



### Features

- Compliant with XFP MSA
- Wavelength selectable to C-band ITU-T grid wavelengths
- Suitable for use in 100GHz channel spacing DWDM systems
- No Reference Clock required
- Cold Start up Wavelength Compliance
- DWDM-rated EML transmitter and APD receiver
- link length up to 120km (with amplifier)
- Low Power Dissipation 3.5W Maximum
- RoHS Compliant

### Applications

- SONET OC-192&SDH STM 64
- Ethernet (10GBASE and 10G BASE with FEC)
- DWDM Networks

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units	Remarks
Storage Temperature	$T_{st}$	-40	85	°C	
Supply Voltage	$V_{cc2}$	-0.5	+2.0	V	
	$V_{cc3.3}$	-0.5	+4.0	V	
	$V_{cc5.0}$	-0.5	+6.0	V	
Optical Input Received Power	$APD-IN$	---	-8	dBm	

### Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Units	Remarks
Operating Case temperature	$T_{ca}$	-5	-	70	°C	
Supply Voltage	$V_{cc1.8}$	1.71	1.8	1.89	V	
	$V_{cc3.3}$	3.13	3.3	3.47	V	
	$V_{cc5.0}$	4.75	5.0	5.25	V	
Supply Current	$I_{cc2}$	-	-	750	mA	
	$I_{cc3.3}$	-	-	750	mA	
	$I_{cc5.0}$	-	-	500	mA	
Module Power Dissipation	$P_m$	-	-	3.5	W	

### Transmitter Electro-optical Characteristics

V<sub>cc</sub> = 3.13 V to 3.47 V, T<sub>c</sub> = -5 °C to 70 °C

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Optical Transmit Power	P <sub>o</sub>	-2		+2	dBm	
Optical Transmit Power (disabled)	PTX_DIS	---	---	-30	dBm	
Extinction Ratio	ER	9	---	---	dB	
Center Wavelength-Start of Life	λ <sub>C</sub>	λ <sub>C</sub> -25	λ <sub>C</sub>	λ <sub>C</sub> +25	pm	1
Center Wavelength-End of Life	λ <sub>C</sub>	λ <sub>C</sub> -100	λ <sub>C</sub>	λ <sub>C</sub> +100	pm	1
Side-mode Supression Ratio	SMSR	30	---	---	dB	
Jitter Generation (P-P)	JG P-P	---	---	0.1	UI	
Jitter Generation (RMS)	JG RMS	---	---	0.01	UI	
Spectral Width (-20dB)	Δλ <sub>20</sub>	---	---	0.3	nm	
Dispersion Penalty with 2400 ps/nm	DP	---	---	2.0	dB	2
Relative Intensity Noise	RIN	---	---	-130	dB/Hz	
Optical Output Eye	Compliant with ITU-T G.691 STM-64 eye mask					
Input Differential impedance	R <sub>im</sub>	---	100		Ω	
Differential data Input	V <sub>txDIFF</sub>	120		850	mV	
Transmit Disable Voltage	V <sub>D</sub>	2.0		V <sub>cc</sub> +0.3	V	
Transmit Enable Voltage	V <sub>en</sub>	0		+0.8	V	
Transmit Disable Assert Time	V <sub>n</sub>	---	---	10	us	

Note:

1. Wavelength stability is achieved within 60 seconds (max) of power up.
2. BER=10<sup>-12</sup>; PRBS 2<sup>31</sup>-1@9.95Gbps

### Receiver Electro-optical Characteristics

V<sub>cc</sub> = 3.13 V to 3.47 V, T<sub>c</sub> = -5 °C to 70 °C

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Maximum Input Power	<i>RX-overload</i>	-7	---	---	dBm	
Input Operating Wavelength	$\lambda$	1528	---	1565	nm	
Reflectance	<i>Rrx</i>	---	---	-27	dB	
Loss of Signal Asserted	<i>LOS_A</i>	-34	---	---	dBm	
LOS De-Asserted	<i>LOS_D</i>	---	---	-24	dBm	
LOS Hysteresis	<i>LOS_H</i>	0.5	---	---	dB	
Output differential impedance	<i>Rom</i>	---	100	---	$\Omega$	
Differential Output Swing	<i>Vout P-P</i>	350	---	850	mV	
Rise/Fall Time (20%~80%)	<i>Tr/Tf</i>	24	---	---	ps	
Loss of Signal-Asserted	<i>VOH</i>	2	---	V <sub>cc</sub> 3+0.3-	V	
Loss of Signal-Negated	<i>VOL</i>	GND	---	GND+0.5	V	

