



# 10GBASE-ZR/ZW 1470nm~1610nm SMF 70km CWDM SFP+ Optical Transceiver with Duplex LC Connector

Model No. 10GxxCWDM-USFPx

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

## FEATURES

- Compliant with SFF8472 diagnostic monitoring interface
- Duplex LC connector
- Hot pluggable
- Class 1 laser product compliant with EN 60825-1
- Support CPRI line bit rate option 7: 9830.4 Mbit/s
- 1550nm EML laser and APD receiver
- Single power supply 3.3V
- Up to 70km transmission on SMF



## 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	0 to +4	±3	dB	
RX Average Power	-23 to -10	±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-USFPx
		-40	85		10GxxCWDM-USFPi
Supply Voltage	V <sub>CC</sub>	3.14	3.46	V	
Supply Current	I <sub>TX</sub> + I <sub>RX</sub>		545	mA	10GxxCWDM-USFPx
			645		10GxxCWDM-USFPi
Power Consumption @3.3V	P	-	1.8	W	10GxxCWDM-USFPx
			2.1		10GxxCWDM-USFPi

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**TRANSMITTER 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	
Output Optical Power	$P_{out}$	0	-	+4.0	dBm	
Extinction Ratio	ER	8.2			dB	
Center Wavelength	$\lambda_c$	-6.5	x	+6.5	nm	x = specified center wavelength
Spectral Width (RMS)	$\Delta\lambda$	-	-	1	nm	
Side Mode Suppression Ratio	$SSR_{min}$	30			dB	
Transmitter and Dispersion Penalty	TDP			3	dB	
Relative Intensity Noise	RIN	-	-	-128	dB/Hz	
Optical Return Loss	ORL	21	-	-	dB	
Output Eye		Compliant with IEEE802.3ae				
Differential Input Impedance	$Z_d$		100		$\Omega$	
Differential Input Voltage Swing	$V_{DIFF}$	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	-	$V_{CC}$	V	
TX_DISABLE Assert Time	$t_{off}$	-	-	100	$\mu s$	
TX_DISABLE Negate Time	$t_{on}$	-	-	2	ms	
TX_FAULT from fault to assertion	$t_{fault}$	-	-	50	ms	
TX_DISABLE Time to start reset	$t_{reset}$	10	-	-	$\mu s$	

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

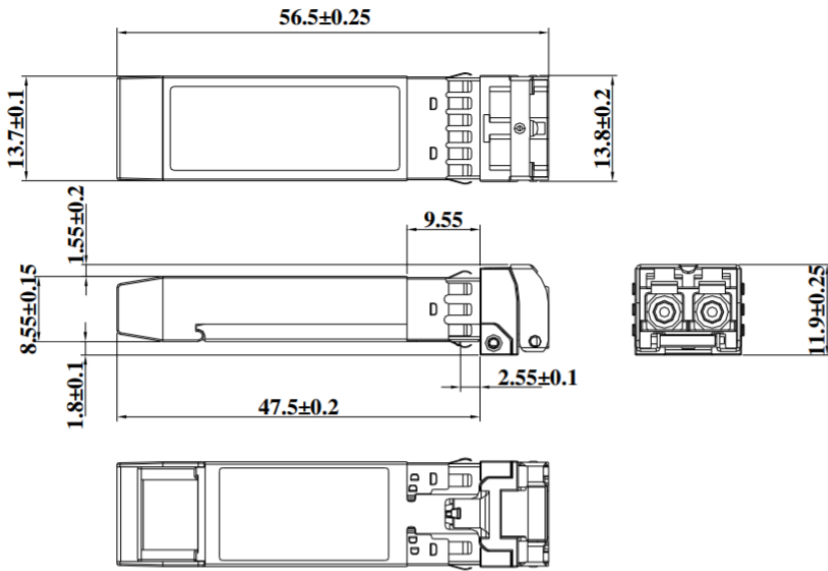
PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Data Rate	B		10.3125		Gbps	
Optical Input Power – maximum	$P_{IN}$	-7	-	-	dBm	BER<10 <sup>-12</sup>
Receiver Sensitivity@10.3125 Gbps	$P_{IN}$	-	-	-23	dBm	BER<10 <sup>-12</sup>
Receiver Sensitivity with 70km fiber @10.3125G	$P_{IN\_fiber}$	-	-	-20	dBm	BER<10 <sup>-12</sup>
Operating Center Wavelength	$\lambda_c$	1460	-	1620	nm	
Loss of Signal-Asserted	$P_A$	-38	-	-	dBm	
Loss of Signal-Deasserted	$P_D$	-	-	-25	dBm	
Differential Output Impedance	$Z_d$	-	100	-	$\Omega$	
Differential Output Voltage	$V_{DIFF}$	300	-	800	mVpp	
Receiver Loss of Signal Output Voltage-Low	RX_LOS <sub>L</sub>	0	-	0.5	V	
Receiver Loss of Signal Output-High	RX_LOS <sub>H</sub>	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**

