaling Speed			9.95/10.3/10.5/10.7/11.1					Gbps	
Sensitivity	Pin	S-band, C-band				-16	-19	dBm	*3,*7
		L-band				-15	-18	dBm	*3,*6,*7
Overload	Pol		-2					dBm	*3
Wavelength	Lc_rx		1460			1620		nm	
Optical Path Penalty	Pd_rx					2		dB	
Rx_LOS assert	LOSa					-25		dBm	
Rx_LOS de-assert	LOSd					-22		dBm	

*1: non-FEC rate refers 9.9/10.3/10.5Gbps, and FEC rate refers 10.7/11.1Gbps
*2: 9.95328Gbps for ITU-T mask, and 10.3125Gbps for IEEE mask
*3: BER of 1x10E-12 for non-FEC rate, and 1x10E-4 for FEC rate
*4: Measured after 40km transmission to represents 800ps/nm at 1611nm
*5: Includes all physical loss for optical fiber, OM (optical multiplexer) and OD (optical demultiplexer) etc
*6: Provisional value
*7: Source type EML

Transmitter Eye Mask Definition

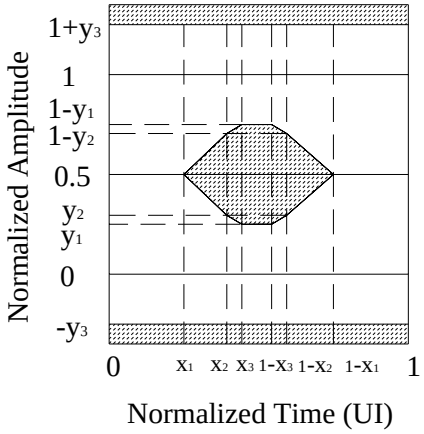
Compliant with ITU-T G.691 STM-64 mask.



	NRZ 10G 1550nm region
x_3-x_2	0.2
y_1	0.25
y_2	0.75
y_3	0.25
y_4	0.25

Fig. 1.1 Optical output eye mask (10Gbps)

Compliant with IEEE802.3ae Specifications.



Transmitter eye mask definition	
x1	0.25
x2	0.4
x3	0.45
y_1	0.25
y_2	0.28
y_3	0.4

Fig. 1.2 Optical output eye mask (10Gbps)

Wavelength

Part Number	Condition	Band	Min	Typ	Max	Unit	Note
SXP3102CP-47		S-band	(1464.5)	1471	(1477.5)	nm	
SXP3102CP-49		S-band	(1484.5)	1491	(1497.5)	nm	
SXP3102CP-51		S-band	(1504.5)	1511	(1517.5)	nm	
SXP3102CP-53		C-band	(1524.5)	1531	(1537.5)	nm	
SXP3102CP-55		C-band	(1544.5)	1551	(1557.5)	nm	
SXP3102CP-57		L-band	(1564.5)	1571	(1577.5)	nm	*1
SXP3102CP-59		L-band	(1584.5)	1591	(1597.5)	nm	
SXP3102CP-61		L-band	(1604.5)	1611	(1617.5)	nm	

*1: Optical and electrical specification for S-band and C-band shall be applied to this wavelength grid.

