Professional high-speed optical transceiver

OPN-S3F15-80LC2 / OPN-S3F15-80LC2I / OPN-S3F15T-80LC2 / OPN-S3F15T-80LC2I / OPN-S3F15E-80LC2 / OPN-S3F15E-80LC2I / OPN-S3F15ET-80LC2 / OPN-S3F15ET-80LC2I

622 Mbps / 80 km / 1550 nm SFF LC SINGLE-MODE TRANSCEIVER

PRODUCT FEATURES

- Duplex LC Single Mode Transceiver
- SONET OC-12 LR-2 / SDH STM-4 (L-4.2) Compliant
- Small Form Factor, RJ-45 size, 2X5 pin Package
- 1550 nm DFB LD Transmitter
- 26 dB Link Power Budget at Least
- LVPECL Signal Input / Output
- LVTTL Transmitter Disable Input
- LVPECL Signal Detection Output: OPN-S3F15E-80LC2I
- LVTTL Signal Detection Output: OPN-S3F15ET-80LC2I
- Single +3.3 V Power Supply
- RoHS Compliant
- 0 to 70ºC Operation: OPN-S3F15E-80LC2
- -50 to 85ºC Operation: OPN-S3F15E-80LC2I
- Wave Solderable and Aqueous Washable
- Class 1 Laser International Safety Standard IEC-60825Compliant

APPLICATIONS

- ATM 622 Mbps Links
- SONET / SDH Equipment Interconnect
- Fiber Channel 533 Mb/s Links

PRODUCT DESCRIPTION

The OPN-S3F15E-80LC2I series single mode transceivers are small form factor, low power, high performance module for bi-directional serial optical data communications such as SONET OC-12 LR-2 / SDH STM-4 (L-4.2) and Fiber Channel. This module is designed for single mode fiber and operates at a nominal wavelength of 1550 nm. A guaranteed minimum optical link budget of 26 dB is offered which can correspond to a link distance of over 80 km (assuming worstcase fiber loss of 0.25 dB/km). The transmitter section uses a multiple quantum well 1550 nm DFB laser and is a class 1laser compliant according to International Safety StandardIEC-60825. The receiver section uses an integrated InGaAs detector preamplifier (IDP) mounted in an optical header and a limiting post-amplifier IC. A PECL logic interface simplifies interface to external circuitry.

ORDER INFORMATION

P/No.	Bit Rate (Mb/s)	SONET /SDH	Distance (km)	Wavelength (nm)	Package	Temp. (ºC)	TX Power (dBm)	RX Sens. (dBm)	RoHS Compliant
OPN-S3F15E-80LC2	622	LR-2/L-4.2	80	1550 DFB	2X5 LC	0 to 70	2 to -3	-29	Yes
OPN-S3F15E-80LC2I	622	LR-2/L-4.2	80	1550 DFB	2X5 LC	-50 to 85	2 to -3	-29	Yes

Absolute Maximum Ratings					
Parameter	**Symbol**	**Min**	**Max**	**Units**	**Notes**
Storage Temperature	Tstg	-50	85	ºC	
Operating Temperature	Topr	0 -50	70 85	ºC	OPN-S3F15E-80LC2 OPN-S3F15E-80LC2I
Soldering Temperature	---		260	ºC	10 seconds on leads only
Power Supply Voltage	Vcc	0	3.6	V	
Input Voltage	---	GND	Vcc	V	
Output Current	Iout	0	30	mA	

Professional high-speed optical transceiver

Recommended Operating Conditions					
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units / Notes**
Power Supply Voltage	Vcc	3.13	3.3	3.47	V
Operating Temperature	Topr	0 -50		70 85	ºC / OPN-S3F15E-80LC2 ºC / OPN-S3F15E-80LC2I / air flow 1m/sec
Data Rate		50	622		Mb/s
Power Supply Current	Icc		200	300	mA

