

**50 Mb/s - 2.97 Gb/s, 20 - 50 km  
TX 1310/RX 1550, TX 1550/RX 1310 nm,  
SDI BIDI SFP LC Connector, Single Mode**

## Description

OptixCom's advanced video Bi-Directional (BIDI) SFP optical transceivers are deployed for the increasing demand of high definition video applications over a long distance. This series of BIDI transceiver product is unique in that only one single fiber is required to transmit and receive video signals simultaneously. That means the total bandwidth capacity of an existing fiber cable infrastructure can be doubled instantly. The typical design of a BIDI transceiver uses a 1310 nm LD to transmit and 1550 nm PD to receive, and vice versa for the matching one (1310 nm to receive and 1550 nm to transmit) at the other end to make a complete link.

The design supports pathological patterns for SD, ED, HD, and 3G SDI (Serial Digital Interface) signals from 50 Mb/s to 3 Gb/s. The high data rate enables crystal clear video resolution with minimum degradation. In addition to standard optical transceiver components used in the module, a micro-controller IC is utilized to process video signals. This electrical-optical interface is also compatible with SMPTE 297-2006 standard and SFP Multi-Source Agreement (MSA) package specifications.

This series of SDI BIDI SFP transceiver supports 16 - 22 dB of power budget for up to 50 km of transmission distance respectively with standard single mode fibers. This product is RoHS compliant.

## Key Features

- TX1310/RX1550 & TX1550/RX1310 nm pair
- Single mode BIDI SFP optical transceiver
- 50 Mb/s – 3 Gb/s; SMPTE 297-2006 compatible
- 16 dB power budget for 20 km distance
- 20 dB power budget for 40 km distance
- 22 dB power budget for 50 km distance
- Support SMPTE 424M/292M/344M/259M
- Single LC connector optical interface
- Single 3.3V power supply
- Z-axis hot pluggable
- SFF-8472 MSA and RoHS compliant



**SDI-2970T3R5-BDXXK**  
**SDI-2970T5R3-BDXXK**  
**(XX = 20, 40, 50)**



## Applications

- ✓ Serial Digital Interface (SDI) standard
- ✓ SMPTE 297-2006 compatible electrical-optical interface
- ✓ Remote digital display or security surveillance systems
- ✓ Professional video broadcast
- ✓ Digital cinema system

## Ordering Information

**Part Number:** SDI-2970T3R5-BDXXK

50 Mb/s to 2.97 Gb/s, single mode, SDI BIDI video SFP transceivers, TX 1310 nm and RX 1550 nm, **XX** km reach, 0 – 70 °C. **XX = 20, 40 50**

**Part Number:** SDI-2970T5R3-BDXXK

50 Mb/s to 2.97 Gb/s, single mode, SDI BIDI video SFP transceivers, TX 1550 nm and RX 1310 nm, **XX** km reach, 0 – 70 °C. **XX = 20, 40, 50**

\* Add "-T" in the Part Number for extended temperature range -40–85 °C, i.e., SDI-2970T3R5-BD20K-T.

## Operating Conditions

Parameter	Min.	Typical	Max.	Units
Operate Temperature	0	25	70	°C
Data Rate	50	--	3000	Mb/s
Supply Voltage	3.15	3.3	3.45	V
Supply Current	---	---	450	mA

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### Absolute Maximum Ratings

Parameter	Symbol	Min.	Max.	Units
Storage Temperature	$T_{st}$	-40	85	°C
Humidity	$R.H.$	---	85	%
Soldering Temperature (10 sec. on leads)	$T_{sd}$	---	260	°C

