

# 155Mbps SFP 80km Optical Transceiver

## Product Features

- Up to 155Mb/s Data Links
- Hot-Pluggable
- 1550nm DFB laser transmitter
- PIN receiver
- Duplex LC connector
- RoHS compliant and Lead Free
- Up to 80 km on 9/125  $\mu$  m SMF
- Monitoring Interface Compliant with SFF-8472
- Low power dissipation <1W typically
- operating temperature range: -5° C to 85° C

## Applications

- SONET OC3-LR2

The AC-B-SFPO3-ELR2-xx is a high performance, cost effective module which have a Duplex LC optics interface. Standard AC coupled CML for high speed signal and LVTTTL control and monitor signals. The receiver section uses a PIN receiver and the transmitter uses 1550 nm DFB laser, supporting OC3 80km application.

## Ordering Information

Part Number	Description
AC-B-SFPO3-ELR2-xx	SFP 155Mbps 1550nm 80km optical transceiver extended temperature

## Regulatory Compliance

Feature	Standard	Performance
Electromagnetic Interference (EMI)	FCC Part 15 Class B	Compatible with standards
	EN 55022:2010, Class B	
Electromagnetic susceptibility (EMS)	EN 55024:2010	Compatible with standards
Laser Eye Safety	FDA 21CFR 1040.10 and 1040.11	Compatible with Class I laser product
	EN60950, EN (IEC) 60825-1,2	

### Absolute Maximum Ratings

The operation in excess of any absolute maximum ratings might cause permanent damage to this module.

Parameter	Symbol	Min	Max	Unit	Notes
Storage Temperature	TS	-40	85	°C	
Operating Case Temperature	TOP	-5	85	°C	
Relative Humidity (non-condensation)	RH	0	85	%	

### Recommended Operating Conditions and Power Supply Requirements

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Supply Voltage	VCC		3.135		3.465	V
Supply Current	Icc				300	mA
Inrush Current	Isurge				Icc+30	mA
Maximum Power	Pmax				1	W
Case operating Temperature	TC	-5			+85	°C

### Electrical Characteristics

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

Parameter	Symbol	Min	Typical	Max	Unit	Notes
Supply Voltage	Vcc	3.135		3.465	V	
Supply Current	Icc		160	300	mA	
Inrush Current	Isurge			Icc+30	mA	
Maximum Power	Pmax			1.0	W	
Transmitter						
Input differential impedance	Rin	90	100	110	Ω	Ω
Single ended data input swing	Vin PP	250		1200	mVp-p	

Transmit Disable Voltage	VD	Vcc – 1.3		Vcc	V	2
Transmit Enable Voltage	VEN	Vee		Vee+ 0.8	V	
Transmit Disable Assert Time	Tdessert			10	us	
<b>Receiver</b>						
Single ended data output swing	Vout,pp	250		800	mv	3
Data output rise time	tr			260	ps	4
Data output fall time	tf			260	ps	4
LOS Fault	Vlosfault	Vcc – 0.5		VCC_host	V	5
LOS Normal	Vlos norm	Vee		Vee+0.5	V	5
Power Supply Rejection	PSR	100			mVpp	6
Deterministic Jitter Contribution	RXΔDJ			51.7	ps	7
Total Jitter Contribution	RXΔTJ			122.4	ps	

**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 Characteristics

All parameters are specified under the recommended operating conditions unless otherwise specified..

Parameter	Symbol	Min	Typical	Max	Unit	Notes
<b>Transmitter</b>						
Center Wavelength	$\lambda_c$	1530	1550	1570	nm	1
Spectral Width(-20dB)	$\sigma$			1	nm	
Side Mode Suppression Ratio	SMSR	30			dB	
Optical Output Power	Pout	0		+5	dBm	2
Optical Rise/Fall Time	tr / tf			260	ps	3
Extinction Ratio	ER	9			dB	
Deterministic Jitter Contribution	TX $\Delta$ DJ			56.5	ps	4
Total Jitter Contribution	TX $\Delta$ TJ			119	ps	
<b>Receiver</b>						
Optical Input Wavelength	.	1270		1610	nm	
Optical Input Power	Pin			0	dBm	5.6
Receiver Reflectance		12			dB	
Receiver Overload	Pol			0	dBm	5.6
RX Sensitivity	Sen			-27	dBm	5.6
RX_LOS Assert	LOS A	-38			dBm	
RX_LOS Deassert	LOS D			-28	dBm	
RX_LOS Hysteresis	LOS H	0.5			dB	

