



## **10GBASE-ER/EW 1470nm~1610nm SMF 40km CWDM SFP+ Optical Transceiver with Duplex LC Connector**

### **10GxxCWDM-LSFPx**



#### **DESCRIPTION**

The 10GxxCWDM-LSFPx Enhanced Small Form Factor Pluggable SFP+ optical transceivers are RoHS compliant and designed for use in serial optical data communications application specified for a data rate of 10 Gb/s. The SFP+ transceiver module provides up to 40km transmission distance over single-mode fiber. There are eight center wavelengths available from 1470nm to 1610nm. They are compliant with SFF 8472 diagnostic monitoring interface, and EN60825-1, and supports CPRI line bit option 7:9830.4 Mbit/s.

#### **FEATURES**

- Compliant with SFF8472 diagnostic monitoring interface
- Duplex LC connector
- Hot pluggable SFP+ package
- Class 1 laser product compliant with EN 60825-1
- Support CPRI line bit rate option 7: 9830.4 Mbit/s
- Single power supply 3.3V
- Up to 40km transmission on SMF

#### **APPLICATIONS**

- CWDM Network

#### **PRODUCT OVERVIEW**

<b>PART NUMBER</b>	<b>OPERATING TEMPERATURE</b>
10GxxCWDM-LSFPC	0°C to 70°C
10GxxCWDM-LSFPI	-40°C to 85°C

Where **xx** value is as follows: **xx = 47** for 1471nm, **xx = 49** for 1491nm, **xx = 51** for 1511nm, **xx = 53** for 1531nm, **xx = 55** for 1551nm, **xx = 57** for 1571nm, **xx = 59** for 1591nm, **xx = 61** for 1611nm

**DIAGNOSTICS**

PARAMETER	RANGE	ACCURACY	UNIT	CALIBRATION
Internal Transceiver Temperature	-40 to 85	±3	°C	Internal
Internal Transceiver Voltage	3.14 to 3.46	±0.1	V	
Bias Current	0 to 120	±10%	mA	
TX Power	-4.7 to +4.7	±3	dB	
RX Average Power	-1 to -16	±3	dB	

**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	MIN	MAX	UNIT
Storage Temperature	T <sub>s</sub>	-40	85	°C
Supply Voltage	V <sub>CC</sub>	0	3.6	V
Input Voltage	V <sub>IN</sub>	0	V <sub>CC</sub>	V
Operating Relative Humidity	RH	0	85	%

**RECOMMENDED OPERATING CONDITIONS**

PARAMETER	SYMBOL	MIN	MAX	UNIT	NOTES
Case Operating Temperature	T <sub>c</sub>	0	70	°C	10GxxCWDM-LSFPC
		-40	85		10GxxCWDM-LSFPI
Supply Voltage	V <sub>CC</sub>	3.14	3.46	V	
Supply Current	I <sub>TX</sub> + I <sub>RX</sub>		390	mA	10GxxCWDM-LSFPC
			450		10GxxCWDM-LSFPI
Power Consumption @3.3V	P	-	1.3	W	10GxxCWDM-LSFPC
			1.5		10GxxCWDM-LSFPI

**TRANSMITTER ELECTRO-OPTICAL CHARACTERISTICS (V<sub>CC</sub> = 3.14V to 3.46V, T<sub>c</sub> = 0°C to 70°C, -40°C to 85°C)**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Data Rate	B		10.3125		Gbps	
Output Optical Power	P <sub>out</sub>	-4.7	-	+4.0	dBm	
Extinction Ratio	ER	6			dB	
Center Wavelength	λ <sub>c</sub>	-6.5	x	+6.5	nm	x = specified center wavelength
Spectral Width (RMS)	Δλ	-	-	1	nm	
Side Mode Suppression Ratio	SSR <sub>min</sub>	30			dB	
Transmitter and Dispersion Penalty	TDP			2	dB	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Optical Return Loss	ORL	21	-	-	dB	
Output Eye		Compliant with IEEE802.3ae				
Differential Input Impedance	Z <sub>d</sub>		100		Ω	
Differential Input Voltage Swing	V <sub>DIFF</sub>	300		1000	mVpp	
Transmit Fault Output-Low	TX_FAULT <sub>L</sub>	0.0	-	0.5	V	
Transmit Fault Output-High	TX_FAULT <sub>H</sub>	2.4	-	V <sub>CC</sub>	V	
TX_DISABLE Assert Time	t <sub>off</sub>	-	-	100	μs	
TX_DISABLE Negate Time	t <sub>on</sub>	-	-	2	ms	
TX_FAULT from fault to assertion	t <sub>fault</sub>	-	-	50	ms	
TX_DISABLE Time to start reset	t <sub>reset</sub>	10	-	-	μs	