3.2. ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min	Typ	Max	Unit	Note
TRANSMITTER							
Data Rate		NRZ		9.95/10.3/10.5/10.7/11.1		Gbps	
Input Single-ended Data Swing	Vin		60		410	mVpp	
Input Differential Impedance	Z_d			100		Ω	
RECEIVER							
Data Rate		NRZ		9.95/10.3/10.5/10.7/11.1		Gbps	
Output Single-ended Data Swing	Vout		170		425	mVpp	
Rise/Fall Time	tr/tf	20% - 80%	24			psec	
Low speed control and sense signals							
XFP Interrupt,Mod_NR,RX_LOS	V_{OL}		0		0.4	V	
	V_{OH}		host_Vcc-0.5		host_Vcc+0.3	V	
XFP TX_Dis, P_Down/RST	V_{IL}		-0.3		0.8	V	
	V_{IH}		2.0		Vcc3+0.3	V	
XFP SCL and SDA	V_{OL}		0		0.4	V	
	V_{OH}		host_Vcc-0.5		host_Vcc+0.3	V	
XFP SCL and SDA	V_{IL}		-0.3		Vcc3x0.3	V	
	V_{IH}		Vcc3x0.7		Vcc3+0.5	V	
Leakage Current	I_I		-10		10	μA	
Capacitance for XFP SCL and SDA I/O Pin	C_i				14	pF	
Total bus capacitive load for SCL and for SDA	C_b				100	pF	*1
					400	pF	*2
DC AND POWER SUPPLY							
Power Dissipation	P				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				500	mA	
	Icc3				750	mA	

*1: At 400 kHz, 3.0 kohms Rpullup, max.
*2: At 400 kHz, 0.8 kohms Rpullup, max.

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	t_on		2	msec	Falling edge of TX_DIS to rise of output signal above 90% of nominal	
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.	
$\overline{\text{Interrupt}}$ assert delay	$\overline{\text{Interrupt}}$_on		200	msec	From occurrence of the condition triggering Interrupt	
$\overline{\text{Interrupt}}$ negate delay	$\overline{\text{Interrupt}}$_off		500	µsec	From clear on read $\overline{\text{Interrupt}}$ 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 reset	
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	

