TTD4580-33-PI-C

Arris® TTD4580-33-PI Compatible TAA 10GBase-DWDM SFP+ Transceiver (SMF, 1550.92nm, 80km, LC, DOM, -40 to 95C)

Features:

- Cooled DWDM EML Transmitter with TEC
- APD Receiver
- Supports 9.95Gbps to 11.3Gbps Bit Rates
- Maximum Link Length of 80km
- LC/UPC Duplex Optical Connector Interface
- Power Consumption: 2.8W
- Single 3.3V Power Supply
- Compliant to SFF-8431 for Electrical Interface; SFF-8432 for Mechanical Interface
- Hot-Pluggable
- Operating Temperature: -40 to 95 Celsius
- RoHS Compliant and Lead-Free

Applications:

- 10x Gigabit Ethernet over DWDM
- 8x/10x Fibre Channel
- Access, Metro and Enterprise

Product Description

This Arris® TTD4580-33-PI compatible SFP+ transceiver provides 10GBase-DWDM throughput up to 80km over single-mode fiber (SMF) using a wavelength of 1550.92nmnm via an LC connector. It can operate at temperatures between -40 and 95C. It is guaranteed to be 100% compatible with the equivalent Arris® transceiver. This easy to install, hot swappable transceiver has been programmed, uniquely serialized and data-traffic and application tested to ensure that it will initialize and perform identically. Digital optical monitoring (DOM) support is also present to allow access to real-time operating parameters. This transceiver is Trade Agreements Act (TAA) compliant. We stand behind the quality of our products and proudly offer a limited lifetime warranty.

ProLabs' transceivers are RoHS compliant and lead-free.

TAA refers to the Trade Agreements Act (19 U.S.C. & 2501-2581), which is intended to foster fair and open international trade. TAA requires that the U.S. Government may acquire only "U.S.-made or designated country end products.")

TAA COMPLIANT

Rev. 100225

Wavelength Guide (100GHz ITU-T Channels)

ITU Channel #	Frequency (THz)	Center Wavelength (nm)
17	191.7	1563.86
18	191.8	1563.05
19	191.9	1562.23
20	192.0	1561.42
21	192.1	1560.61
22	192.2	1559.79
23	192.3	1558.98
24	192.4	1558.17
25	192.5	1557.36
26	192.6	1556.55
27	192.7	1555.75
28	192.8	1554.94
29	192.9	1554.13
30	193.0	1553.33
31	193.1	1552.52
32	193.2	1551.72
33	193.3	1550.92
34	193.4	1550.12
35	193.5	1549.32
36	193.6	1548.51
37	193.7	1547.72
38	193.8	1546.92
39	193.9	1546.12
40	194.0	1545.32
41	194.1	1544.53
42	194.2	1543.73
43	194.3	1542.94
44	194.4	1542.14
45	194.5	1541.35
46	194.6	1540.56
47	194.7	1539.77
48	194.8	1538.98
49	194.9	1538.19
50	195.0	1537.40
51	195.1	1536.61
52	195.2	1535.82
53	195.3	1535.04

54	195.4	1534.25
55	195.5	1533.47
56	195.6	1532.68
57	195.7	1531.90
58	195.8	1531.12
59	195.9	1530.33
60	196.0	1529.55

Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Data Rate	DR		10.3125		Gbps	1
Storage Temperature	Tstg	-40		95	°C	
Operating Relative Humidity	RH	0		85	%	2
Operating Temperature	Tc	-40		95		3
Maximum Supply Voltage	VccT, VccR	-0.5		4.0	V	

Notes:

1. Distances are calculated for worst-case fiber and transceiver characteristics based on the optical and electrical specifications shown in this document using techniques specified in IEEE 802.3. These distances are consistent with those specified for 10GBASE-ZR and 10GBASE-ZW.
2. Non-condensing.
3. With airflows.

Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter Differential Input Voltage	Vp	2.5			V	
Module Supply Voltage	VccT, VccR	+3.135		-3.465	V	
Total Power Consumption	PC			2.8	W	1
Power Supply Noise Tolerance	PSNT			66	mVp-p	2
Low-Speed Signal Electrical Characteristics						
Tx_Fault, Rx_LOS	VOL	-0.3		0.4	V	3
	VOH	-50		37.5	µA	4
Tx_Disable, RS0, RS1	VIL	-0.3		0.8	V	5
	VIH	2.0		VccT + 0.3	V	5
Low-Speed Signals Timing Specifications						
Tx_Disable Assert Time	t_off			100	µs	6
Tx_Disable Negate Time	t_on			2	ms	7
Time to Initialize (Cold and Warm Start Time)	t_start_up			90	s	8, 9
Rx_LOS Assert Delay	t_los_on			100	µs	10
Rx_LOS Negate Delay	t_los_off			100	µs	11
Tx_Fault Assert	tx_fault_on			1	ms	12
Tx_Fault Reset	t_reset	10			µs	13

Notes:

1. With airflows.
2. 10Hz to 10MHz.
3. At 0.7mA.
4. Measured with a 4.7kΩ load pull up to the Host_Vcc.
5. Tx_Disable has an internal 4.7kΩ to 10kΩ pull up to the VccT.
6. Rising edge of Tx_Disable to fall of output signal below 10% of nominal.
7. Falling edge of Tx_Disable to rise of output signal above 90% of nominal. This only applies in normal operation, not during start up or fault recovery.
8. Time from power on or falling edge of Tx_Disable to when the modulated optical output rises above 90% of nominal and the 2-wire interface is available.
9. Cooled type.
10. From occurrence of loss of signal to assertion of Rx_LOS.
11. From occurrence of presence of signals to negation of Rx_LOS.
12. From occurrence of fault to assertion of Tx_Fault.
13. Time Tx_Disable must be held high to reset the Tx_Fault.

High-Speed Signal Electrical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Module Transmitter Input Electrical Specifications at B'						
Tx Input Differential Voltage	VI	190		700	mV	1
Differential Input Resistance	RI	95	100	105	Ω	
Differential Input S-Parameter *(Note 2)*	SDD11			Note 3	dB	3
				Note 4	dB	4
Reflected Differential to Common-Mode Conversion	SCD11			-10	dB	5
Module Receiver Output Electrical Specifications at C'						
Rx Output Differential Voltage	VO	300		850	mV	1
Termination Mismatch at 1MHz	ΔZM			5	%	
Single-Ended Output Voltage Tolerance		-0.3		4.0	V	
Output AC Common-Mode Voltage				7.5	mV	6
Differential Output S-Parameter	SDD22			Note 6	dB	7
				Note 7	dB	8
Common-Mode Output Reflection Coefficient	SCC22			Note 8	dB	9
				-3	dB	10
Rx Output Rise/Fall Time	Tr/Tf	28			ps	11
Rx Output Total Jitter	TJ			0.70	Ulp-p	
Rx Output Deterministic Jitter	DJ			0.42	Ulp-p	

Notes:

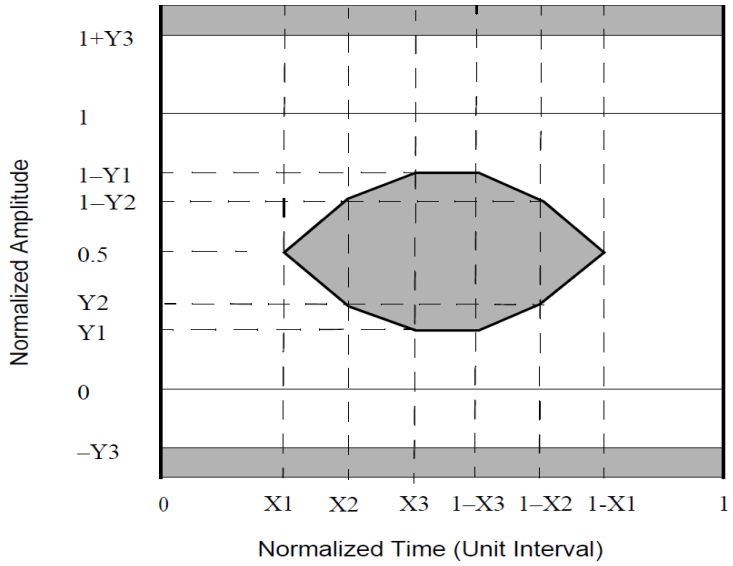
1. Voltage swing for 1G operation is equivalent to voltage swing in 10G operation.
2. Measured at B" with Host Compliance Board and Module Compliance Board pair.
3. Reflection Coefficient given by equation SDD11 (dB) < -12 + 2 × SQRT (f), with f in GHz. 0.01 to 4.1GHz.
4. Reflection Coefficient given by equation SDD11 (dB) < -6.3 + 13 × log10 (f/5.5), with f in GHz. 4.1 to 11.1GHz.
5. 0.01 to 11.1GHz.
6. The RMS value is measured by calculating the standard deviation of the histogram for one UI of the common mode signal.
7. Reflection Coefficient given by equation SDD22 (dB) < -12 + 2 × SQRT (f), with f in GHz. 0.01 to 4.1GHz.
8. Reflection Coefficient given by equation SDD22 (dB) < -6.3 + 13 × log10 (f/5.5), with f in GHz. 4.1 to 11.1GHz.
9. Reflection Coefficient given by equation SCC22 (dB) < -7 + 1.6 × f, with f in GHz. 0.01 to 2.5GHz.
10. 2.5 to 11.1GHz.
11. 20-80%.