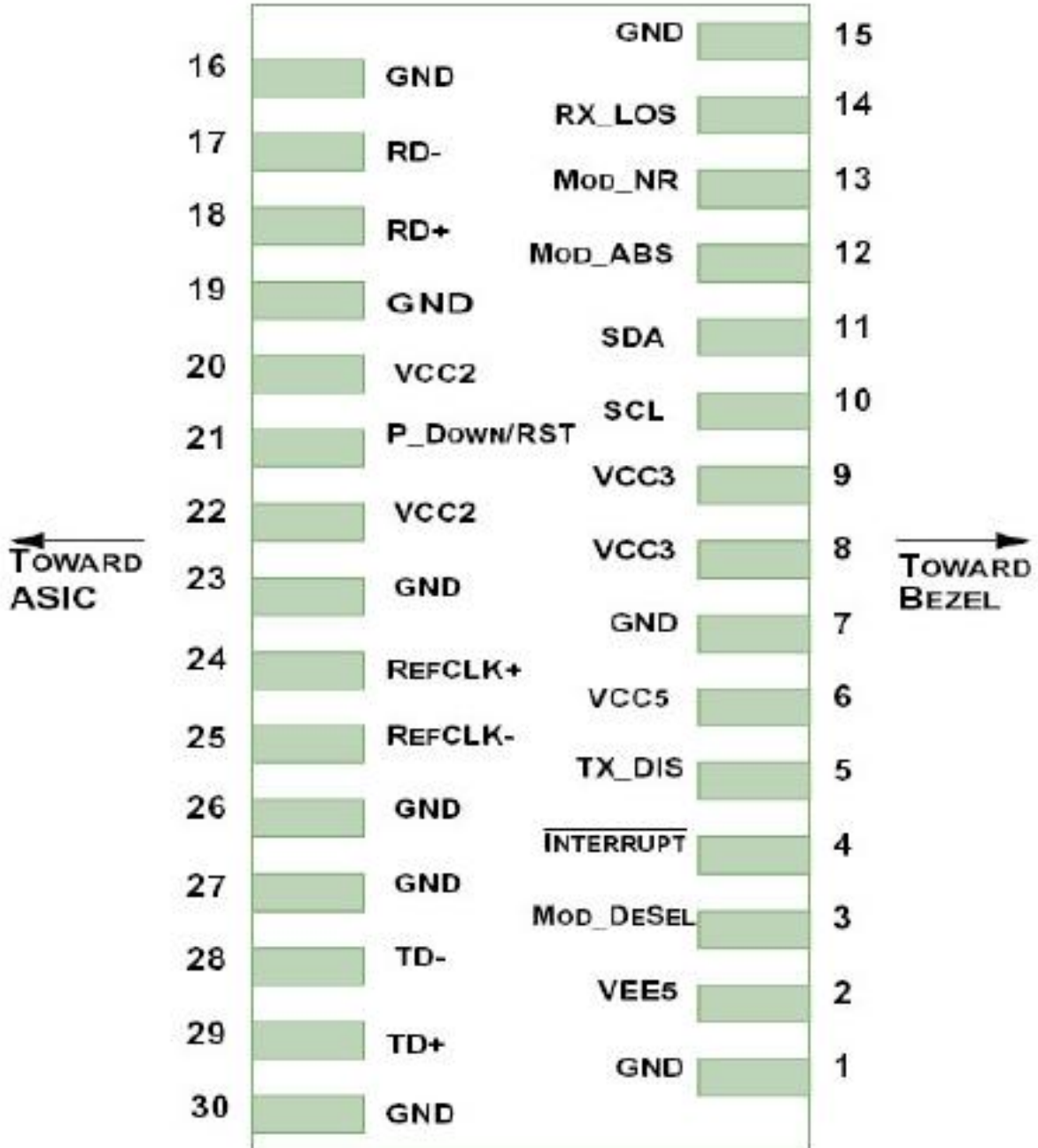
### Reference Clock

Parameter	Symbol	Min.	Typ.	Max.	Units	Note
Clock Differential Input Impedance	<i>CI</i>	80	100	120	$\Omega$	
Differential Input Amplitude (p-p)	<i>DCA</i>	640-	---	1600	mV	
Reference Clock Duty Cycle	<i>RCY</i>	40	---	60	%	
Reference Clock Rise/Fall Time	<i>Tr / Tf</i>	200	---	1250	ps	20%~80%
Reference Clock Frequency	<i>fu</i>	---	Baud/64	---	MHz	