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	Reserved A/D Flag Thresholds	R	00	
11	0B		Flag Thresholds		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	(-2.0dBm)	R	18	-2.00
29	1D				R	A5	
30	1E	2	TX Power High Warning	(+5.0dBm)	R	7B	5.00
31	1F				R	86	
32	20	2	TX Power Low Warning	(+0.0dBm)	R	27	0.00
33	21				R	10	
34	22	2	RX Power High Alarm	(+1.0dBm)	R	31	1.00
35	23			Units defined in MSA (0.1uW)	R	2D	
36	24	2	RX Power Low Alarm	(-18.0dBm)	R	00	-18.01
37	25				R	9E	
38	26	2	RX Power High Warning	(-1.0dBm)	R	1F	-1.00
39	27				R	07	
40	28	2	RX Power Low Warning	(-16.0dBm)	R	00	-16.00
41	29				R	FB	
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	Latched on flag condition.	R		
81	51		Flag Fields	Cleared on host read	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.	R/W	00	
89	59			Cleared at power up or reset	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	R		
97	61			defined in MSA (1/256deg.C).	R		
98	62	2	Reserved	(reserved)	R	00	
99	63				R	00	
100	64	2	TX Bias	Tx bias value in units	R		
101	65			defined in MSA (2uA)	R		
102	66	2	TX Power	Tx power value in units	R		
103	67			defined in MSA (0.1uW)	R		
104	68	2	RX Power	Rx power value in units	R		
105	69			defined in MSA (0.1uW)	R		
106	6A	2	AUX 1	(not supported)	R	00	
107	6B				R	00	
108	6C	2	AUX 2	(not supported)	R	00	
109	6D				R	00	
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	W		
120	78			New Optional Password	W		
121	79				W		
122	7A				W		
123	7B	4	Password Entry	Location for Entry of	W		
124	7C			Optional Password	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
Serial ID Data Fields							
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		R	B0	
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	40km	R	28	40
143	8F	1	Length (E-50 µm)		R	00	
144	90	1	Length (50 µ m)		R	00	
145	91	1	Length (62.5 µ m)		R	00	
146	92	1	Length (Copper)		R	00	
147	93	1	Device Technology	1550nm cooled EML, PIN	R	74	
148	94	16	Vendor name		R	53	S
149	95		(ASCII code)		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	(e.g. SXP3102CP-57)	R	53	S
169	A9		(ASCII code)		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	43	C
176	B0				R	50	P
177	B1				R	2D	-
178	B2				R	35	5
179	B3				R	37	7
180	B4				R	20	
181	B5				R	20	
182	B6				R	20	
183	B7				R	20	
184	B8	2	Vendor rev	(revision of datasheet)	R	41	A
185	B9		(ASCII code)		R	30	0
186	BA	2	Wavelength	(e.g. C57= 1571.0nm)	R	7A	1571.0
187	BB			Units defined in MSA (0.05nm)	R	BC	
188	BC	2	Wavelength Tolerance	(6.5nm)	R	05	6.5
189	BD			Units defined in MSA (0.005nm)	R	14	
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	(e.g. 97H001100001)	R	39	9
197	C5		(ASCII code)		R	37	7
198	C6				R	48	H
199	C7				R	30	0
200	C8				R	30	0
201	C9				R	31	1
202	CA				R	31	1
203	CB				R	30	0
204	CC				R	30	0
205	CD				R	30	0
206	CE				R	30	0
207	CF				R	31	1
208	D0				R	20	
209	D1				R	20	
210	D2				R	20	
211	D3				R	20	
212	D4	8	Date code	two low order digits of year.	R	30	0
213	D5		(ASCII code)	(00 =2000)	R	39	9
214	D6			date code -month	R	30	0
215	D7			(01 -12)	R	37	7
216	D8			date code-day	R	32	2
217	D9			(01 -31)	R	33	3
218	DA			vendor specific lot code	R	30	0
219	DB			(ASCII)	R	31	1
220	DC	1	Diagnostic Monitoring Typ	Average Power	R	08	
221	DD	1	Enhanced Options	Soft_Tx_Dis, Soft_P_Down	R	60	
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		Size	Name of field	Description of Field	R/W	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE
Serial ID Data Fields						C47		C49		C51		C53	
168	A8	16	Vendor PN	(e.g. SXP3102CP-57)	R	53	S	53	S	53	S	53	S
169	A9		(ASCII code)		R	58	X	58	X	58	X	58	X
170	AA				R	50	P	50	P	50	P	50	P
171	AB				R	33	3	33	3	33	3	33	3
172	AC				R	31	1	31	1	31	1	31	1
173	AD				R	30	0	30	0	30	0	30	0
174	AE				R	32	2	32	2	32	2	32	2
175	AF				R	43	C	43	C	43	C	43	C
176	B0				R	50	P	50	P	50	P	50	P
177	B1				R	2D	-	2D	-	2D	-	2D	-
178	B2				R	34	4	34	4	35	5	35	5
179	B3				R	37	7	39	9	31	1	33	3
180	B4				R	20		20		20		20	
181	B5				R	20		20		20		20	
182	B6				R	20		20		20		20	
183	B7				R	20		20		20		20	
186	BA	2	Wavelength	(e.g. C57= 1571.0nm)	R	72	1471.0	74	1491.0	76	1511.0	77	1531.0
187	BB			Units defined in MSA (0.05nm)	R	EC		7C		0C		9C	

Address		Size	Name of field	Description of Field	R/W	Hex	NOTE	Hex	NOTE	Hex	NOTE	Hex	NOTE
Serial ID Data Fields						C55		C57		C59		C61	
168	A8	16	Vendor PN	(e.g. SXP3102CP-57)	R	53	S	53	S	53	S	53	S
169	A9		(ASCII code)		R	58	X	58	X	58	X	58	X
170	AA				R	50	P	50	P	50	P	50	P
171	AB				R	33	3	33	3	33	3	33	3
172	AC				R	31	1	31	1	31	1	31	1
173	AD				R	30	0	30	0	30	0	30	0
174	AE				R	32	2	32	2	32	2	32	2
175	AF				R	43	C	43	C	43	C	43	C
176	B0				R	50	P	50	P	50	P	50	P
177	B1				R	2D	-	2D	-	2D	-	2D	-
178	B2				R	35	5	35	5	35	5	36	6
179	B3				R	35	5	37	7	39	9	31	1
180	B4				R	20		20		20		20	
181	B5				R	20		20		20		20	
182	B6				R	20		20		20		20	
183	B7				R	20		20		20		20	
186	BA	2	Wavelength	(e.g. C57= 1571.0nm)	R	79	1551.0	7A	1571.0	7C	1591.0	7D	1611.0
187	BB			Units defined in MSA (0.05nm)	R	2C		BC		4C		DC	

4. MECHANICAL DESCRIPTION

XFP MSA compliant. Color coding is indicated at latch portion.