Transmitter Specifications (0ºC < Topr < 70ºC, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Optical Transmit Power	Po	-3	---	2	dBm	1
Output Center Wavelength	λ	1480		1580	nm	
Output Spectrum Width	Δλ	---	---	1	nm	-20 dB width
Extinction Ratio	E_R	10	---	---	dB	
Output Eye	Compliant with Bellcore GR-253-CORE and ITU recommendation G.957					
Optical Rise Time	t_r			1.2	ns	10% to 90% Values
Optical Fall Time	t_f			1.2	ns	10% to 90% Values
Relative Intensity Noise	RIN			-120	dB/Hz	
Total Jiter	TJ			0.55	ns	2
Electrical						
Data Input Current – Low	I_{IL}	-350			μA	
Data Input Current – High	I_{IH}			350	μA	
Differential Input Voltage	V_{IH} - V_{IL}	300			mV	
Data Input Voltage – Low	V_{IL} - V_{CC}	-2.0		-1.58	V	3
Data Input Voltage -- High	V_{IH} - V_{CC}	-1.1		-0.74	V	3
Disable Input Voltage -- Low	$V_{TDIS,L}$	0		0.5	V	TX Output Enabled
Disable Input Voltage -- High	$V_{TDIS,H}$	Vcc – 1.3		Vcc	V	TX Output Disabled
Shut Off Time for TxDis	t_{DIS}			1	ms	

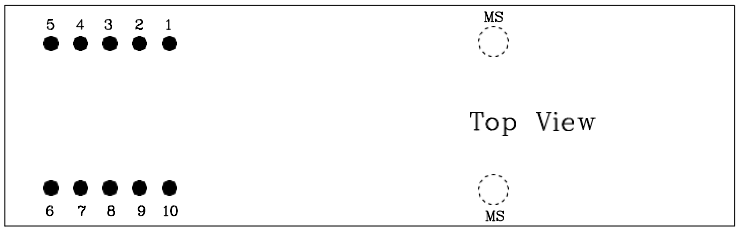
Notes: 1. Output power is power coupled into a 9/125 μm single mode fiber.
2. Measured with 2^{23}-1 PRBS with 72 ones and 72 zeros
3. These inputs are compatible with 10K, 10KH and 100K ECL and PECL inputs.

Receiver Specifications (0ºC < Topr < 70ºC, 3.13V < Vcc < 3.47V)						
Parameter	**Symbol**	**Min**	**Typ**	**Max**	**Units**	**Notes**
Optical						
Sensitivity	---	---	---	-29	dBm	1
Maximum Input Power	Pin	-5		---	dBm	
Signal Detect -- Asserted	Pa	---	---	-29	dBm	Transition: low to high
Signal Detect -- Deasserted	Pd	-40	---	---	dBm	Transition: high to low
Signal detect -- Hysteresis		1.0	---		dB	
Wavelength of Operation		1100	---	1600	nm	
Electrical						
Data Output Voltage – Low	V_{OL} - V_{CC}	-2.0		-1.58	V	2
Data Output Voltage – High	V_{OH} - V_{CC}	-1.1		-0.74	V	2
Signal Detect Output Voltage -- Low	V_{OL}	-2.0		-1.58	V	OPN-S3F15E-80LC2I
Signal Detect Output Voltage -- High	V_{OH}	-1.1		-0.74	V	
Signal Detect Output Voltage -- Low	V_{OL} - V_{CC}			0.5	V	OPN-S3F15ET-80LC2I
Signal Detect Output Voltage -- High	V_{OH} - V_{CC}	2.0			V	

Notes: 1. Minimum sensitivity and saturation levels at BER=1E-10 for a 2^{23}-1 PRBS with 72 ones and 72 zeros.
2. These outputs are compatible with 10K, 10KH and 100K ECL and PECL outputs.

