

### Product Overview

The PT0-S1-4103Q-I of the Enhanced Small Form Factor Pluggable (SFP+) transceiver module is designed for high performance integrated data link over dual single-mode optical fibers. The high-speed laser diode and photodiode are provided as a light source and a detector, respectively. Digital diagnostics monitoring information and detailed product information for the host equipment is accessed by the 2-wire serial CMOS EEPROM protocol. It complies with SFF 8472, SFF 8431, SFF 8432 and IEEE 802.3ae 10GBASE-LR/LW.



### Features

- RoHS Compliant
- Operation Case Temperature: -10°C~85°C
- 1310nm un-cooled DFB LD
- 1310nm receiver with Limiting amplifier
- Link distance Up to 10km(SMF)@10G links
- Hot pluggable
- Single 3.3V power supply
- Low Power Consumption(typically 720mW)
- Digital Diagnostic compliant to SFF 8472
- Compliant to electrical SFF 8431
- Compliant to mechanical SFF 8432
- Compliant to specification IEEE-802.3ae 10GBASE-LR/LW at 10.3125Gb/s

### Applications

- 10G link specifications
- 8G Fiber Channel links

### Absolute Maximum Ratings

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Storage Temperature	T <sub>s</sub>	-40		85	°C	
Relative Humidity	RH	5		95	%	noncondensing
Power Supply Voltage	V <sub>ccT,R</sub>	0		3.8	V	

### Ordering Information

P	T	0	-	S	1	-	4	1	0	3	Q	-	I																												
a	b	-	X	-	c	d	e	f	g	h	Function parameter																														
												Function distinction		may be Blank, or P (P→ Pigtail ),or C(Case Color),or S ( S→ Shield ), or W ( W→ Composite Specifications ), or F(F→POF), or I(I→DDMI)																											
												Potential energy & temperature		I→AC/AC PECL 0℃~70℃ RoHS    W→DC/AC TTL 0℃~70℃ RoHS		J→AC/AC PECL -40℃~85℃ RoHS    N→DC/DC PECL -40℃~85℃ RoHS		K→AC/AC TTL 0℃~70℃ RoHS    O→DC/DC TTL 0℃~70℃ RoHS		L→AC/AC TTL -40℃~85℃ RoHS    P→DC/DC TTL -40℃~85℃ RoHS		M→DC/DC PECL 0℃~70℃ RoHS    R→DC/DC PECL -10℃~85℃ RoHS		Q→AC/AC TTL -10℃~85℃ RoHS    X→DC/AC TTL -40℃~85℃ RoHS																	
												Operating voltage		3→3.3V		5→5V																									
												Distance		D1~D9 : D1→100M, D2→200M		01~99 : 01→1km, 10→10km		00→100km																							
												Optical connector		1→FC		2→SC		3→ST		4→LC																					
												Wavelength		M3→Multi-mode 850 nm		S1→Single-mode 1310 nm		S3→For Bi-direction : Single-mode Tx1310 / Rx1550 nm		M4→Multi-mode 1310 nm		S2→Single-mode 1550 nm		S4→For Bi-direction : Single-mode Tx1550 / Rx1310 nm		00~99 (CWDM)		S5→For Bi-direction : Single-mode Tx1310 / Rx1490 nm		S6→For Bi-direction : Single-mode Tx1490 / Rx1310 nm											
												Bit rate		1→155Mbps		3→1.0625Gbps		5→2.125Gbps		7→2.7Gbps		9→4.25Gbps		2→622Mbps		4→1.25Gbps		6→2.5Gbps		8→3.125Gbps		0→10Gbps									
												Electric connector		TR→Dual Fiber 1×9 Transceiver		FB→Single Fiber SFP Transceiver		EUFB→ EPON ONU SFF 2×5 BIDI Transceiver		TB→Single Fiber 1×9 Transceiver		PT→Dual Fiber SFP Transceiver		ETFB→ EPON OLT SFF 2×5 BIDI Transceiver		FT→Dual Fiber SFP Transceiver		PB→Single Fiber SFP Transceiver		GUFB→ GPON ONU SFF 2×5 BIDI Transceiver		GTFB→ GPON OLT SFF 2×5 BIDI Transceiver		UM→Dual Bi-Direction SFP Transceiver (CSFP MSA)		GUFM→GPON OLT SFF 2×5 BIDI Transceiver(DDMI)		UB→Dual Bi-Direction SFP Transceiver (OM PIN Assignemnt)		UT→Quad Bi-Direction SFP Transceiver	

