

80KM CWDM SFP+ Optical Transceiver

SFP+-10G-CWDM-XX80

Features

- ◆ Compliant with SFF-8431, SFF-8432 and IEEE802.3ae
- ◆ 10GBASE-ZR, and 2G/4G/ 8G/10G Fiber Channel applications.
- ◆ Wavelength selectable to ITU-T standards covering CWDM grid wavelengths
- ◆ Cooled EML transmitter and APD receiver
- ◆ link length up to 80km (1450ps/nm@G652 fiber)
- ◆ Low Power Dissipation 1.4W Typical (Maximum:2W)
- ◆ -5°C to 70°C Operating Case Temperature
- ◆ Single 3.3V power supply
- ◆ Diagnostic Performance Monitoring of module temperature, supply Voltages, laser bias current, transmit optical power, receive optical power
- ◆ RoHS compliant and lead free

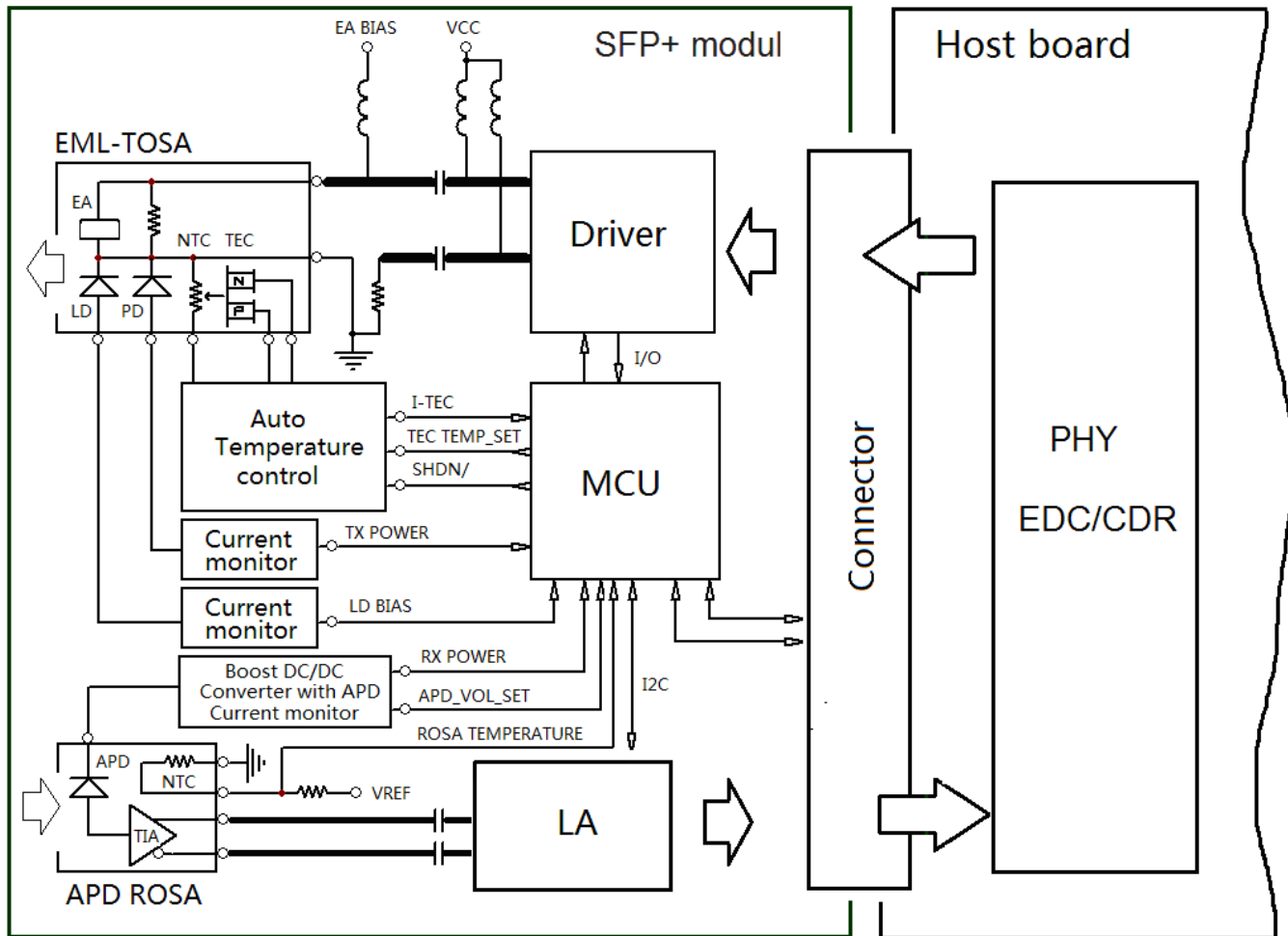
Applications

- ◆ 10G Ethernet
- ◆ 10G Fiber Channel
- ◆ CWDM Networks

Description

SFP+ZR CWDM Transceiver is a “Limiting module”, designed for 10G Ethernet, and 2G/4G/ 8G/10G Fiber- Channel applications.

The transceiver consists of two sections: The transmitter section incorporates a colded EML laser. And the receiver section consists of a APD photodiode integrated with a TIA. All modules satisfy class I laser safety requirements. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, received optical power and transceiver supply voltage.



Gigalight 2011 --HHC

Figure1. Module Block Diagram

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	Vcc	-0.5	3.8	V
Storage Temperature	Tst	-40	85	°C
Relative Humidity	Rh	0	85	%

Operating Conditions

Parameter	Symbol	Min	Typical	Max	Unit
Supply Voltage	Vcc	3.13	3.3	3.47	V
Supply current	Icc	-	420	610	mA
Operating Case temperature	Tca	-5	-	70	°C
Module Power Dissipation	Pm	-	1.4	2	W

Transmitter Specifications – Optical

Parameter	Symbol	Min	Typical	Max	Unit
Center Wavelength	λ_c	1464.5		1617.5	nm
Center wavelength stability	$\Delta\lambda_D$	-6.5	λ_c	6.5	nm
