

DATASHEET

DESCRIPTION:

PWTR-24-335114133F/PWTR-24-353214133F Bi-Directional transceiver is a high performance, cost effective module, which is compliant with SC Optics interface with built in WDM for Bi-Directional serial optical data communication applications. This module is designed for Single-Mode single fiber, operates at the normal wavelength of 1310/1550nm. Standard AC coupled CML for high speed signal and LVTTTL control and monitor signals. The transmitter section incorporates FP or DFB and driver IC with temperature compensation and automatic power control circuit, which make the transmitter section output power and Extinction ratio stabled in operation temperature. The receiver section incorporates an efficient InGaAs photodiode and transimpedance with AGC for wide dynamic range.



FEATURES:

- Single Mode bi-directional Transmission
- SFP Multi-source Package with SC Receptacle
- Up to 1.25Gb/s Data Links
- Hot-Pluggable Capability
- Up to 20 km on 9/125µm SMF
- Single +3.3V Power Supply
- Built-in WDM
- Isolation > 30dB, Cross Talk < -45dB
- Metal Enclosure, Excellent EMI & ESD protection
- Compliant with Specifications for IEEE802.3Z
- Compliant with Bellcore TA-NWT-000983
- Eye Safety Designed to Meet Laser Class1, Compliant with IEC60825-1
- Operating temperature range: 0°C to 70°C
- RoHS Compliant

APPLICATIONS:

- Gigabit Ethernet
- Fiber Channel
- WDM Application

SPECIFICATIONS:

Absolute Maximum Ratings:

Parameter		Symbol	Min.	Typical	Max.	Unit
Storage Temperature		T_s	-40		+85	°C
Supply Voltage		$V_{CC,T,R}$	-0.5		4	V
Relative Humidity		RH	0		85	%
Case Operating Temperature	Commercial	T_{op}	0		70	°C

Recommended Operating Environment:

Parameter		Symbol	Min.	Typical	Max.	Unit
Case operating Temperature	Commercial	T_{op}	0		70	°C
Supply Voltage		$V_{CC,T,R}$	3.0		3.6	V
Power Supply Rejection			100			mV _{p-p}

Electrical Characteristics: ($T_{op} = -0$ to 70 °C, $V_{CC} = 3.0$ to 3.60 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note
Supply Voltage	V_{CC}	3.0	3.30	3.60	V	
Supply Current	I_{CC}		160	280	mA	
Inrush Current	I_{surge}			$I_{CC}+30$	mA	
Maximum Power	P_{max}			1.0	W	
Transmitter Section:						
Input differential impedance	R_{in}	90	100	110	·	·
Single ended data input swing	$V_{in,pp}$	200		1200	mV _{p-p}	
Transmit Disable Voltage	V_D	$V_{CC} - 1.3$		V_{CC}	V	2
Transmit Enable Voltage	V_{EN}	V_{EE}		$V_{EE} + 0.8$	V	
Transmit Disable Assert Time	$T_{dessert}$			10	us	
Receiver Section:						
Single ended data output swing	$V_{out,pp}$	300		1000	mv	3
Data output rise time	t_r			150	ps	4
Data output fall time	t_f			150	ps	4
LOS Fault	$V_{losfault}$	$V_{CC} - 0.5$		V_{CC_host}	V	5
LOS Normal	$V_{los norm}$	V_{EE}		$V_{EE} + 0.5$	V	5
Power Supply Rejection	PSR	100			mV _{pp}	6
Deterministic Jitter Contribution	$RX\Delta DJ$			51.7	ps	7
Total Jitter Contribution	$RX\Delta TJ$			122.4	ps	

1.25Gb/s SFP Bi-di Transceiver

20km, Hot Pluggable,
Single SC, +3.3V, 1310 FP/1550nm DFB
PWTR-24-335114133F/PWTR-24-353214133F

Note:

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.
7. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.

