

SP10-CWxxZR80x

SFP+ 10Gb/s CWDM 80km Transceiver

PRODUCT FEATURES

- Supports up to 10.7Gbps bit rates
- Hot-pluggable SFP+ footprint
- Up to 80km for SMF
- CWDM Cooled EML laser and APD photodiode
- Compliant with SFP+ MSA and SFF-8472
- Single +3.3V power supply
- Real Time Digital Diagnostic Monitoring
- RoHS compliant
- Operating case temperature:
Standard: 0 to +70°C



APPLICATIONS

- 10Gbps CWDM Optical systems
- 10GBASE-ZR at 10.3125Gbps
- 10GBASE-ZW at 9.953Gbps
- LTE systems

PRODUCT DESCRIPTION

The SP10-CWxxZR80x SFP+ transceivers are high performance, cost effective modules supporting data rate of 10Gbps and 80km transmission distance with SMF.

The transceiver consists of three sections: a Cooled EML laser transmitter, a APD photodiode integrated with a trans-impedance preamplifier (TIA) and MCU control unit. All modules satisfy class I laser safety requirements.

Ordering information

Product part Number	Data Rate (Gbps)	Media	Wavelength (nm)	Transmission Distance(km)	Temperature Range T _{case} / °C	
SP10-CWxxZR80C	10.3	SMF	1470~1570	80	0~70	Commercial

λC Wavelength Guide											
Code	λc	Unit	Code	λc	Unit	Code	λc	Unit	Code	λc	Unit
47	1470	nm	51	1510	nm	55	1550	nm	59	1590	nm
49	1490	nm	53	1530	nm	57	1570	nm	61	1610	nm

Absolute Maximum Ratings

Parameter	Symbol	Min	Max	Unit
Supply Voltage	V _{cc}	-0.5	4.5	V
Storage Temperature	T _s	-40	+85	°C
Operating Humidity	-	5	85	%
Parameter	Symbol	Min	Max	Unit

Recommended Operating Conditions

Parameter	Symbol	Min	Typ	Max	Unit
Case Operating Temperature Range	T _c	0	-	70	°C
Power Supply Voltage	V _{cc}	3.135	3.30	3.465	V
Power Supply Current	I _{cc}			320	mA
Data Rate		1.0	10.3	10.7	Gbps

Optical and Electrical Characteristics

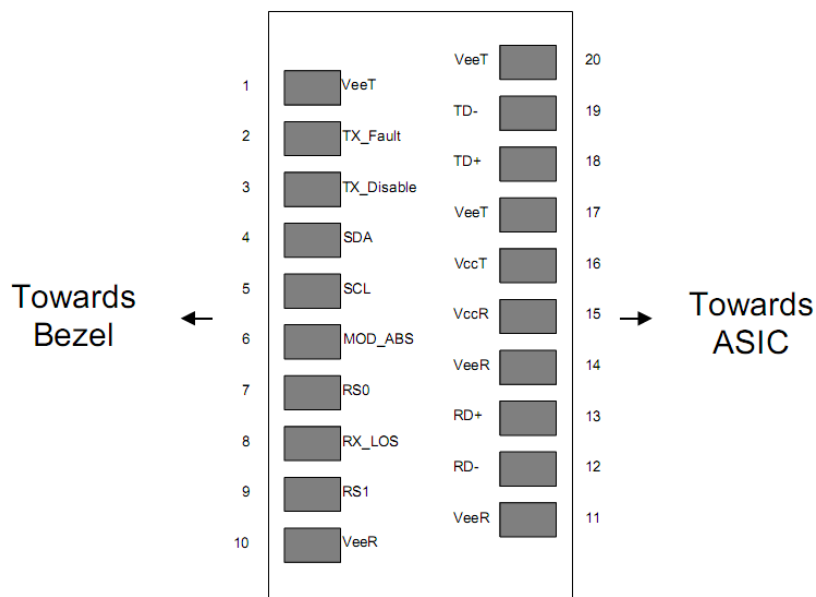
Parameter	Symbol	Min	Typical	Max	Unit	Notes
Transmitter						
Centre Wavelength	λ _c	λ _c -6.5	λ _c	λ _c +6.5	nm	
Spectral Width (-20dB)	Δλ			1	nm	
Side-Mode Suppression Ratio	SMSR	30	-		dB	
Average Output Power	P _{out}	0		+4.0	dBm	1
Extinction Ratio	ER	8.2			dB	
Data Input Swing Differential	V _{IN}	180		850	mV	2
Input Differential Impedance	Z _{IN}	90	100	110	Ω	
TX Disable	Disable		2.0	V _{cc}	V	