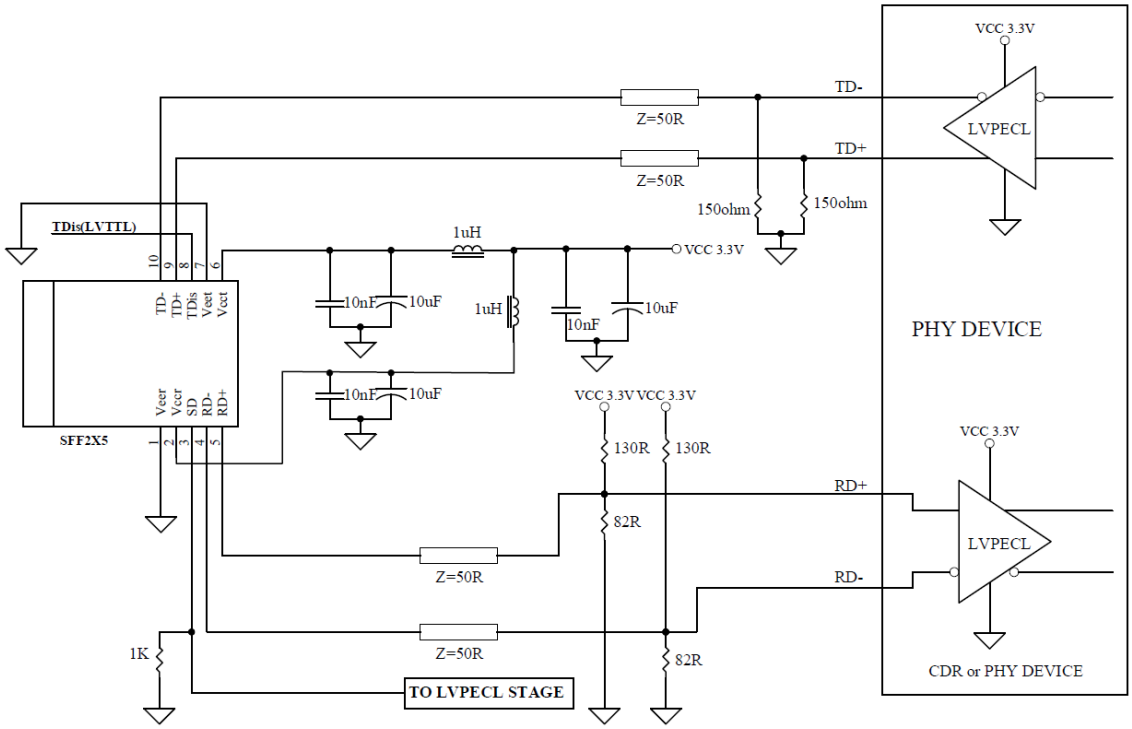
Professional high-speed optical transceiver

CONNECTION DIAGRAM



PIN	Symbol	Notes
1	V_{EE}r	Directly connect this pin to the receiver ground plane
2	V_{CC} r	+3.3V dc power for the receiver section
3	SD	Active high on this indicates a received optical signal.
4	RD–	Receiver Data out Bar. See recommended circuit schematic
5	RD+	Receiver Data out. See recommended circuit schematic
6	V_{CC} t	+3.3V dc power for the transmitter section
7	V_{EE}t	Directly connect this pin to the transmitter ground plane
8	TDis	Transmitter Disable. Connect this pin to +3.3V TTL logic "1" to disable module To enable module connect to TTL logic low "0"
9	TD+	Transmitter Data In. See recommended circuit schematic
10	TD-	Transmitter Data In Bar. See recommended circuit schematic
MS	MS	Mounting Studs. Connect to Chassis Ground