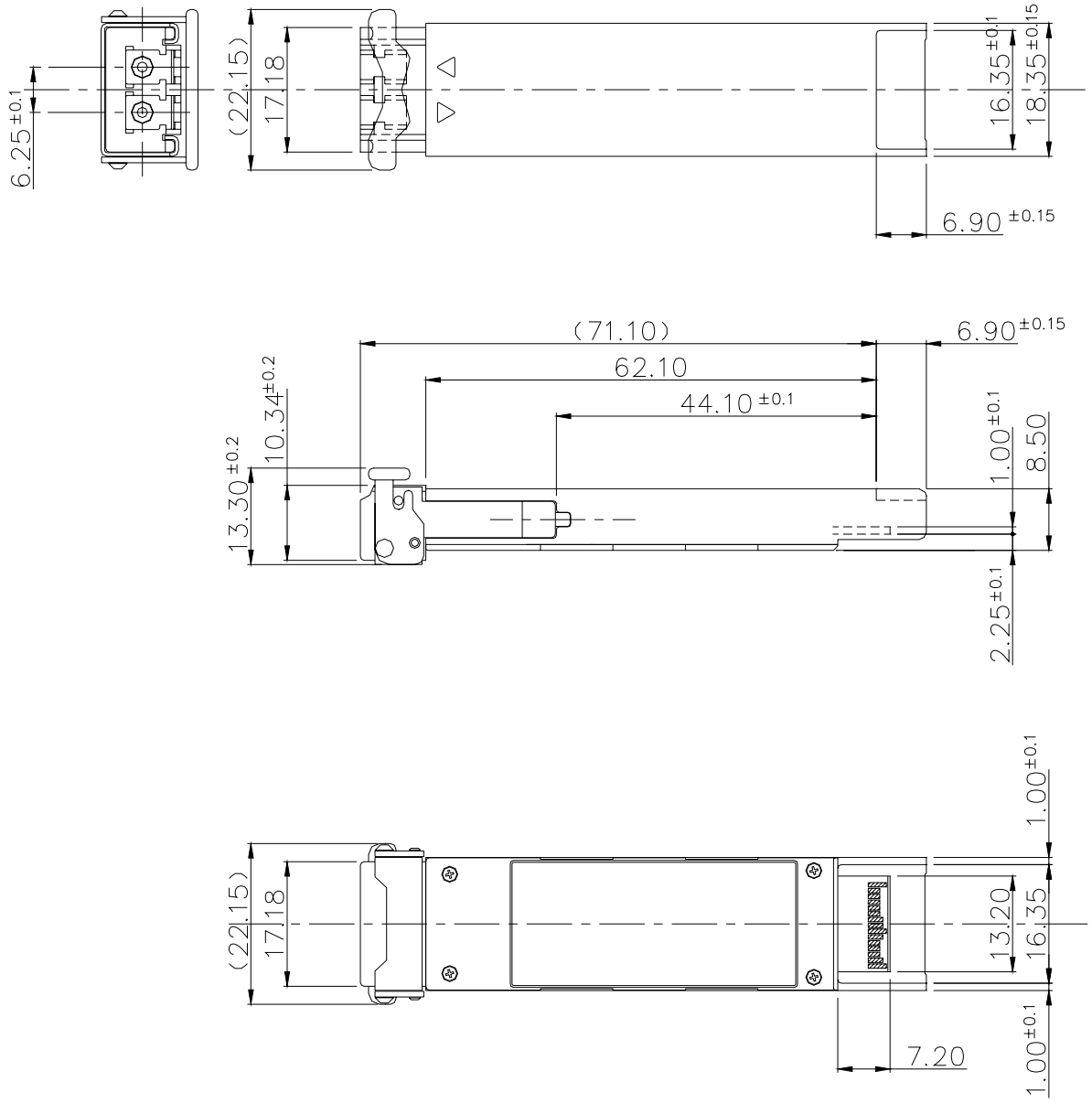
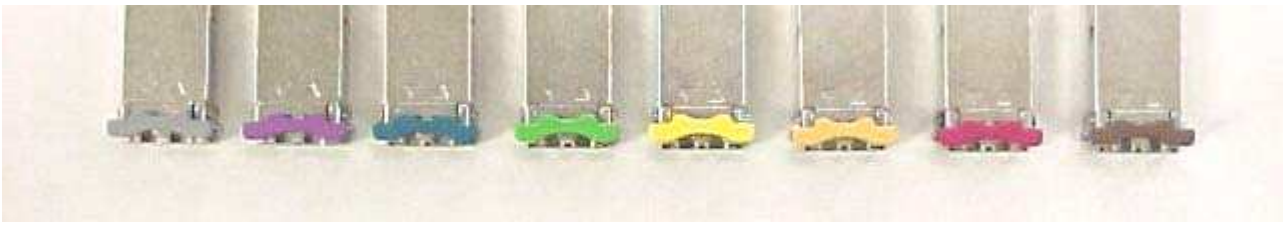


