Stratos
SPLC-20-9D-x-B Optical SFP Transceiver

Connectivity for Business Critical Continuity™

SMPTE 292M/297M/259M
Video SFP (V_SFP) with Digital Diagnostics

Product Overview

The **Emerson Network Power Connectivity Solutions** SPLC-20-9D-x-B optical Video Small Form Factor Pluggable (V_SFP) transceivers are high performance integrated duplex data links for bi-directional communication over single mode optical fiber. These transceivers are designed to transmit/receive data rates from 143Mbps to 1.485Gbps and are compatible with the following standards:

- SMPTE 297M/292M (HDTV – 1.485Gbps)
- SMPTE 297M/259M (SDTV – 143/177/270/360Mbps)

The Stratos Lightwave V_SFP transceiver is hot pluggable which allows a suitably designed enclosure to be changed from one type of external interface to another simply by plugging in a V_SFP having the alternative external interface. The SPLC-20-9D-x-B operates using a single 3.3V supply. This optoelectronic transceiver module is a Class 1 Laser product compliant with FDA Radiation Performance Standards, 21 CFR Subchapter J. This component is also Class 1 Laser compliant according to International Safety standard IEC-825-1.

Ordering Information

SPLC - 20 - 9D - **X** - B

Transmitter & Receiver Type
2 = 1310nm FP TX / PIN RX
2M = 1310nm DFB TX / PIN RX
2L = 1310nm DFB TX / APD RX
3 = 1550nm DFB TX / PIN RX
3L = 1550nm DFB TX / APD RX

Key Features & Benefits

- SMPTE 292M/297M/259M Compatible
- Based on industry standard SFP
- Keyed to support dual TX and RX options
- RoHS-6 Compliant
- Handles Pathological Test Pattern
- Internally Calibrated Digital Diagnostic Monitoring Interface
- 100Ω Differential AC Coupled CML Outputs
- Die Cast Metal Housing
- Hot Pluggable

Module Specifications – Electrical: 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Supply Current (SPLC-20-9D-2-B)	Icc		170	210 300	mA	Tc = 25°C, Vcc = +3.3V 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V
Supply Current (SPLC-20-9D-2M-B)	Icc		170	210 300	mA	Tc = 25°C, Vcc = +3.3V 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V
Supply Current (SPLC-20-9D-2L-B)	Icc		195	225 350	mA	Tc = 25°C, Vcc = +3.3V 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V
Supply Current (SPLC-20-9D-3-B)	Icc		170	210 325	mA	Tc = 25°C, Vcc = +3.3V 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V
Supply Current (SPLC-20-9D-3L-B)	Icc		195	225 350	mA	Tc = 25°C, Vcc = +3.3V 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V
Surge Current	Isurge			30	mA	Surge above steady value

Module Specifications – Electrical (Continued)

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Transmitter						
CML/LVPECL Inputs (Differential)		300		1860	mVpp	AC Coupled Inputs
Input Impedance (Differential)	Zin	95	100	105	Ω	Rin > 100K Ω @ DC
TX_DISABLE Input Voltage – High	ViH	2		3.45	V	
TX_DISABLE Input Voltage – Low	ViL	0		0.8	V	
Receiver						
CML Outputs (Differential)		400	800	1200	mVpp	AC Coupled Outputs
Total Jitter [pk-pk]	Tj			135 740	ps	Measured with Color Bar Test Signal @ 1.485Gbps (note 1) Measured with Color Bar Test Signal @ 143/177/270/360Mbps
Return Loss		15			dB	Worst Case @ 10KHz to 3GHz
SCL, SDA	VoH VoL	2.5 0		Vcc+0.3 0.5	V	

Note 1: Maximum jitter is specified for single module point-to-point applications only. In cascaded configurations, where the receiver electrical output is directly interfaced with the transmitter electrical input of a separate module, accumulated jitter may result in CRC errors to occur during pathological pattern transmission. For error-free operation in such a situation, use of re-clocker device is recommended at the output of the receiver before interfacing to the inputs of the optical transmitter. This will ensure that the output jitter will not exceed the input jitter tolerance of the succeeding transmitter input.