### General Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Input Voltage <sup>1</sup>	$\Delta V_i$	0.4	---	1.8	V
Differential Input Impedance <sup>2</sup>	$Z$	90	100	110	ohm
Spectral Width (-20 dB)	$\Delta\lambda$	---	---	1	nm
Side Mode Suppression Ratio	$SMSR$	30	---	---	dB
TX Disable Voltage – High	$V_{DH}$	2.0	---	$V_{cc}$	V
TX Disable Voltage - Low	$V_{DL}$	0	---	0.8	V
TX Fault Output - High	$V_{FH}$	2.0	---	$V_{cc}$	V
TX Fault Output - Low	$V_{FL}$	0	---	0.8	V
TX Disable Assert Time	$T_{ass}$	---	---	10	μs
TX Disable Deassert Time	$T_{disass}$	---	---	1.0	ms
Time to Initialize	$T_{as}$	---	---	300	ms
TX Fault from Fault to Assertion	$T_{fault}$	---	---	100	μs
TX Disable Time to Start Reset	$T_{reset}$	10	---	---	μs
Rise/Fall Time (20% - 80%)	SD-SDI	---	---	1500	ps
	HD-SDI	---	---	270	
	3G-SDI	---	---	135	
Total Jitter PRBS & Color Bar	SD-SDI	---	70	200	ps
	HD-SDI	---	50	135	
	3G-SDI	---	70	100	
Total Jitter Pathological	SD-SDI	---	200	300	ps
	HD-SDI	---	115	---	
	3G-SDI	---	120	---	

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.

### General Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Differential Output Voltage <sup>1</sup>	$\Delta V_i$	0.6	0.8	1.0	V
Differential Impedance <sup>2</sup>	Z	90	100	110	ohm
RX Signal Loss – Deasserted	$P_{RL-}$	-29	---	---	dBm
RX Signal Loss – Asserted	$P_{RL+}$	---	---	-22	dBm
Signal Detect Hysteresis	$P_{RL+} - P_{RL-}$	1	---	4	dB
Rise/Fall Time (20% - 80%)	SD-SDI	---	---	1500	ps
	HD-SDI	---	---	270	
	3G-SDI	---	---	135	
Total Jitter PRBS & Color Bar	SD-SDI	---	70	200	Ps
	HD-SDI	---	50	135	
	3G-SDI	---	70	100	
Total Jitter Pathological	SD-SDI	---	200	300	ps
	HD-SDI	---	115	---	
	3G-SDI	---	120	---	
RX Signal Loss Output - High	$V_{RL+}$	2.0	---	$V_{CC}$	V
RX Signal Loss Output - Low	$V_{RL-}$	0	---	0.8	V
RX Signal Loss Assert Time	$T_{RL+}$	---	---	100	$\mu$ s
RX Signal Loss Deassert Time	$T_{RL-}$	---	---	100	$\mu$ s

Notes:

1. Applied to AC LVPECL I/O coupling. See the design guide for proper termination.
2. Single ended will be 50 ohm for each signal line.

### Transmitter Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Output Power (20 km) <sup>1</sup>	$P_o$	-6	-2	0	dBm
Optical Output Power (40 km) <sup>1</sup>	$P_o$	-2	0	+3	dBm
Optical Output Power (50 km) <sup>1</sup>	$P_o$	0	+1	+3	dBm
Optical Wavelength (SDI-2970T3R5-BDXXK)	$\lambda_o$	1260	1310	1360	nm
Optical Wavelength (SDI-2970T5R3-BDXXK)	$\lambda_o$	1530	1550	1570	nm
Extinction Ratio	$ET$	5	8	---	dB

### Receiver Electro-Optical Characteristics

Parameter	Symbol	Min.	Typical	Max.	Units
Optical Wavelength (SDI-2970T3R5-BDXXK)	$\lambda_o$	1480	---	1580	nm
Optical Wavelength (SDI-2970T5R3-BDXXK)	$\lambda_o$	1290	---	1330	nm
Receiver Overload	$P_{max}$	+0	---	---	dBm
Receiver Sensitivity (PBRS) <sup>2</sup>	SD-SDI	---	---	-22	dBm
	HD-SDI	---	---	-21	
	3G-SDI	---	---	-18	
Receiver (Pathological) <sup>2</sup>	SD-SDI	---	---	-22	dBm
	HD-SDI	---	---	-21	
	3G-SDI	---	---	-18	

Notes:

1. Output of coupling optical power into 9/125  $\mu\text{m}$  SMF.
2. Test at 3 Gb/s, 2<sup>7</sup> - 1 PRBS data pattern, and > 1x10<sup>-12</sup> of Bit-Error-Rate (BER)

Class 1 Laser Product  
Complies with  
21 CFR 1040.10 and 1040.11