**Notes:**

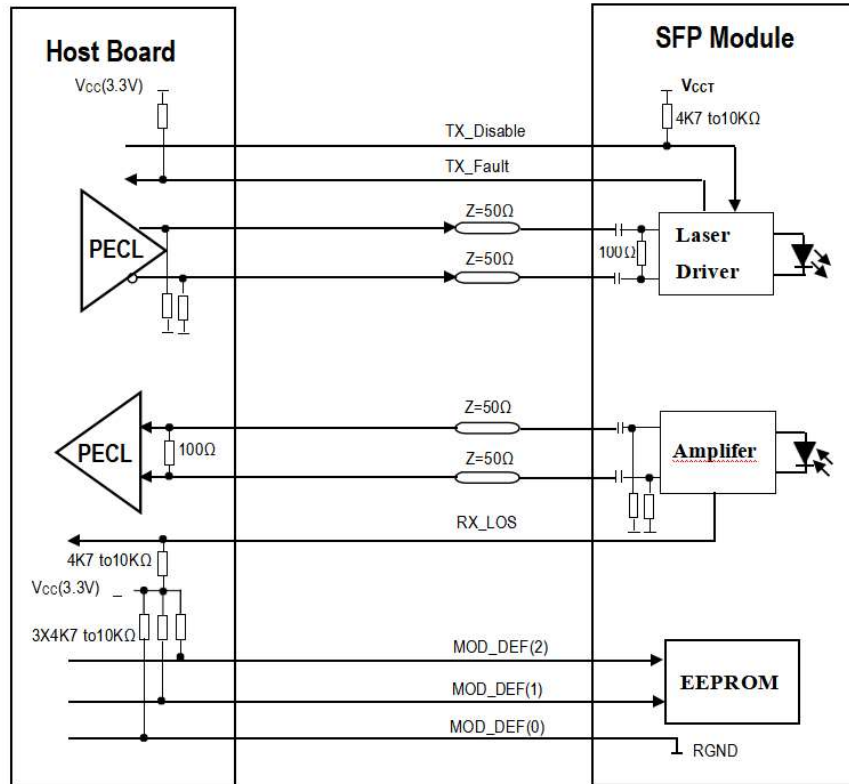
1. Also specified to meet curves in FC-PI 13.0 Figures 18 and 19, which allow trade-off between wavelength spectral width.
2. Class 1 Laser Safety per FDA/CDRH and EN (IEC) 60825 regulations.
3. Unfiltered, 20-80%. Complies with IEEE 802.3 (Gig. E), FC 1x and 2x eye masks when filtered.
4. Measured with 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 PRBS31 at 10-12 BER
7. Dispersion limited per FC-PI Rev. 13
8. Attenuation of 0.25 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.