SPLC-20-9D-2-B Optical Specifications – 1310nm FP/PIN: 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Link Distance						
9.0μm Core Diameter SMF		10 15			km	1.485Gbps (Note 2) 143/177/270/360Mbps (Note 2)
Transmitter						
Optical Center Wavelength	λ	1290	1310	1330	nm	Tcase = +25°C
Spectral Width	δλ			2.5	nm	RMS
Optical Transmit Power	Popt	-9		-3	dBm	Average @ 1310nm
Extinction Ratio	ER	9			dBm	P1/P0
Relative Intensity Noise	RIN			-117	dB/Hz	
Total Jitter [pk-pk]	Tj		120	135 740	ps	Measured with Color Bar Test Signal @ 1.485Gbps Measured with Color Bar Test Signal @ 143/177/270/360MBaud
Output Rise Time	t_R		80	120	ps	20%-80%; Measured unfiltered @ 143/177/270/360/1485MBaud
Output Fall Time	t_F		240	270	ps	
Receiver						
Optical Input Wavelength	λ	1270		1610	nm	
Optical Input Power	Pr	-20		-1	dBm	Note 3
Optical Return Loss	ORL	29			dB	
RX_LOS – Asserted	Pa	-29			dBm	No Signal Pins Designated for RX_LOS. Assert/Deassert Levels can be Monitored via Digital Diagnostics Interface.
RX_LOS – Deasserted	Pd			-20	dBm	
RX_LOS – Hysteresis	Pa-Pd		1.5	5	dB	

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SPLC-20-9D-2M-B Optical Specifications – 1310nm DFB/PIN: 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Link Distance						
9.0µm Core Diameter SMF		30 35			km	1.485Gbps (Note 2) 143/177/270/360Mbps (Note 2)
Transmitter						
Optical Center Wavelength	λ	1300 1280	1310	1320 1335	nm	Tcase = +25°C Tcase = 0°C<Tc<+70°C
Side Mode Suppression Ratio	SMSR	30	40		dB	
Optical Transmit Power	Popt	0		+3	dBm	Average @ 1310nm
Extinction Ratio	ER	9			dBm	P1/P0
Relative Intensity Noise	RIN			-117	dB/Hz	
Total Jitter [pk-pk]	Tj		120	135 740	ps	Measured with Color Bar Test Signal @ 1.485Gbps Measured with Color Bar Test Signal @ 143/177/270/360MBaud
Output Rise Time	t_R		80	120	ps	20%-80%; Measured unfiltered @ 143/177/270/360/1485MBaud
Output Fall Time	t_F		240	270	ps	
Receiver						
Optical Input Wavelength	λ	1270		1610	nm	
Optical Input Power	Pr	-20		-1	dBm	Note 3
Optical Return Loss	ORL	29			dB	
RX_LOS – Asserted	Pa	-29			dBm	No Signal Pins Designated for RX_LOS. Assert/Deassert Levels can be Monitored via Digital Diagnostics Interface.
RX_LOS – Deasserted	Pd			-20	dBm	
RX_LOS – Hysteresis	Pa-Pd		1.5	5	dB	

SPLC-20-9D-2L-B Optical Specifications – 1310nm DFB/APD: 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Link Distance						
9.0µm Core Diameter SMF		50 55			km	1.485Gbps (Note 2) 143/177/270/360Mbps (Note 2)
Transmitter						
Optical Center Wavelength	λ	1300 1280	1310	1320 1335	nm	Tcase = +25°C Tcase = 0°C<Tc<+70°C
Side Mode Suppression Ratio	SMSR	30	40		dB	
Optical Transmit Power	Popt	0		+3	dBm	Average @ 1310nm
Extinction Ratio	ER	9			dBm	P1/P0
Relative Intensity Noise	RIN			-117	dB/Hz	
Total Jitter [pk-pk]	Tj		120	135 740	ps	Measured with Color Bar Test Signal @ 1.485Gbps Measured with Color Bar Test Signal @ 143/177/270/360MBaud
Output Rise Time	t_R		80	120	ps	20%-80%; Measured unfiltered @ 143/177/270/360/1485MBaud
Output Fall Time	t_F		240	270	ps	
Receiver						
Optical Input Wavelength	I	1270		1620	nm	
Optical Input Power	Pr	-30	-32	-9	dBm	Typical value @ Tc=+25°C; Note 3
Optical Return Loss	ORL	29			dB	
RX_LOS – Asserted	Pa	-36			dBm	No Signal Pins Designated for RX_LOS. Assert/Deassert Levels can be Monitored via Digital Diagnostics Interface.
RX_LOS – Deasserted	Pd			-29	dBm	
RX_LOS – Hysteresis	Pa-Pd		1.5	5	dB	

