JCxxxx-SFP-LC.S80 Series

CWDM SFP+ Single-Mode for 10GbE
Duplex SFP+ Transceiver
RoHS6 Compliant

Features

- Supports 9.95Gb/s to 11.3Gb/s Bit Rates
- Hot-Pluggable SFP+ Footprint
- 10-Wavelengths CWDM DFB Transmitter from 1270nm to 1450nm, with step 20nm
- High Sensitivity APD for Receiver
- 23dB Power Budget
- Duplex LC connector
- Power Dissipation < 1.5W
- Case Operation Temperature Range: -5°C to 70°C
- Compliant with SFP+ MSA Specification SFF-8431
- Build-in Digital Diagnostic Functions Compliant with SFF-8472 MSA Specification

Applications

- 10G Ethernet
- OBSAI rates 6.144 Gb/s, 3.072 Gb/s, 1.536 Gb/s, 0.768Gb/s
- CPRI rates 10.138Gb/s , 9.830 Gb/s, 7.373Gb/s, 6.144 Gb/s, 4.915 Gb/s, 2.458 Gb/s, 1.229 Gb/s, 0.614Gb/s
- Other optical links

Ordering information

Part No.	Data Rate	Laser	Fiber	Power Budget	Temp.	Interface
JCxxxx-SFP-LC.S80*(note1)	0.614 to 11.3Gbps	CWDM DFB	SMF	23dB	-5~70°C	LC

Note1: X refers to CWDM Wavelength range 1270nm to 1450nm.

*The product image only for reference purpose.

CWDM* Wavelength

Band	Nomenclature	Wavelength(nm)		
		Min.	Typ.	Max.
O-band Original	1270	1264	1270	1277.5
	1290	1284	1290	1297.5
	1310	1304	1310	1317.5
	1330	1324	1330	1337.5
O-band Original	1350	1344	1350	1357.5
E-band Extended	1370	1364	1370	1377.5
	1390	1384	1390	1397.5
	1410	1404	1410	1417.5
	1430	1424	1430	1437.5
	1450	1444	1450	1457.5

CWDM*: 10 Wavelengths from 1270nm to 1330nm, each step 20nm.

Regulatory Compliance*Note2

Product Certificate	Certificate Number	Applicable Standard
TUV	R50135086	EN 60950-1:2006+A11+A1+A12+A2
		EN 60825-1:2014
		EN 60825-2:2004+A1+A2
UL	E317337	UL 60950-1
		CSA C22.2 No. 60950-1-07
EMC CE	AE 50285865 0001	EN 55022:2010
		EN 55024:2010
FCC	WTF14F0514417E	47 CFR PART 15 OCT., 2013
FDA	/	CDRH 1040.10
ROHS	/	2011/65/EU

Note2: The above certificate number updated to June 2014, because some certificate will be updated every year, such as FDA and ROHS. For the latest certification information, please check with Data Controls.

Product Description

The JCxxxx-SFP-LC.S80 series optical transceiver is designed for fiber communications application such as 10G Ethernet (10GBASE-ZR/ZW), which fully compliant with the specification of SFP+ MSA SFF-8431.

This module is designed for single mode fiber and operates at a nominal wavelength of CWDM wavelength. There are ten center wavelengths available from 1270nm to 1450nm, with each step 20nm. A guaranteed optical link budget of 23 dB is offered.

The module is with the SFP+ connector to allow hot plug capability. Only single 3.3V power supply is needed. The optical output can be disabled by LVTTL logic high-level input of TX_DIS. Loss of signal (RX_LOS) output is provided to indicate the loss of an input optical signal of receiver.

This module provides digital diagnostic functions via a 2-wire serial interface as defined by the SFF-8472 specification.