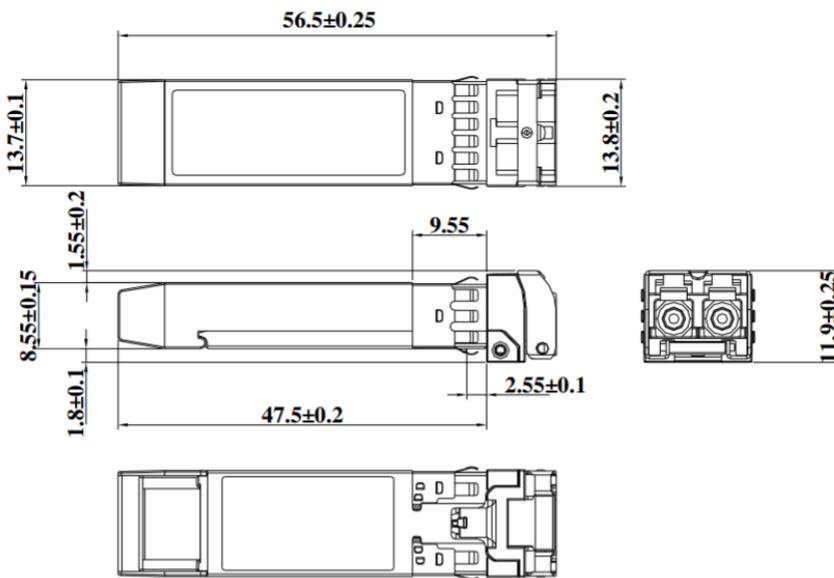
**RECEIVER ELECTRO-OPTICAL CHARACTERISTICS ( $V_{CC} = 3.14V$  to  $3.46V$ ,  $T_C = 0^{\circ}C$  to  $70^{\circ}C$ ,  $-40^{\circ}C$  to  $85^{\circ}C$ )**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Data Rate	B		10.3125		Gbps	
Optical Input Power – maximum	$P_{IN}$	-1.0	-	-	dBm	BER< $10^{-12}$
Receiver Sensitivity@10.3125 Gbps	$P_{IN}$	-	-	-15.8	dBm	BER< $10^{-12}$
Receiver Sensitivity (OMA)	$P_{IN}$	-	-	-14.1	dBm	BER< $10^{-12}$
Stressed Receiver Sensitivity (OMA)	$P_{IN}$	-	-	-11.3	dBm	BER< $10^{-12}$
Receiver Reflectance	Ref	-	-	-26	dB	
Operating Center Wavelength	$\lambda_C$	1460	-	1620	nm	
Loss of Signal-Asserted	$P_A$	-30	-	-	dBm	
Loss of Signal-Deasserted	$P_D$	-	-	-18	dBm	
Differential Output Impedance	$Z_d$	-	100	-	$\Omega$	
Differential Output Voltage	$V_{DIFF}$	300	-	800	mVpp	
Receiver Loss of Signal Output Voltage-Low	RX_LOSL	0	-	0.5	V	
Receiver Loss of Signal Output-High	RX_LOSH	2.4	-	$V_{CC}$	V	
Receiver Loss of Signal Assert Time (off to on)	$t_{A,RX\_LOS}$	-	-	100	$\mu s$	
Receiver Loss of Signal Assert Time (on to off)	$t_{D,RX\_LOS}$	-	-	100	$\mu s$	