\* Please contact us for the released types

### Recommended Operating Conditions

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
Operating Case Temperature	T <sub>OP</sub>	-10		85	°C	Case temperature
Power Supply Voltage	V <sub>CC,T,R</sub>	3.14	3.30	3.46	V	
Data Rate			10.3125	10.52	Gb/s	
Power Supply Current	I <sub>CC</sub>		220	300	mA	TX+RX

### Transmitter Electro-Optical Interface (T<sub>C</sub> = -10°C~85°C, V<sub>CC,T,R</sub>=3.14V<V<sub>CC</sub><3.46V)

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Optical</b>						
Optical Output Power(average)	P <sub>O</sub>	-8.2		+0.5	dBm	
Optical Output Power(OMA)	P <sub>OMA</sub>	-5.2				
Spectral width(-20dBm)	Δλ			1	nm	
Side Mode suppression Ratio	SMSR	30			dB	
Extinction Ratio	ER	3.5			dB	
Output Eye mask	Compliant with IEEE 802.3ae Clause 52					
Center Wavelength	λ <sub>C</sub>	1260	1310	1355	nm	
Laser off power	P <sub>OFF</sub>			-30	dBm	
Transmitter Dispersion Penalty	TDP			3.2	dB	
Relative Intensity Noise(OMA)	RIN			-128	dB/Hz	12dB reflection
<b>Electrical</b>						
Differential Data Input Voltage	V <sub>IH</sub> -V <sub>IL</sub>	200		800	mVpp	Internal AC coupled
Differential Input Impedance	R <sub>IN</sub>		100		Ω	
TX-Disable Input Voltage-Low	V <sub>IL</sub>	0		0.8	V	1
TX-Disable Input Voltage-High	V <sub>IH</sub>	2.0		V <sub>CC</sub>	V	1
TX-Fault Output Voltage-Low	V <sub>OL</sub>	0		0.8	V	2
TX-Fault Output Voltage-High	V <sub>OH</sub>	2.0		V <sub>CC</sub>	V	2



10G/1G Ethernet / 8G Fiber Channel  
1310TX/1310RX SFP+ Transceiver  
RoHS Compliant

## PT0-S1-4103Q-I

[www.palconnusa.com](http://www.palconnusa.com)

### Receiver Electro-Optical Interface ( $T_C = -10^{\circ}\text{C} \sim 85^{\circ}\text{C}$ , $V_{\text{CCT,R}}=3.15\text{V} < V_{\text{CC}} < 3.45\text{V}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Optical</b>						
Receiver Sensitivity(OmA)	$P_{\text{MIN}}$			-12.6	dBm	3
Stressed Sensitivity(OmA)	$P_{\text{MIN}}$			-10.3	dBm	
Receive Power Overload(average)	$P_{\text{OVER}}$	+0.5			dBm	
Receiver Reflectance	RL			-12	dB	
Center Wavelength	$\lambda_c$	1260		1355	nm	
LOS-Asserted(OmA)	$P_A$	-30			dBm	
LOS-Deasserted(OmA)	$P_D$			-16	dBm	
LOS-Hysteresis(OmA)	$P_D - P_A$	0.5			dB	
<b>Electrical</b>						
Differential Data Output Voltage	$V_{\text{OH}} - V_{\text{OL}}$	300		800	mV	Internal AC coupled
Differential Output Impedance	$R_{\text{OUT}}$		100		$\Omega$	
LOS-Asserted Output Voltage-Low	$V_{\text{OL}}$	0		0.8	V	2
LOS-Deasserted Output Voltage-High	$V_{\text{OH}}$	2.0		Vcc	V	2