Spectral Width (-20dB)	$\Delta\lambda_{20}$	-	-	0.3	nm
Average Optical Power [2]	Po	0	-	+3	dBm
Side Mode Suppression Ratio	SMSR	30	-	-	dB
Optical Transmit Power (disabled)	PTX_DISABL E	-	-	-30	dBm
Extinction Ratio	ER	8.2	-	-	dB
Dispersion penalty(1450ps/nm) [2]	DP	-	-	2	dB
Relative Intensity Noise	RIN	-	-	-128	dB/Hz
Optical Return Loss Tolerance	Orl	-	-	21	dB

Receiver Specifications – Optica

Parameter	Symbol	Min	Typical	Max	Unit
Input Operating Wavelength	λ	1260	-	1610	nm
Receiver sensitivity(Average) [1] Receiver sensitivity@9.95G Receiver sensitivity@10.3125G Receiver sensitivity@11.1G	Rsen1 Rsen2 Rsen3	-	-	-24.5 -24 -22	dBm
Maximum Input Power	RX-overload	-7	-		dBm
Path penalty at 1450ps/nm @9.95Gb/s	DP1			2	dB
Path penalty at 1450ps/nm @10.3125Gb/s	DP2			3	dB
Path penalty at 1300ps/nm @11.1Gb/s	DP3			3	dB
Loss of Signal Asserted	Lsa	-34	-	-	dBm
LOS De-Asserted	Lda	-	-	-24	dBm
LOS Hysteresis	Lh	0.5	-	-	dB

Notes:

[1] Measured with conformance test signal for BER = 10^{-12} . The stressed sensitivity values in the table are for system level BER measurements which include the effects of CDR circuits. It is recommended that at least 0.4 dB additional margin be allocated if component level measurements are made without the effects of CDR circuits.

Transmitter Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate	Mra	-	10.3125	11.1	Gbps
Input differential impedance	Rim	-	100	-	Ω
Differential data Input	VtxDIFF	120	-	850	mV
Transmit Disable Voltage	VD	2.0	-	Vcc3+0.3	V
Transmit Enable Voltage	Ven	0	-	+0.8	V
Transmit Disable Assert Time	Vn	-	-	100	us

Receiver Specifications – Electrical

Parameter	Symbol	Min	Typical	Max	Unit
Data Rate	Mra	-	10.3125	11.1	Gbps
Differential Output Swing	Vout P-P	350	-	850	mV
Rise/Fall Time	Tr / Tf	-	-	40-	ps
Loss of Signal –Asserted	VOH	2	-	Vcc3+0.3-	V
Loss of Signal –Negated	VOL	0	-	+0.4	V