Optical Parameters: (TOP = 0 to 70 °C, VCC = 3.00 to 3.60 Volts)

Parameter	Symbol	Min.	Typical	Max.	Unit	Note	
Transmitter Section:							
Center Wavelength	PWTR-24-335114133F	λ_c	1270	1310	1360	nm	1
	PWTR-24-353214133F		1480	1550	1580		
Spectral Width	PWTR-24-335114133F	σ			4	nm	RMS
	PWTR-24-353214133F				1		-20dB
Optical Output Power	P_{out}	-9.5		-3.0	dBm	2	
Optical Rise/Fall Time	t_r / t_f			160	ps	3	
Extinction Ratio	ER	9.2			dB		
Deterministic Jitter Contribution	TX Δ DJ			56.5	ps	4	
Total Jitter Contribution	TX Δ TJ			119	ps		
Eye Mask for Optical Output	Compliant with Eye Mask Defined in IEEE 802.3 standard						
Relative Intensity Noise	RIN			-120	dB/Hz		
Receiver Section:							
Optical Input Wavelength	PWTR-24-335114133F	λ_c	1480	1550	1580	nm	
	PWTR-24-353214133F		1270	1310	1360		
Optical Input Power	P_{in}	-22		-3	dBm	5.6	
Receiver Reflectance		12			dB		
Receiver Overload	P_{ol}			-3	dBm	5.6	
RX Sensitivity	S_{en}			-22	dBm	5.6	
RX_LOS Assert	LOS _A	-34			dBm		
RX_LOS Deassert	LOS _D			-24	dBm		
RX_LOS Hysteresis	LOS _H		2	2.5	dB		
General Specifications							
Data Rate	BR	1062		1250	Mb/s		
Bit Error Rate	BER			10^{-12}			
Max. Supported Link Length on 9/125 μ m SMF@1.25G	LMAX		20		km	7	
Total System Budget	LB	12.5			dB	8	

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Note:

1. Also specified to meet curves in FC-PI 13.0 Figures 18 and 19, which allow trade-off between wavelength spectral width.
2. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
3. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E), FC 1x and 2x eye masks when filtered.
4. Measured with DJ-free data input signal. In actual application, output DJ will be the sum of input DJ and . DJ.
5. Measured with conformance signals defined in FC-PI 13.0 specifications.
6. Measured with PRBS $2^{31}-1$ at 10^{-12} BER
7. Dispersion limited per FC-PI Rev. 13
8. Attenuation of 0.45 dB/km is used for the link length calculations. Distances are indicative only. Please refer to the Optical Specifications in Table IV to calculate a more accurate link budget based on specific conditions in your application.

Block Diagram of Transceiver:

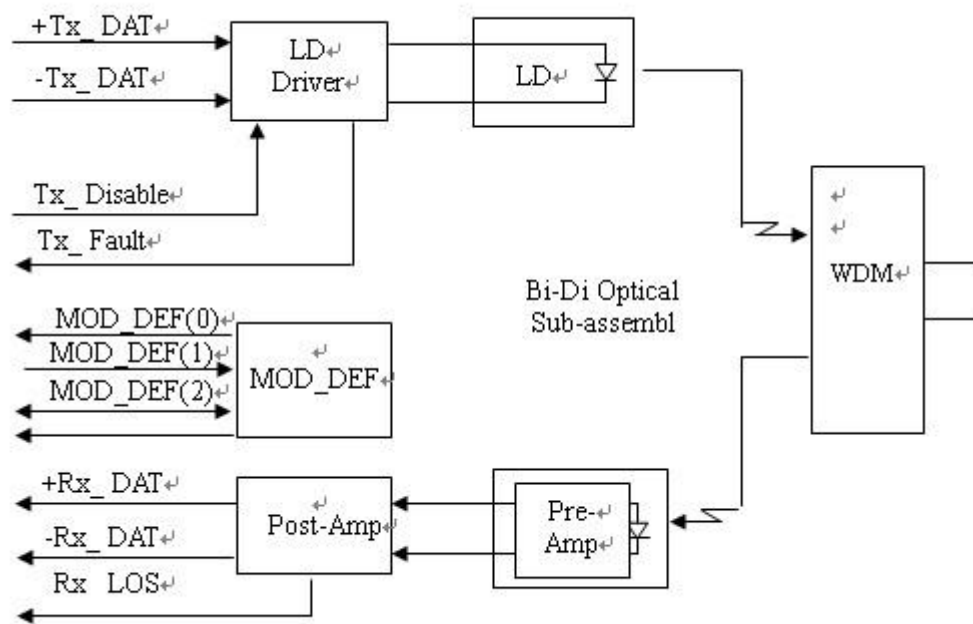


Figure1: Block Diagram

Pin Assignment:

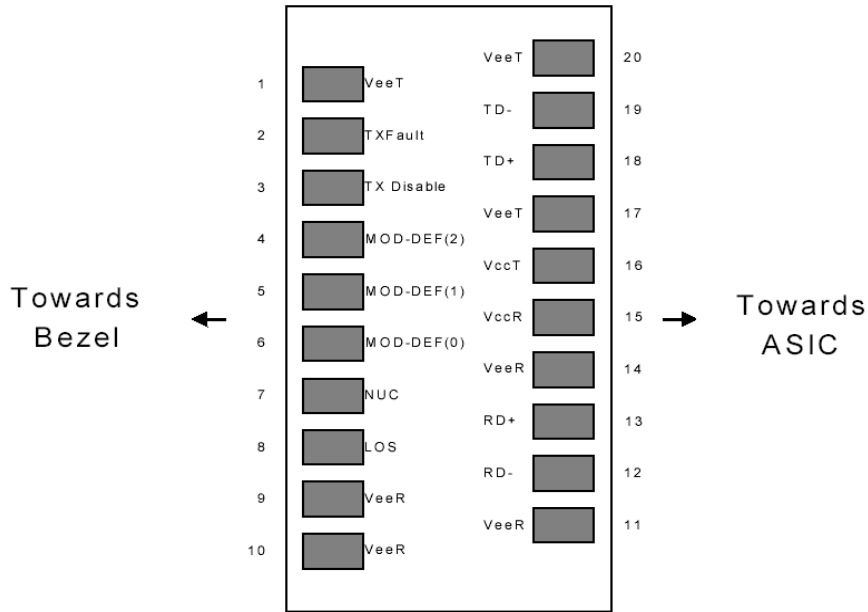


Figure2: Diagram of Host Board Connector Block Pin Numbers and Names

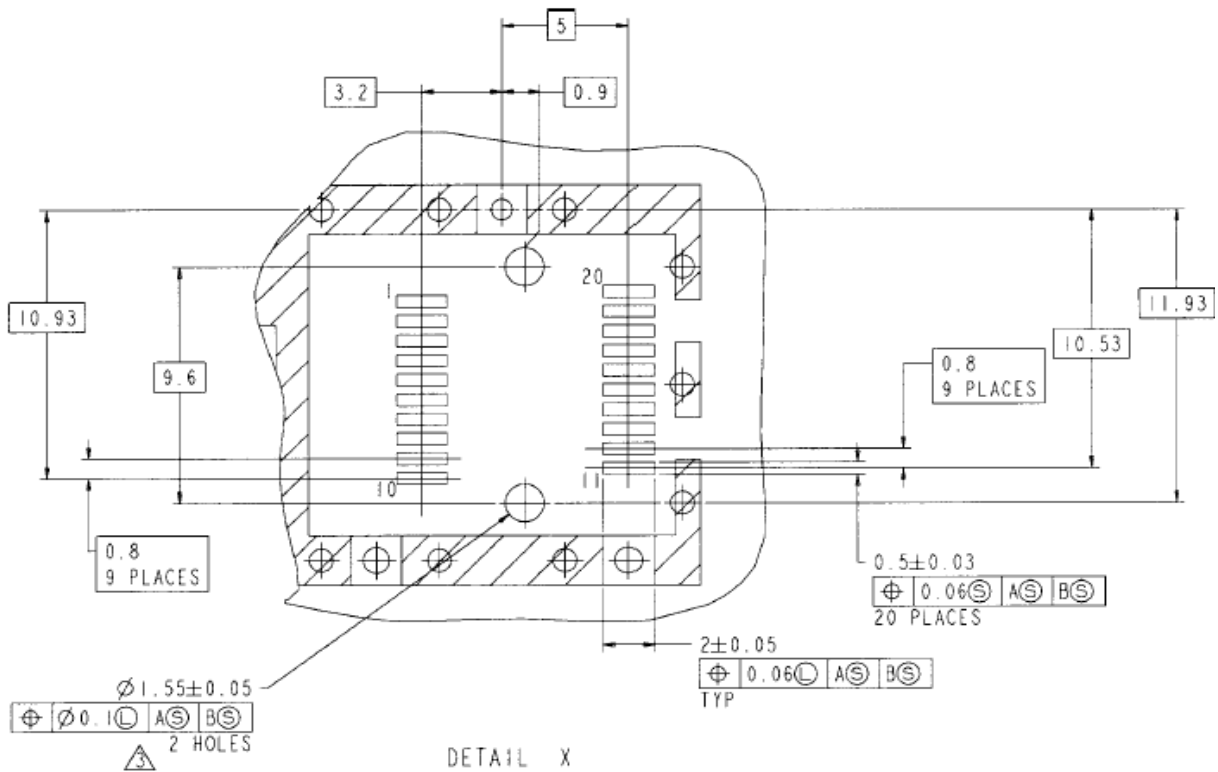


Figure 3. SFP Host Board Mechanical Layout

1.25Gb/s SFP Bi-di Transceiver
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Single SC, +3.3V, 1310 FP/1550nm DFB