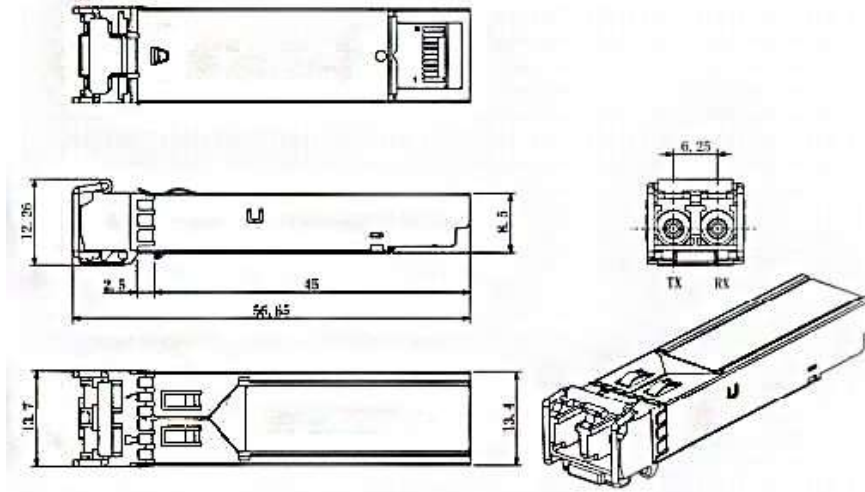
### Digital Diagnostic Functions

Parameter	Symbol	Min	Max	Unit	Notes
Temperature monitor absolute error	DMI_Temp	-3	+3	°C	
Supply voltage monitor absolute error	DMI_VCC	-0.1	+0.1	V	
TX power monitor absolute error	DMI_RX	-3	+3	dB	
RX power monitor absolute error	DMI_RX	-3	+3	dB	
Bias current monitor	DMI_Ibias	-10%	+10%	mA	

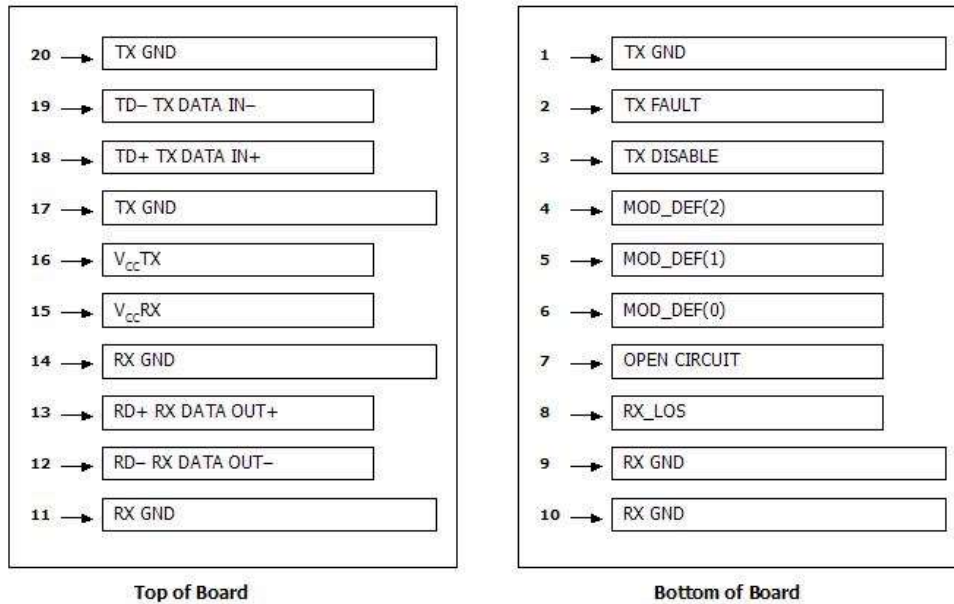
Recommended Circuit



**Mechanical Dimensions**



**Pin Assignment and Description**



**Pin Assignment**

PIN #	Symbol	Description	Notes
1	VeeT	Transmitter Ground	1
2	TX Fault	Transmitter Fault Indication	
3	TX Disable	Transmitter Disable	2
4	MOD-DEF2	Module Definition	3
5	MOD-DEF1	Module Definition 1	3
6	MOD-DEF0	Module Definition 0	3
7	Rate Select	Not Connected	4
8	LOS	Loss of Signal	5
9	VeeR	Receiver Ground	1



10	VeeR	Receiver Ground	1
11	VeeR	Receiver Ground	1
12	RD-	Inv. Received Data Out	6
13	RD+	Received Data Out	6
14	VeeR	Receiver Ground	1
15	VccR	Receiver Power	1
16	VccT	Transmitter Power	
17	VeeT	Transmitter Ground	
18	TD+	Transmit Data In	6
19	TD-	Inv. Transmit In	6
20	VeeT	Transmitter Ground	

**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 - 10kohms 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 – 10kohms 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.