Digital Diagnostic Functions

Parameter	Symbol	Min.	Max	Unit	Notes
Accuracy					
Transceiver Temperature	DMI_Temp	-3	+3	degC	Over operating temp
TX Output optical power	DMI_TX	-3	+3	dB	
RX Input optical power	DMI_RX	-3	+3	dB	-7dBm to -26dBm range
Transceiver Supply voltage	DMI_VCC	-0.08	+0.08	V	Full operating range
Bias current monitor	DMI_Ibias	-10%	10%	mA	
Dynamic Range Accuracy					
Transceiver Temperature	DMI_Temp	-5	70	degC	
TX Output optical power	DMI_TX	0	+3	dBm	
RX Input optical power	DMI_RX	-26	-7	dBm	
Transceiver Supply voltage	DMI_VCC	3.0	3.6	V	
Bias current monitor	DMI_Ibias	0	100	mA	

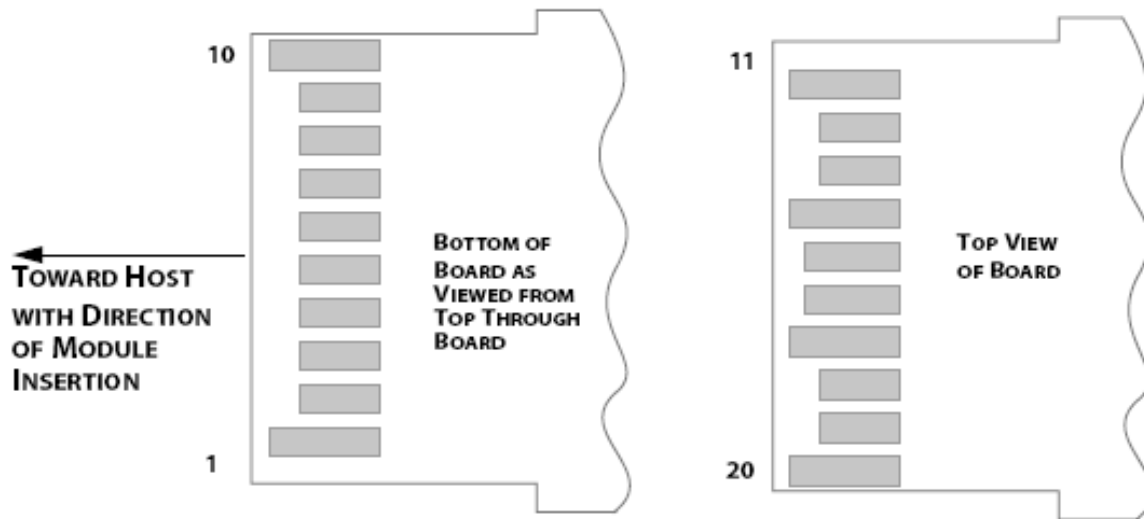
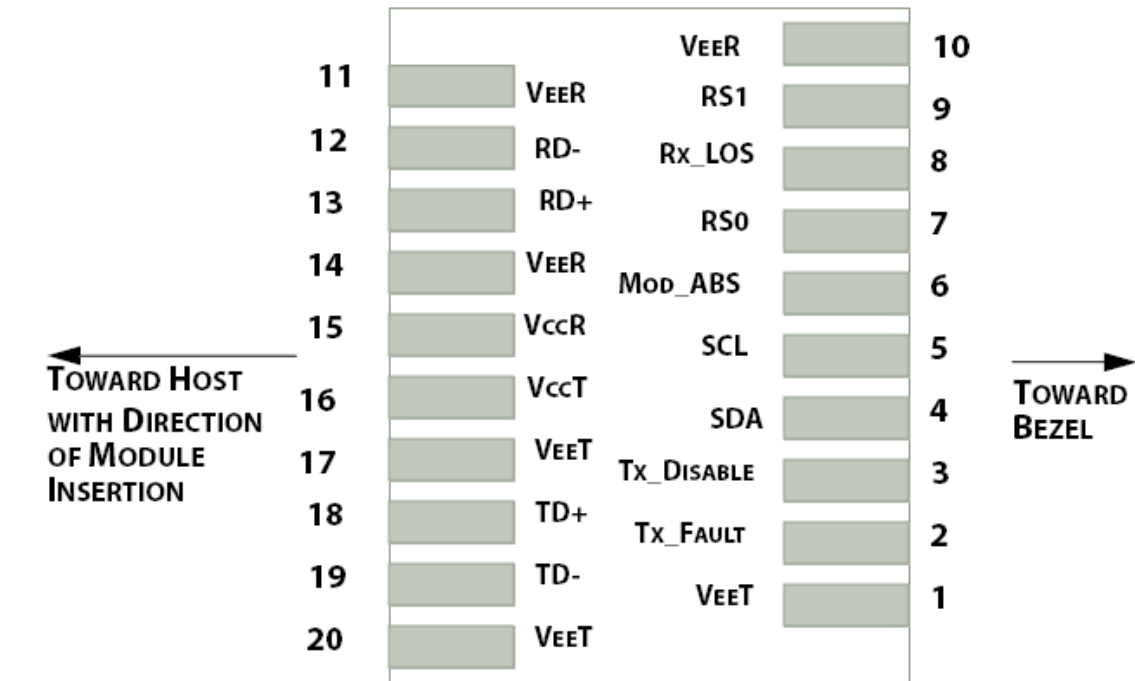


