10Gb/s SFP+ 1310nm LR 10km Transceiver
SLT0SPLR010GT31x

Features

- Up to 11.1Gbps Data Links
- Up to 10km transmission on 9/125um SMF
- DFB Laser and PIN receiver
- Metal enclosure, for lower EMI
- 2-wire interface with integrated Digital Diagnostic monitoring
- Hot-pluggable SFP+ footprint
- Specifications compliant with SFF 8472
- Compliant with SFP+ MSA with LC connector
- Single 3.3V power supply
- Power dissipation < 1.2 W
- Case operating temperature
  Commercial: 0 ~ +70℃
  Extended: -10 ~ +85℃
  Industrial: -40 ~ +85℃

Applications

- 10GBASE-LR/LW 10G Ethernet
- 1Gb/s,2Gb/s,4Gb/s,8Gb/s and 10Gb/s Fiber Channel
- Other Optical Links

Order Information

Part Number	Data Rate (Gb/s)	Wavelength (nm)	Transmission Distance(km)	Temperature (℃) (Operating Case)
SLT0SPLR010GT31C	10.3125	1310	10	0 ~ 70
SLT0SPLR010GT31E	10.3125	1310	10	-10 ~ 85
SLT0SPLR010GT31I	10.3125	1310	10	-40 ~ 85

Description

SLT0SPLR010GT31x is designed for 10km optical communication applications. The module consists of DFB Laser, PIN and Preamplifier in a high-integrated optical sub-assembly. Digital diagnostics functions are available via a 2-wire serial interface, as specified in SFF-8472.

SLT0SPLR010GT31x provide a unique enhanced digital diagnostic monitoring interface, which allows real-time access to device operating parameters such as transceiver temperature, laser bias current, transmitted optical power, and received optical power and transceiver supply voltage. It also defines a sophisticated system of alarm and warning flags, which alerts end-users when particular operating parameters are outside of a factory set normal range.

The SFP+ MSA defines a 256-byte memory map in EEPROM that is accessible over a 2-wire serial interface at the 8bit address 1010000X (A0h). The digital diagnostic monitoring interface makes use of the 8bit address 1010001X (A2h), so the originally defined serial ID memory map remains unchanged.

Absolute Maximum Ratings

It has to be noted that the operation in excess of any individual absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Supply Voltage	Vcc_3	-0.5	-	+3.6	V	
Storage Temperature	T_s	-40	-	+85	°C	
Operating Humidity	RH	+5	-	+85	%	1
Receiver Damage Threshold per Lane	P_{IND}	+5	-	-	dBm	

Note: 1 No condensation

Recommended Operating Conditions

Parameter	Symbol	Min.	Typical	Max.	Unit	Notes
Operating Case Temperature	TC	-40	-	+85	°C	
Power Supply Voltage	Vcc	3.14	3.3	3.47	V	
Power Supply Current	ICC	-		330	mA	
Data Rate	BR		10.3125		Gbps	
Link Distance (SMF)	D			10	km	

