DATA SHEET

MODULETEK: SFP-OC3-SR0-D10

OC-3/STM-1 SFP (Small Form Pluggable) MultiMode Transceiver

SFP-OC3-SR0-D10 Overview

ModuleTek's SFP-OC3-SR0-D10 SFP optical transceivers are designed to comply with ATM/SONET/SDH standards at OC-3/STM-1 (155 Mb/s) and Fast Ethernet standards at 125Mb/s data rate. SFP-OC3-SR0-D10 with digital diagnostics monitoring functionality provide a quick and reliable interface for OC-3/STM-1 multimode application. In addition, they comply with the Small Form Factor Pluggable Multi-Source Agreement (MSA).

Product Features

- Up to 155Mb/s bi-directional data links
- Compliant with ANSI-T1.646, ATM and SONET and SDH for OC-3/STM-1 (155Mb/s)
- Compliant with Fast Ethernet standards at 125Mb/s
- Compliant with SFP MSA
- Hot-pluggable SFP footprint
- 1310nm LED transmitter
- Duplex LC connector
- Up to 2km on MMF
- Single power supply 3.3V
- RoHS Compliant
- Class 1 laser product complies with EN 60825-1
- Operating temperature range: 0°C to 70°C

Applications

- SONET OC-3 SR-0/SDH STM-1
- 125Mb/s Fast Ethernet

Ordering Information

Part Number	Description	Color on Clasp
SFP-OC3-SR0-D10	SONET OC-3 SR-0/STM-1 and 100BASE-FX, SFP LC Connectors 1310nm MultiMode 2KM	Gray

For More Information:
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General Specifications

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Data Rate	DR	125		155	Mb/s	
Bit Error Rate	BER			10^{-12}		
Operating Temperature	T_C	0		70	°C	1
Storage Temperature	T_{STO}	-40		85	°C	2
Supply Current	I_{CC}		165	300	mA	3
Input Voltage	V_{CC}	3.14	3.3	3.46	V	

Notes:
1. Case temperature
2. Ambient temperature
3. For electrical power interface

Optical – Characteristics – Transmitter

V_{CC}=3.14V to 3.46V, T_C=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Output Optical Power	P_{TX}	-20		-14	dBm	
Optical Center Wavelength	λ_C	1300	1310	1320	nm	
Extinction Ratio	ER	10			dB	
Optical Rise/Fall Time (20%-80%)	t_r /t_f		1000	3000	ps	
Relative Intensity Noise	RIN			-120	dB/Hz	
Generated Jitter (peak to peak)	GJ_{PP}			0.07	UI	
Generated Jitter (RMS)	GJ_{RMS}			0.007	UI	
Output Eye	Comply with SONET OC-3/SDH STM-1 standard					

Optical – Characteristics – Receiver

V_{CC}=3.14V to 3.46V, T_C=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Receiver Overload	P_{OL}	0			dBm	1
Optical Center Wavelength	λ_C	1270		1600	nm	
Receiver Sensitivity@ 155Mb/s	R_{X_SEN1}			-30	dBm	2
Receiver Sensitivity@125Mb/s	R_{X_SEN2}			-31	dBm	2
Optical Return Loss	ORL	12			dB	
Receiver Electrical 3dB Upper cutoff frequency				1500	MHz	
LOS Assert	LOS_A	-45			dBm	
LOS De-Assert	LOS_D			-33	dBm	
LOS Hysteresis	LOS_H	0.5			dB	

Notes:
1. BER$<10^{-12}$
2. PRBS 2^{23}-1

Electrical – Characteristics – Transmitter

V_{CC}=3.14V to 3.46V, T_C=0°C to 70°C

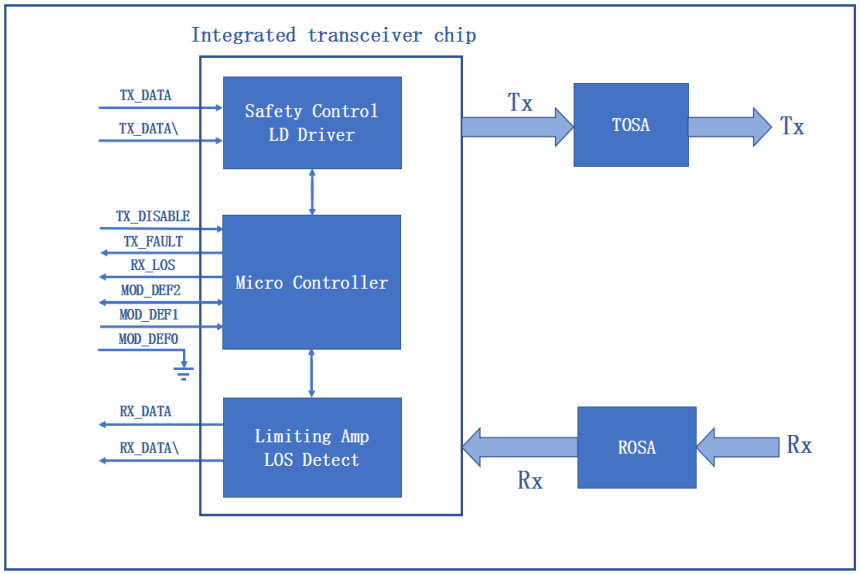
Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Input differential impedance	R_{IN}		100		Ω	
Single ended data input swing	V_{IN_PP}	250		1200	mV	
Transmit disable voltage	V_D	2		V_{CC}	V	
Transmit enable voltage	V_{EN}	V_{EE}		V_{EE}+0.8	V	