	Enable		0		0.8	V	
TX Fault	Fault		2.0		Vcc	V	
	Normal		0		0.8	V	
Receiver							
Centre Wavelength	λ_c		1450		1620	nm	
Receiver Sensitivity					-23.0	dBm	3
Receiver Overload			0.5			dBm	3
LOS De-Assert	LOS _D				-24	dBm	
LOS Assert	LOS _A		-35			dBm	
LOS Hysteresis			0.5			dB	
Data Output Swing Differential	V _{out}		300		900	mV	4
LOS	High		2.0		Vcc	V	
	Low				0.8	V	

Notes:

1. The optical power is launched into SMF.
2. PECL input, internally AC-coupled and terminated.
3. Measured with a PRBS 2³¹-1 test pattern @10312Mbps, BER ≤1×10⁻¹².
4. Internally AC-coupled.

Pin Description



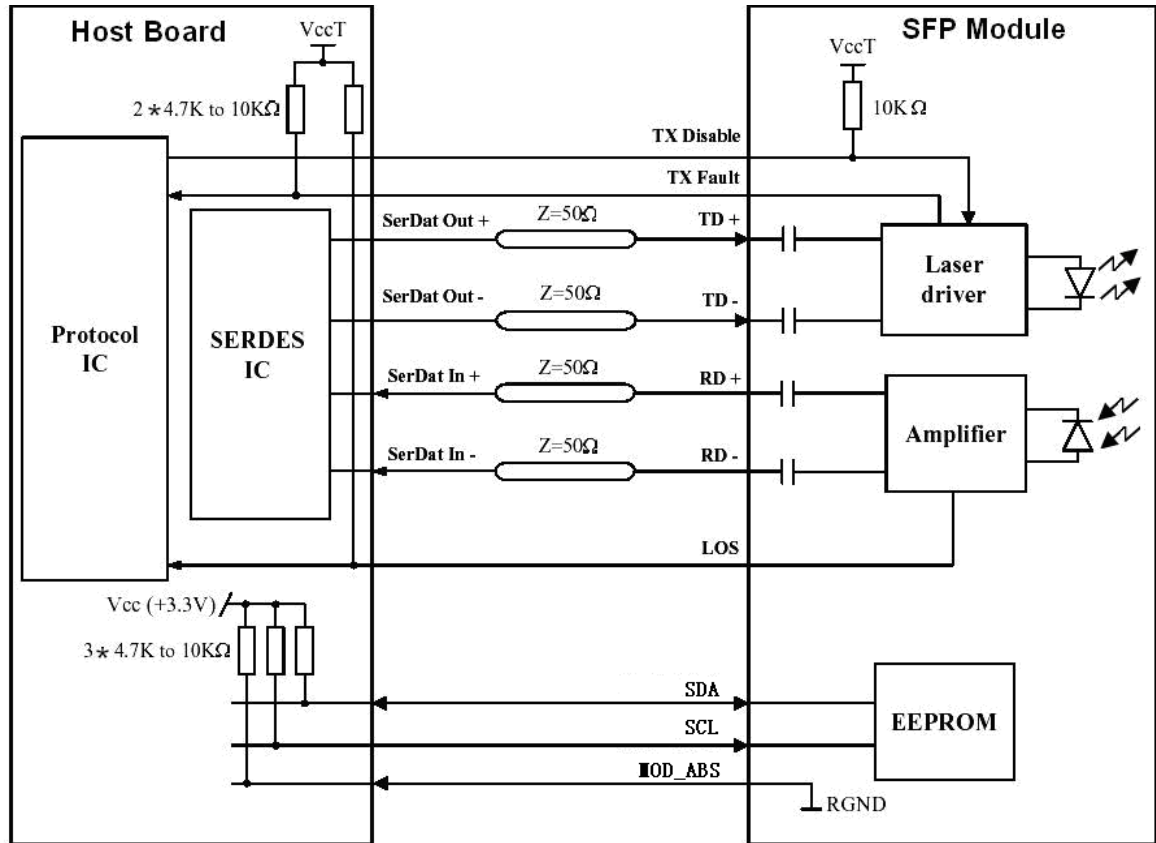
Pin	Signal Name	Description	Plug Seq.	Notes
1	V _{EET}	Transmitter Ground	1	
2	TX FAULT	Transmitter Fault Indication	3	Note 1
3	TX DISABLE	Transmitter Disable	3	Note 2
4	SDA	SDA Serial Data Signal	3	
5	SCL	SCL Serial Clock Signal	3	
6	MOD_ABS	Module Absent. Grounded within the module	3	
7	RS0	Not Connected	3	
8	LOS	Loss of Signal	3	Note 3
9	RS1	Not Connected	3	
10	V _{EER}	Receiver ground	1	
11	V _{EER}	Receiver ground	1	
12	RD-	Inv. Received Data Out	3	Note 4
13	RD+	Received Data Out	3	Note 4
14	V _{EER}	Receiver ground	1	
15	V _{CCR}	Receiver Power Supply	2	
16	V _{CCT}	Transmitter Power Supply	2	
17	V _{EET}	Transmitter Ground	1	
18	TD+	Transmit Data In	3	Note 5
19	TD-	Inv. Transmit Data In	3	Note 5
20	V _{EET}	Transmitter Ground	1	