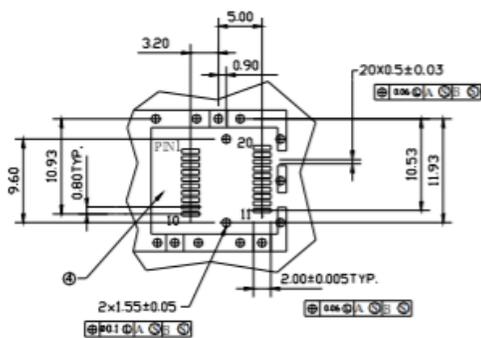
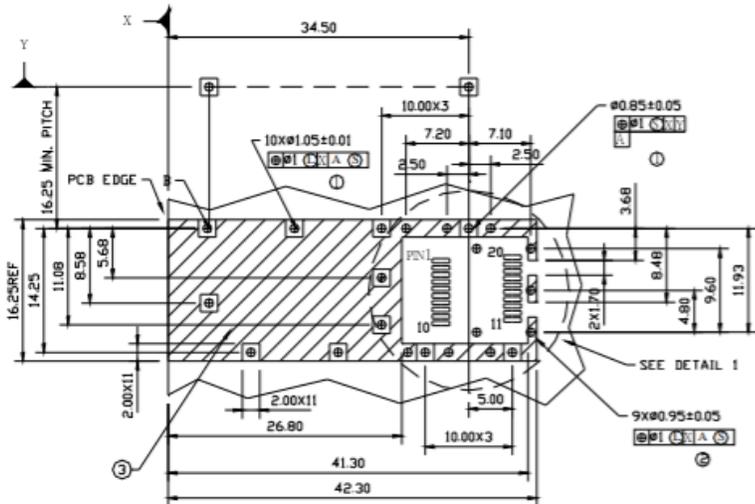
**TIMING PARAMETERS**

PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Time to Initialize	$t_{start\_up}$			10	s	

**DIMENSIONS (unit: mm)**



SFP HOST BOARD MECHANICAL LAYOUT (unit: mm)

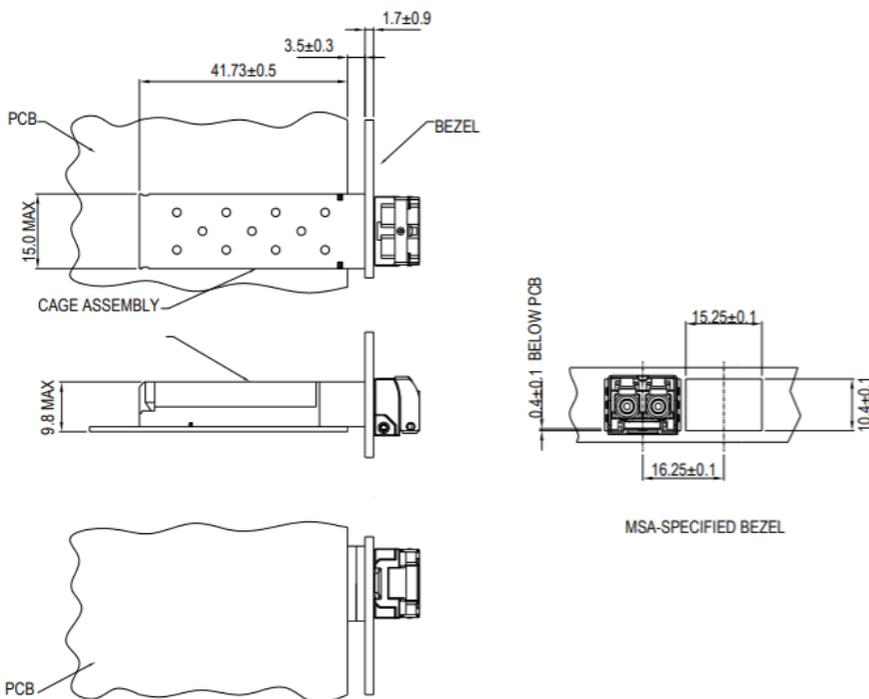


LEGEND

- 1.PADS AND VIAS ARE CHASSIS GROUND
- 2.THROUGH HOLES, PLATING OPTIONAL
- 3.HATCHED AREA DENOTES COMPONENT AND TRACE KEEPOUT(EXCEPT CHASSIS GROUND)
- 4.AREA DENOTES COMPONENT KEEPOUT (TRACES ALLOWED)