Figure2.Electrical Pin-out Details

Pin Descriptions

Pin	Symbol	Name/Description
1	VEET [1]	Transmitter Ground
2	Tx_FAULT [2]	Transmitter Fault
3	Tx_DIS [3]	Transmitter Disable. Laser output disabled on high or open
4	SDA [2]	2-wire Serial Interface Data Line
5	SCL [2]	2-wire Serial Interface Clock Line
6	MOD_ABS [4]	Module Absent. Grounded within the module
7	RS0 [5]	Rate Select 0
8	RX_LOS [2]	Loss of Signal indication. Logic 0 indicates normal operation
9	RS1 [5]	Rate Select 1
10	VEER [1]	Receiver Ground
11	VEER [1]	Receiver Ground
12	RD-	Receiver Inverted DATA out. AC Coupled
13	RD+	Receiver DATA out. AC Coupled
14	VEER [1]	Receiver Ground
15	VCCR	Receiver Power Supply
16	VCCT	Transmitter Power Supply
17	VEET [1]	Transmitter Ground
18	TD+	Transmitter DATA in. AC Coupled
19	TD-	Transmitter Inverted DATA in. AC Coupled
20	VEET [1]	Transmitter Ground

Notes:

[1] Module circuit ground is isolated from module chassis ground within the module.

[2].should be pulled up with 4.7k – 10k ohms on host board to a voltage between 3.15V and 3.6V.

[3]Tx_Disable is an input contact with a 4.7 kΩ to 10 kΩ pullup to VccT inside the module.

[4]Mod_ABS is connected to VeeT or VeeR in the SFP+ module. The host may pull this contact up to Vcc_Host with a resistor in the range 4.7 kΩ to 10 kΩ. Mod_ABS is asserted “High” when the SFP+ module is physically absent from a host slot.

[5] RS0 and RS1 are module inputs and are pulled low to VeeT with > 30 kΩ resistors in the module.