Notes:

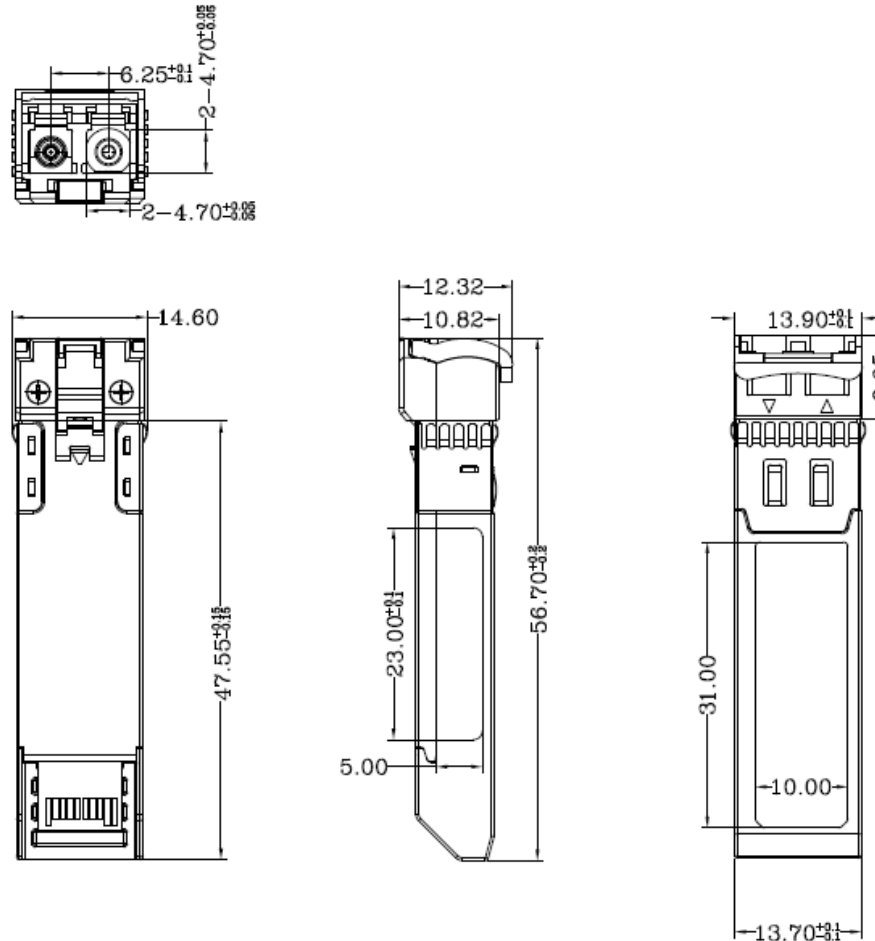
Plug Seq.: Pin engagement sequence during hot plugging.

- 1) TX Fault is an open collector output, which should be pulled up with a 4.7k~10kΩ resistor on the host board to a voltage between 2.0V and V_{cc}+0.3V. Logic 0 indicates normal operation; Logic 1 indicates a laser fault of some kind. In the low state, the output will be pulled to less than 0.8V.
- 2) Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
- 3) LOS is open collector output. Should be pulled up with 4.7k~10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 4) RD-/+ : These are the differential receiver outputs. They are internally AC-coupled 100 differential lines which should be terminated with 100Ω (differential) at the user SERDES.
- 5) TD-/+ : These are the differential transmitter inputs. They are internally AC-coupled, differential lines with 100Ω differential termination inside the module.

Recommended Interface Circuit



Machnical Dimensions



Regulatory Compliance

Feature	Reference	Performance
Electrostatic discharge (ESD)	IEC/EN 61000-4-2	Compatible with standards
Electromagnetic Interference (EMI)	FCC Part 15 Class B EN 55022 Class B (CISPR 22A)	Compatible with standards
Laser Eye Safety	IEC/EN 60825-1, 2	Class 1 laser product
ROHS	2002/95/EC	Compatible with standards
EMC	EN61000-3	Compatible with standards