Pin Assignment and Pin Description

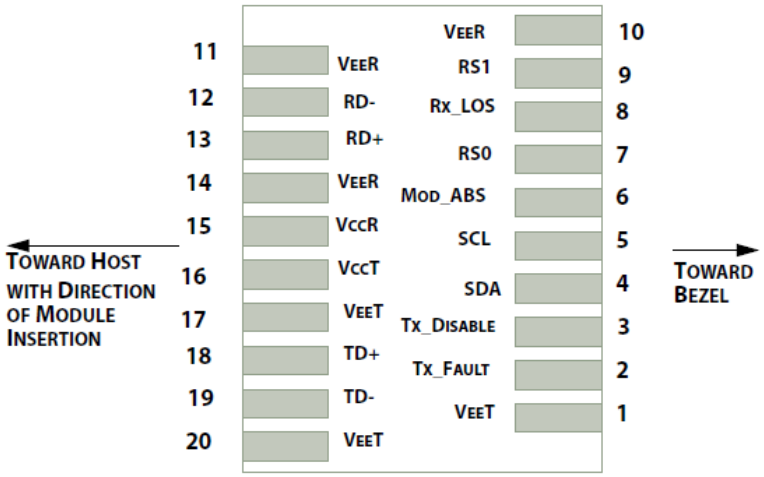


Figure1. Diagram of host board connector block pin numbers and names

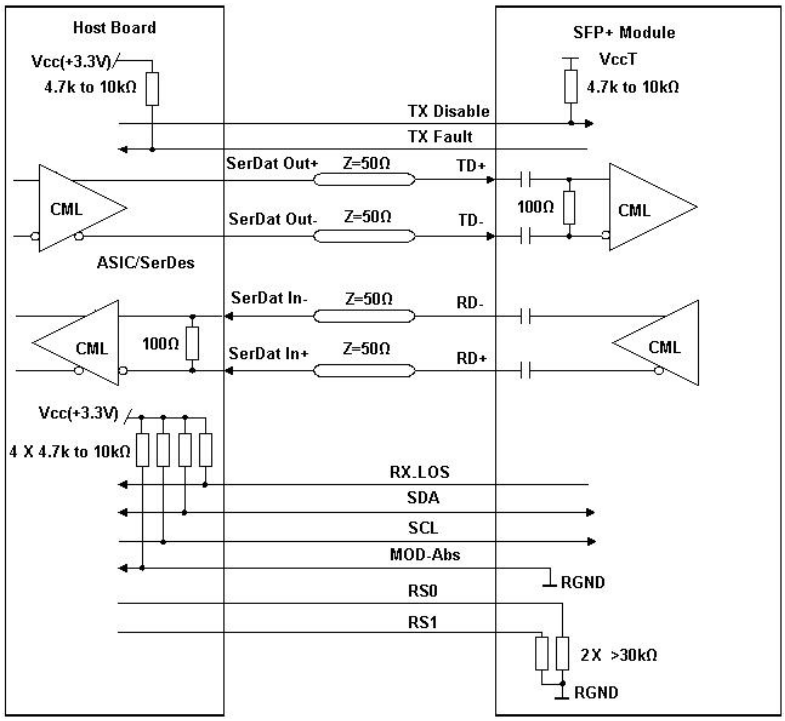
Pin	Symbol	Name/Description	Notes
1	VEET	Transmitter Ground (Common with Receiver Ground)	1
2	TFAULT	Transmitter Fault.	2
3	TDIS	Transmitter Disable. Laser output disabled on high or open.	3
4	SDA	2-wire Serial Interface Data Line	4
5	SCL	2-wire Serial Interface Clock Line	4
6	MOD_ABS	Module Absent. Grounded within the module	4
7	RS0	Rate Select 0	5
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation.	6
9	RS1	No connection required	
10	VEER	Receiver Ground (Common with Transmitter Ground)	1
11	VEER	Receiver Ground (Common with Transmitter Ground)	1
12	RD-	Receiver Inverted DATA out. AC Coupled	
13	RD+	Receiver Non-inverted DATA out. AC Coupled	
14	VEER	Receiver Ground (Common with Transmitter Ground)	1
15	VCCR	Receiver Power Supply	

16	VCCT	Transmitter Power Supply	
17	VEET	Transmitter Ground (Common with Receiver Ground)	1
18	TD+	Transmitter Non-Inverted DATA in. AC Coupled.	
19	TD-	Transmitter Inverted DATA in. AC Coupled.	
20	VEET	Transmitter Ground (Common with Receiver Ground)	1

Notes:

1. Circuit ground is internally isolated from chassis ground.
2. TFAULT is an open collector/drain output, which should be pulled up with a 4.7kΩ-10kΩ resistor on the host board if intended for use. Pull up voltage should be between 2.0V to Vcc + 0.3V.A high output indicates a transmitter fault caused by either the TX bias current or the TX output power exceeding the preset alarm thresholds. A low output indicates normal operation. In the low state, the output is pulled to <0.8V.
3. Laser output disabled on TDIS >2.0V or open, enabled on TDIS <0.8V.
4. Should be pulled up with 4.7kΩ-10kΩ on host board to a voltage between 2.0V and 3.6V. MOD_ABS pulls line low to indicate module is plugged in.
5. Internally pulled down per SFF-8431 Rev 4.1.
6. LOS is open collector output. It should be pulled up with 4.7kΩ-10kΩ on host board to a voltage between 2.0V and 3.6V. Logic 0 indicates normal operation; logic 1 indicates loss of signal.

Recommended Interface Circuit



Electrical Characteristics

The following electrical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typ.	Max	Unit	Notes
Power Consumption	p			1.2	W	
Supply Current	Icc			330	mA	
Transmitter (each Lane)						
Input differential impedance	Rin		100		Ω	
Differential Termination Mismatch				10	%	
Differential Data Input Amplitude	Vin, PP	180		1000	mV	
FAULT and Disable	VIL	-0.3		0.8	V	
	VIH	2		Vcc+0.3	V	
Receiver						
Output differential impedance	Rin		100		Ω	
Differential Termination Mismatch				10	%	
Differential Data Output Amplitude	Vout, PP	300	600	850	mV	
LOS	VOL	0		0.8	V	
	VOH	2		Vcc+0.3	V	

Optical Characteristics

The following optical characteristics are defined over the Recommended Operating Environment unless otherwise specified.

Parameter	Symbol	Min.	Typical	Max	Unit	Notes
Transmitter						
Center Wavelength Range	λ_C	1260	1310	1355	nm	
Average Optical Power	P_{AVG}	-8.2		2	dBm	
Side-mode suppression ratio	SMSR	30				

Spectral Width(-20dB)	Δλ			1	nm	
Optical Extinction Ratio	ER	3.5			dB	
Transmitter OFF Output Power	POff			-30	dBm	
Return Loss		12			dB	
Transmitter Eye Mask	Compliant with IEEE802.3ae					
Receiver						
Center Wavelength	λ	1270		1610	nm	
Receiver Sensitivity (Average Power)	Sen.			-14.4	dBm	1
Input Saturation Power (overload)	Psat	0.5			dBm	
LOS Assert	LOSA	-30			dBm	
LOS De-assert	LOSD			-17	dBm	
LOS Hysteresis	LOSH	0.5			dB	

Notes:

1. Measured @10.3125Gbps, ER=3.5dB, BER=<1E-12, PRBS=2^31-1

Digital Diagnostic Functions

The following digital diagnostic characteristics are defined over the normal operating conditions unless otherwise specified.