Electrical – Characteristics – Receiver

V_{CC}=3.14V to 3.46V, T_C=0°C to 70°C

Parameter	Symbol	Min	Typ	Max	Unit	Remarks
Single ended data output swing	V_{OUT_PP}	250	450	900	mV	
Data output rise/fall time (20%-80%)	t_r/t_f	0.6		5	ns	
LOS Assert	V_{LOS_A}	2		V_{CC_HOST}	V	
LOS De-Assert	V_{LOS_D}	V_{EE}		V_{EE}+0.5	V	

Block-Diagram-of-Transceiver

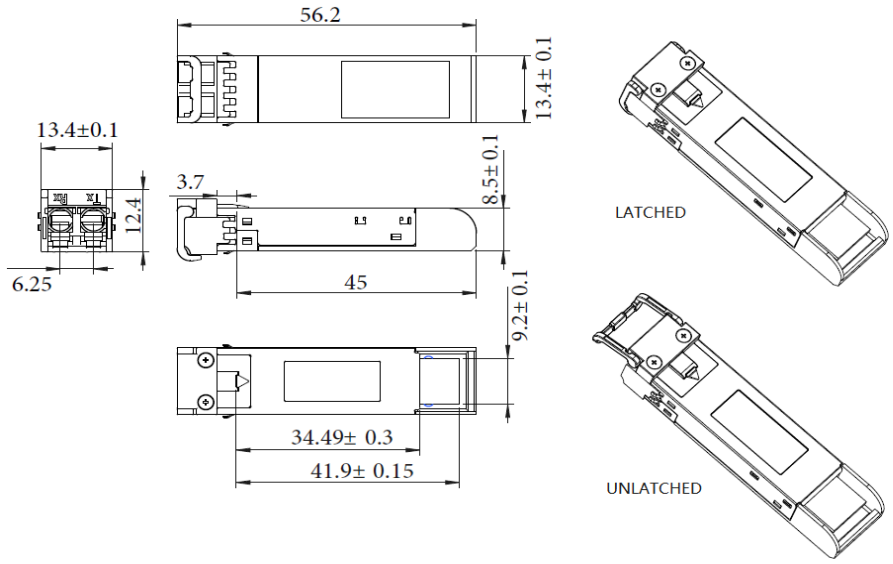


Functions Description

The transmitter is mainly composed of a laser driver part of the intelligent transceiver chip and a TOSA (light-emitting component), the TOSA includes a 1310nm LED laser and a backlight photodetection chip,When the module is working, the input signal is connected to the intelligent transceiver chip, at this time, the laser driver of the intelligent transceiver chip supplies the bias current and the modulation current to the laser.The intelligent transceiver chip simultaneously uses an automatic optical power control (APC) feedback loop to maintain a constant average optical power of the laser output. The purpose is to eliminate the change of the output optical signal due to temperature changes and aging of the light source device.When the transmitter enable pin (TX_Disable) is high (TTL logic “1”), the laser output is turned off. When TX_Disable is low (TTL logic “0”), the laser will turn on within 1ms.When the transmitter fault signal (TX_Fault) is reported as high,indicates a transmitter failure caused by the transmitter’s bias current or transmitted optical power or laser tube temperature exceeding a preset alarm threshold. Low indicates normal operation.