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SPLC-20-9D-3-B Optical Specifications – 1550nm DFB/PIN: 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Link Distance						
9.0µm Core Diameter SMF		55 65			km	BER<1E-10 @ 360/1485Mbps (Note 2) BER<1E-10 @ 143/177/270Mbps (Note 2)
Transmitter						
Optical Center Wavelength	λ	1540 1480	1550	1565 1580	nm	@ Tc = +25°C @ 0°C<Tc<+70°C
Side Mode Suppression Ratio	SMSR	30	40		dB	
Optical Transmit Power	Popt	0		+3	dBm	Average power coupled into SMF
Extinction Ratio	ER	9			dBm	P1/P0
Relative Intensity Noise	RIN			-117	dB/Hz	
Total Jitter [pk-pk]	Tj			135 740	ps	Measured with Color Bar Test Signal @ 1.485Gbps Measured with Color Bar Test Signal @ 143/177/270/360MBaud
Output Rise Time	t_R		80	120	ps	20%-80%; Measured unfiltered @ 143/177/270/360/1485MBaud
Output Fall Time	t_F		240	270	ps	
Receiver						
Optical Input Wavelength	λ	1270		1620	nm	
Optical Input Power	Pr	-20		-1	dBm	Note 3
Optical Return Loss	ORL	29			dB	
RX_LOS – Asserted	Pa	-29			dBm	No Signal Pins Designated for RX_LOS. Assert/Deassert Levels can be Monitored via Digital Diagnostics Interface.
RX_LOS – Deasserted	Pd			-20	dBm	
RX_LOS – Hysteresis	Pa-Pd		1.5	5	dB	

SPLC-20-9D-3L-B Optical Specifications – 1550nm DFB/APD: 0°C<Tc<+70°C; +3.135V<Vcc<+3.465V

Parameter	Sym	MIN	Typ	MAX	Unit	Notes
Link Distance						
9.0µm Core Diameter SMF		75 100			km	@ 360/1485Mbps (Note 2) @ 143/177/270Mbps (Note 2)
Transmitter						
Optical Center Wavelength	λ	1540 1480	1550	1565 1580	nm	@ Tc = +25°C @ 0°C<Tc<+70°C
Side Mode Suppression Ratio	SMSR	30	40		dB	
Optical Transmit Power	Popt	0		+3	dBm	Average power coupled into SMF
Extinction Ratio	ER	9			dBm	P1/P0
Relative Intensity Noise	RIN			-117	dB/Hz	
Total Jitter [pk-pk]	Tj			135 740	ps	Measured with Color Bar Test Signal @ 1.485Gbps Measured with Color Bar Test Signal @ 143/177/270/360MBaud
Output Rise Time	t_R		80	120	ps	20%-80%; Measured unfiltered @ 143/177/270/360/1485MBaud
Output Fall Time	t_F		240	270	ps	
Receiver						
Optical Input Wavelength	λ	1270		1620	nm	
Optical Input Power	Pr	-30	-32	-9	dBm	Typical value @ Tc=+25°C; Note 3
Optical Return Loss	ORL	29			dB	
RX_LOS – Asserted	Pa	-36			dBm	No Signal Pins Designated for RX_LOS. Assert/Deassert Levels can be Monitored via Digital Diagnostics Interface.
RX_LOS – Deasserted	Pd			-29	dBm	
RX_LOS – Hysteresis	Pa-Pd		1.5	5	dB	

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Note 2: The specified minimum link distances are based on IEEE link budget models. Assumes minimum transmitter output power and extinction ratio and worst case receiver sensitivity with color bar test signal at 140/177/270/360/1485Mbps. The minimum link distances will be reduced with SDI test matrix. Please contact factory to discuss specific applications.

Note 3: Minimum receiver input power is defined for link BER < 1 x 10^{-10} running PRBS 2^{23} – 1 at 140/177/270/360/1485Mbps.

For more information on this product consult the SPLC-20-9D-x-B product data sheet.

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