Absolute Maximum Ratings

Parameter	Symbol	Min	Typical	Max	Unit	Note
Maximum Supply Voltage 1	Vcc	-0.5		4.0	V	
Storage Temperature	T_S	-40		85	°C	

Recommend Operating Condition

Parameter	Symbol	Min	Typical	Max	Units	Note
Case Operating Temperature	T_C	-5		+70	°C	
Supply Voltage	Vcc	3.13	3.3	3.45	V	
Supply Current	Icc			430	mA	
Data Rate		0.614		11.3	Gbps	

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Transmitter						
CML Inputs(Differential)	Vin	180		1000	mVpp	1
Input Impedance (Differential)	Zin	85	100	115	ohm	
TX_DISABLE Input Voltage – High		2		Vcc+0.3	V	
TX_DISABLE Input Voltage – Low		0		0.8	V	
TX_FAULT Output Voltage – High		2		Vcc+0.3	V	
TX_FAULT Output Voltage – Low		0		0.8	V	
Receiver						
CML Outputs (Differential)	Vout	350		700	mVpp	1
Output Impedance (Differential)	Zout	85	100	115	ohm	
RX_LOS Output Voltage – High		2		Vcc+0.3	V	
RX_LOS Output Voltage – Low		0		0.8	V	
MOD_DEF (0:2)	VoH	2.5			V	2
	VoL	0		0.5	V	

Notes:

1. After internal AC coupling.
2. Reference the SFF-8472 MSA.

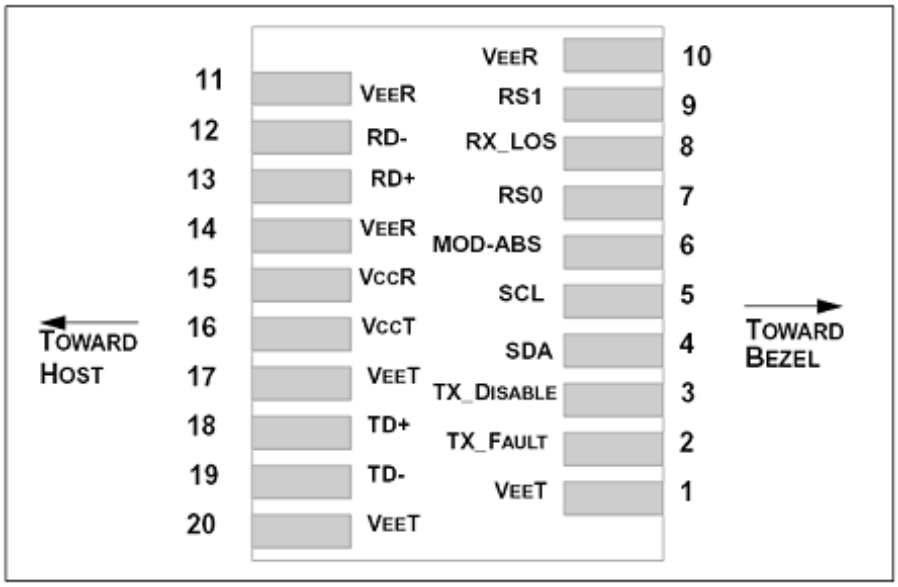
Optical Characteristics

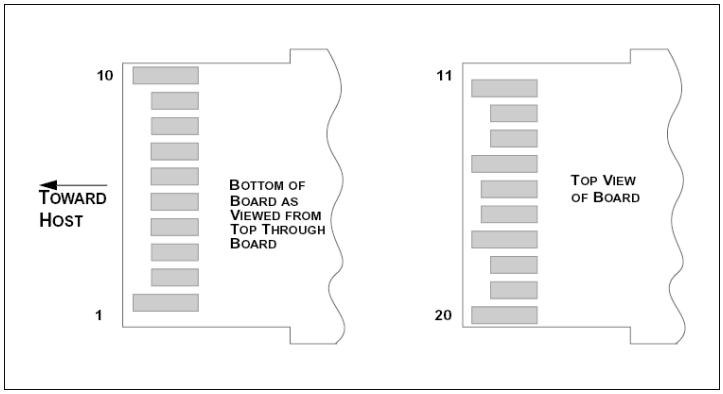
Parameter	Symbol	Min	Typical	Max	Unit	Note
Transmitter						
Output Opt. Pwr: 9/125 SMF	Pout	2		+5	dBm	1
Optical Extinction Ratio	ER	3.5			dB	
Optical Wavelength	λ	λc–6	λc	λc+7.5	nm	2
-20dB Spectrum Width	Δλ			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Average Launch Power of OFF Transmitter	P_{OFF}			-30	dBm	
TX Jitter	TXj	Per 802.3ae requirements				
Relative Intensity Noise	RIN			-128	dB/Hz	
Receiver						
Receiver Sensitivity @ 10.3125Gb/s	Pmin			-21	dBm	3
Maximum Input Power	Pmax	-6			dBm	
Optical Center Wavelength	λ	1260		1460	nm	
Receiver Reflectance	Rrf			-12	dB	
LOS De-Assert	LOS_D			-23	dBm	
LOS Assert	LOS_A	-35			dBm	
LOS Hysteresis		1			dB	