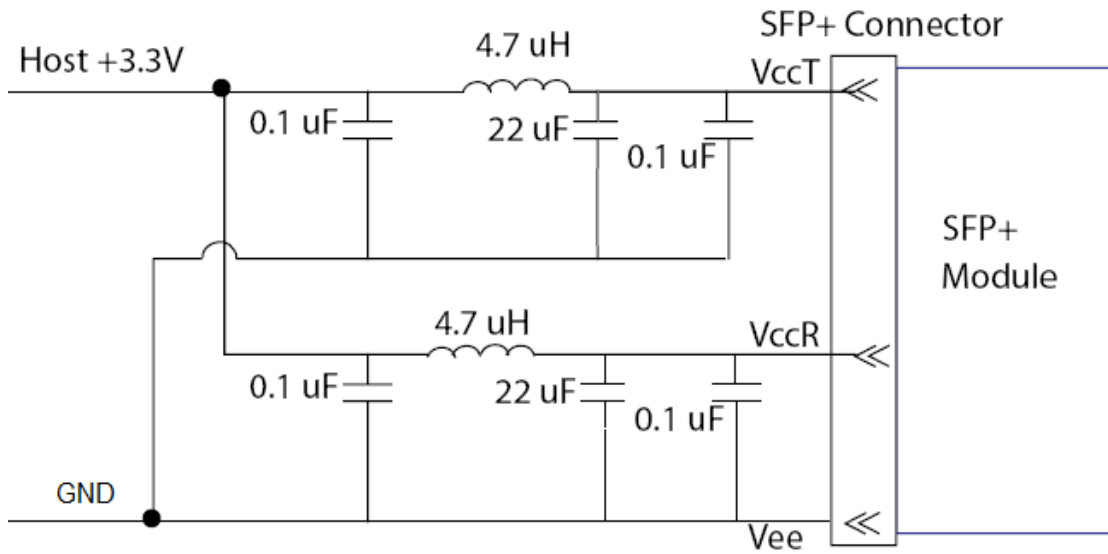


Figure3. Host Board Power Supply Filters Circuit

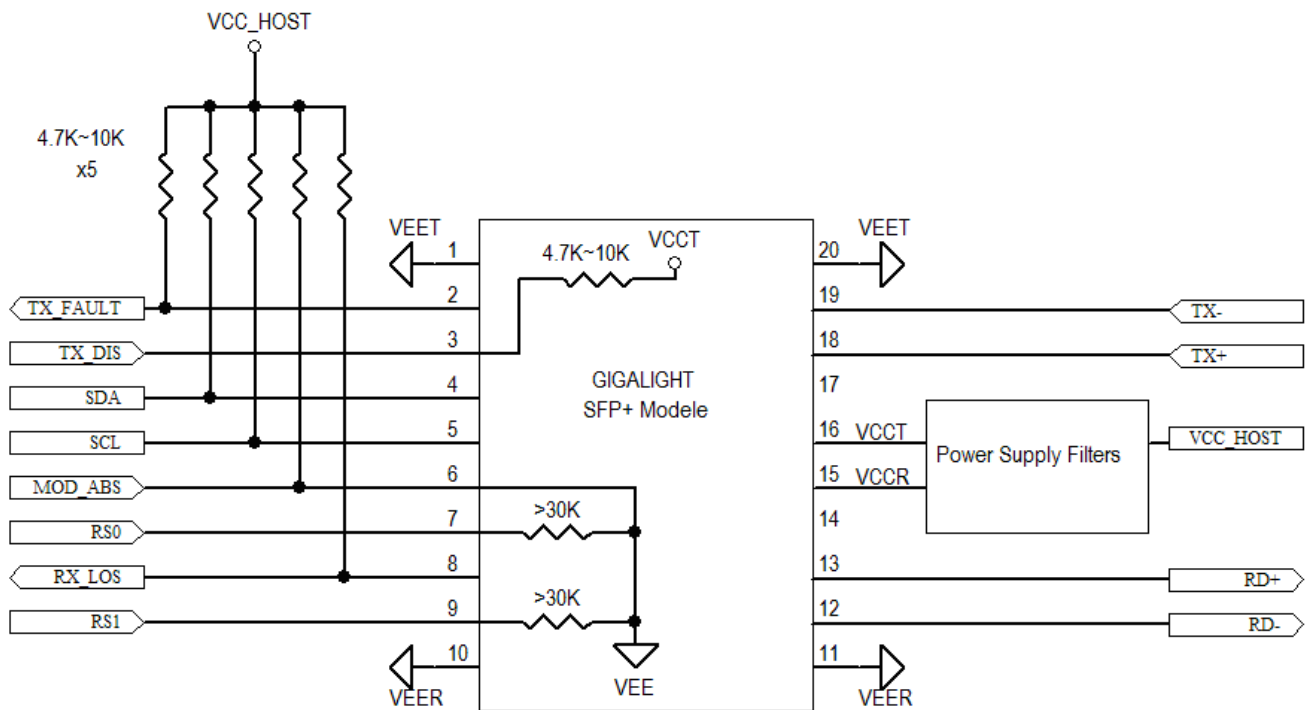


Figure4. Host-Module Interface

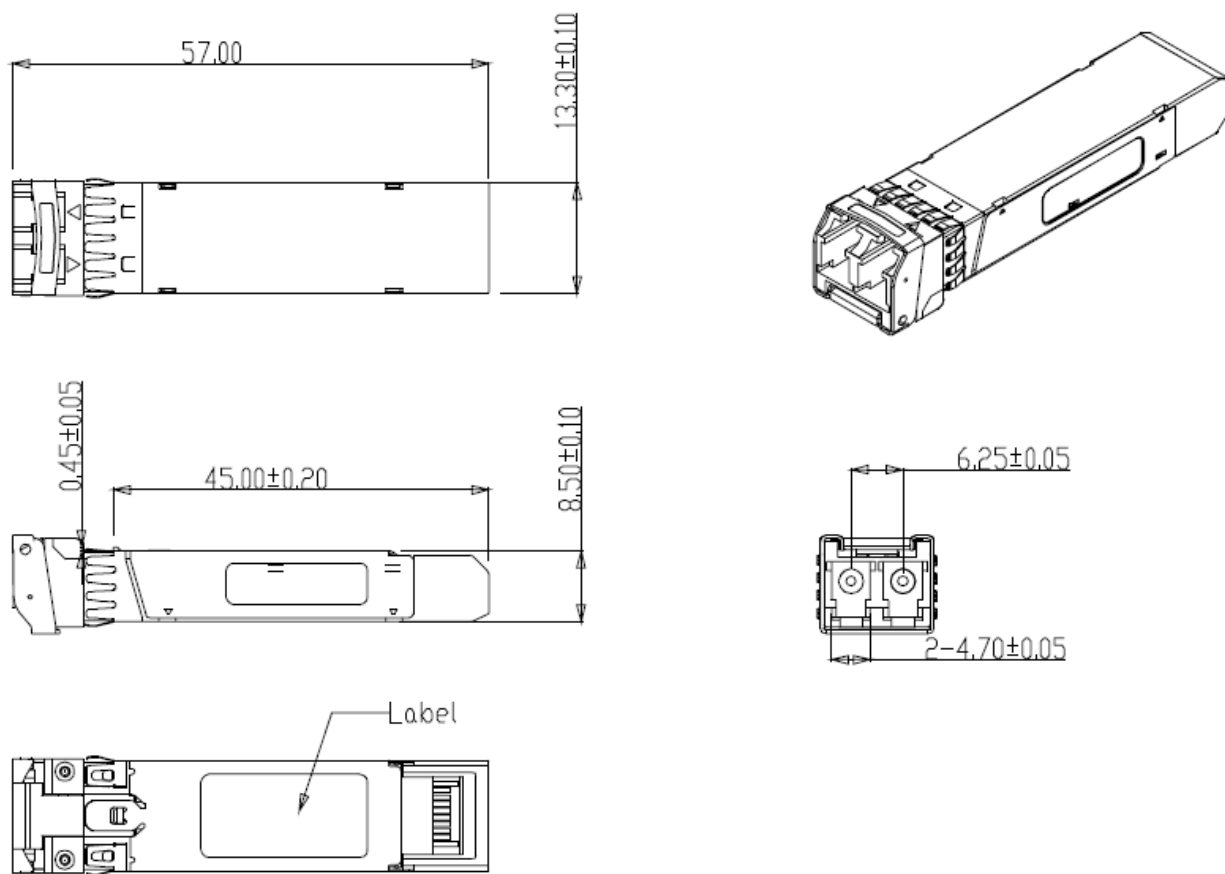


Figure5. Mechanical Specifications

Regulatory Compliance

SFP+ transceiver is designed to be Class I Laser safety compliant and is certified per the following standards:

Feature	Agency	Standard	Certificate / Comments
Laser Safety	FDA	CDRH 21 CFR 1040 annd Laser Notice No. 50	1120292-000
Product Safety	UL	UL and CUL EN60950-2:2007	E347511
Environmental protection	SGS	RoHS Directive 2002/95/EC	GZ1001008918/CHEM
EMC	WALTEK	EN 55022:2006+A1:2007 EN 55024:1998+A1+A2:2003	WT10093759-D-E-E

Ordering information

Part Number	Product Description
SFP+-10G-CWDM-4780	10Gbps, 1470nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-4980	10Gbps, 1490nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-5180	10Gbps, 1510nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-5380	10Gbps, 1530nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-5580	10Gbps, 1550nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-5780	10Gbps, 1570nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-5980	10Gbps, 1590nm SFP+ZR 70km, -5°C ~ +70°C
SFP+-10G-CWDM-6180	10Gbps, 1610nm SFP+ZR 70km, -5°C ~ +70°C

References

1. "Specifications for Enhanced Small Form Factor Pluggable Module SFP+", SFF-8431, Rev 4.1, July 6, 2009.
2. "Improved Pluggable Formfactor", SFF-8432, Rev 4.2, Apr 18, 2007
3. IEEE802.3ae – 2002
4. "Diagnostic Monitoring Interface for Optical Transceivers" SFF-8472, Rev 10.3, Dec 1, 2007