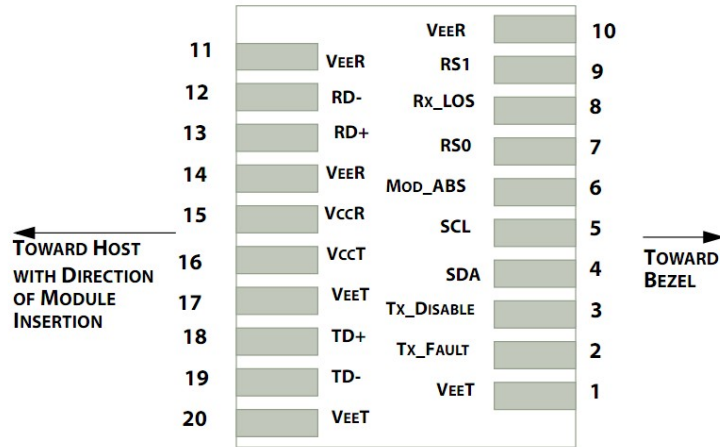
Notes:

1. TX-Disable has an internal 4.7K $\Omega$  to 10K $\Omega$  pull-up to VccT
2. Measure with 4.7K $\Omega$  pull-up to Vcc on host board
3. Measure with 2<sup>31</sup>-1 PRBS at BER < 10<sup>-12</sup>

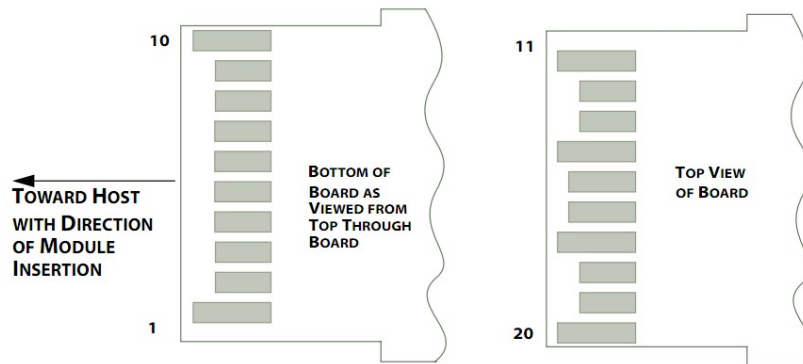
### DIGITAL DIAGNOSTIC MONITOR ACCURACY ( $T_C = -10^{\circ}\text{C} \sim 85^{\circ}\text{C}$ , $V_{\text{CCT,R}}=3.15\text{V} < V_{\text{CC}} < 3.45\text{V}$ )

Parameter	Symbol	Min.	Typ.	Max.	Unit	Note
<b>Optical</b>						
Transceiver Internal Temperature	$T_{\text{INT}}$	-3		+3	$^{\circ}\text{C}$	
Transceiver Internal Supply Voltage	$V_{\text{INT}}$	-3		+3	%	
Transmitter Laser DC Bias Current	$I_{\text{INT}}$	-10		+10	%	
Transmitted Average Optical Output Power	$P_T$	-3		+3	dB	
Received Average Optical Input Power	$P_R$	-3		+3	dB	

### Pin Description



Host PCB SFP+ pad assignment top view



SFP+ module contact assignment



10G/1G Ethernet / 8G Fiber Channel  
 1310TX/1310RX SFP+ Transceiver  
 RoHS Compliant

## PT0-S1-4103Q-I

[www.palconnusa.com](http://www.palconnusa.com)