Fig. 2.1 Mechanical drawing of XFP

Color Coding

Part Number	Channel Number	Nominal Wavelength	Color Code	Note
SXP3102CP-47	01	1471nm	Gray	
SXP3102CP-49	02	1491nm	Violet	
SXP3102CP-51	03	1511nm	Blue	
SXP3102CP-53	04	1531nm	Green	
SXP3102CP-55	05	1551nm	Yellow	
SXP3102CP-57	06	1571nm	Orange	
SXP3102CP-59	07	1591nm	Red	
SXP3102CP-61	08	1611nm	Brown	



Laser Emission

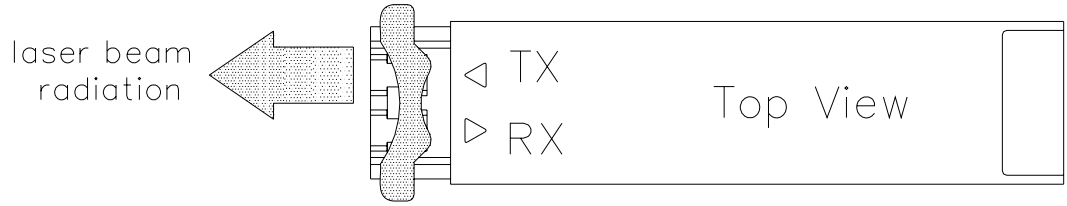


Fig. 2.2 Aperture and direction of laser beam radiation

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	LVTTL	*3
4	$\overline{\text{Interrupt}}$	O	$\overline{\text{Interrupt}}$	LVTTL	*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	LVTTL	*5
11	SDA	I/O	2-Wire Serial Interface Data Line	LVTTL	*5
12	Mod_Abs	O	Indicates Module is not present. Grounded in the Module	LVTTL	*5
13	Mod_NR	O	Module Not Ready; Indicating Module Operational Fault	LVTTL	*5
14	RX_LOS	O	Receiver Loss Of Signal Indicator	LVTTL	*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	LVTTL	*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.

