

**DESCRIPTION**

The TX6F-SX51D-01 (TX-SX51) is an optical subassembly (OSA) with bi-direction comm and control link capabilities. The TX-SX51 can transmit up to four video- or data-lanes (up to 3.5Gbps per channel) and one low-speed lane, while simultaneously receiving one low-speed signal, all on **a single** multimode fiber. With the laser driver embedded in the OSA and a ZIF-terminated flex circuit, the TX-SX51 is a bi-directional TOSA also capable of receiving a control signal thereby enabling increased flexibility in system design, extending to applications in DVI and HDMI™ v1.4.



**FEATURES**

- Up to 3.5 Gbps on each of the 4 high-speed data channels
- 5 transmit lanes and 1 receive lane over 1 multimode fiber
- HDMI™ 1.4-capable
- On-board High Speed Laser Driver with individual modulation and bias control of each VCSEL
- Low-stress, highly flexible ZIF connection
- Low power consumption
- High-speed CML inputs

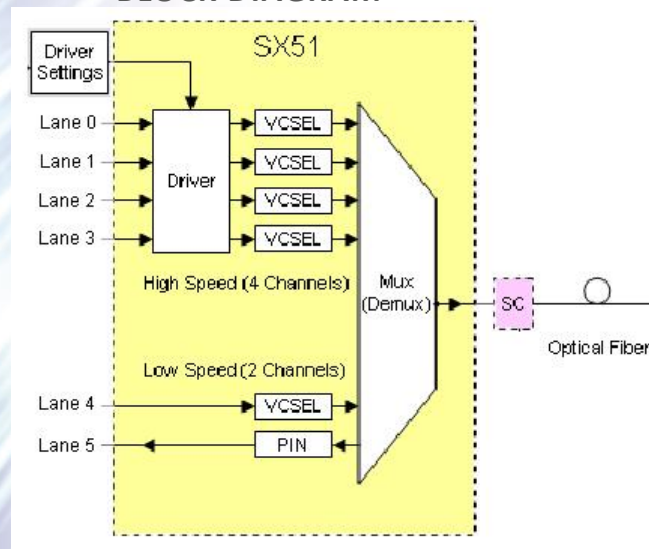
**APPLICATIONS**

- High-speed Optical Links
- DVI Optical Extenders
- DVI Switches
- HDMI™ Matrix Switches
- HDMI™ Optical Extenders

**ORDERING INFORMATION**

PART NUMBER	DESCRIPTION
TX6F-SX51D-01	4-ch Transmitter Optical Subassembly, 3.5 Gbps per channel plus 5 Mbps Bi-di channel
TX6F-SX51D-01C	4-ch Transmitter Optical Subassembly, 3.5 Gbps per channel plus 5 Mbps Bi-di channel with Clip
TX6F-SX51D-01H	4-ch Transmitter Optical Subassembly, 3.5 Gbps per channel plus 5 Mbps Bi-di channel with Heatsink & Clip

**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	MIN	MAX	UNITS
Storage Temperature <sup>1</sup>	T <sub>st</sub>	-40	85	°C
Supply Voltage	V <sub>CC</sub>	-0.3	3.6	V
Operating Ceramic (substrate) Temperature <sup>2</sup>	T <sub>a</sub>	0	70	°C
Operating Humidity <sup>3</sup>	RH		80	%

**Notes:**

1. Stresses listed may be applied without causing damage. Functionality at or above the values listed is not implied. Exposure to these values for extended periods may affect reliability.
2. See outline drawing for measurement point. Inneos strongly recommends mounting with a heat sink.
3. Non condensing humidity.

**OPTICAL SPECIFICATIONS – HIGH-SPEED LANES**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Average Optical Power, per Lane <sup>1,2</sup>	P <sub>out</sub>	-3.0	0.0		dBm
Optical Modulation Amplitude	OMA	-6.25			dBm
Center Wavelength – Lane 0	λ <sub>0</sub>		778		nm
Center Wavelength – Lane 1	λ <sub>1</sub>		800		nm
Center Wavelength – Lane 2	λ <sub>2</sub>		825		nm
Center Wavelength – Lane 3	λ <sub>3</sub>		850		nm
Optical Rise/Fall Time <sup>3</sup>	T <sub>tr</sub>			100	Ps

**Notes:**

1. All laser bias and modulations settings are pre-programmed. Users cannot modify these settings.
2. I = 5mA, T=25°C.
3. Rise and fall times measured from 20 –80%. Tested with Inneos reference circuits.