RECOMMENDED CIRCUIT SCHEMATIC



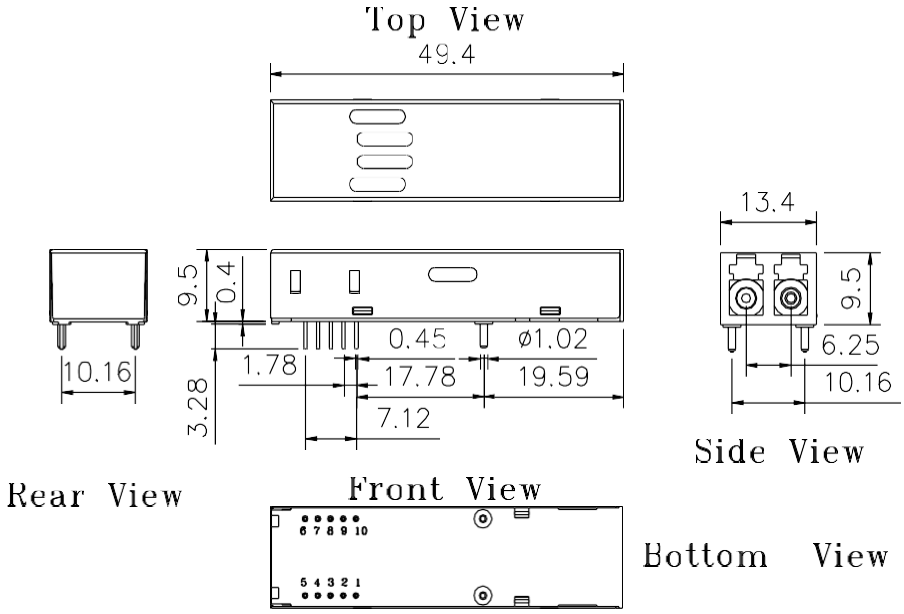
Note: 1. 1000Ω SD Output pull-down resistor required for OPN-S3F15-80LC2 / OPN-S3F15-80LC2I (LVPECL SD Output).
2. No pull-down resistor required for OPN-S3F15T-80LC2 / OPN-S3F15T-80LC2I (LVTTL SD Output)
3. Veer and Veet are not internally connected to each other.
4. 50 Ω line pattern and component placements on TD+/TD- and RD+/RD- lines shall be symmetrical for better impedance matching.

Professional high-speed optical transceiver

PACKAGE DIAGRAM

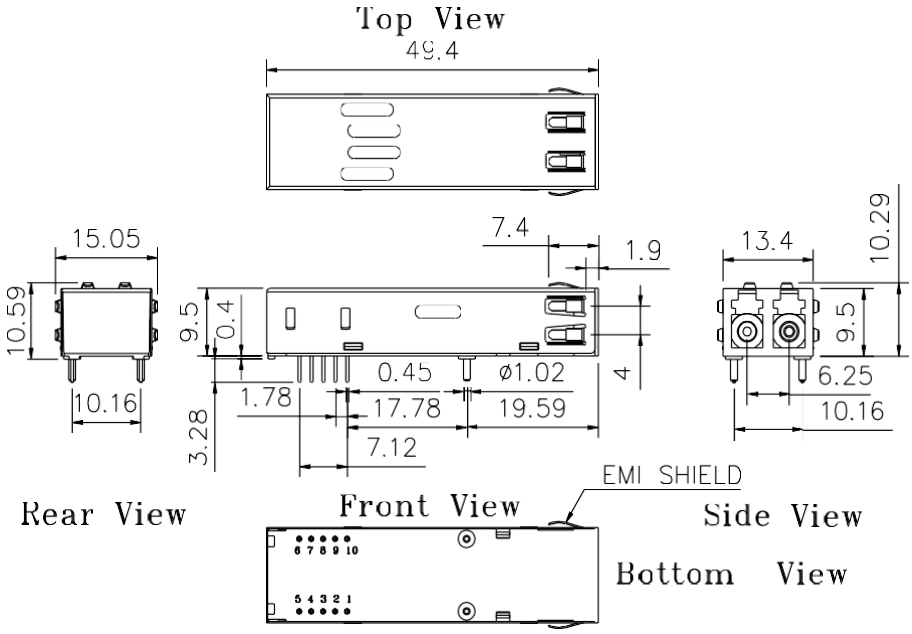
Units in mm

1) Standard Case



OPN-S3F15-80LC2 / OPN-S3F15-80LC2I / OPN-S3F15T-80LC2 / OPN-S3F15T-80LC2I

2) Extended Case



OPN-S3F15E-80LC2 / OPN-S3F15E-80LC2I / OPN-S3F15ET-80LC2 / OPN-S3F15ET-80LC2I

Note: Specifications subject to change without notice.