Optical Characteristics

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Transmitter						
Peak Wavelength	λP	ITU-T 694.1 Grid Wavelength			nm	1
Center Wavelength Spacing		100			GHz	
Spectral Width at -20dB	Δλ -20dB			0.30	nm	2
Side-Mode Suppression Ratio	SMSR	30.0			dB	
Average Optical Power	PAVE	0		+5.0	dBm	
Extinction Ratio	ER	8.2			dB	3
Transmitter and Dispersion Penalty	TDP			3.5	dB	
Laser Off Power	Poff			-30.0	dBm	
Relative Intensity Noise	$RIN_{12}OMA$			-128.0	dB/Hz	
Wavelength Stability After Start-Up		λP - 100		λP + 100	pm	
Transmitter Output Eye Mask	IEEE 802.3-2012 Clause 52.9.7					7
Receiver						
Operating Wavelength	λO	1260		1600	nm	
Receiver Sensitivity (Average)	S			-23.0	dBm	4
Receiver Power (Pave) Overload	OL	-6.0			dBm	4
Sensitivity (OMA)	SOMA			-21.9	dBm	4
Receiver Reflectance	RR			-27.0	dB	5
Loss of Signal - Asserted	LOSA	-37.0			dBm	6
Loss of Signal - De-Asserted	LOSD			-24.0	dBm	6
Loss of Signal Hysteresis	LOSH	0.5	2.5	5.0	dB	

Notes:

1. See 100GHz ITU-T Channels Wavelength Guide.
2. At -20dB.
3. At 10.3Gbps, PRBS 2^{31}-1.
4. Measured with at 10.3125Gbps, ER>8.2dB, PRBS 2^{31}-1, and BER<$1x10^{-12}$.
5. At λO.
6. Loss of Signal (LOS) detection responds only to OMA and the indicator will respond unpredictably with the application of un-modulated optical.
7. See Eye Mask Diagram below.



2-Wire Interface Electrical Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Host 2-Wire Vcc	VccH	3.14		3.46	V	1
SCL and SDA	VOL	0.0		0.8	V	2
	VOH	Vcch-0.5		Vcch+0.3	V	
SCL and SDA	VIL	-0.3		VccT*0.3	V	3
	VIH	VccT*0.7		VccT+0.5	V	
Input Current on the SCL and SDA Contacts	Ii	-10		10	µA	
Capacitance on SCL and SDA Contacts	Ci			14	pF	4
Total Bus Capacitance for SCL and SDA	Cb			100	pF	5, 6
				290	pF	5, 7

Notes:

1. The host 2-wire Vcc is the voltage used for resistive pull-ups for the 2-wire interface.
2. RP pulled to VccT/R. Rp is the pull-up resistor. Active bus termination may be used by the host in place of a pull up resistor. Pull-ups can be connected to any one of several power supplies; however, the host board design shall ensure that no module contact has voltage exceeding module VccT/R+0.5V nor requires the module to sink more than 3.0mA current.
3. These voltages are measured on the other side of the connector to the device under test.
4. Ci is the capacitance looking into the module SCL and SDA contacts.
5. Cb is the total bus capacitance on the SCL or SDA bus.
6. At 400kHz, 3.0kΩ Rp, max. At 100kHz, 8.0kΩ Rp, max.
7. At 400kHz, 1.1kΩ Rp, max. At 100kHz, 2.75kΩ Rp, max.