**C-band  $\lambda$  c Wavelength Guide**

<i>Channels</i>	<i>Frequency</i>	<i>Wavelength</i>	<i>Channels</i>	<i>Frequency</i>	<i>Wavelength</i>	<i>Channels</i>	<i>Frequency</i>	<i>Wavelength</i>
17	191.7	1563.86	32	193.2	1551.72	47	194.7	1539.77
18	191.8	1563.05	33	193.3	1550.92	48	194.8	1538.98
19	191.9	1562.23	34	193.4	1550.12	49	194.9	1538.19
20	192.0	1561.42	35	193.5	1549.32	50	195.0	1537.40
21	192.1	1560.61	36	193.6	1548.51	51	195.1	1536.61
22	192.2	1559.79	37	193.7	1547.72	52	195.2	1535.82
23	192.3	1558.98	38	193.8	1546.92	53	195.3	1535.04
24	192.4	1558.17	39	193.9	1546.12	54	195.4	1534.25
25	192.5	1557.36	40	194.0	1545.32	55	195.5	1533.47
26	192.6	1556.55	41	194.1	1544.53	56	195.6	1532.68
27	192.7	1555.75	42	194.2	1543.73	57	195.7	1531.9
28	192.8	1554.94	43	194.3	1542.94	58	195.8	1531.12
29	192.9	1554.13	44	194.4	1542.14	59	195.9	1530.33
30	193.0	1553.33	45	194.5	1541.35	60	196.0	1529.55
31	193.1	1552.52	46	194.6	1540.56	61	196.1	1528.77