Parameter	Symbol	Min.	Max	Unit	Range
Temperature monitor absolute error	DMI_ Temp	-3	3	ºC	Over operating temp
Supply voltage monitor absolute error	DMI _VCC	-3	3	%	Full operating range
RX power monitor absolute error	DMI_RX	-3	3	dB	
Bias current monitor error	DMI_ bias	-10	10	%	
TX power monitor absolute error	DMI_TX	-3	3	dB	

Monitoring Specification

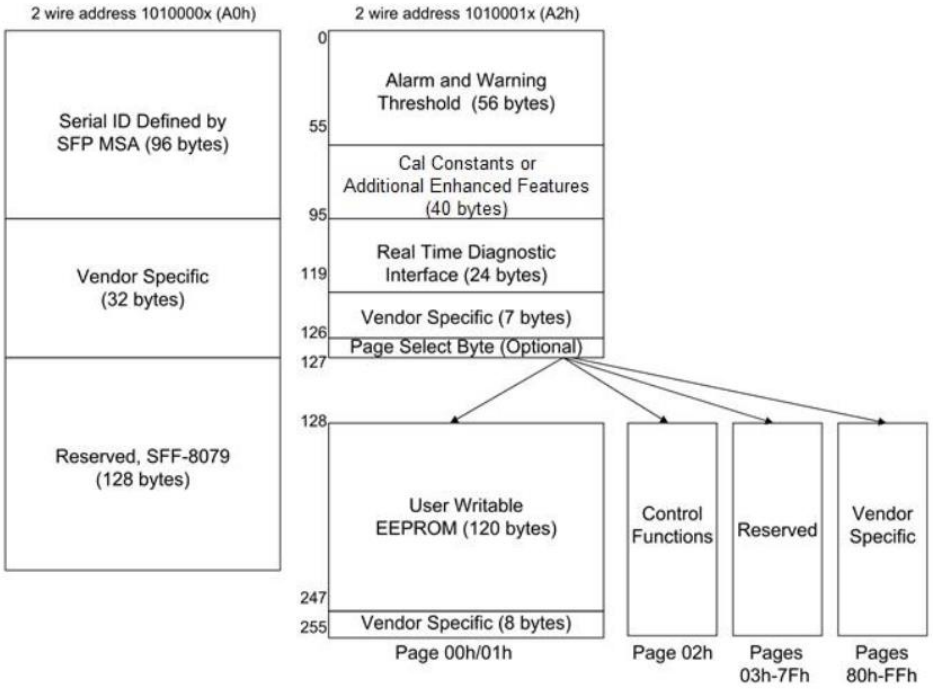


Figure 2, Memory Map

Mechanical Dimensions

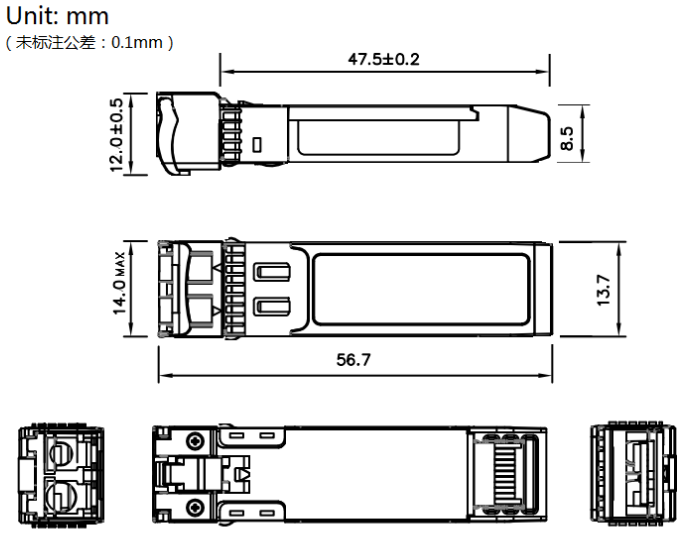


Figure3. Mechanical Outline

Revision History

Version	Initiated	Reviewed	Revision	Release Date
A0	Tony	Jack	New Release	2021-09-09

Warnings

Handling Precautions: This device is susceptible to damage as a result of electrostatic discharge (ESD).

A static free environment is highly recommended. Follow guidelines according to proper ESD procedures.

Laser Safety: Radiation emitted by laser devices can be dangerous to human eyes. Avoid eye exposure to direct or indirect radiation.

Contact Information

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