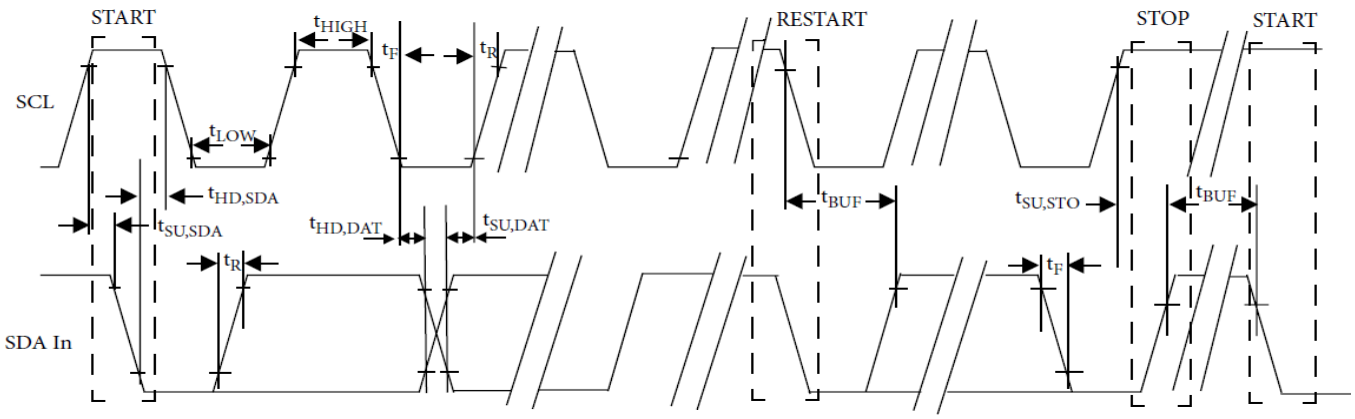
2-Wire Timing Specifications

Parameter	Symbol	Min.	Typ.	Max.	Unit	Notes
Clock Frequency	fSCL	0		400	kHz	1
Clock Pulse Width Low	tLOW	1.3			µs	
Clock Pulse Width High	tHIGH	0.6			µs	
Stop to Start Time	tBUF	20			µs	2
Start Hold Time	tHD,STA	0.6			µs	
Start Set-Up Time	tSU,STA	0.6			µs	
Data In Hold Time	tHD,DAT	0			µs	
Data In Set-Up Time	tSU,DAT	0.1			µs	
Input Rise Time (100kHz)	tR,100			1000	ns	3
Input Rise Time (400kHz)	tR,400			300	ns	3
Input Fall Time (100kHz)	tF,100			300	ns	4
Input Fall Time (400kHz)	tF,400			300	ns	4
Stop Set-Up Time	tSU,STO	0.6			µs	
Serial Interface Clock Holdoff "Clock Stretching"	t_clock_hold			500	µs	5

Notes:

1. Module shall operate with fSCL up to 100kHz without requiring clock stretching. The module may clock stretch with fSCL greater than 100kHz and up to 400kHz.
2. Between STOP and START and between ACK and restart.
3. From (VIL, MAX. - 0.15) to (VIH, MIN. + 0.15).
4. From (VIH, MIN. + 0.15) to (VIL, MAX. - 0.15).
5. Maximum time the module may hold the SCL line low before continuing with a read or write operation.

