

# 1000BASE-CWDM SFP 1270nm~1610nm 40km Transceiver Module

3HE00410AA-LL



## Application

- Gigabit Ethernet
- 1 × Fiber Channel
- CWDM Networks

## Features

- Up to 1.25Gb/s Data Links
- Hot-Pluggable
- Duplex LC connector
- Up to 40km on 9/125μm SMF
- 18-Wavelength CWDM 1270n~1610nm Available
- CWDM DFB laser transmitter
- Single +3.3V Power Supply
- Monitoring Interface Compliant with SFF-8472
- Low power dissipation <1W typically
- Operating temperature range: 0° C to 70° C
- RoHS compliant and Lead Free

## Description

Longline's CWDM-SFP1G-ZX--LL CWDM Transceiver products provide optical networking equipment manufacturers with a timely and cost effective tool in supporting the unceasing demand for higher bandwidth equipment build-outs in the enterprise access and metropolitan area networks. There are 18 center wavelengths available from 1270nm to 1610nm. The 20nm channel spacing allows for un-cooled laser operation, a high yield manufacturing process, and lower cost Mux/Demux technology, thus providing a complete cost effective solution for various data and telecom applications.

## Product Specifications

### I. General Specifications

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Data Rate</b>	BR		1.25		Gb/s	
<b>Bit Error Rate</b>	BER			10-12		
<b>Max. Supported Link Length on 9/125<math>\mu</math>m SMF@1.25Gb/s</b>	LMAX		40		km	
<b>Total System Budget</b>	LB	19			dB	

### II. Absolute Maximum Ratings

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Storage Temperature</b>	TS	-40		+85	$^{\circ}$ C	
<b>Supply Voltage</b>	VCC	-0.5		4	V	
<b>Relative Humidity</b>	RH	0		85	%	

### III. Recommended Operating Environment

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Case operating Temperature</b>	Tc	0		+70	$^{\circ}$ C	
<b>Supply Voltage</b>	VCC	3.135		3.465	V	
<b>Supply Current</b>	Icc			250	mA	
<b>Inrush Current</b>	I <sub>surge</sub>			I <sub>cc</sub> +30	mA	
<b>Maximum Power</b>	P <sub>max</sub>			1	W	

**IV. Electrical Characteristics (TOP = Tc, VCC = 3.135 to 3.465 Volts)**

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Transmitter</b>						
<b>Input differential impedance</b>	Rin	90	100	110	W	1
<b>Single ended data input swing</b>	Vin PP	250		1200	mVp-p	
<b>Transmit Disable Voltage</b>	VD	Vcc – 1.3		Vcc	V	2
<b>Transmit Enable Voltage</b>	VEN	Vee		Vee+ 0.8	V	
<b>Transmit Disable Assert Time</b>	Tdessert			10	us	
<b>Receiver</b>						
<b>Single ended data output swing</b>	Vout,pp	300		800	mv	3
<b>Data output rise time</b>	tr			260	ps	4
<b>Data output fall time</b>	tf			260	ps	4
<b>LOS Fault</b>	Vlosfault	Vcc – 0.5		VCC_host	V	5
<b>LOS Normal</b>	Vlos norm	Vee		Vee+0.5	V	5
<b>Power Supply Rejection</b>	PSR	100			mVpp	6

**Notes:**

1. AC coupled.
2. Or open circuit.
3. Into 100 ohm differential termination.
4. 20 – 80 %
5. LOS is LVTTTL. Logic 0 indicates normal operation; logic 1 indicates no signal detected.
6. All transceiver specifications are compliant with a power supply sinusoidal modulation of 20 Hz to 1.5MHz up to specified value applied through the power supply filtering network shown on page 23 of the Small Form-factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), September 14, 2000.

**V. Optical Characteristics(TOP =Tc, VCC = 3.135 to 3.465 Volts)**

Parameter	Symbol	Min	Typ.	Max	Unit	Ref.
<b>Transmitter</b>						
<b>Center Wavelength</b>	$\lambda_c$	$\lambda-6.5$	$\lambda$	$\lambda+6.5$	nm	
<b>Spectral Width</b>	$\sigma$			1	nm	
<b>Side Mode Suppression Ratio</b>	SMSR	30			dB	
<b>Optical Output Power</b>	P <sub>out</sub>	-5		0	dBm	1
<b>Optical Rise/Fall Time</b>	t <sub>r</sub> / t <sub>f</sub>			260	ps	2
<b>Extinction Ratio</b>	ER	9			dB	
<b>Generated Jitter (peak to peak)</b>	JTX <sub>p-p</sub>			0.07	UI	3
<b>Generated Jitter (rms)</b>	JTX <sub>rms</sub>			0.007	UI	3
<b>Eye Mask for Optical Output</b>	Compliant with IEEE802.3z(class 1 laser safety)					
<b>Receiver</b>						
<b>Optical Input Wavelength</b>	$\lambda_c$	1260		1620	nm	
<b>Receiver Overload</b>	Pol	-8			dBm	4
<b>RX Sensitivity</b>	Sen			-24	dBm	4
<b>RX_LOS Assert</b>	LOS A	-40			dBm	
<b>RX_LOS De-assert</b>	LOS D			-25	dBm	
<b>RX_LOS Hysteresis</b>	LOS H	0.5			dB	

## Notes:

1. The optical power is launched into SMF.
2. 20-80%.
3. Jitter measurements taken using Agilent OMNIBERT 718 in accordance with GR-253.
4. Measured with PRBS 27 -1at 10-12 BER

## VI. Pin Assignment



**Figure1. Diagram of Host Board Connector Block Pin Numbers and Names**

Pin	Name	Function	Plug Seq	Notes
1	VeeT	Transmitter Ground	1	1
2	TX Fault	Transmitter Fault Indication	3	
3	TX Disable	Transmitter Disable	3	2
4	MOD-DEF2	Module Definition	2	3
5	MOD-DEF1	Module Definition 1	3	3
6	MOD-DEF0	Module Definition 0	3	3
7	Rate Select	Not Connected	3	4
8	LOS	Loss of Signal	3	5

9	VeeR	Receiver Ground	1	1
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground		1
12	RD-	Inv. Received Data Out	3	6
13	RD+	Received Data Out	3	6
14	VeeR	Receiver Ground	3	1
15	VccR	Receiver Power	2	1
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	
18	TD+	Transmit Data In	3	6
19	TD-	Inv. Transmit In	3	6
20	VeeT	Transmitter Ground	1	

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
3. Should be pulled up with 4.7k - 10 kohms on host board to a voltage between 2.0V and 3.6V. MOD\_DEF(0) pulls line low to indicate module is plugged in.
4. Rate select is not used
5. LOS is open collector output. Should be pulled up with 4.7k – 10 kohms on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
6. AC Coupled

## VII. Mechanical Specifications