### SFP+ module and Host Electrical contact definition

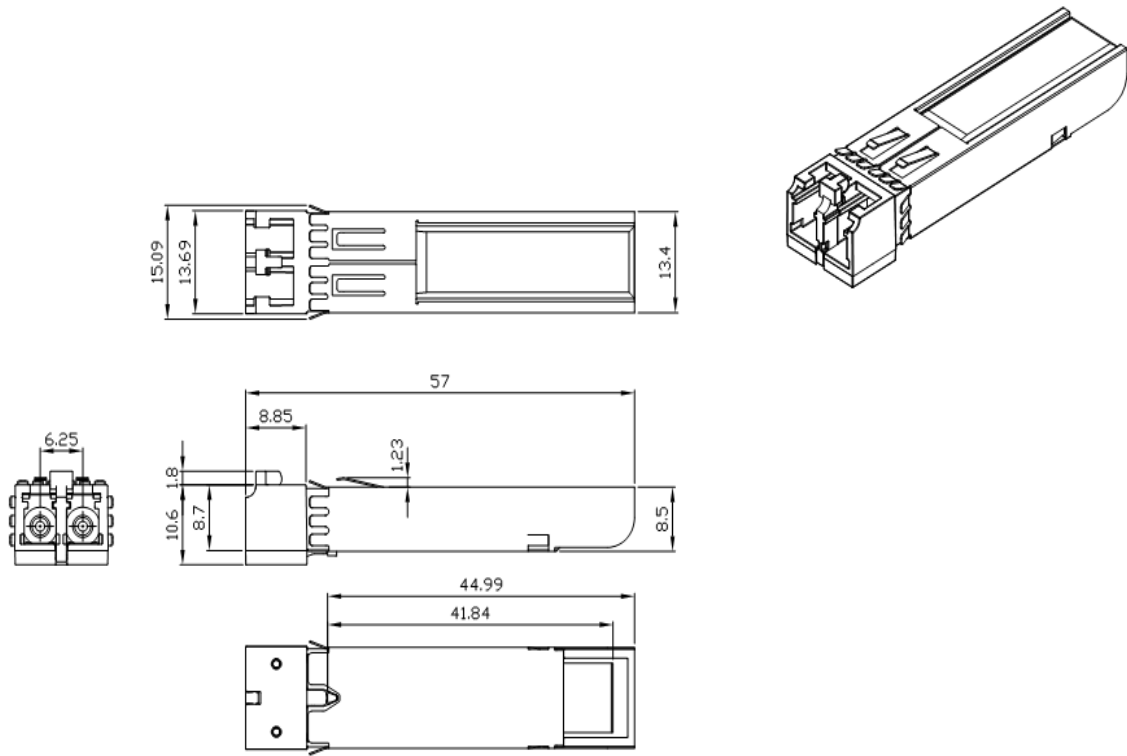
Pin No.	Pin Name	Function	Plug Seq.	Notes
1	VeeT	Transmitter Ground	1	1
2	Tx_Fault	Transmitter Fault Indication	3	2
3	Tx_Disable	Transmitter Disable	3	3
4	SDA	I2C Data Line	3	4
5	SCL	I2C Clock Line	3	4
6	MOD_ABS	Module Absent	3	4
7	RS0	Rate Select 0,control SFP+ receiver	3	6
8	Rx_LOS	Receiver Loss of Signal indication	3	5
9	RS1	Rate Select 1,control SFP+ transmitter	1	6
10	VeeR	Receiver Ground	1	1
11	VeeR	Receiver Ground	1	1
12	RD-	Receiver inverted Data Output	3	
13	RD+	Receiver non-inverted Data Output	3	
14	VeeR	Receiver Ground	1	1
15	VccR	Receiver Power	2	
16	VccT	Transmitter Power	2	
17	VeeT	Transmitter Ground	1	1
18	TD+	Transmitter non-inverted Data Input	3	
19	TD-	Transmitter inverted Data Input	3	
20	VeeT	Transmitter Ground	1	1

Note:

- 1, Circuit ground is internally isolated from chassis ground
- 2, Open-Collector outputs, asserted when LD and/or APC function fail.
- 3, Disable when high voltage (>2.0V or Open)
- 4, Should be pulled up with 4.7KΩ – 10KΩ on host board to a voltage between 2.0V and 5.5V. MOD\_ABS pulls line low to indicate module is plugged in.
- 5, LOS is open collector output. Should be pulled up to with 4.7KΩ – 10KΩ on host board to a voltage between 2.0V and 5.5V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.
- 6.

parameter	state	conditions
RS0	Low	RX signaling rate less than or equal to 4.25GBd
	High	RX signaling rate greater than 4.25GBd
RS1	Low	TX signaling rate less than or equal to 4.25GBd
	High	TX signaling rate greater than 4.25GBd

Mechanical Dimensions (Units in mm)



### Application Circuit