2-Wire Bus Timing Diagram



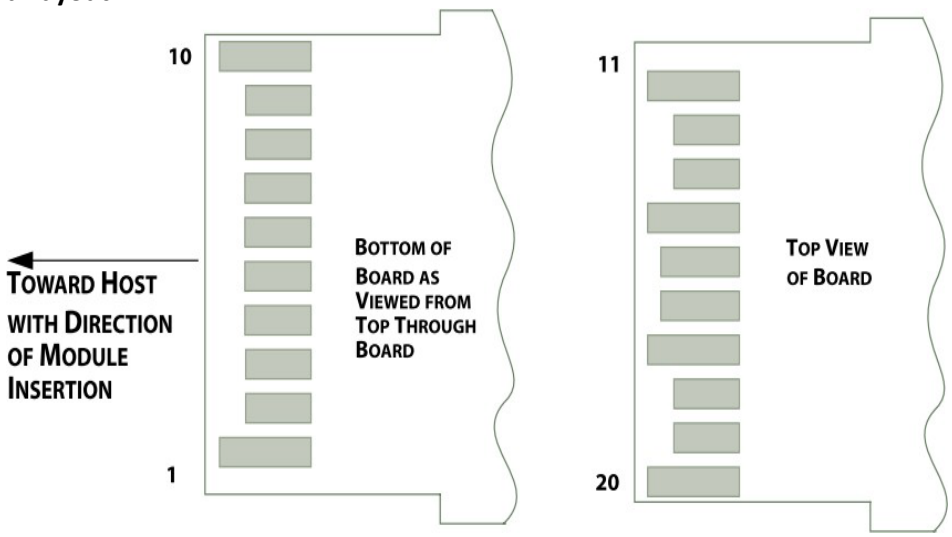
Pin Descriptions

Pin	Symbol	Name/Description	Plug Seq.	Notes
1	VeeT	Transmitter Signal Ground.	1st	
2	Tx_Fault	Transmitter Fault (LVTTL-O) – High indicates a fault condition.	3rd	1
3	Tx_Disable	Transmitter Disable (LVTTL-I) – High or open disables the transmitter.	3rd	2
4	SDA	2-Wire Serial Interface Data Line (LVCMOS – I/O). Same as MOD-DEF2 in INF-8074.	3rd	3
5	SCL	2-Wire Serial Interface Clock Line (LVCMOS – I/O). Same as MOD-DEF1 in INF-8074.	3rd	3
6	MOD_ABS	Module Absent. Controlled by the module.	3rd	4
7	RS0	Receiver Rate Select 0. Not Used. Internally pulled down, 51kΩ.	3rd	
8	RX_LOS	Receiver Loss of Signal Indication (LVTTL-O).	3rd	1
9	RS1	Transmitter Rate Select 1. Not Used. Internally pulled down, 51kΩ.	3rd	
10	VeeR	Receiver Signal Ground.	1st	
11	VeeR	Receiver Signal Ground.	1st	
12	RD-	Receiver Data Output, Inverted (CML-O).	3rd	
13	RD+	Receiver Data Output, Non-Inverted (CML-O).	3rd	
14	VeeR	Receiver Signal Ground.	1st	
15	VccR	Receiver Power +3.3V.	2nd	
16	VccT	Transmitter Power +3.3V.	2nd	
17	VeeT	Transmitter Signal Ground.	1st	
18	TD+	Transmitter Data Input, Non-Inverted (CML-I).	3rd	
19	TD-	Transmitter Data Input, Inverted (CML-I).	3rd	
20	VeeT	Transmitter Signal Ground.	1st	

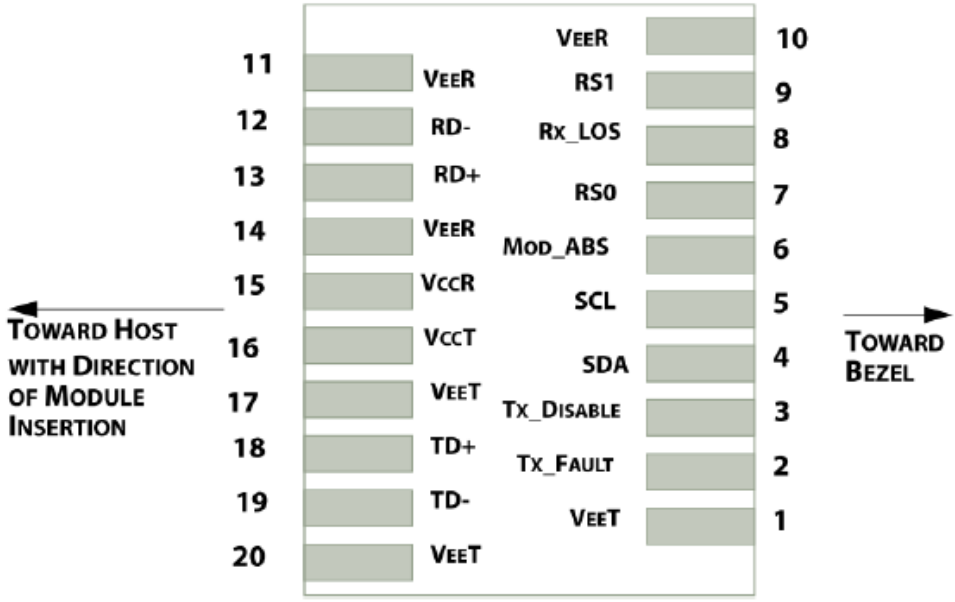
Notes:

1. This is an open drain output that, on the host board, requires a 4.7kΩ to 10kΩ pull-up resistor to the Host_Vcc.
2. This input is internally biased high with a 4.7kΩ to 10kΩ pull-up resistor to the VccT.
3. 2-wire serial interface clock and data lines require an external pull-up resistor dependent on the capacitance load.
4. They must be pulled up with a 4.7kΩ to 10kΩ resistor on the host board. MOD_ABS is grounded by the module to indicate that the module is present.