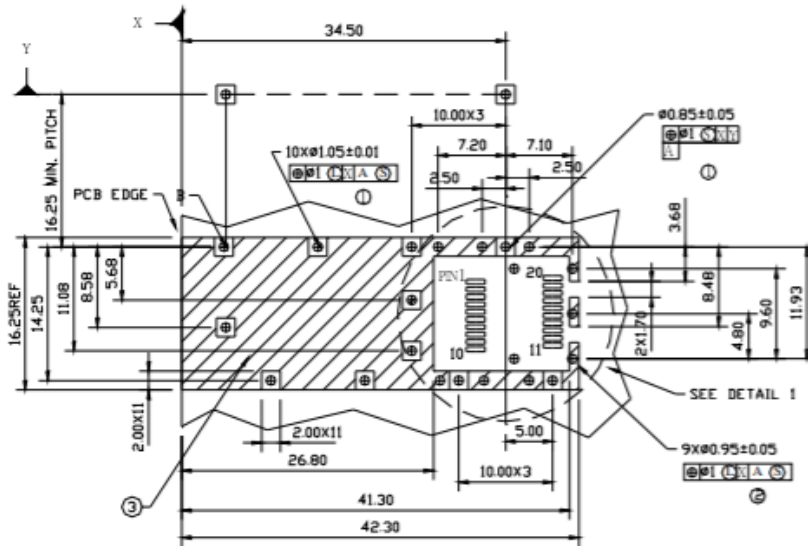
PARAMETER	SYMBOL	MIN	TYP.	MAX	UNIT	NOTES
Time to Initialize	$t_{start\_up}$			10	s	



**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

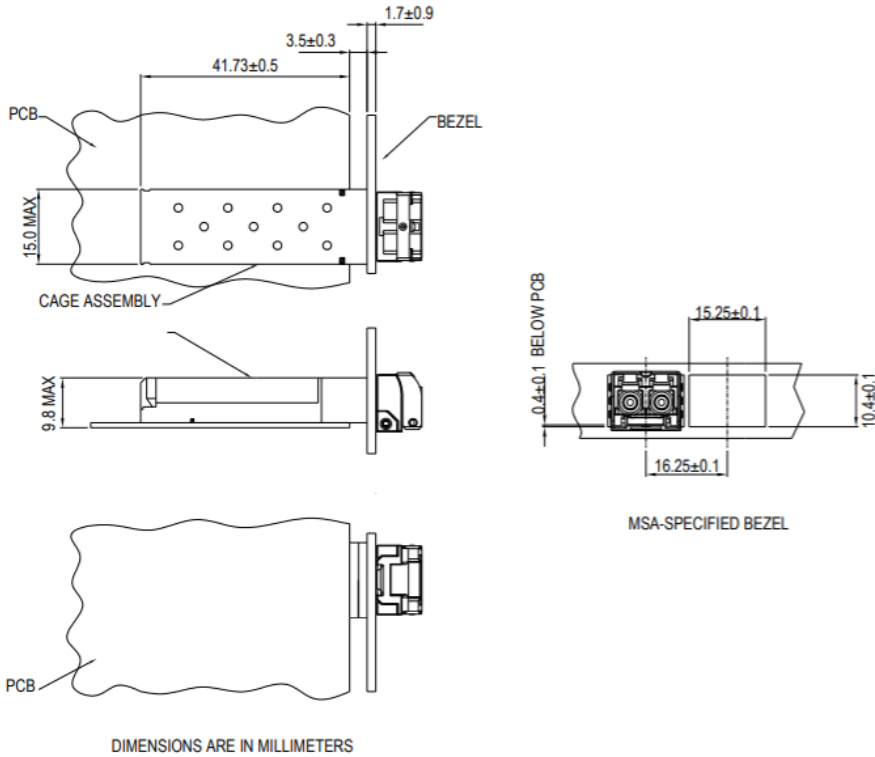
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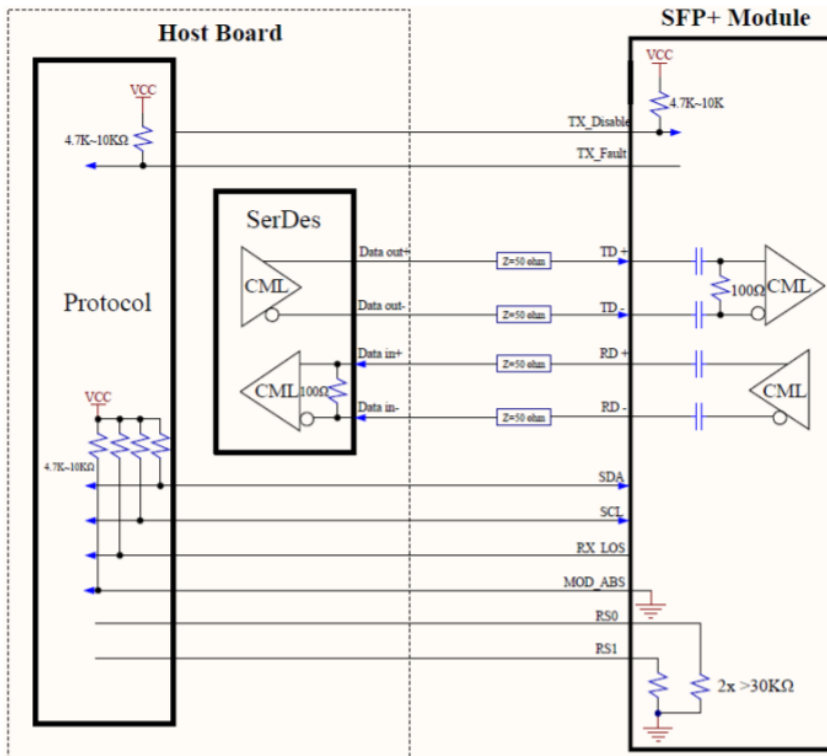
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**ASSEMBLY DRAWING**

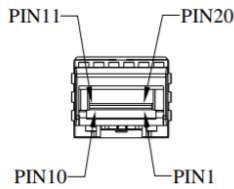


**RECOMMENDED INTERFACE CIRCUIT**





## 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

## ORDERING INFORMATION

PART NUMBER	OPERATING TEMPERATURE
10GxxCWDM-USFPC	0°C to 70°C
10GxxCWDM-USFPI	-40°C to 85°C

**Note:** The specifications subject to change without notice.