Notes:

1. Output power is coupled into a 9/125μm SMF.
2. ITU-T G.694.2 CWDM wavelength from 1270nm to 1450nm, each step 20nm.
3. Average received power; BER less than 1E-12 and PRBS 2^{31}-1 test pattern.

SFP+ Transceiver Electrical Pad Layout





Pin Function Definitions

Pin Num.	Name	Function	Plug Seq.	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	No Function Implement..
8	LOS	Loss of Signal	3	Note 4
9	RS1	TX Rate Select (LVTTL).	1	No Function Implement..
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 6
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 K Ω 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 on host board. 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.

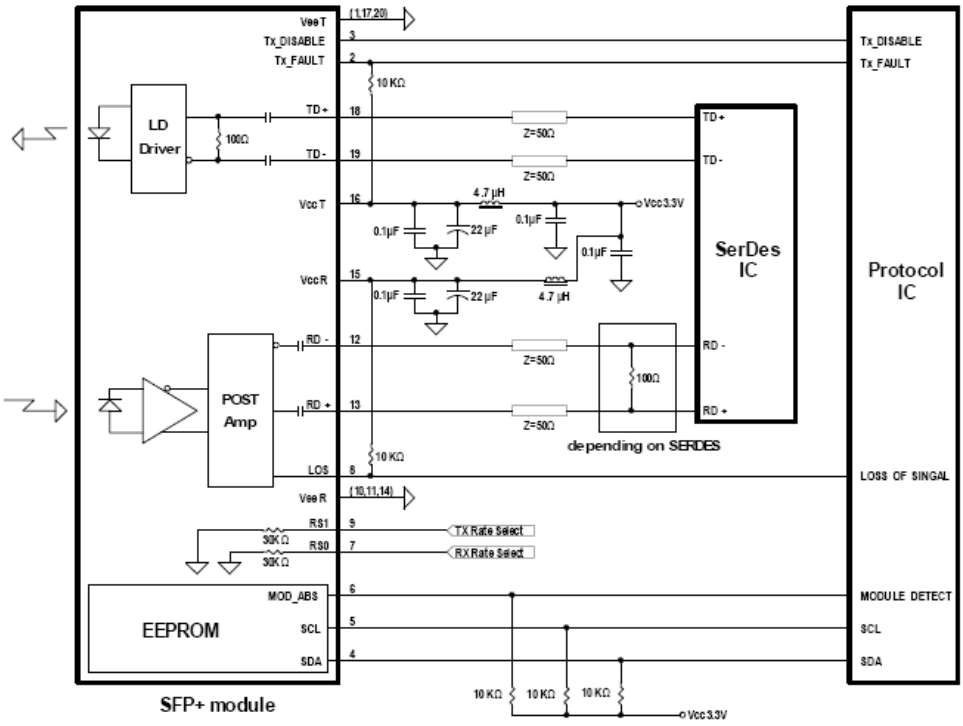
5) The module signal ground contacts, VeeR and VeeT, should be isolated from the module case.

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. The voltage swing on these lines will be between 370 and 700 Mv differential (185 –350Mv single ended) when properly terminated.