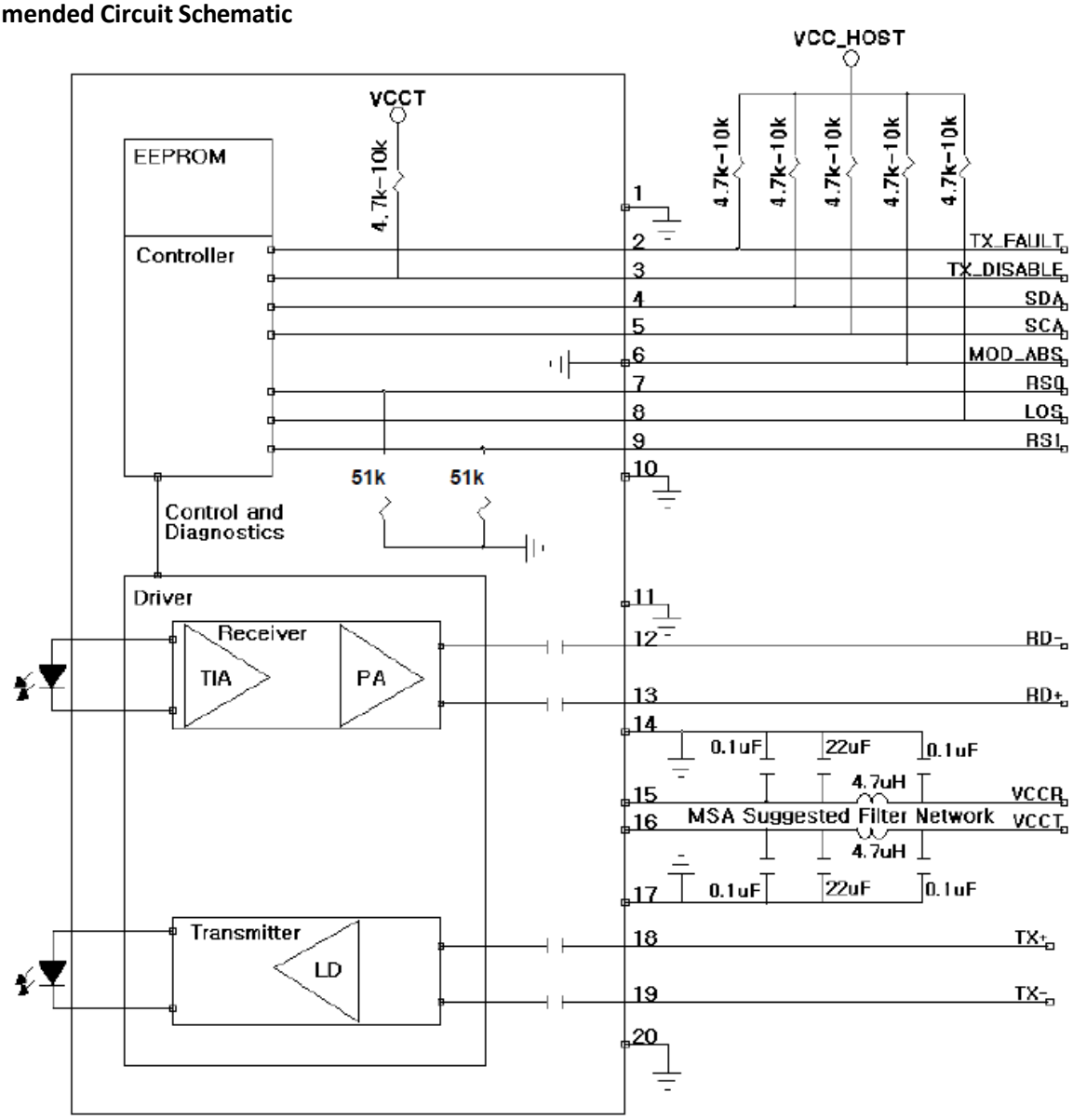
Electrical Pad Layout



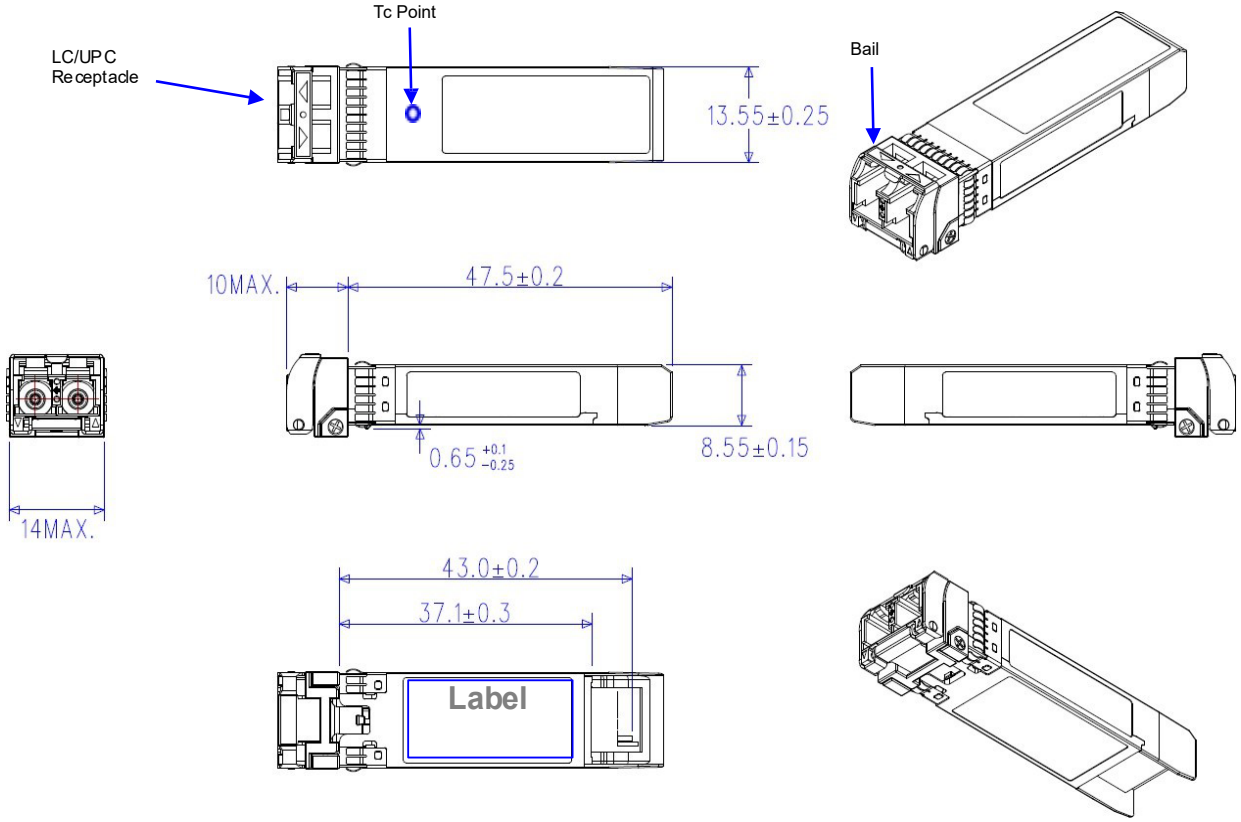
Host Board



Recommended Circuit Schematic



Mechanical Specifications



About ProLabs

Our experience comes as standard; for over 15 years ProLabs has delivered optical connectivity solutions that give our customers freedom and choice through our ability to provide seamless interoperability. At the heart of our company is the ability to provide state-of-the-art optical transport and connectivity solutions that are compatible with over 90 optical switching and transport platforms.

Complete Portfolio of Network Solutions

ProLabs is focused on innovations in optical transport and connectivity. The combination of our knowledge of optics and networking equipment enables ProLabs to be your single source for optical transport and connectivity solutions from 100Mb to 400G while providing innovative solutions that increase network efficiency. We provide the optical connectivity expertise that is compatible with and enhances your switching and transport equipment.

Trusted Partner

Customer service is our number one value. ProLabs has invested in people, labs and manufacturing capacity to ensure that you get immediate answers to your questions and compatible product when needed. With Engineering and Manufacturing offices in the U.K. and U.S. augmented by field offices throughout the U.S., U.K. and Asia, ProLabs is able to be our customers best advocate 24 hours a day.

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