**ELECTRICAL SPECIFICATIONS – HIGH-SPEED LANES**

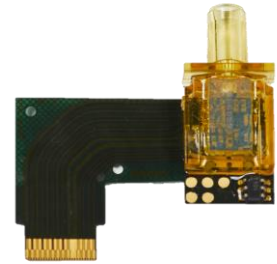
PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Data Rate per Lane <sup>1</sup>	DR			3.50	Gb/s
Total Jitter (RMS), per lane <sup>2</sup>	T <sub>J1</sub>		10		ps
Input Differential Impedance	Z <sub>DIFF</sub>		100		ohm
Differential Input Voltage <sup>3</sup>	V <sub>IN-DIFF</sub>	320		2000	mV <sub>p-p</sub>
Single-ended Input Voltage	V <sub>IN-SE</sub>	160		1000	mV <sub>p-p</sub>
Common mode input voltage (AC-coupled input)	V <sub>IN-CM</sub>	0.85	2.6	V <sub>CC</sub>	V
Operating Supply Voltage	V <sub>CC</sub>	3.15	3.30	3.45	V
Operating Supply Current	I <sub>CC</sub>		140		mA

**Notes:**

1. Requires DC-balanced data pattern. Measured with input signals conforming to HDMI rev 1.3a, Section 4.2.4, Figure 4-18.
2. Based on a jitter-free source
3. Differential CML compatible inputs

**DESCRIPTION**

The P1RX6A-SX51x-01 (RX-SX51) is an optical subassembly (OSA) with bi-direction comm and control link capabilities. The RX-SX51 can receive up to four video- or data-lanes (up to 3.5Gbps) and one low-speed lane, while simultaneously transmitting one low-speed signal, all on **a single** multimode fiber. With the TIA and Limiting Amplifier embedded in the OSA and a ZIF-terminated flex circuit, the RX-SX51 is a bi-directional ROSA also capable of transmitter a control signal thereby enabling increased flexibility in system design, extending to applications in DVI and HDMI™ v1.4.



**FEATURES**

- 5 receive lanes and 1 transmit lane
- HDMI™ 1.4-capable
- Integrated TIA and Limiting Amp
- Low-stress, highly flexible ZIF connection
- Low power consumption
- High-speed CML outputs

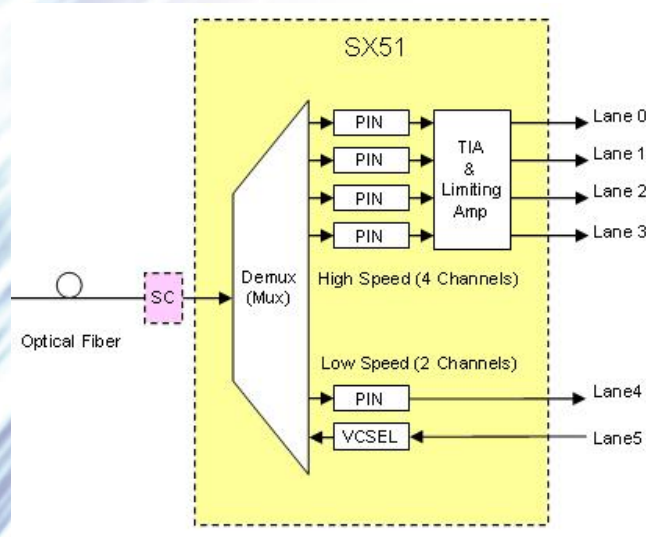
**APPLICATIONS**

- High-speed Optical Links
- DVI Optical Extenders
- DVI Switches
- HDMI™ Matrix Switches
- HDMI™ Optical Extenders