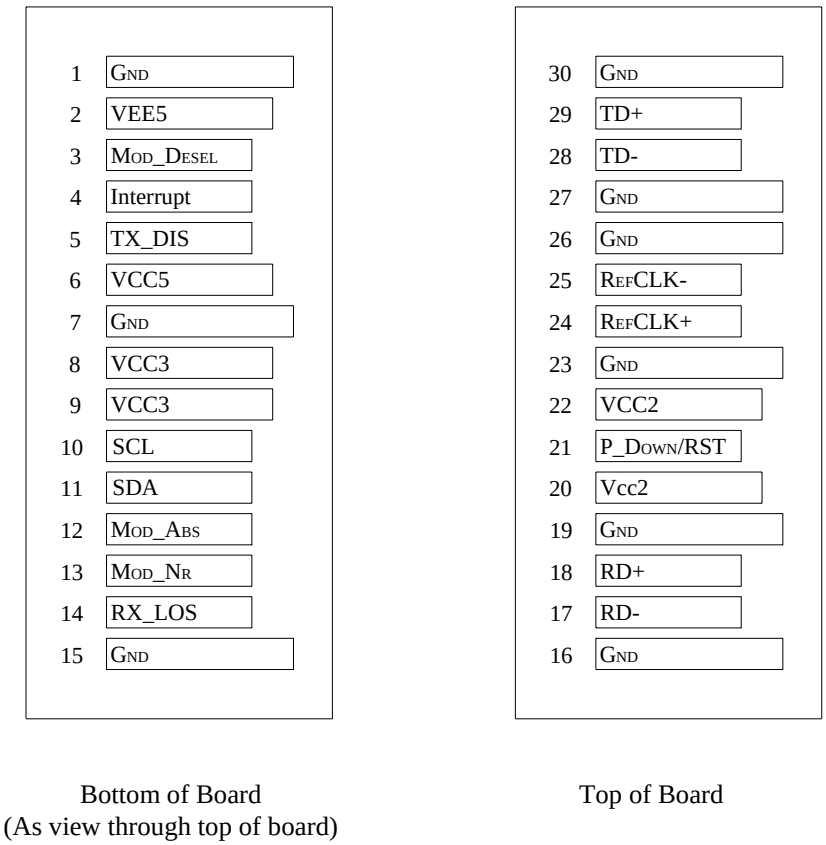
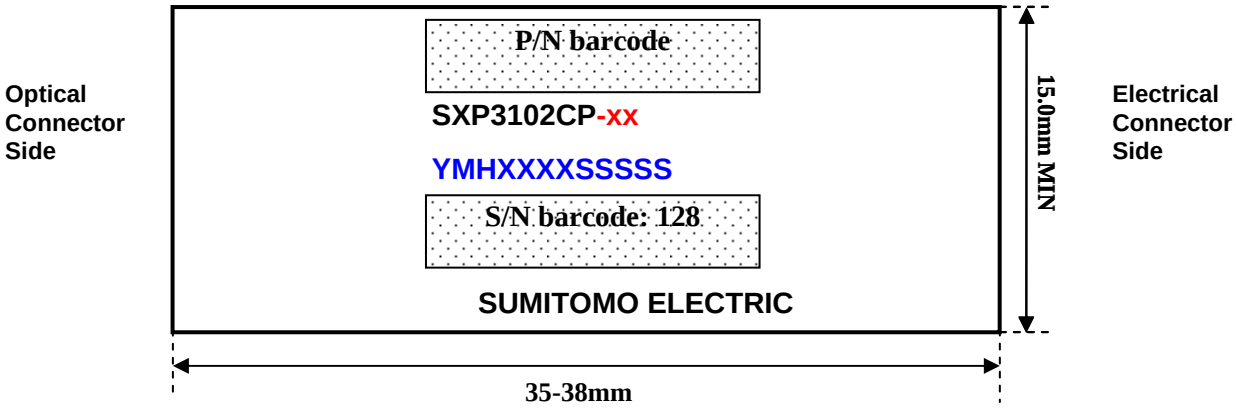


Fig. 3 XFP Transceiver Electrical Pad Layout

6. LABEL



P/N: -xx= -47, -49, -51, -53, -55, -57, -59 or -61
S/N: YMHXXXXSSSSS 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.691 and Telcordia GR-253 Specifications
- IEEE802.3ae Specifications

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.

<End of Document>