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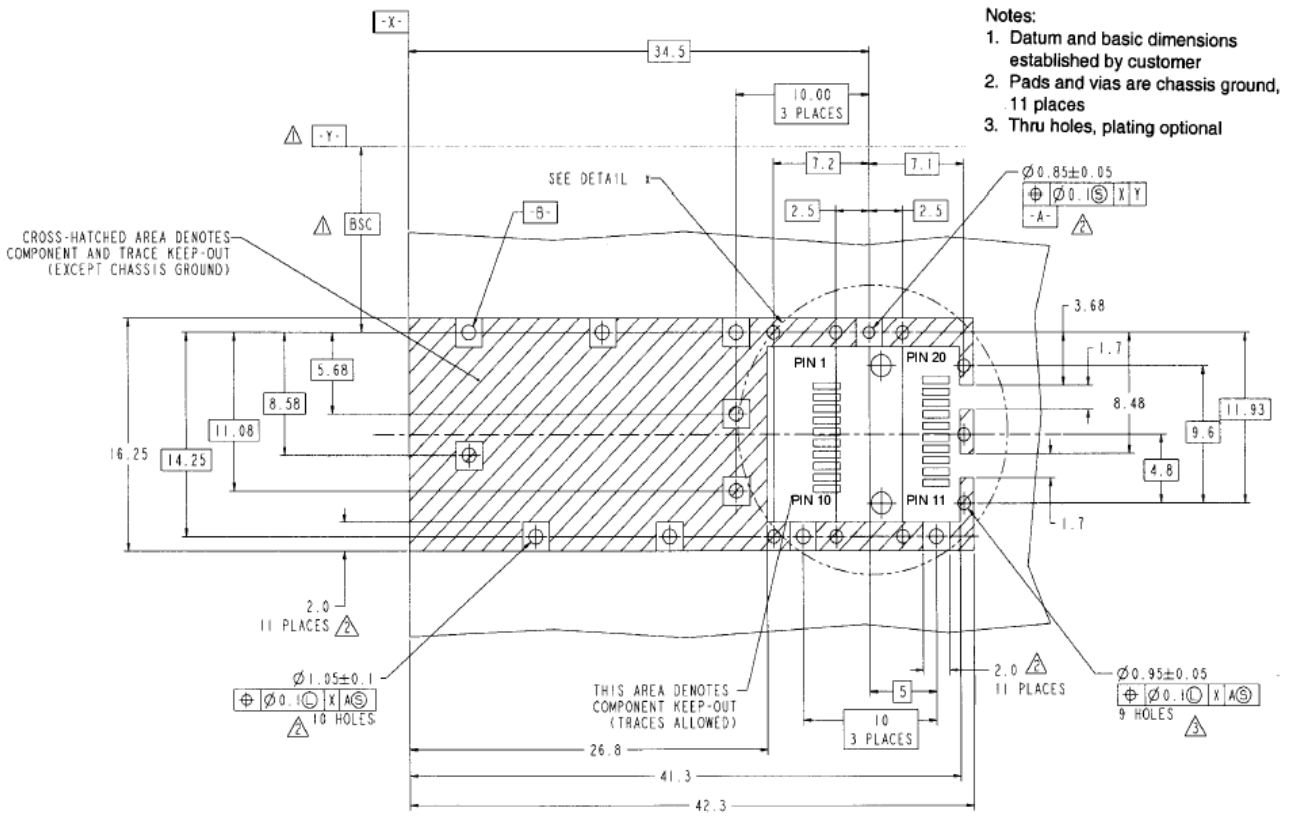


Figure 4. SFP Host Board Mechanical Layout(Cont)

Pin Description:

Pin No	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

Recommended Circuit:

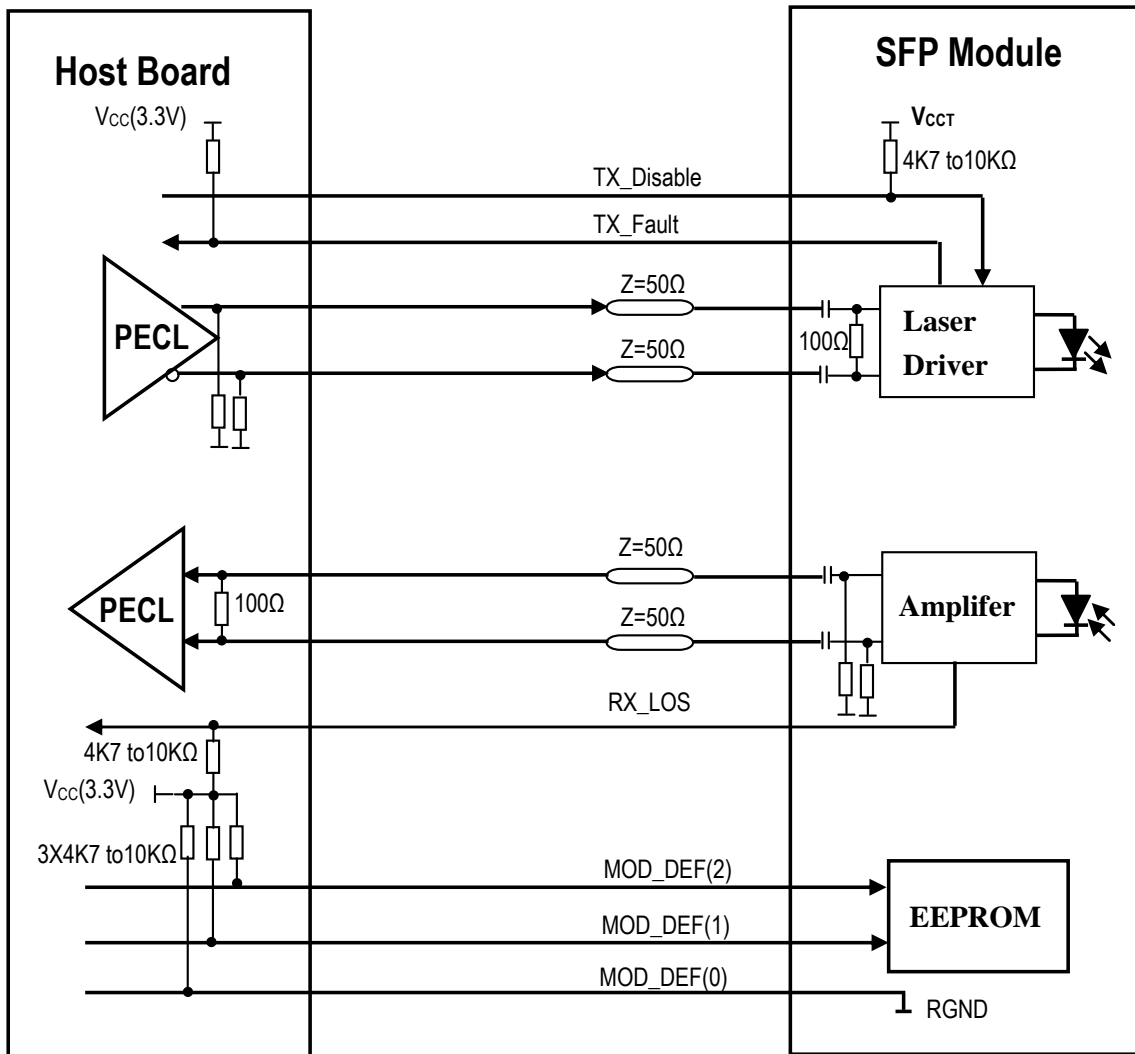


Figure 5. SFP Host Recommended Circuit

Serial ID Memory Contents:

Data Address	Length (Byte)	Name of Length	Description and Contents
Base ID Fields			
0	1	Identifier	Type of Serial transceiver (03h=SFP)
1	1	Reserved	Extended identifier of type serial transceiver (04h)
2	1	Connector	Code of optical connector type (01=SC)
3-10	8	Transceiver	Gigabit Ethernet 1000Base-BX
11	1	Encoding	8B10B (01h)
12	1	BR,Nominal	Nominal baud rate, unit of 100Mbps
13	1	Reserved	(0000h)
14	1	Length(9um,km)	Link length supported for 9/125um fiber, units of km
15	1	Length(9um)	Link length supported for 9/125um fiber, units of 100m
16	1	Length(50um)	Link length supported for 50/125um fiber, units of 10m
17	1	Length(62.5um)	Link length supported for 62.5/125um fiber, units of 10m
18	1	Length(Copper)	Link length supported for copper, units of meters
19	1	Reserved	
20-35	16	Vendor Name	SFP vendor name:
36	1	Reserved	
37-39	3	Vendor OUI	SFP transceiver vendor OUI ID
40-55	16	Vendor PN	Part Number: "FTxxxx" (ASCII)
56-59	4	Vendor rev	Revision level for part number
60-62	3	Reserved	
63	1	CCID	Least significant byte of sum of data in address 0-62
Extended ID Fields			
64-65	2	Option	Indicates which optical SFP signals are implemented(001Ah = LOS, TX_FAULT, TX_DISABLE all supported)
66	1	BR, max	Upper bit rate margin, units of %
67	1	BR, min	Lower bit rate margin, units of %
68-83	16	Vendor SN	Serial number (ASCII)
84-91	8	Date code	Manufacturing date code
92	1	Diagnostic Monitoring Type	Digital diagnostic monitoring implemented, "externally calibrated" is implemented, RX measurement type is "Average Power".
93	1	Enhanced Options	Optional Alarm/Warning flags implemented for all monitored quantities, Optional Soft TX_FAULT monitoring implemented, Optional Soft RX_LOS monitoring implemented.
94	1	SFF_8472 Compliance	Includes functionality described in Rev9.3 SFF-8472.
95	1	CCEX	Check code for the extended ID Fields (addresses 64 to 94)
Vendor Specific ID Fields			
96-127	32	Readable	Vendor specific date, read only

Mechanical Dimensions:

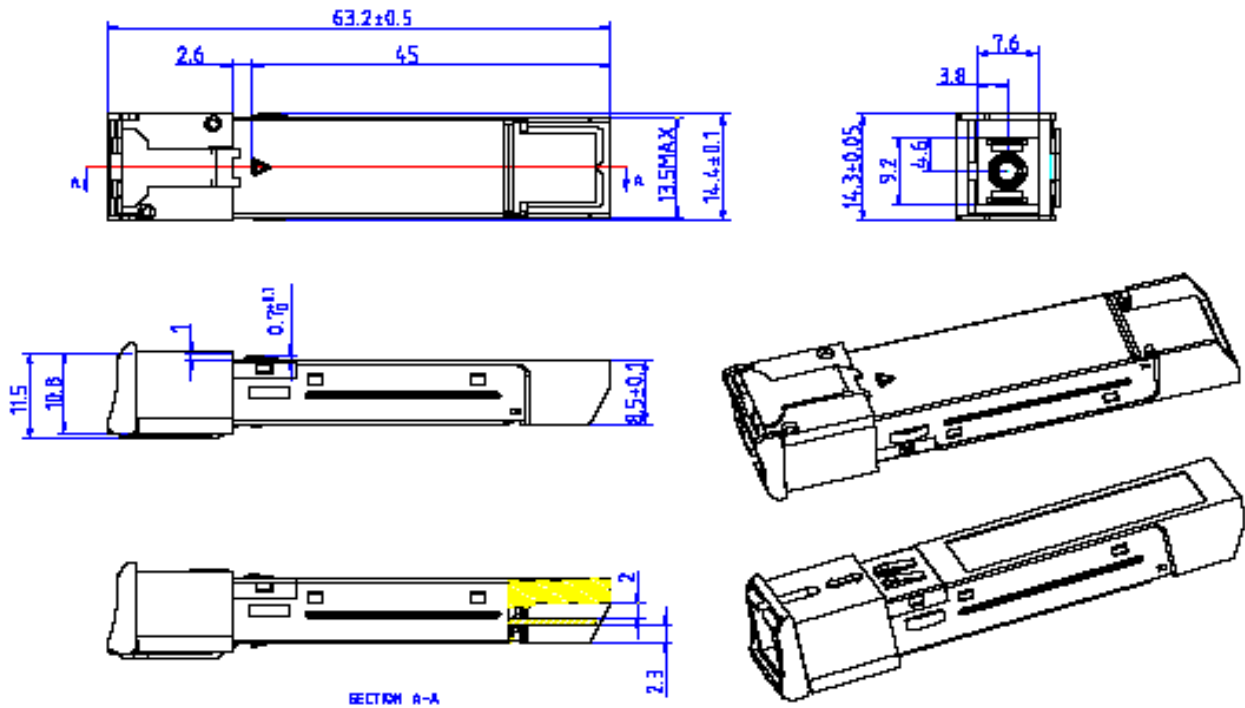


Figure 6. Mechanical Drawing