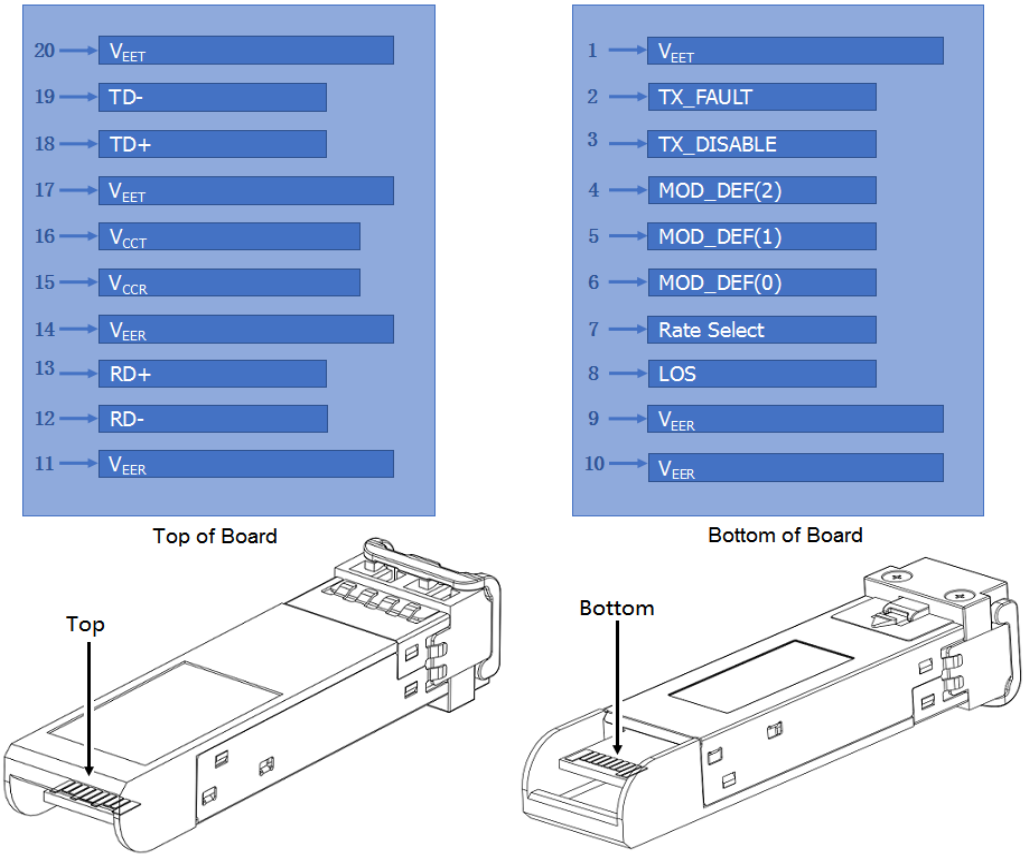
The receiver is mainly composed of a limiting amplifier part of the intelligent transceiver chip and a ROSA (light-receiving component),the ROSA includes a PIN photodetector and a transimpedance amplifier chip.When the ROSA detects the incident light signal, it will be converted into a photo-generated current by the PIN photodetector. The photo-generated current is converted into an electrical signal after passing through the transimpedance amplifier. The electrical signal is further amplified by the limiting amplifier of the intelligent transceiver chip, then outputs a fixed-amplitude electrical signal to the host.When the amplitude of the electrical signal received from the incident light conversion of the opposite optical transceiver module is lower than the set threshold,the module reports that the received signal is lost,the RX_LOS pin is high (logic “1”),which can be used to diagnose whether the physical signal is normal.The signal is operated in TTL level.The microprocessor inside the module monitors the module’s operating voltage, temperature, transmitted optical power, received optical power, and laser bias current value in real time. The host acquires this information over a 2-wire serial bus.

Dimensions



ALL DIMENSIONS ARE ±0.2mm UNLESS OTHERWISE SPECIFIED
UNIT: mm

Electrical Pad Layout



Pin Assignment

PIN #	Symbol	Description	Remarks
1	V_{EET}	Transmitter ground (common with receiver ground)	1
2	TX_FAULT	Transmitter Fault. Not supported	
3	TX_DISABLE	Transmitter Disable. Laser output disabled on high or open	2
4	MOD_DEF(2)	Module Definition 2. Data line for serial ID	3
5	MOD_DEF(1)	Module Definition 1. Clock line for serial ID	3
6	MOD_DEF(0)	Module Definition 0. Grounded within the module	3
7	Rate Select	No connection required	
8	LOS	Loss of Signal indication. Logic 0 indicates normal operation	4
9	V_{EER}	Receiver ground (common with transmitter ground)	1
10	V_{EER}	Receiver ground (common with transmitter ground)	1
11	V_{EER}	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	V_{EER}	Receiver ground (common with transmitter ground)	1
15	V_{CCR}	Receiver power supply	
16	V_{CCT}	Transmitter power supply	
17	V_{EET}	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	V_{EET}	Transmitter ground (common with receiver ground)	1

Notes:
1. Circuit ground is isolated from chassis ground
2. Disabled:T_{DIS}>2Vor open, Enabled: T_{DIS}<0.8V
3. Should Be pulled up with 4.7k –10k ohm on host board to a voltage between 2V and 3.6V
4. LOS is open collector output

References

1. Small Form Factor Pluggable (SFP) Transceiver Multi-Source Agreement (MSA), INF-8074i.
2. ISO/IEC 9314-3 "Information Processing Systems–Fiber Distributed Data Interface (FDDI),Part 3,Physical Layer Medium Dependent (PMD)." 1990.
3. ANSI T1.416.01-1999. "Network to Customer Installation Interfaces–Synchronous Optical NETwork (SONET) Physical Media Dependent Specification: Multi-Mode Fiber" ANSI, 1999.