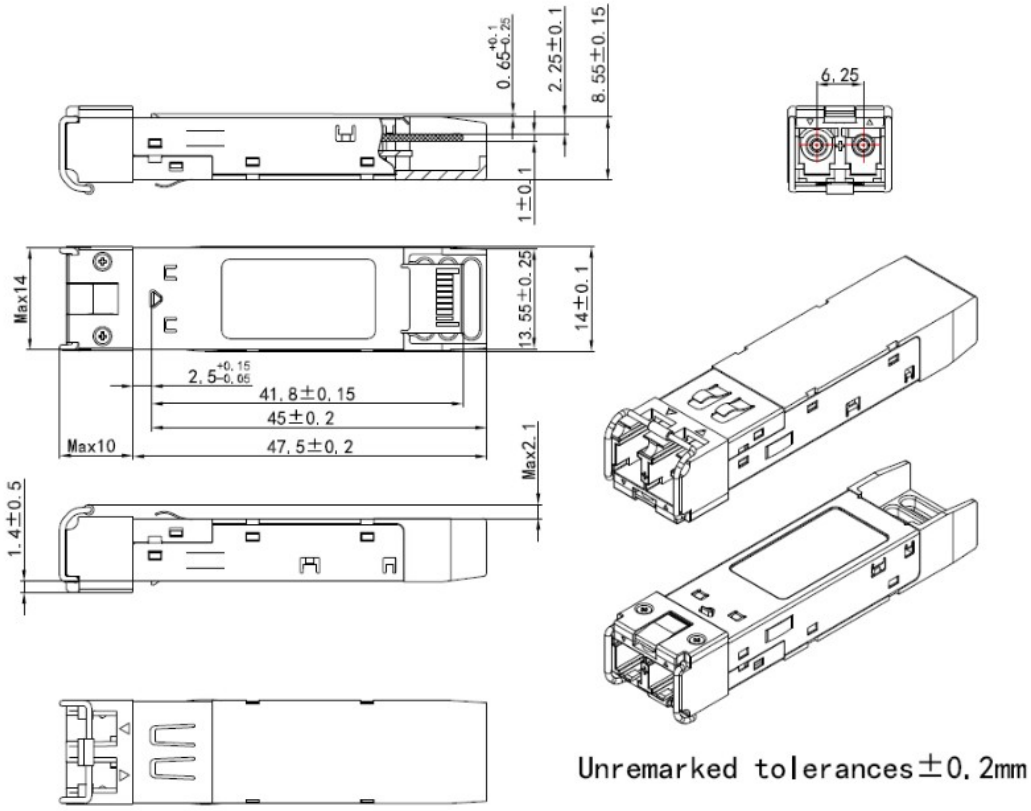
7) VccR and VccT are the receiver and transmitter power supplies. They are defined as 3.3V ±5% at the SFP+ connector pin. Maximum supply current is 300mA. Recommended host board power supply filtering is shown below. Inductors with DC resistance of less than 1 ohm should be used in order to maintain 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.

Recommend Circuit Schematic



Mechanical Specifications



*This 2D drawing only for reference, please check with Data Controls before ordering.

Eye Safety

This single-mode transceiver is a Class 1 laser product. It complies with IEC-60825 and FDA 21 CFR 1040.10 and 1040.11. The transceiver must be operated within the specified temperature and voltage limits. The optical ports of the module shall be terminated with an optical connector or with a dust plug.

Obtaining Document

You can visit our website: http://www.dci.jp
Or contact Data Controls Inc. Listed at the end of the documentation to get the latest documents.

Revision History

Revision	Revision History	Release Date
V1.a	Released.	November 22, 2010
V1.b	Delete redundant wavelength.	June 13, 2011
V2.0	Update spelling mistake	Aug 10, 2011
V2.a	Add power dissipation.	Aug 23, 2011
V2.b	Update P_{out}, Sen and LOSA/LOSD	Jan 13, 2013
V2.c	Update pin definition notes	Jan 31, 2013
V2.d	Update wavelength range and regulatory compliance	Feb 12,2014
V2.e	Update the powerdissipation and regulatory compliance.	Oct 09,2014
V2.f	Update the power dissipation,	Oct 14,2014
V2.g	Update Pmax.	Oct 27,2014
V3.0	Update Mechanical Specifications	Feb 3, 2015
V3.a	Add CPRI/OBSAI application. Update the max data rate and 2D drawing.	July 7,2015
V3.b	Update the regulatory compliance and Tx	Mar 16,2016
V3.c	Update the CPRI data rates and the 2D drawing	Nov 24,2016
V3.d	Update the RS0/RS1 Pin function definition notes, picture, 2D drawing and the contact.	Mar 26, 2018

Notice:

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