**ORDERING INFORMATION**

PART NUMBER	DESCRIPTION
P1RX6A-SX51D-01	4-ch Receiver Optical Subassembly, 3.5 Gbps per channel plus 5 Mbps Bi-di channel
P1RX6A-SX51D-01C	4-ch Receiver Optical Subassembly, 3.5 Gbps per channel plus 5 Mbps Bi-di channel with Clip
P1RX6A-SX51D-01H	4-ch Receiver Optical Subassembly, 3.5 Gbps per channel plus 5 Mbps Bi-di channel with Heatsink & Clip
P1RX6A-SX51V-01	4-ch Receiver Optical Subassembly, 1.65 Gbps per channel plus 5 Mbps Bi-di channel
P1RX6A-SX51V-01C	4-ch Receiver Optical Subassembly, 1.65 Gbps per channel plus 5 Mbps Bi-di channel with Clip
P1RX6A-SX51V-01H	4-ch Receiver Optical Subassembly, 1.65 Gbps per channel plus 5 Mbps Bi-di channel with Heatsink & Clip

**BLOCK DIAGRAM**



**ABSOLUTE MAXIMUM RATINGS**

PARAMETER	SYMBOL	MIN	MAX	UNITS
Storage Temperature <sup>1</sup>	T <sub>st</sub>	-40	85	°C
Supply Voltage	V <sub>CC</sub>	-0.3	3.6	V
Operating Ceramic (substrate) Temperature <sup>2</sup>	T <sub>a</sub>	0	70	°C
Operating Humidity <sup>3</sup>	RH		80	%

**Notes:**

1. Stresses listed may be applied without causing damage. Functionality at or above the values listed is not implied. Exposure to these values for extended periods may affect reliability.
2. See outline drawing for measurement point. Inneos strongly recommends mounting with a heat sink.
3. Non condensing humidity.

**OPTICAL CHARACTERISTICS – HIGH-SPEED LANES**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Wavelength – Lane 0	λ <sub>0</sub>	760	778	860	nm
Wavelength – Lane 1	λ <sub>1</sub>	760	800	860	nm
Wavelength – Lane 2	λ <sub>2</sub>	760	825	860	nm
Wavelength – Lane 3	λ <sub>3</sub>	760	850	860	nm
Peak Optical Input Power per Lane	P <sub>in</sub>			4.0	dBm
OMA Sensitivity <sup>1</sup>		-14.25	-16.00		dBm

**Notes:**

1. Optical Modulation Amplitude. Based on an unstressed input signal.

**ELECTRICAL SPECIFICATIONS – HIGH-SPEED LANES**

PARAMETER	SYMBOL	MIN	TYP	MAX	UNITS
Data Rate per Lane <sup>1</sup> SX51V-01 SX51D-01	DR			1.65 3.50	Gb/s
Low Frequency Cutoff	F <sub>CUTOFF</sub>		125	300	kHz
Total Jitter (RMS), per lane <sup>2</sup>	T <sub>J1</sub>		10		ps
Differential Output Voltage <sup>3</sup>	V <sub>OUT-DIFF</sub>	400	600	2000	mV <sub>p-p</sub>
Loss of Signal Assert Sensitivity	LOS <sub>SEN-ON</sub>	-20	-17	-13	dBm
Loss of Signal De-Assert Sensitivity	LOS <sub>SEN-OFF</sub>	-19.5	-15.5	-11	dBm
Loss of Signal Output Low <sup>4</sup>	V <sub>LOSL</sub>			0.7	V
Loss of Signal Output High	V <sub>LOSH</sub>	2			V
Operating Supply Voltage	V <sub>CC</sub>	3.15	3.30	3.45	V
Operating Supply Current	I <sub>CC</sub>		91		mA

**Notes:**

1. Requires DC-balanced data pattern. Measured with input signals conforming to HDMI rev 1.3a, Section 4.2.4, Figure 4-18.
2. Based on a jitter-free source.
3. Differential CML compatible inputs.
4. This output is asserted high when a loss of signal is detected on all lanes.