**Pin Assignment**



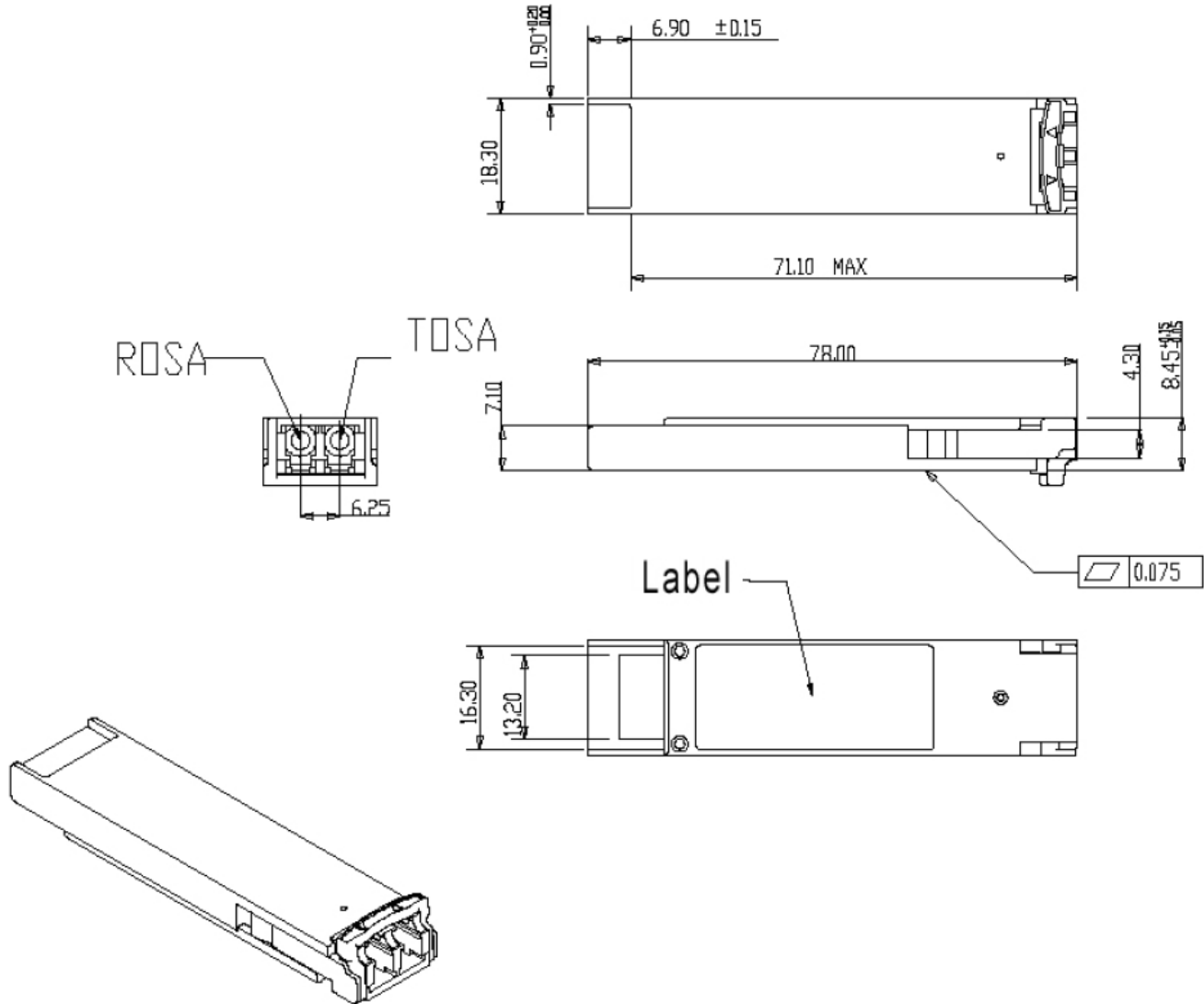
## Pin Description

Pin	Logic	Symbol	Name/Description	Note
1		GND	Module Ground	1
2		VEE5	Optional -5.2V Power Supply – Not required	
3	LVTTL-I	Mod_DeSel	Module De-select; When held low allows module to respond to 2-wire serial interface commands.	
4	LVTTL-O	<u>Interrupt</u>	Interrupt; Indicates presence of an important condition which can be read over the 2-wire serial interface	2
5	LVTTL-I	TX_DIS	Transmitter Disable; Turns off transmitter laser output	
6		VCC5	+5V Power Supply	
7		GND	Module Ground	1
8		VCC3	+3.3V Power Supply	
9		VCC3	+3.3V Power Supply	
10	LVTTL-I/O	SCL	2-Wire Serial Interface Clock	2
11	LVTTL-I/O	SDA	2-Wire Serial Interface Data Line	2
12	LVTTL-O	Mod_Abs	Module Absent; Indicates Module is not present. Grounded in the Module	2
13	LVTTL-O	Mod_NR	Module Not Ready	2
14	LVTTL-O	RX_LOS	Receiver Loss of Signal Indicator	2
15		GND	Module Ground	1
16		GND	Module Ground	1
17	CML-O	RD-	Receiver Inverted Data Output	
18	CML-O	RD+	Receiver Non-Inverted Data Output	
19		GND	Module Ground	1
20		VCC2	+1.8V Power Supply	
21	LVTTL-I	P_Down/RST	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.	
			Reset; The falling edge initiates a complete reset of the module including the 2-wire serial interface, equivalent to a power cycle.	
22		VCC2	+1.8V Power Supply	
23		GND	Module Ground	1
24	PECL-I	RefCLK+	Reference Clock non-inverted input, AC coupled on the host board-Not required.	3
25	PECL-I	RefCLK-	Reference Clock inverted input, AC coupled on the host board- Not required	3
26		GND	Module Ground	1
27		GND	Module Ground	1
28	CML-I	TD-	Transmitter Inverted Data Input	
29	CML-I	TD+	Transmitter Non-Inverted Data Input	
30		GND	Module Ground	1

### Notes:

1. Module circuit ground is isolated from module chassis ground within the module.
2. Open collector; should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.
3. A Reference Clock input is not required.