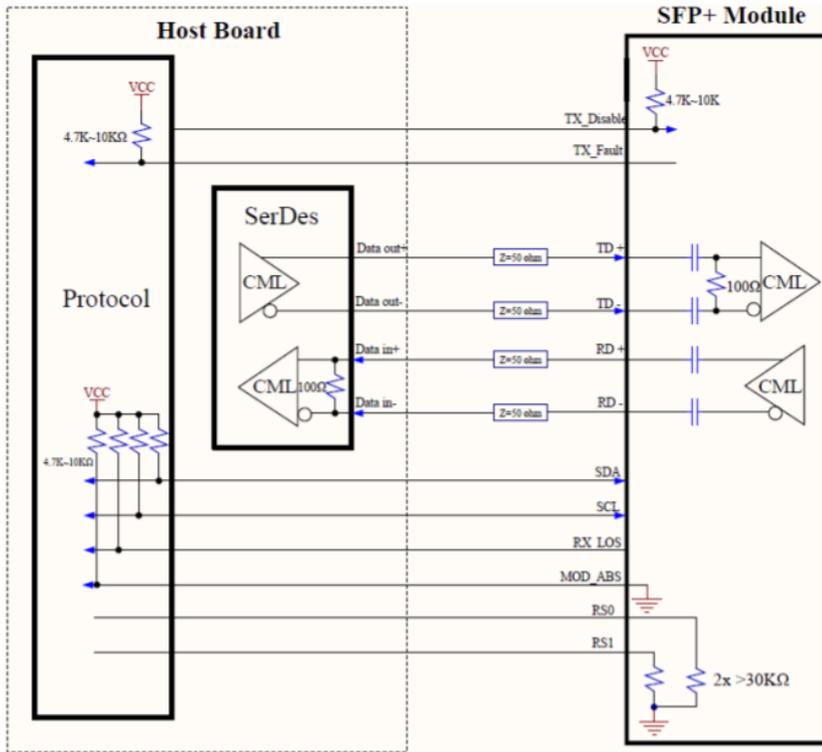
DIMENSIONS ARE IN MILLIMETERS

ASSEMBLY DRAWING

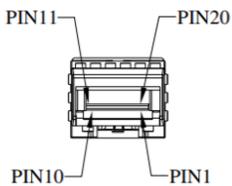


DIMENSIONS ARE IN MILLIMETERS

RECOMMENDED INTERFACE CIRCUIT



PIN ASSIGNMENT



PIN	SIGNAL NAME	DESCRIPTION	PIN	SIGNAL NAME	DESCRIPTION
1	T <sub>GND</sub>	Transmit Ground	11	R <sub>GND</sub>	Receiver Ground
2	TX_FAULT	Transmit Fault	12	RX-	Receive Data out Bar, ac coupled
3	TX_DISABLE	Transmit Disable	13	RX+	Receive Data out, ac coupled
4	MOD_DEF (2)	SDA Serial Data Signal	14	R <sub>GND</sub>	Receiver Ground
5	MOD_DEF (1)	SCL Serial Clock Signal	15	V <sub>CCR</sub>	Receiver Power Supply
6	MOD_DEF (0)	TTL Low	16	V <sub>CCT</sub>	Transmitter Power Supply
7	RS0	RX Rate Select, no function implemented	17	T <sub>GND</sub>	Transmitter Ground
8	RX_LOS	Receiver Loss of Signal, TTL High, open collector	18	TX+	Transmit Data in, ac coupled
9	RS1	TX Rate Select, no function implemented	19	TX-	Transmit Data in Bar, ac coupled
10	R <sub>GND</sub>	Receiver Ground	20	T <sub>GND</sub>	Transmitter Ground

**ADDITIONAL NOTES**

- Avoid eye or skin exposure to laser radiations.
- The device is sensitive to electro-static discharge (ESD). The device should be handled with ESD proof tools. To assemble the device on PCB, proper grounding is required to prevent ESD.
- Specifications are subject to change without notice.



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