**Dimensions**



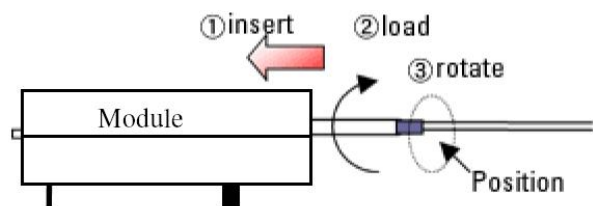
**Optical Receptacle Cleaning Recommendations :**

All fiber stubs inside the receptacle portions were cleaned before shipment. In the event of contamination of the optical ports, the recommended cleaning process is the use of forced nitrogen. If contamination is thought to have remained, the optical ports can be cleaned using a NTT international Cletop® stick type and HFE7100 cleaning fluid. Before the mating of patch-cord, the fiber end should be cleaned up by using Cletop® cleaning cassette.

**Cleaning of patch-cord**



**Cleaning of fiber stub**



1. Insert  
Ensure that stick is held straight when inserting into sleeve.
2. Load  
Apply sufficient pressure (approx 600-700g) to ensure ferrule a little depressed in sleeve.
3. Rotate  
Rotate stick clockwise 4-5 times, while ensuring direct contact with ferrule end-face is maintained.

*Notice: Number of possible wipes:  
Maintenance (repair) ~1 use / piece  
Equipment construction: 4 uses / piece (max.)*

Note: The pictures were extracted from NTT-ME website. And the Cletop® is a trademark registered by NTT-ME



**Ordering Information**

<b>OP</b>	<b>6</b>	<b>C</b>	<b>-</b>	<b>S</b>	<b>10</b>	<b>-</b>	<b>13</b>	<b>-</b>	<b>C</b>	<b>M</b>
	↑	↑		↑	↑		↑		↑	↑
<b>Product Code:</b>	<b>Data Rate:</b>	<b>Type:</b>		<b>Reach:</b>	<b>Wavelength:</b>		<b>Operating Temperature:</b>		<b>Additional Feature:</b>	
5=GBIC; 6=SFP-LC; 7=XFP; 8=XENPAK; 9=X2; A=SFP+; C=QSFP; F=CFP; P=SFP-SC; Q=SFP-MTRJ	A=155Mb/s; B=622Mb/s; C=1.25Gb/s; D=2.125Gb/s; E=2.5Gb/s; F=4.25Gb/s; G=3.1Gb/s; J=2.97G; P=6.144G; Q=7.37G; H=8.5Gb/s; K=10Gb/s; T=1/10Gb/s; L=11.09Gb/s; R=20Gb/s; S=40Gb/s; M=100Base-X SGMII; N=100/1000Base-X SGMII;	S=Single-mode; M=Multi-mode; W=BWDM; C=CWDM; D=DWDM; T=Copper-T (RJ-45) E=GEPON ONU; F=GEPON OLT; G=GPON ONU; H=GPON OLT		Normal: X1=Under 150m; X3=300m; X5=550m; 02=2km, 10=10km; 70=70km; A0=100km; C0=120km  CWDM: 20=20dB; 24=24dB; 28=28dB	Normal: 85=850nm; 13=1310nm; 15=1550nm; 00=Copper T (RJ-45)  CWDM: 27=1270nm; 47=1470nm; 61=1610nm  BWDM: B3=Tx1310/Rx1550; B5=Tx1550/Rx1310; B4=Tx1310/Rx1490; B9=Tx1490/Rx1310; 51=Tx1510/Rx1570; 57=Tx1570/Rx1510; 27=Tx1270/Rx1330; 33=Tx1330/Rx1270; B2=Tx1270/Rx1577; B7=Tx1577/Rx1270 T2=2TX1310nm; T3=TX1310nm; T5=TX1550nm  DWDM: 17=Channel 17 34= Channel 34 00=Channel 17~61 Tunable		C=Commercial Purpose (0~70°C); I= Industrial Purpose (Extended Range)	M=Digital Optical Monitoring (DOM) (RX_LOS for Copper TX); F=with Fiber Stub; I=with Isolator; S=Customized Style		

Model Number	Part Number	Input/Output	Signal Detect	Voltage	Temperature
XFP-DWDM-120	OP7K-DC0-xx-CF	AC/AC	TTL	3.3/5V	-5°C to 70 °C

**Note: xx = channels**

**Note: All information contained in this document is subject to change without notice.**